



United States Department of Agriculture

Lassen National Forest Over-snow Vehicle Use Designation

Final Environmental Impact Statement

Volume I. Chapters 1 through 4, Glossary,
References, and Index



Forest
Service

Lassen
National Forest

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Lassen National Forest Over-snow Vehicle Use Designation

Final Environmental Impact Statement

Lassen National Forest

Lassen, Shasta, Tehama, Butte, Plumas, Siskiyou, and Modoc Counties,
California

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Abstract: The Forest Service proposes to designate snow trails and areas for public over-snow vehicle (OSV) use on the Lassen National Forest. These designations would occur on National Forest System snow trails and areas on National Forest System lands within the Lassen National Forest. The Forest Service would also identify snow trails where grooming for public OSV use would occur within the Lassen National Forest.

Consistent with the Forest Service's Travel Management Regulations at 36 CFR Part 212 Subpart C, trails and areas designated for public over-snow vehicle use would be displayed on a publicly available over-snow vehicle use map (OSVUM). Public OSV use that is inconsistent with the OSVUM would be prohibited under Federal regulations at 36 CFR §261.14.

This environmental impact statement describes the proposed action (as modified since the publication of the Draft Environmental Impact Statement), a no-action alternative, and two additional action alternatives developed in response to issues, and discloses their environmental impacts. Alternative 4 is the preferred alternative.

Summary

Modified Proposed Action

The Forest Service proposes to designate National Forest System snow trails and areas on National Forest System land for public over-snow vehicle (OSV) use. These designations would occur on administrative units, or parts of administrative units or Ranger Districts of the Lassen National Forest where snowfall is adequate for that use to occur. These designations would be consistent with the requirements of Subpart C of the Forest Service's Travel Management Regulation at 36 Code of Federal Regulations (CFR) Part 212. The Forest Service would also identify snow trails to be groomed for public OSV use under the Lassen National Forest OSV trail grooming program.

The Forest Service proposes the following actions on the Lassen National Forest:

1. To designate 323 miles of National Forest System snow trails on National Forest System lands within the Lassen National Forest as trails where public OSV use would be allowed when snow depth is adequate for that use to occur. All existing OSV prohibitions applying to trails where public motorized use is not allowed would continue.
2. To designate 921,130 acres of National Forest System lands within the Lassen National Forest as areas where public, cross-country OSV use would be allowed when snow depth is adequate for that use to occur. All existing OSV prohibitions applying to areas of the forest where public motorized use is not allowed would continue.
3. To not designate (to prohibit public OSV use on) approximately 228,890 acres on the Lassen National Forest for public OSV use. These areas include all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited.
4. To implement Forest-wide snow depth requirements for public OSV use that would provide for public safety and natural and cultural resource protection by:
 - a. Allowing public, cross-country OSV use in designated areas only when there are 12 or more inches of snow or ice covering the landscape based on weather and observations by Forest Service personnel and the public, to prevent impacts to surface and subsurface resources including, but not limited to, archaeological deposits, historic features, and historic properties; and
 - b. Allowing public OSV use on designated snow trails when there are 6 or more inches of snow covering the trail. Except for approximately 0.1 mile of OSV trail (which would require a minimum of 12 or more inches of snow for OSV use), all snow trails to be designated for public OSV use or identified for OSV grooming in all alternatives would overlay an existing paved, gravel, or native surface travel route. These travel routes are trails and roads used by wheeled, motorized vehicles when such use is allowed, and non-motorized recreation.
5. To not designate for public OSV use any existing trail in an area where motorized use is currently prohibited on the Lassen National Forest.
6. To designate 28 public OSV crossing points of the Pacific Crest National Scenic Trail (Pacific Crest Trail) on trails designated for wheeled, motorized vehicle use when such use is allowed. Two of the Pacific Crest Trail crossing points that would be designated are adjacent to private land.

7. To establish a corridor for the Pacific Crest Trail, within which public OSV use would not be designated (public OSV use would be prohibited), except on 26 designated public OSV trails across this corridor. This corridor is included in the areas that would not be designated for public OSV use in item #3, above.
8. Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.
9. To identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service’s Lassen National Forest Grooming Program.
10. To groom OSV snow trails when there are 12 or more inches of snow, and formally adopt California State Parks’ snow grooming standards 12 or more inches of snow depth before grooming can occur.

Significant Issues

Internal and external scoping identified the following significant issues and these issues were used to develop the action alternatives. The significant issues include the following:

Table S-1. List of significant issues

Issue Topic	Cause and Effect
Motorized Recreation Opportunities	<p>The decision has the potential to impact the amount of available opportunities for public access and use of National Forest System (NFS) lands by OSV-equipped winter recreation enthusiasts seeking enjoyable and challenging motorized experiences. The designation of snow trails and areas for public OSV use has the potential to impact the opportunities these enthusiasts seek by:</p> <ol style="list-style-type: none"> a) Changing the location of and/or reducing the amount of high quality and desirable areas designated for public, cross-country OSV use on the forest; b) Designating an insufficient number of opportunities for public OSV use of snow trails on the forest; and c) Providing an insufficient number of opportunities for public OSV use of groomed snow trails on the forest. These opportunities are subject to an external constraint due to limits on the amount of funding from the State for grooming snow trails for public OSV use. Snow trail grooming for OSV use on NFS land is 100 percent State-funded. The State’s financial support of snow trail grooming for OSV use is not expected to increase.
Non-motorized Recreation Opportunities	<p>The decision has the potential to impact the amount of available opportunities for public access and use of NFS lands by non-motorized winter recreation enthusiasts seeking solitude and challenging physical experiences. The designation of snow trails and areas for public OSV use and grooming of snow trails for OSV use has the potential to impact the opportunities these enthusiasts seek by:</p> <ol style="list-style-type: none"> a) Displacing non-motorized winter recreation enthusiasts, or requiring them to travel longer distances through motorized snow trails and areas than they are physically able to traverse to access their desired quiet, non-motorized experiences; b) Consuming untracked powder desired by backcountry skiers; c) Making the snow surface difficult to ski on; d) Tripling the amount of OSV use on snow trails that are groomed for OSV use, increasing the potential for all other impacts to opportunities these enthusiasts seek; e) Creating concerns for their safety when non-motorized winter recreationists share winter recreation routes and areas with OSVs; f) Creating noise impacts that intrude on the solitude these enthusiasts seek; g) Creating local air quality impacts that intrude on the unpolluted air and solitude these enthusiasts seek; and h) Creating visual impacts that intrude on the unaltered scenery these enthusiasts seek.

Alternatives Considered in Detail

The Forest Service developed four alternatives: No Action, the Modified Proposed Action, and two additional action alternatives generated in response to the significant issues listed above. The four alternatives considered in detail for this analysis are listed in table S-2. Complete details of the alternatives, including project design criteria, are found in chapter 2 of this document.

Table S-2. Alternatives considered in detail

Alternative	Description of Alternative
1	<p>No-action alternative. There would be no change to the way the Forest Service currently manages public OSV use on the Lassen National Forest.</p> <ul style="list-style-type: none"> • 964,020 acres would be open to public OSV use. This land area would represent approximately 83.8 percent of the NFS land within the Lassen National Forest. • 2,760 miles of currently groomed, ungroomed, marked, and unmarked snow trail would be open to public OSV use as shown on the 2005 Lassen National Forest Winter Recreation Guide (project record). • 12 inches would be the minimum snow depth for public OSV use on snow trails. • 12 inches would be the minimum snow depth for public, cross-country OSV use. • 349 miles of snow trails would be groomed for public OSV use. • 18 inches would be the minimum snow depth for snow trail grooming to occur.
2	<p>Proposed action as scoped, with modifications based on public concerns expressed in the scoping process.</p> <ul style="list-style-type: none"> • 921,130 acres would be designated as areas for public, cross-country OSV use. This land area would represent approximately 80.1 percent of the NFS land within the Lassen National Forest. • 323 miles of snow trails would be designated for public OSV use. • Approximately 97 percent of the OSV trails in the current trail system would be either designated for public OSV use or located in areas designated for public, cross-country OSV use. • 6 inches would be the minimum snow depth for public OSV use on designated snow trails overlaying roads and trails. • 12 inches would be the minimum snow depth for public OSV use on designated snow trails not overlaying roads and trails. • 12 inches would be the minimum snow depth for OSV use in areas designated for public, cross-country OSV use. • 349 miles of snow trails would be groomed for public OSV use. • 12 inches would be the minimum snow depth for snow trail grooming for OSV use to occur.

Alternative	Description of Alternative
3	<ul style="list-style-type: none"> • 834,660 acres would be designated as areas for public, cross-country OSV use. This land area would represent approximately 72.6 percent of the NFS land within the Lassen National Forest. • 316 miles of snow trails would be designated for public OSV use. • Approximately 88 percent of the OSV trails in the current trail system would be either designated for public OSV use or located in areas designated for public, cross-country OSV use. • 12 inches would generally be the minimum snow depth for public OSV use on designated snow trails. This minimum depth could be reduced to 6 inches on specific trails as long as site reviews determine no potential damage to underlying surface resources. • 12 inches would be the minimum snow depth for OSV use in areas designated for public, cross-country OSV use. • 349 miles of snow trails would be groomed for public OSV use. • 18 inches would be the minimum snow depth for snow trail grooming for OSV use to occur.
4	<ul style="list-style-type: none"> • 958,930 acres would be designated as areas for public, cross-country OSV use. This land area would represent approximately 83.4 percent of the NFS land within the Lassen National Forest. • 398 miles of snow trails would be designated for public OSV use. • Approximately 99 percent of the OSV trails in the current trail system would be either designated for public OSV use or located in areas designated for public, cross-country OSV use. • 6 inches would be the minimum snow depth for public OSV use on designated snow trails. • 12 inches would be the minimum snow depth for OSV use in areas designated for public, cross-country OSV use. • 349 miles of snow trails would be groomed for public OSV use. • 12 inches would be the minimum snow depth for snow trail grooming for OSV use to occur. • Alternative 4 is the preferred alternative.

Summary of Environmental Impacts

The Forest Service analyzed the impacts of the alternatives on the following resource conditions:

- Motorized and Non-motorized Recreation Opportunities (Significant Issues)
- Transportation and Engineering
- Impacts on Soil Resources
- Impacts on Water Resources
- Impacts on Heritage Resources
- Impacts on Botanical Resources
- Impacts on Terrestrial Wildlife
- Impacts on Fisheries and Aquatic Resources
- Impacts on Socioeconomic Conditions
- Noise Impacts
- Impacts on Air Quality

The analyses of those impacts are summarized in table S-3 and detailed in chapter 3 of this document.

Table S-3 Summary of environmental impacts

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Recreation					
<i>Motorized Recreation Opportunities – cross-country</i>	Opportunities for motorized winter uses/size of area (acres) and percent change	964,020 acres open to OSV use 12-inch snow depth requirement	921,130 acres open to OSV use, 4.5% decrease from existing conditions 12-inch snow depth requirement	834,660 acres open to OSV use, 13.4% decrease from existing conditions 12-inch snow depth requirement	958,930 acres open to OSV use, 0.5% decrease from existing conditions 12-inch snow depth requirement
<i>Motorized Recreation Opportunities – designated snow trails</i>	OSV trail designations, length of trails (miles) and percent change	2,760 miles 12-inch snow depth requirement	323 miles, 88.2 percent decrease from existing conditions (however 97 percent of current trail system is designated or in OSV open areas). 6 inch snow depth requirement on trail (12 inches where trails do not overlay existing roads or trails)	316 miles, 88.5 percent decrease from existing conditions (however 88 percent of the current trail system is designated or in OSV open areas) 12-inch snow depth requirement (could be reduced to 6 inches on specific trails where site reviews determine no potential damage to underlying surface resources).	398 miles, 85.5 percent decrease from existing conditions (however 99 percent of the current trail system is designated or in OSV open areas) 6-inch snow depth requirement
<i>Motorized Recreation Opportunities – groomed snow trails</i>	OSV trail grooming, length of trails (miles), percent change	349 miles 18-inch snow depth requirement for grooming	349 miles, no change 12-inch snow depth requirement for grooming	349 miles, no change 18- inch snow depth requirement for grooming	349 miles, no change 12-inch snow depth requirement for grooming
<i>Non-motorized Recreation Opportunities - displacement</i>	Access to desired non-motorized recreation settings and opportunities Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts	Six plowed trailheads provide access for motorized and non-motorized winter use, 75,169 acres available for non-motorized recreation within 10 miles of plowed trailheads	Six plowed trailheads provide access for motorized and non-motorized winter use, 85,706 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-	Six plowed trailheads provide access for motorized and non-motorized winter use, 121,899 acres available for non-motorized recreation within 10 miles of plowed trailheads 72 miles of cross-country ski trails and other non-	Six plowed trailheads provide access for motorized and non-motorized winter use, 79,740 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	within 10 miles of plowed trailheads	44 miles of cross-country ski trails and other non-motorized routes available for non-motorized recreation within 10 miles of plowed trailheads	motorized trails available within 10 miles of plowed trailheads	motorized trails available within 10 miles of plowed trailheads	motorized trails available within 10 miles of plowed trailheads
	Recreation Opportunity Spectrum/Consistency with ROS class	Consistent	Consistent	Consistent – with enhanced opportunities for non-motorized recreation experiences	Consistent – with enhanced opportunities for motorized recreation experiences
<i>Non-motorized Recreation Conflicts - Public Safety</i>	Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	186,000 acres closed to OSV use, a total of 148 miles for non-motorized use.	228,890 acres closed to OSV use, 23% increase from existing conditions, a total of 148 miles for non-motorized use.	315,360 acres closed to OSV use, 69.5% increase from existing conditions, a total of 148 miles for non-motorized use.	191,090 acres closed to OSV use, 2.7% increase from existing conditions, a total of 148 miles for non-motorized use.
<i>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas</i>	Proximity and frequency of OSV designations in relation to designated non-motorized areas Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries. Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries. Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner. PCT non-motorized corridor and 28	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner. No designated PCT crossing points or	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner. No designated PCT crossing points or corridors, Groomed OSV

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		the park's northwest corner. No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	designated PCT crossing points. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	corridors, Groomed OSV trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.
<i>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)</i>	Noise Size of areas (acres) potentially affected by noise/size of area (acres) closed to winter motorized use	964,020 acres open to OSV use, potentially affected by noise; 186,000 closed to OSV use, available for quiet recreation.	921,130 acres open to OSV use, potentially affected by noise; 228,890 closed to OSV use, available for quiet recreation.	834,660 acres open to OSV use, potentially affected by noise; 315,360 closed to OSV use, available for quiet recreation.	958,930 acres open to OSV use, potentially affected by noise; 191,090 closed to OSV use, available for quiet recreation.
	Air Quality Qualitative/narrative description of potential impacts (with reference to air quality analysis)	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions (see air quality report).	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Fewer acres open to OSV use than in existing conditions and alternative 2 (see air quality report).	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).
	Scenery Qualitative/narrative description of potential visual impacts	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. The visual evidence of OSV use decreases as fresh snow covers the tracks and/or when	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of OSV use	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions or alternative 2. The visual evidence of	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Slightly fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of OSV

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		the snow melts at the end of the season.	decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season	OSV use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season	use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season
<i>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)</i>	Wilderness Attributes Size of area (acres) affected and duration of impact. Qualitative description for wilderness attributes	Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. There are approximately 27,088 acres open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.	Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. Approximately 21,248 acres would be open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.	Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. Approximately 19,154 acres would be open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.	Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. Approximately 25,556 acres would be open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.
	Roadless Characteristics Size of area (acres) affected and duration of impact. Qualitative description for roadless characteristics	Approximately 72,972 IRA acres open to OSV use. Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.	Approximately 59,750 IRA acres would be open to OSV use. Opportunities for solitude would be temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.	Approximately 58,487 IRA acres would be open to OSV use. Opportunities for solitude would be temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.	Approximately 72,884 IRA acres would be open to OSV use. Opportunities for solitude would be temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Transportation and Engineering					
<i>Safety</i>	Public Safety and Traffic	The current Lassen National Forest Winter Recreation Guide map provides adequate information to maintain a reasonable level of public safety and avoid traffic conflicts	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.
<i>Cost</i>	Affordability	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
<i>Transportation Property</i>	Effects to underlying NFS roads and trails	18 inches (grooming) and 12 inches (OSV use) snow depth requirement provides more than adequate protection of underlying roads.	12 inches (grooming and general OSV use), and 6 inches (OSV use on underlying routes) snow depth requirement provides adequate protection of underlying roads.	18 inches (grooming), 12 inches (general OSV use) and 6 to 12 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.	12 inches (grooming, general OSV use) and 6 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.
Soil Resources					
<i>Soil Productivity and Soil Stability</i>	OSV acres open to cross-country travel on sensitive soils (including wet meadows, areas with potential low stability, and areas with potential erosion hazards).	There would be no change in acreage of area currently open to cross-country OSV travel on sensitive soils. Approximately 53,902 acres with mapped sensitive soil types are open to cross-country OSV travel.	Approximately 52,964 acres of sensitive soils would be open to cross-country OSV travel within the forest. This is slightly less acres than the no-action alternative and alternative 4, but more acres than alternative 3.	Approximately 40,590 acres of sensitive soils would be open to cross-country OSV travel. Under this alternative, the least amount of sensitive soils would be open to OSV cross-country travel.	Approximately 53,507 acres of sensitive soils would be open to cross-country OSV travel. Under this alternative, there would be more acres of sensitive soils open to cross-country OSV travel than the proposed action, no action, and under alternative 3. This

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
					alternative has the greatest acreage of sensitive soils open to cross-country OSV travel.
<i>Soil Stability</i>	Minimum snow depths on trails (inches)	Minimum snow depth is 12 inches of unpacked snow prior to any OSV travel over existing roads and trails. This minimum snow depth has been observed to be sufficient to prevent contact of OSVs with the bare soil surface.	Minimum snow depth is 6 inches of snow prior to any OSV travel over existing roads and trails. This minimum snow depth may potentially create conditions in which the road surface is exposed to OSVs and there is potential for some soil erosion or rutting of the road surface. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.	Minimum snow depth is 12 inches of snow prior to any OSV travel over existing roads and trails. OSV use on trails with 6 inches would be allowed if site review determines there would be no damage to the underlying resources. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.	Minimum snow depth is 6 inches of snow prior to any OSV travel over existing roads and trails. This minimum snow depth may potentially create conditions in which the road surface is exposed to OSVs and there is potential for some soil erosion or rutting of the road surface. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.
<i>Soil Productivity</i>	Minimum snow depths for cross-country travel (inches)	Minimum snow depth for cross-country OSV travel is currently 12 inches of unpacked snow. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.
<i>Soil Productivity</i>	Total acres open to OSV use	Approximately 964,020 acres of the forest are open to OSV use. Under the no-action alternative, the most acreage is open to OSV use; therefore, the most	Approximately 921,130 acres of the forest would be open to OSV use. This is less area open to OSV use compared to the no-action alternative and alternative 4, but it is	Approximately 834,660 acres of the forest would be open to OSV use, which is the least amount of land open to OSV use out of all four alternatives.	Approximately 958,930 acres of the forest would be open to OSV use, which is a greater area than under the proposed action and alternative 3, but less area than the no-action

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		potential for soil damage exists under this alternative.	greater than alternative 3. The proposed action has the potential for more impacts than alternative 3, but less than the proposed action and alternative 4.		alternative. Alternative 4 has the potential to have the greatest soil impacts out of the 3 action alternatives.
Water Resources					
	Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Complies with RCOs 1,2,4,5,6	Complies with RCOs 1,2,4,5,6	Complies with RCOs 1,2,4,5,6	Complies with RCOs 1,2,4,5,6
Heritage Resources					
		No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect
Botanical Resources					
	Threatened and Endangered plants	All alternatives equal (issue sufficiently addressed – no effects)	All alternatives equal	All alternatives equal	All alternatives equal
	Threatened and Endangered plant Critical Habitats	All alternatives equal (issue sufficiently addressed – no effects)	All alternatives equal	All alternatives equal	All alternatives equal
	Sensitive plants	All alternatives equal (issue sufficiently addressed – minor potential effects)	All alternatives equal	All alternatives equal	All alternatives equal
	Survey and Manage plants	All alternatives equal (issue sufficiently addressed)	All alternatives equal	All alternatives equal	All alternatives equal
	Special Interest plants	Alternative 1 holds the greatest potential for effects (issue sufficiently addressed)	Alternative 2 has the second to least potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 3 holds the least potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 4 has the second greatest potential for effects (issue sufficiently addressed – minor potential effects)

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		– minor potential effects)			
	Invasive plants	All alternatives equal (issue sufficiently addressed – very low risk)	All alternatives equal (very low risk)	All alternatives equal (very low risk)	All alternatives equal (very low risk)
	Special Interest Areas	All alternatives equal (issue sufficiently addressed)	All alternatives equal	All alternatives equal	All alternatives equal
Terrestrial Wildlife					
<i>Giant garter snake</i>	Threatened	No Effect	No Effect	No Effect	No Effect
<i>Sierra Nevada red fox, Southern Cascades Distinct Population Segment</i>	Federal candidate for listing; Forest Service Sensitive	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
<i>Gray wolf</i>	Endangered	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
<i>California wolverine</i>	Federal Proposed; Forest Service Sensitive	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
<i>Northern spotted owl</i>	Threatened	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
	Designated Critical Habitat	No Effect	No Effect	No Effect	No Effect
<i>Valley elderberry long-horned beetle</i>	Threatened	No Effect	No Effect	No Effect	No Effect
	Designated Critical Habitat	No Effect	No Effect	No Effect	No Effect
<i>Yellow-billed cuckoo</i>	Threatened	No Effect	No Effect	No Effect	No Effect
	Designated Critical Habitat	No Effect	No Effect	No Effect	No Effect

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<i>Fisher</i>	Forest Service ¹ Sensitive	MINL	MINL	MINL	MINL
<i>Pacific marten</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Fringed myotis</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Pallid bat</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Townsend's big-eared bat</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Bald eagle</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>California spotted owl</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Great gray owl</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Greater Sandhill crane</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Northern goshawk</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Willow flycatcher</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Yellow rail</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Western pond turtle</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Shasta Hesperian snail</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Western bumble bee</i>	Forest Service Sensitive	NI	NI	NI	NI

¹ NI = Will not impact; MINL = may impact individuals, but is not likely to lead to a trend toward Federal listing or loss of viability for the species; MIL = may impact individuals and is likely to lead to a trend toward Federal listing or loss of viability for the species.

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fisheries and Aquatic Resources					
<i>Chinook salmon, Central Valley Spring Run ESU</i>	Threatened	May Affect, Not Likely to Adversely Affect			
	Critical Habitat	May Affect, Not Likely to Adversely Affect			
<i>Central Valley Steelhead</i>	Threatened	May Affect, Not Likely to Adversely Affect			
	Critical Habitat	May Affect, Not Likely to Adversely Affect			
<i>Sierra Nevada Yellow-legged Frog</i>	Endangered	May Affect, Not Likely to Adversely Affect			
<i>Cascades frog</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Black juga</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
Socioeconomic Conditions					
	Economic activity	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
	Quality of life - Recreation visitation	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time
	Quality of life - Values, beliefs, and attitudes	No net change in quality of life relative to current conditions; user conflict may increase due to	23% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users; potential	70% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users; potential	No net change in quality of life relative to current conditions; user conflict may increase due to

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		population growth and increased visitor use	for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads	for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads	population growth and increased visitor use
	Environmental Justice	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth	Minor change in travel costs due to reduction in acres open to public OSV use; climate change may increase distances winter recreation users must travel for adequate snow depth	Minor change in travel costs due to prohibition on OSV use below 3,500 feet in elevation and reduction in acres open to public OSV use; climate change may increase distances winter recreation users must travel for adequate snow depth	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth
Noise					
	Opportunities for motorized winter uses	964,020 acres open to OSV use and potentially affected by noise	921,130 acres open to OSV use and potentially affected by noise, a 4.5% decrease from existing conditions	834,660 acres open to OSV use and potentially affected by noise, a 13.4% decrease from existing conditions	958,930 acres open to OSV use and potentially affected by noise, a 0.5% decrease from existing conditions
	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management	186,000 acres closed to OSV use and available for quiet recreation	228,890 acres closed to OSV use and available for quiet recreation, a 23% increase from existing conditions	315,360 acres closed to OSV use and available for quiet recreation, a 69.5% increase from existing conditions	191,090 acres closed to OSV use and available for quiet recreation, a 2.7% increase from existing conditions
	OSV designations Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use	2,760 miles designated /349 miles groomed	323 miles designated /349 miles groomed	316 miles designated /349 miles groomed	398 miles designated /349 miles groomed

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Air Quality					
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality/ Miles of trail open to OSV visitor use	964,020 acres open to OSV use. No known violations of the Clean Air Act (CAA) as a result of OSV use under the existing condition	921,130 acres open to OSV use, a 4% reduction from existing conditions. No violations of the CAA are anticipated.	834,660 acres open to OSV use, a 13% reduction from existing conditions. No violations of the CAA are anticipated.	958,930 acres open to OSV use, a <1% reduction from existing conditions. No violations of the CAA are anticipated.
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality. Acres open to OSV visitor use	349 miles designated for OSV use. No known violations of the CAA as a result of OSV use under the existing condition.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.
	Potential effects of OSV emissions to create adverse impacts to air quality/ Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. No known violations of the CAA or impact to Class 1 areas as a result of OSV use under the existing condition.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. No violations of the CAA or impact to Class 1 areas are anticipated under this alternative.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. Designation of Butte Lake Backcountry Solitude area minimizes OSV impacts and reduces emissions near Caribou wilderness and Lassen NP No violations of the CAA or impact to Class 1 areas are anticipated under this alternative.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness and the boundary of Lassen Volcanic National Park. No violations of the CAA are anticipated or impacts to Class 1 areas.

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Chapter 1. Purpose of and Need for Action

Document Structure

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

- **Chapter 1. Purpose and Need for Action:** This chapter briefly describes the modified 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 modified proposed action and how the public responded.
- **Chapter 2. Alternatives, including the Modified Proposed Action:** This chapter provides a detailed description of the agency's modified proposed action as well as alternative actions that were developed in response to comments raised by the public during scoping. The end of the chapter includes a summary table comparing the modified proposed action and alternatives with respect to their environmental impacts.
- **Chapter 3. Affected Environment and Environmental Consequences:** This chapter describes the environmental impacts of the modified proposed action and alternatives.
- **Chapter 4. Consultation and Coordination:** This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental impact statement.
- **Index:** The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Lassen National Forest Supervisor's Office in Susanville, California.

This document is tiered to the 2010 Over Snow Vehicle Program Final Environmental Impact Report, Program Years 2010 – 2020, by the State of California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation (OHMVR) Division (California Department of Parks and Recreation, Off Highway Motor Vehicle Recreation Division 2010).

Types of Routes and Other Definitions

Route categories and travel planning definitions applicable to this project (table 1) are based on the definitions in 36 Code of Federal Regulations (CFR) Part 212 – Travel Management. For a complete list of terms, please refer to the glossary found at the end of this document.

Table 1. Road and trail terminology - definitions

Term	Definition
Administrative Use	Motorized vehicle use associated with management activities or projects on National Forest System land administered by the Forest Service or under authorization of the Forest Service. Management activities include but are not limited to: law enforcement, timber harvest, reforestation, cultural treatments, prescribed fire, watershed restoration, wildlife and fish habitat improvement, private land access, allotment management activities, and mineral exploration and development that occur on National Forest land administered by the Forest Service or under authorization of the Forest Service.
Area	A discrete, specifically delineated space that is smaller, and, except for over-snow vehicle use, in most cases much smaller, than a Ranger District (36 CFR §212.1).
Cross-country Over-snow Vehicle Use	Public over-snow vehicle use that occurs off of snow trails designated for over-snow vehicle use, but within areas designated for public over-snow vehicle use.
Designated Road or Trail or Area	A National Forest System road, National Forest System trail, or an area on National Forest System lands that is designated for over-snow vehicle use pursuant to 36 CFR §212.51 on an over-snow vehicle use map (36 CFR §212.1).*
Designation of over-snow vehicle use	Designation of a National Forest System road, a National Forest System trail, or an area on National Forest System lands where over-snow vehicle use is allowed pursuant to 36 CFR §212.81.
Forest road or trail	A road or trail wholly or partially within or adjacent to and serving the [National Forest System (NFS)] that is determined to be necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 CFR §212.1).
Non-motorized use	A term used in this document to refer to travel other than that defined as motorized. For example, hiking, skiing, riding horses, or mountain biking.
Over-snow vehicle (OSV)	A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow (36 CFR §212.1).
Over-snow vehicle use map (OSVUM)	A map reflecting roads, trails, and areas designated for over-snow vehicle use on an administrative unit or a Ranger District of the National Forest System.
Trail	A route 50 inches wide or less or a route over 50 inches wide that is identified and managed as a trail (36 CFR §212.1).

*The decision resulting from this analysis would not designate National Forest System roads for public OSV use. Public OSV trails that would overlay existing National Forest System roads would be designated as National Forest System trails where public OSV use is allowed.

Background

This analysis responds to recently finalized regulations for the management of OSV use on national forests (36 CFR Part 212, Subpart C), as well as a settlement agreement in the case of *Snowlands Network et al. v. U.S. Forest Service* (Case No. 2:11-cv-02921-MCE-DAD, E.D. Cal.) regarding the environmental impacts of the grooming of snow trails for OSV use on five national forests, including the Lassen National Forest.

The following summarizes how the Forest Service currently manages public OSV use on the approximately 1,050,020-acre Lassen National Forest:

- The Lassen National Forest includes approximately 1,050,020 acres of National Forest System (NFS) lands;
- Approximately 964,020 acres of NFS lands are open to public, cross-country OSV use;
- Approximately 186,000 acres of NFS lands are closed to public OSV use;
- Approximately 2,760 miles of groomed, ungroomed, marked, and unmarked snow trails are open to public OSV use. Most of this management is shown on the 2005 Lassen National Forest Winter Recreation Guide (project record);
- Approximately 349 miles of snow trails are groomed for public OSV use;
- Public OSV use is allowed when there are 12 or more inches of snow; and
- Snow trail grooming is allowed when there are 18 or more inches of snow.

Travel Management Regulations – Subpart C: “Use by Over-snow Vehicles”

The Forest Service published its final rule for Subpart C of the Forest Service’s Travel Management Regulations (36 CFR Part 212) in the Federal Register on January 27, 2015 (80 FR 4500). The rule became effective on February 27, 2015. The regulations state, in part: “Over-snow vehicle use on National Forest System roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by the Responsible Official on administrative units or Ranger Districts, or parts of administrative units or Ranger Districts, of the National Forest System where snowfall is adequate for that use to occur, and, if appropriate, shall be designated by class of vehicle and time of year...” (36 CFR §212.81(a)). Designations of routes and areas for over-snow vehicle use made as a result of the analysis in this EIS would conform to Subpart C of the Travel Management Regulations.

Consistent with the Travel Management Regulations at 36 CFR Part 212 Subpart C, designated public over-snow vehicle snow trails and areas would be displayed on a publicly available over-snow vehicle use map (OSVUM). Once issued, these designations would be made enforceable with the provisions of 36 CFR §261.14, which prohibits the possession or operation of an OSV on National Forest System lands other than in accordance with the Subpart C designations.

Snow Trail Grooming Program

In 2013, the Forest Service entered into a settlement agreement with Snowlands Network et al., to “complete appropriate NEPA analysis(es) to identify snow trails for grooming” on the Lassen National Forest and four other national forests in California. The Forest Service will comply with the terms of the settlement agreement for the Lassen National Forest by completing this analysis.

Furthermore, additional terms of the settlement agreement require the Forest Service to:

1. Analyze ancillary activities such as the plowing of related parking lots and trailheads as part of the effects analysis;
2. Consider a range of alternative actions that would result in varying levels of snowmobile use; and

3. Consider an alternative submitted by Plaintiffs and/or Intervenors in the NEPA analysis so long as the alternative meets the purpose and need, and is feasible and within the scope of the NEPA analysis, and Plaintiffs and/or Intervenors provide the Forest Service with a detailed description of that alternative during the scoping period for the NEPA analysis.

Scope of this Action

The Lassen National Forest Over-snow Vehicle Use Designation is not intended to be a comprehensive, holistic winter recreation planning effort. The designations resulting from this analysis would only apply to trails and areas for the public use of OSVs on National Forest System lands within the Lassen National Forest. An OSV is defined in the Forest Service's Travel Management Regulations as "a motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow" (36 CFR §212.1).

Regulating the use of wheeled, motorized vehicles or bicycles is not within the scope of this action. Other types of motor vehicles that may operate over snow, but do not meet the definition of an OSV, are regulated under Subpart B of the Travel Management Regulations. Routes and areas for these types of vehicles were previously designated and published on a motor vehicle use map as the result of a separate environmental analysis and decision.

These designations would only apply to public OSV use. Limited administrative use by the Forest Service; use of any fire, military, emergency, or law enforcement vehicle for emergency purposes; authorized use of any combat or combat support vehicle for national defense purposes; law enforcement response to violations of law, including pursuit; and OSV use that is specifically authorized under a written authorization issued under Federal law or regulations, such as for managing permitted livestock or for access under a special use permit, would be exempt from these designations (36 CFR §212.81(a)).

The decision resulting from this analysis would not designate National Forest System roads for public OSV use. Public OSV trails that would exist on snow overlaying existing National Forest System roads would be designated as National Forest System trails where public OSV use is allowed.

All existing trails and areas on the Lassen National Forest where OSV use is currently prohibited would remain non-motorized in all alternatives analyzed in detail. Some relevant existing non-motorized trails will be identified in this analysis to provide context. Non-motorized winter recreational opportunities and uses will be considered in the analysis in terms of the effects that designating snow trails and areas for public OSV use may have on non-motorized recreational opportunities.

Further, with respect to the grooming action, there are financial limitations on the miles and frequency of snow trail grooming within the forest's snow trail grooming program. This is because the forest's current snow trail grooming program is funded by the State of California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation (OHMVR) Division. These funds are not likely to substantially increase in future years.

Additionally, the Forest Service does not have legal jurisdiction over some of the trails that are groomed by the Forest Service. Although the agency does not have jurisdiction over such trails, we groom these trails under authorizations from non-Federal landowners. In these cases, OSV trails where we have authorization to groom still cannot be designated for public OSV use under Subpart C of the Forest Service's Travel Regulations because these designations cannot be enforced. Therefore, these non-jurisdictional trails within the administrative boundaries of the Lassen National Forest will

be shown on the OSVUM for public convenience and the grooming of these trails will be analyzed to satisfy the settlement agreement with Snowlands Network et al.

Subpart C of the Travel Management Regulations also specifies that certain requirements of Subpart B of the Travel Management Regulations will continue to apply to the decision designating National Forest System snow trails and areas for public OSV use (36 CFR §212.81(d)), including:

1. Public involvement as required by the National Environmental Policy Act (36 CFR §212.52);
2. Coordination with Federal, State, county, and other local governmental entities and tribal governments (36 CFR §212.53);
3. Consideration of the criteria for designation of roads, trails, and areas (36 CFR §212.55);
4. Identification of designated uses on a publicly available use map of roads, trails, and areas (36 CFR §212.56); and
5. Monitoring of effects (36 CFR §212.57).

The trail and area designations made as a result of this analysis would be effective immediately upon the issuance of the record of decision, which is expected in October 2016. The Forest Service would produce an OSV use map (OSVUM) that would look like the existing motor vehicle use map (MVUM) for the Lassen National Forest. Such a map would allow OSV enthusiasts to identify the routes and areas where public OSV use would be allowed on the Lassen National Forest.

Project Location

This proposal would be implemented on all of the National Forest System lands within the Lassen National Forest in northeastern California (figure 1). However, not all National Forest System trails and areas on these National Forest System lands would be designated for public OSV use.

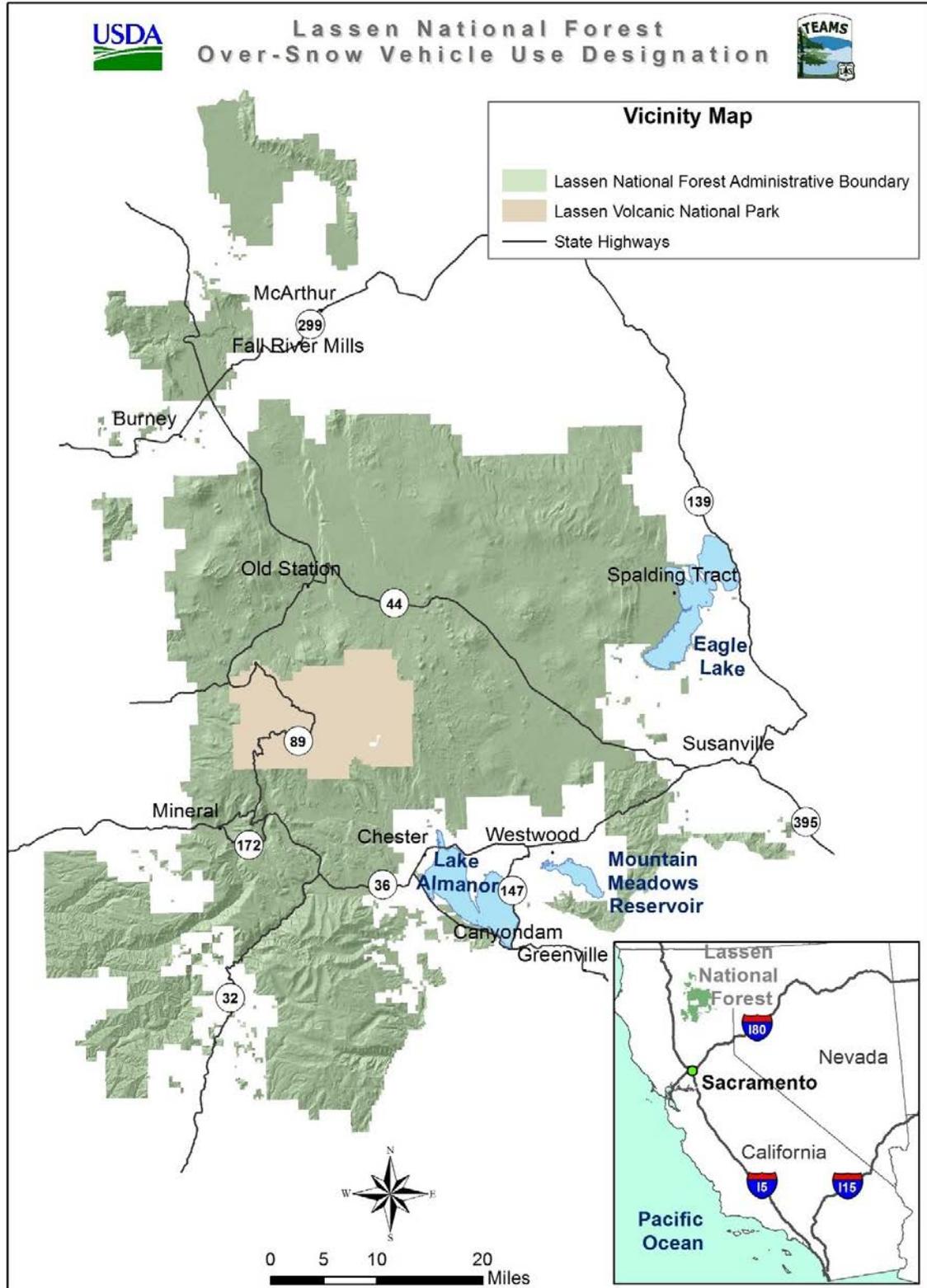


Figure 1. Vicinity map

Purpose and Need for Action

The purpose of this project is to effectively manage public OSV use on the Lassen National Forest and to comply with the settlement agreement with Snowlands Network et al. Effective management would provide public OSV access, ensure that OSV use occurs when there is adequate snow, promote the safety of all users, enhance public enjoyment, minimize impacts to natural and cultural resources, and minimize conflicts among the various uses.

We would address this purpose by designating a manageable system of snow trails and areas for public OSV use within the Lassen National Forest that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212. To comply with the settlement agreement, this analysis also identifies those designated NFS and non-designated snow trails that will be groomed by the Forest Service's state-funded snow trail grooming program for public OSV use on the Lassen National Forest.

OSV Designations

The existing system of public OSV snow trails and areas on the Lassen National Forest is the culmination of multiple agency decisions over recent decades. Public OSV use of the majority of this available system continues to be manageable and consistent with the Travel Management Regulations.

Exceptions have been identified, based on internal and public input and the criteria listed at 36 CFR §212.55. These include needs to provide improved access for public OSV users and to formalize prohibitions required by Forest Plan and other existing management direction. These exceptions represent additional needs for changes in how public OSV use is managed on the Lassen National Forest, and in these cases, changes are proposed to meet the overall objectives.

Improve Public OSV Access

Currently, the Forest Service requires 12 or more inches of snow on the ground for the public to operate an OSV on the Lassen National Forest. Although 12 inches of snow may exist at a given time in many higher elevation areas, there may be less than 12 inches of snow at trailheads, which under current regulations, would leave areas with 12 or more inches of snow inaccessible to public OSV use. To improve public OSV access to designated areas open to OSV use, the modified proposed action would allow public OSV use on snow trails designated for OSV use that are located over existing roads, as long as there are at least 6 inches of snow on the ground.

Ensure OSVs are Operated on Adequate Snow to Minimize Impacts to Natural and Cultural Resources

The Forest Service has also identified areas in which public OSV use should not be designated (i.e., not be allowed), but there are no existing orders or directives that have formally prohibited public OSV use within them. These areas total 42,890 acres in addition to the 186,000 acres of National Forest System land where OSV use is currently prohibited.

These areas are either in lower elevations that do not typically receive sufficient snow for OSV use; are interspersed among areas where OSV use is currently prohibited, such as wilderness, proposed wilderness, and areas classified as semi-primitive non-motorized in the recreation opportunity spectrum; have limited access, except from adjacent private land; are not managed consistent with the Forest Plan, which would prohibit motorized use in the area; or are small areas adjacent to pedestrian trails upon which motorized use is currently prohibited. The modified proposed action would not designate these types of areas for public OSV use.

There are also approximately 12 miles of ungroomed OSV trails located within areas where OSV use is currently prohibited. These trails typically extend a short distance into non-motorized areas and reach a dead end. The non-motorized areas where these motorized trails are located are designated as semi-primitive non-motorized in the Forest Plan. The Forest Plan prohibits motorized recreation, including four-wheel driving, motorcycling, and snowmobiling in semi-primitive non-motorized areas. These semi-primitive non-motorized areas are designated in the Forest Plan as Management Prescription “N” (Forest Plan, page 4-63). The proposed action would not designate these 12 miles of ungroomed trail for OSV use.

Identification of Snow Trails for Grooming

For more than 30 years, the Forest Service, Pacific Southwest Region, in cooperation with the California Department of Parks and Recreation (California State Parks) Off-highway Motor Vehicle Division has enhanced winter recreation, and more specifically, snowmobiling recreation by grooming snow trails for snowmobile use. On the Lassen National Forest, all groomed trails are co-located on underlying roads. Some of the Forest Service’s grooming occurs on county roads and closed snow-covered highways not under Forest Service jurisdiction. Grooming activities are funded by the State off-highway vehicle trust fund.

In addition to complying with the settlement agreement with Snowlands Network et al., the snow trail grooming analysis would also address the need to provide a high quality OSV trail system on the Lassen National Forest that is smooth and stable for the rider. Groomed snow trails are designed so that the novice OSV rider can use them without difficulty.

Modified Proposed Action

The Forest Service proposes several actions on the Lassen National Forest to be analyzed as required by the National Environmental Policy Act (NEPA). The actions proposed are as follows:

1. To designate 323 miles of National Forest System snow trails on National Forest System lands within the Lassen National Forest as trails where public OSV use would be allowed when snow depth is adequate for that use to occur. All existing OSV prohibitions applying to non-motorized trails would continue.
2. To designate 921,130 acres of National Forest System lands within the Lassen National Forest as areas where public, cross-country OSV use would be allowed when snow depth is adequate for that use to occur. This land area would represent approximately 80.1 percent of the National Forest System land within the Lassen National Forest. All existing OSV prohibitions applying to areas of the forest where public OSV use is not allowed would continue.
3. To not designate (to prohibit public OSV use on) approximately 228,890 acres on the Lassen National Forest for public OSV use. These areas include all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited.
4. To implement Forest-wide snow depth requirements for public OSV use that would provide for public safety and natural and cultural resource protection by:
 - a. Allowing public, cross-country OSV use in designated areas only when there are 12 or more inches of snow or ice covering the landscape based on weather and observations by Forest Service personnel and the public, to prevent impacts to surface and subsurface resources including, but not limited to, archaeological deposits, historic features, and historic properties; and

- b. Allowing public OSV use on designated snow trails when there are 6 or more inches of snow covering the trail. Except for approximately 0.1 mile of OSV trail (which would require 12 or more inches of snow for OSV use), all snow trails to be designated for public OSV use or identified for OSV grooming in all alternatives would overlay an existing paved, gravel, or native surface travel route. These travel routes are trails and roads already designated for use by wheeled, motorized vehicles when such use is allowed, and non-motorized recreation.
5. To not designate for public OSV use any existing trail in an area where motorized use is currently prohibited on the Lassen National Forest.
6. To designate 28 public OSV crossing points of the Pacific Crest Trail on roads and trails already designated for wheeled, motorized vehicle use when such use is allowed. Two of the Pacific Crest Trail crossing points that would be designated are adjacent to private land.
7. To establish a corridor for the Pacific Crest Trail, within which public OSV use would not be designated (public OSV use would be prohibited), except on 26 designated public OSV trails across this corridor. This corridor is included in the areas that would not be designated for public OSV use in item #3, above. This is a modification to the proposed action as originally scoped, which did not include a corridor along the Pacific Crest Trail.
8. Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.
9. To identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service's Lassen National Forest Grooming Program.
10. To groom OSV snow trails when there are 12 or more inches of snow or more, and formally adopt California State Parks' snow grooming standards requiring 12 or more inches of snow depth before grooming can occur.

Decision Framework

This decision would designate National Forest System snow trails and areas on National Forest System lands for public OSV use on the Lassen National Forest where snowfall is adequate for that use to occur. It would also identify the National Forest System and non-system snow trails where grooming for public OSV use would occur. The decision would only apply to the public use of over-snow vehicles as defined in the Forest Service's Travel Management Regulations (36 CFR §212.1).

Responsible Official

The Lassen National Forest Supervisor is the deciding official who would issue the decision. The Forest Supervisor will consider all reasonable alternatives and decide whether to continue current management of public OSV uses on the Lassen National Forest, implement the modified proposed action, or select an alternative for the management of public OSV uses.

Public Involvement

The interdisciplinary team relied on public involvement to ensure that a reasonable range of alternatives, representing a broad array of perspectives, would be analyzed in this final environmental impact statement (FEIS).

A pre-scoping meeting was held on November 5, 2014, which was attended by interested and affected stakeholders. The meeting's objectives were to share information about the project and the NEPA process, gather input on public engagement, and confirm and collect public input on a preliminary purpose and need for action through shared concerns and solutions with current OSV management on the forest. The meeting was attended by 28 people. A more detailed description of this meeting and outcomes are included in the December 2014 Pre-NEPA meeting summary report, available on the web and in the project record. The project first appeared on the Lassen National Forest's Schedule of Proposed Actions in January 2015.

A scoping letter describing the proposed action and seeking public comments was sent via regular mail or email to approximately 138 interested groups, individuals, and agencies on January 14, 2015, with comments requested to be returned by February 15, 2015. A press release was sent to local news media outlets on January 14, 2015. A notice of intent to prepare an environmental impact statement was published in the *Federal Register* on January 20, 2015 (80 FR 2676). All notices included a web address for the project's website where comments could also be submitted. The project's website could also be accessed from the home page of the Lassen National Forest's public website.

The public was invited to comment on the proposed action, identify potential conflicts or benefits, and provide any relevant information that would be useful in the subsequent environmental analysis. The Forest Service received and considered responses from 66 interested groups, individuals, and agencies in the form of letters, emails, and website submissions. All comments were thoughtful narratives responding to the proposed action with support, opposition, concerns, or requests for revision and new alternatives. The Forest Service appreciates the time and perspectives shared by each commenter, and the willingness of all to engage in the environmental analysis process.

We reviewed and analyzed all of the comment letters. See page 467 for a list of respondents; a list of the subject categories represented by all of the comments; and a description of classification codes used for identifying preliminary issues. We held and attended meetings and discussed the OSV designation process with local county governments, and we considered their opinions in developing alternatives.

The draft environmental impact statement (DEIS) was released for public review and comment. A notice of availability to comment on the DEIS was published in the *Federal Register* on January 29, 2016 (81 FR 5013). The 45-day comment period began on January 30, 2016. A legal notice of opportunity to comment was published in the newspaper of record on February 2, 2016. Letters were sent to 402 interested groups, individuals, and agencies, notifying them that the draft environmental impact statement was available for review. As a result of these solicitations, the Forest Service received 156 comment letters containing 623 comments from 142 interested groups, individuals, and agencies in the form of letters, emails, and website submissions. These comments were sorted for redundancies and the Forest Service addressed the 357 remaining comments that were considered materially relevant to the analysis. Appendix E includes a list of all commenters and the specific written comments (as defined in 36 CFR §218.2) that were addressed.

Administrative Review Opportunities

The Lassen National Forest Over-snow Vehicle Use Designation is an activity implementing a land management plan. It is not an activity authorized under the Healthy Forests Restoration Act of 2003 (Pub. L. 108-148). Therefore, this activity is subject to pre-decisional administrative review consistent with the Consolidated Appropriations Act of 2012 (Pub. L. 112-74) as implemented by subparts A and B of 36 CFR Part 218.

Issues

Comments that express concerns about cause-effect relationships between the proposed action and its effects are called “issues.” Issues serve to highlight effects or unintended consequences that may result from the proposed action, giving opportunities to reduce adverse effects through design features, mitigations, or alternatives. They are the potential cause-effect relationships that we identified to consider and analyze in depth to determine the likely impacts of each alternative. They are not the results of the analysis. Not all comments are issues.

Significant issues generally concern resources that may be significantly impacted by implementation of the proposed action and cannot be resolved through routine or standard project design features or mitigation measures. A significant issue is most often addressed by development and analysis of an alternative to the proposed action.

An issue may be deemed a non-significant issue for any of the following reasons: (1) the issue is already decided by law, regulation, Forest Plan or other higher level decision; (2) the issue is outside the scope of the proposed action (the issue is not part of the proposal or is not affected by it); (3) the issue is irrelevant to the decision to be made; and (4) the issue is conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality NEPA regulations explain this delineation in Sec. 1501.7, “...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...”

Significant Issues

Based on our review of all comments received during scoping and the comment period for the DEIS, we identified two significant issues for the Lassen National Forest Over-snow Vehicle Use Designation analysis.

Motorized Recreation Opportunities

The decision has the potential to impact the amount of available opportunities for public access and use of National Forest System lands by OSV-equipped winter recreation enthusiasts seeking enjoyable and challenging motorized experiences. The designation of snow trails and areas for public OSV use has the potential to impact the opportunities these enthusiasts seek by:

- a. Changing the location of and/or reducing the amount of high-quality and desirable areas designated for public, cross-country OSV use on the forest;
- b. Designating an insufficient number of opportunities for public OSV use of snow trails on the forest; and
- c. Providing an insufficient number of opportunities for public OSV use of groomed snow trails on the forest.

Resource indicators and measures for this issue are shown in table 2.

Table 2. Resource indicators and measures for the issue of motorized recreation opportunities

Impact	Resource Indicator	Measure
Changing the location of and/or reducing the amount of high-quality and desirable areas designated for public, cross-country OSV use on the forest	The area of National Forest System land designated for public, cross-country OSV use	Size of areas (acres) where public OSV use would be allowed; Percent change in size of areas (acres) where public OSV use would be allowed as compared to current management
Designating an insufficient number of opportunities for public OSV use of snow trails on the forest	Snow trails designated for public OSV use	Length of snow trail (miles) designated for public OSV use; Percent change in length of snow trail (miles) designated for public OSV use as compared to current management
Providing an insufficient number of opportunities for public OSV use of groomed snow trails on the forest.	Groomed snow trails designated for public OSV use	Length of snow trail (miles) groomed for public OSV use; Percent change in length of snow trail (miles) groomed for public OSV use as compared to current management

Non-motorized Recreation Opportunities

The decision has the potential to impact the amount of available opportunities for public access and use of National Forest System lands by non-motorized winter recreation enthusiasts seeking solitude and challenging physical experiences. The designation of snow trails and areas for public OSV use and grooming of snow trails for public OSV use has the potential to impact the opportunities these enthusiasts seek by:

- a. Displacing non-motorized winter recreation enthusiasts, or requiring them to travel longer distances through motorized routes and areas than they are physically able to traverse to access their desired quiet, non-motorized experiences;
- b. Consuming untracked powder desired by backcountry skiers;
- c. Making the snow surface difficult to ski on;
- d. Tripling the amount of OSV use on snow trails that are groomed for OSV use, increasing the potential for all other impacts to opportunities these enthusiasts seek;²
- e. Creating concerns for their safety when non-motorized winter recreationists share winter recreation routes and areas with OSVs;
- f. Creating noise impacts that intrude on the solitude these enthusiasts seek;
- g. Creating local air quality impacts that intrude on the unpolluted air and solitude these enthusiasts seek; and
- h. Creating visual impacts that intrude on the unaltered scenery these enthusiasts seek.

Resource indicators and measures for this issue are shown in table 3.

² According to the State of California’s Over-Snow Vehicle Program Draft EIR, OSV use on groomed snow trails is three times the OSV use on ungroomed snow trails (California Department of Parks and Recreation, Off Highway Motor Vehicle Recreation Division 2010, page 2-20).

Table 3. Resource indicators and measures for the issue of non-motorized recreation opportunities

Impact	Resource Indicator	Measure
<p>Displacing non-motorized winter recreation enthusiasts, or requiring them to travel longer distances through motorized routes and areas than they are physically able to traverse to access their desired quiet, non-motorized experiences</p> <p>Consuming untracked powder desired by backcountry skiers;</p> <p>Making the snow surface difficult to ski on; and</p> <p>Tripling the amount of OSV use on snow trails that are groomed for OSV use.</p>	<p>Access to desired non-motorized settings and opportunities</p>	<p>Size of area (acres) and trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads</p>
	<p>Recreation Opportunity Spectrum (ROS)</p>	<p>Consistency of OSV designations with ROS classes</p>
<p>Creating concerns for their safety when non-motorized winter recreationists share winter recreation routes and areas with OSVs</p>	<p>Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences</p>	<p>Size of areas (acres) designated for public OSV use, size of areas (acres) of non-motorized areas such as cross-country ski areas, non-motorized trail access</p>
<p>Creating noise impacts that intrude on the solitude these enthusiasts seek</p>	<p>Potential noise impacts</p>	<p>Size of area (acres) potentially affected by noise/size of area (acres) closed to winter motorized use</p> <p>Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)</p>
	<p>Proximity and frequency of OSV designations in relation to designated non-motorized areas (e.g., Wilderness, Inventoried Roadless, Lassen Volcanic National Park, Research Natural Areas (RNAs), Proposed Wilderness, Primitive and Semi-primitive Non-motorized ROS classifications)</p>	<p>Distance of groomed public OSV snow trails from designated areas/number of public OSV snow trails within designated areas, or number of crossings of linear designated areas</p>
	<p>Applicable wilderness capability attributes/characteristics (FSH 1909.12 (72.1))</p>	<p>Size of areas (acres) affected and duration of impact. Qualitative description for each roadless area characteristic.</p>
	<p>Applicable Inventoried Roadless Area (IRA) criteria/characteristics (36 CFR §294.11)</p>	<p>Size of areas (acres) affected and duration of impact. Qualitative description for each roadless area characteristic.</p>

Impact	Resource Indicator	Measure
Creating local air quality impacts that intrude on the unpolluted air and solitude these enthusiasts seek	Potential air quality impacts	Qualitative/narrative description of potential impacts (with reference to the air quality analysis)
	Proximity and frequency of OSV designations in relation to designated non-motorized areas (e.g., Wilderness, Inventoried Roadless, Lassen Volcanic National Park, RNAs, Proposed Wilderness, Primitive and Semi-primitive Non-motorized ROS classifications)	Distance of groomed public OSV snow trails from designated areas/number of public OSV snow trails within designated areas, or number of crossings of linear designated areas
	Applicable wilderness capability attributes/characteristics (FSH 1909.12 (72.1))	Size of areas (acres) affected and duration of impact. Qualitative description for each roadless area characteristic.
	Applicable Inventoried Roadless Area (IRA) criteria/characteristics (36 CFR §294.11)	Size of areas (acres) affected and duration of impact. Qualitative description for each roadless area characteristic.
Creating visual impacts that intrude on the unaltered scenery these enthusiasts seek	Qualitative/narrative description of potential visual impacts	Qualitative description of potential effects
	Proximity and frequency of OSV designations in relation to designated non-motorized areas (e.g., Wilderness, Inventoried Roadless, Lassen Volcanic National Park, RNAs, Proposed Wilderness, Primitive and Semi-primitive Non-motorized ROS classifications)	Qualitative description of potential effects
	Applicable wilderness capability attributes/characteristics (FSH 1909.12 (72.1))	Qualitative description of potential effects
	Applicable Inventoried Roadless Area (IRA) criteria/characteristics (36 CFR §294.11)	Qualitative description of potential effects

Non-significant Issues

Effects on Transportation and Engineering

This analysis evaluates potential effects to engineering and roads, including safety, traffic, affordability, jurisdiction, and the underlying forest transportation system.

The potential effects on public safety and traffic will be evaluated by considering the interface between motor vehicle operators and other users of the trail systems. Cost and affordability will be evaluated in terms changes to the total cost of maintaining the Lassen National Forest transportation system that would be open to motor vehicle use. This analysis would not involve standard (wheeled motor vehicle) road maintenance costs. The effects to the underlying National Forest System roads and trails, including wear and tear that may affect wheeled motor vehicle use would also be

evaluated. Project design criteria and monitoring measures have been identified for all of the action alternatives to minimize these potential impacts.

Effects on Soil Resources

Designating snow trails and areas for public OSV use has the potential to result in ground disturbance and snow compaction and this can directly, indirectly, and/or cumulatively adversely impact the soil resource through soil compaction, erosion, and displacement. These potential impacts to soils can then indirectly result in adverse impacts to plants due to changes in soil temperature and productivity.

OSVs, when operated by the public cross-country instead of on snow trails, have the potential for more widespread impacts due to the potential for ground disturbance (similar in nature to wheeled, motorized use if there is inadequate snow cover). These potential effects are highly dependent on location, particularly areas of thin snow cover, and the amount and timing of use.

Measurement Indicators

Measurement indicators for determining effects to soil resources are described in table 4.

Table 4. Resource indicators and measures used to determine impacts on soil resources

Resource Element	Resource Indicator	Measure (Quantify if possible)
Soil Productivity and Soil Stability	Public OSV use on sensitive soils including wet meadows, areas with potential low stability and areas with potential erosion hazards.	Size of areas (acres) in which public, cross-country OSV travel would be allowed on sensitive soils
Soil Stability	Minimum snow depths on snow trails designated for public OSV use	Depth of snow (inches)
Soil Productivity	Minimum snow depths in areas designated for public, cross-country OSV use	Depth of snow (inches)
Soil Productivity	Total area where public OSV use would be designated (allowed)	Size of areas (acres) open to public, cross-country OSV use

Effects on Water Resources

Designating snow trails and areas for public OSV use has the potential to result in ground disturbance and snow compaction, and this can directly, indirectly, and/or cumulatively adversely impact water resources through soil compaction, erosion, and displacement. The potential for ground disturbance is similar to wheeled, motorized use on native surfaces if there is inadequate snow cover, which can affect the underlying vegetation. Public OSV use also has the potential for releasing burned and unburned fuel and lubricants into the environment. These potential impacts can then indirectly result in adverse impacts to water quality and alter snowmelt patterns. Changes in snowmelt patterns could affect hydrologic regimes in localized areas. It is also possible that public OSV use can directly damage riparian and wetland vegetation when operated by the public, cross-country.

OSVs, when operated cross-country instead of on snow trails, have the potential for more widespread impacts due to the potential for ground disturbance (similar in nature to wheeled, motorized use if there is inadequate snow cover). These potential effects are highly dependent on location, particularly areas of thin snow cover, and the amount and timing of use.

We will analyze the direct and indirect effects and cumulative watershed effects for each of the action alternatives. Direct and indirect effects of each project alternative will be analyzed together. At the end of these analyses there is a summarized comparison of alternatives.

Measurement Indicators

We will use key indicators (table 5) to summarize the direct and indirect effects of alternatives and compare them to the no-action alternative. We will consider those effects on surface water, ground water, riparian conservation areas, and wetlands. A summary compares each alternative by the indicators, Forest Plan consistency, and consistency with the Federal Clean Water Act and the Porter Cologne Act.

Table 5. Indicators used for the hydrologic analyses

Indicator Measures	Resource Indicator	Usefulness of Indicator Measure
Indicator Measure 1	Designated use area for OSV use	Impacts are widely dispersed and differences in alternatives are minor
Indicator Measure 2	Minimum Snow Depth for OSV Use on Designated Trails (Inches)	Minimum snow depths on trails can be evaluated for effectiveness for protecting the trail surface
Indicator Measure 3	Minimum Snow Depth for Cross-country OSV Use (Inches)	Minimum snow depths for cross-country travel can be evaluated for effectiveness for protecting the ground surface and vegetation
Indicator Measure 4	Number of OSVs per year using trails across forest	Total amount of use can be compared to use amounts in Yellowstone National Park and other studies to gauge potential water quality effects
Indicator Measure 5	Consistency with Forest Plan Riparian Conservation Objectives 1, 2, 4, 5, and 6	Evaluation of the effects to riparian conservation areas, water quality and beneficial uses of water

Effects on Heritage Resources

Impact analysis follows established procedures and stipulations outlined in regulations implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800) and Regional Programmatic Agreement. These include: (1) identifying areas and types of resources that could be impacted; (2) assessing information regarding historic properties within this area and conducting additional inventories and resource evaluations, as necessary; (3) comparing the location of the impact area with that of important cultural resources; (4) identifying the extent and types of effects; (5) assessing those effects according to procedures established in the Advisory Council on Historic Preservation's regulations; and (6) considering ways to avoid, minimize, or mitigate adverse effects.

Effects on Botanical Resources

Designating snow trails and areas for public OSV use and grooming trails for public OSV use have the potential to (1) impact woody species that extend above the snow cover; (2) impact plant composition and habitat suitability through snow compaction; (3) impact plants under the snow when there is less than adequate snow cover; and (4) transport weed seeds into new areas.

The potential for impacts to botanical resources is influenced by snow depth, season of use, and proximity to groomed and ungroomed snow trails where public OSV use would occur.

Botanical species and habitat in the following categories will be considered: federally listed threatened, endangered, proposed, and candidate species; designated or proposed critical habitat; Forest Service sensitive species, and special interest species.

This issue is primarily addressed by project design features and monitoring measures listed later in this document and by the minimum snow depths common to all alternatives (as described above for soil and water resources) because most plants of concern would be covered with snow and not impacted by OSV use.

Measurement Indicators

The potential for impacts to botanical resources will be measured by the:

- Presence of threatened, endangered, proposed or candidate species, sensitive species, and special interest plant species in areas designated for public, cross-country OSV use and within 100 feet of snow trails designated or identified for public OSV use;
- Presence of invasive plant species in areas designated for public OSV use and within 100 feet of snow trails designated or identified for public OSV use;
- Presence of RNAs, candidate RNAs, Special Interest Areas (SIAs), or other designated botanical special areas in cross-country OSV use areas and within 100 feet of snow trails designated or identified for public OSV use; and
- Qualitative assessment of potential effects to threatened, endangered, proposed or candidate species, sensitive species; special interest, and invasive plant species, and Designated Botanical areas.

Effects on Terrestrial Wildlife

Designating snow trails and areas for public OSV use and grooming trails for public OSV use have the potential to impact terrestrial wildlife through direct/indirect or cumulative injury, mortality, or disturbance to individuals (e.g., increased noise and human presence resulting in a loss of breeding and/or feeding) and direct/indirect or cumulative modifications of wildlife habitats (e.g., alteration of competitor/predator communities).

OSVs, when operated by the public cross-country instead of on snow trails, have the potential for impacts to wildlife species due to the potential for snow compaction in areas of inadequate snow cover and impacts on subnivean (i.e., the zone in and under the snow) habitat for small mammals. These potential effects are highly dependent on location, particularly areas of inadequate snow cover, and the amount and timing of use.

Terrestrial species and habitat in the following categories will be considered:

- Federally listed threatened, endangered, proposed, and candidate species;
- Forest Service sensitive species;
- Sierra Nevada Forest Management indicator species/Special Interest species identified during public scoping; and
- Migratory bird species.

Measurement Indicators

The potential effects on terrestrial wildlife species will be evaluated by considering the proximity to and overlap of designated OSV snow trails and areas to occupied or suitable habitat (depending on the species), considering known noise disturbance thresholds during the OSV season, which includes sensitive breeding periods. The potential for snow compaction due to public OSV use in designated

areas and the proximity to suitable subnivean habitat would also be evaluated. Project design criteria and monitoring measures have been identified for all of the action alternatives to minimize resource impacts.

Effects on Fisheries and Aquatic Resources

Public OSV use and snow trail grooming for public OSV use have the potential to impact fish and amphibian populations and habitat in the project area through: (1) direct disturbance to species when OSV use occurs in wet meadows, streams, lakes, and/or other sensitive habitats; (2) indirectly through generation of exhaust and associated pollutants in or near sensitive habitat, which can degrade water quality; (3) indirectly through release of fuel or other pollutants during refueling and proximity to sensitive habitats, which can degrade water quality; and (4) indirectly through increased soil erosion in marginal snow depth areas.

OSVs, when operated by the public cross-country instead of on snow trails, have the potential for more widespread impacts due to the potential for ground disturbance (similar in nature to wheeled, motorized use if there is inadequate snow cover). These potential effects are highly dependent on location, the amount of snow cover, and the amount and timing of use.

OSVs, when operated by the public on designated National Forest System snow trails without adequate snow cover have the potential to also result in soil compaction, erosion, and displacement and decreased water quality, as described above. These potential impacts to soil and water resources can indirectly affect riparian habitats and sensitive aquatic habitats, if they are in close proximity to these OSV trails.

Aquatic species and habitat in the following categories will be considered:

- Federally listed threatened, endangered, proposed, and candidate species;
- Forest Service sensitive species; and
- Management indicator species.

Measurement Indicators

Potential effects on aquatic species will be evaluated by considering the results of the soil and water resources analyses. The potential for disturbance to habitat will be based on:

- Areas of overlap of public OSV routes and species habitat;
- Amount and timing of snowmelt;
- Altered hydrologic patterns;
- Snow compaction;
- Timing of grooming activity (seasonal and diurnal); and
- Likelihood that grooming activities may attract public use to sensitive areas such as streams, breeding ponds, and other winter areas.

The potential for injury or mortality to individuals of the evaluated species (including harassment and impairment of essential behavioral patterns as defined under Section 9 of the Endangered Species Act and Federal regulation pursuant to Section 4(d) of the act) resulting from public OSV use in occupied habitats will be based on observations or monitoring to estimate the area of overlap of snow trails or areas designated for public OSV use within occupied habitat.

The potential for changes in water quality from petroleum-based pollutants emitted by public OSV use and absorbed in snowpack will be measured by the soil and water analysis and proximity to aquatic habitats (stream channels, wet meadows, seeps, springs, fens, and margins of lakes and ponds).

Project design criteria and monitoring measures have been identified for all of the action alternatives to minimize resource impacts.

Effects on Socioeconomic Conditions

Designating snow trails and areas for public OSV use and changes in areas available for public OSV use and non-motorized use have the potential to impact the local economy (economic contributions of winter recreation on National Forest System lands and the potential for changes to this contribution) and could result in social consequences (including quality of life and local lifestyles).

The potential for impacts to socioeconomic factors will be estimated using a customizable input-output model known as IMPLAN Professional Version 3.0 and the Apheleia tool, with 2014 data. Input-output models provide a means of examining relationships within an economy, both between businesses and between businesses and final consumers; so that net changes in economic activity can be assessed.

In addition to economic impacts, management actions affecting public OSV use on National Forest System lands may also have social consequences. Potential social impacts will be considered in a qualitative fashion, including how management actions may affect traditional and cultural ties to Federal lands within the area of influence.

Minority and low-income populations within the area of influence that qualify as Environmental Justice populations would also be identified to determine if disproportionately high adverse human health or environmental effects would result from proposed actions.

Noise Impacts

Designating snow trails and areas for public OSV use and grooming snow trails for public OSV use have the potential to generate anthropogenic noise and increase noise levels above ambient levels in the short term. This has the potential to adversely impact wildlife species that are sensitive to this sort of disturbance as well as the experience of the recreational user who values solitude and quiet recreational opportunities.

Measurement Indicators

Potential effects from noise are analyzed in chapter 3 using the following indicator measures:

- Opportunities for motorized winter uses – Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management;
- OSV designations – Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use.

Effects on Air Quality

Designating snow trails and areas for public OSV use and grooming snow trails for public OSV use have the potential to generate exhaust and emit pollutants into the air. This has the potential to degrade air quality, which can impact recreational users, wildlife, and sensitive areas.

Measurement Indicators

Potential effects from exhaust and pollutants are analyzed in chapter 3 using the following indicator measures:

- Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality – Length of snow trail (miles) and size of areas (acres) designated for public OSV use;
- Potential effects of public OSV emissions to create adverse impacts to air quality – Shifts in public OSV use in relation to sensitive areas (Class I and II areas).

Climate Change Impacts

The Forest Service’s 2009 “Climate Change Considerations in Project Level NEPA Analysis” (January 13, 2009) recommends that we consider effects of agency actions on global climate change and effects of climate change on proposed projects. The Council on Environmental Quality also released draft guidance in 2014 related to considering climate change in NEPA analysis.

Designating snow trails and areas for public OSV use and grooming trails for public OSV use have the potential to increase greenhouse gas emissions via OSV exhaust and release of these pollutants into the air. The air quality analysis will consider these emissions and provide information for the EIS related to the differences between the alternatives regarding overall air quality.

However, preliminary analysis indicates that while localized air quality may be degraded in some site-specific locations based on concentrated OSV use in specific popular motorized recreation areas, it is unlikely to contribute in any measureable way to regional levels. For this reason, the impact of the project on climate change will not be considered further in the analysis. However, the public and our interdisciplinary team raised concerns regarding the potential for changing climate conditions to influence snow levels and amounts into the future and the overall available winter recreational opportunity.

Issues Considered but not Analyzed in Detail

The Impacts of Unauthorized OSV Use

Public comments expressed the concern that “unauthorized OSV use is having and will have significant impacts that the analysis in the DEIS does not discuss” (Comments 80-79 and 83-22). The comments cite litigation (*Sierra Club v. U.S. Forest Serv.*, 857 F. Supp. 2d 1167, 1176-78 (D. Utah 2012)) finding that NEPA requires the agency to take a hard look at the impacts of illegal motorized use on forest resources and the likelihood of illegal use continuing under each alternative.

We reviewed the Memorandum Decision and Order in the case cited (857 F. Supp. 2d 1167 (D. Utah 2012)) and we determined that it is not analogous to the present analysis nor its decision. The Sierra Club case was based on a wheeled, motorized vehicle use designation analysis under Subpart B of the Forest Service’s Travel Management Regulations. It dealt with the designation of trails for wheeled, motorized vehicles and the threat that the creation of unauthorized routes posed on forest resources. The environmental consequences of unauthorized routes created for wheeled, motorized vehicles are more substantial than unauthorized routes created by OSVs.

“The difference in management of motor vehicle use and OSV use on NFS lands stems from differences in their associated settings, activities, environmental impacts, and public

preferences. National forests and grasslands change when snow blankets the landscape. Vegetation camouflages, animals burrow, and water transforms into ice...

OSV use occurs only in the months when snow is present, in contrast to other types of motor vehicle use, which can occur at any time of the year...

A key difference between OSV use and other types of motor vehicle use is that, when properly operated and managed, OSVs do not make direct contact with soil, water, and vegetation, whereas most other types of motor vehicles operate directly on the ground. Unlike other types of motor vehicles traveling cross-country, OSVs traveling cross-country generally do not create a permanent trail or have a direct impact on soil and ground vegetation...

Subpart B of the TMR recognizes that cross-country travel [and, by association, unauthorized routes created by cross-country travel] by [wheeled, motorized vehicles] is generally unacceptable [and the regulations are written to only permit such travel by wheeled, motorized vehicles in specific circumstances]. Subpart C of the TMR [Travel Management Rule] as originally promulgated and in the proposed rule recognizes that cross-country travel by OSVs may be acceptable in appropriate circumstances” (79 FR 34679, June 18, 2014).

As the District Court in the Sierra Club case stated in its Memorandum Decision and Order, “The test of adequacy of an EIS is to be ‘pragmatic,’ requiring ‘a good faith attempt to identify and to discuss all foreseeable environmental consequences.’” After considering potential environmental impacts, we determined that illegal OSV trail creation and use is not a significant environmental issue. This is because although there may be some risk of OSV enthusiasts creating new OSV trails or going off-trail areas where OSV use is not allowed, the hazard of this activity resulting in adverse environmental consequences of any perceptible magnitude is negligible for several reasons:

- Illegal trails generated by wheeled, motorized vehicles are likely to directly affect soil and vegetation;
- Illegal OSV trails would exist on snow and are not likely to directly affect soil and vegetation;
- OSVs would be prohibited from directly affecting soil, vegetation, and other surface resources by snow depth restrictions in each action alternative;
- Because they disturb soil and vegetation, illegal trails generated by wheeled, motorized vehicles would exist for a longer duration of time;
- Illegal OSV trails would only exist until the next heavy snowfall or snow melt, so the effects on the snow would be temporary;
- We have found very little evidence of illegal OSV use that would remain after the snow melts;
- Illegal OSV use would not result in permanent routes because of the widely dispersed nature of off-trail, cross-country OSV travel.
- The opportunity to create illegal trails by wheeled, motorized vehicles is greater than for OSVs because:
 - ◆ Wheeled, motorized vehicle use is generally confined to designated trails. Generally, simply diverting off a designated trail would be an illegal use of a wheeled, motorized vehicle;

- ◆ Although OSV trails would be designated, most of designations would be for areas where public, cross-country OSV use would be allowed. Therefore, there would be fewer opportunities for illegal OSV use except in areas not designated for OSV use.

Chapter 2. Alternatives

Introduction

This chapter describes and compares the no-action alternative and three action alternatives for the **Lassen National Forest Over-snow Vehicle Use Designation**. It includes a detailed description and maps of each alternative, how they were developed, and alternatives considered but eliminated from detailed study; and presents the alternatives in comparative form, sharply defining the differences between alternatives and providing a clear basis for choice among options by the decision maker and the public. Numbers such as acres and miles are approximate due to the use of GIS data and rounding.

How Alternatives were Developed

After the scoping period concluded, the Forest Service reviewed and considered all public comments. These public comments, along with information that we gathered in our consultation and discussions with other agencies, organizations, individuals, government entities, and Forest Service employees contributed to the development of alternatives.

Once issues were identified, we carefully considered alternatives to the proposed action or possible changes that may be necessary to the proposed action. There were multiple comments regarding the proposed action; and many comments suggested new alternatives or new alternative components to consider. The interdisciplinary team reviewed these proposed alternatives to determine whether any modifications should be made to the proposed action and to make a recommendation to the line officer about which alternatives should be analyzed in detail in the EIS and which ones should be dismissed from further detailed consideration.

As an integral part of the development and analysis of the alternatives, we apply the minimization criteria at 36 CFR §212.55(b) and use these criteria to compare and contrast alternatives as to how they would minimize:

- Damage to soil, watershed, vegetation, and other forest resources;
- Harassment of wildlife and significant disruption of wildlife habitats;
- Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands; and
- Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands.

Minimization measures are incorporated into each of the alternative descriptions and resource effects sections. Project design features identified for minimizing impacts are labeled as such throughout the EIS. All project design, minimization, and monitoring features are compiled in the Project Design Features and Monitoring section in this chapter (page 66).

OSV Use Assumptions

Assumptions regarding areas of high, moderate, and low potential OSV use were identified on an assumptions map (see page 107 and appendix A). Resource specialists used these assumptions when conducting their analyses. OSV area and trail distance measurements are based on available GIS data depicting these features.

Alternatives Considered in Detail

The Forest Service explored and evaluated four alternatives (all are summarized and compared in table 26 through table 31 at the end of this chapter).

Alternative 1: No Action

The no-action alternative is required under NEPA regulations [40 CFR §1502.14(d)]. This alternative represents the existing, baseline condition or trends by which the action alternatives are compared. Under alternative 1, there would be no changes to the existing system of OSV use on roads, snow trails, and areas within the Lassen National Forest except as prohibited by Forest Order. Most of the existing system of OSV use on the Lassen National Forest is shown on the 2005 Winter Recreation Guide for the Lassen National Forest. In addition, only those seasonal restrictions as specified in the Lassen Forest Plan and contained in existing Forest Orders would be continued. The 2005 Travel Management Regulations, Subpart C, would not be implemented, and no OSV use map would be produced.

Current management requires a minimum snow depth of 12 inches for OSV use. Table 6 through table 11 and figure 2 display the current OSV management.

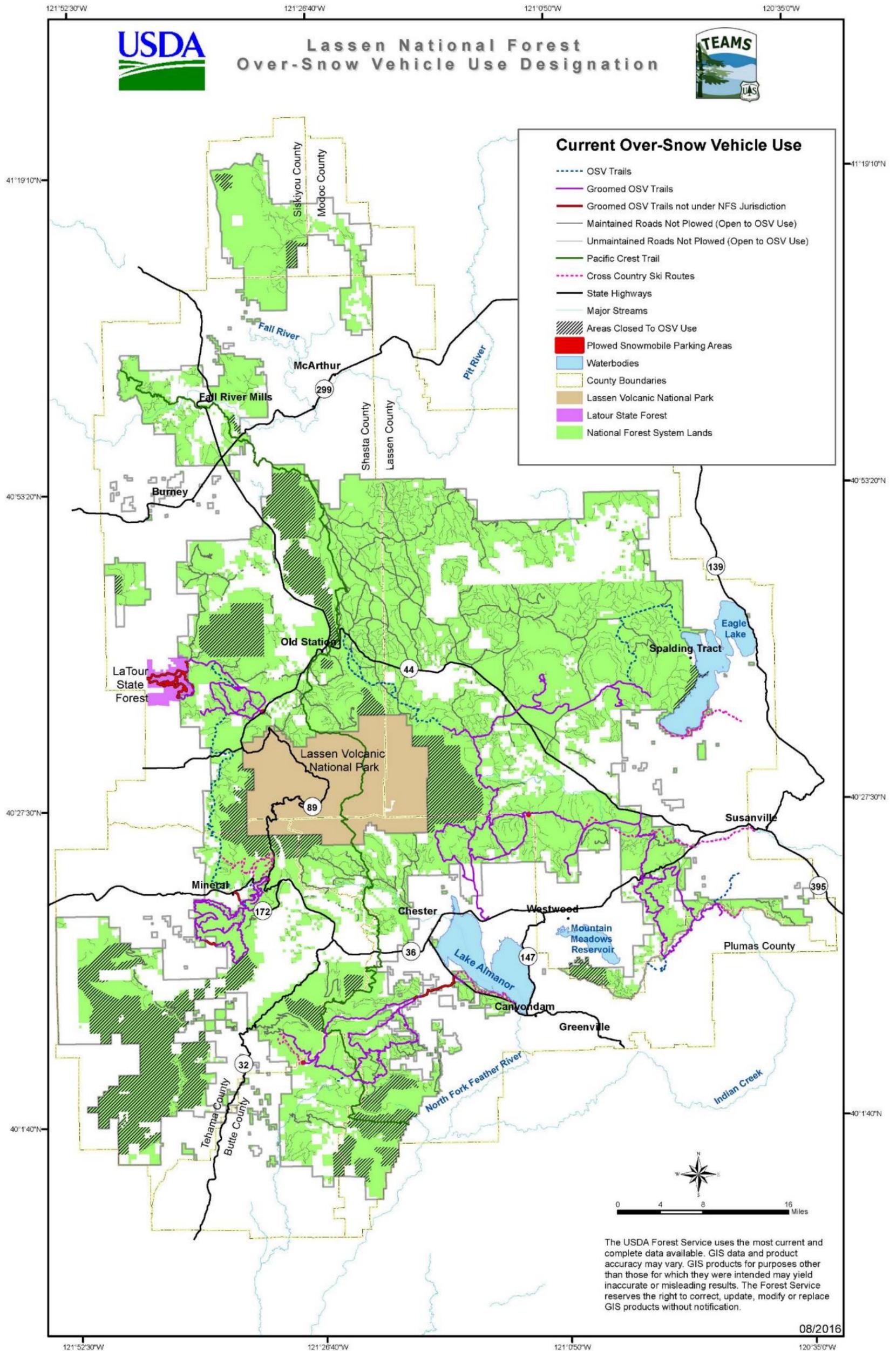


Figure 2. Map showing existing condition – current management

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Alternative 2: Modified Proposed Action

The Forest Service proposes several actions on the Lassen National Forest to be analyzed as required by the NEPA. The actions proposed are as follows:

1. To designate 323 miles of National Forest System snow trails on National Forest System lands within the Lassen National Forest as trails where public OSV use would be allowed when snow depth is adequate for that use to occur. All existing OSV prohibitions applying to trails where public motorized use is not allowed would continue.
2. To designate 921,130 acres of National Forest System lands within the Lassen National Forest as areas where public, cross-country OSV use would be allowed when snow depth is adequate for that use to occur. This land area would represent approximately 80.1 percent of the National Forest System land within the Lassen National Forest. All existing OSV prohibitions applying to areas of the forest where public motorized use is not allowed would continue.
3. To not designate (to prohibit public OSV use on) approximately 228,890 acres on the Lassen National Forest for public OSV use. These areas include all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited, and 42,890 acres of areas currently open to OSV use that would not be designated for OSV use in this alternative.
4. To implement Forest-wide snow depth requirements for public OSV use that would provide for public safety and natural and cultural resource protection by:
 - a. Allowing public, cross-country OSV use in designated areas only when there are 12 or more inches of snow or ice covering the landscape based on weather and observations by Forest Service personnel and the public, to prevent impacts to surface and subsurface resources including, but not limited to, archaeological deposits, historic features, and historic properties; and
 - b. Allowing public OSV use on designated snow trails when there are 6 or more inches of snow covering the trail. Except for approximately 0.1 mile of OSV trail (which would require 12 or more inches of snow for OSV use), all snow trails to be designated for public OSV use or identified for OSV grooming in all alternatives would overlay an existing paved, gravel, or native surface travel route. These travel routes are trails and roads already designated for use by wheeled, motorized vehicles when such use is allowed, and non-motorized recreation.
5. To not designate for public OSV use any existing trail in an area where motorized use is currently prohibited on the Lassen National Forest.
6. To designate 28 public OSV crossing points of the Pacific Crest Trail on roads and trails already designated for wheeled, motorized vehicle use when such use is allowed. Two of the Pacific Crest Trail crossing points that would be designated are adjacent to private land.
7. To establish a corridor for the Pacific Crest Trail, within which public OSV use would not be designated (public OSV use would be prohibited), except on 26 designated public OSV trails across this corridor. This corridor is included in the areas that would not be designated for public OSV use in item #3, above.

8. Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.
9. To identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service's Lassen National Forest Grooming Program.
10. To groom OSV snow trails when there are 12 or more inches of snow, and formally adopt California State Parks' snow grooming standards requiring a minimum of 12 inches of snow depth before grooming can occur.
11. Project design features, including minimization measures and monitoring procedures are described beginning on page 66 of this document.

The modified proposed action is summarized and compared with current management in table 6 through table 13 and figure 3.

Table 6. Comparison of areas where OSV use would be allowed with total forest land area – current management and alternative 2

Area	Alternative 1 - Current Management*	Alternative 2 – OSV Designations
National Forest System Land Area within Administrative Boundary of Lassen National Forest (Acres)	1,150,020	1,150,020
Total Areas Open (Designated in Alternative 2) for Cross-country OSV Use (Acres)	964,020	921,130
Percentage of NFS Land Area Open (Designated in Alternative 2) for Cross-country OSV Use	83.8%	80.1%
Total Areas OSVs Not Allowed and Not Designated for OSV Use in Alternative 2 (Acres) (Table 7)	186,000	228,890

*Because no Subpart C designations of areas and trails for OSV use have been made, areas and trails are not “designated,” but are either “open” or “closed” to OSV use under current management.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 7. Areas not designated for OSV use – current management and alternative 2 (acres)

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated
• Ishi Wilderness	40,910	40,910
• Caribou Wilderness	20,830	20,830
• Thousand Lakes Wilderness	16,570	16,570
• Proposed Wilderness Adjacent to SW Corner Lassen Volcanic National Park (LVNP) (Rocky Peak)	8,620	8,620
• Proposed Wilderness Southwest Corner of Forest	7,710	7,710
• Proposed Wilderness South Border of LVNP (Chummy Meadows)	4,890	4,890
• Proposed Wilderness East Side of Caribou Wilderness	890	890
• Pacific Crest Trail and Non-motorized Corridor	-	10,460
• Cub Creek RNA	4,090	4,090
• Blacks Mountain RNA	-	520
• Semi-primitive Non-motorized and Primitive Near Ishi Wilderness	22,320	22,320
• Semi-primitive Non-motorized Near Old Station and East of Hwy. 89 (Cinder Butte)	13,700	13,700
• Semi-primitive Non-motorized Chips Creek Area	7,400	7,400
• Semi-primitive Non-motorized Soda Creek Area	4,210	4,210
• Semi-primitive Non-motorized South of Mountain Meadows Reservoir Including Homer Deer SIA	3,370	3,370
• Semi-primitive Non-motorized Snow Meadow Area	3,140	3,140

Over-snow Vehicle Use Designation

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated
• Semi-primitive Non-motorized North of LVNP (East of West Prospect Peak)	2,610	2,610
• Semi-primitive Non-motorized Jackass Creek Area	1,800	1,800
• Semi-primitive Non-motorized Rock Creek Area	1,760	1,760
• Semi-primitive Non-motorized (East of Adobe Flat Reservoir - Shasta Trinity NF Managed by Lassen NF)	1,750	1,750
• Semi-primitive Non-motorized (West of Mayfield Ice Cave - Shasta Trinity NF Managed by Lassen NF)	1,070	1,070
• Semi-primitive Non-motorized Snow Mountain Area West of Old Station	700	700
• Semi-primitive Motorized Near Old Station East of Hwy. 89 (Hat Creek Valley)	12,110	12,110
• Semi-primitive Motorized Butt Mountain Area	1,660	1,660
• Semi-primitive Motorized SE of Old Station East of Hwy. 44 (Little Potato Butte)	630	630
• Roded Natural Onion Springs Closure (West Border of LVNP)	1,080	1,080
• West Shore of Eagle Lake South of Spalding Tract Osprey Mgt Area	1,670	1,670
• Deer Creek Anadromous Fish Closure	-	1,520
• Butte Lake Closure (OSV prohibited except where restricted to trail only) North of LVNP	-	-
• Limited OSV Access in Southwest Corner of Lassen NF	-	27,400
• Below 3,500-foot Elevation in Southwest Corner of Lassen NF	-	-
• Fredonyer-Goumaz Closure (OSV prohibited except where restricted to trail only) Between Hwys 36 & 44	-	-
• McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17)	-	-
• Colby Mountain Closure	-	-
• Southwest Shore Lake Almanor	-	1,840
• South Shore Eagle Lake	-	1,150
• Tippin Forest Order North of Hwy. 299	510	510
• Willard Hill Closure	-	-
Total Areas OSVs Not Allowed and Not Designated for OSV Use in Alternative 2 (Acres)	186,000	228,890

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 8. Designated groomed and ungroomed trails for OSV use – current management and alternative 2 (miles)

Snow Trails for OSV Use	Alternative 1 - Current Management	Alternative 2 – OSV Designations
Groomed and Ungroomed Snow Trails on Lassen NF for OSV Use (miles) (Includes groomed designated OSV trails in Table 10)	2,760	323
Ungroomed Snow Trails where OSV Use would be Allowed (Designated in alternative 2) (miles)		
<ul style="list-style-type: none"> • PCT OSV Crossing Access Trails (Table 9) 	-	7
<ul style="list-style-type: none"> • Road 29N10 	5	5
<ul style="list-style-type: none"> • Road 30N16 from 31N17 To McGowan OSV Closure 	2	-
<ul style="list-style-type: none"> • Road 27N11 Ungroomed Designated SE of Jonesville 	1	-
<ul style="list-style-type: none"> • Road (3xN17) West of McGowan Designated Ungroomed to Ashpan Groomed System 	28	-
<ul style="list-style-type: none"> • Forest Road 21 & County Road 105 from Hwy. 44 to Eagle Lake 	25	-
<ul style="list-style-type: none"> • Designated Ungroomed North of LVNP (Butte Lake) 	22	-
<ul style="list-style-type: none"> • Road 32N46 in Ashpan Designated Ungroomed 	4	-
<ul style="list-style-type: none"> • Ungroomed OSV Trail in OSV Prohibited Areas 	12	-
<ul style="list-style-type: none"> • Other Ungroomed OSV Trail in Areas Open to Cross-country OSV Use (Marked and Unmarked) 	2,350*	-**
Total Trails Open for OSV Use but not Groomed	2,449	12

*Most of these OSV trails are mapped on the Lassen National Forest's 2005 Winter Recreation Guide.

**The modified proposed action would not designate ungroomed OSV trails located within areas designated for public, cross-country OSV use.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 9. Designated Pacific Crest Trail (PCT) OSV crossings – current management and alternative 2

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations
Designated Pacific Crest Trail Crossing Points (#)	No PCT Crossing Points or Corridor*	28
Designated OSV Access Trails Through Designated Pacific Crest Trail Crossing Points by Road Name (miles)	-	8
<ul style="list-style-type: none"> Pit River Canyon Rd (St Dr 50) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only
<ul style="list-style-type: none"> St. Bernard So Rd. (Collins 1) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only
<ul style="list-style-type: none"> 37N05 and 37N052Y - Designated Ungroomed 	-	0.4
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.4
<ul style="list-style-type: none"> 37N5C - Designated Ungroomed 	-	0.3
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 37N02 - Designated Ungroomed 	-	0.1
<ul style="list-style-type: none"> 36N10 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 36N36Y - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 36N09 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 36N33B - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 35N10 - Designated Ungroomed 	-	0.3
<ul style="list-style-type: none"> 34N94 and 34N34 - Designated Ungroomed 	-	0.6
<ul style="list-style-type: none"> 33N22 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 32N99 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 32N20 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 32N12 - Designated Ungroomed 	-	0.3
<ul style="list-style-type: none"> 32N92 - Designated Ungroomed 	-	0.2
<ul style="list-style-type: none"> 32N42Y - Designated Ungroomed; approximately 0.1 mile not on underlying route. 	-	0.3
<ul style="list-style-type: none"> 29N97 and 29N27 - Designated Ungroomed 	-	0.3
<ul style="list-style-type: none"> 28N61 - Designated Ungroomed 	-	0.8

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations
• 28N16 - Designated Ungroomed	-	0.4
• 28N16 , 29N17, and 29N17J - Designated Ungroomed	-	0.3
• 27N11G - Designated Ungroomed	-	0.6
• 26N74 - Designated Ungroomed	-	0.2
• Humboldt Rd./28N43 - Designated Groomed Included in Jonesville Groomed Total	-	0.3
• Humbug Rd./BU915 - Designated Groomed Included in Jonesville Groomed Total	-	0.2
• 26N02/Cirby Meadows - Designated Groomed Included in Jonesville Groomed Total	-	0.3
Designated OSV Access Trails Through Designated PCT Crossing Points (#)	-	26
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (#)	-	3
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (miles)	-	1
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (#)	-	23
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (miles)	-	7

*OSV use is currently allowed adjacent to and across the PCT. Motorized use is prohibited on the tread of the PCT in all alternatives.
All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 10. OSV trail systems groomed by the Lassen National Forest – current management and alternative 2 (miles)

Groomed OSV Trail System	Alternative 1	Alternative 2
La Tour State Forest Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	20	20
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in Alternative 2)	3	3
• Subtotal	23	23
Ashpan Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in Alternative 2)	34	34
• Subtotal	34	34

Over-snow Vehicle Use Designation

Groomed OSV Trail System	Alternative 1	Alternative 2
Morgan Summit Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	2	2
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in Alternative 2)	60	60
• Subtotal	62	62
Jonesville Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	5	5
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in Alternative 2)	64	64
• Subtotal	69	69
Swain Mountain Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in Alternative 2)	71	71
• Subtotal	71	71
Bogard Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in Alternative 2)	47	47
• Subtotal	47	47
Fredonyer Snowmobile Area		
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-
• Groomed Lassen NF by Forest Service Under NFS Jurisdiction (Trail to be Designated on Plumas NF)	11	11
• Groomed by Lassen NF Forest Service Under NFS Jurisdiction (Trail to be Designated on Lassen NF in Alternative 2)	32	32
• Subtotal	43	43
Total OSV Use Allowed (Designated on Lassen NF in Alternative 2) and Groomed by Lassen NF	311	311
Total OSV Use Allowed (on Plumas NF) and Groomed by Lassen NF	11	11
Total Groomed but not Under NFS Jurisdiction	27	27
Grand Total Groomed	349	349

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Allowed OSV Use

Public OSV use would be designated on 323 miles of snow trails on the Lassen National Forest. Approximately 921,130 acres would be designated as areas where public, cross-country OSV use would be allowed, and snow would be subject to snow-depth restrictions.

Public OSV use would be prohibited on the Lassen National Forest unless there is adequate snow depth that meets the conditions in table 11. The minimum snow depth of 6 inches for public OSV use on snow trails with underlying roads and trails represents a change from current management. This change is to provide improved public trail access for OSV users from trailheads to deeper snow areas.

Table 11. Summary comparing minimum snow depth (in inches) and OSV trail grooming season on the Lassen National Forest – current management and alternative 2

OSV Management	Alternative 1 – Current Management	Alternative 2
Minimum Snow Depth for Public OSV Use on Snow Trails (Inches)	12	6 inches on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails
Minimum Snow Depth for Public, Cross-country OSV Use (Inches)	12	12
Minimum Snow Depth for Snow Trail Grooming to Occur (Inches)	18	12*
OSV Trail Grooming Season	12/26 – 3/31	12/26 – 3/31

*The originally scoped proposed action has been modified to be consistent with the State grooming standard which states, “Begin grooming when the snow depth is at least 12 to 18 inches” (OSV Program Draft EIR, Program Years 2010-2020 – October 2010, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, page 2-12)

Designation of Areas

Subpart A of the Travel Management Regulations defines an area as, “a discrete, specifically delineated space that is smaller, and, except for OSV use, in most cases much smaller, than a Ranger District” (36 CFR §212.1). The modified proposed action would designate areas on the Lassen National Forest where public, cross-country OSV use would be allowed when there are 12 or more inches of snow on the ground. These areas total approximately 921,130 acres (table 6).

Prohibited OSV Use

The modified proposed action would not designate (would prohibit) and continue existing prohibitions on OSV use on approximately 186,000 acres of National Forest System land and add new OSV use prohibitions on approximately 42,890 acres. These new prohibitions are listed in table 7 and would apply to areas where OSV access is difficult in the southwestern corner of the Lassen National Forest, a non-motorized corridor along the Pacific Crest Trail, an area along Deer Creek to protect anadromous fish habitat, the Blacks Mountain RNA, and areas in the immediate vicinity of trails where motorized use is prohibited near Lake Almanor and Eagle Lake.

Existing OSV prohibitions in Wilderness areas and in areas designated in the Forest Plan as Recommended Wilderness, Semi-primitive Non-motorized, and Research Natural Areas that currently have the force of law, regulation, or policy and would continue to exist.

Designation of Trails

The modified proposed action would designate 323 miles of groomed and marked but ungroomed trails under National Forest System jurisdiction on the Lassen National Forest for OSV use (table 8). This represents a reduction in the number of miles of OSV trail compared to the length of trail (miles) where OSV use is currently allowed. However, approximately 97 percent of the OSV trails in the current trail system would be either designated for public OSV use or are located in areas that would be designated for public, cross-country OSV use in this alternative.

The modified proposed action would include a primarily non-motorized corridor along both sides of the Pacific Crest Trail. This corridor would be of various widths, based on the recreational opportunity spectrum (ROS) classification of the National Forest System land in the area adjacent to the Pacific Crest Trail (table 12).

Table 12. Pacific Crest Trail Corridor widths based on ROS classification

ROS Classification	Pacific Crest Trail Corridor Width
Primitive	½ mile each side of trail centerline
Semi-primitive Non-Motorized	½ mile each side of trail centerline
Semi-primitive Motorized	¼ mile each side of trail centerline
Roaded Natural	500 feet each side of trail centerline

The modified proposed action would designate 28 points on the Pacific Crest Trail where OSVs would be allowed to cross the Pacific Crest Trail (table 9). The modified proposed action would also designate 26 trails through the non-motorized Pacific Crest Trail corridor so these crossing points can be accessed by OSVs. OSV use would be restricted to the trail, only, on these 26 crossing trails.

Two crossings would be designated on National Forest System roads that are located on non-Federal land. Although these two crossings would be designated, they would not be located within the Pacific Crest Trail corridor under National Forest System jurisdiction. Therefore, only the Pacific Crest Trail OSV crossing points are designated under the modified proposed action for these two crossings.

OSV Use on Groomed Trails

The modified proposed action would identify 349 miles of National Forest System snow trails that would be groomed for public OSV use on the Lassen National Forest (see map, page 39). Although identified for grooming and historically groomed by the Forest Service, approximately 38 miles of groomed trails would not be subject to designation because they are not under National Forest System jurisdiction on the Lassen National Forest. This would represent no change from current management.

Table 10 compares the number of miles of groomed snow trails that have historically been groomed (current management) with the length of snow trails (miles) under the modified proposed action that are identified to be groomed. When 6 or more inches of snow cover these trails they would be open to public OSV use. Snow trail grooming for public OSV use would occur on all of these trails only when 12 or more inches of snow cover the ground.

The grooming season generally begins in mid-December and continues through March. Start and stop times vary per trail location and are dependent upon the presence and depth of snow. Snow trails are prioritized for grooming based on visitor use. Grooming has historically occurred several times per week. As part of this proposal, the grooming frequency on priority trails would occur several times

per week and after major storms, typically between 4:00 p.m. and 6:00 a.m. The total hours of snow trail grooming that would occur at each trail system for an average season are shown in table 13.

Table 13. Summary of grooming operations on the Lassen National Forest

Grooming Location	Annual Groomed Miles	Annual Snowcat Hours	Max Day Hours
Ashpan	1,743	249	12
Bogard and Fredonyer	5,076	680	12
Jonesville	2,222	420	25
Morgan Summit	900	300	12
Swain Mountain	660	94	12

Snow trails would be groomed for public OSV use to a minimum width of 10 feet and typically up to 14 feet wide. Snow trails would be groomed up to 30 feet wide in the more heavily used areas such as near trailheads. Groomed trail width is determined by variety of factors such as width of the underlying road bed, width of grooming tractor, heavy two-way traffic on the trail, and trail corners. Snow trails would not be groomed beyond the width of the underlying roadbed, where one exists. Where the terrain allows, main ingress and egress snow trails that connect to the trailhead would be groomed to 18 feet wide or greater to facilitate the added traffic.

Snowcats are operated at speeds in the range of 3 to 7 miles per hour. The vehicle is operated with warning lights on at all times. The maximum hours of equipment operation is generally a 12-hour day during peak season (table 13).

Snow trail grooming for public OSV use would be conducted in accordance with the 1997 Snowmobile Trail Grooming Standards set by the California Off-Highway Motor Vehicle Recreation (OHMVR) Division, as follows:

- Operators shall be trained and directed by a grooming coordinator.
- Identify hazards in advance of grooming, preferably in autumn before snow falls.

The California OHMVR Division's snowcat fleet is subject to emission regulation by the California Air Resources Board (CARB) as off-road equipment. The CARB sets an emission limit for the vehicle fleet as a whole rather than for individual pieces of equipment. Based on the total horsepower of the vehicle fleet, and the model and year of the individual equipment within the fleet, CARB determines how much horsepower per year must be repowered, retrofitted, or retired. The California OHMVR Division then determines what modifications to make to its fleet in order to satisfy CARB requirements.

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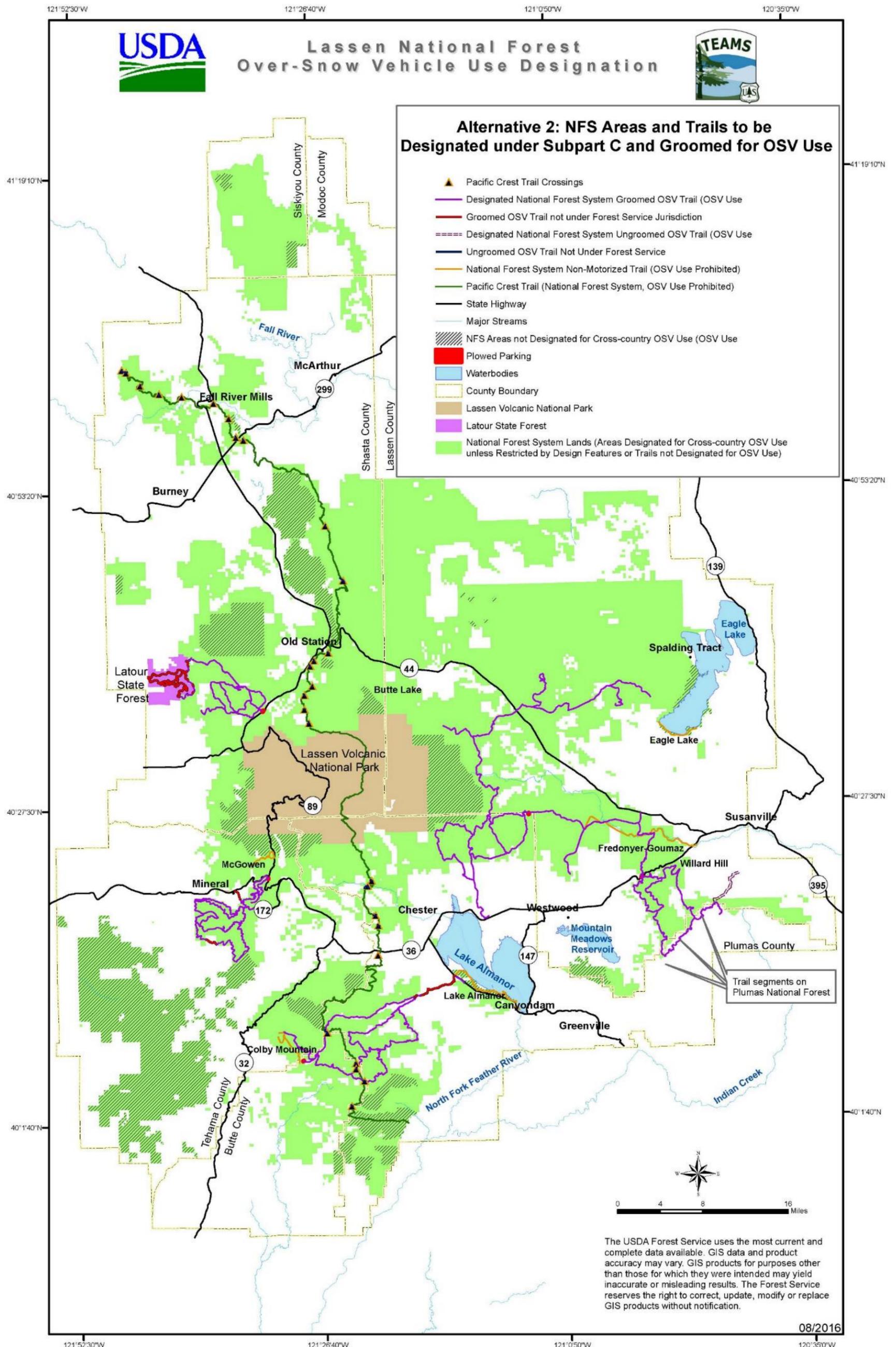


Figure 3. Map showing alternative 2, modified proposed action – NFS areas and trails to be designated under Subpart C and groomed for OSV use

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Alternative 3

This alternative addresses the non-motorized recreational experience significant issue. Differences between this alternative, current management, and the modified proposed action are summarized in table 14 through table 19.

This alternative includes the following actions:

1. To designate 316 miles of National Forest System snow trails on National Forest System lands within the Lassen National Forest as trails where public OSV use would be allowed when snow depth is adequate for that use to occur. All existing OSV prohibitions applying to trails where public motorized use is not allowed would continue.
2. To designate 834,660 acres of National Forest System lands within the Lassen National Forest as areas where public, cross-country OSV use would be allowed when snow depth is adequate for that use to occur. This land area would represent approximately 72.6 percent of the National Forest System land within the Lassen National Forest. All existing OSV prohibitions applying to areas of the forest where public motorized use is not allowed would continue.
3. To not designate (to prohibit public OSV use on) approximately 315,360 acres on the Lassen National Forest for public OSV use. These areas include all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited, and 129,360 acres currently open to OSV use that would not be designated for OSV use in this alternative.
4. To implement Forest-wide snow depth requirements for public OSV use that would provide for public safety and natural and cultural resource protection by:
 - a. Allowing public, cross-country OSV use in designated areas only when there are 12 or more inches of snow or ice covering the landscape based on weather and observations by Forest Service personnel and the public, to prevent impacts to surface and subsurface resources including, but not limited to, archaeological deposits, historic features, and historic properties; and
 - b. Allowing public OSV use on designated snow trails generally when there are 12 or more inches of snow covering the trail. This use would be allowed when there are as few as 6 inches of snow only where site review determines there would be no damage to underlying resources.
5. To not designate for public OSV use any existing trail in an area where motorized use is currently prohibited on the Lassen National Forest.
6. Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.
7. To identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service's Lassen National Forest Grooming Program.
8. To groom OSV snow trails consistent with historical grooming practices, when there are 18 or more inches of snow.
9. Project design features, including minimization measures and monitoring procedures are described beginning on page 66 of this document. In addition, the following project design feature would also be implemented:

10. Education on responsible practices, trail restrictions, or separations to reduce conflicts. This alternative is summarized in table 14 through table 19 and shown on the map in figure 4.

Table 14. Comparison of areas where OSV use would be allowed with total forest land area – current management and alternatives 2 and 3

Area	Alternative 1 - Current Management*	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations
National Forest System Land Area within Administrative Boundary of Lassen National Forest (Acres)	1,150,020	1,150,020	1,150,020
Total Areas Open (Designated in Alternatives 2 and 3) for Cross-country OSV Use (Acres)	964,020	921,130	834,660
Percentage of NFS Land Area Open (Designated in Alternatives 2 and 3) for Cross-country OSV Use	83.8%	80.1%	72.6%
Total Areas OSVs Not Allowed and Not Designated for OSV Use in Alternatives 2 and 3 (Acres) (Table 15)	186,000	228,890	315,360

*Because no Subpart C designations of areas and trails for OSV use have been made, areas and trails are not “designated,” but are either “open” or “closed” to OSV use under current management.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 15. Areas not designated for OSV use – current management and alternatives 2 and 3 (acres)

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 3 – OSV Use Not Designated
• Ishi Wilderness	40,910	40,910	40,910
• Caribou Wilderness	20,830	20,830	20,830
• Thousand Lakes Wilderness	16,570	16,570	16,570
• Proposed Wilderness Adjacent to SW Corner LVNP (Rocky Peak)	8,620	8,620	8,620
• Proposed Wilderness Southwest Corner of Forest	7,710	7,710	7,710
• Proposed Wilderness South Border of LVNP (Chummy Meadows)	4,890	4,890	4,890
• Proposed Wilderness East Side of Caribou Wilderness	890	890	890
• Pacific Crest Trail and Non-motorized Corridor	-	10,460	-
• Cub Creek RNA	4,090	4,090	4,090
• Blacks Mountain RNA	-	520	520
• Semi-primitive Non-motorized and Primitive Near Ishi Wilderness	22,320	22,320	22,320
• Semi-primitive Non-motorized Near Old Station and East of Hwy. 89 (Cinder Butte)	13,700	13,700	13,700

Over-snow Vehicle Use Designation

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 3 – OSV Use Not Designated
• Semi-primitive Non-motorized Chips Creek Area	7,400	7,400	7,400
• Semi-primitive Non-motorized Soda Creek Area	4,210	4,210	4,210
• Semi-primitive Non-motorized South of Mountain Meadows Reservoir Including Homer Deer SIA	3,370	3,370	3,370
• Semi-primitive Non-motorized Snow Meadow Area	3,140	3,140	3,140
• Semi-primitive Non-motorized North of LVNP (East of West Prospect Peak)	2,610	2,610	2,610
• Semi-primitive Non-motorized Jackass Creek Area	1,800	1,800	1,800
• Semi-primitive Non-motorized Rock Creek Area	1,760	1,760	1,760
• Semi-primitive Non-motorized (East of Adobe Flat Reservoir - Shasta Trinity NF Managed by Lassen NF)	1,750	1,750	1,750
• Semi-primitive Non-motorized (West of Mayfield Ice Cave - Shasta Trinity NF Managed by Lassen NF)	1,070	1,070	1,070
• Semi-primitive Non-motorized Snow Mountain Area West of Old Station	700	700	700
• Semi-primitive Motorized Near Old Station East of Hwy. 89 (Hat Creek Valley)	12,110	12,110	12,110
• Semi-primitive Motorized Butt Mountain Area	1,660	1,660	1,660
• Semi-primitive Motorized SE of Old Station East of Hwy. 44 (Little Potato Butte)	630	630	630
• Roaded Natural Onion Springs Closure (West Border of LVNP)	1,080	1,080	1,080
• West Shore of Eagle Lake South of Spalding Tract Osprey Mgt Area	1,670	1,670	1,670
• Deer Creek Anadromous Fish Closure	-	1,520	-
• Butte Lake Closure (OSV prohibited except where restricted to trail only) North of LVNP	-	-	31,730
• Limited OSV Access in Southwest Corner of Lassen NF	-	27,400	-
• Below 3,500-foot Elevation on the Lassen NF	-	-	59,130
• Fredonyer-Goumaz Closure (OSV prohibited except where restricted to trail only) Between Hwys 36 & 44	-	-	19,040
• McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17)	-	-	10,300
• Colby Mountain Closure	-	-	4,490
• Southwest Shore Lake Almanor	-	1,840	1,840

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 3 – OSV Use Not Designated
• South Shore Eagle Lake	-	1,150	1,680
• Tippin Forest Order North of Hwy. 299	510	510	510
• Willard Hill Closure	-	-	630
Total Areas OSVs Not Allowed and Not Designated for OSV Use in alternatives 2 and 3 (Acres)	186,000	228,890	315,360

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 16. Designated groomed and ungroomed trails for OSV use – current management and alternatives 2 and 3 (miles)

Snow Trails for OSV Use	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations
Groomed and Ungroomed Snow Trails on Lassen NF for OSV Use (miles) (Includes groomed designated OSV trails in Table 18)	2,760	323	316
Ungroomed Snow Trails where OSV Use would be Allowed (Designated in alternatives 2 and 3) (miles)			
• PCT OSV Crossing Access Trails (Table 17)	-	7	-
• Road 29N10	5	5	5
• Road 30N16 from 31N17 To McGowan OSV Closure	2	-	-
• Road 27N11 Ungroomed Designated SE of Jonesville	1	-	-
• Road (3xN17) West of McGowan Designated Ungroomed to Ashpan Groomed System	28	-	-
• Forest Road 21 & County Road 105 from Hwy. 44 to Eagle Lake	25	-	-
• Designated Ungroomed North of LVNP (Butte Lake)	22	-	-
• Road 32N46 in Ashpan Designated Ungroomed	4	-	-
• Ungroomed OSV Trail in OSV Prohibited Areas	12	-	-
• Other Ungroomed OSV Trail in Areas Open to Cross-country OSV Use (Marked and Unmarked)	2,350*	-**	-**
Total Trails Open for OSV Use but not Groomed	2,449	12	5

*Most of these OSV trails are mapped on the Lassen National Forest's 2005 Winter Recreation Guide.

**Alternatives 2 and 3 would not designate ungroomed OSV trails located within areas designated for public, cross-country OSV use.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 17. Designated Pacific Crest Trail (PCT) OSV crossings – current management and alternatives 2 and 3

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations
Designated Pacific Crest Trail Crossing Points (#)	No PCT Crossing Points or Corridor*	28	No PCT Crossing Points or Corridor Designated*
Designated OSV Access Trails Through Designated Pacific Crest Trail Crossing Points by Road Name (miles) (miles)	-	8	-
<ul style="list-style-type: none"> Pit River Canyon Rd (St Dr 50) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only	-
<ul style="list-style-type: none"> St. Bernard So Rd. (Collins 1) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only	-
<ul style="list-style-type: none"> 37N05 and 37N052Y - Designated Ungroomed 	-	0.4	-
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.4	-
<ul style="list-style-type: none"> 37N5C - Designated Ungroomed 	-	0.3	-
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 37N02 - Designated Ungroomed 	-	0.1	-
<ul style="list-style-type: none"> 36N10 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 36N36Y - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 36N09 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 36N33B - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 35N10 - Designated Ungroomed 	-	0.3	-
<ul style="list-style-type: none"> 34N94 and 34N34 - Designated Ungroomed 	-	0.6	-
<ul style="list-style-type: none"> 33N22 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N99 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N20 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N12 - Designated Ungroomed 	-	0.3	-
<ul style="list-style-type: none"> 32N92 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N42Y - Designated Ungroomed, 0.095 mile not on underlying route. 	-	0.3	-

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations
• 29N97 and 29N27 - Designated Ungroomed	-	0.3	-
• 28N61 - Designated Ungroomed	-	0.8	-
• 28N16 - Designated Ungroomed	-	0.4	-
• 28N16 , 29N17, and 29N17J - Designated Ungroomed	-	0.3	-
• 27N11G - Designated Ungroomed	-	0.6	-
• 26N74 - Designated Ungroomed	-	0.2	-
• Humboldt Rd./28N43 - Designated Groomed Included in Jonesville Groomed Total	-	0.3	-
• Humbug Rd./BU915 - Designated Groomed Included in Jonesville Groomed Total	-	0.2	-
• 26N02/Cirby Meadows - Designated Groomed Included in Jonesville Groomed Total	-	0.3	-
Designated OSV Access Trails Through Designated PCT Crossing Points (#)	-	26	-
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (#)	-	3	-
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (miles)	-	1	-
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (#)	-	23	-
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (miles)	-	7	-

*In alternatives 1 and 3, OSV use would be allowed adjacent to and across the PCT. Motorized use would be prohibited on the tread of the PCT in all alternatives. All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 18. OSV trail systems groomed by the Lassen National Forest – current management and alternatives 2 and 3 (miles)

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 3
La Tour State Forest Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	20	20	20
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 3)	3	3	3
• Subtotal	23	23	23
Ashpan Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 3)	34	34	34
• Subtotal	34	34	34
Morgan Summit Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	2	2	2
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 3)	60	60	60
• Subtotal	62	62	62
Jonesville Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	5	5	5
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 3)	64	64	64
• Subtotal	69	69	69
Swain Mountain Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 3)	71	71	71
• Subtotal	71	71	71
Bogard Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 3)	47	47	47
• Subtotal	47	47	47

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 3
Fredonyer Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed Lassen NF by Forest Service Under NFS Jurisdiction (Trail to be Designated on Plumas NF)	11	11	11
• Groomed by Lassen NF Forest Service Under NFS Jurisdiction (Trail to be Designated on Lassen NF in alternatives 2 and 3)	32	32	32
• Subtotal	43	43	43
Total OSV Use Allowed (Designated on Lassen NF in alternatives 2 and 3) and Groomed by Lassen NF	311	311	311
Total OSV Use Allowed (on Plumas NF) and Groomed by Lassen NF	11	11	11
Total Groomed but not Under NFS Jurisdiction	27	27	27
Grand Total Groomed	349	349	349

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Allowed OSV Use

Public OSV use would be designated on 316 miles of snow trails on the Lassen National Forest. Approximately 834,660 acres would be designated as areas where public, cross-country OSV use would be allowed, and snow would be subject to snow-depth restrictions.

Public OSV use would be prohibited on the Lassen National Forest unless there is adequate snow depth that meets the conditions in table 19.

Table 19. Summary comparing minimum snow depth (in inches) and OSV trail grooming season on the Lassen National Forest – current management and alternatives 2 and 3

OSV Management	Alternative 1 – Current Management	Alternative 2	Alternative 3
Minimum Snow Depth for Public OSV Use on Snow Trails (Inches)	12	6 on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails	12 inches, generally. 6 inches only where site review determines there would be no damage to underlying resources
Minimum Snow Depth for Public, Cross-country OSV Use (Inches)	12	12	12
Minimum Snow Depth for Snow Trail Grooming to Occur (Inches)	18	12*	18
OSV Trail Grooming Season	12/26 – 3/31	12/26 – 3/31	12/26 – 3/31

*The originally scoped proposed action has been modified to be consistent with the state grooming standard which states, “Begin grooming when the snow depth is at least 12 to 18 inches” (OSV Program Draft EIR, Program Years 2010-2020 – October 2010, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, page 2-12)

Designation of Areas

Alternative 3 would designate areas on the Lassen National Forest where public, cross-country OSV uses would be allowed when there are 12 or more inches of snow on the ground. These areas would total approximately 834,660 acres (table 14).

Prohibited OSV Use

This alternative would not designate (would prohibit) and continue existing prohibitions on OSV use on approximately 186,000 acres of National Forest System land and add new OSV use prohibitions on approximately 129,360 acres. These new prohibitions are listed in table 15.

Existing OSV prohibitions in Wilderness areas and in areas designated in the Forest Plan as Recommended Wilderness, Semi-primitive Non-motorized, and Research Natural Areas that currently have the force of law, regulation, or policy and would continue to exist.

Designation of Trails

This alternative would designate 316 miles of groomed and marked but ungroomed trails under National Forest System jurisdiction on the Lassen National Forest for OSV use (table 16). This represents a reduction in the number of miles of OSV trail compared to the length of trail (miles) where OSV use is currently allowed. However, approximately 88 percent of the OSV trails in the current trail system would be either designated for public OSV use or are located in areas that would be designated for public, cross-country OSV use in this alternative.

OSV Use on Groomed Trails

This alternative would identify 349 miles of National Forest System snow trails that would be groomed for public OSV use on the Lassen National Forest (figure 5). Although identified for grooming and historically groomed by the Forest Service, approximately 38 miles of groomed trails would not be subject to designation because they are not under National Forest System jurisdiction on the Lassen National Forest. This would represent no change from current management.

Table 18 compares the number of miles of groomed snow trails that have historically been groomed (current management) with the length of snow trails (miles) under the modified proposed action and this alternative that would be identified to be groomed. Snow trail grooming for public OSV use would occur on all of these trails only when there are 18 or more inches of snow on the ground.

All other aspects of the grooming program would be as described in alternative 2 (page 36).

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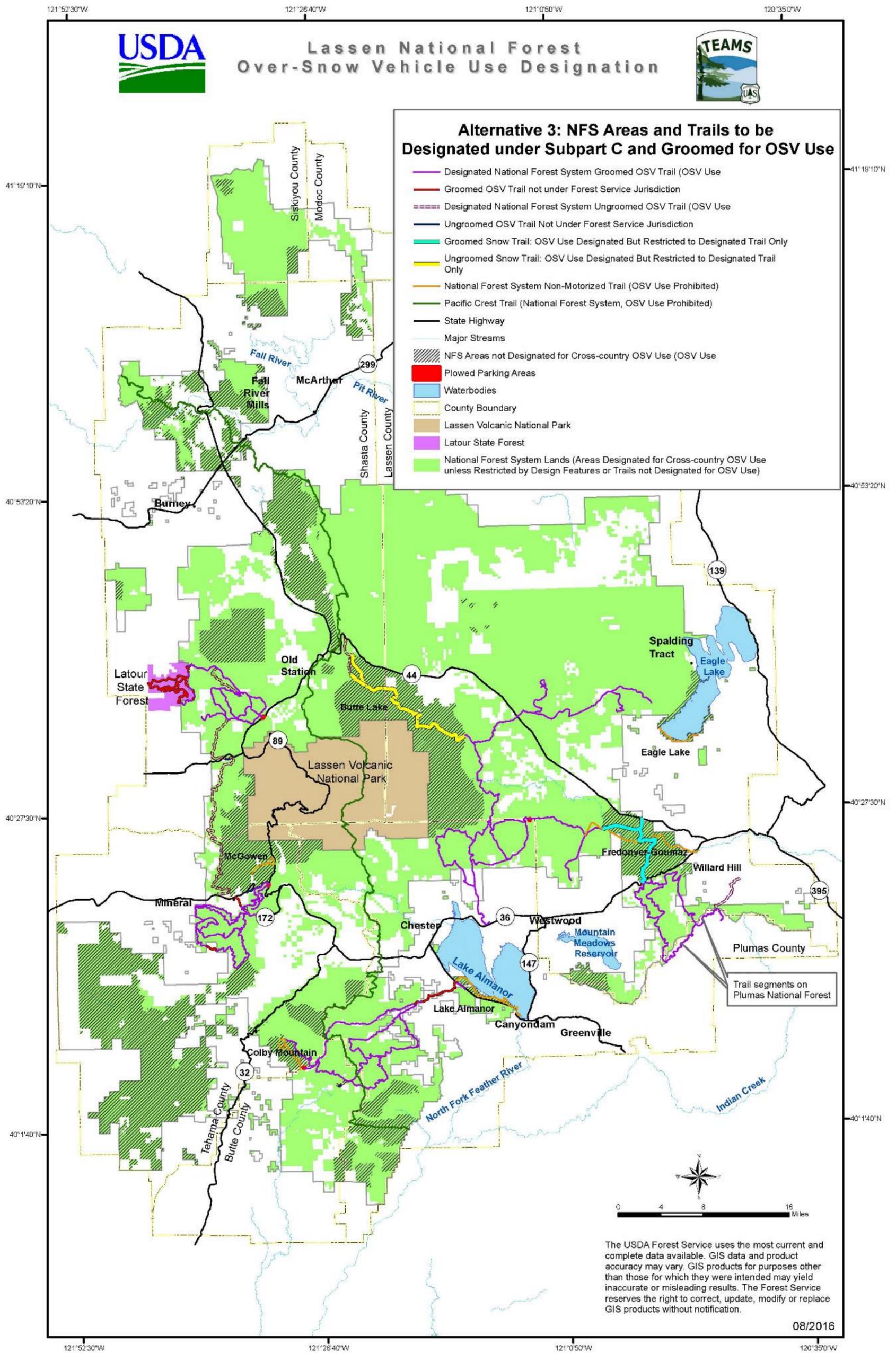


Figure 4. Map showing alternative 3 – NFS areas and trails to be designated under Subpart C and groomed for OSV use

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Alternative 4

Alternative 4 is the preferred alternative. This alternative addresses the motorized recreational experience significant issue. Differences between this alternative, current management, and the modified proposed action are summarized in table 20 through table 25, below.

This alternative includes the following actions:

1. To designate 398 miles of National Forest System snow trails on National Forest System lands within the Lassen National Forest as trails where public OSV use would be allowed when snow depth is adequate for that use to occur. All existing OSV prohibitions applying to trails where public motorized use is not allowed would continue.
2. To designate 958,930 acres of National Forest System lands within the Lassen National Forest as areas where public, cross-country OSV use would be allowed when there are 12 or more inches of snow. This land area would represent approximately 83.4 percent of the National Forest System land within the Lassen National Forest. All existing OSV prohibitions applying to areas of the forest where public motorized use is not allowed would continue.
3. To not designate (to prohibit public OSV use on) approximately 191,090 acres on the Lassen National Forest for public OSV use. These areas include all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited, and 5,090 acres currently open to OSV use that would not be designated for OSV use in this alternative.
4. To implement Forest-wide snow depth requirements for public OSV use that would provide for public safety and natural and cultural resource protection by:
 - a. Allowing public, cross-country OSV use in designated areas only when there are 12 or more inches of snow or ice covering the landscape based on weather and observations by Forest Service personnel and the public, to prevent impacts to surface and subsurface resources including, but not limited to, archaeological deposits, historic features, and historic properties; and
 - b. Allowing public OSV use on designated snow trails when there are 6 or more inches of snow. Exceptions are allowed on designated OSV trails overlaying existing paved, dirt, and gravel National Forest System roads and trails in order for OSVs to access higher terrain and legal snow levels when snow depths are less than 6 inches, as long as this use does not cause visible damage to the underlying surface.
5. To not designate for public OSV use any existing trail in an area where motorized use is currently prohibited on the Lassen National Forest.
6. Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.
7. To identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service's Lassen National Forest Grooming Program.
8. To groom OSV snow trails when there are 12 or more inches of snow, and formally adopt California State Parks' snow grooming standards requiring 12 or more inches of snow depth before grooming can occur.
9. Project design features, including minimization measures and monitoring procedures are described beginning on 66 of this document.

Alternative 4 is summarized in table 20 through table 25 and shown in figure 5 of this document.

Table 20. Comparison of areas where OSV use would be allowed with total forest land area – current management and alternatives 2 and 4

Area	Alternative 1 - Current Management*	Alternative 2 – OSV Designations	Alternative 4 – OSV Designations
National Forest System Land Area within Administrative Boundary of Lassen National Forest (Acres)	1,150,020	1,150,020	1,150,020
Total Areas Open (Designated in alternatives 2 and 4) for Cross-country OSV Use (Acres)	964,020	921,130	958,930
Percentage of NFS Land Area Open (Designated in alternatives 2 and 4) for Cross-country OSV Use	83.8%	80.1%	83.4%
Total Areas OSVs Not Allowed and Not Designated for OSV Use in alternatives 2 and 4 (Acres) (Table 21)	186,000	228,890	191,090

*Because no Subpart C designations of areas and trails for OSV use have been made, areas and trails are not “designated,” but are either “open” or “closed” to OSV use under current management.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 21. Areas not designated for OSV use – current management and alternatives 2 and 4 (acres)

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 4 – OSV Use Not Designated
• Ishi Wilderness	40,910	40,910	40,910
• Caribou Wilderness	20,830	20,830	20,830
• Thousand Lakes Wilderness	16,570	16,570	16,570
• Proposed Wilderness Adjacent to SW Corner LVNP (Rocky Peak)	8,620	8,620	8,620
• Proposed Wilderness Southwest Corner of Forest	7,710	7,710	7,710
• Proposed Wilderness South Border of LVNP (Chummy Meadows)	4,890	4,890	4,890
• Proposed Wilderness East Side of Caribou Wilderness	890	890	890
• Pacific Crest Trail and Non-motorized Corridor	-	10,460	-
• Cub Creek RNA	4,090	4,090	4,090
• Blacks Mountain RNA	-	520	520
• Semi-primitive Non-motorized and Primitive Near Ishi Wilderness	22,320	22,320	22,320
• Semi-primitive Non-motorized Near Old Station and East of Hwy. 89 (Cinder Butte)	13,700	13,700	13,700
• Semi-primitive Non-motorized Chips Creek Area	7,400	7,400	7,400

Over-snow Vehicle Use Designation

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 4 – OSV Use Not Designated
• Semi-primitive Non-motorized Soda Creek Area	4,210	4,210	4,210
• Semi-primitive Non-motorized South of Mountain Meadows Reservoir Including Homer Deer SIA	3,370	3,370	3,370
• Semi-primitive Non-motorized Snow Meadow Area	3,140	3,140	3,140
• Semi-primitive Non-motorized North of LVNP (East of West Prospect Peak)	2,610	2,610	2,610
• Semi-primitive Non-motorized Jackass Creek Area	1,800	1,800	1,800
• Semi-primitive Non-motorized Rock Creek Area	1,760	1,760	1,760
• Semi-primitive Non-motorized (East of Adobe Flat Reservoir - Shasta Trinity NF Managed by Lassen NF)	1,750	1,750	1,750
• Semi-primitive Non-motorized (West of Mayfield Ice Cave - Shasta Trinity NF Managed by Lassen NF)	1,070	1,070	1,070
• Semi-primitive Non-motorized Snow Mountain Area West of Old Station	700	700	700
• Semi-primitive Motorized Near Old Station East of Hwy. 89 (Hat Creek Valley)	12,110	12,110	12,110
• Semi-primitive Motorized Butt Mountain Area	1,660	1,660	1,660
• Semi-primitive Motorized SE of Old Station East of Hwy. 44 (Little Potato Butte)	630	630	630
• Roded Natural Onion Springs Closure (West Border of LVNP)	1,080	1,080	1,080
• West Shore of Eagle Lake South of Spalding Tract Osprey Mgt Area	1,670	1,670	1,670
• Deer Creek Anadromous Fish Closure	-	1,520	-
• Butte Lake Closure (OSV prohibited except where restricted to trail only) North of LVNP	-	-	-
• Limited OSV Access in Southwest Corner of Lassen NF	-	27,400	-
• Below 3,500-foot Elevation in Southwest Corner of Lassen NF	-	-	-
• Fredonyer-Goumaz Closure (OSV prohibited except where restricted to trail only) Between Hwys 36 & 44	-	-	-
• McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17)	-	-	4,570
• Colby Mountain Closure	-	-	-
• Southwest Shore Lake Almanor	-	1,840	-
• South Shore Eagle Lake	-	1,150	-

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 4 – OSV Use Not Designated
• Tippin Forest Order North of Hwy. 299	510	510	510
• Willard Hill Closure	-	-	-
Total Areas OSVs Not Allowed and Not Designated for OSV Use in alternatives 2 and 4 (Acres)	186,000	228,890	191,090

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 22. Designated groomed and ungroomed trails for OSV use – current management and alternatives 2 and 4 (miles)

Snow Trails for OSV Use	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 4 – OSV Designations
Groomed and Ungroomed Snow Trails on Lassen NF for OSV Use (miles) (Includes groomed designated OSV trails in Table 24)	2,760	323	398
Ungroomed Snow Trails where OSV Use would be Allowed (Designated in alternatives 2 and 4) (miles)			
• PCT OSV Crossing Access Trails (Table 23)	-	7	-
• Road 29N10	5	5	5
• Road 30N16 from 31N17 To McGowan OSV Closure	2	-	2
• Road 27N11 Ungroomed Designated SE of Jonesville	1	-	1
• Road (3xN17) West of McGowan Designated Ungroomed to Ashpan Groomed System	28	-	28
• Forest Road 21 & County Road 105 from Hwy. 44 to Eagle Lake	25	-	25
• Designated Ungroomed North of LVNP (Butte Lake)	22	-	22
• Road 32N46 in Ashpan Designated Ungroomed	4	-	4
• Ungroomed OSV Trail in OSV Prohibited Areas	12	-	-
• Other Ungroomed OSV Trail in Areas Open to Cross-country OSV Use (Marked and Unmarked)	2,350*	-**	-
Total Trails Open for OSV Use but not Groomed	2,449	12	87

*Most of these OSV trails are mapped on the Lassen National Forest's 2005 Winter Recreation Guide.

**Alternative 2 would not designate ungroomed OSV trails located within areas designated for public, cross-country OSV use.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 23. Designated Pacific Crest Trail (PCT) OSV crossings – current management and alternatives 2 and 4

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 4 – OSV Designations
Designated Pacific Crest Trail Crossing Points (#)	No PCT Crossing Points or Corridor*	28	No PCT Crossing Points or Corridor Designated*
Designated OSV Access Trails Through Designated Pacific Crest Trail Crossing Points by Road Name (miles)	-	8	-
<ul style="list-style-type: none"> Pit River Canyon Rd (St Dr 50) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only	-
<ul style="list-style-type: none"> St. Bernard So Rd. (Collins 1) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only	-
<ul style="list-style-type: none"> 37N05 and 37N052Y - Designated Ungroomed 	-	0.4	-
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.4	-
<ul style="list-style-type: none"> 37N5C - Designated Ungroomed 	-	0.3	-
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 37N02 - Designated Ungroomed 	-	0.1	-
<ul style="list-style-type: none"> 36N10 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 36N36Y - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 36N09 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 36N33B - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 35N10 - Designated Ungroomed 	-	0.3	-
<ul style="list-style-type: none"> 34N94 and 34N34 - Designated Ungroomed 	-	0.6	-
<ul style="list-style-type: none"> 33N22 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N99 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N20 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N12 - Designated Ungroomed 	-	0.3	-
<ul style="list-style-type: none"> 32N92 - Designated Ungroomed 	-	0.2	-
<ul style="list-style-type: none"> 32N42Y - Designated Ungroomed, 0.095 mile not on underlying route. 	-	0.3	-

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 4 – OSV Designations
• 29N97 and 29N27 - Designated Ungroomed	-	0.3	-
• 28N61 - Designated Ungroomed	-	0.8	-
• 28N16 - Designated Ungroomed	-	0.4	-
• 28N16 , 29N17, and 29N17J - Designated Ungroomed	-	0.3	-
• 27N11G - Designated Ungroomed	-	0.6	-
• 26N74 - Designated Ungroomed	-	0.2	-
• Humboldt Rd./28N43 - Designated Groomed Included in Jonesville Groomed Total	-	0.3	-
• Humbug Rd./BU915 - Designated Groomed Included in Jonesville Groomed Total	-	0.2	-
• 26N02/Cirby Meadows - Designated Groomed Included in Jonesville Groomed Total	-	0.3	-
Designated OSV Access Trails Through Designated PCT Crossing Points (#)	-	26	-
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (#)	-	3	-
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (miles)	-	1	-
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (#)	-	23	-
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (miles)	-	7	-

*In alternatives 1 and 4, OSV use would be allowed adjacent to and across the PCT. Motorized use would be prohibited on the tread of the PCT in all alternatives. All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 24. OSV trail systems groomed by the Lassen National Forest – current management and alternatives 2 and 4 (miles)

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 4
La Tour State Forest Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	20	20	20
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 4)	3	3	3
• Subtotal	23	23	23
Ashpan Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 4)	34	34	34
• Subtotal	34	34	34
Morgan Summit Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	2	2	2
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 4)	60	60	60
• Subtotal	62	62	62
Jonesville Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	5	5	5
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 4)	64	64	64
• Subtotal	69	69	69
Swain Mountain Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 4)	71	71	71
• Subtotal	71	71	71
Bogard Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 and 4)	47	47	47
• Subtotal	47	47	47

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 4
Fredonyer Snowmobile Area			
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-
• Groomed Lassen NF by Forest Service Under NFS Jurisdiction (Trail to be Designated on Plumas NF)	11	11	11
• Groomed by Lassen NF Forest Service Under NFS Jurisdiction (Trail to be Designated on Lassen NF in alternatives 2 and 4)	32	32	32
• Subtotal	43	43	43
Total OSV Use Allowed (Designated on Lassen NF in alternatives 2 and 4) and Groomed by Lassen NF	311	311	311
Total OSV Use Allowed (on Plumas NF) and Groomed by Lassen NF	11	11	11
Total Groomed but not Under NFS Jurisdiction	27	27	27
Grand Total Groomed	349	349	349

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Allowed OSV Use

Public OSV use would be designated on 398 miles of snow trails on the Lassen National Forest. Approximately 958,930 acres would be designated as areas where public, cross-country OSV use would be allowed, and snow would be subject to snow-depth restrictions.

Public OSV use would be prohibited on the Lassen National Forest unless there is adequate snow depth that meets the conditions in table 25. This alternative is a change is to provide improved public trail access for OSV users from trailheads to deeper snow areas.

Table 25. Summary comparing minimum snow depth (in inches) and OSV trail grooming season on the Lassen National Forest – current management and alternatives 2 and 4

OSV Management	Alternative 1 – Current Management	Alternative 2	Alternative 4
Minimum Snow Depth for Public OSV Use on Snow Trails (Inches)	12	6 inches on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails	No restriction with 6 or more inches
Minimum Snow Depth for Public, Cross-country OSV Use (Inches)	12	12	12
Minimum Snow Depth for Snow Trail Grooming to Occur (Inches)	18	12*	12
OSV Trail Grooming Season	12/26 – 3/31	12/26 – 3/31	12/26 – 3/31

*The originally scoped proposed action has been modified to be consistent with the state grooming standard which states, "Begin grooming when the snow depth is at least 12 to 18 inches" (OSV Program Draft EIR, Program Years 2010-2020 – October 2010, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, page 2-12)

Designation of Areas

Alternative 4 would designate areas on the Lassen National Forest where public, cross-country OSV uses would be allowed as long as there are 12 or more inches of snow. These areas total approximately 958,930 acres (table 20).

Prohibited OSV Use

This alternative would not designate (would prohibit) and continue existing prohibitions on OSV use on approximately 186,000 acres of National Forest System land and add new OSV use prohibitions on approximately 5,090 acres. These new prohibitions are listed in table 21.

Existing OSV prohibitions in Wilderness areas and in areas designated in the Forest Plan as Recommended Wilderness, Semi-primitive Non-motorized, and Research Natural Areas that currently have the force of law, regulation, or policy and would continue to exist.

Designation of Trails

This alternative would designate 398 miles of groomed and marked but ungroomed trails under National Forest System jurisdiction on the Lassen National Forest for OSV use (table 22). This represents a reduction in the number of miles of OSV trail compared to the length of trail (miles) where OSV use is currently allowed. However, approximately 99 percent of the OSV trails in the current trail system would be either designated for public OSV use or are located in areas that would be designated for public, cross-country OSV use in this alternative.

OSV Use on Groomed Trails

This alternative would identify 349 miles of National Forest System snow trails that would be groomed for public OSV use on the Lassen National Forest (figure 5). Although identified for grooming and historically groomed by the Forest Service, approximately 38 miles of groomed trails would not be subject to designation because they are not under National Forest System jurisdiction on the Lassen National Forest. This would represent no change from current management.

Table 24 compares the number of miles of groomed snow trails that have historically been groomed (current management) with the length of snow trails (miles) under the modified proposed action and this alternative that would be identified to be groomed. Snow trail grooming for public OSV use would occur on all of these trails only when there are 12 or more inches of snow on the ground.

All other aspects of the grooming program would be as described in alternative 2 (page 36).

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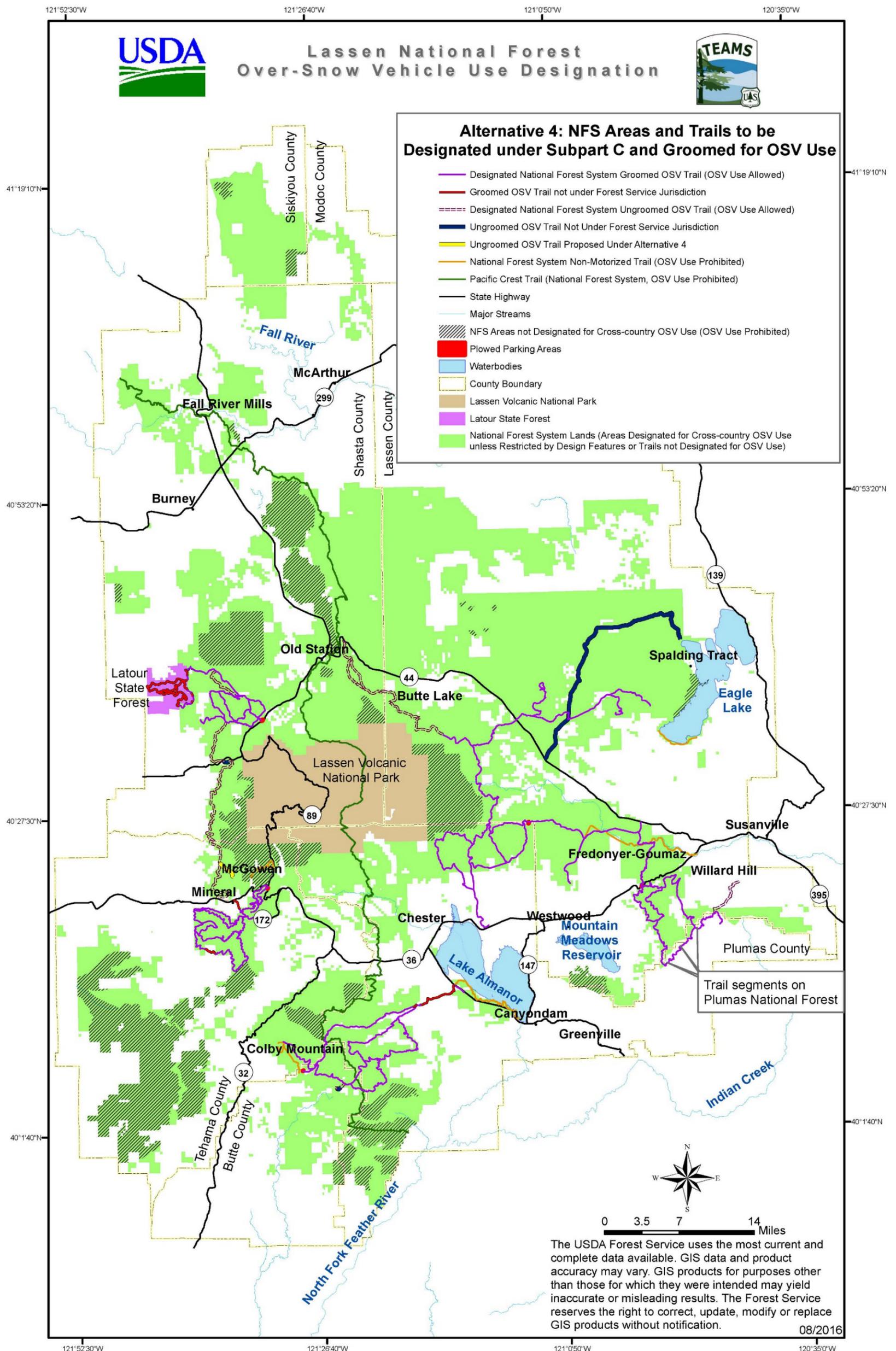


Figure 5. Map showing alternative 4 – NFS areas and trails to be designated under Subpart C and groomed for OSV use

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Project Design Features and Monitoring

We developed the following project design features and mitigation measures to be used as part of the implementation of the action alternatives. These practices would apply to all alternatives unless specified only for a specific alternative. These features were developed to reduce or eliminate adverse impacts from project activities and are incorporated as an integrated part of each alternative. Project design features are based upon standard practices and operating procedures that have been employed and proved effective in similar circumstances and conditions.

1. All activities will adhere to Best Management Practices (BMPs) related to Over Snow Vehicle Use from the 2012 USDA Forest Service National Core BMP Technical Guide and the 2011 Region 5 Soil and Water Conservation Handbook (defined in FEIS, Appendix D).
2. Forest Service National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1 National Core BMP Technical Guide (FEIS appendix D) applicable to OSV use will be implemented under all alternatives.
3. Grooming of snow trails for OSV use will occur only when the ground surface is covered with adequate snowpack to prevent soil damage or soil rutting (FEIS, table 31). The operator shall consider recent, current, and forecasted weather and snow conditions to ensure these conditions are met.
4. OSV use of groomed trails will occur only when and where adequate snow cover ensures negligible potential for contact with bare soil and practically no disturbance of trail and road surfaces (FEIS, table 31). This will prevent substantial impacts to water quality in perennial, intermittent, or ephemeral streams, or in wetlands or other bodies of water.
5. To prevent substantial impacts to soil resources, areas designated for public, cross-country OSV use will be clearly delineated and marked in the field, where practical.
6. Areas will be protected from substantial impacts to resources resulting from overuse by closing or managing designated OSV areas to mitigate adverse effects to soil, water quality, and riparian resources, by adaptive management, or changing season-of use periods as necessary to allow rehabilitation of an area, particularly hill-climb areas.
7. Watershed resources will be protected by making spill containment equipment available at the facilities where grooming equipment is re-fueled.
8. Watershed resources will be protected by designating equipment maintenance and refueling sites to ensure that they are located on gentle slopes, on uplands, and outside of riparian conservation areas and sensitive terrestrial wildlife habitats.
9. To protect watershed resources, all stream crossings and other in-stream structures facilitating OSV passage will be designed and maintained to provide for the passage of flow and sediment, to withstand expected flood flows, and to allow for free movement of resident aquatic life (California Snowmobile Trail Grooming, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division).
10. To protect watershed resources, public OSV use of trails and grooming snow trails for OSV use will be prohibited in wetlands unless protected by at least 12 inches of packed snow or 2 inches of frozen soil. If OSV trails must enter wetlands, bridges or raised prisms with diffuse drainage to sustain flow patterns will be used.
11. To protect watershed resources, crossing bottoms will be set at natural levels of channel beds and wet meadow surfaces.

12. To protect watershed resources, actions that dewater or reduce water budgets in wetlands will be avoided.
13. To protect cultural and historic resources, foreign material may be utilized to cover historic properties under the following conditions:
 - a. Engineering staff will design the foreign material depth to acceptable professional standards;
 - b. Engineering staff will design the foreign material use to assure that there will be no surface or subsurface impacts to archaeological deposits or historic features;
 - c. The foreign material must be easily distinguished from underlying archaeological deposits or historic features;
 - d. The remainder of the archaeological site or historic feature is to be avoided, and traffic is to be clearly routed across the foreign fill material;
 - e. The foreign material must be removable should research or other heritage need require access to the archaeological deposit or historic feature at a later date; and
 - f. Indian tribe or other public concerns about the use of the foreign material will be addressed prior to use.
14. Signage will be installed along the Pacific Crest Trail as staffing and funding allow, to enhance wayfinding of winter OSV users and reduce encroachment on the Pacific Crest Trail. Agency signage procedures will be followed. As a guideline, trail markers will be at eye level, approximately 40 inches above the average snow depth.
15. OSV trail grooming will be timed minimize impacts on non-motorized recreation experiences.
16. Wheeled vehicle use of groomed snow trails will be prohibited from December 26 through March 31.
17. The grooming season generally begins in mid-December and continues through March. Start and stop times vary per trail location and are dependent upon the presence and depth of snow. Snow trails are prioritized for grooming based on visitor use. Grooming has historically occurred several times per week. As part of this proposal, the grooming frequency on priority trails would occur several times per week and after major storms, typically between 4:00 p.m. and 6:00 a.m.
18. Snow trails would be groomed for public OSV use to a minimum width of 10 feet and typically up to 14 feet wide. Snow trails would be groomed up to 30 feet wide in the more heavily used areas such as near trailheads. Groomed trail width is determined by variety of factors such as width of the underlying road bed, width of grooming tractor, heavy two-way traffic on the trail, and trail corners. Snow trails would not be groomed beyond the width of the underlying roadbed, where one exists. Where the terrain allows, main ingress and egress snow trails that connect to the trailhead would be groomed to 18 feet wide or greater to facilitate the added traffic.
19. Snowcats are operated at speeds in the range of 3 to 7 miles per hour. The vehicle is operated with warning lights on at all times. The maximum hours of equipment operation is generally a 12-hour day during peak season (table 8).

20. Snow trail grooming for public OSV use would be conducted in accordance with the 1997 Snowmobile Trail Grooming Standards set by the California Off-Highway Motor Vehicle Recreation (OHMVR) Division, as follows:
21. Operators shall be trained and directed by a grooming coordinator.
22. Identify hazards in advance of grooming, preferably in autumn before snow falls.
23. Maintain a 10-foot vertical clearance from potential obstructions.
24. The California OHMVR Division's snowcat fleet is subject to emission regulation by the California Air Resources Board (CARB) as off-road equipment. The CARB sets an emission limit for the vehicle fleet as a whole rather than for individual pieces of equipment. Based on the total horsepower of the vehicle fleet, and the model and year of the individual equipment within the fleet, CARB determines how much horsepower per year must be repowered, retrofitted, or retired. The California OHMVR Division then determines what modifications to make to its fleet in order to satisfy CARB requirements.

Project design features do not apply to the no-action alternative because no project activities are proposed; no changes would be made to the existing system of OSV trails or areas in the planning area under the no-action alternative. However, continuing current management under the no-action alternative would include the use of standard operating procedures and best management practices for routine OSV trail grooming and maintenance of the current OSV trail and area system.

Minimization Measures to Address Travel Management Regulation Requirements

In designating National Forest System trails and areas on a national forest, the Forest Service Travel Management Regulations require the responsible official to “consider effects on the following, with the objective of minimizing:

- Damage to soil, watershed, vegetation, and other forest resources;
- Harassment of wildlife and significant disruption of wildlife habitats;
- Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands; and
- Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands” (36 CFR §212.55(b)).

Many reviewers of the DEIS expressed the opinion that this language in the Travel Management Regulations requires the decision to minimize damage, harassment, significant disruption, and conflicts to the extent that they would not occur at all. The Department of Agriculture explained the appropriate interpretation of this requirement when it released the Travel Management Regulations in November of 2005:

An extreme interpretation of “minimize” would preclude any [motorized] use at all, since impacts always can be reduced further by preventing them altogether. Such an interpretation would not reflect the full context of E.O. 11644 or other laws and policies related to multiple use of NFS lands. Neither E.O. 11644, nor these other laws and policies, establish the primacy of any particular use of trails and areas over any other. The Department believes “shall consider * * * with the objective of minimizing * * *” will assure that environmental impacts are properly taken into account, without categorically precluding motor vehicle use (70 FR 68281, November 9, 2005).

Criteria for designating trails and areas was applied in two ways, generally in accordance with 36 CFR §212.55(a), and specifically in accordance with 36 CFR §212.55(b) to routes and areas with a granular approach to address the objective of minimizing impacts. By granular, I mean the following:

- ◆ Establishing design criteria to protect specific resources and specific areas on the forest on potential OSV routes and in OSV areas smaller than the entire forest to meet the objective of minimizing impacts; and
- ◆ Applying the minimization criteria to provide for resource protection and a balance of recreation opportunities.

The following describes the minimization measures that will be applied to the management of OSV uses on the Lassen National Forest:

Minimizing Damage to Soil, Watershed, Vegetation, and other Forest Resources (36 CFR §212.55(b)(1))

Minimizing Damage to Soil

All Public OSV Use

1. The objective of minimizing impacts of public OSV use to soil resources will be addressed by locating designated OSV routes to overlay existing NFS roads (FEIS, page 9). These roads are part of the managed road system and are maintained under best management practices (Appendix D) as they apply to soil conservation.

Use of Groomed Snow Trails

1. The objective of minimizing impacts to soil will be addressed by grooming over the existing road and trail network. This will not alter landforms or result in perceptible soil disturbance and therefore will not cause substantial impacts to water quality, perennial, intermittent or ephemeral streams, wetlands or other bodies of water (Appendix D, Water Quality Best Management Practices; Project Record, Hydrology Report).

Public, Cross-country OSV Use

1. The objective of minimizing impacts to soil will be addressed by requiring that public, cross-country OSV use only occur when and where there is adequate snow coverage to prevent adverse impacts to soil and water resources from OSV use on designated routes and areas (table 31).

Minimizing Damage to Watershed Resources

All Public OSV Use

1. The objective of minimizing impacts of public OSV use to watershed resources will be addressed by adhering to Best Management Practices related to Over Snow Vehicle Use from the 2012 USFS National Core BMP Technical Guide and the 2011 Region 5 Soil and Water Conservation Handbook.
2. The objective of minimizing impacts of public OSV use to watershed resources will be addressed by locating designated OSV routes to overlay existing NFS roads. These roads are part of the managed road system and are maintained under best management practices (page 8) as they apply to water quality.

Use of Groomed Snow Trails

1. The objective of minimizing impacts of public OSV use to watershed resources will be addressed by adhering to Best Management Practices related to Over Snow Vehicle Use from the 2012 USFS National Core BMP Technical Guide and the 2011 Region 5 Soil and Water Conservation Handbook.

Public, Cross-country OSV Use

1. The objective of minimizing impacts to watershed resources will be addressed by prohibiting public, cross-country OSV use when and where there is less snow coverage than sufficient to prevent damage to underlying soil and vegetation resources.
2. The objective of minimizing impacts to watershed resources will be addressed by prohibiting public OSV use on unfrozen lakes, reservoirs, ponds and any other open surface water.
3. The objective of minimizing impacts to watershed resources will be addressed by providing information to the public of the hazards of running over-snow vehicles on thin ice and the effects of OSV emissions on air quality and water quality.

Minimizing Damage to Vegetation

All Public OSV Use

1. The objective of minimizing damage to vegetation will be addressed by requiring sufficient snow coverage in all alternatives to prevent or minimize damage to soil and vegetation.
2. The objective of minimizing damage to vegetation will be addressed by not designating the Cub Creek and Blacks Mountain RNAs for OSV use to protect rare plant species and significant natural ecosystems (Forest Plan, page 3-26).
3. The objective of minimizing damage to vegetation will be addressed by providing public education for invasive species and encouraging cleaning of over-snow vehicles, towing vehicles, and trailers prior to entering public lands to remove dirt, debris, plant parts, and material that may carry weed seeds.
4. The objective of minimizing impacts of public OSV use to vegetation will be addressed by locating designated OSV routes to overlay existing NFS roads. These roads are part of the managed road system and no new vegetation would be disturbed.

Public, Cross-country OSV Use

1. The objective of minimizing impacts to vegetation will be addressed by designating public OSV use only when snow depths are sufficient to protect the underlying vegetation and soil. Such measures will include the implementation season of use restrictions, only allowing public OSV use when the snow pack is expected to be of sufficient depth.

Minimizing Damage to Other Forest Resources

All Public OSV Use

1. The objective of minimizing damage to other forest resources will be addressed by temporarily closing designated OSV use areas or OSV trails for other types of management activities such as contracted timber or vegetation management or other resource concerns.
2. The objective of minimizing damage to other forest resources will be addressed by using temporary closures in areas designated for public, cross-country OSV use or on public OSV

trails if unacceptable adverse impacts are occurring, a public safety hazard is revealed, or for other site-specific needs by authorization of the Forest Supervisor.

3. The objective of minimizing damage to historic and cultural resources will be addressed by ensuring the accumulation of sufficient snow depth over archaeological deposits or historic features to prevent surface and subsurface impacts. Undertaking activities may be implemented over snow cover on historic properties under the following conditions:
 - a. The snow cover must be at least 12 inches of snow or ice throughout the duration of undertaking activities on sites.
 - b. All concentrated work areas shall be located prior to snow accumulation and outside historic property boundaries.
 - c. Foreign, non-archaeological material (e.g., padding or filter cloth) will be placed within transportation corridors (e.g., designated trails) over archaeological deposits or historic features to prevent surface and subsurface impacts caused by over-snow vehicles or grooming equipment.

Public, Cross-country OSV Use

1. The objective of minimizing damage to cultural resources will be addressed by OSV closures in and around the Ishi Wilderness. These closures will address resource concerns in large swaths of land in the south and southwest sections of the Forest to keep them non-motorized for the protection of these areas. These closures will generally apply in areas of the Forest south of Highway 36 to avoid conflicts and adverse effects to natural and cultural resources in these areas.
2. The objective of minimizing impacts to cultural resources will be addressed by not designating areas around the west side of Eagle Lake for OSV use.

Minimizing Harassment of Wildlife and Significant Disruption of Wildlife Habitats (36 CFR §212.55(b)(2))

Minimizing Harassment of Wildlife

Designated OSV Trails

1. The objective of minimizing impacts of public OSV use to wolverine will be addressed by locating designated OSV routes to overlay existing NFS roads. These roads are part of the managed road system. No new OSV routes will be established by this decision. Wolverine are known to avoid roads and areas of human habitation (Project Record, Biological Assessment, pages F-27-28).

All Public OSV Use

1. The objective of minimizing harassment of wildlife will be addressed by developing a public outreach program as part of this project to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funds allow.

Public, Cross-country OSV Use

1. The objective of minimizing impacts to wildlife will be addressed by ensuring that public OSV use is not occurring in areas not designated for public, cross-country OSV use.

Minimizing Significant Disruption of Wildlife Habitats

All Public OSV Use

1. The objective of minimizing impacts to wolverine habitat will be addressed by providing areas of wolverine habitat where OSV use will not be designated to provide for limited human activity in wolverine habitat (Project Record, Wildlife, Map BE-16). Although there have been no recorded sightings of wolverine on the Lassen National Forest, at least 44 percent of suitable wolverine habitat will not be designated or conducive for OSV use.

Designated OSV Trails

1. The objective of minimizing harassment of wildlife habitats will be addressed by minimizing impacts to gray wolf prey base by locating all designated OSV routes outside of mule deer winter range (Project Record, Wildlife, Map BE-12). Referenced map in the record shows mule deer winter range and the location of designated OSV routes.

Groomed Snow Trails

1. To address the objective of minimizing significant disruption of aquatic wildlife habitats, no grooming will occur on open or flowing water, including stream crossings.

Public, Cross-country OSV Use

1. To address the objective of minimizing significant disruption of wildlife habitats, if public OSV use is found to be causing damage to Threatened, Endangered, Proposed, or Sensitive species or habitats, corrective actions will be required, including, but not limited to, area closures and signage to protect the sensitive resources.
2. To address the objective of minimizing impacts to gray wolf and their prey species, public OSV use would not be designated on more than 50.3 percent of mule deer winter range under any alternative (Project Record, Wildlife, Map BE-12). Referenced map in the record shows mule deer winter range and areas not designated for public OSV use.
3. To address the objective of minimizing significant disruption of wildlife habitats, the low risk of modification of the prey/food base from oil, gas, or other vehicle fluids entering waterways, cross-country OSV use will occur only when there is adequate snow cover to protect aquatic and riparian habitats from measurable impacts to wildlife habitats.
4. The objective of minimizing impacts to aquatic habitats will be addressed by prohibiting public OSV use on unfrozen lakes, reservoirs, ponds and any other open surface water.
5. In alternatives 2 and 3, the objective of minimizing impacts to wildlife would be addressed by not designating areas around the west side of Eagle Lake for OSV use. There are osprey and eagle nests in that area. Under alternative 3, Eagle Lake would be completely buffered on National Forest System lands from OSV use.

Minimizing Conflicts between Motor Vehicle Use and Existing or Proposed Recreational Uses of National Forest System Lands or Neighboring Federal Lands (36 CFR §212.55(b)(3))

All Public OSV Use

1. In alternative 2 only, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by identifying a non-motorized corridor in which public, cross-country OSV use would not be

- designated, along both sides of the Pacific Crest Trail. The width of this corridor zone would be based on the Recreational Opportunity Spectrum classification of the land in which the Pacific Crest Trail is located. This corridor would be shown on the Over-snow Vehicle Use Map.
2. In alternative 2 only, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by designating OSV crossing points at intervals within limits specified by the Pacific Crest Trail Comprehensive Plan (USDA Forest Service 1982, pp. 18-19). These OSV crossings will be located on existing roads and shown on the Over-snow Vehicle Use Map.
 3. In alternative 2 only, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by designating OSV trails through the PCT corridor with the objective of minimizing the distance an OSV would travel to cross the corridor to the designated Pacific Crest Trail crossing point. These corridor crossings would, with the exception of 0.1 mile, exist as designated OSV trails located on roads and trails already designated for wheeled, motorized vehicles under Subpart B of the Travel Management Regulations, where possible.
 4. The objective of minimizing conflicts between OSV use and other existing or proposed recreational use would be addressed by identifying the Pacific Crest Trail as non-motorized on the Over-snow Vehicle Use Map.
 5. The objective of minimizing conflicts between OSV use and other existing or proposed recreational use would be addressed by encouraging public awareness and education regarding locations of non-motorized trails or areas where public OSV use is prohibited; considering additional signage; or applying other methods to minimize OSV encroachment in these areas.

Public, Cross-country OSV Use

1. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use will be addressed by encouraging public awareness and education regarding locations of non-motorized trails or areas where public OSV use will be prohibited. We will install additional signage or other methods to minimize OSV encroachment in these areas where necessary.
2. In alternative 3, the objective of minimizing conflicts between public OSV use and non-motorized recreation enthusiasts will be addressed by not designating the 31,730-acre area around Butte Lake, north of Lassen Volcanic National Park, for public, cross-country OSV use. OSV use will be restricted to the designated OSV trail that runs through this area.
3. In alternative 3, the objective of minimizing conflicts between public OSV use and non-motorized recreation enthusiasts will be addressed by not designating the 19,040-acre Fredonyer-Goumaz area for public, cross-country OSV use. OSV use will be restricted to the designated OSV trail system that runs through this area.
4. In alternatives 2 and 3, the objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by not designating the area along Lake Almanor's south shoreline. Skiers use the bike trail in this area in the winter.
5. In alternatives 2 and 3, the objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by not designating areas around the south end of Eagle Lake for OSV use in the modified proposed action. Skiers and

- fishermen use the lake in the winter. This would also buffer and protect the lake from potential OSV incursions on Eagle Lake trout (an important forest natural resource).
6. In alternatives 3 and 4, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts will be addressed by not designating the 4,570-acre area near McGowan Lake for cross-country OSV use. This area surrounds a popular non-motorized trail and it will provide additional non-motorized cross-country opportunities, offer additional opportunities for solitude, and will provide an additional non-motorized buffer near Lassen Volcanic National Park. This area would cover 10,300 acres in alternative 3 and 4,570 acres in alternative 4.
 7. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use will be addressed by not designating specific areas around the perimeter of Lassen Volcanic National Park for public OSV use.

General Monitoring Procedures

Once a decision is made on OSV use designation via the record of decision, the implementation phase would begin. We anticipate that an implementation plan, with a monitoring component, would be developed at that time. However, the analysis assumes the following monitoring procedures would be implemented:

1. The Forest Service has an obligation to monitor the effects of public OSV use as required by Subpart C of the Travel Management Regulations. Furthermore, as an ongoing part of our State-funded OSV program, California State Parks provides funding to the Forest Service to monitor our groomed trail systems for evidence of OSV trespass into closed areas, OSV use near or damage of sensitive plant and wildlife sites, and low snow areas subject to erosion concerns.
2. Wilderness boundaries and other closed areas near groomed snow trails and areas open to OSV use will be monitored for OSV incursions. We will coordinate and implement increased education or enforcement actions as needed.
3. Trailheads and groomed trail areas will be monitored for user conflicts and public safety concerns, coordinating and implementing site-specific controls as necessary (such as speed limits, segregated access points for motorized and non-motorized use, increased visitor information, or increased on-site management presence).
4. Areas where OSV use is restricted to designated routes will be monitored to ensure public OSV use is restricted to designated routes and is not encroaching outside the trail corridor in areas where such use is not allowed.
5. Monitoring that will occur during implementation of all alternatives includes effectiveness monitoring, based on available resources. Monitoring will ensure that:
 - a. Resource damage is not occurring when there is less than the prescribed minimum snow depth with certain exceptions as described in the description of alternative 4. Snow depth measurement locations and techniques will be developed using an interdisciplinary team approach and will consider terrain, season, proximity to sensitive areas, and resource damage criteria;
 - i. Where resource damage is suspected due to public OSV use on less than the prescribed minimum snow depth, monitoring will occur to help inform the responsible official if damage is occurring, the extent of the damage, and what steps need to be taken to address the issue;

- ii. Public OSV use is not damaging sensitive resource locations, in consultation with forest resource specialists;
- iii. Public OSV use is not occurring in prohibited areas; and

Public OSV use restricted to designated routes is not encroaching outside the trail corridors into areas not designated for OSV use.

Implementation Monitoring

Monitoring Soil Resources

1. Impacts to soils, vegetation and water quality will be addressed by monitoring precipitation and temperature changes and adapting seasons of use for public OSV use (see General Monitoring Procedures, page 77).
2. Impacts to soils will be addressed by monitoring to ensure that resource damage is not occurring when there is less than sufficient snow coverage (see General Monitoring Procedures, page 77, and table 31).
3. Impacts to soils, water quality, vegetation, and aquatic species will be addressed by monitoring the High Lakes area and prescribing corrective actions if resource impacts are found (see General Monitoring Procedures, page 77).

Monitoring Watershed Resources

1. Impacts to watershed resources will be addressed by monitoring to determine if implementing protective measures ensures that aquatic resources are adequately protected. Possible protective measures include restricting access to aquatic communities where substantial impacts are observed through the dissemination of educational materials and by using signage, or, if necessary, through the use of barriers or trail re-routes.
2. Impacts to watershed resources will be addressed by monitoring in consultation with forest biologists to ensure that public OSV use is not damaging sensitive resource locations.
3. Impacts to watershed resources will be addressed by monitoring water quality in spring snowmelt periodically at specified locations, in consultation with the forest hydrologist and aquatic biologist, to determine potential impacts of public OSV use on water quality. If adverse impacts are observed, changes in management of public OSV use will be considered, or other appropriate protective measures will be taken, in consultation with a forest hydrologist.
4. Impacts to watershed resources will be addressed by periodically monitoring the effects of public OSV use with sufficient snow coverage over road or trail surfaces.
5. Impacts to watershed resources will be addressed by periodically monitoring water quality in spring snowmelt periodically at specified locations, in consultation with the forest hydrologist and aquatic biologist, to determine potential impacts of OSV exhaust on water quality. If adverse impacts are observed, changes in management of OSV use will be considered, or other appropriate protective measures taken, in consultation with a forest botanist.
6. For the 6-inch or less minimum snow depths allowed on trails, operation of OSVs will be monitored periodically when use is allowed at every site where this standard will apply when snow is less than 12 inches deep. Monitoring will be consistent with BMP 4-7 (see FEIS, appendix D) and focus on whether OSVs are impacting trail surfaces, and be reported to the

Forest or District hydrologist and soil scientist. If adverse effects are observed to occur on trail surfaces, use should be discontinued until snow depth conditions permit.

Monitoring Vegetation

1. Damage to vegetation will be addressed by monitoring in consultation with forest biologists to minimize damage to vegetation by ensuring that public OSV use is not damaging sensitive resource locations. In particular, OSV use will be monitored in the white bark pine stand on Burney Mountain to determine if damage is occurring. If adverse impacts are observed, changes in management of OSV use will be considered, or other appropriate protective measures taken, in consultation with a forest botanist. Considerations will include prohibiting public, cross-country OSV use in this area.
2. Damage to vegetation will be addressed by monitoring public OSV use in designated Forest Plan botanical special interest areas (SIAs) to determine if damage is occurring. If adverse impacts are observed and it is determined that public OSV use in these areas is not compatible with the intended focus of these areas, per each special area's management plan, changes in management of public OSV use will be considered, or other appropriate protective measures taken, in consultation with a forest botanist. Considerations will include prohibiting public, cross-country OSV use in these SIAs or restricting OSV use to designated routes only.

Monitoring Heritage Resources

1. Effects will be monitored to focus on the potential for any effects to historic properties resulting from OSV traffic.

Monitoring for Significant Disruption of Wildlife Habitats

1. Harassment of wildlife will be addressed by using the results of annual inventory and monitoring efforts for threatened, endangered, and sensitive species (northern spotted owl, California spotted owl, northern goshawk, bald eagle) to determine proximity of known nesting or roosting sites to designated OSV trails.
2. Significant disruption of wildlife habitats, public OSV use in sensitive wildlife habitats will be monitored in consultation with the forest biologist, to determine if adverse impacts are occurring. If adverse impacts are observed, changes in management will be considered in consultation with the forest biologist.

Suggested Alternatives or Alternative Components Considered

We carefully considered each of the public suggestions discussed below to determine whether the suggestion should be carried forward into detailed analysis in the EIS or dismissed from further consideration. Those carried forward into detailed analysis could become a new alternative or part of a revision to the proposed action.

For an alternative to be analyzed in detail in the EIS, it must meet the purpose and need for action, must address one or more significant issues, and should reduce the potential for significant impacts. Reasonable alternatives include those that are practical or feasible from a technical and economic standpoint and use common sense; they do not necessarily have to be within Agency jurisdiction to implement.

Alternatives not considered in detail in the EIS may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm.

The suggested alternatives and the rationale for either incorporation into the range of alternatives for detailed analysis, or elimination from detailed study are summarized below.

1. Ensure size of areas designated for OSV use are consistent with the definition of areas as described in the Travel Management Rule; they should be smaller than ranger districts and they should be established using the minimization criteria.

We considered this suggestion and have modified the proposed action to address it (Alternative 2, Modified Proposed Action). None of the areas designated for public, cross-country OSV use are as large as a ranger district.

2. Use a universal minimal snow depth for the proposal and/or modify the proposed 6-inch minimum snow depth for OSV use on underlying Forest Service roads. The identification of varying snow depths for different uses or areas, as described in the proposed action can be confusing to the public and difficult to enforce, particularly the 6-inch depth for OSV trails overlaying roads, and could lead to increased probability of OSV use off-trail in these areas.

We considered this suggestion and have modified the proposed action to include a 12-inch minimum snow depth for public, cross-country OSV use and for grooming. Alternative 3 includes a 12-inch minimum snow depth for trails designated for public OSV use which would generally apply, but could be reduced if site review determines there would be no damage to underlying resources.

3. Remove any minimum snow depth requirement for snow trails on existing underlying roads; OSVs do not impact roads and the operator should be allowed to decide whether he or she can safely travel on minimal snow to access the backcountry where deeper snow exists.

This concern is addressed by the minimum snow depth component of alternative 4.

4. Ensure flexibility in the requirement for minimum snow depths and consider them guidelines instead. Flexibility is needed to account for snow depths that are affected by variables such as elevation, temperature, aspect, and snow melt.

We considered this suggestion and have modified the proposed action to include a 12-inch minimum snow depth for public, cross-country OSV use and the retention of some flexibility in the application of snow depths on underlying roads. The minimum snow depth component of alternative 4 provides also addresses this concern.

5. Ensure that the process used to measure snow depth and enforce minimum snow depths are equitable and that entire areas are not closed to OSV use based on a snow depth measurement taken at just one trailhead, for instance.

We considered this suggestion and have developed monitoring measures to determine snow depth measurement criteria and locations, using an interdisciplinary approach, which would apply to any of the action alternatives.

6. Ensure monitoring and enforcement are part of the proposal.

We agree that monitoring and enforcement are critical to the success of implementation. Overall enforceability and administration of the alternatives will be considered as part of the engineering analysis and documented, in a general sense, in chapter 3 of the EIS. Any alternatives considered in detail will be based on the assumption that they will be enforced. We developed several monitoring measures that would apply to implementation of all alternatives.

7. Modify the 18-inch minimum snow depth for grooming; it is too restrictive. This depth is not mandated by the State's grooming program.

We considered this suggestion and have modified the proposed action to include a 12-inch minimum snow depth for public, cross-country OSV use, and for grooming.

8. Include, in any action, a prohibition of recreational OSV travel on or across open or flowing water.

We considered this suggestion and agree this is a necessary project design feature to ensure adverse impacts from public OSV use on open or flowing water are minimized. This has been added to the list of project design features that would apply to all action alternatives.

9. Eliminate the prohibition of OSV use in areas below 3,500 feet in elevation and use minimum snow depth to guide use instead.

We considered this suggestion and recognize that the provision for ensuring 12 inches of snow are on the ground before public OSV use will be allowed could be used in areas below 3,500 feet, like it would for the rest of the project area, as an alternative to prohibiting use based on this elevational band. This is addressed by alternative 4.

10. Create a non-motorized corridor along the Pacific Crest National Scenic Trail (PCT) of up to one-half mile on either side; this will promote user safety, reduce conflicts between motorized and non-motorized users, and ensure consistency with the Comprehensive Plan for the Pacific Crest National Scenic Trail and the National Trails System Act of 1968 (P.L. 90-543). The Pacific Crest Trail and its non-motorized corridor should be illustrated on Over-snow Vehicle Use Maps.

We acknowledge the importance of appropriate management of the PCT. The originally scoped proposed action has been modified to include a non-motorized corridor along the PCT that would not be designated for public, cross-country OSV use. OSV crossing points over the PCT would be designated, as would OSV trails across the corridor through these crossing points.

All action alternatives include identification of the PCT on the OSVUM.

11. Designate OSV crossings of the Pacific Crest Trail, overlaying the same roads and trails designated for wheeled, motorized vehicle use, when such use is allowed, as shown on the Subpart B Motor Vehicle Use Map.

The maximum frequency of public OSV crossing points is established in the Comprehensive Plan for the PCT management plan. No crossing points are allowed in the Primitive or Semi-Primitive Non-motorized ROS classifications. However, on the Lassen, no public OSV use is allowed in either of these ROS classes and the modified proposed action and all alternatives are consistent with this crossing standard.

For the remainder of the trail corridor in other ROS classes, the standard is a minimum of 1 crossing per one-half mile, or more frequent, averaging over the entire length of PCT on the Forest. GIS data show 106 miles of PCT on the Forest. This would allow 212 OSV crossings. The modified proposed action and alternatives would designate 28 OSV crossing points of the PCT. Therefore, current OSV management and the modified proposed action would be consistent with the Comprehensive Plan for the PCT.

12. Ensure OSV use is restricted in riparian areas, in streams and on frozen lakes.

We considered this suggestion and developed a project design feature for all action alternatives to prohibit public OSV use on open or flowing water. Minimum snow depth restrictions would also minimize OSV impacts in riparian areas, streams, and frozen lakes. We also added a monitoring measure to the modified proposed action to focus on monitoring public OSV use on Eagle Lake and other priority streams.

13. Consider providing more flexibility in the beginning and ending dates for grooming.

The proposed action states that grooming “generally begins in mid-December and continues through March. Start and stop times vary per trail location and are dependent upon the presence and depth of snow. Snow Trails are prioritized for grooming based on visitor use.” These dates are consistent with the previous wheeled, motorized vehicle travel management decision (Travel Management Regulation, Subpart B) on the Lassen National Forest and allow for passenger vehicle access through mid- to late-December for visitors with Christmas tree permits. There is a safety concern with allowing grooming activities on roads with passenger vehicles. This suggestion would increase conflicts between classes of vehicles, would increase the overall cost of the grooming program, and would conflict with the existing wheeled, motorized vehicle travel decision. For these reasons, this suggestion was dismissed from further detailed analysis.

14. Ensure OSV use designations avoid municipal watersheds.

There are no designated municipal watersheds in the project area.

15. Prohibit OSV use in a 2.5-mile radius around the SW Visitor’s Center of Lassen Volcanic National Park.

Currently, there is no public OSV use allowed within a 2.5-mile radius of the SW Visitors’ Center. A review of the map of Lassen Volcanic National Park shows the SW Visitors’ Center approximately 1 mile inside the park boundary. No public OSV use is allowed within the park boundary. Outside the park boundary, public OSV use is prohibited by the Forest Service for at least 1.5 additional miles from the SW Visitors’ Center. For these reasons, this suggestion was dismissed from further detailed analysis.

16. Modify the minimum snow depth for cross-country OSV use to 10 inches instead of 12 inches.

Also consider that 6 or 8 inches of snow is adequate when there is a good crust of snow or if the area is flat.

This suggestion is addressed in alternative 4.

17. Increase the minimum snow depth requirement for off-trail OSV use to 18 inches or, better, 24 inches.

We considered this suggestion, but disagree that a snow depth greater than 12 inches for public, cross-country OSV use is necessary to provide adequate snow cover while still protecting forest resources. We have conducted preliminary analysis with our interdisciplinary team to ensure that this snow depth is adequate, based on the best available science, while still providing access for public OSV use. For these reasons, this suggestion was dismissed from further detailed analysis. However, the minimum snow depth components of alternatives to the proposed action were developed to address certain resource impacts in certain areas. Project design features have also been developed to ensure resource impacts are minimized as well.

18. Consider a suggestion for an alternative to the proposed action with an emphasis on providing additional opportunities for non-motorized users.

We considered this suggestion and developed alternative 3 that will be included for detailed analysis in the EIS. However, not all aspects of this suggested alternative are within the scope of the analysis, as described below, and these specific components have been dismissed from further detailed analysis:

- Designation of non-motorized trailheads to access non-motorized areas.
 - The designation of non-motorized trailheads would not address the purpose and need for action which is to provide a manageable, designated system of snow trails and areas for public OSV use within the Lassen National Forest, that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. Therefore this feature is not included in alternative 3 to be analyzed in detail.
- Monitoring of ambient air quality and noise near trails, in trailheads, and in OSV areas with heavy over-snow vehicle traffic.
 - The monitoring of ambient air quality and noise is outside the scope of the purpose and need for action, which is to provide a manageable, designated system of snow trails and areas for public OSV use within the Lassen National Forest that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. The Forest Service has no regulatory jurisdiction over air quality or noise. There are no standards that would allow the Forest Service to identify or enforce prohibitions against unacceptable noise or air quality levels. These levels are set by state law. The OSV Program Monitoring Checklist for the California Department of Parks and Recreation, OHMVR Division, and U.S. Forest Service does not include ambient air quality monitoring (California OSV Program EIR, Program Years 2010-2020, Appendix C). Therefore, this feature is not included in alternative 3 to be analyzed in detail. The EIS, however, will examine effects on air quality and noise from the modified proposed action and alternatives to the modified proposed action, including the indirect effects of changes in air quality and noise levels on forest resources.
- Transition to cleaner and quieter OSVs through encouragement of best available technology (BAT) forest-wide to reduce air and noise pollution. Exception is in the “Managed Shared Use” area where air quality and noise monitoring every five years will determine whether mandatory BAT would be needed.
 - The imposition of best available technology requirements is outside the scope of the purpose and need for action, which is to provide a manageable, designated system of snow trails and areas for public OSV use within the Lassen National Forest that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. The regulation of best available technology, whether only encouraged or mandated, is outside the scope of this analysis. The Forest Service has no regulatory jurisdiction over air quality or noise and there are no Forest Service directives requiring the establishment of standards.

Therefore, this feature is not included in alternative 3 to be analyzed in detail.

- Nordic trail grooming.
 - Grooming of trails for non-motorized use would not address the purpose and need for action, which is to provide a manageable, designated system of snow trails and areas for public OSV use within the Lassen National Forest, that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. Therefore, this feature is not included in alternative 3 to be analyzed in detail.
- Granting of access rights to private lands.
 - Over-snow vehicle use that is specifically authorized under a written authorization issued under Federal law or regulations is exempt from Subpart C designations (36 CFR §261.14(e)). The granting or maintenance of such access is outside the scope of the purpose and need for action, which is to provide a designated system of snow trails and areas for public OSV use within the Lassen National Forest that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. Therefore, this feature is not included in alternative 3 to be analyzed in detail. Under the scope of this project, the Forest Service would only designate routes under Subpart C of the Travel Management Regulations that are available for public use. Therefore, designating routes specifically for access to private lands, and not for public use, would not fall within the scope of this analysis or Subpart C of the Travel Management Regulations.
- Forest Plan amendments creating “Front-country Non-motorized,” “Backcountry Solitude,” and “Managed Shared Use” management areas. The objectives of these management areas are to “create a fair balance of recreational opportunity on the Lassen National Forest,” and “protect opportunities for non-motorized recreation recognizing the experience non-motorized users seek, and minimize impacts from OSVs on wildlife, the environment, and other uses.”
 - No OSV use would be allowed in “Front-country Non-motorized” areas. These areas would “protect non-motorized recreation opportunity in areas that are easily accessed from plowed trailheads and roads and have a high degree of non-motorized use. Restriction of OSVs is necessary to eliminate the noise, toxic exhaust, disproportionate consumption of powder snow, trail rutting, and other OSV impacts.”
 - OSVs would be restricted to designated OSV trails in “Backcountry Solitude” areas. These areas would “protect large areas for a quiet and remote recreation experience in winter. These areas also protect sensitive species that thrive only in relatively large areas with minimal human activity.”
 - OSVs would be restricted to designated OSV trails in “Managed Shared Use” areas. These areas would “restrict OSV usage so that there can be meaningful shared use of easily accessible and popular areas. Meaningful shared use is made possible by restricting OSVs to designated routes, establishing separate trailheads, [gradually] restricting OSVs to cleaner and quieter machines, imposing speed limits on shared-use trails, and other management tools.”

- Forest Plan amendments are not necessary to address the concerns the commenter seeks to address, because implementation of Subpart C would result in areas and trails that are clearly designated for public OSV use and use inconsistent with those designations will be prohibited. The Forest Plan does not directly restrict uses, and an amendment establishing these management areas would have no immediate on-the-ground effect on public uses. In addition, no Forest Plan amendment is required to restrict or prohibit OSV use to achieve most of the objectives of the commenter's alternative in the identified areas. (As discussed above for features 1 and 3, the creation of separate, non-motorized trailheads and the transition to cleaner and quieter OSVs through the encouragement of best available technology (BAT) are outside the scope of the purpose and need and are not included in alternative 3. This feature is, therefore, not be included in alternative 3 to be analyzed in detail. However, alternative 3 includes the restrictions on public OSV use sought by the commenter for the same geographic areas.
- Forest Plan amendment allowing the Forest Service to designate snow play areas. “Designation of snow play areas allows for concentration of use in areas that are appropriate for snow play and that have adequate parking, such as Willard Hill. Such areas and their primary access routes should be closed to snowmobile traffic for safety and other reasons.”
 - A Forest Plan amendment allowing the designation of snow play areas is outside the scope of the purpose and need for action, which is to provide a designated system of snow trails and areas for public OSV use within the Lassen National Forest that is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. A Forest Plan amendment would also not be necessary to address the concern the commenter seeks to address, for the reasons explained above in response to alternative component #6. Therefore, this feature is not included in alternative 3 to be analyzed in detail. However, alternative 3 includes the restrictions on public OSV use sought by the commenter for the Willard Hill area.

19. Segregate motorized and non-motorized user groups by designating separate trailheads, separate trails and/or separate areas. Designate specific areas as snowplay areas.

We considered this suggestion and recognize that the motorized and non-motorized recreational experience is an important concern to be considered for this analysis (see Significant Issues).

However, the development of new facilities such as new trailheads, new trails, or new snowplay areas are outside the scope of this project. This analysis is focused on the designation of snow trails and areas for public OSV use. For this reason, this suggestion has been dismissed from further detailed analysis.

20. Ensure over-snow vehicle route density is below 1 mile per square mile, that wolverine and Canada lynx are considered and protected, that OSV use areas are discreet specified areas that consider visual and acoustic barriers to ensure wildlife habitat security.

We considered this and several other suggestions and concerns related to terrestrial wildlife. We consider terrestrial wildlife a non-significant issue for this analysis and will analyze effects on wildlife in the EIS.

21. Create winter conservation plans for sensitive species.

See the response above regarding the identification of terrestrial wildlife as a non-significant issue for this analysis. Development of specific conservation plans for individual species, however, is outside the scope of the analysis.

22. Consider a “no OSV use” alternative.

The agency recognizes that OSV travel is a legitimate use of the national forests. The purpose and need for action in these designations is to “effectively manage public OSV use on the Lassen National Forest. Effective management would provide public OSV access, ensure that OSV use occurs when there is adequate snow, promote the safety of all users, enhance public enjoyment, minimize impacts to natural and cultural resources, and minimize conflicts among the various uses” (see page 66).

A reasonable alternative must address the purpose and need for action. An alternative that prohibits OSV use on all of the Lassen National Forest would be an action alternative because an action would be required to prohibit OSV use on the entire Lassen National Forest. However, a “no OSV use” action alternative would not address the purpose and need for action, and was therefore, not considered reasonable.

23. Consider a suggestion for an alternative to the proposed action with an emphasis on providing additional opportunities for motorized users.

We considered this suggestion and developed alternative 4 with the components of this alternative included for detailed analysis in the EIS. However, not all aspects of this suggested alternative are within the scope of the analysis. Since these trails would be unmarked, ungroomed, and located in areas where cross-country OSV use would be allowed, the agency sees no need to designate them in the proposed action.

- Many of these ungroomed trails pass through lands not under Forest Service jurisdiction or where Forest Service jurisdiction is uncertain (unknown if the Forest Service has easements to allow public access on non-National Forest System land). Establishment of Forest Service jurisdiction would be required for these trails to be designated for OSV use under Subpart C.
- The suggested alternative recommends the use of a minimum snow depth less than 12 inches for cross-country use and grooming. Alternative 4 was designed with no restriction on public, cross-country OSV use as long as there is no damage to underlying surface resources. However, the 12-inch snow depth for trail grooming is a standard set by the State of California, which funds the grooming program.
- The suggested alternative recommends that the Pacific Crest Trail be managed for non-motorized use only and to allow public OSV use only to cross the trail at non-designated points. This recommendation is included in the modified proposed action. However, the Comprehensive Plan for the Pacific Crest Trail requires that we identify and designate public OSV crossing points.

Comparison of Alternatives

Table 26. Comparison of areas where OSV use would be allowed with total forest land area, by alternative

Area	Alternative 1 - Current Management*	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations	Alternative 3 – OSV Designations
National Forest System Land Area within Administrative Boundary of Lassen National Forest (Acres)	1,150,020	1,150,020	1,150,020	1,150,020
Total Areas Open (Designated in alternatives 2 - 4) for Cross-country OSV Use (Acres)	964,020	921,130	834,660	958,930
Percentage of NFS Land Area Open (Designated in alternatives 2 - 4) for Cross-country OSV Use	83.8%	80.1%	72.6%	83.4%
Total Areas OSVs Not Allowed and Not Designated for OSV Use (Acres) (Table 27)	186,000	228,890	315,360	191,090

*Because no Subpart C designations of areas and trails for OSV use have been made, areas and trails are not “designated,” but are either “open” or “closed” to OSV use under current management.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 27. Areas not designated for OSV use, by alternative (acres)

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 3 – OSV Use Not Designated	Alternative 4 – OSV Use Not Designated
• Ishi Wilderness	40,910	40,910	40,910	40,910
• Caribou Wilderness	20,830	20,830	20,830	20,830
• Thousand Lakes Wilderness	16,570	16,570	16,570	16,570
• Proposed Wilderness Adjacent to SW Corner LVNP (Rocky Peak)	8,620	8,620	8,620	8,620
• Proposed Wilderness Southwest Corner of Forest	7,710	7,710	7,710	7,710
• Proposed Wilderness South Border of LVNP (Chummy Meadows)	4,890	4,890	4,890	4,890
• Proposed Wilderness East Side of Caribou Wilderness	890	890	890	890
• Pacific Crest Trail and Non-motorized Corridor	-	10,460	-	-
• Cub Creek RNA	4,090	4,090	4,090	4,090
• Blacks Mountain RNA	-	520	520	520

Over-snow Vehicle Use Designation

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 3 – OSV Use Not Designated	Alternative 4 – OSV Use Not Designated
• Semi-primitive Non-motorized and Primitive Near Ishi Wilderness	22,320	22,320	22,320	22,320
• Semi-primitive Non-motorized Near Old Station and East of Hwy. 89 (Cinder Butte)	13,700	13,700	13,700	13,700
• Semi-primitive Non-motorized Chips Creek Area	7,400	7,400	7,400	7,400
• Semi-primitive Non-motorized Soda Creek Area	4,210	4,210	4,210	4,210
• Semi-primitive Non-motorized South of Mountain Meadows Reservoir Including Homer Deer SIA	3,370	3,370	3,370	3,370
• Semi-primitive Non-motorized Snow Meadow Area	3,140	3,140	3,140	3,140
• Semi-primitive Non-motorized North of LVNP (East of West Prospect Peak)	2,610	2,610	2,610	2,610
• Semi-primitive Non-motorized Jackass Creek Area	1,800	1,800	1,800	1,800
• Semi-primitive Non-motorized Rock Creek Area	1,760	1,760	1,760	1,760
• Semi-primitive Non-motorized (East of Adobe Flat Reservoir - Shasta Trinity NF Managed by Lassen NF)	1,750	1,750	1,750	1,750
• Semi-primitive Non-motorized (West of Mayfield Ice Cave - Shasta Trinity NF Managed by Lassen NF)	1,070	1,070	1,070	1,070
• Semi-primitive Non-motorized Snow Mountain Area West of Old Station	700	700	700	700
• Semi-primitive Motorized Near Old Station East of Hwy. 89 (Hat Creek Valley)	12,110	12,110	12,110	12,110
• Semi-primitive Motorized Butt Mountain Area	1,660	1,660	1,660	1,660
• Semi-primitive Motorized SE of Old Station East of Hwy. 44 (Little Potato Butte)	630	630	630	630
• Roaded Natural Onion Springs Closure (West Border of LVNP)	1,080	1,080	1,080	1,080
• West Shore of Eagle Lake South of Spalding Tract Osprey Mgt Area	1,670	1,670	1,670	1,670
• Deer Creek Anadromous Fish Closure	-	1,520	-	-
• Butte Lake Closure (OSV prohibited except where restricted to trail only) North of LVNP	-	-	31,730	-
• Limited OSV Access in Southwest Corner of Lassen NF	-	27,400	-	-

Area	Alternative 1 - Current Management	Alternative 2 – OSV Use Not Designated	Alternative 3 – OSV Use Not Designated	Alternative 4 – OSV Use Not Designated
• Below 3,500-foot Elevation on the Lassen NF	-	-	59,130	-
• Fredonyer-Goumaz Closure (OSV prohibited except where restricted to trail only) Between Hwys 36 & 44	-	-	19,040	-
• McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17)	-	-	10,300	4,570
• Colby Mountain Closure	-	-	4,490	-
• Southwest Shore Lake Almanor	-	1,840	1,840	-
• South Shore Eagle Lake	-	1,150	1,680	-
• Tippin Forest Order North of Hwy. 299	510	510	510	510
• Willard Hill Closure	-	-	630	-
Total Areas OSVs Not Allowed and Not Designated for OSV Use in alternatives 2 - 4 (Acres)	186,000	228,890	315,360	191,090

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 28. Designated groomed and ungroomed trails for OSV use (miles)

Snow Trails for OSV Use	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations	Alternative 4 – OSV Designations
Groomed and Ungroomed Snow Trails on Lassen NF for OSV Use (miles) (Includes groomed designated OSV trails in Table 30)	2,760	323	316	398
Ungroomed Snow Trails where OSV Use would be Allowed (Designated in alternatives 2 - 4) (miles)				
<ul style="list-style-type: none"> • PCT OSV Crossing Access Trails (Table 29) 	-	7	-	-
<ul style="list-style-type: none"> • Road 29N10 	5	5	5	5
<ul style="list-style-type: none"> • Road 30N16 from 31N17 To McGowan OSV Closure 	2	-	-	2
<ul style="list-style-type: none"> • Road 27N11 Ungroomed Designated SE of Jonesville 	1	-	-	1
<ul style="list-style-type: none"> • Road (3xN17) West of McGowan Designated Ungroomed to Ashpan Groomed System 	28	-	-	28
<ul style="list-style-type: none"> • Forest Road 21 & County Road 105 from Hwy. 44 to Eagle Lake 	25	-	-	25
<ul style="list-style-type: none"> • Designated Ungroomed North of LVNP (Butte Lake) 	22	-	-	22
<ul style="list-style-type: none"> • Road 32N46 in Ashpan Designated Ungroomed 	4	-	-	4
<ul style="list-style-type: none"> • Ungroomed OSV Trail in OSV Prohibited Areas 	12	-	-	-
<ul style="list-style-type: none"> • Other Ungroomed OSV Trail in Areas Open to Cross-country OSV Use (Marked and Unmarked) 	2,350*	-**	-**	-
Total Trails Open for OSV Use but not Groomed	2,449	12	5	87

*Most of these OSV trails are mapped on the Lassen National Forest's 2005 Winter Recreation Guide.

**Alternatives 2 and 3 would not designate ungroomed OSV trails located within areas designated for public, cross-country OSV use.

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 29. Designated Pacific Crest Trail (PCT) OSV crossings

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations	Alternative 4 – OSV Designations
Designated Pacific Crest Trail Crossing Points (#)	No PCT Crossing Points or Corridor*	28	No PCT Crossing Points or Corridor Designated*	No PCT Crossing Points or Corridor Designated*
Designated OSV Access Trails Through Designated Pacific Crest Trail Crossing Points by Road Name (miles)	-	8	-	-
<ul style="list-style-type: none"> Pit River Canyon Rd. (St Dr 50) – Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only	-	-
<ul style="list-style-type: none"> St. Bernard So Rd. (Collins 1) - Only a crossing point designated in alternative 2. No PCT corridor or access trail designated due to lack of NFS jurisdiction on adjacent land. 	-	Designated as Crossing Point Only	-	-
<ul style="list-style-type: none"> 37N05 and 37N052Y - Designated Ungroomed 	-	0.4	-	-
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.4	-	-
<ul style="list-style-type: none"> 37N5C - Designated Ungroomed 	-	0.3	-	-
<ul style="list-style-type: none"> 37N05 - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 37N02 - Designated Ungroomed 	-	0.1	-	-
<ul style="list-style-type: none"> 36N10 - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 36N36Y - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 36N09 - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 36N33B - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 35N10 - Designated Ungroomed 	-	0.3	-	-
<ul style="list-style-type: none"> 34N94 and 34N34 - Designated Ungroomed 	-	0.6	-	-
<ul style="list-style-type: none"> 33N22 - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 32N99 - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 32N20 - Designated Ungroomed 	-	0.2	-	-
<ul style="list-style-type: none"> 32N12 - Designated Ungroomed 	-	0.3	-	-
<ul style="list-style-type: none"> 32N92 - Designated Ungroomed 	-	0.2	-	-

OSV/PCT Crossing	Alternative 1 - Current Management	Alternative 2 – OSV Designations	Alternative 3 – OSV Designations	Alternative 4 – OSV Designations
• 32N42Y - Designated Ungroomed, 0.095 mile not on underlying route.	-	0.3	-	-
• 29N97 and 29N27 - Designated Ungroomed	-	0.3	-	-
• 28N61 - Designated Ungroomed	-	0.8	-	-
• 28N16 - Designated Ungroomed	-	0.4	-	-
• 28N16 , 29N17, and 29N17J - Designated Ungroomed	-	0.3	-	-
• 27N11G - Designated Ungroomed	-	0.6	-	-
• 26N74 - Designated Ungroomed	-	0.2	-	-
• Humboldt Rd./28N43 - Designated Groomed Included in Jonesville Groomed Total	-	0.3	-	-
• Humbug Rd./BU915 - Designated Groomed Included in Jonesville Groomed Total	-	0.2	-	-
• 26N02/Cirby Meadows - Designated Groomed Included in Jonesville Groomed Total	-	0.3	-	-
Designated OSV Access Trails Through Designated PCT Crossing Points (#)	-	26	-	-
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (#)	-	3	-	-
Designated Groomed OSV Access Trails Through Designated PCT Crossing Points - Jonesville Groomed Trail System (miles)	-	1	-	-
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (#)	-	23	-	-
Designated Ungroomed OSV Access Trails Through Designated PCT Crossing Points (miles)	-	7	-	-

*In alternatives 1, 3, and 4, OSV use would be allowed adjacent to and across the PCT. Motorized use would be prohibited on the tread of the PCT in all alternatives. All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 30. OSV trail systems groomed by the Lassen National Forest (miles)

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 3	Alternative 4
La Tour State Forest Snowmobile Area				

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 3	Alternative 4
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	20	20	20	20
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 - 4)	3	3	3	3
• Subtotal	23	23	23	23
Ashpan Snowmobile Area				
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 - 4)	34	34	34	34
• Subtotal	34	34	34	34
Morgan Summit Snowmobile Area				
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	2	2	2	2
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 - 4)	60	60	60	60
• Subtotal	62	62	62	62
Jonesville Snowmobile Area				
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	5	5	5	5
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 - 4)	64	64	64	64
• Subtotal	69	69	69	69
Swain Mountain Snowmobile Area				
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 - 4)	71	71	71	71
• Subtotal	71	71	71	71
Bogard Snowmobile Area				
• Groomed by Forest Service; Trail Not Under NFS Jurisdiction	-	-	-	-
• Groomed by Forest Service Under NFS Jurisdiction (Trail to be Designated in alternatives 2 - 4)	47	47	47	47
• Subtotal	47	47	47	47

Groomed OSV Trail System	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fredonyer Snowmobile Area				
<ul style="list-style-type: none"> Groomed by Forest Service; Trail Not Under NFS Jurisdiction 	-	-	-	-
<ul style="list-style-type: none"> Groomed Lassen NF by Forest Service Under NFS Jurisdiction (Trail to be Designated on Plumas NF) 	11	11	11	11
<ul style="list-style-type: none"> Groomed by Lassen NF Forest Service Under NFS Jurisdiction (Trail to be Designated on Lassen NF in alternatives 2 - 4) 	32	32	32	32
<ul style="list-style-type: none"> Subtotal 	43	43	43	43
Total OSV Use Allowed (Designated on Lassen NF in alternatives 2 - 4) and Groomed by Lassen NF	311	311	311	311
Total OSV Use Allowed (on Plumas NF) and Groomed by Lassen NF	11	11	11	11
Total Groomed but not Under NFS Jurisdiction	27	27	27	27
Grand Total Groomed	349	349	349	349

All area size and total trail distance estimates are approximate and are rounded to the nearest 10 acres or nearest mile.

Table 31. Summary comparing current OSV management with the action alternatives for minimum snow depth (in inches) and OSV trail grooming season on the Lassen National Forest

OSV Management	Alternative 1 – Current Management	Alternative 2	Alternative 3	Alternative 4
Minimum Snow Depth for Public OSV Use on Snow Trails (Inches)	12	6 inches on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails	12 inches, generally. 6 inches only where site review determines there would be no damage to underlying resources	No restriction with 6 or more inches
Minimum Snow Depth for Public, Cross-country OSV Use (Inches)	12	12	12	12
Minimum Snow Depth for Snow Trail Grooming to Occur (Inches)	18	12*	18	12
OSV Trail Grooming Season	12/26 – 3/31	12/26 – 3/31	12/26 – 3/31	12/26 – 3/31

*The originally scoped proposed action has been modified to be consistent with the state grooming standard which states, "Begin grooming when the snow depth is at least 12 to 18 inches" (OSV Program Draft EIR, Program Years 2010-2020 – October 2010, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, page 2-12).

Table 32. Summary of comparison of alternatives by environmental effects (ranking alternatives averaged across indicators) (chapter 3)

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Recreation					
<i>Motorized Recreation Opportunities – cross-country</i>	Opportunities for motorized winter uses/size of area (acres) and percent change	964,020 acres open to OSV use 12-inch snow depth requirement	921,130 acres open to OSV use, 4.5% decrease from existing conditions 12-inch snow depth requirement	834,660 acres open to OSV use, 13.4% decrease from existing conditions 12-inch snow depth requirement	958,930 acres open to OSV use, 0.5% decrease from existing conditions 12-inch snow depth requirement
<i>Motorized Recreation Opportunities – designated snow trails</i>	OSV trail designations, length of trails (miles) and percent change	2,760 miles 12-inch snow depth requirement	323 miles, 88.2 percent decrease from existing conditions (however 97 percent of current trail system is designated or in OSV open areas). 6 inch snow depth requirement on trail (12 inches where trails do not overlay existing roads or trails)	316 miles, 88.5 percent decrease from existing conditions (however 88 percent of the current trail system is designated or in OSV open areas) 12-inch snow depth requirement (could be reduced to 6 inches on specific trails where site reviews determine no potential damage to underlying surface resources).	398 miles, 85.5 percent decrease from existing conditions (however 99 percent of the current trail system is designated or in OSV open areas) 6-inch snow depth requirement
<i>Motorized Recreation Opportunities – groomed snow trails</i>	OSV trail grooming, length of trails (miles), percent change	349 miles 18-inch snow depth requirement for grooming	349 miles, no change 12-inch snow depth requirement for grooming	349 miles, no change 18- inch snow depth requirement for grooming	349 miles, no change 12-inch snow depth requirement for grooming
<i>Non-motorized Recreation Opportunities - displacement</i>	Access to desired non-motorized recreation settings and opportunities Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads	Six plowed trailheads provide access for motorized and non-motorized winter use, 75,169 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and	Six plowed trailheads provide access for motorized and non-motorized winter use, 85,706 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-motorized trails available	Six plowed trailheads provide access for motorized and non-motorized winter use, 121,899 acres available for non-motorized recreation within 10 miles of plowed trailheads 72 miles of cross-country ski trails and other non-motorized trails available	Six plowed trailheads provide access for motorized and non-motorized winter use, 79,740 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-motorized trails available

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		other non-motorized routes available for non-motorized recreation within 10 miles of plowed trailheads	within 10 miles of plowed trailheads	within 10 miles of plowed trailheads	within 10 miles of plowed trailheads
	Recreation Opportunity Spectrum/Consistency with ROS class	Consistent	Consistent	Consistent – with enhanced opportunities for non-motorized recreation experiences	Consistent – with enhanced opportunities for motorized recreation experiences
<i>Non-motorized Recreation Conflicts - Public Safety</i>	Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	186,000 acres closed to OSV use, a total of 148 miles for non-motorized use.	228,890 acres closed to OSV use, 23% increase from existing conditions, a total of 148 miles for non-motorized use.	315,360 acres closed to OSV use, 69.5% increase from existing conditions, a total of 148 miles for non-motorized use.	191,090 acres closed to OSV use, 2.7% increase from existing conditions, a total of 148 miles for non-motorized use.
<i>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas</i>	Proximity and frequency of OSV designations in relation to designated non-motorized areas Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries. Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner.	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries. Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner. PCT non-motorized corridor and 28 designated PCT crossing points.	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner. No designated PCT crossing points or corridors, Groomed OSV	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries Lassen Volcanic National Park: Groomed OSV trails 3/4 mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner. No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations.

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	No known conflicts with tribal/spiritual areas, historic areas or populated areas.	trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	No known conflicts with tribal/spiritual areas, historic areas or populated areas.
<i>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)</i>	Noise Size of areas (acres) potentially affected by noise/size of area (acres) closed to winter motorized use	964,020 acres open to OSV use, potentially affected by noise; 186,000 closed to OSV use, available for quiet recreation.	921,130 acres open to OSV use, potentially affected by noise; 228,890 closed to OSV use, available for quiet recreation.	834,660 acres open to OSV use, potentially affected by noise; 315,360 closed to OSV use, available for quiet recreation.	958,930 acres open to OSV use, potentially affected by noise; 191,090 closed to OSV use, available for quiet recreation.
	Air Quality Qualitative/narrative description of potential impacts (with reference to air quality analysis)	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions (see air quality report).	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Fewer acres open to OSV use than in existing conditions and alternative 2 (see air quality report).	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).
	Scenery Qualitative/narrative description of potential visual impacts	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. The visual evidence of OSV use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season.	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of OSV use decreases as fresh snow covers the tracks and/or	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions or alternative 2. The visual evidence of OSV use decreases as fresh snow covers the	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Slightly fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of OSV use decreases as fresh snow covers the tracks

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<p><i>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)</i></p>	<p>Wilderness Attributes Size of area (acres) affected and duration of impact. Qualitative description for wilderness attributes</p>	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. There are approximately 27,088 acres open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>	<p>when the snow melts at the end of the season</p> <p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. Approximately 21,248 acres would be open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>	<p>tracks and/or when the snow melts at the end of the season</p> <p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. Approximately 19,154 acres would be open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>	<p>and/or when the snow melts at the end of the season</p> <p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. Approximately 25,556 acres would be open to OSV use within 1/2 mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>
	<p>Roadless Characteristics Size of area (acres) affected and duration of impact. Qualitative description for roadless characteristics</p>	<p>Approximately 72,972 IRA acres open to OSV use. Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>	<p>Approximately 59,750 IRA acres would be open to OSV use. Opportunities for solitude would be temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>	<p>Approximately 58,487 IRA acres would be open to OSV use. Opportunities for solitude would be temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>	<p>Approximately 72,884 IRA acres would be open to OSV use. Opportunities for solitude would be temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Transportation and Engineering					
<i>Safety</i>	Public Safety and Traffic	The current Lassen National Forest Winter Recreation Guide map provides adequate information to maintain a reasonable level of public safety and avoid traffic conflicts	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.
<i>Cost</i>	Affordability	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
<i>Transportation Property</i>	Effects to underlying NFS roads and trails	18 inches (grooming) and 12 inches (OSV use) snow depth requirement provides more than adequate protection of underlying roads.	12 inches (grooming and general OSV use), and 6 inches (OSV use on underlying routes) snow depth requirement provides adequate protection of underlying roads.	18 inches (grooming), 12 inches (general OSV use) and 6 to 12 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.	12 inches (grooming, general OSV use) and 6 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.
Soil Resources					
<i>Soil Productivity and Soil Stability</i>	OSV acres open to cross-country travel on sensitive soils (including wet meadows, areas with potential low stability, and areas with potential erosion hazards).	There would be no change in acreage of area currently open to cross-country OSV travel on sensitive soils. Approximately 53,902 acres with mapped sensitive soil types are open to cross-country OSV travel.	Approximately 52,964 acres of sensitive soils would be open to cross-country OSV travel within the forest. This is slightly less acres than the no-action alternative and alternative 4, but more acres than alternative 3.	Approximately 40,590 acres of sensitive soils would be open to cross-country OSV travel. Under this alternative, the least amount of sensitive soils would be open to OSV cross-country travel.	Approximately 53,507 acres of sensitive soils would be open to cross-country OSV travel. Under this alternative, there would be more acres of sensitive soils open to cross-country OSV travel than the proposed action, no action, and under alternative 3. This

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
					alternative has the greatest acreage of sensitive soils open to cross-country OSV travel.
<i>Soil Stability</i>	Minimum snow depths on trails (inches)	Minimum snow depth is 12 inches of unpacked snow prior to any OSV travel over existing roads and trails. This minimum snow depth has been observed to be sufficient to prevent contact of OSVs with the bare soil surface.	Minimum snow depth is 6 inches of snow prior to any OSV travel over existing roads and trails. This minimum snow depth may potentially create conditions in which the road surface is exposed to OSVs and there is potential for some soil erosion or rutting of the road surface. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.	Minimum snow depth is 12 inches of snow prior to any OSV travel over existing roads and trails. OSV use on trails with 6 inches would be allowed if site review determines there would be no damage to the underlying resources. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.	Minimum snow depth is 6 inches of snow prior to any OSV travel over existing roads and trails. This minimum snow depth may potentially create conditions in which the road surface is exposed to OSVs and there is potential for some soil erosion or rutting of the road surface. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.
<i>Soil Productivity</i>	Minimum snow depths for cross-country travel (inches)	Minimum snow depth for cross-country OSV travel is currently 12 inches of unpacked snow. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.
<i>Soil Productivity</i>	Total acres open to OSV use	Approximately 964,020 acres of the forest are open to OSV use. Under the no-action alternative, the most acreage is open to OSV use; therefore, the most	Approximately 921,130 acres of the forest would be open to OSV use. This is less area open to OSV use compared to the no-action alternative and alternative 4, but it is	Approximately 834,660 acres of the forest would be open to OSV use, which is the least amount of land open to OSV use out of all four alternatives.	Approximately 958,930 acres of the forest would be open to OSV use, which is a greater area than under the proposed action and alternative 3, but less area than the no-action

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		potential for soil damage exists under this alternative.	greater than alternative 3. The proposed action has the potential for more impacts than alternative 3, but less than the proposed action and alternative 4.		alternative. Alternative 4 has the potential to have the greatest soil impacts out of the 3 action alternatives.
Water Resources					
	Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Complies with RCOs 1,2,4,5,6	Complies with RCOs 1,2,4,5,6	Complies with RCOs 1,2,4,5,6	Complies with RCOs 1,2,4,5,6
Heritage Resources					
		No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect
Botanical Resources					
	Threatened and Endangered plants	All alternatives equal (issue sufficiently addressed – no effects)	All alternatives equal	All alternatives equal	All alternatives equal
	Threatened and Endangered plant Critical Habitats	All alternatives equal (issue sufficiently addressed – no effects)	All alternatives equal	All alternatives equal	All alternatives equal
	Sensitive plants	All alternatives equal (issue sufficiently addressed – minor potential effects)	All alternatives equal	All alternatives equal	All alternatives equal
	Survey and Manage plants	All alternatives equal (issue sufficiently addressed)	All alternatives equal	All alternatives equal	All alternatives equal
	Special Interest plants	Alternative 1 holds the greatest potential for effects (issue sufficiently addressed)	Alternative 2 has the second to least potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 3 holds the least potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 4 has the second greatest potential for effects (issue sufficiently addressed – minor potential effects)

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		– minor potential effects)			
	Invasive plants	All alternatives equal (issue sufficiently addressed – very low risk)	All alternatives equal (very low risk)	All alternatives equal (very low risk)	All alternatives equal (very low risk)
	Special Interest Areas	All alternatives equal (issue sufficiently addressed)	All alternatives equal	All alternatives equal	All alternatives equal
Terrestrial Wildlife					
<i>Giant garter snake</i>	Threatened	No Effect	No Effect	No Effect	No Effect
<i>Sierra Nevada red fox, Southern Cascades Distinct Population Segment</i>	Federal candidate for listing; Forest Service Sensitive	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
<i>Gray wolf</i>	Endangered	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
<i>California wolverine</i>	Federal Proposed; Forest Service Sensitive	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
<i>Northern spotted owl</i>	Threatened	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
	Designated Critical Habitat	No Effect	No Effect	No Effect	No Effect
<i>Valley elderberry long-horned beetle</i>	Threatened	No Effect	No Effect	No Effect	No Effect
	Designated Critical Habitat	No Effect	No Effect	No Effect	No Effect
<i>Yellow-billed cuckoo</i>	Threatened	No Effect	No Effect	No Effect	No Effect
	Designated Critical Habitat	No Effect	No Effect	No Effect	No Effect

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<i>Fisher</i>	Forest Service ³ Sensitive	MINL	MINL	MINL	MINL
<i>Pacific marten</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Fringed myotis</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Pallid bat</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Townsend's big-eared bat</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Bald eagle</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>California spotted owl</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Great gray owl</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Greater Sandhill crane</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Northern goshawk</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Willow flycatcher</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Yellow rail</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Western pond turtle</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Shasta Hesperian snail</i>	Forest Service Sensitive	NI	NI	NI	NI
<i>Western bumble bee</i>	Forest Service Sensitive	NI	NI	NI	NI

³ NI = Will not impact; MINL = may impact individuals, but is not likely to lead to a trend toward Federal listing or loss of viability for the species; MIL = may impact individuals and is likely to lead to a trend toward Federal listing or loss of viability for the species.

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fisheries and Aquatic Resources					
<i>Chinook salmon, Central Valley Spring Run ESU</i>	Threatened	May Affect, Not Likely to Adversely Affect			
	Critical Habitat	May Affect, Not Likely to Adversely Affect			
<i>Central Valley Steelhead</i>	Threatened	May Affect, Not Likely to Adversely Affect			
	Critical Habitat	May Affect, Not Likely to Adversely Affect			
<i>Sierra Nevada Yellow-legged Frog</i>	Endangered	May Affect, Not Likely to Adversely Affect			
<i>Cascades frog</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
<i>Black juga</i>	Forest Service Sensitive	MINL	MINL	MINL	MINL
Socioeconomic Conditions					
	Economic activity	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
	Quality of life - Recreation visitation	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time
	Quality of life - Values, beliefs, and attitudes	No net change in quality of life relative to current conditions; user conflict may increase due to	23% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users; potential	70% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users; potential	No net change in quality of life relative to current conditions; user conflict may increase due to

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		population growth and increased visitor use	for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads	for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads	population growth and increased visitor use
	Environmental Justice	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth	Minor change in travel costs due to reduction in acres open to public OSV use; climate change may increase distances winter recreation users must travel for adequate snow depth	Minor change in travel costs due to prohibition on OSV use below 3,500 feet in elevation and reduction in acres open to public OSV use; climate change may increase distances winter recreation users must travel for adequate snow depth	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth
Noise					
	Opportunities for motorized winter uses	964,020 acres open to OSV use and potentially affected by noise	921,130 acres open to OSV use and potentially affected by noise, a 4.5% decrease from existing conditions	834,660 acres open to OSV use and potentially affected by noise, a 13.4% decrease from existing conditions	958,930 acres open to OSV use and potentially affected by noise, a 0.5% decrease from existing conditions
	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management	186,000 acres closed to OSV use and available for quiet recreation	228,890 acres closed to OSV use and available for quiet recreation, a 23% increase from existing conditions	315,360 acres closed to OSV use and available for quiet recreation, a 69.5% increase from existing conditions	191,090 acres closed to OSV use and available for quiet recreation, a 2.7% increase from existing conditions
	OSV designations Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use	2,760 miles designated /349 miles groomed	323 miles designated /349 miles groomed	316 miles designated /349 miles groomed	398 miles designated /349 miles groomed

Resource Condition	Impacts Considered/ Species Status	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Air Quality					
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality/ Miles of trail open to OSV visitor use	964,020 acres open to OSV use. No known violations of the Clean Air Act (CAA) as a result of OSV use under the existing condition	921,130 acres open to OSV use, a 4% reduction from existing conditions. No violations of the CAA are anticipated.	834,660 acres open to OSV use, a 13% reduction from existing conditions. No violations of the CAA are anticipated.	958,930 acres open to OSV use, a <1% reduction from existing conditions. No violations of the CAA are anticipated.
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality. Acres open to OSV visitor use	349 miles designated for OSV use. No known violations of the CAA as a result of OSV use under the existing condition.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.
	Potential effects of OSV emissions to create adverse impacts to air quality/ Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. No known violations of the CAA or impact to Class 1 areas as a result of OSV use under the existing condition.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. No violations of the CAA or impact to Class 1 areas are anticipated under this alternative.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. Designation of Butte Lake Backcountry Solitude area minimizes OSV impacts and reduces emissions near Caribou wilderness and Lassen NP No violations of the CAA or impact to Class 1 areas are anticipated under this alternative.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness and the boundary of Lassen Volcanic National Park. No violations of the CAA are anticipated or impacts to Class 1 areas.

Chapter 3. Affected Environment and Environmental Consequences

Introduction

This chapter presents the relevant resource components of the existing environment—the baseline environment. It describes the resources of the area that would be affected by the alternatives. This chapter also discloses the environmental effects of implementing the alternatives. These form the scientific and analytical basis for comparing the alternatives described in chapter 2.

Chapter 3 explains the basic components of the analysis followed by a section on each resource. This should provide the reader a better understanding of the overall designations of trails and areas for over-snow vehicles within the planning area. Area size and trail mileage totals are approximate within tables and text due to rounding.

This final environmental impact statement (FEIS) looks at effects within the Lassen National Forest. The effects of the modified proposed action in the Lassen National Forest were aggregated rather than describing the site-specific effect at each road or trail, unless necessary for a particular sensitive resource or concern area. For instance, specialists' reports describe the overall effects of reducing or allowing places people could ride OSVs instead of listing every route and predicting the effects at a particular site.

Most specialists used Geographic Information System (GIS) to calculate the miles and areas affected, or to model habitats. If specialists used models other than GIS, it would be described in their report.

It was assumed that OSV use would occur where it is proposed. In doing so, the effects analysis describes the effects resulting from the change between where people are riding OSVs (alternative 1) and where people would ride OSVs (alternatives 2, 3, and 4).

OSV Use Assumptions

Assumptions regarding areas of high, moderate, low and potential OSV use were identified on an assumptions map. These assumptions will be utilized by all resource specialists when conducting their analyses. Refer to the Assumptions Map, in appendix A of the recreation specialist report, for a visual depiction of where these areas are located.

High use: Areas within 0.5 mile of staging areas and of groomed trails; meadows within 0.5 mile of a groomed trail.

Moderate use: Areas within 0.5 mile of marked (not groomed) trails; areas between 0.5 mile and 1.5 miles of groomed routes; meadows 10 acres or greater in size or 0.5 to 1.5 miles from OSV trails.

Low use: Areas where OSV use is prohibited or restricted under current management; areas below 5,000 feet elevation; CWHR Vegetation 2D, 3D, 4D, 4M; vegetation types 5 and 6 with a slope greater than 20 percent; meadows 30 acres or greater, 1.5 miles or greater from OSV trail; areas more than 1.5 miles from groomed OSV trail; areas more than 0.5 mile from marked (not groomed) OSV trail.

Potential use: CWHR Vegetation Open Areas (annual grass, barren, lacustrine, mixed chaparral, montane chaparral, perennial grass, sagebrush, wet meadow, and urban)

Additional resource specific assumptions utilized during effects analysis are disclosed in the applicable sections of this chapter.

Past, Present, and Reasonably Foreseeable Actions

The interdisciplinary team considered the effects of past actions as part of the existing condition. The current conditions are the sum total of past actions. The Council on Environmental Quality recognizes “agencies can conduct an adequate cumulative effects analysis by focusing on current aggregate effects of past actions without delving into the historical details of individual past actions” (Council on Environmental Quality 2005). Innumerable actions over the last century and beyond have shaped the Lassen National Forest’s current designated road system within the planning area. Attempting to isolate and catalog these individual actions and their effects would be nearly impossible. By looking at current conditions, the effects of past human actions and natural events, regardless of which event contributed to those effects are captured.

Courts have interpreted a “reasonably foreseeable future action” as one that has been proposed and is in the planning stages. To analyze the cumulative effects of present and reasonably foreseeable future actions, each resource specialist looked at the list of projects in appendix C. They identified the ones expected to cause effects to their resource, at the same time and in the same place as effects from the modified proposed action or alternatives.

Specialist Reports

Relevant resource components from each resource specialist’s report are highlighted in this chapter. Components include the existing environment which is the baseline environmental condition as described under alternative 1, and the anticipated environmental effects of implementing the range of alternatives. Please see appendix B for Forest Plan consistency for each resource.

This FEIS incorporates by reference the resource specialists’ reports in the Project Record (40 CFR §1502.21). These reports contain the detailed data, executive summaries, regulatory framework, assumptions and methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach their conclusions.

Project Record

As also stated in chapter 1, the Lassen National Forest Project Record is referenced in an effort to keep this document brief and concise as per 40 CFR §1502.21. The Project Record contains a variety of documents, including, but not limited to: specialists’ reports, literature, supporting documents, and other process-related documents.

Motorized and Non-motorized Recreation Opportunities (Significant Issues)

Introduction

Designating trails and areas for OSV use has the potential to change recreation settings and opportunities by enhancing opportunities for motorized winter users in some areas and limiting those opportunities in other areas. In the same way, OSV designations have the potential to enhance opportunities for non-motorized winter users in some areas while limiting or displacing those users

in other areas. Conflict between motorized and non-motorized winter users arise due to differing desired recreation experiences, public safety concerns, noise, air quality, and access issues. OSV use and the grooming of snow trails for OSV use has the potential to impact areas designated as non-motorized under existing law or policy that are managed for non-motorized recreation opportunities through incidental noise emanating from trails and areas where OSV use would be designated, increased human presence, and illegal encroachment on trails and areas where OSV use would not be designated (i.e., Pacific Crest Trail, Wilderness).

This analysis compares alternatives that would result in varying levels of snowmobile use on the Lassen National Forest. The analysis considers the extent to which the alternatives respond to recreation management direction established in the Lassen National Forest Land and Resource Management Plan (LRMP or Forest Plan), as amended; the Sierra Nevada Forest Plan Amendment; and the requirements of Subpart C of the Forest Service's Travel Management Regulations (36 CFR Part 212).

The designation of trails and areas for OSV use is not intended to be a comprehensive winter recreation planning effort. The focus is on OSV use designations and identification of OSV trails for grooming. This analysis considers how the proposed actions and alternatives would potentially impact quality recreation opportunities and experiences for both motorized and non-motorized users.

In accordance with the Travel Management Regulations, and following a decision on the OSV use designations as required by Subpart C of those regulations, the Forest Service would publish an over-snow vehicle use map (OSVUM) identifying snow trails and areas that would be designated for public OSV use on the Lassen National Forest. Public OSV use that is inconsistent with the OSVUM would be prohibited under Federal regulations at 36 CFR §261.14.

Relevant Laws, Regulations, and Policy

Regulatory Framework

National Forest Management Act

Specifically for off-highway vehicle management, the National Forest Management Act (NFMA) requires that this use be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System (NFS) lands. NFMA also requires that a broad spectrum of forest and rangeland-related outdoor recreation opportunities be provided that respond to current and anticipated user demands.

Sierra Nevada Forest Plan Amendment

The Sierra Nevada Forest Plan Amendment established standards and guidelines specific to wheeled motor vehicle travel off of designated routes, trails, and limited off-highway vehicle (OHV) use areas. Unless otherwise restricted by current forest plans or other specific area standards and guidelines or forest orders, cross-country travel by OSVs would continue (forest-wide standard and guideline number 69 (USDA Forest Service 2009)).

Land and Resource Management Plan

The 1992 Lassen LRMP summarizes the dispersed recreation opportunities relevant to winter use as follows:

Recreationists hike and horseback ride, mainly on 465 miles of trails; they also snowmobile and cross-country ski on trails, unplowed roads, and open areas. The Forest has 125 miles of the Pacific Crest National Scenic Trail, and several National Recreation Trails: the McGowan Cross Country Ski Trail, Colby Meadows, Swain Mountain, the Heart Lake Trail, and the Spencer Meadow Trail...The Bizz Johnson Trail (a "Rails to Trails" project) provides excellent opportunities for hiking, biking, and cross-country skiing between Westwood and Susanville....Cross-country skiers ski the McGowan Cross Country Ski Trail and the Butte Lake Trail. Much of the Forest's road system is skiable during winter months when snow plowing does not occur. Use of the Forest trail system is light to moderate and its user capacity is undetermined. New trails would be built to improve or disperse existing use and provide additional opportunities. Reconstruction is generally a higher priority than new construction. (LRMP 3-21)

Because snowmobile use has increased recently, the Forest has improved snowmobiling opportunities by constructing snowmobile parking areas and warming huts financed by State Off-Highway Vehicle funds. Additional OHV recreation developments are likely (LRMP 3-33).

The Lassen LRMP provides forest-wide and management area-specific standards and guidelines relevant to winter recreation as follows:

Forest Goals:

Recreation:

- (a) Provide a wide range of outdoor recreation opportunities to meet public demand by furnishing different levels of access, service, facilities, and information.
- d. Provide diverse opportunities for winter sports.

Visual Resources:

- a. Throughout the Forest, maintain visual quality commensurate with other resource needs. Adopt and apply specific Visual Quality Objectives (VQOs) for all areas of the Forest.

Wild and Scenic Rivers:

- b. Protect and enhance outstandingly remarkable values and free-flowing condition of recommended and designated Wild and Scenic Rivers.

Wilderness and Further Planning Areas

- a. Protect Wilderness character in designated and recommended Wilderness.

Special Areas

- a. Protect areas of outstanding scientific, scenic, botanic or geologic value as Research Natural Areas (RNAs), or Special Interest Areas (SIAs).

Standards and Guidelines:

15. Recreation

- (a)(3). Manage recreation according to the Recreation Opportunity Spectrum (ROS) classes described in the ROS User's Guide, as specified in Appendix J [of the Forest Plan], and the Management Prescriptions Refer to the separate ROS Map for the distribution of ROS classes throughout the Forest.
- (b)(1) Continue to implement the preferred alternative of the 1989 Winter OHV Management Plan, for the construction of trailheads and trail networks for winter recreation.
- (b)(2) Cooperate with the State of California to identify locations where snow removal is needed to accommodate safe, off-highway parking for dispersed winter use.
- (b)(3) Designate and mark trails needed for additional dispersed winter recreation.
- (b)(4) Designate and sign cross-country ski trails.
- (b)(5) Accommodate snowmobile use over most of the Forest where not in conflict with other uses or resources. Due to the dispersed nature of the activities, do not provide regular patrols. Provide first aid services only as Forest personnel happen to be available.
- (b)(6) Minimize user conflicts by specifying allowable winter use on certain roads and trails (for example cross-country ski trails, snowmobile-only trails or winter 4-wheel drive only).
- (b)(7) Prohibit snow removal on designated snowmobile and cross-country ski trails between specified dates.
- (b)(8) Areas for snow play will not be designated. (LRMP 4-34)

18. Special Areas

- (a)(4) Protect and preserve the values of each special area as identified in an establishment report or area management plan, in conformance with the Special Areas Prescription and Management Area direction.

23. Wild and Scenic Rivers

- (b)(1) Administer river corridors commensurate with their proposed Wild and Scenic designations, as provided in the Wild and Scenic Rivers Act, the Special Areas Prescription, and Management Area direction.

24. Wilderness and Further Planning Areas

- (a)(1) Conduct management activities according to the Wilderness Act of 1964, the Wilderness Prescription in this Plan, and any applicable wilderness plan.

Desired Condition

The desired future condition for recreation and areas designated as non-motorized under existing law or policy is described in the Lassen LRMP as follows:

Recreation facilities are well maintained and are sufficient to handle the increased demand. Wilderness, semi-primitive, Wild and Scenic Rivers, Special Interest Areas, and other special areas are managed to provide generally primitive recreational experiences while maintaining healthy, natural ecosystems (LRMP 4-2).

The desired future condition for scenery is described in the Lassen LRMP as follows:

The appearance of the Forest from designated throughways and vantage points appears mostly unchanged by management activities, from other areas, harvest openings and roads may be visible (LRMP 4-3).

The desired outcome of this OSV use designation process would be a manageable, designated OSV system of trails and areas within the Lassen National Forest, which is consistent with and achieves the purposes of the Forest Service Travel Management Regulations at 36 CFR Part 212, Subpart C. The system of trails and areas will provide access, ensure that OSV use occurs when there is adequate snow, promote the safety of all users, enhance public enjoyment, minimize impacts to natural and cultural resources, and minimize conflicts among the various uses.

This is consistent with the goal in the Lassen LRMP to provide diverse opportunities for winter sports.

Management Area

F – Riparian – Fish Prescriptions (Recreation)

3. Confine off-highway vehicles, except over-snow vehicles, to designated roads, trails, and stream crossings in riparian areas. (LRMP 4-75)

M – Semi-Primitive Motorized Recreation

This prescription is derived from the Recreation Opportunity Spectrum (ROS) class of semi-Primitive Motorized (SPM) (see Appendix J [of the Forest Plan] for the definition of this class). It is intended to facilitate dispersed, motorized recreation, such as snowmobiling, four-wheel driving, and motorcycling, in areas essentially undisturbed except for the presence of four-wheel drive roads and trails. Non-motorized activities such as hiking, fishing, hunting, picnicking, and cross-country skiing are also possible. Motorized travel may be seasonally prohibited or restricted to designated routes to protect other resources. (LRMP 4-60)

N – Semi-Primitive Non-Motorized Recreation:

This prescription is derived from the Recreation Opportunity Spectrum (ROS) class of Semi-Primitive Non-Motorized (SPNM). See Appendix J [of the Forest Plan] for the definition of this class. It is intended to facilitate dispersed recreation such as hiking, mountain bicycling, horseback riding, hunting, and cross-country skiing in unroaded, essentially undisturbed areas outside of existing and proposed wilderness areas. Motorized recreation is prohibited (LRMP 4-63).

Prohibit motorized recreation, including four wheel driving, motorcycling, and snowmobiling (LRMP 4-64).

S – Special Areas

Recreation: 2. Prohibit motorized vehicles within Research Natural Areas (LRMP 4-68).

Wild and Scenic Rivers: 1. Allow public recreation and other resource use activity based on the recommended category of each river segment (LRMP 4-69).

W – Wilderness Prescription

The prescription specifies management direction in accordance with the Wilderness Act of 1964, assuming no permanent or long-lasting evidence of human use. Motorized and mechanized equipment is prohibited (LRMP 4-76).

Management Areas – Logan:

Recreation: 1. Continue designation of trails and restrict snow plowing of snowmobile trails for timber sales between December 1 and April 1 (LRMP p 4-118).

Special Area Designations

Special area designations present within the Lassen National Forest include eligible Wild and Scenic Rivers, Wilderness, proposed wilderness, Inventoried Roadless Areas, national trails, and Research Natural Areas.

Federal Law

The proposed OSV designations will be reviewed to determine their consistency with the following applicable laws, regulations and policies:

- Wilderness Act of 1964 and applicable Wilderness Implementation Plans
- Wild and Scenic Rivers Act of 1968 and applicable Wild and Scenic River Plans
- National Trails System Act of 1968 (P.L. 90-543) and the Pacific Crest National Scenic Trail Comprehensive Plan
- 2001 Roadless Area Final Rule (36 CFR Part 294)
- 2005 Travel Management Regulation – Subpart C (36 CFR Parts 212 and 261) as amended in 2015 - Use by Over Snow Vehicles (Travel Management Regulation)

Executive Orders

Executive Order 11644 of February 8, 1972, as amended by Executive Order 11989 of May 24, 1977, and by Executive Order 12608 of September 9, 1987, requires certain Federal agencies, including the Forest Service, to “ensure that the use of off-road vehicles on public lands [is] controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.”

Other Guidance or Recommendations

National Best Management Practices for Water Quality Management on National Forest System Lands – Rec – 7 Over-Snow Vehicle Use (USDA Forest Service 2012).

The California Off-Highway Motor Vehicle Recreation Division of the California Department of Parks and Recreation provides funding for operating, maintaining, and grooming of winter recreation trails and trailheads in mountainous regions throughout California. OSV trail grooming and ancillary activities, such as trailhead plowing and maintenance are described in detail in the OSV Program Draft and Final Environmental Impact Report (EIR), Program Years 2010–2020. The EIR includes annual monitoring and reporting requirements for Forest Service participation in the grooming program (California Department of Parks and Recreation 2010).

Issues Addressed in This Analysis

OSV Designations

The existing system of public OSV snow trails and areas on the Lassen National Forest is the culmination of multiple agency decisions over recent decades. Public OSV use of the majority of this available system continues to be manageable and consistent with the Travel Management Regulations.

Exceptions have been identified, based on internal and public input and the criteria listed at 36 CFR §212.55. These include needs to provide improved access for OSV users and to formalize prohibitions required by Forest Plan and other management direction. These exceptions represent additional needs for change, and in these cases, changes are proposed to meet the overall objectives.

Improve Public OSV Access

Currently, the Forest Service requires 12 or more inches of snow on the ground for the public to operate an OSV on the Lassen National Forest. Although 12 inches of snow may exist at a given time in many higher elevation areas, there may be less than 12 inches of snow at trailheads, which under current regulations, would leave areas with 12 or more inches of snow inaccessible to public OSV use. To improve public OSV access to areas designated for OSV use, the modified proposed action would allow public OSV use on snow trails designated for OSV use, as long as there are at least 6 inches of snow on the ground.

Ensure OSVs are Operated on Adequate Snow to Minimize Impacts to Natural and Cultural Resources

The Forest Service has also identified areas in which public OSV use should not be designated (i.e., not be allowed), but there are no existing orders or directives that have formally prohibited public OSV use within them. These areas total 42,890 acres in addition to the 186,000 acres of National Forest System land where OSV use is currently prohibited.

These areas are either in lower elevations that do not typically receive sufficient snow for OSV use; are interspersed among areas where OSV use is currently prohibited, such as wilderness, proposed wilderness, and areas classified as semi-primitive non-motorized in the recreation opportunity spectrum; have limited access, except from adjacent private land; are not managed consistent with the Forest Plan, which would prohibit motorized use in the area; or are small areas adjacent to pedestrian trails upon which motorized use is currently prohibited. The modified proposed action would not designate these types of areas for public OSV use.

There are also approximately 12 miles of ungroomed OSV trails located within areas where OSV use is currently prohibited. These trails typically extend a short distance into non-motorized areas and reach a dead end. These non-motorized areas are designated as semi-primitive non-motorized in the Forest Plan. The Forest Plan prohibits motorized recreation, including four-wheel driving, motorcycling, and snowmobiling in semi-primitive non-motorized areas. These semi-primitive non-motorized areas are designated in the Forest Plan as Management Prescription “N” (Forest Plan, page 4-63). The proposed action would not designate these 12 miles of ungroomed trail for OSV use.

Identification of Snow Trails for Grooming

For more than 30 years, the Forest Service, Pacific Southwest Region, in cooperation with the California Department of Parks and Recreation (California State Parks) Off-highway Motor Vehicle

Division has enhanced winter recreation, and more specifically, snowmobiling recreation by grooming snow trails for snowmobile use. On the Lassen National Forest, all groomed trails are co-located on underlying roads. Some of the Forest Service’s grooming occurs on county roads and closed snow-covered highways not under Forest Service jurisdiction. Grooming activities are funded by the State off-highway vehicle trust fund.

In addition to complying with the settlement agreement with Snowlands Network et al., the snow trail grooming analysis would also address the need to provide a high-quality OSV trail system on the Lassen National Forest that is smooth and stable for the rider. Groomed snow trails are designed so that the novice OSV rider can use them without difficulty.

Recreation Analysis

The recreation opportunities and desired experiences for both motorized and non-motorized winter activities are key drivers behind the purpose and need for this analysis. Effectively managing OSV use and identifying snow trails for grooming would help the Forest Service address the Forest Plan goals of providing a wide range of outdoor recreation opportunities to meet public demand by furnishing different levels of access, service, facilities, and information, and providing diverse opportunities for winter sports on the Lassen National Forest (USDA Forest Service 1992).

Significant Issues

Motorized Recreation Opportunities

The decision has the potential to impact the amount of available opportunities for public access and use of National Forest System lands by OSV-equipped winter recreation enthusiasts seeking enjoyable and challenging motorized experiences. The designation of snow trails and areas for public OSV use has the potential to impact the opportunities these enthusiasts seek by:

- a. Changing the location of and/or reducing the amount of high-quality and desirable areas designated for public, cross-country OSV use on the forest;
- b. Designating an insufficient number of opportunities for public OSV use of snow trails on the forest; and
- c. Providing an insufficient number of opportunities for public OSV use of groomed snow trails on the forest.

Resource indicators and measures for this issue are shown in table 33.

Table 33. Resource indicators and measures for the issue of motorized recreation opportunities

Impact	Resource Indicator	Measure
Changing the location of and/or reducing the amount of high-quality and desirable areas designated for public, cross-country OSV use on the forest	The area of National Forest System land designated for public, cross-country OSV use	Size of areas (acres) where public OSV use would be allowed; Percent change in size of areas (acres) where public OSV use would be allowed as compared to current management
Designating an insufficient number of opportunities for public OSV use of snow trails on the forest	Snow trails designated for public OSV use	Length of snow trails (miles) designated for public OSV use; Percent change in length of snow trail (miles) designated for public OSV use as compared to current management

Impact	Resource Indicator	Measure
Providing an insufficient number of opportunities for public OSV use of groomed snow trails on the forest.	Groomed snow trails designated for public OSV use	Length of snow trail (miles) groomed for public OSV use; Percent change in length (miles) of snow trail groomed for public OSV use as compared to current management

Non-motorized Recreation Opportunities

The decision has the potential to impact the amount of available opportunities for public access and use of National Forest System lands by non-motorized winter recreation enthusiasts seeking solitude and challenging physical experiences. The designation of snow trails and areas for public OSV use and grooming of snow trails for public OSV use has the potential to impact the opportunities these enthusiasts seek by:

- i. Displacing non-motorized winter recreation enthusiasts, or requiring them to travel longer distances through motorized routes and areas than they are physically able to traverse to access their desired quiet, non-motorized experiences;
 - Consuming untracked powder desired by backcountry skiers;
 - Making the snow surface difficult to ski on;
 - Tripling the amount of OSV use on snow trails that are groomed for OSV use, increasing the potential for all other impacts to opportunities these enthusiasts seek;⁴
 - Creating concerns for their safety when non-motorized winter recreationists share winter recreation routes and areas with OSVs;
 - Creating noise impacts that intrude on the solitude these enthusiasts seek;
 - Creating local air quality impacts that intrude on the unpolluted air and solitude these enthusiasts seek; and
 - Creating visual impacts that intrude on the unaltered scenery these enthusiasts seek.

Resource indicators and measures for this issue are shown in table 34.

⁴ According to the State of California’s Over-Snow Vehicle Program Draft EIR, OSV use on groomed snow trails is three times the OSV use on ungroomed snow trails (California Department of Parks and Recreation, Off Highway Motor Vehicle Recreation Division 2010, page 2-20).

Table 34. Resource indicators and measures for the issue of non-motorized recreation opportunities

Impact	Resource Indicator	Measure
<p>Displacing non-motorized winter recreation enthusiasts, or requiring them to travel longer distances through motorized routes and areas than they are physically able to traverse to access their desired quiet, non-motorized experiences</p> <p>Consuming untracked powder desired by backcountry skiers;</p> <p>Making the snow surface difficult to ski on; and</p> <p>Tripling the amount of OSV use on snow trails that are groomed for OSV use.</p>	<p>Access to desired non-motorized settings and opportunities</p>	<p>Size of area (acres) and trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads</p>
	<p>Recreation Opportunity Spectrum (ROS)</p>	<p>Consistency of OSV designations with ROS classes</p>
<p>Creating concerns for their safety when non-motorized winter recreationists share winter recreation routes and areas with OSVs</p>	<p>Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences</p>	<p>Size of areas (acres) designated for public OSV use, size of areas (acres) of non-motorized areas such as cross-country ski areas, non-motorized trail access</p>
<p>Creating noise impacts that intrude on the solitude these enthusiasts seek</p>	<p>Potential noise impacts</p>	<p>Size of area (acres) potentially affected by noise/size of area (acres) closed to winter motorized use</p> <p>Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)</p>
	<p>Proximity and frequency of OSV designations in relation to designated non-motorized areas (e.g., Wilderness, Inventoried Roadless, Lassen Volcanic National Park, RNAs, Proposed Wilderness, Primitive and Semi-primitive Non-motorized ROS classifications)</p>	<p>Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy</p>
	<p>Applicable wilderness capability attributes/characteristics (FSH 1909.12 (72.1))</p>	<p>Size of areas (acres) affected and duration of impact. Qualitative description for each wilderness attribute.</p>
	<p>Applicable Inventoried Roadless Area (IRA) criteria/characteristics (36 CFR §294.11)</p>	<p>Size of areas (acres) affected and duration of impact. Qualitative description for each roadless area characteristic.</p>
<p>Creating local air quality impacts that intrude on the unpolluted air and solitude these enthusiasts seek</p>	<p>Potential air quality impacts</p>	<p>Qualitative/narrative description of potential impacts (with reference to the air quality analysis)</p>

Impact	Resource Indicator	Measure
Creating local air quality impacts that intrude on the unpolluted air and solitude these enthusiasts seek (continued)	Proximity and frequency of OSV designations in relation to designated non-motorized areas (e.g., Wilderness, Inventoried Roadless, Lassen Volcanic National Park, RNAs, Proposed Wilderness, Primitive and Semi-primitive Non-motorized ROS classifications)	Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy.
	Applicable wilderness capability attributes/characteristics (FSH 1909.12 (72.1))	Size of area (acres) affected and duration of impact. Qualitative description for each wilderness attribute.
	Applicable Inventoried Roadless Area (IRA) criteria/characteristics (36 CFR §294.11)	Size of area (acres) affected and duration of impact. Qualitative description for each roadless area characteristic.
Creating visual impacts that intrude on the unaltered scenery these enthusiasts seek	Qualitative/narrative description of potential visual impacts	Qualitative description of potential effects
	Proximity and frequency of OSV designations in relation to designated non-motorized areas (e.g., Wilderness, Inventoried Roadless, Lassen Volcanic National Park, RNAs, Proposed Wilderness, Primitive and Semi-primitive Non-motorized ROS classifications)	Qualitative description of potential effects
	Applicable wilderness capability attributes/characteristics (FSH 1909.12 (72.1))	Qualitative description of potential effects
	Applicable Inventoried Roadless Area (IRA) criteria/characteristics (36 CFR §294.11)	Qualitative description of potential effects

Other Resource Concerns

Other resources relevant to this analysis that were addressed in public scoping comments include Wilderness, Research Natural Areas, Wild and Scenic Rivers, and the Pacific Crest National Scenic Trail.

Methodology

This analysis used ArcMap and relevant Geographic Information System (GIS) data layers covering the Lassen National Forest, including recreation opportunity spectrum (ROS) classes, Wilderness areas, inventoried roadless areas, national trails, Wild and Scenic Rivers, Research Natural Areas, etc. The GIS layer of proposed OSV designations and groomed trails was used as an overlay with the recreation settings and opportunities, scenery, access and designated area layers listed above to determine any potential conflicts.

Forest Plan direction was considered to ensure compliance with management direction. A review of existing law, regulation and policy relevant to recreation settings and opportunities, access, scenery,

and designated area resources within the project area was completed and referenced where appropriate.

The requirements of the Travel Management Regulation, Subpart C, including the general criteria for designation of roads, trails and areas (36 CFR §212.55(a)):

- Natural and cultural resources
- Public safety
- Provision of recreational opportunities
- Access needs
- Conflicts among uses of NFS lands
- Need for maintenance and administration of roads, trails and areas that would arise if uses under consideration are designated and availability of resources for that maintenance and administration.

And the specific criteria to consider effects on the following with the objective of minimizing (36 CFR §212.55 (b)):

1. Damage to soil, watershed, vegetation, and other forest resources;
2. Harassment of wildlife and significant disruption of wildlife habitats;
3. Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands; and
4. Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands.

In addition:

5. Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.

The National Visitor Use Monitoring (NVUM) results, California State Parks, California Outdoor Recreation Plan, National Recreation Survey and the Environment information and online visitor information sources provided by the Forest Service and other local organizations and industry was used as an overview of the recreation opportunities, visitor use, and trends within the analysis area. The Recreation Facility Analysis niche statement was used to depict the importance of winter use (motorized or non-motorized) on the national forest; and secondly, consideration was given to how important the National Forest System lands are for this use (motorized or non-motorized) compared to other non-National Forest System lands.

The NVUM visitor use information from 2001, 2006, and 2010 was considered. The best available site-specific visitor use information for Lassen National Forest OSV use was from the 2009 OSV Winter Trailhead Survey conducted in support of the 2010 State OSV Program EIR for Program Years 2010–2020. OSV registration information for the State of California and for counties within the Lassen National Forest was also used to depict OSV use trends.

A case study and literature review of current information regarding motorized and non-motorized winter recreation trends and preferences; and coordination with local Forest Service Specialists

regarding on-the-ground conditions and use patterns were used to summarize existing conditions and potential impacts.

To evaluate potential impacts to recreation settings and opportunities, access, scenery, and designated area resources, each alternative will be compared using issues, indicators and measures defined below.

Resource Indicators and Measures

The resource indicators and measures shown in table 35 will be used to measure and disclose effects to recreation resources related to OSV use designations and grooming trails for OSV use.

Table 35. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: Purpose and Need (P/N), or key issue?	Source (LRMP S&G, ⁵ law or policy, BMPs, ⁶ etc.)?
Motorized Recreation Opportunities – cross-country	Opportunities for motorized winter uses	Size of areas (acres) open to OSV use, percent change	P/N	LRMP Forest Goals, Recreation: <i>d. Provide diverse opportunities for winter sports</i> , and LRMP S&G 15 Recreation. (b)(5) <i>Accommodate snowmobile use over most of the Forest where not in conflict with other uses or resources...</i> Travel Management Regulation (36 CFR Part 212), Subpart C.
Motorized Recreation Opportunities – designated snow trails	OSV trail designations	Length of designated OSV trails (miles), percent change	P/N	Travel Management Regulation (36 CFR Part 212), Subpart C.
Motorized Recreation Opportunities – groomed snow trails	OSV trail grooming	Length of groomed OSV trails (miles), percent change	P/N	Travel Management Regulation (36 CFR Part 212), Subpart C.
Non-motorized Recreation Opportunities - displacement	Access to desired non-motorized recreation settings and opportunities	Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads	Significant Issue	Scoping, Civil Complaint

⁵ Standard and guideline

⁶ Best management practices

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: Purpose and Need (P/N), or key issue?	Source (LRMP S&G, ⁵ law or policy, BMPs, ⁶ etc.)?
	Recreation Opportunity Spectrum	Consistency of OSV designations with ROS classes	Significant Issue	LRMP S&G 15 (3) – p 4-24: <i>Manage recreation according to the Recreation Opportunity Spectrum (ROS) classes described in the ROS User's Guide, as specified in Appendix J [of the Forest Plan], and the Management Prescriptions. Refer to the separate ROS Map for the distribution of ROS classes throughout the Forest.</i>
Non-motorized Recreation Conflicts - Public Safety	Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	Size of areas (acres) closed to OSV use, percent change.	Significant Issue	Minimization Criteria: 36 CFR §212.55(b)(3): Consider effects on the following with the objective of minimizing: <i>Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands; and (4) Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands. In addition, the responsible official shall consider: (5) Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors</i>
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas	Proximity and frequency of OSV designations in relation to designated non-motorized areas	Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy	Significant Issue	Wilderness Act of 1964 Wild and Scenic Rivers Act of 1968 National Trails System Act of 1968 Pacific Crest Trail Comprehensive Plan

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: Purpose and Need (P/N), or key issue?	Source (LRMP S&G, ⁵ law or policy, BMPs, ⁶ etc.)?
	Noise	Size of areas (acres) potentially affected by noise/size of areas (acres) closed to winter motorized use Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)	Issue analyzed to inform analysis of significant issue	Minimization Criteria: 36 CFR §212.55(b)(3)
	Air Quality	Qualitative/narrative description of potential impacts (with reference to air quality analysis	Issue analyzed to inform analysis of significant issue	Minimization Criteria: 36 CFR §212.55(b)(3)
	Scenery	Qualitative/narrative description of potential visual impacts	Issue analyzed to inform analysis of significant issue	
	Wilderness Attributes	Size of areas (acres) affected and duration of impact. Qualitative description for wilderness attributes	Issue analyzed to inform analysis of significant issue	FSH 1909.12 (72.1)
	Roadless Characteristics	Size of areas (acres) affected and duration of impact. Qualitative description for roadless characteristics	Issue analyzed to inform analysis of significant issue	36 CFR §294.11

OSV Use Assumptions for Analysis

The following OSV use assumptions were developed based on information in the State EIR and 2009 Trailhead Survey, and based on local knowledge and observations of resource specialists from the Lassen National Forest. The assumptions were mapped and used in this analysis to consider potential impacts from OSV designations and OSV trail grooming activities on recreation and areas designated as non-motorized under existing law or policy. The maps of OSV use potential for the Almanor, Eagle Lake, and Hat Creek Ranger Districts are included as appendix A of the recreation specialist report.

The OSV use assumptions include:

- Limited OSV use on steep slopes with heavy forest cover/high tree density (assume no use on slopes 35 percent or greater). In open terrain, with no trees, there is no slope-limiting factor for high-marking.
- Open areas with many shrubs, OSVs won't use without adequate snow depth.
- OSV use patterns:
 - Primarily day use (generally 10:00 am to 3:00 pm; grooming occurs at night).
 - OSV use is at the highest on weekends and holidays.
 - Highest concentrations of OSV use occur along groomed trails (this is supported by research documented in State EIR).
 - Concentrated use at trailheads.
 - Higher use in open meadows (concentrated on meadows with groomed trail access) and flatter areas.
 - OSV "high marking" occurs primarily on slopes with open vegetation coverage, near groomed trails.
 - Lower elevations generally have less OSV use – snow occurs at lower elevations less frequently and does not persist for long periods of time (2 to 5 days), 3,500 feet and below for the Lassen.
- Ungroomed routes receive 50 percent less use than groomed routes (only 25,000 registered OSVs in California per State EIR, most use on groomed trails; if OSV trail grooming were discontinued, assume that use would decline by 50 percent).
- Groomed trails are suitable for OSVs other than snowmobiles (side-by-sides and quads on tracks, snowcats, etc.)
- Groomed trails provide a higher degree of educational messages including messages encouraging trail sharing to reduce potential use conflicts.

Spatial and Temporal Context for Effects Analysis

Spatial Context:

- Forest Boundary

Effects Timeframe:

- Short-term effects occur within one year.
- Long-term effects occur up to 20 years.

Affected Environment

Existing Condition

Recreation Settings and Opportunities

The Lassen National Forest offers a variety of high-quality recreation opportunities in a range of settings, year round. Three geomorphic provinces meet within the national forest and contribute to its diversity—the Sierra Nevada Mountains, the Southern Cascade Mountains, and the Modoc Plateau. Elevations range from 900 feet to 8,677 feet. Topography varies from deep river canyons and vast sage brush flats to sharp rocky peaks. The forest completely surrounds Lassen Volcanic National Park, and the 10,457-foot Lassen Peak is a prominent feature visitors view from many national forest locations. Proximity to the national park and a variety of access points from the forest increase visitors' opportunities for quiet recreation. Other public lands adjacent to the Lassen National Forest include the Plumas National Forest (south), Shasta-Trinity National Forest (north), Bureau of Land Management (BLM) (north and east), and Tehama Wildlife area (State of California) (west). Private lands surrounding the Lassen National Forest vary between rural or sparsely populated to residential subdivisions. In addition, private timber companies like Sierra Pacific Industries, Collins Pine Company, Beaty & Associates, and Fruit Growers hold significant acreage (USDA Forest Service 2009).

Recreation Niche

The recreation niche is a characterization of the distinct role the national forest has in providing outdoor recreation opportunities to the public. The niche allows the Forest Service to focus management efforts on providing recreation opportunities related to what is unique and valuable about the Lassen. The recreation niche statement of Lassen National Forest is:

Your Crossroads to Discovery—The Lassen National Forest is a crossroads of landscape and people. Here the granite of the Sierra Nevada, the lava of the Cascades and the Modoc Plateau, and the ranges of the Great Basin converge. The geologic crossroads has influenced the cultural crossroads throughout time. For generations, the Forest has and continues to provide quality of life and livelihood for local families and native people while enriching the experiences of a changing and diverse group of visitors. In this high country oasis, water is the key attraction. Large, high elevation lakes provide a social weekend getaway and clear streams offer premier fishing. The Volcanic Legacy All-American Road, Lassen Backcountry Discovery Trail and other major routes traverse the Forest offering outstanding viewing and learning opportunities and access to the Forest backcountry. (USDA Forest Service 2007)

Water-based recreation, hiking or walking, viewing scenery and wildlife, developed camping, and driving for pleasure, as well as geologic and cultural interpretation, provide the focus for recreation on the Lassen National Forest. Four broad niches describe this focus: lakes and special waterways, travel ways, backcountry, and wildlands.

Recreation Opportunity Spectrum

The Forest Service uses the recreation opportunity spectrum (ROS) to inventory and describe the range of recreation opportunities available based on the following characteristics of an area: physical (characteristics of the land and facilities), social (interactions and contact with others), and managerial (services and controls provided). The recreational settings are described on a continuum ranging from Primitive to Urban. The ROS classes within the Lassen include Primitive (P), Semi-

Primitive Non-Motorized (SPNM), Semi-Primitive Motorized (SPM), Roded Natural (RN), and Rural (R). OSV designations that remain consistent with the ROS classes will provide for a diversity of opportunities for both motorized and non-motorized winter activities and the associated desired experiences.

Primitive: High opportunity for isolation from sights and sounds of man, unmodified natural environment. Very low interaction with other users.

Semi-Primitive Non-Motorized: Moderate opportunity for isolation from sights and sounds of man, natural appearing environment. Low interaction with other users.

Semi-Primitive Motorized: Moderate opportunity for isolation from sights and sounds of man, natural appearing environment. Low interaction with other users. Access permitted by four-wheel drive or motor bikes.

Roded Natural Appearing: Sights and sounds of man are moderate. Mostly natural appearing as viewed from sensitive roads and trails. Landings, roads, slash, and other debris are evident. Access travel is conventional motorized.

Rural: Sights and sounds of man are evident. Natural environment is culturally modified, yet attractive. Access and travel facilities are for individual intensive motorized use.

A majority of Lassen National Forest acres are in the Roded Natural class.

Table 36. Lassen National Forest recreation opportunity spectrum classes

Recreation Opportunity Spectrum	ROS Class Acres
Primitive	3,393
Semi-Primitive Non-Motorized	146,387
Semi-Primitive Motorized	59,350
Roded Natural	910,774
Rural	9,681

LRMP Table 3.1 (3-21)

On the Lassen National Forest, all wilderness and proposed wilderness areas are classified as Semi-Primitive Non-Motorized and Primitive. All Semi-Primitive Non-Motorized and Primitive areas are closed to OSV use. Groomed trails are located in Semi-Primitive Motorized, Roded Natural, and Rural classes.

Motorized Winter Recreation

The Lassen National Forest has a well-developed winter recreation program, which emphasizes snowmobile use and includes 406 miles of snowmobile trails that connect to six well-placed developed staging areas.

For over 30 years, the Forest Service, Pacific Southwest Region, in cooperation with the California Department of Parks and Recreation (California State Parks) Off-highway Motor Vehicle Division has enhanced winter recreation, and more specifically, snowmobiling recreation by maintaining National Forest System trails (snow trails) by grooming snow for snowmobile use. Plowing of local access roads and trailhead parking lots, grooming trails for snowmobile use, and light maintenance

of facilities (e.g., restroom cleaning, garbage collection) are the essential elements of the OSV Program that keep the national forests open for winter recreation use.

The groomed OSV trail system on the Hat Creek, Eagle Lake, and Almanor Ranger Districts is described below.

Ashpan Snowmobile Area

The Ashpan Snowmobile Area, which has been in operation for 26 years, is on State Route 44/89, 4 miles northeast of the north entrance to Lassen Volcanic National Park. Ashpan offers 35 miles of groomed trails and access to another 30 miles of groomed trails associated with neighboring Latour State Forest. The Latour State Forest trails are not groomed by State of California OSV Program funds.

This trail system travels through mixed conifer forests with the higher sections containing views of Mount Lassen, Mount Shasta, and the upper Sacramento Valley. Trail elevations range from 5,400 feet to 6,000 feet. The Ashpan trailhead has a parking lot, warming hut, and restroom.

The Forest Service (Hat Creek Ranger District) is responsible for operating and maintaining the Ashpan Snowmobile Area. Caltrans provides plowed trailhead access, but a private vendor could provide the service under contract to the Forest Service (Lassen National Forest) in the future.

Bogard Snowmobile Area

The Bogard Snowmobile Area is located 25 miles northwest of Susanville on State Route 44. Trailhead parking and restrooms are provided off State Route 44 at Forest Route 10. Bogard offers 80 miles of groomed trail ranging in elevation from 5,600 feet to 7,700 feet.

To the east of the highway are ungroomed meadows and two groomed trails: Antelope Mountain Lookout and Crater Lake. Antelope Mountain Lookout has 16 miles of trail with panoramic views of Mount Lassen, Mount Shasta, and the Warner Mountains. Crater Lake has 7 miles of trail.

The meadows of Pine Creek Valley are the focal point of snowmobile use in Bogard. There are also 30 miles of ungroomed forest roads that travel through the Pine Creek Valley to Eagle Lake. To the west of the highway are trails that travel through pine and fir forests and connect to Hat Creek rim to the north and Swain Mountain to the south.

The Forest Service (Eagle Lake Ranger District) is responsible for operating and maintaining the Bogard Snowmobile Area. Caltrans provides plowed trailhead access, but a private vendor could provide the service under contract to the Forest Service (Lassen National Forest) in the future.

Fredonyer Snowmobile Area

The Fredonyer Snowmobile Area is located on State Route 36, 10 miles west of Susanville. The area has 80 miles of groomed trails, a parking area, a warming hut, and a restroom.

The Fredonyer Snowmobile Area can be accessed from three different areas. Primary access is from the Fredonyer trailhead on State Route 36 at Fredonyer Pass. Additional pullout parking is available along the road shoulder, dependent upon plowed conditions. Willard Hill, a few miles farther east on State Route 36 also provides access with pullout parking along the road. South of Susanville, Gold Run Road (County Road 204) provides an ungroomed trail link to the Fredonyer trails.

The Fredonyer trails are located on both the north and south sides of State Route 36 with the northern trail route linking to the Swain Mountain Snowmobile Area. Trails on the south side of State Route 36 offer various loop trails which traverse through a combination of forest and open

meadow and offer views of the Great Basin and the high country around Mount Lassen. Trail elevations range from 4,800 feet to 7,000 feet.

The Forest Service (Eagle Lake Ranger District) is responsible for operating and maintaining the Fredonyer Snowmobile Area. Caltrans provides plowed trailhead access, but a private vendor could provide the service under contract to the Forest Service (Lassen National Forest) in the future.

Jonesville Snowmobile Area

The Jonesville Snowmobile Area is located in the Lake Almanor area between State Routes 32 and 89. The Jonesville trailhead is located on Humboldt Road off State Route 32 about 2 miles east of the Cherry Hill Campground and provides a parking lot and restrooms. The Jonesville trails can also be accessed from the Almanor Picnic Area on State Route 89 on the west shore of Lake Almanor.

Jonesville offers 70 miles of groomed trails and three loop routes that follow Humboldt and Humboldt county roads. Trail elevations range from 4,600 feet to 6,600 feet. Views of the Lake Almanor Basin can be seen from the Yellow Creek loop. Colby Mountain Lookout is a popular destination in the Jonesville area.

Butte Meadows Hillsliders Snowmobile Club provides trail grooming under contract to Butte County. The Butte County Road Department plows 7 miles of Humboldt Road from State Route 32 to the trailhead.

Morgan Summit Snowmobile Area

The Morgan Summit Snowmobile Area is located 4 miles east of Mineral on State Route 36 and State Route 89. This snowmobile area has 77 miles of groomed trails, a parking lot, restrooms, and a warming hut maintained by the Forest Service (Almanor Ranger District).

It contains loop trails and the trail to Turner Mountain Lookout that has views of the central Sacramento Valley, Sutter Buttes, Lake Almanor, and Mount Shasta. Trail elevations range from 4,800 feet to 6,900 feet.

Both volunteers and Forest Service groomer operators groom the Morgan Summit trail system. Caltrans provides plowed trailhead access, but a private vendor could provide the service under contract to the Forest Service (Lassen National Forest) in the future.

Swain Mountain Snowmobile Area

The Swain Mountain Snowmobile Area is located north of Lake Almanor off Mooney Road (County Road A-21). The area can also be accessed from the Chester-Lake Almanor staging area at Lake Almanor on Forest Route 10 off State Route 36. Each trailhead provides parking and restrooms.

Swain Mountain has 60 miles of groomed trails and three loop trails, and is the hub of the snowmobile system on the Lassen National Forest. Trail elevations range from 5,200 feet to 6,800 feet. It provides direct access to Fredonyer and Bogard Snowmobile Areas and 200 miles of marked trails (groomed and ungroomed).

The Forest Service (Almanor Ranger District) is responsible for operating and maintaining the Swain Mountain Snowmobile Area. The Plumas County Road Department plows the Swain Mountain trailhead and Chester-Lake Almanor trailhead along with 0.25 mile of Forest Route 10.

Table 37. Overview of State of California OSV grooming program activity on the Lassen National Forest

Project Location National Forest (NF) and County	Recreation Facility⁷	State of California OSV Program Funded Activity
Lassen NF, Hat Creek Ranger District Shasta County near Latour State Forest and Lassen Volcanic National Park	Ashpan Snowmobile Area	Groom 35 miles of trail, plow 1 trailhead, service 1 restroom, and refuse collection.
Lassen NF, Eagle Lake Ranger District Lassen County, near Eagle Lake (Bogard) and Westwood (Fredonyer)	Bogard and Fredonyer Snowmobile Areas	Groom 160 miles of trail, plow 2 trailheads, service 2 restrooms, and refuse collection
Lassen NF, Almanor Ranger District Butte and Plumas Counties, near Jonesville and Lake Almanor	Jonesville Snowmobile Area	Groom 70 miles of trail, plow 7 miles of road and 1 trailhead
Lassen NF, Almanor Ranger District Plumas and Lassen Counties, near Chester (Swain Mountain) and Tehama County near Mineral (Morgan Summit)	Swain Mountain and Morgan Summit Snowmobile Areas	Groom 137 miles of trail, plow 0.25 mile of road and 3 trailheads, service 2 restrooms, and refuse collection

Non-motorized Winter Recreation

The Lassen National Forest contains three designated wildernesses (78,060 acres), three proposed wilderness areas (61,686 acres); three eligible wild and scenic rivers (84 miles), and six research natural areas. Most of the managed non-motorized lands lie within the primitive (P) and semi-primitive non-motorized (SPNM) ROS classes, which are free of conflicts with motorized activities (USDA Forest Service 2009).

The Lassen has abundant opportunities for cross-country skiing. Several locations on the national forest are closed to motorized vehicles by Forest Order to allow for solitude on designated cross-country ski trails. These trails are designed to challenge a variety of skill levels and are marked from easy to most difficult. They are groomed periodically during the snow season.

Popular cross-country ski trails include the McGowan cross-country ski trail, the Butte Lake trail, the Bizz Johnson Trail, and Colby Meadows. The Pacific Crest trail (PCT) runs through the center of the Lassen National Forest from north to south. The PCT is closed to motorized OSV use and provides non-motorized winter trail opportunities.

The 106,372-acre Lassen Volcanic National Park (LVNP) is located near the center of the Lassen National Forest. A variety of winter non-motorized activities are available in the park including cross-country skiing, telemarking, snowshoeing, and snowplay. The NPS offers ranger-led snowshoe trips from the Manzanita Lake area. Throughout the winter, the park highway is plowed to the southwest parking area on the south side of the park and to the Loomis Museum on the north side of the park. Non-motorized access is allowed year-round (USD National Park Service 2015). The nearest groomed OSV trails to the LVNP, located on the Lassen National Forest are approximately three-quarters of a mile to the east of the park's southeast corner, and approximately one and one-half miles north of the park's northwest corner.

⁷ The only seasonal restrictions occur with regard to wheeled motorized and grooming – wheeled vehicle use on groomed trails is prohibited from December 26 until March 30.

Visitor use

To determine the potential effects of management alternatives, it is important to understand the characteristics of people who visit and recreate on Lassen National Forest. Responding to the need for improved information about visitors to National Forest System lands, the Forest Service developed a nationwide, systematic monitoring process for estimating annual recreation use: the National Visitor Use Monitoring (NVUM) program.

The NVUM program was designed to provide statistically reliable estimations of recreation visitation to national forests and grasslands. Through collection and dissemination of information about recreational users and their preferred activities, resource managers can make informed, strategic decisions about the types and amount of recreation opportunities provided on the national forest.

NVUM surveys were conducted on Lassen National Forest during calendar year 2000 and fiscal years 2005 and 2010, the results of which were published in 2001, 2006, and 2010, respectively (USDA Forest Service 2001, 2006, 2010). Surveys collected information about participation in recreation activities, visitor demographics, and spending patterns. Summaries from these surveys are useful to describe recreation use patterns on the national forest. As displayed, these data are only valid at the forest level and cannot be disaggregated to specific sites or locations.

The Lassen serves a largely local client base. Over 43 percent of visits came from people living within 50 miles of the national forest; another 7 percent came from people living 50 to 75 miles away. Most visits are short, day use lasting 6 hours or less. Almost 60 percent are people who visit five times or less per year.

In 2010, the three most reported main activities were fishing (22 percent), viewing natural features (19 percent), and snowmobiling (8 percent). In 2005, the three most reported main activities were hunting (16.4 percent), hiking/walking (15.4 percent), and fishing (13.1 percent). Winter activities were lower during this survey year with cross-country skiing (3.5 percent), downhill skiing (2.3 percent), and snowmobiling (1.2 percent). In 2001, the top primary activities were: fishing (20.9 percent), other non-motorized activities such as swimming, games and sports (14 percent), developed camping (9.2 percent), and driving for pleasure (9 percent). Winter activities were lower with downhill skiing and snowboarding (3.3 percent), snowmobile travel (2 percent), cross-country skiing and snowshoeing (1 percent).

Table 38 shows the estimated visitor use based on the percentage of visitors reporting snowmobiling and cross-country skiing as their main activity.

Table 38. National visitor use management winter activities

Year	Activity	Total Annual National Forest Visits	% Main Activity	Estimated Annual National Forests Visits based on the % main Activity	Average hours participating in main activity
2010	Snowmobiling	300,000	8.4%	25,200	3.9
2010	Cross-country skiing	300,000	1.8%	5,400	0
2005	Snowmobiling	607,200	1.2%	7,286	4
2005	Cross-country skiing	607,200	3.5%	21,252	2.7
2001	Snowmobiling	656,038	2.0%	13,120	Not reported
2001	Cross-country skiing	656,038	1.0%	6,560	Not reported

*A National forest visit is defined as the entry of one person upon a national forest to participate in recreation activities for an unspecified period of time. A national forest visit can be composed of multiple site visits. The visit ends when the person leaves the national forest to spend the night somewhere else.

The California Department of Motor Vehicles records OSV registration by county each year. The Lassen National Forest falls within the seven counties shown in table 39.

Table 39. California OSV registration for counties in Lassen National Forest, 2009 through 2014

	2009	2010	2011	2012	2013	2014
Butte	1,093	1,054	1,057	991	1,014	955
Lassen	394	364	352	322	315	279
Modoc	41	35	42	39	37	28
Plumas	1,236	1,180	1,111	1,025	1,022	920
Shasta	417	432	471	410	433	399
Siskiyou	508	505	474	472	457	420
Tehama	103	108	111	112	106	110
TOTAL	3,792	3,678	3,618	3,371	3,384	3,111

*Data from CA State Parks, not official DMV records

Table 40 shows total statewide OSV registrations and out-of-state registrations.

Table 40. California statewide OSV registration, 2009 through 2014

	2009	2010	2011	2012	2013	2014
Subtotal	18,542	17,982	17,776	16,956	16,929	16,189
Out of State	260	242	235	244	215	197
Total	18,802	18,224	18,011	17,200	17,144	16,386

*Data from CA State Parks, not official DMV records

Snowmobile registrations in the Lassen National Forest counties and statewide have remained nearly stable, or declined slightly over the past six years. The State EIR estimated that OSV use would continue to increase at a rate of approximately 4 percent per year, as it had between 1997 and

2009 (California Department of Park and Recreation 2010); however, that has not been the case in recent years.

OSV visitor use varies based on the amount of snowfall and the length of the season. All districts on the Lassen National Forest receive some snow; however, the Front Country, Ishi Wilderness area, Almanor Ranger District, generally does not get sufficient snow for OSV use.

Table 41 is derived from the OSV trailhead survey conducted for the State EIR, and based on data summarized in the State EIR (California Department of Park and Recreation 2010). The table shows the average number of vehicles at trailheads, and the average number of OSVs that would be expected on weekends and holidays versus weekdays. Based on this information, estimated use for the 2015/2016 winter season is 10,020 OSV users forest wide.

Table 41. Lassen National Forest OSV visitor use

Location	Day description	Number of vehicles	Number of OSVs*
Forest wide	Weekend or holiday (approx. 33 per season)	106	212
Forest wide	Weekday (approx. 65 per season)	21	42
Individual trailheads	Weekend or holiday	15 (average)	30
Individual trailheads	Weekday	3.5	7

Based on 2009 data from California State Draft EIR

*assumes an average of 2 OSV's per vehicle parked at a trailhead

Conflicts between Motorized and Non-motorized Winter Experiences

The 2010 NVUM report indicates that 81.4 percent of visitors to the Lassen National Forest are very satisfied, and 12.2 percent are somewhat satisfied. The satisfaction survey questions did not directly address winter use, however, the NVUM Importance-Performance ratings for Undeveloped General Forest areas that could be relevant to winter recreation include conditions of the environment, parking availability, parking lot condition, feeling of safety and scenery, all were rated “keep up the good work” while signage adequacy was rated as “concentrate here” (USDA Forest Service 2010).

There are occasional OSV incursions in wilderness and adjacent non-motorized areas (reports of OSV trespass into Caribou Wilderness, Lassen Volcanic National Park, and occasionally on designated cross-country ski trails), but law enforcement has determined many of the incursions to be inadvertent. OSV trespass into designated wilderness facilitated by groomed trails could occur and may increase as use increases. There are no other known conflicts between OSV use and other uses on National Forest System land or neighboring Federal lands, no known conflicts among classes of OSVs, and no known areas where use is adversely affecting cultural, tribal, or historic resources (USDA Forest Service 2014).

Conflict between motorized and non-motorized winter users arise due to differing desired recreation experiences, public safety concerns, noise, air quality, and access issues. Public comments received during the scoping period for this project describe conflicts related to (1) displacing visitors who prefer non-motorized recreation opportunities; (2) posing safety concerns for non-motorized users due to the high speed of vehicles on shared trails; (3) creating noise and air quality impacts that lead to the displacement of non-motorized users; (4) quickly consuming untracked powder snow, which reduces a desired backcountry skiing experience; (5) disrupting ski tracks, making the snow surface unsuitable for cross-country skiing; and (6) grooming trails which

the State of California's Over Snow Vehicle Program Draft EIR estimates triples the OSV use on trails to the detriment of non-motorized users.

Motorized winter users expressed concerns regarding additional limitations on use; however, they generally did not describe conflicts with non-motorized users.

Opportunities for quality recreation experiences depend on both the settings (physical, social, and managerial aspects), and on the desired experience of the user. Conflicts occur when one recreationist effects or degrades the experience of another. Many non-motorized recreationists experience conflict with motorized recreationists (Adams and McCool 2010). Conflict can result in displacement or the abandonment of the use of a particular trail or area, or a change in time of use (Adams and McCool 2010).

Both motorized and non-motorized winter recreation activities can be described in three general categories including trail touring, backcountry exploring, and alpine adventure (Snowlands 2014). Trail touring is typically focused on the use of groomed trail systems, where the quality of the groomed trail with moderate climbs and descents is often the most important factor for the recreation experience. Backcountry exploring is focused on cross-country travel away from the groomed trail system with emphasis on travelling and exploring. Alpine adventure is characterized by the challenge of riding through powder snow on steeper slopes. In alpine adventure, backcountry skiers seek the downhill experience, while snowmobilers enjoy the challenge of climbing up (Snowlands 2014).

Quality non-motorized winter recreation experiences are typically characterized by quiet activities such as cross-country skiing or snow-shoeing in a natural environment that is not influenced by the sound, smell of exhaust, or sight of snowmobiles. Areas must be accessible from plowed trailheads, as non-motorized users typically do not travel long distances. Non-motorized visitors spend an average of 2.3 hours on the snow per visit (Rolloff et al. 2009).

Opportunities for quality motorized winter recreation experiences are typically characterized by groomed trail system and open hills for high marking. Snowmobilers typically have a maximum 80-mile round-trip travel range (California Department of Parks and Recreation 2010). Approximately half of motorized visitors indicated that they would not snowmobile or would snowmobile less if the trails were not groomed (Rolloff et al. 2009). OSV visitors spend an average of 6 hours on the snow per visit. Motorized users are also interested in travelling through and experiencing a natural environment. According to the Lassen National Forest recreation staff, a majority of OSV use on the national forest would fall into the "trail touring" category described above (O'Brien, personal communication 2015).

Areas Designated Non-motorized under Existing Law or Policy

Wilderness

Three designated wilderness areas on the Lassen National Forest cover approximately 78,240 acres, Caribou Wilderness (20,546 acres), Thousand Lakes Wilderness (16,355 acres), and Ishi Wilderness (41,399 acres). The Ishi Wilderness Area is located in the lower-elevation country that typically does not receive adequate snow for OSV use. Proposed wilderness areas include Heart Lake, Wild Cattle Mountain, Caribou extension, and Mill Creek.

Designated wilderness areas are closed to motorized OSV use by the Wilderness Act of 1964. Proposed Wilderness areas on the Lassen National Forest are closed to OSV use, per forest plan direction, since they fall within the Semi-Primitive Non-motorized ROS class and are managed to

maintain their wilderness characteristics. There are groomed OSV trails within one-quarter mile of the south and east boundaries of the Caribou Wilderness and Caribou extension proposed wilderness (approximately six miles) and north of the Mill Creek proposed wilderness (approximately two and one-half miles). There are groomed OSV trails within one-half mile south of Thousand Lakes Wilderness (approximately one-half mile).

Inventoried Roadless Areas

Approximately 169,400 acres of inventoried roadless areas (IRAs) are located within Lassen National Forest. IRAs provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at-risk species. IRAs provide opportunities for dispersed outdoor recreation, opportunities that diminish as open space and natural settings are developed elsewhere. They also serve as bulwarks against the spread of non-native invasive plant species and provide reference areas for study and research (USDA Forest Service 2009).

Roadless area characteristics, as defined in 36 CFR §294.11 – Roadless Area Conservation, Final Rule and evaluated here include the following:

- High-quality or undisturbed soil, water, and air
- Sources of public drinking water
- Diversity of plants and animal communities
- Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land
- Primitive, semi-primitive nonmotorized and semi-primitive motorized classes of dispersed recreation
- Reference landscapes
- Natural appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites
- Other locally identified unique characteristics

Wilderness attributes, as defined at FSH 1909.12 (72.1) and evaluated here include the following:

1. Natural – The extent to which long-term ecological processes are intact and operating
2. Undeveloped – The degree to which the impacts documented in natural integrity are apparent to most visitors
3. Outstanding opportunities for solitude or primitive unconfined recreation – Solitude is a personal, subjective value defined as the isolation from sights, sounds, and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities.
4. Special features and values – Unique ecological, geographical, scenic, and historical features of an area
5. Manageability – The ability to manage an area for wilderness consideration and maintain wilderness attributes

Table 42 shows the crosswalk between the wilderness attributes identified in Forest Service Handbook 1909.12 and the 1964 Wilderness Act; and the roadless area characteristics defined in the 2001 Roadless Area Conservation Rule (36 CFR §294.11).

Table 42. Wilderness attributes and roadless characteristics crosswalk

Wilderness Attributes	Roadless Area Characteristics
<p>Natural Ecological systems are substantially free from the effects of modern civilization and generally appear to have been affected primarily by forces of nature</p>	<p>High-quality or undisturbed soil, water, and air; Sources of public drinking water: Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; Reference landscapes</p>
<p>Undeveloped Degree to which the area is without permanent improvements or human habitation</p>	<p>Natural appearing landscapes with high scenic quality</p>
<p>Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation Solitude: opportunity to experience isolation from the sights, sounds, and presence of others from the developments and evidence of humans Primitive and unconfined recreation: opportunity to experience isolation from the evidence of humans, to feel a part of nature, to have a vastness of scale, and a degree of challenge and risk while using outdoor skills</p>	<p>Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation</p>
<p>Special Features and Values Capability of the area to provide other values such as those with geologic, scientific, educational, scenic, historical, or cultural significance</p>	<p>Traditional cultural properties and sacred sites; and Other locally identified unique characteristics.</p>
<p>Manageability The ability of the Forest Service to manage an area to meet size criteria and the elements of wilderness</p>	<p>No criteria</p>

There are no groomed OSV trails within the IRAs. A majority of the roadless acreage is closed to cross-country OSV use, per forest plan direction, because the IRAs are within the semi-primitive non-motorized ROS class. However, there are small portions of roadless areas that are within the semi-primitive motorized or roaded natural ROS classes where OSV use could occur, but is not likely due to the proximity of other closed acres and because they are located in areas where low to no OSV use is expected based on the OSV use assumptions (see OSV use potential maps in appendix A of the recreation specialist's report).

Small portions of the following IRAs that fall within the roaded natural or semi-primitive motorized ROS classes are currently open to OSV use, but fall within areas where low to no OSV use is expected: Mayfield, Lava, Timbered Crater, Unnamed IRA near Old Station and East of Hwy 89 (Cinder Butte), Cypress, Snow Mountain, Prospect, Onion Springs, Wild Cattle Mountain, Ishi, Polk Springs, Mill Creek, Cub Creek, Butt Mountain, and Chips Creek.

IRAs with small portions of roaded natural and semi-primitive motorized that are open to OSV use and fall in areas where moderate to high OSV is expected include: Devils Garden, Trail Lake, Black Cinder, and Heart Lake.

Wild and Scenic Rivers

There are three eligible Wild and Scenic Rivers located in the southwest portion of the Lassen National Forest near the Ishi Wilderness and Mill Creek proposed wilderness. They are Mill Creek (five segments having either wild, scenic, or recreational eligibility, 24.0 miles), Deer Creek (seven segments having either wild, scenic, or recreational eligibility, 22.0 miles) and Antelope Creek (three segments with wild eligibility, North Fork 5.72 miles, south fork 7.05 miles). Most of the eligible Wild and Scenic River corridors are within areas closed to OSV use. There are groomed OSV trails adjacent to the two northernmost segments of Mill Creek with eligibility as a recreational Wild and Scenic River. With the presence of groomed OSV trails, this is an area where OSV use is expected to be high to moderate. The scenic and recreational segments of Deer Creek that are outside of existing OSV closure area fall within an area where low to no OSV use is expected (see OSV use potential maps in appendix A of the recreation specialist report).

Research Natural Areas

Grahams Pinery, Soda Ridge, Green Island Lake, Cub Creek, Mayfield, Timbered Carter, and Indian Creek Research Natural Areas are closed to OSV use under existing conditions.

The Lassen LRMP prohibits motorized vehicles within Research Natural Areas, but no formal directive prohibiting such use has been issued for the Black Mountain Research Natural Area. This area covers approximately 520 acres.

No groomed or ungroomed routes are within any of the Research Natural Areas.

Pacific Crest National Scenic Trail

The Lassen National Forest contains 125 miles of the Pacific Crest National Scenic Trail (PCT) that is managed for non-motorized trail uses. The PCT runs roughly through the center of the national forest from north to south.

The PCT was designated in 1968 as one of the first national scenic trails. The PCT (extending from Mexico to Canada) was established to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas which such trails may pass. Along with the Appalachian Trail, the PCT is acknowledged as one of the premier non-motorized trails in the nation (USDA Forest Service 2009).

Most of the PCT on the Lassen National Forest passes through areas that are either closed to OSV use, or within areas where low to no OSV use is expected. Approximately 11 miles of the PCT on the Almanor Ranger District pass through the Jonesville Snowmobile Area with high to moderate OSV use. Groomed OSV trails cross the PCT in three locations (see OSV use potential maps in appendix A of the recreation specialist report).

Table 43. Resource indicators and measures for the existing condition, alternative 1

Resource Element	Resource Indicator	Measure (Quantify if possible)	Existing Conditions
Motorized Recreation Opportunities – cross-country	Opportunities for motorized winter uses	Size of areas (acres) open to OSV use	964,020 acres open to public, cross-country OSV use, subject to snow depth restrictions 12 inches snow depth
Motorized Recreation Opportunities – designated snow trails	OSV trail designations	Length of designated OSV trails (miles)	2,760 miles of groomed and ungroomed OSV trails open for OSV use, subject to snow depth restrictions 12 inch snow depth
Motorized Recreation Opportunities – groomed snow trails	OSV trail grooming	Length of groomed OSV trails (miles)	349 miles 18 inch snow depth for grooming
Non-motorized Recreation Opportunities - displacement	Access to desired non-motorized recreation settings and opportunities	Size of area (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads	Six plowed trailheads provide access for motorized and non-motorized winter use, 75,169 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-motorized routes available for non-motorized recreation within 10 miles of plowed trailheads
	Recreation Opportunity Spectrum	Consistency of OSV designations with ROS classes	Motorized OSV use prohibited in Primitive and Semi-Primitive Non-Motorized ROS classes. Motorized OSV use allowed in Semi-Primitive Motorized, Roded Natural and Rural ROS classes.
Non-motorized Recreation Conflicts - Public Safety	Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	Size of areas (acres) closed to OSV use/length of non-motorized trails (miles)	186,000 acres/ six non-motorized trails with a total of 148 miles for non-motorized use.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Existing Conditions
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas	Proximity and frequency of OSV designations in relation to designated non-motorized areas	Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy	<p>A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries.</p> <p>Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner.</p> <p>No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations.</p> <p>No known conflicts with tribal/spiritual areas, historic areas or populated areas.</p>
	Noise	<p>Size of areas (acres) potentially affected by noise/size of areas (acres) closed to winter motorized use</p> <p>Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)</p>	<p>964,020 acres open for OSV use and potentially affected by noise/186,000 acres closed to OSV use and available for quiet recreation</p>
	Air Quality	Qualitative/narrative description of potential impacts (with reference to air quality analysis)	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSVs and grooming equipment due to the smell of exhaust emissions (see air quality report).
	Scenery	Qualitative/narrative description of potential visual impacts	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Existing Conditions
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)	Wilderness Attributes	Size of areas (acres) affected and duration of impact. Qualitative description for wilderness attributes	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. There are approximately 27,088 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>
	Roadless Characteristics	Size of area (acres) affected and duration of impact. Qualitative description for roadless characteristics	<p>Approximately 72,972 IRA acres open to OSV use.</p> <p>Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Recreation Settings and Opportunities

In the no-action alternative, opportunities for winter motorized recreation both cross-country and on groomed trails would remain the same as described in the existing conditions. A majority of OSV use on the Lassen National Forest is expected to continue to be along the groomed trail system. There would be no reduction of opportunities or change in location for winter motorized OSV use. Current management requires a minimum snow depth of 12 inches for OSV use, this requirement would continue to limit access to deeper snow at higher elevations when snow depths at trailheads are below 12 inches.

Opportunities for winter non-motorized recreation would also remain the same as described in the existing conditions. OSV use would remain consistent with existing ROS classes, with motorized use prohibited in primitive and semi-primitive non-motorized ROS classes and allowed in semi-primitive motorized, roaded natural, and rural ROS classes.

Conflicts between Motorized and Non-motorized Winter Experiences

Conflicts between motorized and non-motorized winter experiences on the Lassen are currently minor and infrequent; existing conflicts would continue and may increase as population and visitor use increase.

Non-motorized winter recreation enthusiasts would continue to be displaced in some areas by motorized OSV use, or be unable to access areas for desired quiet, non-motorized experiences away from the sights, sounds, and smells of motorized use, since they would have to travel longer distances through motorized routes and areas than they are physically able to traverse. There are 75,169 acres available for quiet, non-motorized winter activities and 44 miles of cross-country ski trails and other non-motorized trails within 10 miles of plowed trailheads. There are a total of 186,000 acres across the Lassen National Forest available for quiet, non-motorized experiences, where OSV use is prohibited.

Other potential conflicts would continue to occur in some areas, as motorized OSVs consume untracked powder snow that is desired by backcountry skiers, create tracks across the snow surface making skiing difficult, and creating safety concerns in areas where motorized and non-motorized use is occurring at shared trailheads and on shared trails.

Areas Designated Non-motorized under Existing Law or Policy

Occasional incursions into adjacent Wilderness areas and non-motorized areas on other Federal lands would continue to occur, and possibly increase as population and visitor use increase.

There are approximately nine miles of groomed OSV trails within one-half mile of Wilderness and proposed wilderness boundaries. There are small portions of four Inventoried Roadless Areas that are open to OSV use in areas where moderate to high OSV use is expected. The closest groomed OSV trails to the LVNP are one and one-half miles north of the park's northwest corner and three-quarters mile east of the park's southeast corner.

Ongoing motorized use in close proximity to the designated non-motorized areas temporarily degrades opportunities for solitude near the non-motorized area boundaries, when OSVs are present on the trails. Similarly, there may be temporary impacts to air quality in the vicinity of OSVs, and short-term impacts to scenery when OSV tracks through the snow crisscross the landscape, leaving visual evidence of motorized use. The tracks only remain on the landscape until they are covered by additional snowfall or until the snow melts, and do not cause long-term impacts to scenery or the underlying soils and vegetation (see additional analysis in the applicable resource sections of this analysis).

The PCT would remain non-motorized, as it is currently managed. No OSV crossings of the PCT would be designated; OSVs would be allowed to cross the PCT in any of the areas open to OSV use, as in current conditions, potentially impacting the quiet, non-motorized trail experience when hikers and cross-country skiers encounter OSVs crossing the trail.

Alternative 2 – Modified Proposed Action

The modified proposed action is described in detail in chapter 2. Alternative 2 would allow public, cross-country OSV use on 921,130 acres of National Forest System lands within the Lassen National Forest when snow depth is adequate for that use to occur. Trails where public OSV use would be allowed when snow depth is adequate for that use to occur would total 323 miles. All existing OSV prohibitions applying to areas or trails would continue. Alternative 2 would identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service's Lassen National Forest Grooming Program. The California State Parks' snow grooming standards would be formally adopted, requiring a minimum of 12 inches of snow depth before grooming could occur.

Alternative 2 would implement a forest-wide snow depth requirement for OSV use that would provide for public safety and natural and cultural resource protection by allowing public, cross-country OSV use in areas designated for OSV use when there is a minimum of 12 inches of snow covering the landscape; and allowing public OSV use on designated snow trails when there are six or more inches of snow covering the trail. Except for approximately 0.1 mile of OSV trail (which would require 12 or more inches of snow for OSV use), all snow trails to be designated for public OSV use or identified for OSV grooming in all alternatives would overlay an existing paved, gravel, or native surface travel route. These travel routes are trails and roads used by wheeled, motorized vehicles, when allowed, and non-motorized recreation.

Alternative 2 would designate 28 public OSV crossing points of the Pacific Crest Trail on trails designated for wheeled, motorized vehicle use when such use is allowed. Two of the Pacific Crest Trail crossing points that would be designated are adjacent to private land. This alternative would also establish a corridor for the Pacific Crest Trail, within which public OSV use would not be designated (public OSV use would be prohibited), except on 26 designated public OSV trails across this corridor.

Public OSV use would not be designated (would be prohibited) on approximately 228,890 acres, including all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited, and 42,890 acres of areas currently open to OSV use that would not be designated for OSV use in this alternative

Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.

Direct and Indirect Effects - Alternative 2

Recreation Settings and Opportunities

Alternative 2 would provide a range of winter motorized and non-motorized recreation opportunities similar to that currently found on the Lassen National Forest. Although the designation of 323 miles of groomed and ungroomed (marked) OSV trails is a reduction in the number of miles of trail where OSV use is currently allowed, approximately 97 percent of the OSV trails in the current trails system would be either designated for public OSV use, or are located in areas that would be designated for public, cross-country OSV use in this alternative. Having a clearly designated system of trails and areas where OSV use is allowed and the subsequent production of the OSV use map would improve information available to the public about opportunities for OSV use. This would assist both motorized and non-motorized recreationists in selecting areas that meet their setting and experience preferences, and therefore, would minimize the potential for conflict.

The proposed OSV designations would be in compliance with existing ROS classes, maintaining a variety of both motorized and non-motorized recreation opportunities available across the forest. Primitive and semi-primitive non-motorized areas would remain closed to OSV use (would not be designated for OSV use), while motorized opportunities would be available in semi-primitive motorized, roaded natural, and rural ROS classes.

There are 42,890 acres of areas currently open to OSV use that would not be designated for OSV use in alternative 2. This is a slight reduction in potential opportunities for cross-country OSV use that would have minor impacts to motorized OSV use opportunities. The 27,400 acres in the southwest corner of Lassen National Forest would not be designated because there is limited access for OSVs due to the proximity to other non-motorized areas including the Ishi Wilderness, Mill Creek Proposed Wilderness, and semi-primitive non-motorized areas within the Ishi and Polk Springs Inventoried Roadless Areas. The 1,520-acre Deer Creek Anadromous Fish Closure would also be in the southwest portion of the forest, and would run along the northwestern boundary of the Cub Creek Inventoried Roadless Area. The impacts of the new prohibition of OSV use in the Blacks Mountain Research Natural Area (520 acres within the Black Mountain Experimental Forest on the Eagle Lake Ranger District) to be consistent with Forest Plan management area direction to prohibit motorized vehicles in Research Natural Areas would also be expected to be minor. Closure of the areas described above would minimize impacts to resources such as wildlife (as described in the wildlife section), Wilderness, Inventoried Roadless Areas, and eligible Wild and Scenic Rivers (described in the Areas Designated Non-motorized under Existing Law or Policy section below), and the natural conditions of the Research Natural Area that are managed for baseline and research purposes (described in the botany section). The 10,460 acre Pacific Crest Trail non-motorized corridor, the 1,840 acres along the southwest shore of Lake Almanor, and the 1,150 acres along the South Shore of Eagle Lake would meet the objective of minimizing impacts on non-motorized recreation opportunities, by eliminating OSV use and reducing the potential for conflict between motorized and non-motorized winter visitors in these areas. Existing OSV prohibitions on non-motorized trails would continue.

Alternative 2 would identify 349 miles of OSV trails for grooming for public use. Although identified for grooming and historically groomed by the Forest Service, approximately 38 miles of groomed trails would not be subject to designation because they are not under National Forest System jurisdiction on the Lassen National Forest. This would represent no change from current management. Alternative 2 would maintain the existing level of groomed trail riding

opportunities, which Lassen National Forest staff indicates is adequate to meet existing demand (USDA Forest Service 2014). The State EIR information also shows that Lassen National Forest trailheads have rare or no overflow capacity issues (California Department of Parks and Recreation 2010). Existing OSV support facilities/services (access roads, trailhead parking, toilets, and garbage service) are provided in sufficient quantities to satisfy winter OSV recreation demand (USDA Forest Service 2014), and would continue to do so.

The forest-wide snow depth requirement of 12 inches for areas designated for OSV use would impose restrictions on OSV use, although it is likely that most OSV owners would not ride with less than adequate snow depths to prevent damage to their OSVs. Establishing the forest-wide minimum snow depth for cross-country OSV use would minimize impacts to soil, water, vegetation, and wildlife resources, as described in the relevant sections of this analysis. Allowing public OSV use on designated snow trails when there are six or more inches of snow covering the trail. Except for approximately 0.1-mile of OSV trail (which would require 12 or more inches of snow for OSV use) would provide improved trail access for OSV users to reach areas of higher terrain with adequate snow depths.

Conflicts between Motorized and Non-motorized Winter Experiences

Conflicts between motorized and non-motorized winter experiences on the Lassen National Forest are currently minor and infrequent (USDA Forest Service 2014); however, conflicts between motorized and non-motorized uses that do currently exist would likely continue with designation of a similar OSV trail system. Conflict may increase as population and visitor use increase.

Motorized use has inherent conflicts with non-motorized users who are typically seeking a quiet recreation setting that is not influenced by the sight, sound, or exhaust smell of motorized vehicles. There are also inherent conflicts in that motorized OSVs travel much faster and farther than non-motorized users. OSV use may impact the setting for non-motorized users by making tracks through the snow that often crisscross the landscape, leaving visual evidence of motorized use. The tracks only remain on the landscape until they are covered by additional snowfall or until the snow melts, and do not cause long-term impacts to scenery or the underlying soils and vegetation (see additional analysis in the applicable resource sections of this analysis). OSV tracks can interfere with cross-country skiing by causing ruts in the trails, and since OSVs travel faster and further than non-motorized users, they often “consume” the fresh powder slopes, limiting opportunities for backcountry skiers who are seeking similar opportunities on snow covered slopes (Snowlands 2014).

Occasional incursions into adjacent Wilderness areas and non-motorized areas on other Federal lands would continue to occur, and possibly increase as population and visitor use increase. Monitoring to determine the need for additional education or enforcement actions would be implemented. Monitoring is also a requirement of participation in the State OSV grooming program.

Non-motorized winter recreation enthusiasts would continue to be displaced in some areas by motorized OSV use, or be unable to access areas for desired quiet, non-motorized experiences away from the sights, sounds, and smells of motorized use, since they would have to travel longer distances through motorized routes and areas than they are physically able to traverse. However, there are 85,706 acres available for quiet, non-motorized winter activities, and 44 miles of cross-country ski trails and other non-motorized trails within 10 miles of plowed trailheads. This is a 10,537-acre increase over existing conditions. There are a total of 228,890

acres across the Lassen National Forest available for quiet, non-motorized experiences, where OSV use is prohibited.

Other potential conflicts would continue to occur in some areas, as motorized OSVs consume untracked powder snow that is desired by backcountry skiers, create tracks across the snow surface making skiing difficult, and creating safety concerns in areas where motorized and non-motorized use is occurring at shared trailheads and on shared trails.

There are no known conflicts occurring between different classes of OSV use. Snowcats are used for grooming OSV trails. The grooming operations are conducted during the night or during low use timeframes if possible to avoid conflicts with day use. Since snowcats groom the OSV trails, the trails would be wide enough to accommodate larger tracked OSVs in addition to snowmobiles; however, there is currently very little use by larger tracked OSVs on the Lassen National Forest. Public comments indicated concern with emerging trends in OSVs such as snow bikes (motorcycles that are converted to OSVs by installing a single ski/track conversion kit) and other changing technology that allow OSVs to travel faster, farther, and in more confined spaces. The proposed OSV area and trail designations would apply to public use of all OSV's that meet the definition of an OSV, whether on a single ski, double ski, or track. The trails and areas proposed for designation were found to be suitable for OSV use, subject to snow-depth restrictions for protection of natural resources.

Monitoring of trailheads and groomed trail areas for user conflicts and public safety concerns would be implemented. If monitoring indicates that conflicts are occurring, the Forest Service would consider implementing site-specific controls on the Lassen National Forest as necessary (such as speed limits, segregated access points for motorized and non-motorized use, increased visitor information or increased on-site management presence).

Areas Designated Non-motorized under Existing Law or Policy

The existing OSV prohibitions in designated Wilderness areas, semi-primitive non-motorized areas, and Research Natural Areas would continue, protecting these areas from OSV impacts.

The proposed prohibition of OSV use in the limited access area in the southwest portion of the forest would provide further protection from potential OSV impacts to the Ishi Wilderness, Mill Creek Proposed Wilderness, and semi-primitive non-motorized areas within the Ishi and Polk Springs Inventoried Roadless Areas. This would maintain or enhance the wilderness attributes and roadless characteristics of naturalness, high-quality or undisturbed soil, water, and air, and outstanding opportunities for solitude. This prohibition would also provide further protection to Antelope Creek and Mill Creek eligible Wild and Scenic River corridors.

There are groomed OSV trails within one-quarter mile of the south and east boundaries of the Caribou Wilderness and Caribou extension proposed wilderness (approximately 6 miles) and north of the Mill Creek proposed wilderness (approximately two and one-half miles). There are groomed OSV trails within one-half mile south of Thousand Lakes Wilderness (approximately one-half mile). The presence of these groomed trails in close proximity to Wilderness and proposed Wilderness may temporarily impact outstanding opportunities for solitude, when OSVs are present on the trails. Allowing OSV use adjacent to wilderness and proposed wilderness does not, however, reduce the wilderness potential of these areas. Most statewide wilderness acts include what has become known as "buffer zone preclusion language" such as,

Congress does not intend that the designation of wilderness areas ... lead to the creation of protective perimeters or buffer zones around each wilderness area. The fact that

nonwilderness activities or uses can be seen or heard from areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area. (Kelson and Lillieholm 1999).

Virtually identical language has been included in 30 other wilderness statutes enacted since 1980 (Gorte 2011). This concept is also supported by Forest Service Manual 2320.3 that directs consideration of uses on both sides of wilderness boundaries, but states,

Do not maintain buffer strips of undeveloped wildland to provide an informal extension of wilderness. Do not maintain internal buffer zones that degrade wilderness values.

Small portions of several IRAs that fall within the semi-primitive motorized or roaded natural ROS class would remain open for OSV use, low to no OSV use is expected in most of these areas, and little to no impacts to the roadless characteristics are anticipated. The small portions of the following IRAs that are open to OSV use, are in areas where moderate to high OSV use is anticipated, including: Devils Garden, Trail Lake, Black Cinder, and Heart Lake IRAs. The roadless characteristics of high-quality or undisturbed soil, water, and air, and solitude associated with semi-primitive non-motorized recreation opportunities may be temporarily impacted when OSVs are present.

Designated crossings of the PCT would minimize potential motorized impacts along the trail and would enhance the quiet, non-motorized experience while accommodating motorized access to OSV areas and maintaining OSV loop riding opportunities. Using the wheeled vehicle trails designated in Subpart B for off-highway vehicle use as PCT crossings would limit motorized disturbance to areas of the trail that already contain motorized vehicle trails. The frequency of designated crossings would be consistent with the ROS class through which the trail passes, based on PCT management direction, and would ensure consistency with recreation settings along the trail.

A majority of the PCT mileage on the Lassen National Forest passes through National Forest System lands that are either closed to OSV use, or areas where little to no OSV use is anticipated. Designating a non-motorized PCT corridor would maintain quiet, non-motorized trails opportunities along the entire Lassen National Forest portion of the PCT and reduce the potential for conflicts between motorized and non-motorized users along the trail.

Formalizing the closure of the Blacks Mountain Research Natural Area to OSV use would be in compliance with the Lassen Forest Plan standard that prohibits motorized vehicles in research natural areas.

Table 44. Resource indicators and measures for alternative 2 direct and indirect effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 2
Motorized Recreation Opportunities – cross-country	Opportunities for motorized winter uses	Size of areas (acres) open to OSV use, percent change	921,130 acres open to public cross-country OSV use, subject to snow depth restrictions, a 4.5 percent decrease from existing conditions. 12 inch snow depth
Motorized Recreation Opportunities – designated snow trails	OSV trail designations	Length of designated OSV trails (miles), percent change	323 miles of groomed and ungroomed (marked) snow trails, subject to snow depth restrictions, 88 percent decrease from existing conditions (however 97 percent of current trail system is designated or in OSV open areas). 6 inch or more snow depth on snow trails overlaying roads and trails; 12 inch snow depth on 0.1 mile of trail not overlaying roads or trails.
Motorized Recreation Opportunities – groomed snow trails	OSV trail grooming	Length of groomed OSV trails (miles), percent change	349 miles, no change 12 inch snow depth for grooming
Non-motorized Recreation Opportunities - displacement	Access to desired non-motorized recreation settings and opportunities	Size of area (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads	Six plowed trailheads provide access for motorized and non-motorized winter use, 85,706 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-motorized trails available within 10 miles of plowed trailheads
	Recreation Opportunity Spectrum	Consistency of OSV designations with ROS classes	Motorized OSV use prohibited in Primitive and Semi-Primitive Non-Motorized ROS classes. Motorized OSV use allowed in Semi-Primitive Motorized, Roded Natural and Rural ROS classes.
Non-motorized Recreation Conflicts - Public Safety	Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	Size of areas (acres) closed to OSV use/length of non-motorized trails (miles), percent change	228,890 acres, a 23 percent increase/ six non-motorized trails with a total of 148 miles for non-motorized use.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 2
<p>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas</p>	<p>Proximity and frequency of OSV designations in relation to designated non-motorized areas</p>	<p>Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy</p>	<p>A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries.</p> <p>Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park’s southeast corner, and 1 1/2 miles north of the park’s northwest corner.</p> <p>PCT non-motorized corridor and 28 designated PCT crossing points.</p> <p>No known conflicts with tribal/spiritual areas, historic areas or populated areas.</p>
	<p>Noise</p>	<p>Size of areas (acres) potentially affected by noise/size of areas (acres) closed to winter motorized use</p> <p>Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)</p>	<p>921,130 acres open for OSV use and potentially affected by noise/228,890 acres closed to OSV use and available for quiet recreation</p>
	<p>Air Quality</p>	<p>Qualitative/narrative description of potential impacts (with reference to air quality analysis)</p>	<p>Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).</p>
	<p>Scenery</p>	<p>Qualitative/narrative description of potential visual impacts</p>	<p>Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season</p>

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 2
	Wilderness Attributes	Size of areas (acres) affected and duration of impact. Qualitative description for wilderness attributes	Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. There are approximately 21,248 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)	Roadless Characteristics	Size of areas (acres) affected and duration of impact. Qualitative description for roadless characteristics	Approximately 59,750 IRA acres open to OSV use. Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.

Cumulative Effects – Alternative 2

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present, and reasonably foreseeable projects in the area include vegetation management (including timber sales, fire salvage, and restoration projects), livestock grazing, prescribed burns, and recreation. There are many on-going and scheduled projects identified on the Lassen National Forest (appendix C) which may increase the management presence forest wide.

Recreation Settings and Opportunities

The OSV route designations and restrictions increase the management presence across the forest, slightly impacting the managerial component of the forest setting. This could result in cumulative impacts when added to other ongoing and future Forest Service projects that place limitations or temporary restrictions on the recreating public.

The trailhead and parking lot plowing activities associated with the OSV trail grooming program would also increase the presence of management personnel in the area; however, this is not a change from existing conditions.

There are four current vegetation management projects that overlap groomed OSV trails in the Jonesville OSV area (Lost, Yellow, Ursa, and Castle Timber Sale areas). Vegetation management activities, in addition to OSV use, and OSV grooming activities occurring at the same time would cumulatively impact the recreation setting due to the increased presence of people and vehicles in the area. Vegetation management and fire salvage projects adjacent to groomed OSV trails and in areas open to cross-country OSV use may temporarily enhance opportunities for cross-country OSV use by removing trees that would otherwise obstruct OSV riding. Vegetation treatment, in addition to OSV grooming could cumulatively enhance OSV opportunities in this area.

Conflicts between Motorized and Non-Motorized Winter Experiences

Non-motorized winter visitors to the Lassen National Forest could experience noise from OSV use in areas and on trails designated for OSV use under this alternative, in addition to other noise such as snow grooming equipment, vehicles on roads, log trucks, heavy equipment associated with vegetation management projects, and aircraft that may be in the same area at the same time, cumulatively impacting the quiet recreation experience in the short term.

Areas Designated Non-motorized under Existing Law or Policy

OSV use is prohibited in certain areas designated by law, and the Forest Plan, such as Wilderness, proposed wilderness on the Lassen National Forest, there are no known potential cumulative impacts associated with the OSV prohibitions, which are in compliance with the relevant management direction for specific areas designated as non-motorized under existing law or policy. Illegal encroachment by OSVs into areas not designated for OSV use could occur, potentially adding to other ongoing future activities impacting these areas and causing cumulative impacts, but would be monitored and dealt with as a law enforcement issue.

Alternative 3

Alternative 3 is described in detail in chapter 2. Alternative 3 was developed to address the non-motorized recreational opportunities significant issue. It includes components of the modified proposed action with several additions. OSV use would be prohibited in additional areas that are important for non-motorized recreation, including the Butte Lake Closure (OSV prohibited except where restricted to trail only) north

of LVNP; areas below 3500 feet on the Lassen National Forest; Fredonyer-Goumaz Closure (OSV prohibited except where restricted to trail only) between highways 36 and 44; McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17); Colby Mountain Closure; Southwest Shore Lake Almanor; South Shore Eagle Lake; and the Willard Hill Closure.

Alternative 3 would allow public OSV use on designated snow trails generally when there are 12 or more inches of snow covering the trail. OSV use on designated snow trails would also be allowed when there are as few as 6 inches of snow only where site review determines there would be no damage to underlying resources.

Grooming of OSV snow trails would be allowed, consistent with historical grooming practices, when there are 18 or more inches of snow. This alternative would groom the same snow trails for OSV use as the modified proposed action.

No PCT crossing points or corridor would be designated. OSV use would be allowed adjacent to, and across the PCT. The trail itself would remain non-motorized.

Project Design Features and Mitigation Measures

The project design features and mitigation measures listed for alternative 2 would apply, in addition to the following:

- Education on responsible practices, trail restrictions, or separations to reduce conflicts.

Direct and Indirect Effects - Alternative 3

Recreation Settings and Opportunities

Alternative 3 would not designate as many areas for OSV use as alternative 2, and would also designate some areas where motorized OSVs are restricted to designated trails. With additional areas not designated for OSV use and restricting OSVs to trails only, the opportunities for non-motorized use (in areas not influenced by the sights, sounds and exhaust smells of OSV use) would be enhanced.

Proposed OSV designations would be consistent with existing ROS classes, maintaining a variety of both motorized and non-motorized recreation opportunities available across the forest. Primitive and semi-primitive non-motorized areas would remain closed to OSV use, while motorized opportunities would be available in semi-primitive motorized, roaded natural, and rural ROS classes. The additional closures of areas to OSVs, which are located primarily within the roaded natural ROS class would not formally change the ROS class, but would reduce the influence of motorized OSV use within these areas and help minimize impacts to non-motorized winter visitors.

The proposed OSV prohibitions including areas below 3,500 feet, McGowen Lake, Colby Mountain, southwest shore of Lake Almanor, south shore of Eagle Lake, and Willard Hill, and the restriction of OSVs to trails in the Butte Lake and Fredonyer-Goumaz areas would reduce opportunities for motorized OSV use to some extent. However, grooming 349 miles of OSV trails would maintain the current level of groomed OSV trail riding opportunities.

The forest-wide snow depth requirement of 12 inches for areas designated for OSV use would impose limitations on OSV use, although it is likely that most OSV owners would not ride with less than adequate snow depths to prevent damage to their OSVs. Allowing use on trails with at least 6 inches of snow, where site review determines there would be no damage to underlying resources, would be slightly more restrictive than alternative 2; however it would still provide opportunities for OSVs to access higher terrain and legal snow depths. It would also require the Forest Service to identify routes where the 6-inch

minimum would be allowed on the Lassen National Forest and to conduct additional monitoring for resource damage.

Conflicts between Motorized and Non-motorized Winter Experiences

Although conflicts are currently minimal on the Lassen National Forest, alternative 3 would provide more areas where OSV use would be prohibited, enhancing opportunities for non-motorized experiences, and reducing the potential for conflict since there would be greater separation of motorized and non-motorized uses.

The proposed OSV prohibitions in areas below 3,500 feet would reduce potential conflicts with designated non-motorized areas, including Wilderness, proposed wilderness, and IRA resources in the southwest portion of the forest, as described in alternative 2. This prohibition would also eliminate OSV use from other areas of the forest below 3,500 feet that seldom receive adequate snow depths, thus minimizing the potential for OSV use with inadequate snow depths. The McGowen Lake, Colby Mountain, southwest shore of Lake Almanor, south shore of Eagle Lake, and Willard Hill prohibitions would minimize conflicts between motorized and non-motorized winter users in areas that are popular and suitable for non-motorized uses.

The restriction of OSV use to trails in the Butte Lake and Fredonyer-Goumaz areas would provide an opportunity to minimize impacts on non-motorized recreation experience while also maintaining access and opportunities for motorized OSV use. OSV closures in the area north of the Caribou Wilderness (Butte Lake) and south of the Heart Lake and Wild Cattle Mountain Proposed Wilderness Areas (McGowen) would also help to minimize potential impacts from the sights and sounds of OSVs to quiet, non-motorized areas and to Lassen Volcanic National Park.

Non-motorized winter recreation enthusiasts would continue to be displaced in some areas by motorized OSV use, or be unable to access areas for desired quiet, non-motorized experiences away from the sights, sounds, and smells of motorized use, since they would have to travel longer distances through motorized routes and areas than they are physically able to traverse. However, there would be 121,899 acres available for quiet, non-motorized winter activities and 72 miles of cross-country ski trails and other non-motorized trails within 10 miles of plowed trailheads. This would be a 46,730-acre increase over existing conditions. There would be a total of 315,360 acres across the Lassen National Forest available for quiet, non-motorized experiences, where OSV use would be prohibited.

Otherwise, alternative 3 effects would be the same as described for alternative 2.

Areas Designated Non-motorized under Existing Law or Policy

Designation of the McGowan Front-country non-motorized area would minimize motorized impact on the Heart Lake and Wild Cattle Mountains Proposed Wilderness Areas.

Designation of the Butte Lake Backcountry Solitude Area would minimize motorized impacts, such as loss of opportunities for solitude when OSVs are present, and impacts to natural scenery due to visual evidence of OSV tracks in the snow, on the Caribou Wilderness, the Caribou extension proposed wilderness, Prospect IRA, and Lassen Volcanic National Park.

Designating the McGowan Front-country non-motorized area and the Butte Lake Backcountry Solitude non-motorized area would also minimize potential impacts from OSV encroachment into Lassen Volcanic National Park.

OSV use of the PCT trail itself would continue to be prohibited; however, motorized use adjacent to, and across the PCT could continue to impact the quiet, non-motorized trail experience.

Otherwise, alternative 3 would be the same as alternative 2 in regard to areas designated as non-motorized under existing law or policy.

Table 45. Resource indicators and measures for alternative 3 direct and indirect effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 3
Motorized Recreation Opportunities – cross-country	Opportunities for motorized winter uses	Size of area (acres) open to OSV use, percent change	834,660 acres open to public cross-country OSV use, subject to snow depth restrictions, a 13.4 percent decrease from existing conditions. 12 inch snow depth
Motorized Recreation Opportunities – designated snow trails	OSV trail designations	Length of designated OSV trails (miles), percent change	316 miles of groomed and ungroomed (marked) snow trails, subject to snow depth restrictions. 88.5 percent decrease from existing conditions (however 88 percent of the current trail system is designated or in OSV open areas) 12 inch snow depth on designated snow trails; use allowed on as few as 6 inches of snow only where site review determines there would be no damage to underlying resources.
Motorized Recreation Opportunities – groomed snow trails	OSV trail grooming	Length of groomed OSV trails (miles), percent change	349 miles, no change 18 inch snow depth for grooming
Non-motorized Recreation Opportunities - displacement	Access to desired non-motorized recreation settings and opportunities	Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads	Six plowed trailheads provide access for motorized and non-motorized winter use, 121,899 acres available for non-motorized recreation within 10 miles of plowed trailheads 72 miles of cross-country ski trails and other non-motorized trails available within 10 miles of plowed trailheads
	Recreation Opportunity Spectrum	Consistency of OSV designations with ROS classes	Motorized OSV use prohibited in Primitive and Semi-Primitive Non-Motorized ROS classes. Motorized OSV use allowed in Semi-Primitive Motorized, Roaded Natural and Rural ROS classes.
Non-motorized Recreation Conflicts - Public Safety	Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	Size of areas (acres) closed to OSV use/length of non-motorized trails (miles), percent change	315,360 acres, a 69.5 percent increase/ six non-motorized trails with a total of 148 miles for non-motorized use.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 3
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas	Proximity and frequency of OSV designations in relation to designated non-motorized areas	Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy	<p>A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries</p> <p>Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park's southeast corner, and 1 1/2 miles north of the park's northwest corner.</p> <p>No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations.</p> <p>No known conflicts with tribal/spiritual areas, historic areas or populated areas.</p>
	Noise	<p>Size of areas (acres) potentially affected by noise/size of areas (acres) closed to winter motorized use</p> <p>Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)</p>	834,660 acres open for OSV use and potentially affected by noise/315,360 acres closed to OSV use and available for quiet recreation
	Air Quality	Qualitative/narrative description of potential impacts (with reference to air quality analysis)	Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Fewer acres open to OSV use than in existing conditions and Alt 2 (see air quality report).
	Scenery	Qualitative/narrative description of potential visual impacts	Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions or Alt 2. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season
	Wilderness Attributes	Size of areas (acres) affected and duration of impact. Qualitative description for wilderness attributes	Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. There are approximately 19,154 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 3
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)	Roadless Characteristics	Size of area (acres) affected and duration of impact. Qualitative description for roadless characteristics	Approximately 58,487 IRA acres open to OSV use. Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.

Cumulative Effects – Alternative 3

The cumulative effects of alternative 3 would be the same as described for alternative 2.

Alternative 4

Alternative 4 is described in detail in chapter 2. Alternative 4 was developed to address the motorized recreational opportunities significant issue.

Alternative 4 would designate 398 miles of groomed and marked but ungroomed snow trails. This would represent a reduction in the number of miles of trail where OSV use is currently allowed. However, approximately 99 percent of the OSV trails in the current trail system would be either designated for public OSV use or are located in areas that would be designated for public, cross-country OSV use in this alternative. Alternative 4 would identify 349 miles of snow trails for grooming, as in the existing conditions.

In addition to areas where OSV use is already prohibited on the Lassen National Forest, alternative 4 proposes OSV prohibitions in the Blacks Mountain RNA, and the McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17).

Public, cross-country OSV use would be allowed in areas designated for OSV use as long as there are 12 or more inches of snow; and public OSV use on designated snow trails would be allowed when there are 6 or more inches of snow. The minimum snow depth for trail grooming to occur would be 12 inches.

OSV use would be allowed below 3,500 feet when there is adequate snow depth to prevent damage to underlying surface resources.

This alternative would groom the same snow trails for OSV use as the modified proposed action.

No PCT crossing points or corridor would be designated. OSV use would be allowed adjacent to, and across the PCT. The trail itself would remain non-motorized.

Direct and Indirect Effects - Alternative 4

Recreation Settings and Opportunities

Alternative 4 would allow OSV use on more acres than alternatives 2 and 3, and slightly fewer acres than in alternative 1. Allowing use of OSVs below 3,500 feet would enhance OSV opportunities when snow depths are adequate for use in that area. Alternative 4 would allow public OSV use on designated snow trails when there are 6 or more inches of snow, this would provide improved public trail access for OSV users from trailheads to deeper snow areas and allow motorized users access to higher elevations and adequate snow depths. This would enhance OSV opportunities.

The proposed OSV designations would comply with existing ROS classes, maintaining a variety of both motorized and non-motorized recreation opportunities available across the national forest. Primitive and semi-primitive non-motorized areas would remain closed to OSV use, while motorized opportunities would be available in semi-primitive motorized, roaded natural and rural ROS classes.

Conflicts between Motorized and Non-motorized Winter Experiences

Non-motorized winter recreation enthusiasts would continue to be displaced in some areas by motorized OSV use, or be unable to access areas for desired quiet, non-motorized experiences away from the sights, sounds, and smells of motorized use, since they would have to travel longer distances through motorized routes and areas than they are physically able to traverse. However, there would be 79,740 acres available

for quiet, non-motorized winter activities and 44 miles of cross-country ski trails and other non-motorized trails within 10 miles of plowed trailheads. This would be a 4,571-acre increase over existing conditions. There would be a total of 191,090 acres across the Lassen National Forest available for quiet, non-motorized experiences, where OSV use would be prohibited.

Otherwise, alternative 4 effects would be the same as described for alternative 2.

Areas Designated Non-motorized under Existing Law or Policy

Alternative 4 would be the same as alternative 2 in regard to areas designated as non-motorized under existing law and policy, with the exception of the area below 3,500 feet and the limitation to designated trails in the McGowan Front-country area. Allowing use in areas below 3,500 feet in the southwestern portion of the Lassen National Forest would not provide additional protection from OSV use near wilderness, proposed wilderness, and IRAs, or from OSV use near Antelope and Mill Creek eligible Wild and Scenic River corridors; however, a majority of the corridors would be located in areas that are closed to OSVs under existing conditions, or are in areas where low to no OSV use is expected. Restrictions to designated trails in the McGowan Front-country area would minimize impacts from OSV encroachment into the Heart Lake and Wild Cattle Mountain proposed wilderness areas, and Lassen Volcanic National Park.

Table 46. Resource indicators and measures for alternative 4 direct and indirect effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 4
Motorized Recreation Opportunities – cross-country	Opportunities for motorized winter uses	Size of areas (acres) open to OSV use, percent change	958,930 acres open to public cross-country OSV use, subject to snow depth restrictions, a .5 percent decrease from existing conditions. 12 inch snow depth
Motorized Recreation Opportunities – designated snow trails	OSV trail designations	Length of designated OSV trails (miles), percent change	398 miles of groomed and ungroomed (marked) snow trails, subject to snow depth restrictions. 85.5 percent decrease from existing conditions (however 99 percent of the current trail system is designated or in OSV open areas) 6 inch or more snow depth
Motorized Recreation Opportunities – groomed snow trails	OSV trail grooming	Length groomed OSV trails (miles), percent change	349 miles, no change 12 inch snow depth for grooming
Non-motorized Recreation Opportunities - displacement	Access to desired non-motorized recreation settings and opportunities	Size of area (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads	Six plowed trailheads provide access for motorized and non-motorized winter use, 79,740 acres available for non-motorized recreation within 10 miles of plowed trailheads 44 miles of cross-country ski trails and other non-motorized trails available within 10 miles of plowed trailheads
	Recreation Opportunity Spectrum	Consistency of OSV designations with ROS classes	Motorized OSV use prohibited in Primitive and Semi-Primitive Non-Motorized ROS classes. Motorized OSV use allowed in Semi-Primitive Motorized, Roaded Natural and Rural ROS classes.
Non-motorized Recreation Conflicts - Public Safety	Areas and trails available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences	Size of areas (acres) closed to OSV use/length of non-motorized trails (miles), percent change	191,090 acres, 2.7 percent increase/ six non-motorized trails with a total of 148 miles for non-motorized use.

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 4
<p>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas</p>	<p>Proximity and frequency of OSV designations in relation to designated non-motorized areas</p>	<p>Distance of groomed public OSV snow trails from designated non-motorized areas, or number of crossings of linear areas designated as non-motorized under existing law or policy</p>	<p>A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries</p> <p>Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park’s southeast corner, and 1 1/2 miles north of the park’s northwest corner.</p> <p>No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations.</p> <p>No known conflicts with tribal/spiritual areas, historic areas or populated areas.</p>
	<p>Noise</p>	<p>Size of areas (acres) potentially affected by noise/size of areas (acres) closed to winter motorized use</p> <p>Proximity of predicted noise increases above ambient levels in sensitive areas (GIS model for selected points)</p>	<p>958,930 acres open for OSV use and potentially affected by noise/191,090 acres closed to OSV use and available for quiet recreation</p>
	<p>Air Quality</p>	<p>Qualitative/narrative description of potential impacts (with reference to air quality analysis)</p>	<p>Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).</p>
	<p>Scenery</p>	<p>Qualitative/narrative description of potential visual impacts</p>	<p>Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Slightly fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season</p>
	<p>Wilderness Attributes</p>	<p>Size of areas (acres) affected and duration of impact. Qualitative description for wilderness attributes</p>	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries. There are approximately 25,556 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>

Resource Element	Resource Indicator	Measure (Quantify if possible)	Alternative 4
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)	Roadless Characteristics	Size of areas (acres) affected and duration of impact. Qualitative description for roadless characteristics	Approximately 72,884 IRA acres open to OSV use. Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.

Cumulative Effects – Alternative 4

The cumulative effects of alternative 4 would be the same as described for alternative 2

Degree to Which the Purpose and Need for Action is Met

All of the action alternatives (alternatives 2, 3, and 4) equally meet the purpose and need to effectively manage OSV use by identifying a manageable system of OSV trails and areas per Subpart C of the Travel Management Regulation and to identify OSV trails for grooming to provide a high-quality OSV trail system.

Degree to Which the Alternatives Address the Issues

Table 47 provides a comparison of the alternatives and the degree to which the alternatives address the recreation-related issues.

Table 47. Summary comparison of how the alternatives address the key issues

Resource Element	Resource Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3	Alternative 4
Motorized Recreation Opportunities – cross-country	Opportunities for motorized winter uses/size of area (acres) and percent change	964,020 acres open to OSV use 12 inch snow depth requirement	921,130 acres open to OSV use, 4.5 percent decrease from existing conditions 12 inch snow depth requirement	834,660 acres open to OSV use, 13.4 percent decrease from existing conditions 12 inch snow depth requirement	958,930 acres open to OSV use, .5 percent decrease from existing conditions 12 inch snow depth requirement
Motorized Recreation Opportunities – designated snow trails	OSV trail designations, length of trails (miles) and percent change	2,760 miles 12 inch snow depth requirement	323 miles, 88.2 percent decrease from existing conditions (however 97 percent of current trail system is designated or in OSV open areas). 6 inch snow depth requirement on trail (12 inches where trails do not overlay existing roads or trails)	316 miles, 88.5 percent decrease from existing conditions (however 88 percent of the current trail system is designated or in OSV open areas) 12 inch snow depth requirement (could be reduced to 6 inches on specific trails where site reviews determine no potential damage to underlying surface resources).	398 miles, 85.5 percent decrease from existing conditions (however 99 percent of the current trail system is designated or in OSV open areas) 6 inch snow depth requirement
Motorized Recreation Opportunities – groomed snow trails	OSV trail grooming, length of trails (miles), percent change	349 miles 18 inch snow depth requirement for grooming	349 miles, no change 12 inch snow depth requirement for grooming	349 miles, no change 18 inch snow depth requirement for grooming	349 miles, no change 12 inch snow depth requirement for grooming

Resource Element	Resource Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3	Alternative 4
<p>Non-motorized Recreation Opportunities - displacement</p>	<p>Access to desired non-motorized recreation settings and opportunities</p> <p>Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts within 10 miles of plowed trailheads</p>	<p>Six plowed trailheads provide access for motorized and non-motorized winter use,</p> <p>75,169 acres available for non-motorized recreation within 10 miles of plowed trailheads</p> <p>44 miles of cross-country ski trails and other non-motorized routes available for non-motorized recreation within 10 miles of plowed trailheads</p>	<p>Six plowed trailheads provide access for motorized and non-motorized winter use,</p> <p>85,706 acres available for non-motorized recreation within 10 miles of plowed trailheads</p> <p>44 miles of cross-country ski trails and other non-motorized trails available within 10 miles of plowed trailheads</p>	<p>Six plowed trailheads provide access for motorized and non-motorized winter use,</p> <p>121,899 acres available for non-motorized recreation within 10 miles of plowed trailheads</p> <p>72 miles of cross-country ski trails and other non-motorized trails available within 10 miles of plowed trailheads</p>	<p>Six plowed trailheads provide access for motorized and non-motorized winter use,</p> <p>79,740 acres available for non-motorized recreation within 10 miles of plowed trailheads</p> <p>44 miles of cross-country ski trails and other non-motorized trails available within 10 miles of plowed trailheads</p>
	<p>Recreation Opportunity Spectrum/Consistency with ROS class</p>	<p>Consistent</p>	<p>Consistent</p>	<p>Consistent – with enhanced opportunities for non-motorized recreation experiences</p>	<p>Consistent – with enhanced opportunities for motorized recreation experiences</p>
<p>Non-motorized Recreation Conflicts - Public Safety</p>	<p>Size of areas (acres) and length of trails (miles) available to non-motorized recreation enthusiasts for quality non-motorized recreation experiences</p>	<p>186,000 acres closed to OSV use, a total of 148 miles for non-motorized use.</p>	<p>228,890 acres closed to OSV use, 23 percent increase from existing conditions, a total of 148 miles for non-motorized use.</p>	<p>315,360 acres closed to OSV use, 69.5 percent increase from existing conditions, a total of 148 miles for non-motorized use.</p>	<p>191,090 acres closed to OSV use, 2.7 percent increase from existing conditions, a total of 148 miles for non-motorized use.</p>

Resource Element	Resource Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3	Alternative 4
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas	Proximity and frequency of OSV designations in relation to designated non-motorized areas Distance of groomed public OSV snow trails from areas designated as non-motorized under existing law or policy, or number of crossings of linear areas designated as non-motorized under existing law or policy	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries. Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park’s southeast corner, and 1 1/2 miles north of the park’s northwest corner. No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries. Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park’s southeast corner, and 1 1/2 miles north of the park’s northwest corner. PCT non-motorized corridor and 28 designated PCT crossing points. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park’s southeast corner, and 1 1/2 miles north of the park’s northwest corner. No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.	A total of approximately 9 miles of groomed OSV trails within 1/2 mile of the Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries Lassen Volcanic National Park: Groomed OSV trails ¾ mile east of the park’s southeast corner, and 1 1/2 miles north of the park’s northwest corner. No designated PCT crossing points or corridors, Groomed OSV trails cross PCT in 3 locations. No known conflicts with tribal/spiritual areas, historic areas or populated areas.
	Noise Size of areas (acres) potentially affected by noise/size of area (acres) closed to winter motorized use	964,020 acres open to OSV use, potentially affected by noise; 186,000 closed to OSV use, available for quiet recreation.	921,130 acres open to OSV use, potentially affected by noise; 228,890 closed to OSV use, available for quiet recreation.	834,660 acres open to OSV use, potentially affected by noise; 315,360 closed to OSV use, available for quiet recreation.	958,930 acres open to OSV use, potentially affected by noise; 191,090 closed to OSV use, available for quiet recreation.

Resource Element	Resource Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3	Alternative 4
<p>Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)</p>	<p>Air Quality Qualitative/narrative description of potential impacts (with reference to air quality analysis)</p>	<p>Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions ((see air quality report).</p>	<p>Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).</p>	<p>Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Fewer acres open to OSV use than in existing conditions and Alt 2 (see air quality report).</p>	<p>Potential short-term impacts to the experience of recreational visitors in the vicinity of OSV and grooming equipment due to the smell of exhaust emissions. Slightly fewer acres open to OSV use than in existing conditions (see air quality report).</p>
	<p>Scenery Qualitative/narrative description of potential visual impacts</p>	<p>Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season.</p>	<p>Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season</p>	<p>Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions or Alt 2. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season</p>	<p>Cross-country OSV use creates temporary tracks in the snow that crisscross the landscape. Slightly fewer acres open to cross-country OSV use, and associated visual impacts than in existing conditions. The visual evidence of snowmobile use decreases as fresh snow covers the tracks and/or when the snow melts at the end of the season</p>

Resource Element	Resource Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3	Alternative 4
Non-motorized Recreation Conflicts – Solitude, Air Quality, Scenery, Designated non-motorized areas (continued)	<p>Wilderness Attributes</p> <p>Size of area (acres) affected and duration of impact. Qualitative description for wilderness attributes</p>	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries.</p> <p>There are approximately 27,088 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries.</p> <p>There are approximately 21,248 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries.</p> <p>There are approximately 19,154 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>	<p>Opportunities for solitude may be temporarily affected due to the sights and sounds of OSVs near the wilderness or proposed wilderness boundaries.</p> <p>There are approximately 25,556 acres open to OSV use within ½ mile of designated and proposed wilderness boundaries, The duration of the potential impacts would be short-term, during the winter while snow depth is adequate for OSVs to access the area.</p>
	<p>Roadless Characteristics</p> <p>Size of area (acres) affected and duration of impact. Qualitative description for roadless characteristics</p>	<p>Approximately 72,972 IRA acres open to OSV use.</p> <p>Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>	<p>Approximately 59,750 IRA acres open to OSV use.</p> <p>Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>	<p>Approximately 58,487 IRA acres open to OSV use.</p> <p>Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>	<p>Approximately 72,884 IRA acres open to OSV use.</p> <p>Opportunities for solitude are temporarily affected in portions of four roadless areas that are within areas of expected high to moderate OSV use.</p>

Summary of Environmental Effects

Recreation Settings and Opportunities

All action alternatives would provide the same level of groomed motorized OSV trail opportunities. Cross-country travel, and use of OSV trails would be limited by minimum snow depth requirements for all action alternatives; however, alternative 4 would provide the least restrictive snow depth, 6 inches with no restrictions, for use of OSV trails. Alternative 3 would also provide some flexibility in the snow depth requirements on specific trails where site review would determine there would be no damage to underlying resources. This flexibility would allow OSV access to higher elevations and adequate snow depths. Alternative 4 would provide the most access for motorized OSV use forest-wide, compared to alternatives 2 and 3.

Alternative 3 would enhance opportunities for quiet, non-motorized recreation with the designation of areas where OSVs would be prohibited, or restricted to designated OSV trails, while maintaining the existing level of groomed OSV trail opportunities.

Alternative 2 would maintain OSV opportunities most similar to the existing conditions on the Lassen National Forest.

Conflicts between Motorized and Non-Motorized Uses

All action alternatives would minimize conflicts between motorized and non-motorized uses to some degree by designating a clear system of OSV trails and areas, and development of the subsequent OSV use maps that would allow visitors to choose areas to recreate that would best meet their expectations and desired settings.

Alternative 3 would minimize conflicts between motorized and non-motorized uses to the greatest extent by designating three non-motorized areas and two areas where OSVs would be restricted to designated OSV trails. These designations would provide separate areas for non-motorized recreation that would not be influenced by the noise, smell of exhaust and presence of OSVs. Alternative 3 also would enhance public safety for non-motorized users by providing areas that would be separated from the influence of OSVs.

Alternative 4 would provide the most acres open to OSV use, and therefore, would have the potential for continued or increased conflict with non-motorized users in the future, with the exception of one area where OSVs would be restricted to the designated OSV trail. Alternative 4 would also enhance public safety for non-motorized users in this area.

Areas Designated Non-motorized under Existing Law or Policy

Potential impacts to areas designated as non-motorized under existing law or policy related to the groomed OSV trail system, such as encroachment into wilderness, proposed wilderness, and adjacent Federal lands, would be the same for all action alternatives, since all alternatives would provide the same level of groomed motorized snow trail opportunities. Alternatives 2 and 3 would provide slightly more protection for the Ishi Wilderness, Mill Creek Proposed Wilderness, semi-primitive non-motorized areas within the Ishi and Polk Springs Inventoried Roadless Areas, and Antelope and Mill Creek eligible Wild and Scenic River corridors, with the closure of area in the southwestern portion of the forest, and areas below 3,500 feet in elevation. Alternative 3 would minimize potential impacts to wilderness and proposed wilderness areas to the greatest extent with the addition of the OSV closures in the area north of Caribou Wilderness and south of the Heart Lake and Wild Cattle Mountain Proposed Wilderness Areas. These closures would

also help to minimize potential impacts from the sights and sounds of OSVs to quiet, non-motorized areas within Lassen Volcanic National Park.

Alternative 4 would include restrictions to designated trails in the McGowan Front-country area that would minimize impacts from OSV encroachment into the Heart Lake and Wild Cattle Mountain proposed wilderness areas, and Lassen Volcanic National Park.

The proposed non-motorized corridor along the PCT with 28 designated crossing points, in alternative 2 would minimize potential conflicts between motorized and non-motorized users along the PCT to the greatest extent of all alternatives. Alternative 2 most closely complies with the direction in the PCT Comprehensive Plan regarding management of the PCT and would maintain non-motorized opportunities and quiet settings along the trail. In alternatives 3 and 4, the PCT trail itself would remain non-motorized, however there would be no restrictions for OSVs crossing the trails in OSV open areas, potentially leading to conflicts between motorized and non-motorized users along the trail.

In all action alternatives, Wilderness areas, semi-primitive non-motorized areas and Research Natural Areas would be closed to OSV use.

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

Alternative 1, no action, would not comply with Subpart C of the Travel Management Regulation that requires designation of roads, trails, and areas on National Forest System lands to provide for over-snow vehicle use. Alternative 1 would not implement the management area direction from the Lassen Forest Plan to prohibit motorized use in the Blacks Mountain Research Natural Area.

Alternatives 2, 3, and 4 would comply with Subpart C of the Travel Management Regulation and the Lassen Forest Plan.

Unavoidable Adverse Effects

Allowing motorized OSV use, which is an acceptable use of National Forest System lands, unavoidably affects non-motorized or quiet opportunities in some areas, as discussed in the analysis related to conflicts between motorized and non-motorized winter experiences.

Transportation and Engineering

Introduction

This analysis will consider and disclose potential effects to engineering and roads (safety, traffic, affordability, jurisdiction, and the underlying forest transportation system) that could result from four unique alternatives pertaining to implementing Subpart C of the Travel Management Regulations (36 CFR 212). These regulations require designating roads, trails, and areas for OSV use.

Relevant Laws, Regulations, and Policy

Laws

National Forest Roads and Trails Act of October 13, 1964, as amended (16 U.S.C. 532-538)

This act authorizes road and trail systems for the national forests. It also authorizes granting of easements across NFS lands, construction and financing of maximum economy roads (FSM 7705), and imposition of requirements on road users for maintaining and reconstructing roads, including cooperative deposits for that work.

Annual Department of the Interior, Environment, and Related Agencies Appropriations Act

This act appropriates funds for the Forest Service's road and trail programs.

Organic Administration Act of 1897 (16 U.S.C. 551).

This act authorizes the regulation of national forests.

National Trails System Act of October 2, 1968 (16 U.S.C. 1241-1249)

This act established the National Trails System and authorizes planning, right-of-way acquisition, and construction of trails established by Congress or the Secretary of Agriculture.

Federal Regulations

Code of Federal Regulations

- 36 CFR 212 (Forest Service travel management)
- 36 CFR 251 (Land Uses)
- 36 CFR 261 (Prohibitions)

Forest Service Manual and Handbooks

- FSM 7700 Travel Management
- FSM 7730 Transportation System Operation and Maintenance
- FSH 7709.55 Chapter 10- Travel Planning for Designations
- FSH 7709.59 Chapter 20- Traffic Management

State Direction

- California Snowmobile Trail Grooming (1997 Grooming Standards)
- Over Snow Vehicle Program Final Environmental Impact Report, Program Years 2010 – 2020 (State of California, Dept. of Parks and Recreation)
- California OSV laws

Lassen National Forest Land and Resource Management Plan

Forest-wide Standards and Guidelines

FACILITIES

- Provide a stable and cost-efficient road system through appropriate construction, reconstruction, maintenance
 - Maintain all roads and related structures to protect resources of adjacent areas; meet contractual and legal obligations, and provide an efficient transportation system
- Provide a stable and cost-efficient trail system through appropriate construction, re-construction, maintenance
 - Meet current objectives for trail management and use of all designated hiking, equestrian, off-highway vehicle, and over-snow trails.
 - Maintain all trails and related structures to: protect the recreation amenities of adjacent areas, provide reasonable access, be an efficient transportation system; and provide various levels according to type and volume of use
 - Modify parts of the Forest Development Trail System as needed to meet changing use demands
 - Construct, reconstruct, and maintain each trail to satisfy reasonable environmental and economic criteria
- Provide administrative sites and facilities that effectively and cost-efficiently serve the public and the Forest Service workforce

Sierra Nevada Forest Plan Amendment

- No applicable direction

Resource Indicators and Measures

- Measurement Indicator 1: Public Safety and Traffic - For each alternative display/discuss the effects on public safety. Discuss the proposed changes to the trail system and effects it would have to motor vehicle operators and other users of the trail system. Note any instances where the proposed designation would allow operation of motor vehicles in a manner inconsistent with State law.
- Measurement Indicator 2: Affordability –For each alternative display/discuss how over-snow uses and grooming would affect the total cost of maintaining the Forest Transportation System (FTS) that would be open to motor vehicle use. Include the annual maintenance

changes associated with making the changes to the system. This analysis will not involve road maintenance costs associated with standard wheeled motor vehicles.

- Measurement Indicator 3: Effects to underlying NFS roads and trails, including wear and tear that may potentially affect wheeled motor vehicle use.

This analysis uses qualitative indicators and measures, due to the nature of the resource and scope/scale of the alternatives.

Methodology

Information Sources

The Forest Transportation Atlas was the primary data used, along with professional expertise. The atlas is primarily composed of roads and motorized trail information as contained in geographic information system (GIS) spatial data and Forest Service Infrastructure (INFRA) tabular data. In addition, the proposed over-snow vehicle route network for designation, by alternative (GIS data) were included. Last of all, the existing National Forest System roads and OSV-related engineering facilities, including snow parks, warming huts, parking areas (GIS data) were considered.

All distance figures are approximate values based on the Forest Transportation Atlas (including spatial GIS data and tabular INFRA data) and are limited to the accuracy of those sources which includes measurements from GIS, GPS, field instruments and aerial photography. Mileages have been updated throughout the planning process as better information has been made available and may change slightly with additional field verification and project implementation.

Assumptions

- All OSV users would follow applicable laws and designations as described under each alternative.
- All proposed and analyzed OSV trails would be located where the Forest Service has jurisdiction.

Spatial and Temporal Context for Effects Analysis

The affected spatial area where direct, indirect, and cumulative transportation effects may be caused by proposed activities involves the project area (Lassen National Forest).

The temporal boundaries for transportation effects from the proposed activities are indefinite, as long as snow conditions exist to provide for the designations as described under each alternative.

Affected Environment

Existing Condition

The existing system of available OSV trails and areas on the Lassen National Forest is the culmination of multiple agency decisions over recent decades. Currently, the Forest Service requires 12 or more inches of snow on the ground to operate an OSV on the Lassen National Forest. Although 12 inches of snow may exist at a given time in many higher elevation areas, there may be less than 12 inches of snow at trailheads, which under current regulations, would leave areas with 12 or more inches of snow inaccessible to OSV use. All snow trails are located on existing dirt, gravel, or paved trails or roads. These trails and roads are used in the summer for

highway vehicles, off-highway vehicles, and non-motorized recreation. Snow grooming currently is allowed when there is a minimum snow depth of 18 inches.

The following summarizes how the Forest Service currently manages OSV use on the approximately 1,150,020-acre Lassen National Forest:

- 2,760 miles of currently groomed, ungroomed, marked, and unmarked snow trail are open to public OSV use as shown on the 2005 Lassen National Forest Winter Recreation Guide (project record).
- Approximately 349 miles of groomed OSV trails are open to OSV use;
- Approximately 964,020 acres of National Forest System land open to off-trail cross-country OSV use; and
- Approximately 186,000 acres of National Forest System land closed to OSV use.

Desired Condition

The desired condition involves providing a stable and cost-efficient road system through appropriate construction, reconstruction, maintenance; providing a stable and cost-efficient trail system through appropriate construction, reconstruction, maintenance; and providing administrative sites and facilities that effectively and cost-efficiently serve the public and the Forest Service workforce.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects – Alternative 1

Table 48. Resource indicators and measures for alternative 1

Resource Element	Resource Indicator	Measure	Alternative 1
Safety	Public Safety & Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	The current Lassen National Forest Winter Recreation Guide map provides adequate information to maintain a reasonable level of public safety and avoid traffic conflicts
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	18 inches (grooming) and 12 inches (OSV use) snow depth requirement provides more than adequate protection of underlying roads.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Alternative 2

Table 49. Resource indicators and measures for alternative 2

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2
Safety	Public Safety & Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	12 inches (general OSV use) and 6 inches (OSV use on underlying routes) snow depth requirement provides adequate protection of underlying roads.

Cumulative Effects – Alternative 2

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis (applicable to all action alternatives)

- Bald Fire Salvage and Restoration
- Jellico Fire Salvage and Restoration
- Tamarack Fire Salvage
- Dutch Fire Salvage
- Castle Timber Sale
- Lassen Day Salvage Sale
- Lost Timber Sale
- Urfa Timber Sale
- Yellow Modified Contract Timber Sale
- Various ongoing grazing allotments
- Big Meadows Powerline Improvement Project CE
- Big Springs Project CE
- Chips Creek Bridge CE
- Grizzly Restoration Project EA
- High Lakes Motorized Trail Re- routes and Staging Area Improvements EA

- Ridge Project CE
- Rocks Restoration EA
- Storrie Aquatic Organism Passage (AOP) Project CE
- Moonlight Hand Thinning Project CE
- Re-issuance of Eagle Lake Rec Area Special Use Permit (Concessionaire) CE
- Rust Resistant Sugar Pine Maintenance CE
- Bailey Creek Aquatic Organism Passage (AOP) Project CE
- Big Lake Restoration Project CE
- Halls Flat Windthrow Project EA
- Hat Creek Valley Powerline Spur CE
- Plum Restoration Project EA

Table 50. Resource indicators and measures for alternative 2 cumulative effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2
Safety	Public Safety and Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	Negligible cumulative effects; use of temporary closures for logging and forest operations activities would eliminate conflicts.
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Negligible cumulative effects.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	Negligible cumulative effects; use of temporary closures and proper use of snow plowing requirements for logging and forest operations activities would minimize cumulative effects.

Alternative 3

Direct and Indirect Effects - Alternative 3

Table 51. Resource indicators and measures for alternative 3

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 3
Safety	Public Safety and Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	18 inches (grooming), 12 inches (general OSV use) and 6 to 12 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.

Cumulative Effects – Alternative 3

Table 52. Resource indicators and measures for alternative 3 cumulative effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 3
Safety	Public Safety and Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	Negligible cumulative effects; use of temporary closures for logging and forest operations activities would eliminate conflicts.
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Negligible cumulative effects.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	Negligible cumulative effects; use of temporary closures and proper use of snow plowing requirements for logging and forest operations activities would minimize cumulative effects.

Alternative 4

Direct and Indirect Effects - Alternative 4

Table 53. Resource indicators and measures for alternative 4

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 4
Safety	Public Safety & Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	12 inches (grooming, general OSV use) and 6 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.

Cumulative Effects – Alternative 4

Table 54. Resource indicators and measures for alternative 4 cumulative effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 4
Safety	Public Safety & Traffic	Qualitative effects to motor vehicle operators and other users of the trail system	Negligible cumulative effects; use of temporary closures for logging and forest operations activities would eliminate conflicts.
Cost	Affordability	Qualitative effects to the total cost of maintaining the Forest transportation system (FTS) that will be open to motor vehicle use	Negligible cumulative effects.
Transportation property	Effects to underlying NFS roads and trails	Wear and tear that may affect wheeled motor vehicle use	Negligible cumulative effects; use of temporary closures and proper use of snow plowing requirements for logging and forest operations activities would minimize cumulative effects.

Summary of Environmental Effects

Table 55. Summary comparison of environmental effects to transportation and engineering resources

Resource Element	Indicator/ Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Safety	Public Safety and Traffic	The current Lassen National Forest Winter Recreation Guide map provides adequate information to maintain a reasonable level of public safety and avoid traffic conflicts	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.	The over-snow vehicle use map would provide adequate information to maintain a reasonable level of public safety and avoid traffic conflicts; this would also improve understanding of allowed uses and prohibitions.
Cost	Affordability	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.	Minor effects (minor costs) due to over-snow vehicle use for access roads to popular parking and staging areas.
Transportation property	Effects to underlying NFS roads and trails	18 inches (grooming) and 12 inches (OSV use) snow depth requirement provides more than adequate protection of underlying roads.	12 inches (grooming and general OSV use), and 6 inches (OSV use on underlying routes) snow depth requirement provides adequate protection of underlying roads.	18 inches (grooming), 12 inches (general OSV use) and 6 to 12 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.	12 inches (grooming, general OSV use) and 6 inches (OSV use on underlying routes) snow depth requirements provide adequate protection of underlying roads.

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

Alternatives 2, 3, and 4 are compliant with all applicable direction, since they all involve production of a motor vehicle use map as required in Subpart C of the Travel Management Regulations (36 CFR 212).

Alternative 1 does not involve production of a motor vehicle use map as required in Subpart C of the travel management regulations. Alternative 1 is otherwise compliant with applicable direction.

Impacts on Soil Resources

The purpose of this section is to analyze the potential impacts (direct, indirect and cumulative effects) of over-snow vehicles (OSVs) on the soil resource by alternative within the Lassen National Forest. This section includes:

- Analysis Methods and Scale;
- Affected Environment; and
- Environmental Consequences, including direct, indirect, and cumulative effects in light of past, present, and reasonably foreseeable future events

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

The Lassen National Forest Land and Resource Management Plan (LRMP) provides standards and guidelines for activities on the forest including OSV management.

- ◆ LRMP Standards and Guidelines pertinent to OSV management (USDA Forest Service 1993: Chapter 4):
 - Prevent irreversible losses of soil productivity: Assess impacts of proposed projects on the soil resource and take appropriate mitigative action.
 - The areal extent of detrimental soil disturbance will not exceed 15 percent of the area dedicated to growing vegetation
 - Soil cover is sufficient to prevent the rate of accelerated soil erosion from exceeding the rate of soil formation
 - Soil porosity and bulk density are at least 90 percent of the measurements found under undisturbed or natural conditions
 - Organic matter is present in amounts sufficient to prevent significant short- or long-term nutrient cycle deficits
 - Field verify existing reconnaissance soil resource inventory data for each ground-disturbing project
 - Conduct detailed soil surveys for all project areas that have an erosion hazard rating of “high” or “very high,” landslides or unstable areas, potential revegetation or regeneration problems, active erosion or a significant potential to contribute to cumulative degradation of water quality
 - Retain ground-covering litter, duff and vegetation on at least 90 percent of non-rocky riparian areas, except when removal is needed to improve vegetative diversity or wildlife habitat
 - Rehabilitate areas of significant soil degradation caused by off-highway vehicles. Close trails and areas to motorized use if necessary to protect soils.
 - Map the occurrence of unstable Eocene non-marine deposits and granitic soils prior to ground-disturbing activities.

- ◆ Monitor and take necessary actions to prevent damage to meadows and soils in the high Lakes area.

Desired Condition

The desired condition for soils is that soil productivity and water quality remain high on the forest.

Regional Direction

Pacific Southwest Region Soil Management Handbook Supplement (Pacific Southwest Region FSH Supplement No. 2509.18-95-1)

This supplement establishes regional soil quality analysis standards. The analysis standards address three basic elements for the soil resource: (1) soil productivity (including soil loss, porosity and organic matter), (2) soil hydrologic function, and (3) soil buffering capacity. The analysis standards are to be used for areas growing vegetation. They are not applied to lands with other dedicated uses, such as developed campgrounds, administrative facilities, or in this case, the actual land surface of routes authorized for travel by OSVs. This standard does apply to cross-country OSV travel.

Federal Law

National Forest Roads and Trails Act of 1964 (78 Stat. 1089; 16 U.S.C. 532-538)

Section 1 of the National Forest Roads and Trails Act states “Congress hereby finds and declares that the construction and maintenance of an adequate system of roads and trails within and near the national forests and other lands administered by the Forest Service is essential.” This system of roads is needed “to provide for intensive use, protection, development, and management of these lands under principles of multiple use and sustained yield of products and services.” (16 U.S.C. 532)

Section 2 of this act states, “The Secretary is authorized, under such regulations as he may prescribe, subject to provisions of this Act, to grant permanent or temporary easements for specified periods or otherwise for road rights-of-way (1) over national forest lands administered by the Forest Service.” (16 U.S.C. 533).

Implicit in this legal direction is Forest Service authority to withdraw lands from vegetation production and related soil productivity on the national forest for dedication to road and trail corridors for transportation and access uses.

National Environmental Policy Act of 1969

This report was developed using the principal elements from the National Environmental Policy Act (NEPA) of 1969 and the regulations for implementing the procedural provisions of the NEPA from the Council on Environmental Quality (40 CFR Parts 1500-1508) and Regulation 36 CFR Part 220.

National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1608)

Section 8(c) of this act states “Roads constructed on National Forest System lands shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on land resources.”

Issues Addressed in This Analysis

Issues

Designating snow trails, and areas for OSV use has the potential to result in ground disturbance and snow compaction, and this can directly, indirectly, and/or cumulatively adversely impact soil and water resources through soil compaction, erosion, and displacement.

OSVs, when operated cross-country instead of on designated trails, have the potential for more widespread impacts from ground disturbance (similar in nature to summer motorized use if there is inadequate snow cover). These potential effects are highly dependent on location, particularly areas of thin snow cover, and the amount and timing of use.

OSVs, when operated on designated National Forest System roads and designated National Forest System trails without adequate snow cover have the potential to also result in soil compaction, erosion, and displacement and decreased water quality, as described above.

Resolution

This issue will be carried forward through effects analysis in this section. Measurement indicators will be used to compare and contrast alternatives and minimization criteria will be applied to reduce the impacts to the soil resource.

We addressed this issue by developing an alternative to the proposed action that includes establishing a uniform 12-inch minimum snow depth for all uses, with some exceptions and added clarification to all alternatives (via project design criteria and monitoring measures) regarding how snow depths would be measured, enforced, and used as guidelines to ensure resource impacts are minimized.

This minimum snow depth would minimize the likelihood of adverse impacts to soil and water resources from OSV use.

Resource Indicators and Measures

Soil productivity and soil stability are the two soil resource indicators (table 56).

Table 56. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)
Soil Productivity and Soil Stability	OSV use on sensitive soils including wet meadows, areas with potential low stability and areas with potential erosion hazards.	Acres of cross-country travel open to OSV use on sensitive soils
Soil Stability	Minimum snow depths on trails	Inches of snow
Soil Productivity	Minimum snow depths for cross-country travel	Inches of snow
Soil Productivity	Total area open to OSV use	Acres open to cross-country OSV travel

Methodology and Information Sources

We analyzed soil resources within the project area using geographic information system (GIS) data, soils survey data, corporate soils data layers including the geology and geomorphology layers for the Lassen National Forest, a variety of reports and assessments of OSV impacts, and professional experience and judgement using scientific literature on OSV impacts. We consulted

the Lassen National Forest Soil Scientist to help determine where the sensitive soils might be located on the forest.

Incomplete and Unavailable Information

We performed no field observations and collected no site-specific soils information to support this analysis. Very little monitoring information is available on OSV impacts to the soil resource. The Forest Service does monitor OSV use on the Lassen National Forest, but no specific soils monitoring has been conducted. Assessments of soil resource impacts of OSV use were primarily based on the scientific literature.

To determine where potential sensitive soils might be located on the forest, we used the soils survey data and other corporate GIS layers to determine where wet meadow soils, soils with low stability, and soils with erosion potential might be located. The Forest Service does not have a specific meadows layer or slope stability layer for the Lassen National Forest.

Spatial and Temporal Context for Effects Analysis

Direct/Indirect and Cumulative Effects Boundaries

The spatial boundaries for analyzing the direct, indirect, and cumulative effects to the soil resource are the area of land managed by the Lassen National Forest.

The short-term temporal boundary for analyzing the direct, indirect, and cumulative effects to the soil resource is 1 year; the long-term temporal boundary is 10 years because climate changes, unforeseeable future projects, and other factors make assumptions beyond this timeframe speculative.

Affected Environment

Existing Condition

The majority of precipitation occurs on the Lassen National Forest from about late October to early May. At elevations above 5,000 feet, the majority of precipitation occurs as snow, and very little rainfall occurs during the summer months. The amount of annual precipitation ranges from about 16 inches along the eastern boundary and the northern Little Valley area, to 80 or 90 inches in and around Lassen Volcanic National Park, Philbrook Reservoir, and Snow Mountain. The median annual precipitation is approximately 30 to 50 inches. East of the Lassen National Forest boundary is high desert country with only 6 to 10 inches of annual precipitation.

The Lassen National Forest has diverse vegetation because of its wide ranges in precipitation and elevation. In the upper elevations, white pine, red and white fir, and manzanita grow well. Lodgepole pine, willow, alder, and ceanothus, snowbrush, and grasses can also be found at this elevation. The lower elevations typically see various oaks (blue, live, and black), grasses, and ceanothus, along with ponderosa pine and Jeffrey pine.

Soils and Geology

Soil resources on the Lassen National Forest are varied with a diversity of parent materials present. About 85 percent of the forest is volcanic in origin including basalt, rhyolite, andesite, cinders, and ash parent materials. These soils are generally coarser-textured soils, but with good water-holding capacity and abundant nutrients. The southern 15 percent of the forest is derived from non-volcanic parent materials including granitics, metamorphic and sedimentary rocks of

different ages. These soil types tend to be less productive and are more prone to erosion, especially on steeper slopes. Tertiary age gravelly sediments are also present on the southern portion of the forest and these soil types are more prone to slope instability and landslides. Lassen National Forest soils are included and described in the Tehama County soil survey (USDA Soil Conservation Service and Forest Service 1967) and the Soil Survey of Lassen National Forest Area, California (Kliwer 1994).

Elevations throughout the forest range from 2,500 to 8,700 feet. The western and southern sections are composed of gentle to steep slopes; the northern and eastern sections have larger swaths of gently sloping and flatter stretches of land. The higher elevation portions of the forest were glaciated in the last ice age.

The soils are grouped into 224 soil map units within 41 taxonomic groups (see appendix A of the soil resources specialist report).

Soil Productivity

Soil productivity is important to maintain. Soil organic matter and soil porosity are two indicators of soil productivity. The importance of soil organic matter cannot be overstated (Jurgensen et al. 1997). This organic component contains a large reserve of nutrients and carbon, and it is dynamically alive with microbial activity. The character of forest soil organic matter influences many critical ecosystem processes, such as the formation of soil structure, which in turn influences soil gas exchange, soil water infiltration rates, and soil water-holding capacity. Soil organic matter is also the primary location of nutrient recycling and humus formation, which enhances soil cation exchange capacity and overall fertility. Organic matter including the forest floor and large woody material are essential for maintaining ecosystem function by supporting moderate soil temperatures, improved water availability and bio-diversity (Page-Dumroese et al. 2010).

Soil porosity refers to the amount and character of void space within the soil. In a “typical” soil, approximately 50 percent of the soil volume is void space. Pore space is lost primarily through mechanical compaction. Three fundamental processes are negatively impacted by compromised soil pore space:

- Gas exchange;
- Soil water infiltration rates; and
- Water-holding capacity.

Gas Exchange

Soil oxygen is fundamental to all soil biologic activity. Roots, soil fauna, and fungi all respire, using oxygen while releasing carbon dioxide. When gas exchange is compromised, biologic activity is also compromised. Maintaining appropriate soil biologic activity is paramount when considering long-term forest vitality.

Soil Water Infiltration Rates

Severely compacted soils do not allow appropriate water infiltration, leading to overland flow and associated erosion, sediment delivery, spring flooding, and low summer flows.

Soil productivity within the Lassen National Forest could be most affected by OSV use within sensitive soil types including wet meadow areas and soils that are prone to erosion. Wet

meadows are located on approximately 1 percent of the Lassen National Forest (approximately 13,759 acres). Maintaining a minimum snow depth to not disturb the organic matter at the soil surface or compact the soil and reduce soil porosity are essential to reducing the effects of OSV use on the soil resource in these sensitive areas.

Soil Stability

Non-marine sediments in the southern part of the forest, as well as some granitic slopes, can be unstable when slopes are steep (over 35 percent). Generally, the instability and slumping only occurs when soils are excavated deeper than 2 feet. These soil types make up about 6 percent of the forest. These areas generally have a moderate stability hazard, with less than 2 percent of the soils having a high or very high stability hazard. Most of the remaining portions of the forest have low-relief volcanic topography where the stability hazard is low. Old landslides are present within the project area on approximately 2 percent of the forest (28,818 acres). None of the actual proposed OSV trails (groomed or ungroomed) occur on any mapped landslide deposits.

Some smaller portions of the granitic soils on steep slopes and some small areas of poorly consolidated rhyolite are the areas on the forest with potential erosion hazards when soils have no vegetation present. These soil types are found on approximately 4 percent of the project area (64,101 acres).

Existing roads also have the potential for soil erosion (Cacek 1989). The dominant processes in roaded areas are surface erosion from bare soil areas of roads, including the cutslope, fillslope, and travelway. Snow cover on roads is an important component in reducing risks of erosion from roads due to OSV use.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Current OSV use would continue on 964,020 acres of the Lassen National Forest under the no-action alternative where 2,760 miles of currently groomed, ungroomed, marked and unmarked snow trails would be open to public OSV use. Minimum snow depth would be 12 inches of snow to travel on trails or cross-country. Minimum snow depth prior to grooming would be between 18 inches of snow and 349 miles of snow trails would be groomed for public OSV use.

Soil Productivity

Incidental direct effects of OSV use on and off trails could include compaction, rutting, and disturbance of the forest floor and organic matter within the soil in low snow areas. Although snowmobiles generally have low ground pressure, the tracks on snowmobiles could potentially churn soil and cause compaction with repeated travel over areas with low snow conditions (Baker and Buthmann 2005; Gage and Cooper 2009). This type of incidental contact with the soil surface or low snow conditions would likely occur during the fall or spring season, would more likely be found on ridges that are windy and exposed or on south-facing slopes, and would be very limited. Repeated compaction of snow can also alter soil temperatures potentially changing or reducing microbial activity, but some research has shown that with repeated compaction, soil temperatures were not affected (Gage and Cooper 2009; Keller et al. 2004).

Currently, grooming generally occurs when there is 18 inches of snow on trails, meaning that there is little to no chance that soil would be exposed on groomed OSV trails. The 12-inch snow

depth off trails has been observed to be adequate for cross-country travel and to mitigate and eliminate contact with soil surface, compaction, or rutting or disturbance of organic matter on ungroomed trails (USDA FSH 2509.25 for Region 2).

Soils within the Lassen National Forest that may be most prone to compaction and rutting include the soils located within the wet meadows. These soils tend to have more soil moisture for longer periods throughout the year with finer soil textures. Monitoring of wet meadow areas would ensure that 12 inches of snow is adequate to protect these sensitive soil types that cover approximately 1 percent of the forest.

Moderate snowpack levels have been shown to minimize the potential compaction from OSV use (Gage and Cooper 2009). With adequate snow depth, on-trail and off-trail OSV use would have minimal to no impact on the soil resource and would not likely lead to any loss of soil productivity.

Soil Stability

With adequate snow depths, cross-country OSV use is unlikely to affect soil stability. There are approximately 28,818 acres with landslide potential. Landslides within the Lassen National Forest are generally caused by excavating soil to a depth greater than 2 feet. OSV use on these soils would not lead to excavated soils and would likely be widely spread out throughout the forest versus concentrated on landslide prone areas. Even with concentrated use on sites where landslide potential is high, OSV use would not likely cause landslides.

Cross-country use of OSVs could have a small effect on ground disturbance that could lead to erosion, especially on soils derived from granitic or rhyolitic parent materials (approximately 64,101 acres). Depending on site-specific factors including slope, aspect, elevation, level of use, and weather conditions, trails and off-trail riding on steep slopes could contribute to erosion (Baker and Buthmann 2005; Olliff et al. 1999). Adequate snowpack would likely mitigate the potential for erosion on these sites. Also, OSV operators generally avoid traveling over bare soil because it can damage their machines.

Trail Grooming

Trail grooming occurs over a National Forest System road or trail. Adequate snowpack is present on the trail prior to grooming and grooming is not likely to cause impacts to the soil resource on trails or roads.

Table 57. Resource indicators and measures for alternative 1

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 1
Soil Productivity and Soil Stability	OSV use on sensitive soils (Meadow soils, erosive soils, low stability soils)	Acres of cross-country travel open to OSV use on sensitive soils	87,292
Soil Stability	Minimum Snow Depths on trails	Inches of snow	12
Soil Productivity	Minimum snow depths for cross-country travel	Inches of snow	12
Soil Productivity	Total area open to OSV use	Acres open to cross-country OSV travel	964,020

Alternatives 2, 3, and 4

Table 58 provides a summary of the different alternatives proposed.

Table 58. Alternative comparisons

OSV Management	Alternative 1 No Action: Current OSV Management	Alternative 2 Proposed Action	Alternative 3	Alternative 4
National Forest System (NFS) Lands within the Lassen National Forest (acres)	1,150,020	1,150,020	1,150,020	1,150,020
OSV Use Allowed:				
<ul style="list-style-type: none"> Designated OSV Areas (acres) 	964,020	921,130	834,660	958,930
<ul style="list-style-type: none"> Designated OSV Trails (miles) 	2,760	323	316	398
Minimum Snow Depth for OSV Use on Designated Trails (inches)	12	6 inches on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails	12 inches generally. 6 inches only where site review determines there would be no damage to underlying resources	No restriction with 6 or more inches
Minimum Snow Depth for Cross-country OSV Use (inches)	12	12	12	12

Direct and Indirect Effects

The potential direct and indirect effects for these alternatives are similar to the no-action alternative except that the no-action alternative has more acreage open to cross-country OSV use and has the potential to have the most impacts to the soil resource. Project design features proposed here would not be implemented under the no-action alternative either. Also, under alternatives 2 and 4, OSV use can occur on existing roads and trails with a minimum snow depth of 6 inches instead of 12 inches, which could lead to localized soil disturbance where there is repeated use at lower snow depths. The effects of snow plowing and trail grooming would be similar to those effects described under the no-action alternative above.

Soil Productivity

Impacts of OSV use on soil productivity would be similar to the impacts described under the no-action alternative. No new trail or road construction would occur under any of the alternatives. Because OSV use would occur with sufficient amounts of snow to protect the soil resource, there would not likely be soil disturbance including compaction or the disturbance of organic matter including forest floor litter and large woody debris present on the soil surface. Existing regulations would allow the issuance of a closure order if snow cover had the potential to become inadequate during the open season. During times of the year when snowpacks are potentially more variable, there could be incidental indirect effects including some minor ground disturbance in low-snow areas. Under alternative 2, the acres open to cross-country OSV travel

on sensitive soils would be the same as under the no-action alternative, but that acreage would decrease under alternatives 3 and 4 (table 59). Alternative 3 would have the least impact on sensitive soils and soil productivity overall because the least acreage would be open to potential cross-county OSV travel within the Lassen National Forest.

Soil Stability

Impacts of OSV use on soil stability would be similar to the impacts described under the no-action alternative. OSV use would not increase landslide potential on low stability sites across the forest. Erosion would likely not increase with adequate snow cover, although there is slightly more potential to have exposed bare soil on trails and roads under alternatives 2 and 4, because the minimum snow depth for OSV travel on existing roads and trails is reduced to 6 inches of unpacked snow. Monitoring under these alternatives is important to determine the site-specific effects of a reduced minimum snow depth on the soil resource.

Table 59. Resource indicators and measures for alternatives 2, 3, and 4 direct and indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2	Alternative 3	Alternative 4
Soil Productivity and Soil Stability	OSV use on sensitive soils (meadow soils, erosive soils, low stability soils)	Acres (%) of cross-country open to OSV use on sensitive soils	52,964 (6%)	40,590 (5%)	53,507 (6%)
Soil Stability	Minimum Snow Depths on trails	Inches of snow	6 inches on snow trails overlaying roads and trails	12 inches generally. 6 inches only where site review determines there would be no damage to underlying resources	No restriction with 6 or more inches
Soil Productivity	Minimum snow depths for cross-country travel	Inches of snow	12	12	12
Soil Productivity	Total area open to OSV use	Acres open to cross-country OSV travel	921,130	834,660	958,930

Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects include a discussion of the combined, incremental effects of human activities. For activities to be considered cumulative, their effects need to overlap in both time and space with those of the proposed actions. For the soil resource, the area for consideration is the whole planning area.

Vegetation Management

Several past, current, and future vegetation management activities are occurring on the Lassen National Forest over approximately 722,391 acres. These ground-disturbing activities could have cumulative effects on the soil resource if the soil disturbance occurs in the same location as potential soil disturbance from OSV use. This is very unlikely, as effects of OSV use will be minimal throughout the forest. Potential road-building activities associated with vegetation management activities could increase soil disturbance and decrease soil productivity and stability where the roads are located. These vegetation management activities are regulated by Forest Plan standards and guidelines, Regional Standards and best management practices to ensure soil productivity is maintained.

In general, snowmobiling is the primary winter recreational use in the action area. Snowmobiling primarily occurs on existing trails, naturally un-forested areas, or in areas with limited forest cover or associated structural complexity at the ground level. Because snowmobiles operate over snow that protects the ground, it is unlikely that OSV use has a significant direct impact upon soils.

Grazing

Almost the entire Lassen National Forest is located within grazing allotments. There are 60 grazing allotments present. Impacts of grazing are generally limited to areas where the animals bed, lounge, trail or access water. This generally only occurs during the spring, summer, and fall seasons when there no snow covers the ground. Cumulative impacts from grazing are unlikely as OSV use will not likely occur at the same time as grazing, and impacts from OSV use are minimal.

Other Recreation Activities

Disturbance from general motorized use and recreational access occurs and will continue to occur throughout the forest indefinitely. We anticipate no changes in the existing recreation profile. Other recreational activities that take place off the developed roads, such as the gathering of miscellaneous forest products and hunting, occur within the project area, but because OSV use would generally occur on minimum snowpack, we anticipate no cumulative effects from other ongoing recreational activities.

Climate Change

Climate change affects and will continue to affect California and the Lassen National Forest in the future. Precipitation events would likely become more unpredictable and warmer temperatures would decrease the amount of precipitation that falls as snow, likely decreasing the total snowpack and the amount of time that snow would be on the ground (State of California 2007). This could potentially increase the amount of time the soil would be exposed to OSV impacts if seasons of OSV use are not shortened. Potentially, this could increase the impacts on sensitive soil sites including wet meadows and erosive sites because of increased soil exposure.

Summary of Environmental Effects

Table 60 summarizes the soil issue indicators and the potential effects to those indicators by alternative.

Table 60. Summary comparison of environmental effects to the soil resource

Resource Element	Indicator/ Measure	Alternative 1 (no-action alternative)	Alternative 2 (proposed action)	Alternative 3	Alternative 4
Soil Productivity and Soil Stability	OSV acres open to cross-country travel on sensitive soils (including wet meadows, areas with potential low stability, and areas with potential erosion hazards).	There would be no change in acreage of area currently open to cross-country OSV travel on sensitive soils. Approximately 53,902 acres with mapped sensitive soil types are open to cross-country travel.	Approximately 52,964 acres of sensitive soils would be open to cross-country OSV travel within the forest. This is slightly less acres than the no-action alternative and alternative 4, but more acres than alternative 3.	Approximately 40,590 acres of sensitive soils will be open to cross-country OSV travel. Under this alternative, the least amount of sensitive soils will be open to OSV cross-country travel.	Approximately 53,507 acres of sensitive soils will be open to cross-country OSV travel. Under this alternative, there would be more acres of sensitive soils open to cross-country OSV travel than the proposed action, the no action and under alternative 3. This alternative has the greatest acreage of sensitive soils open to OSV cross country travel.
Soil Stability	Minimum snow depths on trails (inches)	Minimum snow depth is 12 inches of unpacked snow prior to any OSV travel over existing roads and trails. This minimum snow depth has been observed to be sufficient to prevent contact of OSVs with the bare soil surface.	Minimum snow depth is 6 inches of snow prior to any OSV travel over existing roads and trails. This minimum snow depth may potentially create conditions in which the road surface is exposed to OSVs and there is potential for some soil erosion or rutting of the road surface. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.	Minimum snow depth is 12 inches of snow prior to any OSV travel over existing roads and trails. OSV use on trails with 6 inches would be allowed if site review determines there would be no damage to the underlying resources. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.	Minimum snow depth is 6 inches of snow prior to any OSV travel over existing roads and trails. This minimum snow depth may potentially create conditions in which the road surface is exposed to OSVs and there is potential for some soil erosion or rutting of the road surface. Monitoring of this snow depth is recommended to further evaluate the potential effects to soils.
Soil Productivity	Minimum snow depths for cross-country travel (inches)	Minimum snow depth for cross-country OSV travel is currently 12 inches of unpacked snow. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.	Minimum snow depth of 12 inches of unpacked snow for cross-country OSV travel would not change. Potential effects to the soil are unlikely to occur with at least 12 inches of snow covering the soil surface.

Resource Element	Indicator/ Measure	Alternative 1 (no-action alternative)	Alternative 2 (proposed action)	Alternative 3	Alternative 4
Soil Productivity	Total acres open to OSV use	Approximately 964,020 acres of the forest are open to OSV use. Under the no-action alternative, the most acreage is open to OSV use; therefore, the most potential for soil damage exists under this alternative.	Approximately 921,130 acres of the forest would be open to OSV use. This is less area open to OSV use compared to the no-action alternative and alternative 4, but it is greater than alternative 3. The proposed action has the potential for more impacts than alternative 3, but less than the proposed action and alternative 4.	Approximately 834,660 acres of the forest would be open to OSV use, which is the least amount of land open to OSV use out of all four alternatives.	Approximately 958,930 acres of the forest would be open to OSV use, which is a greater area than under the proposed action and alternative 3, but less area than the no-action action alternative. Alternative 4 has the potential to have the greatest soil impacts out of the 3 action alternatives.

Impacts on Water Resources

Introduction

Management activities on national forest lands must be planned and implemented to protect hydrologic function and water quality of forest watersheds, including the volume, timing, and quality of stream flow. The use of roads, trails, and other areas on national forests for public operation of over-snow vehicles has the potential to affect these hydrologic functions through runoff changes and changes in water quality. OSV use has the potential to impact water and watersheds in several ways including chemical contamination, ground surface disturbance, runoff timing, or altering stream side vegetation.

The hydrologic analysis includes all aquatic resources that could be affected by OSVs. This includes perennial and seasonal streams, lakes, ponds, meadows, and springs.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

The Lassen National Forest Land and Resource Management Plan (LRMP) provides standards and guidelines for water-related concerns. This following list of standards and guidelines, are a subset of all applicable LRMP direction and this management strategy must be analyzed for consistency to all applicable LRMP standards and guidelines for hydrology (table 61).

Table 61. Lassen National Forest LRMP (1992) guidelines relevant to watershed resources

Page	Forest-wide Guidelines
Ch. 4, Sec. E, p. 4-31, WR a. (1-2)	a. Provide water of sufficient quality and quantity to meet current needs. Meet additional future demand where compatible with other resource needs. (1) Implement Best Management Practices (BMP) (LRMP Appendix Q) to meet water quality objectives stated in 22.c. below, and maintain and improve the quality of surface waters on the Lassen National Forest. Identify methods for applying the BMPs during environmental analysis of proposed projects, and incorporate them into project planning documents. (2) Provide water for Lassen National Forest uses by filing for and maintaining all water rights needed for such uses. Deny special use permit applications and protest other parties' water rights applications that jeopardize forest uses or fish and wildlife needs.
Ch. 4, Sec. E, p. 4-32, WR b. (4)	(4) Conduct formal cumulative watershed effects analysis in accordance with Pacific Southwest Region FSH2509.22, Chapter 20. Adjust project impacts and/or timing to keep disturbance below the appropriate threshold of concern (TOC) in all affected sub basins and watersheds.
Ch. 4, Sec. E, p. 4-32, WR b. (5)	(5) Where formal analysis of a project's cumulative watershed effects is not necessary or feasible, document the reasons and limit disturbance to five percent per decade in sensitive areas, per Land Management Planning Direction for the Pacific Southwest Region (4-1.H.2.b(2)). Sensitive areas are defined as watershed acres that have high erosion potential, steep slopes, or high instability. See FEIS Glossary under "sensitive watershed lands."

Page	Forest-wide Guidelines
Ch. 4, Sec. E, p. 4-32, WR c. (1-2)	c. Comply with Federal, State, regional, and local water quality regulations, requirements and standards. (1) Comply with discharge requirements of the Clean Water Act, state drinking water and sanitary regulations, and State and Regional Water Quality Control Board basin plans and rulings. (2) Take immediate remedial action if activities under Forest Service management violate water quality standards.
Ch. 4, Sec. E, p. 4-33, WR d. (3)	(3) Analyze environmental effects of proposed projects within riparian areas in a NEPA document.
Ch. 4, Sec. F, p. 4-51, D, FI #3	3. Where natural conditions permit, achieve or maintain stable channel conditions over at least 80 percent of the total linear distance of stream channels.
Page	Roads
LRMP Ch. 4, Sec. F, p. 4-50, D, FC #1	1. Limit stream crossings to stable rock or gravel areas or where stream bank damage will be minimal. Where this is not feasible, develop crossings that minimize disturbance to riparian-dependent resources. Crossings will be as near right angles as possible.
LRMP Ch. 4, Sec. F, p. 4-50, D, FC #2	2. Disperse flows from ditches or culverts to keep upland area run off from reaching riparian zones.
Ch. 4, Sec. F, p. 4-50, D, FC #3	3. Route roadside drainage through armored ditches or culverts across erodible areas.
Ch. 4, Sec. F, p. 4-51, D, FC #6	6. Out slope roads to minimize collection of water.
Page	Recreation
Ch. 4, Sec. F, p. 4-52, D, RC #3	3. Confine off-highway vehicles, except over-snow vehicles, to designated roads, trails, and stream crossings in riparian areas.

Sierra Nevada Forest Plan Amendment

The 2004 Sierra Nevada Framework established for the first time a comprehensive aquatic and riparian conservation strategy for all of the national forest lands in the Sierra Nevada Mountains. Key components of this strategy include riparian buffer zones, critical refuges for threatened and endangered aquatic species, special management for large meadows, and a watershed analysis process.

The framework includes standards and guidelines in national forests for construction and relocation of roads and trails and for management of riparian conservation areas. These standards and guidelines require the Forest Service to avoid road construction, reconstruction, and relocation in meadows and wetlands; maintain and restore the hydrologic connectivity of streams, meadows, and wetlands by identifying roads and trails that intercept, divert, or disrupt flow paths, and implementing corrective actions; and determining if stream characteristics are within the range of natural variability prior to taking actions that could adversely affect streams.

The framework's standards and guidelines for riparian conservation areas are intended to minimize the risk of activity-related sediment entering aquatic systems. The framework established riparian conservation area widths for all national forests in the Sierra Nevada Mountains: 300 feet on each side of perennial streams; 150 feet on each side of intermittent and ephemeral streams; and 300 feet from lakes, meadows, bogs, fens, wetlands, vernal pools, and springs (table 62).

Table 62. Riparian conservation areas adjacent to aquatic features as designated by the Sierra Nevada Forest Plan Amendment Record of Decision (SNFPROD 2004)

Aquatic feature	Riparian Conservation Area
Perennial stream	300 feet on each side of the stream, measured from the bank full edge of the stream
Seasonally flowing streams	150 feet on each side of the stream, measured from the bank full edge of the stream
Special aquatic features (includes lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs)	300 feet from the edge of the features or riparian vegetation, whichever width is greater
Perennial streams with riparian conditions extending more than 150 feet from the edge of the stream bank or seasonally flow streams extending more than 50 feet from the edge of the stream bank	300 feet from the edge of the features or riparian vegetation, whichever width is greater
Streams in inner gorge	Top of inner gorge (the inner gorge is defined by stream adjacent slopes greater than 70 percent gradient)

Wheeled Vehicles or Snowmobiles

Standard and Guideline. Minimize resource impacts from wheeled off-highway (and over-snow) vehicle use and cross-country use of OSVs. Each National Forest may designate where OHV or OSV use will occur. Unless otherwise restricted by current forest plans or other specific area standards and guidelines, cross-country travel by over-snow vehicles would continue.

Riparian Conservation Areas: Activity-Related Standards and Guidelines

Where a proposed project encompasses a riparian conservation area (RCA) or a critical aquatic refuge (CAR), conduct a site-specific project area analysis to determine the appropriate level of management within the RCA (or CAR). Determine the type and level of allowable management activities by assessing how proposed activities measure against the riparian conservation objectives (RCOs) and their associated standards and guidelines. Areas included in RCAs are: 300 feet on each side of perennial streams, 150 feet on each side of intermittent and ephemeral streams, and 300 feet from lakes, meadow, bogs, fens, wetlands, vernal pools, and springs (table 62).

Riparian Conservation Objective 1

Ensure that identified beneficial uses for the water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses. Beneficial uses describe how water is used and vary by water body. Examples of beneficial uses include water for domestic water supply, fire suppression, fish and wildlife habitat, and contact recreation (swimming).

Riparian Conservation Objective 2:

Maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, and springs; (2) streams, including in-stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species.

Standard and Guideline 100: Maintain and restore hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert,

or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.

Standard and Guideline 101: Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.

Standard and Guideline 102: Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside of the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.

Standard and Guideline 103: Prevent disturbance to stream banks and natural lake and pond shorelines caused by resource activities (e.g., livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under special use permits, or designated OHV routes.

Riparian Conservation Objective 4:

Ensure that management activities within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic and riparian-dependent species.

Standard and Guideline 116: Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day-use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.

Riparian Conservation Objective 5:

Preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

Standard and Guideline 118: Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles. Criteria for defining bogs and fens include the presence of plants in the genus *Meesia*, and three sundew species (*Drosera* spp.). Complete initial plant inventories of bogs and fens within grazing allotments prior to re-issuing permits.

Riparian Conservation Objective 6:

Identify and implement restoration actions to maintain, restore, or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species.

Standard and Guideline 122: Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices that may be contributing to the observed degradation, such as road building, recreational use, grazing, and timber harvests.

State Laws

The California Water Code consists of a comprehensive body of law that incorporates all state laws related to water, including water rights, water developments, and water quality. The laws related to water quality (CWC §§ 13000 to 13485) apply to waters on the national forests and are directed at protecting the beneficial uses of water. Of particular relevance to the proposed action is Section 13369, which deals with non-point-source pollution and best management practices.

The Porter-Cologne Water Control Quality Act, as amended in 2006, is included in the California Water Code. This act provides for the protection of water quality by the State Water Resources Control Board and the Regional Water Quality Control Boards, which are authorized by the U.S. Environmental Protection Agency to enforce the Federal Clean Water Act (CWA) in California.

Sections 208 and 319 of the Federal Clean Water Act address nonpoint source pollution and require water quality management plans for nonpoint sources of pollution. The Forest Service's Pacific Southwest Region (Region 5) has worked with the California water quality agencies to meet CWA requirements. The greatest emphasis in this coordination has been on the management and control of nonpoint sources of water pollution, with sediment, water temperature, and nutrient levels of most concern.

The State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) entered into agreements with the Forest Service to control nonpoint source discharges by implementing BMPs. These BMPs, which are set forth in the Forest Service Pacific Southwest Region guidance document, "Water Quality Management for National Forest System lands in California, Best Management Practices" (USDA Forest Service 2000), constitute a portion of the State's Nonpoint Source Management Plan and comply with the requirements of Sections 208 and 319 of the CWA. The agreements include BMPs related to OSV use, and to road construction and maintenance. The implementation and effectiveness of the BMPs are reviewed annually. In recent years, the Forest Service has emphasized monitoring in national forests to ensure the implemented projects follow approved control measures (USDA Forest Service 2000, 2004b).

Pacific Southwest Region Best Management Practices and National Core Best Management Practices

The State and Regional Water Quality Control Boards entered into agreements with the Forest Service to control non-point-source discharges by implementing control actions certified by the State Water Quality Control Board and the Environmental Protection Agency as best management practices (USFS R5 FSH 2509.22 - soil and water conservation handbook, 2011). These are designed to protect and maintain water quality and prevent adverse effects to beneficial uses, both on-site and downstream. Further, the Forest Service has generated National Core BMPs that include the BMPs listed below for OSV use.

Through the execution of a formal Management Agency Agreement with the Forest Service in 1981, the SWRCB designated the Forest Service as the Water Quality Management Agency for

National Forest System lands in California. The Forest Service best management practices are in conformance with the provisions and requirements of the Federal CWA and within the guidelines of the Basin Plans developed for the nine RWQCBs in California. The BMPs most relevant to the OSV Program pertain to snow removal and monitoring and are shown in appendix D.

Federal Law

The Organic Administration Act of 1897 (16 U.S.C. 475) states that one of the purposes for which the national forests were established was to provide for favorable conditions of water flow.

The Federal Water Pollution Control Act (Clean Water Act, CWA) as amended, intends to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Required are: (1) compliance with state and other Federal pollution control rules to the same extent as non-governmental entities, (2) in-stream water quality criteria needed to support designated uses, (3) control of nonpoint source water pollution by using conservation or "best management practices," (4) permits to control discharge of pollutants into waters of the United States. Compliance with the Clean Water Act by national forests in California is achieved under state law.

The National Forest Management Act of 1976 (NFMA) prevents watershed conditions from being irreversibly damaged and protects streams and wetlands from detrimental impacts. Land productivity must be preserved. Fish habitat must support a minimum number of reproductive individuals and be well distributed to allow interaction between populations.

The Safe Drinking Water Act Amendment of 1996 provides the states with more resources and authority to enact the Safe Drinking Water Act of 1977. This amendment directs the states to identify source areas for public water supplies that serve at least 25 people or 15 connections at least 60 days a year.

Executive Order 11988 directs Federal agencies to provide leadership and take action on Federal lands to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid the direct or indirect support of development on floodplains whenever there are practicable alternatives and evaluate the potential effects of any proposed action on floodplains.

Executive Order 11990, as amended, requires Federal agencies exercising statutory authority and leadership over Federal lands to avoid to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. Where practicable, direct or indirect support of new construction in wetlands must be avoided. Federal agencies are required to preserve and enhance the natural and beneficial values of wetlands. Other laws pertinent to watershed management on National Forest System lands can be found in Forest Service Manual 2501.1.

Issues Addressed in This Analysis

Scope of Analysis

The hydrologic analysis includes all water resources that could be affected by the public's use of OSVs on trails and areas designated for OSV use and on groomed trails. This includes perennial and seasonal streams, lakes, ponds, vernal pools, meadows, wetlands, and springs.

Seasonal streams include intermittent and ephemeral streams. Ephemeral streams run for a short period of time with rainfall and snowmelt, whereas intermittent streams run for most of the year, except during times when water loss exceeds water availability in the channel. Vernal pools are seasonal ponds that usually develop during snowmelt and dissipate into the summer season.

Data Sources

Data on OSV routes and uses were compiled from geographic information systems data obtained from the Lassen National Forest, or from communication with forest recreation personnel or other specialists on the forest. Available scientific literature combined with an assessment of local conditions was used to assess snowmobile effects on the project area.

Analysis Assumptions

Assumptions used for the analysis are based on published literature and the hydrologist's professional judgement based on experience with the USDA Forest Service. These sources of information framed the key indicators (table 63, page 201) used for analyzing the environmental consequences of each alternative on watershed resources. They provide background information and conclusions regarding the effects of OSVs and other factors considered in this analysis, and apply to the analysis of all alternatives.

Assumption 1: Snow Plowing and Removal

Snow removal at trailhead parking areas has been occurring for decades. Snow plowing and removal occurs on paved surfaces in snow parks and does not cause soil disturbance, alter existing drainage patterns, or affect soil permeability. This is because BMPs would be applied that ensure that snowmelt from snow storage areas does not result in erosion or impair quality of surface waters.

With implementation of BMPs, snow removal would not cause noticeable impacts from erosion. High runoff rates are uncommon from snow storage areas. The thaw rate in snow storage areas is typically slow, and snow is placed where the runoff percolates into the soil. As a result, erosion or siltation from snow storage runoff is minimal.

The snow removal operations at trailhead parking areas would not result in direct impacts on water quality. Snowmelt from snow storage areas could contain a more concentrated level of fuel deposits, oils, sand, and particulates. How this is mitigated because snow is removed to designated storage areas where the snow melt can percolate into the soil and sheet flow across parking areas is avoided. This snow disposal and storage method also allows avoidance of direct discharge into surface water. As a result, the potential for water quality impacts associated with contaminants in the snow from plow equipment use is considered minimal.

Because snow removal operations are subject to BMPs, which ensure compliance with Federal CWA requirements. Consequently, project activities including snow removal are consistent with Lassen National Forest LRMP watershed management standards and guidelines and management prescriptions.

This activity is not included in the proposed action, but is an on-going and reasonably foreseeable future action that would be considered for cumulative effects.

Assumption 2: Trail Grooming

Trail grooming does not cause substantial impacts to water quality, perennial, intermittent or ephemeral streams, wetlands, or in other bodies of water. This is because the direct project

activities of trail grooming occur over an existing road and trail network and do not alter landforms or result in significant soil disturbance that would change water flow patterns or quantities of surface water runoff. Consequently, project activities including snow removal, trail grooming, and OSV travel on groomed trails are consistent with Lassen National Forest LRMP watershed management standards and guidelines and management prescriptions.

Assumption 3: OSV Use on Trails

For this analysis, OSVs include snowmobiles, snowcats, and other tracked vehicles designed for use over snow. Most OSV trails are snow-covered un-paved roads and trails. The primary pollutant of concern in forested environments is eroded sediment from unpaved roads, fill slopes, and cut slopes. According to West (2002), roads in forested lands are the largest source of potential non-point source pollution. Fine-grained sediment from roads and trails that reaches water bodies can potentially impair water quality.

However, this use would not impair water quality because much of the OSV use under this management strategy would occur on groomed trails where design features call for adequate snow cover, negligible potential for contact with bare soil, and practically no disturbance of trail and road surfaces. OSV use on the groomed trail system given adequate snow coverage would not cause substantial impacts to water quality in perennial, intermittent, or ephemeral streams, in wetlands, or in other bodies of water.

Assumption 4: Cross-country Off-trail Riding by OSVs

Some researchers have found that snowmobiles can contribute to erosion of trails and steep slopes. The degree of potential erosion is dependent on site-specific factors such as slope, aspect, elevation, adjacent vegetation, level of use, and weather conditions. Olliff et al. (1999) found that if steep slopes are intensively used, snow may be removed and the ground surface exposed to extreme weather conditions and increased erosion by continued snowmobile traffic. Similar results could occur when snowmobiles use exposed southern exposures. OSV use in off-trail open riding areas where there is minimal snow cover or bare patches of ground could potentially result in destruction of vegetation, soil compaction, and erosion in areas of repeated and concentrated use.

However, with adequate snow depths, cross-country use of OSVs would have a negligible effect on ground disturbance that could lead to erosion and sedimentation in streams or other water bodies, and a negligible effect on vegetation, especially along streams and other water bodies.

This is because off-trail OSV use would be generally dispersed and would not result in high concentration of OSV use on bare soil. Also, travel over bare soil can damage machines, so is generally avoided by operators. With adequate minimum snow levels, this management strategy would result in no more than incidental and localized soil erosion, and therefore, would not create water quality impacts to streams or water bodies by introducing sediment in water runoff.

Cross-country OSV use has the potential to affect woody riparian species by bending and breaking of branches by recreationists running over the branches (Neumann and Merriam 1972). This is most likely to occur with lower snow depths such as the beginning of the winter season and before sufficient snow has accumulated to protect vegetation, and during spring snowmelt. Regenerating timber could also be affected by bending and breaking of leaders with inadequate snow depth. However, vegetation trampling from snowmobiles and potential impacts to riparian resources from OSV use would be considered negligible with adequate snowpack coverage.

Widespread snow compaction from cross-country OSV use can affect melt patterns, and in turn, the hydrologic regime. Studies have found delayed snowmelt in areas compacted by snowmobiles versus areas of un-compacted snow (Keddy et al. 1979, Neumann and Merriam 1972). During spring snowmelt, these effects can reduce the ability of the snow to slow runoff. It is unknown how much OSV-related snow compaction would affect runoff rate and timing, but some studies suggest up to a 2-week delay. However, because snow compaction from off-trail cross-country use is currently not extensive on a watershed scale, measureable changes in hydrology are not expected.

When OSVs are operated on adequate snow depths, the effects of cross-country OSV use are consistent with the Lassen National Forest LRMP, including RCOs, watershed management standards and guidelines, and management prescriptions.

Assumption 5: Exhaust Emissions

Exhaust emissions deposited in the snowpack in the amounts anticipated on the Lassen National Forest from grooming equipment or OSVs on trails or OSVs traveling cross-country would be considered minor and currently do not functionally impair water quality of adjacent water bodies. In addition to exhaust emissions, grooming equipment and OSVs could potentially leave behind unburned fuel, lubrication oil, and other compounds on the top layers of snow. Some of the unburned hydrocarbons could accumulate on the snow surface and could eventually wash into streams and lakes. This could cause localized degradation of water quality.

Concentrations of pollutants from OSVs have been observed in snowmelt runoff (Arnold and Koel 2006, McDaniel and Zielinska 2014). Discharge from two-stroke snowmobile engines can lead to indirect pollutant deposition into the top layer of snow and subsequently into the associated surface and ground water (Adams 1975). Hagemann and Van Mouweik (1999) found that there is a potential risk to aquatic life from snowmobile emissions, but that the risk could not be quantified because of a current lack of water quality data. Adams (1975) showed that high concentrations of lead and hydrocarbons were found in pond water adjacent to snowmobile trails during the weeks following ice melt. The study also found that juvenile brook trout had increased hydrocarbon intake and reduced stamina, from surface water and food chain feeding.

Studies conducted in the Rocky Mountain region provide some indication of the potential effects of pollution deposition from OSV use. The U.S. Geological Survey monitored the snowpack throughout the northern Rocky Mountains over a period of several years to measure regional water quality trends as well as the effect of OSV use. The monitoring showed a relationship between OSV use and pollutant deposition in the snowpack, but not more than negligible to minor quantities of OSV-related pollution in snowmelt. Detectable vehicle-related pollution in snowmelt was found to be in the range of background or near-background levels (Ingersoll 1999).

A study in Yellowstone National Park analyzed snowmelt from four test locations adjacent to roadways and parking lots heavily used by OSVs between Yellowstone's West Entrance at West Yellowstone, Montana, and the Old Faithful visitor area. No cross-country OSV use was allowed, and OSVs were concentrated on one main trail in to the park. The purpose of the study was to evaluate whether increased snowmobile use within the Park was creating increased potential for emissions to enter pristine surface waters. Specific objectives were to (1) examine snowmelt runoff for the presence of specific volatile organic compounds (VOCs), (2) determine if concentrations of any VOCs exceed safe drinking water criteria, and (3) predict the potential for impacts by VOCs on the fauna of streams near roads heavily used by snowmobiles in the

park. In spring 2003 and 2004, water samples were collected and tested. In situ water quality measurements (temperature, dissolved oxygen, pH, specific conductance, and turbidity) were collected; all were found within acceptable limits. Five VOCs were detected (benzene, ethylbenzene, m- and p-xylene, o-xylene, and toluene). The very low concentrations were found to be below EPA criteria and guidelines for the VOCs analyzed and were below levels that would adversely impact aquatic ecosystems (Arnold and Koel 2006).

The number of snowmobiles entering Yellowstone in 2003 and 2004 was 47,799 and 22,423, respectively (Arnold and Koel 2006). The estimated seasonal day use of OSV Program trails across the Lassen National Forest is around 10,000 OSVs. These visitations are spread across multiple trailheads and trail systems and do not all occur in the same location. As a result, OSV seasonal use levels at any Lassen National Forest trailhead or trail system are considerably less than OSV use that occurred at Yellowstone National Park, and are considered very low.

Since Yellowstone OSV use levels studied had not resulted in impaired water quality, due to much lower use numbers it follows that the OSV use in the project area from this management strategy would not adversely affect water quality of snowmelt. Therefore, due to very low concentrations of pollutants from OSV use, operation of OSVs on system trails and cross-country would be consistent with water quality objectives in the Lassen National Forest LRMP, including RCOs, watershed management standards and guidelines, and management prescriptions.

Assumption 6: Monitoring would occur as Prescribed

Although there would be no indicated adverse damage caused by OSV use to water resources, further monitoring and, if needed, implementing other protective measures would further ensure that aquatic resources are adequately protected. Possible protective measures include restricting access to aquatic communities where substantial impacts are observed through educational materials and signage, or if necessary, through the use of barriers or trail re-routes.

The annual OSV monitoring would include monitoring of streams and riparian systems, wetland, and other sensitive aquatic habitats occurring near the groomed trail system. The Forest Service water quality BMP 4-7 (USDA Forest Service 2000) would be followed for monitoring guidelines.

Assumption 7: Other Hydrologic Impacts

The management strategy would not involve the construction of any structures which could impede or redirect flood flows, nor any ground surface modifications which could change drainage patterns, impervious surfaces, soil permeability, or other hydrological characteristics such as surface water volumes. The management strategy would not expose people or property to a risk of flooding nor increase the risk of flooding for existing development in floodplains in the project area. The management strategy would not place housing or other structures within a flood hazard area. The management strategy would not involve a change in water use, affect a private or public water supply, or affect the quantity or quality of groundwater recharge, aquifer volume or cause a lowering of the local groundwater table level. The management strategy would not involve an increase in impervious surfaces. The management strategy would not involve discharges of storm water or wastewater.

Assumption 8: Equivalent Roaded Area Model not Appropriate

The equivalent roaded acre (ERA) model (FSH 1990a: chapter 20) was not used for this analysis to show cumulative watershed effects. As long as adequate snow depths are maintained, because

there are virtually no direct or indirect effects, using the ERA model would not show any detectable differences between alternatives for this management strategy and is not appropriate for this scale of analysis, which covers nearly a million acres.

The ERA model is beneficial at demonstrating changes in ERA for management strategies that intend to disturb hundreds to thousands of acres for fuels reduction, travel management, or timber harvest plans; or to show cumulative effects of wildfires. This management strategy would not create a new disturbance on the landscape for any alternative. Changing the overall acreage of areas open for OSVs would not lead to increases or decreases in ground disturbance as long as OSVs are managed appropriately. Finally, the ERA method would not show any detectable differences within the sixth field watersheds in this analysis.

Assumption 9: Global Climate Change

Global climate change is expected to substantially affect California over the next 50 years (<http://www.water.ca.gov/climatechange/docs/062807factsheet.pdf>). Precipitation is likely to become more variable from year to year. Warmer temperatures would reduce the proportion of precipitation that falls as snow and increase the proportion that falls as rain. This shift would result in higher peak flows, more frequent flooding, increased erosion, reduced summer base flows, more frequent droughts, and increased summertime stream temperatures.

These expected changes have several implications for OHV use effects on water resources on national forests:

- As floods become more frequent and of greater magnitude, roads and trails would likely be subjected to greater stresses from higher runoff. Erosion of route surfaces and route/stream crossings would become more common. Ephemeral channels would carry water more frequently than in the past.
- The role of roads and trails in increasing runoff and peak flows (Ziemer 1981, Jones and Grant 1996) would likely increase. Cumulative watershed effects in watersheds near their thresholds of concern may become more common.
- Protection and restoration of meadows and other riparian areas that extend the duration of base flows would be increasingly important as snowpack diminishes. Routes through riparian areas that are currently not causing resource damage could cause damage in the future as runoff becomes more extreme.
- Seasons of use for OSV routes may need to be modified as precipitation and temperature patterns change.

Assumption 10: Non-motorized Uses

For the purposes of this analysis, non-motorized uses have very little to no effect on hydrology and will not be considered further in this analysis.

Effects Analysis Methodology

This section describes the methodology used for the effects analysis for water resources. This section establishes indicators (table 63) chosen to measure potential effects, the analysis area, timeframe, methods used, and assumptions made for the effects analysis of all action alternatives on water resources.

As defined in the regulations for implementing NEPA, Code of Federal Regulations, Chapter 40, Sections 1500-1508, direct effects would be those effects caused by the proposed action (or action alternative) and which occur at the same time and place as the action. Indirect effects would be those caused by the action that are later in time or farther removed in distance from the location of the action.

We will analyze the direct and indirect effects and cumulative watershed effects for each of the action alternatives. Direct and indirect effects of each project alternative will be analyzed together. At the end of these analyses there is a summarized comparison of alternatives.

We used key indicators (table 63) to summarize the direct and indirect effects of alternatives and compare them to the no-action alternative. A summary compares each alternative by the indicators, LRMP consistency, and consistency with the Federal Clean Water Act and the Porter-Cologne Water Quality Control Act.

Table 63 Indicators used for the hydrologic analyses

Resource Indicator	Usefulness of Indicator Measure	Geographic Scales for Each Indicator Measure
Designated use area for OSV use	Impacts are widely dispersed and differences in alternatives are minor	Lassen National Forest
Minimum Snow Depth for OSV Use on Designated Trails (Inches)	Minimum snow depths on trails can be evaluated for effectiveness for protecting the trail surface	
Minimum Snow Depth for Cross-country OSV Use (Inches)	Minimum snow depths for cross-country travel can be evaluated for effectiveness for protecting the ground surface and vegetation	
Number of OSVs per year using trails across forest	Total amount of use can be compared to use amounts in Yellowstone and other studies to gauge potential water quality effects	
Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Evaluation of the effects to RCAs, water quality and beneficial uses of water	

Note: The Sierra Nevada Forest Plan Amendment requires that RCO analyses be conducted during environmental analyses for new proposed management activities within CARs and RCAs (Standard and Guideline 92). There would be no additional routes proposed for addition to the national forest transportation system within CARs in the analysis area. Consequently, consistency with the RCOs is an indicator to ensure that goals of Aquatic Management Strategy would be met (USDA FS PSW Region 2004: 32). The RCO Analysis is in appendix F.

Methodology and Information Sources

We used GIS data, a variety of reports and assessments of OSV impacts, and professional experience and judgement using scientific literature on OSV impacts for this analysis.

Incomplete and Unavailable Information

We performed no field observations or site-specific water quality or ground-disturbance monitoring for this analysis. And, we conducted very little monitoring of OSV impacts on hydrology at specific sites on the Lassen National Forest. Lassen National Forest recreation staff monitor OSV and other winter recreation use on the forest, but no water quality sampling or hydrology assessments were made supporting this assessment of OSV impacts. We based assessments of OSV water quality impacts primarily on scientific literature.

Spatial and Temporal Context for Effects Analysis

The spatial and temporal bounds for discussing and analyzing direct, indirect, and cumulative effects on water resources and associated riparian areas and wetlands would be the watersheds within the Lassen National Forest.

Short-term effects would be generally up to 1 year in duration, and long-term effects would be more than 1 year in duration.

Affected Environment

The OSV project area on the Lassen National Forest would be located in the southern Cascades with the majority occurring on the east side of the crest. There are many streams, lakes, and reservoirs within the project area. Many water bodies are directly accessed or crossed by the OSV trails and many more can be accessed by OSVs going cross-country in areas designated for OSV use.

Table 64 summarizes the affected environment for water resources, which includes watershed areas on National Forest System lands. The Lassen National Forest is subdivided into 124 6th-level watersheds. The watershed average size is about 35,000 acres. The existing condition of watersheds (watershed health) on the forest varies depending upon amount of disturbance found within each watershed and the degree of natural integrity of the system. Disturbance in the form of land management activities, such as timber management, road construction, livestock grazing, mining, recreation, and special-uses have the potential to adversely affect a watershed's condition. Management activity effects are influenced in part by the local terrain, the precipitation regime, and other factors.

Table 64. Hydrologic characteristics of the OSV analysis area within the Lassen National Forest

	Hydrologic Characteristics
Landscape	Sierra Nevada Mountains (northern end of range) and Cascade Mountains (southern end of range) Elevation ranges between 2,000 feet (foothills near Tehama State Wildlife Refuge) and 7,800 feet (unnamed butte north of Caribou wilderness).
Climate^a	Highly variable across the Lassen NF due to elevation and rain shadow effect of Lassen Peak and Sierra Nevada Mountain Range. Mediterranean climate, whereby most precipitation occurs between November and April. Winter precipitation below 3,500 feet is primarily rain and above 3,500 feet is primarily snow. Mean annual precipitation ranges between: 24–26 inches at the Sacramento Valley foothills, 80–90 inches at the crest of the Sierra Nevada and Cascade Mountains, and 16–32 inches at Eagle Lake.
Aquatic features	514 miles of perennial streams. 1,442 miles of intermittent streams. 1,057 lakes with total acreage of 6,207 acres, ranging between <0.01 acres to 1,407 acres (McCoy Flat Reservoir). 1,086 meadows with total acreage of 321,752 acres, ranging between <0.01 acres to 1,380 acres.
Beneficial Uses^b	Varies by watershed: municipal water supplies for domestic use, fire protection, hydropower generation, irrigation, contact and non-contact recreation, cold freshwater habitat, spawning habitat, stock watering, and wildlife habitat.
Domestic use	Marten Creek, which supplies water to the community of Mineral.

Hydrologic Characteristics	
Clean Water Act 303(d) Water Bodies^c	Eagle Lake for nitrogen and phosphorous from multiple sources, Susan River for mercury and unknown toxicity (source unknown), NF Feather River below Lake Almanor for mercury (unknown source) and temperature (flow regulation and hydromodification), and Pit River for nutrients (agriculture and agriculture grazing).
Watersheds^d	124 sixth-field watersheds on the Lassen National Forest within the affected environment. Average size of entire watersheds (includes all ownerships): 34,526 acres Average watershed acreage within affected environment: 8,649 acres

^aSource: Young 1998.; ^bSource: Cal EPA LRWQCB 2005, Cal EPA CVWQCB 2007; ^cSource: Cal EPA SWRCB 2006; ^dDoes not include Butte, Sacramento River/Antelope Creek, Sacramento River/Thomes Creek, or Sacramento-Deer Creek Watersheds. Watershed size of these watersheds ranges between 153,000 and 519,000 acres and meaningful comparisons could not be made.

Surface Water

Approximately 514 miles of perennial stream channels and 1,442 miles of intermittent streams flow through the Lassen National Forest. The forest also has 1,057 lakes totaling over 6,207 acres, and 321,752 meadow acres, ranging in size from less than an acre to over 1,000 acres. The hydrology of the project area is dynamic and evolving. There can be large annual variations in water availability and quality, seasonal flow rates, and water temperatures (table 64).

Table 65. Major water bodies accessible by OSVs in the project area

National Forest OSV Trail System	Major Water body
Cascade Mountain Range – East Side	
Lassen/Ashpan	North Battle Creek Reservoir
Lassen/Bogard	Crater Lake
Lassen/Fredonyer	McCoy Flat Reservoir and Hog Flat Reservoir. Both devoid of water in 2007, 2008, and 2009
Lassen/Swain Mountain	Silver Lake, Caribou Lake, Echo Lake, Lake Almanor
Cascade Mountain Range – West Side	
Lassen/Morgan Summit	No lakes occur near trail system
Lassen/Jonesville	Lake Almanor

Precipitation and snow accumulation also can change over time as a result of climate change. Modern human activities have altered the natural dynamics of water through the construction of dams and diversions, watershed practices that alter water yields, temperature, sedimentation, and the introduction of pollutants and exotic biota. Surface waters on the forest originate as runoff from snowmelt and rainfall. Snowfall is generally the greatest contributor to total runoff, while intense rainfall events can cause the largest floods. The major runoff season on the forest is from April through June. Snowmelt runoff peaks usually occur from late May into June.

Major water bodies within the Lassen National Forest include Eagle Lake, Susan River, Hat Creek, Lake Almanor (reservoir), and headwaters of the North Fork of the Feather River. Water flowing from the forest in creeks and streams is vital for its fisheries and downstream uses. Other notable streams include Battle Creek, Antelope Creek, Deer Creek, Mill Creek, and Butte Creek. These streams support anadromous fish and flow unimpaired all the way to the Sacramento River downstream of Shasta reservoir.

Surface water quality

Located in high elevations of the Cascades, the project activities occur on snowpack forming the headwaters of many watersheds. These elevations generally produce surface water of excellent quality. Contaminant levels in most waters meet State standards and the fishable and swimmable objectives of the Federal CWA. Most pollutants come from nonpoint sources, such as erosion from roads and parking areas. Sediment at levels above natural rates of erosion is the most common nonpoint source pollutant in forested ecosystems (USFS 2001).

Quality of surface water is affected by the integrity of the fluvial system. Some concerns exist for watersheds where watershed impacts have affected water quality and stream channel potential, including riparian conditions and streambank stability. These effects would be in limited locations, and changes in management could improve existing conditions.

Section 305(b) of the CWA requires states to prepare and submit every two years a water quality summary report to the U.S. Environmental Protection Agency (EPA). In addition, CWA Section 303(d) requires states to submit to the EPA lists of water bodies that meet 303(d) listing criteria. This list identifies water quality-limited water bodies. Water quality impacts can be from point and/or nonpoint sources of pollution, and may require additional controls to meet state water quality standards. These water quality-limited water bodies are prioritized based on the severity of the pollution and other factors. Currently impaired waters include Eagle Lake for nitrogen and phosphorous, Susan River for mercury and other toxics, North Fork Feather River downstream of Lake Almanor for mercury and temperature, and Pit River for nutrients (table 64).

Surface water uses

Surface water from the forest is used both consumptively and non-consumptively. Uses in both categories depend on high quality water. Non-consumptive water uses include recreation, wildlife, fisheries, and the aesthetic quality of this resource. Value on the forest is high for these uses. Much of the recreation use on the forest revolves around water bodies, including sightseeing, camping, fishing, and boating. Most campgrounds on the forest are located near lakes and streams.

Consumptive water uses include hydropower generation, fish hatcheries, downstream agriculture, road construction, fire protection, dust abatement, and special use permits. The Lassen National Forest contains no municipal watersheds that are managed under any type of agreement.

Surface water protection measures

Public water supplies are protected by the Safe Drinking Water Act (SDWA), which was amended in 1996. The SDWA does not require source areas to deliver water of potable quality with no need for treatment. In fact, waters in pristine areas usually need treatment due to natural waterborne parasites, such as giardia.

BMPs have been adopted to protect water quality in compliance with the CWA. BMPs cover a wide variety of land management actions on National Forest System lands, including watershed management, timber, transportation and facilities, pesticide-use, recreation, minerals, fish and wildlife habitat, fire suppression, and fuels management. When BMPs are properly applied, pollutant delivery to streams and lakes is minimal and recovery of waters and aquatic sites should be rapid. The physical, chemical, and biological integrity of waters in all watersheds should be as good as in watersheds that are managed exclusively for domestic and municipal supplies.

Groundwater

Rainfall and snowmelt, as well as producing surface runoff, also recharge groundwater sources on the forest. Groundwater aquifers release water during periods of low precipitation to maintain base flows of streams. Groundwater seeps and springs are in some cases vitally important in providing habitat for over-wintering salmon eggs and fry.

Groundwater is of beneficial use both on and off-forest, in the form of water supply wells. Communities use groundwater for part or all of their municipal water supply, while other residents use individual domestic wells. Consumptive use of groundwater on the forest is low. Such use is limited to special-use permittees and Forest Service campgrounds and administrative sites with domestic wells.

The existing condition of groundwater on the forest is good, although not all wells provide high quality drinking water. Past management activities on the forest do not appear to have adversely affected groundwater quality. No groundwater contamination from recreation uses (toilets) has been recorded, with all road-accessible toilets being of the pump-vault type. Some potential for such ground water contamination exists at heavily used recreation sites with limited facilities.

Riparian Areas and Wetlands

In this analysis, riparian ecosystems, aquatic ecosystems, wetlands, lakeside zones, and floodplains will be jointly referred to as riparian areas. The terms riparian zones and riparian areas are used interchangeably, but by strict ecological definition, may not be the same in all instances.

Riparian areas are the transition zone between uplands and water in lakes and rivers. Riparian ecosystems are characterized by the presence of trees, shrubs, or herbaceous vegetation that require free or unbound water, or conditions that are wetter than those of surrounding areas. Riparian areas occur in stream corridors, along lakeshores, and around springs, wetlands, and wet meadows. Vegetation in riparian areas can include characteristic woody riparian hardwood types such as aspen, alder, or willow, or it can include larger and more vigorous trees of the same species as found on adjacent uplands.

The forest contains a variety of wetlands. Wetlands are defined in the 1987 Corps of Engineers Wetlands Delineation Manual (U.S. Army Corps of Engineers 1989) as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, fens, bogs, and similar areas."

Riparian ecosystems are generally inclusive of wetlands. Healthy riparian areas, with an abundance of trees and other vegetation, slow flood waters and reduce the likelihood of downstream flooding. Riparian areas improve water quality by filtering runoff and sediment from flood flows and adjacent upland slopes. Healthy riparian areas act like a sponge, absorbing water readily during periods of excess. Water slowed by riparian areas enters the groundwater. Some of it is released later, increasing late summer and fall stream flow.

Fish depend upon healthy riparian areas to provide stable channels, sustained water supply, clean and cool water, food, and streambank cover. Riparian areas produce an abundance of stream cover and shade, which in turn limit the amount of water temperature fluctuation in the stream. This limiting in water temperature is generally advantageous to cold-water fish species.

Many animals visit and live in riparian areas. Benefits provided by riparian areas include food, cover, and nesting habitat for birds. They come for water, food, cover, and temperature moderation. Riparian areas often provide sheltered upstream and downstream transportation corridors for wildlife to other habitats.

Riparian areas are attractive and inviting to forest visitors. People often seek water and riparian environments for recreation activities. Management of riparian areas is considered in the context of the environment in which they are located, while recognizing their special values. Riparian-dependent resources include fisheries, stream channel stability, water quality, and wildlife.

Effects Common to all Alternatives

Current and proposed winter recreation activities include non-motorized activities such as backcountry skiing and snow-shoeing, and motorized activities such as private snowcats and snowmobiling. Non-motorized effects would not have a measurable impact on hydrology. Only the effects of motorized OSV activities are considered in the Environmental Consequences section of this FEIS.

For all alternatives including the no-action alternative, OSV use would be allowed in the project area. A comparison of alternatives based on trails and areas open to OSV use, and minimum snow depth for OSV use on trails and cross-country is shown in table 66. Effects common to all alternatives from OSV use are outlined in the assumptions in the previous section and include effects to water quality from OSV exhaust and lubricants, and snow compaction, and trampling of vegetation from OSV tracks.

Table 66 Alternative comparisons

OSV Management	Alternative 1 – Current Management	Alternative 2	Alternative 3	Alternative 4
Minimum Snow Depth for Public OSV Use on Snow Trails (Inches)	12	6 on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails	12 inches, generally. 6 inches only where site review determines there would be no damage to underlying resources	No restriction with 6 or more inches
Minimum Snow Depth for Public, Cross-country OSV Use (Inches)	12	12	12	12
Minimum Snow Depth for Snow Trail Grooming to Occur (Inches)	18	12*	18	12

*The originally scoped proposed action has been modified to be consistent with the state grooming standard which states, "Begin grooming when the snow depth is at least 12 to 18 inches" (OSV Program Draft EIR, Program Years 2010-2020 – October 2010, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, page 2-12).

Alternative 1 – No Action

Measurements of indicators for the range of alternatives for the no-action alternative are shown in table 67. Indicators focus on use levels and required snow depths needed for OSV use under the alternatives. Effects of the alternatives depend in part on the amount of use by OSVs, and also on the effectiveness of required snow depths as a mitigation for anticipated effects of OSV use.

Table 67. Resource indicators and measures for alternative 1, no action

Resource Indicator	Usefulness of Indicator	Alternative 1 Measure
Land area open for OSV use	Impacts are widely dispersed and differences in alternatives are minor	964,020 acres
Minimum Snow Depth for OSV Use on Designated Trails	Minimum snow depths on trails can be evaluated for effectiveness in protecting the trail surface	12 inches
Minimum Snow Depth for Cross-country OSV Use	Minimum snow depths for cross-country travel can be evaluated for effectiveness in protecting the ground surface and vegetation	12 inches
Number of OSVs per year using trails across forest	Total amount of use can be compared to use amounts in Yellowstone and other studies to gauge potential water quality effects	10,000
Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Evaluation of the effects to RCAs, water quality and beneficial uses of water	Complies with RCOs 1,2,4,5,6

Direct and Indirect Effects

Current OSV use would continue on 964,020 acres under the no-action alternative. Minimum snow depths would be 12 inches for both groomed trails and for cross-country OSV use.

Incidental direct effects including ground disturbance in low-snow areas could potentially occur under current use. Snowmobiles and other OSVs have low ground pressure. However, in some instances snowmobile tracks have the capacity to break through thinner snowpack and churn soil, litter or trail surfaces in to the snow, and create isolated ruts in the soil or trail surface. Churned soil may get incorporated in runoff when snow melts.

However, much of the OSV use under this alternative currently occurs on groomed trails where the management strategy calls for 18 inches of snow cover before grooming can occur and low potential for contact with bare soil and practically no disturbance of trail and road surfaces.

For OSV use on the OSV trail system, the ungroomed 12-inch minimum snow depth standard snow coverage has been observed to be adequate to mitigate and eliminate substantial water quality impacts such as stream sedimentation in perennial, intermittent, or ephemeral streams, in wetlands, or in other bodies of water. For proposed minimum snow levels, current uses have not resulted in more than incidental and isolated direct effects such as soil erosion of groomed trail surfaces, and therefore, have not created indirect water quality impacts to streams or water bodies by increasing sediment in water runoff.

Cross-country OSV use in open riding areas where there would be minimal snow cover or bare patches of ground could potentially result in direct effects including destruction of vegetation, soil compaction, and erosion in areas of repeated and concentrated use. However, with adequate snow depths, cross-country use of OSVs would have a negligible effect on ground disturbance leading to erosion and sedimentation in streams or other water bodies, and a negligible effect on vegetation, especially along streams and other water bodies.

There has been and would continue to be incidental and isolated ground contact in areas where OSVs operating cross-country would contact the ground surface due to variations in snow depths

such as on high wind-exposed ridges, and southern-facing slopes. Off-trail OSV use currently is generally dispersed and does not result in high concentration of ground disturbance from OSV use on bare soil. With adequate minimum snow levels, current conditions would result in no more than incidental surface disturbance and soil erosion and therefore would not create water quality impacts to streams or water bodies by introducing sediment in water runoff.

Cross-country OSV use has the potential to directly affect woody riparian species by trampling, including bending and breaking of branches by OSVs running over the branches. This has the potential to directly affect shade along streams by reducing vegetation cover. However, direct effects to vegetation probably do occur under current conditions, but at this time the effects are limited by requiring adequate snow cover before allowing OSV use.

As a result, vegetation trampling from OSVs and potential impacts to riparian resources from OSV use would be considered negligible with adequate snowpack coverage, and no direct or indirect changes to vegetation would be expected from the no-action alternative. Riparian woody shrub species along stream courses would continue to be protected by the 12-inch snow cover requirement by limiting the direct physical trampling effect from OSVs on vegetation.

The direct effect of widespread snow compaction from cross-country OSV use can create more dense snow that leads to an indirect effect of slower melt rate, and could in turn indirectly affect the hydrologic regime by delaying snowmelt rates. It is unknown how much OSV-related snow compaction would affect runoff rate and timing, but some studies suggest up to a 2-week delay. However, because snow compaction from off-trail cross-country use is currently not extensive, measureable changes in hydrology on a watershed scale are not expected.

Direct and indirect effects from overall numbers of OSVs can be used to gage water quality effects. About 10,000 OSVs per year are currently using forest trails and would have access to cross-country use areas. OSV users would be spread over several trailheads, so actual user numbers would be lower for a particular area. Studies on OSV impacts on water quality indicate that even at much higher use levels, there would be no adverse effects on water quality from OSV emissions. The number of snowmobiles that entered Yellowstone in 2003 and 2004 was 47,799 and 22,423, respectively. At Yellowstone, OSVs were confined to a few trails. Since the much higher Yellowstone OSV use levels studied have not resulted in impaired water quality, it follows that the OSV use in the project area for this alternative would not adversely affect water quality of snowmelt.

Unauthorized activities such as “water skipping” or trying to snowmobile across open water have been observed in some areas. These efforts are not always successful, resulting in snowmobiles abandoned in lakes or other open water. This has the potential to increase effects to water quality from lubricants leaking into surface water, which can also affect aquatic biota. Similarly, during spring break-up, snowmobiles could cross open streams and other water bodies where snow cover is not present, which could result in the deposition of pollutants directly in stream courses and water bodies.

However, the authorized operation of OSVs occurs over a protective layer of snow, and direct and indirect effects to hydrology are isolated and incidental. Furthermore, for existing minimum operating snow depths, this alternative would not result in more than incidental soil erosion and therefore would not create water quality impacts to streams or water bodies by introducing sediment in to water runoff. Therefore, with adequate snow depths, OSV use on trails would be consistent with the Lassen National Forest LRMP, including RCOs, watershed management standards and guidelines, and management prescriptions.

Water quality effects from OSV exhaust stored in snowpack would be negligible and not exceed water quality standards. As a result, current operation of OSVs on system trails and cross-country would be consistent with water quality objectives in the Lassen National Forest LRMP, including RCOs 1, 2, 4, 5, and 6, watershed management standards and guidelines, and management prescriptions.

The RCOs apply to all routes that pass through RCAs and meadows. Under alternative 1, groomed and ungroomed OSV trails and cross-country travel would be allowed within RCAs, but because of the layer of snowpack protecting the ground surface, there is currently a very low resource damage potential. Although no restrictions on OSVs in riparian areas, frozen lakes, or meadows are currently in place, no adverse impacts to these areas have been observed or monitored.

Consistency with Riparian Conservation Objectives

RCO 1 and 6: Under alternative 1, beneficial uses of water bodies would be protected and enhanced. There would be no changes in water storage, seasonal availability, or quality.

RCO 2, 4 and 5: Under alternative 1, the geomorphic and biological characteristics of meadows, streams and RCAs would be protected. Because there would be no sedimentation, there would likely be no changes to aquatic primary productivity. Growing season water availability would remain unchanged and would not affect ecosystem integrity.

Cumulative Effects- Alternative 1

Past, present, and reasonably foreseeable future projects in the project area include vegetation management, livestock grazing, prescribed burns, and recreation. There are many past, on-going, and reasonably foreseeable future projects identified in the Lassen National Forest that may be ground-disturbing and could potentially add sediment or other pollutants to surface waters within the forest. The Forest Service utilizes BMPs in compliance with the CWA to minimize water quality impacts. The Forest Service monitors roads and trails used by OSVs and implements BMPs to control erosion and other effects.

The risks of cumulative effects from this alternative are very low, because, as a result of the 12-inch minimum snow depth, there would continue to be only incidental ground disturbance, low risk of damage to vegetation or other direct and indirect effects. **As a result, there would be no change to cumulative watershed effects or equivalent roaded acres calculations for any watersheds under this alternative.**

There would be negligible effects from exhaust emissions stored in snowpack. This alternative would not implement the recommended project design criteria and mitigation measures, and would open the highest amount of land area to OSVs. However, this alternative would provide adequate snow cover to protect soils and water resources, and to protect vegetation in riparian areas. This alternative would be consistent with Lassen National Forest LRMP standards and guidelines, and would not result in irreversible or irretrievable effects to soil, water, or riparian resources.

Alternative 2 – Proposed Action

The proposed action would be similar to the current use in terms of effects to hydrology. It would restrict OSV use to 921,130 acres of Lassen National Forest, and would require at least 6 inches of snow on OSV trails that overlay existing roads and trails. It would require a minimum of 12 inches of snow cover for cross-country OSV use and on designated trails not underlain by

existing roads and trails. The minimum snow depth before snow trail grooming for OSV use could occur would be 12 inches (table 68).

Table 68. Resource indicators, alternative 2

Resource Indicator	Usefulness of Indicator	Alternative 2 Measure
Designated use area for OSV use	Impacts are widely dispersed and differences in alternatives are minor	921,130 acres
Minimum Snow Depth for OSV Use on Designated Trails underlain by roads or trails	Minimum snow depths on trails can be evaluated for effectiveness in protecting the trail surface	6 inches
Minimum Snow Depth for Cross-country OSV Use	Minimum snow depths for cross-country travel can be evaluated for effectiveness in protecting the ground surface and vegetation	12 inches
Number of OSVs per year using trails across forest	Total amount of use can be compared to use amounts in Yellowstone and other studies to gauge potential water quality effects	10,000
Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Evaluation of the effects to RCAs, water quality and beneficial uses of water	Complies with RCOs 1,2,4,5,6

Direct and Indirect Effects

The effects of alternative 2 would be similar to alternative 1, except for slightly lower number of acres open to OSVs, and the snow depth requirement for use of OSV trails underlain by roads or trails. Under this alternative, about 40,000 acres less National Forest System land (table 67) would be open to OSV use. Because direct and indirect effects of this alternative would be negligible, having less acreage open to OSVs would lead to no increase in direct or indirect effects on hydrology.

As in alternative 1, incidental direct effects including ground disturbance in low-snow areas may occur under this alternative. One substantial difference in this alternative would be the minimum 6 inches of snow depth required for the use of designated trails (table 68) underlain by roads and trails. Because minimum snow levels under alternative 2 would be lower than the current conditions on designated trails, there would be a slightly higher risk of ground disturbance and subsequent water quality impacts.

On designated trails with only 6 inches of snow cover, snowmobile tracks have a higher capacity to break through a thinner snowpack and churn soil, litter, or trail surfaces in to the snow, and create isolated ruts in the trail surface. Modern OSVs with deep lugs on their treads can easily displace 4 inches of snow each pass, depending on snow moisture amounts. Ruts could channel runoff from road or trail surfaces, potentially leading to stream sedimentation. Churned soil may get incorporated in runoff when snow melts.

Currently, there are no studies or monitoring information that can provide information on direct or indirect effects of the 6-inch snow depth on trails proposed for this alternative. However, snowmobile user web forums usually suggest about 6 inches as a minimum snow amount needed before snowmobile use (Snowmobile Forum 2008). Snowmobilers hesitate to operate machines on soil because it would damage their machines.

The 6-inch depth may or may not be an adequate depth for hydrology resource protection because direct effects of operation of OSVs on 6 inches of snow on trails may lead to possible trail surface displacement and rutting, leading to a slight chance of sediment erosion from the trail surface. Further, this 6-inch depth may be sufficient for operation of a snowmobile, but other OSVs may need more depth to avoid ground disturbance.

For this alternative, as a result of a minimum 6-inch snow depth on trails there likely would be a much higher risk of causing direct trail impacts such as displacement of the trail surface compared to having a 12-inch minimum snow depth for trail uses. A 6-inch snow depth can become much thinner and may not offer effective protection for the ground surface after several passes by OSVs.

Overall, however, OSV use in alternative 2 would occur over a protective layer of snow, and direct and indirect effects to hydrology would likely be isolated and incidental. As a result, for proposed minimum snow levels, this alternative would not result in more than incidental soil erosion and therefore would not create water quality impacts to streams or water bodies by introducing sediment in to water runoff.

With adequate snow depths, OSV use on trails would be consistent with the Lassen National Forest LRMP, including RCOs, watershed management standards and guidelines, and management prescriptions. Although adverse effects would not be expected, **periodic monitoring would be required consistent with BMP 4-7** as a mitigation in areas with a 6-inch minimum snow depth to ensure there would not be impacts to the trail surface that could lead to stream sedimentation. Further, **it is recommended that the 6-inch OSV use depth only be applied to well-surfaced trails** such as graveled or paved roads.

As in alternative 1, much of the OSV use under this alternative would occur on groomed trails where the management strategy calls for 12 inches of snow cover before grooming can occur. This would result in negligible potential for contact with bare soil and practically no disturbance of trail and road surfaces. For OSV use on the groomed OSV trail system the 12 inch requirement would be adequate to protect trail surfaces. The 6-inch minimum snow depth standard snow coverage for OSV trails overlaying established roads and trails would likely be adequate to mitigate and eliminate substantial indirect water quality impacts such as stream sedimentation in perennial, intermittent, or ephemeral streams, in wetlands, or in other bodies of water.

As in alternative 1, for the proposed 12-inch minimum snow levels for cross-country use, OSVs used for cross-country travel would not result in more than incidental and isolated direct effects such as soil erosion of groomed trail surfaces, and therefore would not create indirect water quality impacts to streams or water bodies by increasing sediment in water runoff. There would continue to be incidental and isolated ground contact in areas where OSVs operating cross-country could potentially contact the ground surface due to variations in snow depths, such as on high wind-exposed ridges and southern-facing slopes. However, off-trail OSV use would be generally dispersed and would not result in a high concentration of ground disturbance from OSV use on bare soil. With adequate minimum snow levels, current conditions would result in no more than incidental surface disturbance and soil erosion and therefore would not create water quality impacts to streams or water bodies by introducing sediment in water runoff.

Similar to alternative 1, cross-country OSV use would have the potential to directly affect woody riparian species by trampling, including bending and breaking of branches by OSVs running over vegetation. This would have the potential to directly affect shade along streams by reducing

vegetation cover. Direct effects to vegetation probably would occur under alternative 2, but the effects would be limited by requiring adequate snow cover before allowing OSV use.

As a result, vegetation trampling from OSVs and potential impacts to riparian resources from OSV use would be considered negligible with adequate snowpack coverage, and no direct or indirect changes to vegetation would be expected from the no-action alternative. Riparian woody shrub species along stream courses would continue to be protected by the 12-inch snow cover requirement by limiting the direct physical trampling effect from OSVs on vegetation.

The direct effect of widespread snow compaction from cross-country OSV use under alternative 2 would create denser snow that could lead to an indirect effect of slower snow melt rates, and could, in turn, indirectly affect the hydrologic regime by delaying snowmelt rates in localized areas. It is unknown how much OSV-related snow compaction would affect runoff rates and timing, and some studies suggest up to a two week delay in melting for heavily compacted snow such as on groomed OSV trails.

It is not expected that cross-country OSV use would heavily compact snow over large areas. Because the areal extent of snow compaction from cross-country OSV use combined with compacted snow on groomed trails would not be extensive on a watershed scale, measureable changes in hydrologic relationships would not be expected.

As described in the assumptions for this alternative, water quality effects from OSV exhaust hydrocarbon emissions stored in snowpack under alternative 2 would be negligible and not exceed water quality standards.

Under alternative 2, operation of OSVs on system trails and cross-country would be consistent with water quality objectives in the Lassen National Forest LRMP, including RCOs 1, 2, 4, 5, and 6, watershed management standards and guidelines, and management prescriptions.

The RCOs apply to all routes that pass through RCAs and meadows. Under alternative 2, groomed and ungroomed OSV trails and cross-country travel would be allowed within RCAs, but because of the layer of snowpack protecting the ground surface, there is currently a negligible resource damage potential. Although no restrictions on OSVs in riparian areas, lakes, or meadows are currently in place, no adverse impacts to these areas have been observed or monitored.

Consistency with Riparian Conservation Objectives

RCO 1 and 6: Under alternative 2, beneficial uses of water bodies would be protected and enhanced. There would be no changes in water storage, seasonal availability, or quality.

RCO 2, 4, and 5: Under alternative 2, the geomorphic and biological characteristics of meadows, streams, and RCAs would be protected. Because there would be no sedimentation, there would likely be no changes to aquatic primary productivity. Growing season water availability would remain unchanged and would not affect ecosystem integrity.

Required Monitoring

For the 6-inch minimum snow depths allowed on trails, operation of OSVs should be monitored periodically when use would be allowed at every site where the 6-inch standard would be applied when snow would be less than 12 inches deep. Monitoring would focus on whether OSVs are impacting trail surfaces, and be reported to the forest or district hydrologist and soil scientist. If adverse effects are observed to occur on trail surfaces, OSV use should be

discontinued. Monitoring would help ensure adverse effects are not occurring, and would reduce the risks of adverse effects by providing information on effects of snowmobile use.

Cumulative Effects – Alternative 2

Past, present, and reasonably foreseeable future projects in the project area include vegetation management, livestock grazing, prescribed burns, and recreation. There are many past, on-going, and reasonably foreseeable future projects identified in the Lassen National Forest that may be ground-disturbing and could potentially add sediment or other pollutants to surface waters within the forest. Wildfires are unforeseeable events that could directly impair water quality until vegetation recovers.

The Forest Service uses BMPs in compliance with the CWA to minimize water quality impacts. In 2008, the Lassen National Forest BMPs were rated and implemented 92 percent of the time and effective 90 percent of the time for 77 site evaluations. Projects whose BMP results were not effective were related to roads, developed and dispersed recreation, and in one case, water source development.

The risks of cumulative effects from this alternative would be negligible. As a result of the 12-inch minimum snow depth for cross-country use, there would continue to be only incidental ground disturbance. **As a result, there would be no change to equivalent roaded acres calculations for any watersheds under this alternative, and no change in detrimental cumulative watershed effects.** There would be negligible effects from exhaust emissions stored in snowpack, and low risk of damage to vegetation or other direct and indirect effects. This alternative would implement the recommended project design criteria and mitigation measures, and would open the second highest amount of land area to OSVs. This alternative would provide adequate snow cover to protect soils and water resources, and to protect vegetation in riparian areas. This alternative would be consistent with Lassen National Forest LRMP standards and guidelines. This alternative would not result in irreversible or irretrievable effects to soil, water, or riparian resources.

Alternative 3

Alternative 3 would be similar to alternative 2 in terms of effects to hydrology. It would restrict OSV use to 864,660 acres of National Forest System land, and would recommend 12 inches of snow cover over trails before OSV use, or at least 6 inches of snow on OSV trails as long as site review determines there is no damage to underlying surface resources. It would require a 12-inch minimum snow cover for cross-country OSV use, and a minimum of 18 inches of snow cover before grooming of trails could occur (table 69).

Table 69. Resource indicators, alternative 3

Resource Indicator	Usefulness of Indicator	Alternative 3 Measure
Designated use area for OSV use	Impacts are widely dispersed and differences in alternatives are minor	834,660 acres
Minimum Snow Depth for OSV Use on Designated Trails	Minimum snow depths on trails can be evaluated for effectiveness for protecting the trail surface	Generally 12 inches except 6 inches with site reviews to prevent damage to underlying surface resources

Resource Indicator	Usefulness of Indicator	Alternative 3 Measure
Minimum Snow Depth for Cross-country OSV Use	Minimum snow depths for cross-country travel can be evaluated for effectiveness for protecting the ground surface and vegetation	12 inches
Number of OSVs per year using trails across forest	Total amount of use can be compared to use amounts in Yellowstone and other studies to gauge potential water quality effects	10,000
Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Evaluation of the effects to RCAs, water quality and beneficial uses of water	Complies with RCOs 1,2,4,5,6

Direct and Indirect Effects

The direct and indirect effects of alternative 3 would be the same as alternative 2. There would be slightly fewer acres open to OSVs. Under this alternative, about 90,000 acres less National Forest System land would be open to OSV use.

Because direct and indirect effects of this alternative would be negligible, having less acreage open to OSVs would lead to minimal direct or indirect effects on hydrology. As in alternative 2, incidental direct effects including ground disturbance in low snow areas could potentially occur under this alternative. As in alternative 2 this alternative requires a minimum 12 inches of snow depth for cross-country OSV use and for grooming of OSV trails, and a recommended 12 inches of snow depth for trails, with a 6-inch snow depth for the use of designated trails as long as site reviews indicate protection of the trail surface (table 68).

As in alternative 2, although adverse effects would not be expected, **periodic monitoring would be required consistent with BMP 4-7** as a mitigation in areas with a 6-inch minimum snow depth to ensure there would not be impacts to the trail surface that could lead to stream sedimentation. Further, **it would be recommended that the 6 inch OSV use minimum depth only be applied to well-surfaced trails** such as graveled or paved roads.

The RCOs apply to all routes that pass through RCAs and meadows. Under alternative 3, groomed and ungroomed OSV trails and cross-country travel would be allowed within RCAs, but because of the layer of snowpack protecting the ground surface, there is negligible resource damage potential. Although no restrictions on OSVs in riparian areas, lakes, or meadows are currently in place, no adverse impacts to these areas have been observed or monitored.

Consistency with Riparian Conservation Objectives

RCO 1 and 6: Under alternative 3, beneficial uses of water bodies would be protected and enhanced. There would be no changes in water storage, seasonal availability, or quality.

RCO 2, 4, and 5: Under alternative 3, the geomorphic and biological characteristics of meadows, streams, and RCAs would be protected. Because there would be no sedimentation, there would likely be no changes to aquatic primary productivity. Growing season water availability would remain unchanged and would not affect ecosystem integrity.

Required Monitoring

For the 6-inch minimum snow depths allowed on trails, operation of OSVs would be monitored periodically when use would be allowed at every site where the 6-inch standard would be

applied when snow would be less than 12 inches deep. Monitoring would be consistent with BMP 4-7, focus on whether OSVs are impacting trail surfaces, and be reported to the forest or district hydrologist and soil scientist. If adverse effects are observed to occur on trail surfaces, OSV use would be discontinued. Monitoring would help ensure adverse effects are not occurring, and would reduce the risks of adverse effects by providing information on effects of snowmobile use.

Cumulative Effects – Alternative 3

Past, present, and reasonably foreseeable future projects in the project area include vegetation management, livestock grazing, prescribed burns, and recreation. There are many past, on-going, and reasonably foreseeable future projects identified in the Lassen National Forest that may be ground-disturbing and could potentially add sediment or other pollutants to surface waters within the forest. Wildfires are unforeseeable events that could directly impair water quality until vegetation recovers.

The risks of cumulative effects from this alternative would be negligible. As a result of the 12-inch minimum snow depth for cross-country use, there would continue to be only incidental ground disturbance. **As a result, there would be no change to equivalent roaded acres calculations for any watersheds under this alternative, and no change in detrimental cumulative watershed effects.**

There would be negligible effects from exhaust emissions stored in snowpack, and low risk of damage to vegetation or other direct and indirect effects. This alternative would implement the recommended project design criteria and mitigation measures, and would open the lowest amount of land area to OSVs. This alternative would provide adequate snow cover to protect soils and water resources, and to protect vegetation in riparian areas. This alternative would be consistent with Lassen National Forest LRMP standards and guidelines. This alternative would not result in irreversible or irretrievable effects to soil, water, or riparian resources.

Alternative 4

Alternative 4 would be similar to alternative 2 in terms of effects to hydrology. It would differ slightly in that it would increase areas designated for OSV use to 958,930 acres of National Forest System land, and would require at least 6 inches of snow on designated OSV trails. It would require a 12-inch snow cover minimum for cross-country OSV use, and 12 inches of snow cover before grooming of trails could occur (table 70).

Table 70. Resource indicators, alternative 4

Resource Indicator	Usefulness of Indicator	Alternative 4 Measure
Designated use area for OSV use	Impacts are widely dispersed and differences in alternatives are minor	958,930 acres
Minimum Snow Depth for OSV Use on Designated Trails	Minimum snow depths on trails can be evaluated for effectiveness for protecting the trail surface	6 inches

Resource Indicator	Usefulness of Indicator	Alternative 4 Measure
Minimum Snow Depth for Cross-country OSV Use	Minimum snow depths for cross-country travel can be evaluated for effectiveness for protecting the ground surface and vegetation	12 inches
Number of OSVs per year using trails across forest	Total amount of use can be compared to use amounts in Yellowstone and other studies to gauge potential water quality effects	10,000
Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6	Evaluation of the effects to RCAs, water quality and beneficial uses of water	Complies with RCOs 1,2,4,5,6

Direct and Indirect Effects

The direct and indirect effects of alternative 4 would be the same as for alternative 2. A higher number of acres would be open to OSVs. Under this alternative, about 40,000 acres more National Forest System land would be open to OSV use. Because direct and indirect effects of this alternative would be negligible, having slightly more acreage open to OSVs would lead to minimal direct or indirect effects on hydrology. As in alternative 2, incidental direct effects including ground disturbance in low snow areas could potentially occur under this alternative. As in alternative 2, this alternative would require a minimum 12 inches of snow depth for cross-country OSV use and for grooming of OSV trails, and a 6-inch snow depth for the use of designated OSV trails. Because, like alternative 2, it also would allow for a 6-inch minimum snowpack for OSV use on trails, there would be a risk for ground disturbance from this alternative. Further, as a result similar to alternative 2 for low-snow conditions, more monitoring would be required of trail conditions before OSV use would be allowed.

As in alternative 2, although adverse effects would be not expected, **periodic monitoring would be required consistent with BMP 4-7** as a mitigation in areas with a 6-inch minimum snow depth to ensure there would not be impacts to the trail surface that could lead to stream sedimentation. Further, **it would be recommended that the 6-inch OSV use minimum depth only be applied to well-surfaced trails** such as graveled or paved roads.

The RCOs apply to all routes that pass through RCAs and meadows. Under alternative 4, groomed and ungroomed OSV trails and cross-country travel would be allowed within RCAs, but because of the layer of snowpack protecting the ground surface, there is a very low resource damage potential. Although no restrictions on OSVs in riparian areas, lakes, or meadows are currently in place, no adverse impacts to these areas have been observed or monitored.

Consistency with Riparian Conservation Objectives

RCO 1 and 6: Under alternative 4, beneficial uses of water bodies would be protected and enhanced. There would be no changes in water storage, seasonal availability, or quality.

RCO 2, 4, and 5: Under alternative 4, the geomorphic and biological characteristics of meadows, streams and RCAs would be protected. Because there would be no sedimentation, there would likely be no changes to aquatic primary productivity. Growing season water availability would remain unchanged and would not affect ecosystem integrity.

Required Monitoring

For the 6-inch minimum snow depths allowed on trails, operation of OSVs would be monitored periodically when use would be allowed at every site where the 6-inch standard would be applied when snow would be less than 12 inches deep. Monitoring would be consistent with BMP 4-7, focus on whether OSVs are impacting trail surfaces, and be reported to the forest or district hydrologist and soil scientist. If adverse effects are observed to occur on trail surfaces, OSV use would be discontinued. Monitoring would help ensure adverse effects are not occurring, and would reduce the risks of adverse effects by providing information on effects of OSV use.

Cumulative Effects – Alternative 4

Past, present, and reasonably foreseeable future projects in the project area include vegetation management, livestock grazing, prescribed burns, and recreation. There are many past, on-going, and reasonably foreseeable future projects identified on the Lassen National Forest that could be ground-disturbing and could potentially add sediment or other pollutants to surface waters within the forest. Wildfires are unforeseeable events that could directly impair water quality until vegetation recovers.

The risks of cumulative effects from this alternative would be negligible. As a result of the 12-inch minimum snow depth for cross-country use, there would continue to be only incidental ground disturbance. **As a result, there would be no change to equivalent roaded acres calculations for watersheds under this alternative, and no change in detrimental cumulative watershed effects.**

There would be negligible effects from exhaust emissions stored in snowpack, and low risk of damage to vegetation or other direct and indirect effects. This alternative would implement the recommended project design criteria and mitigation measures, and would open the highest amount of land area to OSVs. This alternative would provide adequate snow cover to protect soils and water resources, and to protect vegetation in riparian areas. This alternative would be consistent with Lassen National Forest LRMP standards and guidelines. This alternative would not result in irreversible or irretrievable effects to soil, water, or riparian resources.

Conclusions

All alternatives would protect water resources, including the no-action alternative.

Alternative 1 (No Action) would best protect water resources:

For OSV use on the OSV trail system and cross-country uses, the ungroomed 12-inch minimum snow depth standard snow coverage has been observed to be adequate to mitigate and eliminate substantial water quality impacts such as stream sedimentation in perennial, intermittent, or ephemeral streams, in wetlands, or in other bodies of water.

This alternative would have a negligible impact on water quality as a result of hydrocarbon emissions from OSVs. Alternative 1 would be consistent with the Clean Water Act and Porter-Cologne Water Quality Control Act as water quality would not be impaired and beneficial uses would be protected.

There would be no watersheds with a risk of cumulative watershed effects as result of this alternative, and it would be consistent with all of the applicable RCOs in the 2004 Sierra Nevada Forest Plan Amendment.

Beneficial uses would be protected because 12-inch snow depths would be maintained on trails, reducing the risks of trail disturbance.

Alternatives 2, 3, and 4 would do the second best job at protecting water resources:

For OSV use on the OSV trail system, the ungroomed 6-inch minimum snow depth standard snow coverage would probably be adequate to mitigate and eliminate substantial water quality impacts such as stream sedimentation in perennial, intermittent, or ephemeral streams, in wetlands, or in other bodies of water. However, consistent and timely monitoring would be needed as a mitigation to ensure that damage to trails would not occur.

These alternatives would have a negligible impact on water quality as a result of hydrocarbon emissions from OSVs. Beneficial uses of water bodies would be protected under this alternative, as only 6 inches of snow would be required, but sufficient for use of designated OSV trails. As a result, alternatives 2, 3, and 4 would be consistent with the Clean Water Act and Porter-Cologne Water Quality Control Act as water quality and beneficial uses would be protected. There would be no watersheds with a risk of cumulative watershed effects as result of these alternatives, and these alternatives would be consistent with applicable RCOs in the 2004 Sierra Nevada Forest Plan Amendment.

Riparian Conservation Objectives Analysis

The Sierra Nevada Forest Plan Amendment (SNFPA FSEIS ROD) requires that RCO analysis be conducted during environmental analysis for new proposed management activities within CARs and RCAs (Standard and Guideline #92). Consistency with the RCOs is an indicator to ensure that goals of the Aquatic Management Strategy (AMS) would be met (USDA Forest Service PSW Region 2004: 32).

For this management strategy, allowing use of over-snow vehicles when the ground would be covered with a protective layer of snow would have a negligible effect on RCAs because direct and indirect effects would be negligible, and OSV use would result in negligible effects to RCAs. Hydrocarbon pollution derived from OSVs and grooming equipment would have a negligible effect on water quality under this management strategy.

The above determinations are based on Standard and Guideline #92, which states “Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the RCOs at the project level and the AMS goals for the landscape.” Consequently, consistency with the RCOs is an indicator to ensure that goals of the AMS would be met (USDA Forest Service PSW Regulation 2004: 32).

Indicator: Consistency with Riparian Conservation Objectives 1, 2, 4, and 5 (Alternative 1)

The RCOs apply to all routes that pass through RCAs and meadows. Over-snow vehicles would traverse meadows and streams in areas designated for cross-country OSV use with no restriction, and OSV trails in some areas would be located in RCAs.

RCO 1: Under alternatives 2, 3, and 4, beneficial uses of water bodies would be protected. OSV use would not impact beneficial uses of water bodies, especially municipal watersheds. Beneficial uses within the major hydrologic areas, units, or creeks on the Lassen National Forest,

designated by the State Lahontan Regional Water Quality Control Board, have been identified in table 71. OSV use would not impact CWA 303(d) water bodies.

RCO 2: Under the no-action alternative, the geomorphic and biological characteristics of meadows, perennial streams and RCAs would be protected under this management strategy. Under this RCO, the goal is to maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; (2) streams, including in-stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species. For this management strategy, criteria for establishing consistency are that OSV use would not cause accelerated erosion, such as head-cutting or the formation of gullies in meadows or spring ecosystems. Current OSV use does not lower water tables of meadows, and does not alter the movement of surface water in meadows. OSV use does not de-water spring ecosystems, does not capture streams and divert them down roads, and does not disturb shorelines of natural and man-made lakes and ponds.

RCO 4: Under the no-action alternative, management activities within RCAs would enhance or maintain physical and biological characteristics associated with aquatic and riparian-dependent species. For this management strategy, criteria for establishing consistency are that OSV use does not degrade the water quality of hydrologically connected systems, and that OSV use does not modify channel morphology of streams.

RCO 5: Under the no-action alternative, efforts would be made to preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

*Indicator: Consistency with Riparian Conservation Objectives 1, 2, 4, and 5
(Alternatives 2, 3, and 4)*

The RCOs apply to all routes that pass through RCAs and meadows. Over-snow vehicles would traverse meadows and streams in areas designated for cross-country OSV use with no restriction. Snow cover would protect these resources, and OSV trails in some areas would be located in RCAs.

RCO 1: Under alternatives 2, 3, and 4, beneficial uses of water bodies would be protected. OSV use would not impact beneficial uses of water bodies, especially municipal watersheds. Beneficial uses within the major hydrologic areas, units, or creeks on the Lassen National Forest, designated by the State Lahontan Regional Water Quality Control Board, have been identified in table 71. OSV use would not impact CWA 303(d) water bodies.

RCO 2: Under alternatives 2, 3, and 4, the geomorphic and biological characteristics of meadows, perennial streams and RCAs would be protected. Under this RCO, the goal is to maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; (2) streams, including in-stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species. For these alternatives, criteria for establishing consistency are that OSV use would not cause accelerated erosion, such as head-cutting or the formation of gullies in meadows or spring ecosystems. Current OSV use does not lower water tables of meadows, and does not alter the movement of surface water in meadows. OSV use does

not de-water spring ecosystems, does not capture streams and divert them down roads, and does not disturb shorelines of natural and man-made lakes and ponds.

RCO 4: Under alternatives 2, 3, and 4, management activities within RCAs would enhance or maintain physical and biological characteristics associated with aquatic and riparian-dependent species. For these alternatives, criteria for establishing consistency are that OSV use does not degrade the water quality of hydrologically connected systems, and that OSV use does not modify channel morphology of streams.

RCO 5: Under alternatives 2, 3, and 4, efforts would be made to preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

Table 71. Compliance with beneficial uses of water on the Lassen National Forest

Hydrologic Unit/Watershed	State HUC no.	Municipal and Domestic Supply	Agricultural Supply	Industrial Process Supply	Industrial Service Supply	Ground Water Recharge	Freshwater Replenishment	Navigation	Hydropower Generation	Water Contact Recreation	Non-contact Water Recreation	Commercial and Sport Fishing	Aquaculture	Warm Freshwater Habitat	Cold Freshwater Habitat	Inland Saline Water Habitat	Wildlife Habitat	Spawning, Reproduction and Development	Water Quality Enhancement	Flood Peak Attenuation/Flood Water Storage	Preservation of Biological Habitats of Special Significance	Migration of Aquatic Organisms	Rare, threatened and Endangered Species
¹ Susan River	637.20	x	x			x	x	x		x	x	x		x	x		x	x	x	x		x	
¹ Eagle Drainage	637.20	x	x			x	x	x		x	x	x		x	x		x	x	x	x	x	x	x
² Pit River	526.00	x	x						x	x	x			x	x		x	x				x	
² Hat Creek	526.30	x	x						x	x	x				x		x	x			x	x	x
² Cow Creek	507.3	x	x						x	x	x				x		x	x				x	
² Battle Creek	507.12		x						x	x	x				x		x	x			x	x	x
² Antelope Creek	509.63	x	x							x	x				x		x	x			x	x	x
² Mill Creek	509.42	x	x							x	x				x		x	x			x	x	x
² Deer Creek	509.20	x	x							x	x				x		x	x			x	x	x
² Butte Creek	521.30	x	x							x	x				x								
Feather River	520.3		x								x				x							x	

1, 2 Cal LRWQCB EPA 1995,

Table 72. Impaired water bodies on or adjacent to the Lassen National Forest¹

<p><u>Eagle Lake</u> <i>Phosphorous and Nitrogen Sources:</i> Agriculture (N only), Grazing-Related Sources, Silviculture, Other Urban Runoff, Highway/Road/Bridge Runoff, Wastewater, Onsite Wastewater Systems (Septic Tanks), Marinas and Recreational Boating, Atmospheric Deposition, Internal Nutrient Cycling (primarily lakes), Sediment Resuspension, Natural Sources, Recreational and Tourism Activities (non-boating), and Nonpoint Source. Eagle Lake lies within the analysis area and nitrogen and phosphorous, which bind to sediment, can reach Eagle Lake at hydrologically connected road segments.</p>
<p><u>Susan River</u> Mercury from unknown source. Unknown toxicity from unknown source. Headwaters are located within analysis area.</p>
<p><u>NF Feather River below Lake Almanor</u> Mercury from unknown source. Water Temperature from flow regulation/Modification and Hydromodification. Water temperature in the NF Feather Rivers results from water released from the dam on Lake Almanor.</p>
<p><u>Pit River</u> Nutrients from agriculture and agriculture-grazing. Organic Enrichment/Low Dissolved Oxygen from agriculture and agriculture grazing. Temperature, water due agriculture and agriculture grazing. Within analysis area, but constituents of concern are not related to roads.</p>

¹State of California, Water Quality Control Board 2006

Table 73. State water quality standards that are relevant to motorized routes

Category	Standard	Beneficial Uses Potentially Affected										
Bacteria	Fecal coliform concentration shall not exceed a geometric mean of 200/100 ml (min. of 5 samples / 30-day period), nor more than 10 percent of samples (30-day period) exceed 400/100 ml.	Contact Recreation (REC-1)										
Color	Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.	Domestic or municipal Contact Recreation Non-contact Recreation										
Floating Material	Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.	Domestic or municipal Contact Recreation Non-contact Recreation Power										
Oil and Grease	Waters shall not contain oils, greases, waxes, or other materials that causes nuisance, a visible film or coating on the surface or on objects in water, or otherwise adversely affect beneficial uses.	All										
Total Dissolved Solids	Shall not exceed 125 mg/l (90 percentile).	Domestic or municipal Contact Recreation Aquatic organisms										
Sediment	The suspended sediment load and discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.	All										
Settleable Materials	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.	Domestic or municipal Power Aquatic organisms										
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	All										
Turbidity	<p>Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity shall not exceed the following Nephelometric Turbidity Units (NTU)s:</p> <table border="0"> <tr> <td>For natural turbidity between:</td> <td>Increases shall not exceed</td> </tr> <tr> <td>0 and 5 NTUs</td> <td>1 NTU</td> </tr> <tr> <td>5 and 50 NTUs</td> <td>20 percent</td> </tr> <tr> <td>50 and 100 NTUs</td> <td>10 NTUs</td> </tr> <tr> <td>Greater than 100 NTUs</td> <td>10 percent.</td> </tr> </table>	For natural turbidity between:	Increases shall not exceed	0 and 5 NTUs	1 NTU	5 and 50 NTUs	20 percent	50 and 100 NTUs	10 NTUs	Greater than 100 NTUs	10 percent.	All
For natural turbidity between:	Increases shall not exceed											
0 and 5 NTUs	1 NTU											
5 and 50 NTUs	20 percent											
50 and 100 NTUs	10 NTUs											
Greater than 100 NTUs	10 percent.											

Impacts on Heritage Resources

The Over-Snow Vehicle Use Designation (OSV Designation) project area is located in the Lassen National Forest. Cultural Resources within the OSV Designation project area are defined and regulated based on the Lassen National Forest Land and Resource Management Plan.

Cultural resources are objects or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, places, or objects and traditional cultural properties (FSM2360.5). These resources are not mutually exclusive and can oftentimes overlap either in time or space (e.g., an historic building on a prehistoric archaeological site). Descriptions of each type are given below.

Cultural resources are archaeological, cultural, and ecological legacies from our past. Cultural resource information often includes environmental data, and can explain past relationships between people, climate, and the land. Study of cultural-ecological relationships help us understand how cultures changed, how culture affected and was affected by the environment, and how that information can be used to influence our future.

Current Management Direction

Cultural Resources are protected under the Organic Act of 1897 (Title 16, United States Code (U.S.C.), section 473-478, 479-482, 551), Antiquities Act of 1906 (16 U.S.C. 431), Historic Sites Act of 1935 (16 U.S.C. 461), National Historic Preservation Act of 1966, as amended (NHPA) (16 U.S.C. 470) and its implementing regulation 36 CFR Part 800, National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321-4346), Archeological and Historic Preservation Act of 1974 (AHPA) (16 U.S.C. 469), Federal Land Policy and Management Act of 1976 (FLPMA), (43 U.S.C. 1701), National Forest Management Act of 1976 (NFMA) (16 U.S.C. 1600), Archaeological Resources Protection Act of 1979 as amended (ARPA) (16 U.S.C. 470aa et seq.) as implemented by 36 CFR Part 296, Native American Graves Protection and Repatriation Act of 1990 as amended (NAGPRA) (25 U.S.C. 3001) as implemented by 43 CFR Part 10, Subpart B – Human Remains, Funerary Objects, Sacred Objects, or objects of Cultural Patrimony From Federal or Tribal Lands, Federal Lands Recreation Enhancement Act of December 8, 2004, (REA) (16 U.S.C. 6801-6814), Executive Order 11593 - Protection and Enhancement of the Cultural Environment, issued May 13, 1971, Executive Order 13007 - Indian Sacred Sites, issued May 24, 1996, Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments, issued November 6, 2000, and Executive Order 13287 – Preserve America, issued March 3, 2003. In addition archaeological collections are managed by Curation of Federally-owned and Administered Archaeological Collections, 36 CFR Part 79.

The Forest Service implements these laws and regulations through Forest Service Manual 2300, Chapter 2360, Heritage Program Management.

The Forest Service requires its Heritage Program activities to address three broad areas of responsibilities:

1. To protect historic properties,
2. To share their values with the American people, and
3. To contribute relevant information and perspectives to natural resource management (FSM 2360.6).

Also, it is the Forest Service policy to:

1. Establish and maintain effective relationships with federal, state, Tribal, and local governments and historic preservation organizations at all levels of the agency to ensure protection of cultural resources and to promote Heritage Program efficiencies.
2. Fully integrate opportunities for preservation, protection, and utilization of cultural resources into land use planning and decisions.
3. Manage cultural resources through a process of identification, evaluation, and allocation to appropriate management categories that protect cultural resource values and benefit the public.
4. Recognize cultural resources through National Register of Historic Places nomination, National Historic Landmark recommendation, and other special designations.
5. Provide opportunities for public use and enjoyment of cultural resources through education and outreach programs that promote resource stewardship.
6. Facilitate scientific research of cultural resources to increase understanding of past human cultures and environments.
7. Use cultural resource data to increase scientific understanding of the evolution and condition of ecosystems and to benefit Forest Service land management practices.
8. Protect cultural resources from the effects of Forest Service or Forest Service-authorized undertakings, unauthorized use, and environmental damage (FSM 2360.3).

The Sierra Nevada Forest Plan Amendment described the following elements of managing cultural resources (Volume 2, Chapter 3, Part 5.8, p. 510):

- Conducting inventories of proposed project areas to identify types and locations of heritage resources.
- Determining sites that are eligible for the National Register of Historic Places.
- Assessing potential project effects of cultural resources.
- Avoiding or mitigating effects on sites eligible for the National Register or other significant sites.
- Follow-up monitoring to assess the effectiveness of management procedures.

In addition, the Forest Service maintains consistency with 36 CFR Part 800 on the Lassen National Forest pursuant to the Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, And the Advisory Council on Historic Preservation Regarding the Processes for Compliance With Section 106 of the National Historic Preservation Act For Management of Historic Properties by the National Forests of the Pacific Southwest Region (Regional Programmatic Agreement (Regional PA)).

Types of Cultural Resources

Archaeological Sites: Prehistoric and Historic

Archaeological sites are the physical evidence of human actions in specific locations and interactions with the environment over the broader landscape. This evidence includes structures, remains of structures, accumulated or deposited trash, physical evidence of food extraction, mining, logging, livestock grazing, or agriculture. Archaeological evidence is often defined as a site, which under the NRHP is the location of

a significant event, a prehistoric or historic occupation or activity, or a building or structure (whether standing, ruined, or vanished), where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.

The Lassen National Forest has over 3,377 recorded archaeological sites. These sites are the physical remains of human occupation over the last 9,000 years and range from small-scale obsidian flake scatters to large-scale complex Native American village sites occupied for thousands of years. Historic sites chronicle some of the earliest Euro-American exploration, settlement, and development of the southern Cascades. Historic sites in this part of California date from roughly 1850 to the 1960s.

Architectural Resources: Buildings and Structures

The NRHP divides architectural sites into buildings and structures. A building is created principally to shelter any form of human activity, while a structure is used to distinguish buildings whose functional constructions were usually made for purposes other than creating human shelter (e.g., dams, railroad grades, canals).

Cultural Landscapes and Districts

Cultural landscapes are geographic areas, subsuming both cultural and natural resources, and the wildlife or domestic animals therein, associated with an historic event, activity, or person, or exhibiting other cultural or aesthetic value. Cultural landscapes are not a recognized property type under the NRHP but are recognized as districts. The NRHP defines districts as possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. A district derives its importance from being a unified entity, even though it is often composed of a wide variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties. Cultural landscapes are also ecological legacies from our past.

Ethnographic and Traditional Cultural Properties

Traditional Cultural Properties (TCPs) are important places because of their association with the cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. TCPs include sacred sites, natural resource collection areas, and the occasional archaeological site associated with ancestral Native American groups. TCPs must be a tangible property, that is a district, site, building, structure, or object as defined in 36 CFR §64.4 (FSM 2360.5). While TCPs are closely associated with Native American Cultures, a site need not be associated with a Native American cultural group to qualify as a TCP for the purposes of the NRHP.

Objects and Museum Collections

The NRHP describes objects to be relatively small things that are associated with a specific setting or environment. These objects are often recorded or catalogued and then remain in their original context (e.g., large mining and logging equipment), where they can be used for interpretation. All artifacts and associated records (i.e., catalogues and photographs) removed from NFS lands remain Federal property and must be managed according to 36 CFR Part 79.

The types and distribution of cultural resources in the OSV designation areas are determined by what, where, why, and how people of the past used the land. An overview of prehistoric and historic land use patterns and how that is manifested in currently known cultural resources is presented in this section.

Affected Environment

Our knowledge of cultural resources on the Lassen National Forest is derived from archaeological surveys and excavation on the Forest Service, Bureau of Land Management, National Park Service, and private lands in the region that have been completed over the last 40 years.

The Lassen National Forest encompasses four cultural regions: northern Sierra Nevada Mountains, the southern Cascade Mountains, the southern Modoc Plateau, and the Pit River watershed.

Prehistoric Background

Cultural periods are highly variable with each study determining their own new time periods not only in name but in time span. This overview makes no attempt to reconcile these but rather represent general patterns.

Early Holocene/Paleoindian (prior to 7500 B.P.): This period is poorly represented on the Lassen National Forest. The earliest part of this period is recognized by Clovis-like projectile points, characterized by a lanceolate shape and distinctive basal thinning or fluting. Populations during this period were highly mobile, traveling in small groups that made frequent residential moves and exploiting a large subsistence territory while focusing on big game hunting with habitation of the uplands being highly sporadic and mostly sites being lower elevation and associated with the Great Basin's Western Pluvial Lakes Tradition (WPLT; 6000-9000 B.P.). The WPLT focused on the lacustrine environments common to the northeastern portion of the forest. It is represented by Great Basin Stemmed series and lanceolate shaped points (Layton 1970; Pippin and Hattori 1980).

Post Mazama (7500-5000 B.P.): Mount Mazama erupted c. 7600 B.P. causing a dramatic change in northeastern California and southern Oregon. This disrupted human habitation in the region. Following the eruption this period reflects increased use upland areas on the Lassen National Forest. This may represent the expansion of Great Basin populations into the Sierran Transition Zone, during the Tahoe Reach and Spooner Phases of 4000-8000 B.P. (Elston 1971). The earliest sites are located on mid-slope terraces and tend to be situated somewhat away from the river (Cleland 1997). On the east side, populations remained highly mobile with no systematic dependence on storage (Hildebrandt and Mikkelsen 1995).

Diagnostic artifacts include Klikapudi Side-notched, Pinto, Humboldt, Gateciff, Fish Slough, Great Basin Stemmed projectile point styles (Cleland 1997; Hildebrandt and King 2002; 18-21). This expansion may also be represented by the Northern Side-notched point styles on the Lassen National Forest (Gruhn 1961). The western Sierra Nevada foothills and Cascade Mountain is potentially connected to the Windmiller Culture of the central California (Ritter 1970).

Early Archaic (5000- 3500 B.P.): "The Early Archaic, at least in comparison to the two preceding periods, marks the beginning of major increases in archaeological visibility across the entire study area (Kowta 1988)" (King et. al. 2004:31). This period has been identified in upland contexts along both the eastern and western flanks of the Sierra Nevada and Cascade Range as the Martis Complex. The Martis Complex is distinguished by a use of basalt in flaked stone tool manufacture. Settlement systems became oriented along major east-west trending drainages extending from lowland villages to quarries near the crest of the Sierra Nevada (King et al. 2004:32). Cleland (1997) shows an increased occupation of lithic sites, and pit houses were constructed in the uplands. Groundstone begins to show up in assemblages from this period and freshwater mussels were commonly used. This shift may have been the adaptation reaction to Middle Holocene warming where populations from adjacent desert and lower elevations were affected by decreased resource productivity. Diagnostic projectile points include Elko, Siskiyou Side-notched and Northern Side-notched, Gatecliff and Martis.

Middle Archaic (ca 3500-1500 B.P.): A substantial expansion into these mountainous areas with medium- to high-elevation areas occurred post 4,000 B.P. Cleland (1997) states that the use of lithic sites peaks during this period and habitation site use increases. The overall settlement pattern diversifies. Habitation sites increase in number while becoming larger with rich and diverse assemblages of artifacts and proliferation of house structures, midden deposits, hearths, ovens and burials. There is change in obsidian procurement practices occurs during the Late Archaic: “source diversity actually reaches its lowest level at this time, The focus seems to have shifted to more regularized acquisition of a few key glasses procured during logistical forays emanating from larger villages and base camps” (King et. al. 2004:33). “Populations were regularly targeting a few key quarry localities, as contrasted with more ad hoc toolstone procurement conducted during the course of the seasonal subsistence round. It is this systematic and regular use of a few favored toolstone localities over a broad sweep of time that results in greater homogeneity of obsidian source profiles” (King et. al. 2004:33). In addition, regionally this period shows an increased trade and exchange. Occupation of the higher terraces continues, but habitation sites closer to the river are also used. Midden development is recognizable at habitation sites, and freshwater mussel shell lenses appear, often superimposed over midden deposits. Clikapudi Series points continue in use. It appears that people associated with the Martis Complex moved into the southern portion of the forest and the northern and western portions may have been occupied by Hokan speakers.

Late Archaic (1500-750 B.P.): During this period there seems to be a sharply increased expansion into the forest’s plateau uplands and lakes with more permanency of human occupation, an increase in population as lithic site occupation appears to reduce during this period, and intensive occupation of habitation sites continues. Some of these changes may have resulted from the warm/dry interval from 1100 to 600 B.P. known as the Medieval Climatic Anomaly.

This drought period no doubt had major effects on prehistoric populations, although the exact relationships between climatic change and certain cultural shifts observed in the archaeological record is not well understood. Whether induced by climatic change, increases in population density or other factors 1,000 B.P. marks a time of instability and upheaval throughout much of California and the western Great Basin (King et al. 2004:33-34).

Lower elevation and Great Basin habitation sites show distinct changes during this period prior to 1000 B.P. They are larger with rich and diverse assemblages of artifacts and proliferation of house structures. Post 1000 B.P., they “generally lack complexity and can occur as more isolated domestic features, rock rings, or living surfaces....appear to have been occupied for only short durations and lack the semi-sedentary quality of their Middle Archaic counterparts” (King et. al 2004:34). At higher elevations these changes brought resource intensification, there is a shift in “resource zones and diet breadth with procurement increasingly directed at more marginal upland habitats. In the Middle Pit River region at this time, Chatters and Cleland (1995:27-9) document escalating population densities coupled with expanding resource intensification, the latter indicated by intensive exploitation of freshwater mussels, and increased use of seeds and manzanita berries” (King et. al. 2004:34).

Gunther Barbed and Rose Spring projectile points come into use early in the period and are associated with bow and arrow technology. Clikapudi Side-notched points are not represented, but Clikapudi Corner-notched types continue into the early part of this period. The introduction of the bow and arrow is also seen in a shift to generally smaller, flake-based instead of bifacial tools. During this period brownware ceramics also begin to occur.

Terminal Prehistoric/Emergent (150–1000 B.P.): A greatly intensified occupation of habitation sites associated with a concurrent decline in the production of obsidian tools occurs during this period. A major change in obsidian procurement and use is suggested. Settlement patterns remain strongly riverine-oriented. Intra-site movement of activities closer to the river is reported. Gunther Barbed projectile points

continue to be produced. Desert Side-notched and Cottonwood points occur late in the period. A rebound in obsidian use may have occurred around 600. B.P. This period shows “wholesale shifts in populations centering on the arrival of desert-oriented Numic groups (Northern Paiutes)” on the eastern portion of the Lassen National Forest (King et al. 2004). Around A.D. 500, a general change in the human use of the northern Sierra Nevada is hypothesized by Elston (1971), Elston et al. (1977); Ritter (1970); and Moratto (1972). These researchers all suggest that populations on the western slopes stabilized and returned to a more sedentary lifestyle. Riverine and oak woodland resources were heavily exploited, and seasonal transhumance became less necessary. Artifact association indicative of both the Great Basin and the Columbia Plateau became common, leading some (e.g., Kowta 1988) to postulate that the Northeastern Maidu entered their ethnographic territory via the Great Basin/Columbia Plateau at this time. Obviously, post-depositional processes or observational differences could explain part or all of this apparent increase in use. Nevertheless, based on current data, it appears that more people were in the upland valleys after A.D. 500. Both the riverine and oak woodland environments mentioned by Elston and others occur marginally in these valleys today, but the paleoenvironment is poorly understood at best. Projectile point types show similarities to both the Great Basin (Rosegate) and the Columbia Plateau (Gunther-like), although the representative cultural histories and affiliations of these point types are not well defined at present.

Near Crooks Canyon, on the South Fork drainage of the Pit River and adjacent uplands, the settlement system also differed from the Numic lifeway described above. Here, house structures and other residential features dramatically appear at about 500 BP. These are both single- and multi-family residential camps containing a variety of stone and bone tools, roasting features, hearths, work areas, and storage pits, reflecting a full range of residential activities, including plant and animal processing and tool maintenance and production (Delacorte 2002; Waechter 2002d).

While this village pattern may relate to the aforementioned intensification of upland root crops that commenced during the Late Archaic period, an equally plausible explanation for the appearance of upland villages can be derived from a social-conflict model (LeBlanc 1999). According to this thesis, a major settlement shift to a more remote location like the Pit River Uplands may well reflect mounting inter-group hostilities perhaps related to the arrival of Numic-speaking populations. In essence, the rugged canyon and rimrock country of the Modoc and Pit River Uplands may have served as a safe refuge during times of conflict, and this conflict may have been the driving force behind these late-prehistoric settlement shifts. Interestingly, faunal remains from this period show a marked rebound in the use of large game animals, a phenomenon that might be associated with increased periods of conflict (Bayham and Holanda 1997; Broughton 1999; Carpenter 2002). [King et al. 2004:36]

This increased usage was apparently short-lived. The point types generally associated with the period after A.D. 1500 (Desert Side-Notch and Cottonwood Triangular) are quite rare. Again, a number of explanations are possible, but it appears that at least the amount of hunting in the forest environs decreased. It may be that the trend toward resource specialization and increased sedentism may have occurred at a slightly later date here than elsewhere in California and the western Great Basin.

Ethnography

The Lassen is traditional territory of four distinct ethnographic groups: Northeastern Maidu, Pit River, Yana and Northern Paiute.

Northeastern Maidu occupied the mountain valleys in the southern portion of the Forest. They are Mauduan branch of the Penutian linguistic stock (Shiple 1978; Riddell 1978:370)

Pit River includes two distinct linguistic groups, Achumawi and Atsugewi that share broad cultural similarities. Achumawi and Atsugewi form the Palaihnihan branch of the Hokan linguistic stock (Olmsted 1964:1; Garth 1978:236; Shipley 1978:86). Within the Achumawi there are four bands (dialect divisions) that occupied areas currently administered by the Lassen: Madesiwi, Ilmawi, Itsatawi and Ajumawi.

- Ajumawi small group on Fall River north of present day Fall River Mills
- Ilmawi occupied a canyon of the Pit River below Fall River to the divide between Clark and Rock Creeks and Cayton Valley.
- Itsatawi occupied Goose Valley and lower Burney Valley and stretches of the Pit River northwest of Goose Valley.
- Madesiwi were centered around Big Bend.
- Two groups comprised the Atsugewi: Atsuge and Apwaruge.
- Atsuge were concentrated on Hat Creek and in Burney Valley.
- Apwaruge occupied Dixie Valley. Little Valley and portions of the Pit River between Horse Creek and Beaver Creek.

Yana have four dialect subdivisions, and occupied the area between the Sacramento River on the west, the Pit River on the north, Chico Creek on the south and the peaks of the Cascades on the east. Yana is a Hokan language (Dixon and Kroeber 1919:104; Sapir 1917:1)

Northern Paiute on the eastern side in western Nevada and northeastern California. The Honey Lake Paiute (Paviotso), is a Numic (Shoshonean) branch of the Uto-Aztecan stock (Miller 1966:77; Jacobsen 1966:115; Stewart 1966:192-193) The Wadatkut of Honey Lake Valley.

Historical Background

Contact and Explorers

1820s–1848: The earliest exploration of the Lassen area occurred between 1826 and 1836 by small Hudson Bay Company trapping parties who developed one of the earliest routes into northern California along the Pit River and Hat Creek. John Work explored the Pit River territory during 1831–1833. In 1843, Peter Lassen filed for a Mexican land grant and named Mt. Lassen Sister Buttes. In 1846 Captain John Fremont visited that area and Lassen’s ranch as part of his mapping of the Oregon Trail.

During this period diseases introduced to Native Americans by European settlers reached epidemic proportions and decimated local populations. John Work’s expedition was responsible for the pandemic of 1833, variously diagnosed as cholera, typhus, or malaria. The effects of this pandemic were apocalyptic for many California groups—Cook (1976:269) estimates a 40-percent population decline as a result

The Gold Rush and Native Decline

1849–1905: Settlement and early industrial development period. This period saw an expansion of Non-Native occupation and conflict between these settlers and the Natives. Mining was established on the southern portion of the Forest in 1849. Gold mining was not extensive in the forest but did occur primarily in the southern portion.

As the Lassen (established in 1849) and Nobles Emigrant (established in 1851) Trails brought increased numbers of Europeans to and through the region, ranching began. Ranching mostly occurred in the high mountain meadows consisting of dairy, cattle and sheep. By the late 1850s, more than 4,000 people were engaged in agriculture in Shasta County (Bevill and Nilsson 1999:135). Primary crops included grains

(wheat, barley, and hay), and smaller amounts of fruit and vegetable crops. Along the Sacramento River, vegetable farmers also raised dairy cows and several dairies were established in the area. In northeastern Shasta County, starting in the 1870s, homesteads were established primarily in river valleys, where residents were able to eke out a living practicing a combination of cattle ranching, dairy farming, and mixed agriculture. Seasonally, men would work in the nearby logging camps and would also supply the camps with food (Owens 1984:118).

During the late 1850s a “scorched earth” policy was implemented by Lieutenant Crook, who ran the military campaign in the area (Woods and Raven 1992; Wheeler-Voegelin 1974:91). Throughout the 1850s and 1860s the Yahi, Pit River and Maidu resisted and at times were openly hostile to non-Native expeditions and settlers, while local Militia and U.S. Military pursued and battled the tribes.

A second epidemic occurred in 1856, when H.M. Judah’s expedition which was suffering from dysentery and malaria, visited Fort Crook in Fall River Valley in the Pit River area, further decimating the population.

The first major logging activity occurred in the southwestern portion of the forest in the 1870s.

Government Management

The Forest Service was established in 1905, when the Forest Reserve was transferred to the Department of Agriculture. In the 1930s, forest experiment stations were set up in order to conduct research concerning all phases of forest and range land use, such as timber, wildlife habitat, watershed management, fire, economics, and utilization of wood products. In 1933, the Civilian Conservation Corps (CCC) program was created, which led to many improvements to the nation’s resources. The CCC planted over two billion trees in eight years, cleared trails, fought fires, built campgrounds and improved recreation facilities. By 1945, the Forest Service had developed into a network of research specialists and resource managers. A 1941 report on the Cornaz Tract indicates a temporary work camp was located adjacent to the Burney Springs and Cornaz Lake area. The report notes concerns for the “increasingly hazardous slash areas being left by nearby logging operations.” It is mentioned that Burney Springs was of significant importance in potentially battling a wildfire if one were to erupt within this area due to these slash piles.

Red River Mill, one of the Nation’s largest was established. The eastern portion of the forest became an important source of lumber in the 1910s following the construction of railroads. In 1936, Burney developed into a lumber mill center.

Environmental Effects

Effects on cultural resources are described in terminology consistent with the regulations of the Council on Environmental Quality and in compliance with the requirements of both the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA). The determination of effect for the undertaking (implementation of the alternative) required by Section 106 of the NHPA is included in the summary of effects for each alternative.

Legal and Regulatory Compliance

Applicable law, policy and Forest Service Manual direction provide the basis for protection of cultural resources. Activities are subject to the regulations implementing Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and as promulgated by 36 CFR Part 800, to address effects to cultural resources. Section 106 of the NHPA requires a federal agency to consider the effects of its actions on properties included in, eligible for inclusion in; or potentially eligible for inclusion in the

National Register of Historic Places and provide the Advisory Council on Historic Preservation a reasonable opportunity to comment.

In addition to following 36 CFR Part 800, the Forest Service uses a number of Programmatic Agreements outlining alternative procedures, per 36 CFR §800.14, developed by the Pacific Southwest Region including the *Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Processes for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forests of the Pacific Southwest Region (Regional PA)*.

Analysis Assumptions and Methodology

This impact analysis methodology applies to primary types of cultural resources found within the area of potential effect's archaeological sites.

The assumptions used in this effects analysis include:

- Cultural resources will be managed according to existing laws, regulations, and policy to protect these resources according to societal expectations.
- Ground-disturbing management activities could have direct adverse effects on cultural resources.
- Snow pack creates a protective barrier between vehicles and archaeological sites. Snow levels greater than 12 inches provide the greatest protection while levels below 12 inches may allow greater impacts to sites.
- Paved roads, gravel or roads with other base material act as a cap for archaeological sites that are bisected by the road, thus providing protection to historic properties when snow levels are less than 12 inches. [Regional PA stipulation 2.1(c)(1-6)]
- Limited use of maintained designated roads by OSV with 6-12 inches of snow has similar effects to vehicles and OHV use on the same road.
- For existing roads that may not be paved or have a rock base, the assumption is that they were analyzed and monitored under the Forest previous Travel Management Off-Highway Vehicle (OHV) NEPA and followed the 2006 Motorized Recreation Programmatic Agreement guidelines if historic properties were bisected by a road or OHV trail. Therefore, the assumption is that OHV and OSV uses have similar potential impacts to historic properties. (2006 Motorized Recreation PA full title - *Programmatic Agreement Among The U.S.D.A. Forest Service, Pacific Southwest Region, U.S.D.A. Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, And Advisory Council On Historic Preservation Regarding The Process For Compliance With Section 106 Of The National Historic Preservation Act For Designating Motor Vehicle Routes And Managing Motorized Recreation On The National Forests In California*)

As a rule, any activity that causes ground disturbance (disturbance to the soil matrix that contains the cultural resource) has the potential to adversely affect cultural resources, both directly and indirectly. This results in changes to the physical attributes of the resources that, in turn, compromise the integrity of the cultural resource and its context. Its context (the spatial relationship between the various artifacts, features and components of the cultural resource) is what is scientifically studied and interpreted and is the basis for the site significance determination. This effect is irreparable and considered adverse. Even a scientific archaeological excavation has an adverse effect because it destroys the integrity and context of the cultural resource by removing its artifacts, features and components. In addition the significance of cultural resources is often dependent on their context in the larger landscape as much as on their

immediate physical features. Combined effects of ground-disturbing activities may jeopardize the quality of cultural resources. Ground-disturbing activities may affect the “feeling” of a cultural site, even when the activities occur beyond site boundaries. Indirect effects to setting, association, or feeling may also detract from the value of a cultural site for public interpretation and education.

Impact analysis follows established procedures and stipulations outlined in regulations implementing Section 106 of the NHPA (36 CFR Part 800) and Regional PA. These include: (1) identifying areas and types of resources that could be impacted, (2) assessing information regarding historic properties within this area and conducting additional inventories and resource evaluations, as necessary, (3) comparing the location of the impact area with that of important cultural resources, (4) identifying the extent and types of effects, (5) assessing those effects according to procedures established in the Advisory Council on Historic Preservation’s regulations, and (6) considering ways to avoid, minimize, or mitigate adverse effects.

This methodology focuses on specific activities proposed in the alternatives, as well as areas containing known cultural resources that would be most likely to be adversely affected. Limits to current knowledge add uncertainty to the effects analysis of the alternatives.

Analysis consists of identifying the total number of sites within road and trail corridors based on GIS data for the forest. Under this definition, the route corridor is defined as the route itself plus a buffer area of 30 meters on both sides and running parallel to the route. However, many sites that fall within the corridors are not on or adjacent to the route and may not be directly impacted by OSV use. Sites within the buffer zone or adjacent to the route may not experience direct effects from OSV activity along the route. Site effects will depend on the absolute proximity to the site (sites located directly adjacent to the route are more likely to be affected than those located further away), characteristics of OSV use on the route as well as soil and landform characteristics. Sites considered “At Risk” are generally those that are bisected by roads or trails, tend to be smaller in size (thus having a greater proportion of their surface areas affected by OSV use), and/or may have routes impacting major features of the site surface. In many cases, however, GIS, site and field data indicate the site is not being directly impacted by the route, the route exhibits very light OSV use, or in the case of linear site features such as railroad grades and ditches, the route crosses the site at a single point. Sites with these characteristics are not considered to be at risk.

Methodology: We used existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of OSV routes to identify cultural resources in the area of potential effect that may have direct, indirect, or cumulative effects.

Types of Impacts

Impacts are considered either adverse or beneficial to historic properties (cultural resources) when analyzed under NEPA. However, impact type is not viewed this way when conducting analysis under Section 106 of the NHPA for the purposes of assessing effects to historic properties under the Section 106 of NHPA, effects are either adverse or not adverse. Overall, non-beneficial effects usually result in compromising the nature of the cultural resource and may affect its eligibility for inclusion in the NRHP.

Impacts can be direct and/or indirect. Direct impacts result from specific actions, such as vegetation removal or use of a bulldozer through a historic property. Direct effects can result both from natural events or processes and human activities.

Indirect impacts generally occur after an action, and are a result of changes in the condition of the landscape (such as loss of vegetation and subsequent erosion). Indirect effects can result from changed visitor use patterns and improved access that brings more visitors, resulting in the deterioration or loss of

the site. Studies have shown that effects on sites have three basic characteristics: (1) impacts tend to be multiple (that is, several different impacts to the same site); (2) impacts are cumulative; and (3) many impacts are the result of land use activities rather than deliberate vandalism (Marshall and Walt 1984, U.S. Army Corps of Engineers 1988).

There is also the potential for previously unknown cultural resources to be discovered through exposure and/or damage by land use activities that involve surface disturbance.

Duration of Impact

Impacts to historic properties (cultural resources) could be of short-term, long-term, or permanent duration. Analysis of the duration of impacts is required under NEPA, but is not required and is not usually considered in assessing effects in terms of Section 106 of NHPA.

For cultural resources, the duration of an impact is usually not considered in assessing effects in terms of the NHPA. This is because, unlike most other types of resources, cultural resources are basically non-renewable resources. Damage or destruction to cultural resource sites is generally permanent. Effects on some cultural resources (such as the upgrading of windows in an historical building with non-compatible materials [wooden windows to aluminum]) can be reversed; however, until that happens, the effect is ongoing and potentially adverse.

Intensity of Impact

The main focus of the effects analysis for cultural resources is the intensity within the context of NRHP eligibility and integrity. The significance of cultural resources, particularly ethnographic, and cultural landscapes, often depends on their context in the larger landscape as much as their immediate physical features. Activities that occur beyond the physical boundaries of the cultural resource can affect the historic property if they affect the larger, landscape-level context. The intensity of an impact to cultural resources is described as either negligible, minor, moderate, or major:

- Negligible: Impacts would be barely perceptible changes in significant characteristics, contributing elements or character defining features of a historic property.
- Minor: Impacts would be perceptible and noticeable, but would remain localized and confined to a single element or significant characteristic of a historic property (such as a single archaeological site containing low data potential within a larger archaeological district or a single contributing element of a larger historic district).
- Moderate: Impacts would be sufficient to cause a noticeable change which may or may not contribute to a significant change in characteristics of a historic property.
- Major: Impacts would result in substantial and highly noticeable changes or loss of significant characteristics of a historic property.

Duration plays a key role in the overall effect; impacts of minor intensity over a long duration may have the same effect on the characteristics of heritage resources as would impacts of moderate intensity over a short duration.

Mitigation of Impacts to the Cultural Environment

NEPA calls for a discussion of the “appropriateness” of mitigation, and an analysis of the effectiveness of mitigations. A reduction in intensity of impact from mitigation is an estimate of the effectiveness of this mitigation under NEPA. It does not suggest that the level of effect, as defined by implementation regulations for Section 106 of the National Historic Preservation Act (36 CFR Part 800), is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effects remain adverse.

Therefore, measures to address impacts under NEPA may not be sufficient to address the effects under NHPA. The Regional PA provides a list of standard protection measures that can be used, per 36 CFR §800.14. Ultimately, the universal mitigation measures will always be in compliance with the vast array of historic preservation legislation and mandates.

Mitigation generally includes the avoidance of adverse effects. Standard mitigation measures in this document are from the Regional Programmatic Agreement developed in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation.

Archaeological Resources

Type and Duration of Impacts

A change in the physical attributes of an archaeological site that affects the information contained in that site is irreparable and considered adverse and of permanent duration. Adverse impacts to archaeological resources can result from soil movement and artifact displacement. The intensity of impacts to archaeological resources can range from negligible to major, depending on the management actions taken and/or the effects resulting from the intensity of burning during fire events or ground disturbance. The majority of these impacts are long-term in duration.

Intensity of Impact

The intensity of impact to an archaeological resource would depend on the potential of the resource to yield important information, as well as the extent of the physical disturbance and/or degradation. For example, moving earth at an archaeological site(s) with low data potential might result in a minor, adverse impact, though still an effect. The intensity of an impact to archaeological resources is described as either negligible, minor, moderate, or major:

- Negligible: Barely perceptible and not measurable, and would usually be confined to archaeological site(s) with low data potential.
- Minor: Perceptible and measurable, and would remain localized and confined to archaeological site(s) with low to moderate data potential.
- Moderate: Sufficient to cause a noticeable change, and would generally involve one or more archaeological site(s) with moderate to high data potential.
- Major: Substantial and highly noticeable changes, involving archaeological site(s) with high data potential.

Mitigation of Impacts

For archaeological resources, mitigation includes site avoidance during activities, protection of archaeological soils through use of a barrier or other protection measures. In some situations, standard treatments such as complete site documentation may be appropriate as a way to preserve site information and forego continued site management.

Measures or Factors Used to Assess Environmental Consequences

In all of the alternatives, the types of management activities proposed could directly, indirectly, or cumulatively affect cultural resources and are subject to the regulations outlined in Section 106 of NHPA, as amended and as promulgated by 36 CFR Part 800, to address those effects to cultural resources.

The following factors were determined to be the best factors indicating potential effects on cultural resources:

- Total acres of areas open for OSV use.
- Total number or miles of roads of potential use.
- Ability to mitigate impacts through the application of the Regional PA standard protection measures

Effects to Cultural Resources

Direct Effects

Direct Effects of OSV on cultural resources would include impacts from soil compaction, erosion, and displacement. OSV use also would have the potential for releasing burned and unburned fuel and lubricants into archaeological deposits.

Trail use based on snow depth. OSV use on unpaved roads, trails and areas of National Forest System lands that occurs during periods of no or low snow amounts, less than 12 inches, would have the potential to break or crush artifacts, changing artifact provenance, mixing, and dispersal of archaeological soils. OSV treads can potentially move historic and prehistoric artifacts to new locations within a site or spread artifacts and archaeological soil outside the original site boundaries. This change in artifact and soil provenance would alter site integrity.

Indirect Effects

Indirect effects of OSV use result from increased access to sensitive tribal areas and historic sites that are not easily accessible at other times of the year due to lack of vehicle access. Tribal areas that are some distance from trails and/or roads or are isolated due to water or rough terrain may have increased visitation due to OSV use across frozen lakes or smoothing of the terrain due to snow compaction.

Wooden historic sites and artifacts can potentially be scavenged for burnable materials by OSV users building campfires.

Summary of Environmental Consequences by Alternative for Cultural Resources

Table 74. Summary of alternatives

Issue	Alt 1	Alt 2	Alt 3	Alt 4
OSV Areas Acres	964,020	921,130	834,660	958,930
Acres Surveyed	768,815	743,541	674,585	764,511
% surveyed	80%	81%	81%	80%
OSV Area Acres Prohibited	186,000	228,890	315,360	191,090
Sites in OSV Areas	2811	2,666	2,392	2,805
Snow Trails	2,760	323	316	398
Sites bisected by ungroomed trails	16	0	9	22
Sites within 30m of trails	26	0	12	42
Miles of groomed trails	349	349	349	349
Sites bisected by groomed trails	56	56	56	56
Sites within 30m of groomed trails	89	89	89	89
Minimum Snow Depth for OSV Use on Snow trails designated for OSV use (inches)	12	6 on limited basis	12	6

Issue	Alt 1	Alt 2	Alt 3	Alt 4
Minimum Snow Depth for OSV Use on off-trails, Cross-county Use (inches)	12	12	12	12
Minimum Snow Depth for Snow Trail Grooming to Occur	18	12	18	12
Grooming Season	12/26-3/31	12/26-3/31	12/26-3/31	12/26-3/31
Plowed Parking areas	5	5	5	5
Site in Parking	3	3	3	3

Table 75. Summary of percentage of sites within potential use assumptions by alternative

	Potential Use	High	Moderate	Low to No	Closed
Alternative 2	41%	24%	11%	10%	14%
Alternative 3	37%	9%	9%	19%	22%
Alternative 4	43%	11%	11%	27%	9%

Alternative 1

Alternative 1 has the largest area open to OSV, and thus, has the highest potential for direct and indirect effects from OSV use.

Alternative 2

Alternative 2 has the third largest area designated for OSV use and the largest percentage of sites in the high-use areas thus has the second highest potential for direct and indirect effects from general OSV use. With the reduction of minimum snow depth on groomed trails this alternative offers slightly less protection to sites on groomed trails.

Alternative 3

Alternative 3 has the smallest area designated for OSV use and lowest percentage of sites within the high-use areas. Therefore, this alternative has the lowest potential for direct and indirect effects from general OSV use.

Alternative 4

Alternative 4 has the second largest area designated for OSV use and the second highest percentage of sites in the high-use areas. Therefore, alternative 4 has the second highest potential for direct and indirect effects from OSV use.

Summary

Alternative 1 has the highest overall potential to affect cultural resources with alternative 2 having the second highest potential to affect. Alternative 4 has the third highest potential to affect while alternative 3 has the least potential to affect cultural resources.

Mitigations

Mitigations used to protect soils and aquatic species will also protect cultural resources.

Soil Project Design Features

- Grooming shall not occur when the ground surface is exposed and soil damage or rutting could occur. The operator shall consider recent, current, and forecasted weather and snow conditions to ensure these conditions are met.
- Prohibit OSV use and grooming in wetlands unless protected by at least 1 foot of packed snow or 2 inches of frozen soil, unless there is no other practicable alternative. If OSV trails must enter wetlands, use bridges or raised prisms with diffuse drainage to sustain flow patterns. Set crossing bottoms at natural levels of channel beds and wet meadow surfaces. Avoid actions that may dewater or reduce water budgets in wetlands.

Aquatic Species and Habitat

- Prohibit OSV use on lakes, reservoirs, ponds and any open surface water.

By following the mitigation measures outlined in chapter 2 from the Regional PA, impacts and surface effects to cultural resources from OSV use will be reduced to No Effect to Cultural Resources.

Cumulative Effects for Cultural Resources

Plowing of roads and trailheads that access OSV areas is a reasonably foreseeable action that could potentially affect cultural resources within the OSV project area and occur in the same time period as OSV use. Plowing effects differ based on whether the road and trailheads are paved or unpaved. Plowing unpaved areas has the potential to breaking or crushing artifacts, changing artifact provenance, and mixing and dispersal of archaeological soils. Plows can move historic and prehistoric artifacts to new locations within a site or spread artifacts and archaeological soil outside the original site boundaries. This change in artifact and soil provenance alters site integrity.

There are no other reasonably foreseeable projects that will be occurring in this project area that would also affect the cultural resources analyzed in this document. Cultural resources outside this project are analyzed on a project by project basis and for sites on the Lassen National Forest the vast majority of projects use standard mitigations which would greatly reduce or eliminate effects to those resources. The greatest cumulative effect to cultural resources comes from projects not on federal lands. Because of the rapid rate of urbanization, the loss of cultural resources, often unmitigated, is putting greater significance on the cultural resources on Lassen National Forest. The cultural resources on National Forest System lands are afforded a higher level of protection than those on private lands. Thus the public looks to the national forest cultural resources as a more valued resource. At the same time, given the changing cultural demographics, some national forest users may not see the relevance of cultural resource protection to their cultural norms and values, which impedes the effort to protect cultural resource sites.

Through implementation of mitigation measures, there would be no differences in cumulative effects on cultural resources by authorized activities, which appear to be categorically low under the different alternatives. The difference between alternatives and their potential effects to cultural resources comes from the potential difference in open area indirect effects.

When Avoidance Is Not Possible.

If mitigation procedures described in chapter 2 cannot be implemented to protect heritage resources, the Forest Service shall immediately consult with State Historic Preservation Office (SHPO) to ascertain the expected severity of damage. If the SHPO and Forest Service agree that the activity will not diminish or destroy those qualities that may make the property eligible, including potential visual impacts if NRHP criteria A or C may be relevant, the Forest Service shall proceed with the activity using all appropriate protection measures.

Unanticipated Discoveries

There is always the possibility that surface and sub-surface cultural resources would be located during project operations. Should any additional project cultural resources be located, the find must be protected from operations and reported immediately to the Heritage Resource Staff. All operations in the vicinity of the find will be suspended until the sites is visited and appropriate recordation and evaluation is made by a Forest Service archaeologist.

Effects

Through the use of mitigation measures, previous identification and effects monitoring that took place under the 2010 Record of Decision Motorized Travel Management Lassen National Forest, and through the use of *Programmatic Agreement Among The U.S.D.A. Forest Service, Pacific Southwest Region, U.S.D.A. Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, And Advisory Council On Historic Preservation Regarding The Process For Compliance With Section 106 Of The National Historic Preservation Act For Designating Motor Vehicle Routes And Managing Motorized Recreation On The National Forests In California* (2006; Travel Management PA), with survey and monitoring that took place from 2010-2013. All alternatives have been determined to have No Adverse Effect to cultural resources.

Because all surveys and site protection measures have and will follow standards defined in the Regional PA and/or Travel Management PA all alternatives have a No Adverse Effect to historic properties under NHPA and have no direct, indirect effects or cumulative effects under NEPA.

Impacts on Botanical Resources

Because OSV use and snow trail grooming may have potential to harm Threatened, Endangered, Proposed, or Sensitive (TEPS) plants; Survey and Manage plants; and Special Interest plants, this analysis will evaluate the direct, indirect, and cumulative effects of the alternatives on these botanical resources that could result from the proposed actions.

Noxious Weeds

Noxious/invasive weeds sections present the weed species that are present and contain an analysis of effects from weeds and a determination of each alternative's risk of introducing and/or spreading weed species in the project area.

Other Botanical Resources

In addition, an evaluation of designated areas pertaining to botanical resources, such as Special Interest Areas (SIAs) is presented in Other Botanical Resources sections.

Relevant Laws, Regulations, and Policy

Federal Law and Policy

Endangered Species Act (ESA). The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) requires that any action authorized by a Federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE) species, or result in the destruction or adverse modification of critical habitat for these species. Section 7 of the ESA, as amended, requires the responsible Federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities would not be likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of critical habitat for these species. This assessment is documented in a Biological Assessment (BA).

Forest Service Manual and Handbooks (FSM/H 2670). Forest Service Sensitive species discussed in this analysis are plant species identified by the Regional Forester for which population viability is a concern within Region 5 of the National Forest System. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on national forests. It is Forest Service policy to analyze impacts to Sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE).

Forest Service Manual 2670.32 (USDA Forest Service 2005) directs the Forest Service to avoid or minimize impacts to species whose viability has been identified as a concern, and therefore listed as Sensitive by the Regional Forester. If impacts cannot be avoided then the Forest Service must analyze the significance of the potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. Impacts may be allowed but the decision must not result in a trend toward Federal listing.

Forest Service Manual 2670.22 (USDA Forest Service 2005) directs national forests to “maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.” To comply with this direction, forests are encouraged to track and evaluate effects to additional species that may be of concern even

though they are not currently listed as Sensitive. Such plant species are referred to as Special Interest or watch list species.

Forest Service Manual 2900 (USDA Forest Service 2011) contains national direction for noxious weed management. Specific policies included in FSM 2900 include:

- Determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.
- Ensure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas. Integrate visitor use strategies with invasive species management activities on aquatic and terrestrial areas of the National Forest System. At no time are invasive species to be promoted or used in site restoration or re-vegetation work, watershed rehabilitation projects, planted for bio-fuels production, or other management activities on national forests and grasslands.
- Use contract and permit clauses to require that the activities of contractors and permittees are conducted to prevent and control the introduction, establishment, and spread of aquatic and terrestrial invasive species. For example, where determined to be appropriate, use agreement clauses to require contractors or permittees to meet Forest Service-approved vehicle and equipment cleaning requirements/standards prior to using the vehicle or equipment in the National Forest System.

Executive Order (E.O.) 13112 (USDA Forest Service 1999) was signed on Feb 3, 1999, establishing the National Invasive Species Council (NISC) to ensure that Federal programs and activities to prevent and control invasive species are coordinated, effective and efficient. E.O. 13112 defines an invasive species as “...an alien (or non-native) species whose introduction does, or is likely to cause economic or environmental harm or harm to human health.”

Land and Resource Management Plan

The Lassen National Forest Land and Resource Management Plan (LRMP) (USDA Forest Service 1993) provides standards and guidelines for the following botanical resources:

Threatened, Endangered, Proposed, and Sensitive plants (LRMP p. 4-36)

- a. Maintain habitat and viable populations to contribute to eventual de-listing of Sensitive plants that are found on the forest.
 1. Identify, preserve, or enhance Sensitive plant populations.
 2. Restrict vegetative or soil disturbance in areas occupied by Sensitive plants, unless manipulation is needed to perpetuate the species.
 3. Within the planning period, develop Species Management Guides for Sensitive plants that identify population goals and compatible management activities.
- b. Manage Sensitive plants to insure that species do not become Threatened or Endangered because of Forest Service actions.
 1. Evaluate all proposed projects for potential Sensitive plant habitat. Conduct surveys at the correct time of year for species identification if potential habitat exists in a project area.

2. If Sensitive plants are found in a proposed project, modify the project or take mitigative action as necessary to protect the habitat.

Noxious/Invasive Weeds (LRMP p. 4-25)

- a. Reduce impacts of forest pests on all resources to acceptable levels through integrated pest management.
 1. Use an integrated pest management (IPM) approach to managing pests during the planning and implementation of all activities that influence vegetation. Consider a full range of pest management alternatives for each project. Select treatment methods through an environmental analysis process that considers the environmental effects, treatment efficacy, and cost effectiveness of each alternative. Determine monitoring and enforcement plans during this site-specific process. Also use pest detection, surveillance, evaluation, prevention, suppression and post-action evaluation as integral components of this IPM approach.
 3. Cooperate with the State and counties in control of noxious weeds and predation.

Survey and Manage Species

Forest-wide standards and guidelines for “Survey and Manage” old-growth associated species were revised in January 2001, and described in the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures, Standards and Guidelines (2001 ROD) (USDA FS and USDI BLM 2001). Category A and C species that are considered to be within the California Klamath Province require pre-disturbance field survey prior to implementing management actions that could significantly, negatively affect the species’ habitat or persistence of the species on the site. Pre-disturbance surveys are not required if delay in implementation of a proposed action to perform surveys would result in an unacceptable environmental risk. The adopted standards and guidelines for Survey and Manage species only applies within the area of the Northwest Forest Plan (NWFP), which, on the Lassen National Forest, encompasses approximately 41,893 acres in the northwest portion of the Hat Creek Ranger District.

Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment includes the following direction applicable to motorized travel management and noxious weeds:

- Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.
- Sensitive Plant Surveys (Corrected Errata, April 19, 2005): Conduct field surveys for TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outlined in the Forest Service Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file. (Management Standard & Guideline 125). The standards and guidelines provide direction for conducting field surveys, minimizing or eliminating direct and indirect impacts from management activities, and adherence to the Regional Native Plant Policy (USDA Forest Service 2004).

- Goals for noxious weed management are to manage weeds using an integrated weed management approach. Priority 1 is to prevent the introduction of new invaders. Priority 2 is to conduct early treatment of new infestations. Priority 3 is to contain and control established infestations (SNFPA ROD page 36). Applicable Standards and Guidelines for noxious weed management (SNFPA ROD pages 54-55, #36-41, 47-49) are listed below.
- 36. Inform forest users, local agencies, special use permittees, groups, and organizations in communities near national forests about noxious weed prevention and management.
- 37. Work cooperatively with California and Nevada State agencies and individual counties (for example, Cooperative Weed Management Areas) to: (1) prevent the introduction and establishment of noxious weed infestations and (2) control existing infestations.
- 38. As part of project planning, conduct a noxious weed risk assessment to determine risks for weed spread (high, moderate, or low) associated with different types of proposed management activities. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy.
- 39. When recommended in project-level noxious weed risk assessments, consider requiring off-road equipment and vehicles (both Forest Service and contracted) used for project implementation to be weed free. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy.
- 40. Minimize weed spread by incorporating weed prevention and control measures into ongoing management or maintenance activities that involve ground disturbance or the possibility of spreading weeds. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy.
- 41. Conduct follow-up inspections of ground disturbing activities to ensure adherence to the Regional Noxious Weed Management Strategy.
- 47. Complete noxious weed inventories, based on regional protocol. Review and update these inventories on an annual basis.
- 48. As outlined in the Regional Noxious Weed Management Strategy, when new, small weed infestations are detected, emphasize eradication of these infestations while providing for the safety of field personnel.
- 49. Routinely monitor noxious weed control projects to determine success and to evaluate the need for follow-up treatments or different control methods. Monitor known weed infestations, as appropriate, to determine changes in weed population density and rate of spread.

Special Area Designations

Special Interest Areas (SIAs) may have specific management objectives for unique botanical features or other features of interest. On the Lassen National Forest, no management plans are available for SIAs.

The Lassen LRMP (1993, pp. 4-99 to 4-102) contains a prescription for special areas, including Experimental Forests, RNAs, SIAs, and Wild and Scenic Rivers. The purpose of the prescription is to preserve areas with unusual historical, geological, botanical, zoological, paleontological, or other special characteristics for public enjoyment and research. These areas are managed primarily to produce benefits other than timber, range, forage, minerals, and other commodities. Off-road vehicle use is not allowed in RNAs, and so these areas should be excluded from OSV use. Restricted off-road vehicle use is allowable in special areas other than RNAs. This prescription applies to both designated and proposed special areas. Standards and Guidelines are also described for these special areas, and those that apply to OSV use are presented below:

- Manage recreation according to the designated recreation opportunity spectrum classes.
- Prohibit motorized vehicles within research natural areas.

Desired Condition

One goal of the Lassen National Forest Botany Program is to maintain viable populations of TEPS plants, Survey and Manage plants, and Special Interest plants. In addition, it is desired that invasive weed species are reduced by a combination of control methods along with prevention practices including education and requirements for weed-free materials and equipment.

Issues Addressed in This Analysis

Issues

OSV uses would have potential to cause direct and indirect effects to TEPS plants, Survey and Manage plants, Special Interest plants, and invasive plants, but would be most likely to affect those which have living tissues present within the snow column each season (such as trees or shrubs). Several public comments have been received that raise concerns about the effects of OSV use on general vegetation and rare species. Potential effects may be either direct by damage or death to individual plants from OSV (stem breaking, crushing, etc.), or indirect by increasing the opportunity for pathogens to attack damaged plant tissues or by altering habitat. Potential effects include but would not be limited to: physical damage to plants and habitats; reduced seed production; decreased plant vigor; changes in hydrology; changes to soils, especially erosion and sedimentation; changes in physiological responses; and increases in risk of weed introduction and spread. These potential effects become much more likely if OSV use occurs where/when there is inadequate snow depth.

Localized pollution and compaction of snow may lead to changes in plant composition and habitat suitability. Weed seeds may be transported into areas open to OSV use. When snow cover is not adequate, OSV use on and off established routes has potential to affect some TEPS plants, Survey and Manage plants, Special Interest plants, and their habitats. Some species may emerge from the ground very early in the growing season and subsequent snowfall may accumulate enough afterwards to allow authorized OSV use. The proposed minimum snow depth requirements are presumed to be sufficient to protect the majority of plant species from damage.

Potential effects from invasive plant species will be addressed. The proposal and alternatives will also be evaluated for appropriate management and Forest Plan consistency for those special interest areas (SIAs) with a focus on botanical resources.

Resource Indicators and Measures

Table 76. Botanical resources indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure	Used to address: P/N, or key issue?	Source (LRMP S/G; law or policy, BMPs, etc.)?
Vegetation	Species presence	Acres of currently known TEPS, Survey and Manage, and Special Interest plant occurrences within open OSV use areas. Acres of currently known TEPS, Survey and Manage, and Special Interest plant occurrences within 100 feet of designated OSV routes.	No	FSM 2670

Resource Element	Resource Indicator	Measure	Used to address: P/N, or key issue?	Source (LRMP S/G; law or policy, BMPs, etc.)?
Vegetation	Qualitative discussion of species' responses to proposed activities	Survey and Manage and Special Interest plants effects determination.	No	FSM 2670
Vegetation	Noxious/invasive weed presence	Acres of currently known weed infestations within open OSV use areas. Acres of currently known weed infestations within 100 feet of designated OSV routes.	No	FSM 2900
Vegetation	Noxious/invasive weed response to proposed activities	Level of risk (high, moderate, low) for the project introducing or spreading weeds.	No	FSM 2900
Vegetation	Presence of designated botanical resource areas (SIAs)	Acres of botanical resource areas within open OSV use areas. Acres of botanical resource areas within 100 feet of designated OSV routes.	No	LRMP pp. 4-99 to 4-102

Environmental Consequences

Methodology

This analysis uses ArcMap and relevant Geographic Information System (GIS) data layers from the Lassen National Forest and the California Natural Diversity Database (CDFG CNDDDB 2015). The GIS layers of proposed OSV use designations and groomed trails were overlain with the botanical resource layers to identify areas of potential effects.

A full list of plant species was considered for potential effects from the Modified Proposed Action and alternatives. Table 77 lists USFWS Threatened, Endangered or Proposed plants and their critical habitats, as well as Region 5 Sensitive plants that may be present or are known within the planning area. Survey and Manage plants considered in this analysis are presented in table 78. Special Interest plants that are known to occur within the planning area are presented in table 79. The possibility of effects to each Special Interest species were evaluated based on growth form, timing of important life cycle elements (i.e., emergence, flowering, seed production, germination, etc.), identified threats, important habitat components, and the expected interaction with disturbances associated with OSV use and snow trail grooming.

This biological evaluation/biological assessment reviews the Modified Proposed Action and alternatives in sufficient detail to determine the level of effect that would occur to federally listed plants and Region 5 Sensitive plant species. One of four possible determinations is chosen based on the available literature, a thorough analysis of the potential effects of the project, and the professional judgment of the botanist who completed the evaluation. The four possible determinations (from FSM 2672.42) are:

- No impact
- Beneficial impact

- May affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area
- May affect individuals, and is likely to result in a trend toward Federal listing or loss of viability in the planning area

Similar categories for federally listed threatened and endangered species are:

- No effect
- Beneficial effect
- May affect, not likely to adversely affect
- May affect, likely to adversely affect

Information Sources

Information used in this analysis includes pertinent scientific literature, project specific botanical data, results of surveys and site revisits, local knowledge of Lassen National Forest botanists, and GIS layers of the following data: project boundary, actions by alternative, Lassen National Forest TEPS plant occurrences, and the California Natural Diversity Database (CDFG CNDDDB 2015).

Incomplete and Unavailable Information

There is little research and information available regarding the responses of each plant species or whole plant communities from OSV uses, including indirect effects from snow compaction and vehicle emissions during the winter.

Assumptions specific to the botanical resources analysis:

- Plants would be unlikely to be directly affected by authorized OSV use (with the specified snow depth requirements) when their living tissues are not present above ground. Therefore, only shrub or tree species would be likely to be directly affected by OSV use.
- Indirect effects, such as those potentially resulting from snow compaction and vehicle emissions, would likely be concentrated in the corridors along designated OSV trails (groomed or ungroomed). Therefore, an area within 100 feet of designated OSV trails is reasonably foreseeable to be affected by snow compaction, emissions, or other contamination. Areas designated for OSV use outside these concentrated use corridors would be much less likely to experience measurable indirect effects.
- Over-snow vehicles, towing vehicles, or trailers may carry mud or other debris containing weed seeds from infested areas to trailheads and potentially indirectly into any areas designated for OSV use.
- Only authorized OSV uses will be analyzed. Concerns arising from unauthorized uses will be addressed as law enforcement issues and may prompt corrective actions.
- Resource monitoring will identify unexpected types or levels of impacts to botanical resources, and may also prompt corrective actions as warranted.

Spatial and Temporal Context for Effects Analysis

The project area boundary serves as the analysis boundary for direct, indirect, and cumulative effects. Effects to vegetation would be expected to have occurred or become evident within one or two years of disturbance and this constitutes the short term. Effects that linger beyond 2 years are considered long-term effects, and may extend to decades or centuries. Such long-term effects beyond 20 years become increasingly difficult to predict due to unknown interactions and the many environmental variables with numerous possible outcomes.

Direct/Indirect Effects Boundaries

The spatial boundary for analyzing the direct and indirect effects to these botanical resources is the project area boundary, because all expected effects relevant to these resources would occur and remain within this area.

Cumulative Effects Boundaries

Because effects from the proposed activities would interact with effects from other ongoing or future projects only within the project area boundary, the cumulative effects boundary is also the project area boundary.

Affected Environment

Existing Condition

Threatened, Endangered, and Proposed Plants

Official species lists for this project were obtained on September 29, 2015, from the Klamath Falls, Sacramento, Yreka, and Nevada Field Offices of the United States Department of the Interior, Fish and Wildlife Service (USDI FWS 2015a, USDI FWS 2015b, USDI FWS 2015c, USDI FWS 2015d). The lists identify seven plant species to consider, because they may be present within the general area of the Lassen National Forest:

- *Fritillaria gentneri* (Gentner's fritillary) (Endangered)
- *Limnanthes floccosa* ssp. *californica* (Butte County meadowfoam) (Endangered)
- *Tuctoria greenei* (Greene's tuctoria) (Endangered)
- *Chamaesyce hooveri* (Hoover's spurge) (Threatened)
- *Orcuttia tenuis* (slender orcutt grass) (Threatened)
- *Calochortus persistens* (Siskiyou Mariposa Lily) (Candidate)
- *Pinus albicaulis* (whitebark pine) (Candidate)

The candidate species *Pinus albicaulis* (whitebark pine) and *Calochortus persistens* (Siskiyou Mariposa Lily) are addressed as Region 5 Sensitive species in this analysis. *Calochortus persistens* is not suspected to occur on Lassen National Forest lands, but *Pinus albicaulis* does occur at some higher elevations on the forest.

Chamaesyce hooveri (Hoover's spurge) occurs in vernal pools from Tehama to Merced counties below 1,000 feet in elevation. Designated critical habitat does not occur on the Lassen National Forest (USFWS 2003a), and suitable habitat for the species is also not present.

Fritillaria gentneri (Gentner's fritillary) is endemic grows in grassland and chaparral habitats primarily in Jackson and Josephine counties in southwestern Oregon. It also occurs in northern California very close to the Oregon border, and all occurrences are within about a 30-mile radius of Jacksonville, Oregon (USFWS 2003b). The Lassen National Forest is well outside the suspected distributional range for this species.

Limnanthes floccosa ssp. *californica* (Butte County meadowfoam) has not been found here and does not have designated critical habitat on the forest (USFWS 2003a). The project area is outside the range for this species which is known only to valley and foothill grasslands of the lower elevations of Butte County.

Orcuttia tenuis (slender Orcutt grass) and *Tuctoria greenei* (Greene's tuctoria) are the only listed or proposed plant species whose range or critical habitat is present on the Lassen National Forest. Critical habitat has been designated for *Orcuttia tenuis* and *Tuctoria greenei* including approximately 25,000 acres located within or adjacent to the boundaries of the Lassen National Forest (USFWS 2003a).

Region 5 Sensitive Plants

There are currently 49 Region 5 Sensitive plant species known to occur in the project area. See table 77 for the complete list and evaluation of species and habitat presence.

Species Considered in the Analysis

The species and critical habitat in table 77 that may occur in the project area or be affected by activities associated with the modified proposed action and alternatives were evaluated for potential presence in the action area. Species that are not known or suspected to occur in areas that may be designated for OSV use are not carried forward into the effects analysis.

Table 77. TEPS plant species considered

Scientific Name Common Name	Habitat	Species present?	Habitat present?	Effects analysis needed?
Threatened Plants				
<i>Chamaesyce hooveri</i> Hoover's spurge	Vernal pools, typically on alluvial fans or terraces of ancient rivers or streams, along the eastern margin of California's Central Valley, from Tehama County to Merced County. Below 1,000 ft. Flowers July-October. Annual herb.	No	No	No. No Effect. Habitat does not exist on Lassen National Forest.
<i>Chamaesyce hooveri</i> designated critical habitat	Critical habitat is designated in Tehama, Butte, Stanislaus, Merced, and Tulare Counties.	No	No	No. No Effect. Critical habitat does not exist on the Lassen National Forest.
<i>Orcuttia tenuis</i> slender orcutt grass	Vernal pools, in oak and/or pine woodlands. Below 5,800 ft. Flowers May-July. Annual grass. Species occurs on Lassen National Forest.	Yes	Yes	Yes
<i>Orcuttia tenuis</i> designated critical habitat	Critical habitat units are designated in Siskiyou, Modoc, Shasta, Lassen, Tehama, Plumas, Lake, and Sacramento Counties. 23,317 acres of critical habitat occurs on the Lassen National Forest.	Yes	Yes	Yes
Endangered Plants				
<i>Fritillaria gentneri</i> Gentner's Fritillary	Grassland and chaparral habitats within, or on the edges of, dry, open, mixed-species woodlands at elevations below 1,544 meters (5,064 feet). The species is highly localized within about a 30-mile radius of Jacksonville, Oregon (USFWS 2003a).	No	No	No. No Effect. Habitat does not exist on Lassen National Forest.
<i>Limnanthes floccosa</i> <i>ssp. californica</i> Butte County Meadowfoam	Vernal pools in valley and foothill grasslands of Butte County, below about 3,000 feet. Flowers March-May. Annual herb. It is known or suspected to occur in Butte, Glenn, and Tehama Counties. Habitat does not occur on Lassen National Forest.	No	No	No. No Effect. Habitat does not exist on Lassen National Forest.
<i>Limnanthes floccosa</i> <i>ssp. californica</i> designated critical habitat	Critical habitat is designated in Tehama and Butte Counties. No critical habitat exists on the Lassen National Forest.	No	No	No. No Effect. Critical habitat does not exist on the Lassen National Forest.
<i>Tuctoria greenei</i> Greene's tuctoria	Vernal Pools. On private land at Murken Lake. 3500 ft. and below. Flowers May-July. Annual grass. No known occurrences exist on the Lassen National Forest, but suitable habitat is present.	No	Yes	Yes
<i>Tuctoria greenei</i> designated critical habitat	Critical habitat is designated in Shasta, Tehama, Butte, Stanislaus, Tuolumne, Merced, Mariposa, and Madera Counties. 1,551 acres of critical habitat occurs on the Lassen National Forest.	No	Yes	Yes.
Sensitive Plants				
<i>Astragalus pulsiferae</i> <i>var. suksdorfii</i> Suksdorf's milk-vetch	Sandy volcanic soils in sagebrush or pine within a 25 mile radius of Mt. Lassen; Pine Creek Valley and near Bogard Buttes; 4,500-6,500 ft. Flowers May-Aug., Perennial herb.	Yes	Yes	Yes
<i>Boechea constancei</i> Constance's rockcress	Habitat of serpentine soils or rock outcrops; 3,500-6,750 ft. Flowers May-June. Perennial herb.	Yes	Yes	Yes
<i>Botrychium ascendens</i> upswept moonwort	Perennially wet springs, seeps, and streambanks in mixed coniferous forests; 5,200-6,240 ft. Flowers July-Aug. Perennial herb.	Yes	Yes	Yes
<i>Botrychium crenulatum</i> scalped moonwort	Perennially wet springs, seeps, and streambanks in mixed coniferous forests well-surveyed; 5,040-6,000 ft. Flowers June-July. Perennial herb.	Yes	Yes	Yes

Over-snow Vehicle Use Designation

Scientific Name Common Name	Habitat	Species present?	Habitat present?	Effects analysis needed?
<i>Botrychium lunaria</i> common moonwort	Habitat of moist subalpine meadows, stream banks, springs or seeps; 7,000-10,000 ft. Flowers July-Aug. Perennial herb.	No	Possible	Yes
<i>Botrychium minganense</i> Mingan moonwort	Perennially wet springs, seeps, and streambanks in mixed coniferous forests; 5,240-6,250 ft. Flowers July-Aug. Perennial herb.	Yes	Yes	Yes
<i>Botrychium montanum</i> western goblin	Perennially wet springs, seeps, and streambanks in mixed coniferous forests; 5,200-6,250 ft. Flowers July-Aug. Perennial herb.	Yes	Yes	Yes
<i>Botrychium pedunculosum</i> stalked moonwort	Springs, seeps or streambanks in upper montane conifer forest. Flowers in August. Perennial herb.	No	Possible	Yes
<i>Botrychium pinnatum</i> northwestern moonwort	Perennially wet springs and streambanks in mixed coniferous forests; 5,200-6,250 ft. Flowers July-Oct. Perennial herb.	Yes	Yes	Yes
<i>Bruchia bolanderi</i> Bolander's bruchia	Habitat of bare soil along westside montane stream banks in mixed conifer forests; One occurrence reported, but unconfirmed. 3,800-8,200 ft. Bryophyte, Moss (perennial).	No	Possible	Yes
<i>Buxbaumia viridis</i> green bug-on-a-stick	Habitat of highly decayed logs, peaty soil or humus in westside, moist, shaded conditions. Bryophyte, Moss (perennial).	No	Possible	Yes
<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i> long haired star tulip	Habitat of eastside seasonally wet meadows north of Highway 299; 4,000-6,300 ft. Flowers June-July. Perennial herb.	Yes	Yes	Yes
<i>Calochortus persistens</i> Siskiyou mariposa lily	Open, rocky areas, NE Klamath Ranges (Siskiyou County); 3,280-4,921 ft. Flowers June-July. Perennial herb.	No	No	No. No Impact. Not suspected to occur on the Lassen National Forest.
<i>Clarkia gracilis</i> ssp. <i>albicaulis</i> white-stemmed clarkia	Habitat of low-elevation westside foothill open areas; 500-3,600 ft. Flowers May-July. Annual herb.	Yes	Yes	Yes
<i>Clarkia mildrediae</i> ssp. <i>mildrediae</i> Mildred's clarkia	Habitat of sandy, often granitic or disturbed soils in lower montane mixed conifer forests; 1,500-5,200 ft. Flowers June-July. Annual herb.	Yes	Yes	Yes
<i>Collomia larsenii</i> talus collomia	Loose volcanic gravel on talus slopes of alpine fell-fields; 7,250-11,500 ft. Flowers July-Oct. Perennial herb. The single known occurrence on LNF is within the Thousand Lakes Wilderness.	No	No	No. No Impact. Not suspected to occur in areas proposed for OSV use.
<i>Cryptantha crinita</i> silky cryptantha	Habitat of foothill gray pine forest and blue oak woodlands near the Ishi Wilderness; below 3,700 ft. Flowers April-May. Annual herb.	Yes	Yes	Yes
<i>Cypripedium fasciculatum</i> clustered lady's-slipper	Habitat of mid to late seral westside mixed conifer forest south of Lake Almanor; 2,000-6,000 ft. Flowers March-July. Perennial herb.	Yes	Yes	Yes
<i>Cypripedium montanum</i> mountain lady's-slipper	Habitat of moist mixed coniferous forest and riparian areas with high canopy cover, north of Burney (Hat Creek RD); 2,800-6,000 ft. Flowers March-July. Perennial herb.	Yes	Yes	Yes
<i>Eremogone cliffonii</i> Clifton's eremogone	Chaparral and coniferous forests, on granitic sand of road cutbanks and forest openings. Flowers April-Aug. Perennial herb.	Yes	Yes	Yes
<i>Eriastrum tracyi</i> Tracy's eriastrum	Chaparral and cismontane woodland, in gravelly clay, in open areas. 1,200-5,300 ft. Flowers June-July. Annual herb.	Yes	Yes	Yes

Scientific Name Common Name	Habitat	Species present?	Habitat present?	Effects analysis needed?
<i>Eriogonum prociduum</i> prostrate buckwheat	Habitat of eastside juniper woodland or low sage flats; Harvey Valley; 4,200-8,900 ft. Flowers June-July. Perennial mat/subshrub.	Yes	Yes	Yes
<i>Eriogonum spectabile</i> Barron's buckwheat	Habitat of glaciated andesite soil in open red fir/lodgepole forest south of Lassen Volcanic NP; 6,600-6,640 ft. Flowers July-Aug. Shrub.	Yes	Yes	Yes
<i>Frangula purshiana</i> ssp. <i>ultramafica</i> <i>caribou coffeeberry</i>	On substrates of serpentized peridotite in the Bucks Lake area, Red Hill. 2,700-5,150 ft. Flowers May-July. Shrub.	Yes	Yes	Yes
<i>Fritillaria eastwoodiae</i> Butte County fritillary	Habitat of lower westside mixed conifer or brushy areas; 100-4,000 ft. One occurrence reported in Indian Creek RNA, but is unconfirmed. Flowers March-June. Perennial herb.	No	Possible	Yes
<i>Helodium blandowii</i> Blandow's bog moss	Habitat of wet meadows, seeps or fens in westside subalpine coniferous forest or alpine; 6,000-8,100 ft. Bryophyte, Moss (perennial).	No	Possible	Yes
<i>Juncus leiospermus</i> var. <i>leiospermus</i> Red Bluff dwarf rush	Habitat of lower elevation vernal pool or seasonally wet flats north of Hwy 299; 175-3,300 ft. Flowers April-June. Perennial herb.	Yes	Yes	Yes
<i>Juncus luciensis</i> <i>Santa Lucia dwarf rush</i>	Wet, sandy soils of seeps, meadows, vernal pools, streams, and roadsides. 985-6695 ft. Flowers April-July. Perennial herb. One reported occurrence at Papoose Meadows has not been relocated.	No	Yes	Yes
<i>Lewisia kelloggii</i> ssp. <i>hutchisonii</i> Hutchison's lewisia	Ridge tops or relatively high elevations in Sierran or Klamath mountains; 5,100-7,000 ft. Flowers July-Aug. Perennial herb.	Yes	Yes	Yes
<i>Limnanthes floccosa</i> ssp. <i>bellingermana</i> Bellinger's meadowfoam	Seasonally wet areas in oak or oak/juniper woodlands north of Highway 299, below 3,600 ft. Flowers April-June. Annual herb.	Yes	Yes	Yes
<i>Lomatium roseanum</i> adobe parsley	Shallow, rocky soil on open, wind-swept ridge tops, Diamond Mountains. 5,880-7,280 ft. Flowers April-May. Perennial herb.	Yes	Yes	Yes
<i>Meesia uliginosa</i> broad-nerved hump moss	Habitat of logs in westside fens; 4,300-8,200 ft. Bryophyte, Moss (perennial).	Yes	Yes	Yes
<i>Mimulus evanescens</i> ephemeral monkeyflower	Seasonal lake margins or vernal wet areas in sagebrush/ juniper zone. 3,900-5,580 ft. Flowers June-Aug. Annual herb.	Yes	Yes	Yes
<i>Monardella follettii</i> Follett's monardella	Habitat of serpentine soil; 2,800-5,500 ft. Flowers June-Aug. Sub-shrub.	Yes	Yes	Yes
<i>Oreostemma elatum</i> Plumas aster	Habitat of westside wet meadows and fens; 3,800-6,200 ft. Flowers in August. Perennial herb. One occurrence reported but unconfirmed.	No	Yes	Yes
<i>Packera eurycephala</i> var. <i>lewisrosei</i> cut-leaved ragwort	Habitat of serpentine soil; 1,000-6,200 ft. Flowers April-June. Perennial herb.	Yes	Yes	Yes
<i>Peltigera gowardia</i> veined water lichen	Habitat of cool, clear and shallow spring-fed westside streams. Aquatic jelly lichen.	Yes	Yes	Yes
<i>Penstemon personatus</i> closed-throated beardtongue	North-facing slopes in upper mixed conifer forest, southern Almanor RD; 4,500-6,500 ft. Flowers July-Sept. Perennial herb.	Yes	Yes	Yes
<i>Penstemon sudans</i> Susanville beardtongue	Open, rocky volcanic soils in yellow pine forest or juniper woodlands near Susanville; 3,900-5,600 ft. Flowers June-July. Perennial herb.	Yes	Yes	Yes
<i>Phacelia inundata</i> playa phacelia	Habitat of eastside subalkaline flats; 5,000-6,600 ft. Flowers May-July. Annual herb.	Yes	Yes	Yes
<i>Pinus albicaulis</i> whitebark pine	Upper red fir forest to timberline. 6,560-12,140 ft. Coniferous tree.	Yes	Yes	Yes

Scientific Name Common Name	Habitat	Species present?	Habitat present?	Effects analysis needed?
<i>Poa sierra</i> Sierra bluegrass	Steep, shady, rocky slopes in lower montane conifer forest. 1,195-3,805 ft. Flowers April-June. Perennial grass (herb).	No	Possible	Yes
<i>Pyrrocoma lucida</i> sticky pyrrocoma	Spring-wet, alkaline, clay soils below 6,000 ft., especially in sagebrush-meadow ecotone. Flowers July-Oct. Perennial herb.	Yes	Yes	Yes
<i>Rorippa columbiae</i> Columbia yellow cress	Habitat of large, open, seasonally wet eastside flats (playas); 4,000-5,950 ft. Flowers May-July. Perennial herb.	Yes	Yes	Yes
<i>Rupertia hallii</i> Hall's rupertia	Lower westside mixed conifer forest in Campbellville/Butte Meadows area; below 4,800 ft. Flowers June-Aug. Perennial herb.	Yes	Yes	Yes
<i>Scheuchzeria palustris</i> American scheuchzeria	Habitat of floating sphagnum fens in cold, moderately high elevation lakes; 3,000-9,000 ft. Flowers July. Perennial herb.	Yes	Yes	Yes
<i>Sedum albomarginatum</i> Feather River stonecrop	Habitat of serpentine rock outcrops; 1,500-6,400 ft. Flowers June. Perennial herb.	Yes	Yes	Yes
<i>Silene occidentalis</i> ssp. <i>longistipitata</i> long-stiped campion	Openings in mid-elevation, westside mixed coniferous forests south of Highway 36. 3,300-6,100 ft. Flowers July-Aug. Perennial herb.	Yes	Yes	Yes
<i>Thelypodium howellii</i> ssp. <i>howellii</i> Howell's thelypody	Alkaline meadows, seeps and pastures, sagebrush/rabbitbrush scrub. One occurrence at Dow Butte reported, but unconfirmed. 4,100-6,700 ft. Flowers May-June. Perennial herb.	No	Possible	Yes

All but two sensitive species which have no known occurrences in the planning area are omitted from detailed analysis because it is not known whether the species could exist on the Lassen National Forest and there is considerable uncertainty about whether suitable habitats are present. The exception is for two Sensitive *Botrychium* species, which would be more likely to occur due to their tendency to occur together with other *Botrychium* species that are known on the Lassen National Forest. Their small size also makes them very easy to overlook.

Because they are not present and not suspected of occurring within areas currently or proposed for OSV use, the following species would not be affected and are not carried forward into the effects analysis:

Threatened or Endangered Plants

Chamaesyce hooveri

Chamaesyce hooveri designated critical habitat

Fritillaria gentneri

Limnanthes floccosa ssp. *californica*

Limnanthes floccosa ssp. *californica* designated critical habitat

Sensitive Plants

Calochortus persistens

Collomia larsenii

Listed Species and Critical Habitat Information

***Orcuttia tenuis* (slender orcutt grass)**

Habitat Description

Orcuttia tenuis is a small, annual grass that occupies portions of drying and dried beds of relatively deep vernal pools or vernal pool type habitat with clay soils. The main habitat requirement for *Orcuttia tenuis* is standing water of sufficient quantity and duration to drown out most competition and supply *Orcuttia tenuis*' physiological requirements for prolonged inundation, followed by a period of gradual (becoming total) desiccation (USDA FS and USDI BLM 2012).

Status and Distribution

Orcuttia tenuis was listed as Threatened by the USFWS on March 26, 1997, along with other members of the Orcuttiae grass tribe and two vernal pool herbs (USFWS 1997).

Orcuttia tenuis is endemic to northern California, with the majority of occurrences in Tehama and Shasta Counties, mostly found on private lands, but it also extends into the Modoc Plateau. It is currently known from 82 occurrences, of which 76 are presumed to be extant (USFWS 2005). The 21 occurrences of *Orcuttia tenuis* on the Lassen National Forest (totaling 74 acres) are known from all three ranger districts. Seven of these are not found within designated critical habitat.

Life History

Orcuttia tenuis seeds germinate in the spring while under water, and plants send up long, floating leaves. As the pool dries, plants produce shorter terrestrial leaves, and then flowering stalks. *Orcuttia tenuis* plants generally mature later than other vernal pool annuals, so often they are the only vegetation still green by mid-summer on the vernal pool bed. As an annual, *Orcuttia tenuis* depends on seed production to replenish the seed bank for continued survival. Population sizes can fluctuate dramatically with differing amounts of precipitation each year.

Threats

Habitat loss and fragmentation is the single largest threat to the survival and recovery of listed vernal pool plants (USFWS 2005). Habitat loss generally is a result of urbanization, agricultural conversion, and mining. The principal threats to Modoc-Cascades occurrences of *Orcuttia tenuis* are associated with human-caused hydrologic alterations, livestock activity, recreational/OHV use, and vegetative competition (USDA FS and USDI BLM 2012). Nine of the 21 occurrences on the Lassen National Forest have been at least partially fenced to protect them from livestock and OHV impacts (USDA FS and USDI BLM 2012).

When wheeled vehicles are driven through vernal pools, they may impair hydrological functions by displacing soil, causing erosion, or damaging the swale or riparian connectivity, thus resulting in hydrological changes to these systems. In addition, poorly designed trail and roads systems near vernal pools may cause additional erosion and result in siltation of the vernal pool, which may inhibit germination of listed plant species. Impacts from trampling of plants by OHVs may reduce the reproductive output of vernal pool species, and plants may be crushed or killed (USDI FWS 2005). All of these impacts may have occurred to *Orcuttia tenuis* and its habitat (Sanger 2010) before cross-country travel by wheeled vehicles was discontinued on the Lassen National Forest in 2010 (USDA Forest Service 2010), and some of their effects may be persisting to the present day.

Existing Conservation Documents/Agreements

***Orcuttia tenuis* Species Management Guide (USDA FS and USDI BLM 1989):** 1) All populations would be protected from direct disturbance by Forest Service management activities. Disturbance here includes excessive grazing, vehicle traffic within vernal pools, and hydrologic manipulation within pools.

When necessary, fencing will be the primary method of protection. 2) Vernal pool hydrology of all pools containing *Orcuttia tenuis* will be maintained by designing all earth-moving projects within the drainage area to allow unchanged drainage into the vernal pools.

Conservation Strategy for *Orcuttia tenuis* on Federal Lands of the Southern Cascades and Modoc Plateau (USDA FS and USDI BLM 2012): 1) Protect all occurrences of *O. tenuis* from direct disturbance by Forest Service management activities. Disturbance as defined here may include, for example, vehicle impacts or hydrologic manipulations that negatively affect vernal pool habitat. When necessary, fencing will be the primary method of protection. 2) During project design, identify any sources of potentially detrimental hydrologic impacts to vernal pools, such as borrow pits or stream headcuts. If needed, identify measures to restore vernal pool hydrology at sites where *O. tenuis* habitat has been degraded by hydrologic alteration. 3) During project planning, evaluate existing recreational impacts to vernal pool areas, and incorporate measures to eliminate these impacts, where possible. If necessary, fence or use barriers to eliminate impacts.

***Orcuttia tenuis* Designated Critical Habitat**

Critical habitat was designated in 2003, with the Primary Constituent Elements (PCEs) including (USFWS 2003b):

1. Vernal pools, swales, and other ephemeral wetlands and depressions of appropriate sizes and depths and the adjacent upland margins of these depressions that sustain *Orcuttia tenuis* germination, growth and reproduction, including but not limited to, Northern Volcanic Ashflow and Northern Volcanic Mudflow vernal pools with iron-silica and bedrock hardpan impervious layers, and that typically become inundated during winter rains, but are dry during the summer and do not necessarily fill with water every year.
2. The associated watershed(s) and hydrologic features, including the pool basin, swales, and surrounding uplands (which may vary in extent depending on pool size and depth, soil type and depth, hardpan or claypan type and extent, topography, and climate) that contribute to the filling and drying of the vernal pool or ephemeral wetland, and that maintain suitable periods of pool inundation, water quality, and soil moisture for *Orcuttia tenuis* germination, growth and reproduction, and dispersal, but not necessarily every year.

Eleven of the 21 critical habitat units occur on the Lassen National Forest, a total of 22,258 acres. The threats to *Orcuttia tenuis* critical habitat on the Lassen National Forest are also human-caused hydrologic alterations, livestock activity, recreational/OHV use, and vegetative competition (USDA FS and USDI BLM 2012).

***Tuctoria greenei* (Greene's tuctoria)**

Habitat Description

Similar to *Orcuttia tenuis*, *Tuctoria greenei* is a summer annual grass that grows in vernal pool habitats. *Tuctoria greenei* is partially differentiated from Orcutt grasses by the spiral arrangement of spikelets and lack of floating juvenile leaves. *Tuctoria greenei* adults are unable to tolerate prolonged periods of inundation. Thus, *Tuctoria greenei* in the Central Valley tends to occur in relatively small, early-drying pools. When *Tuctoria greenei* is found in larger pools, these are either the shallow playa type or the species is restricted to the shallow pool margins.

Status and Distribution

In 1997, *Tuctoria greenei*, Greene's tuctoria, was federally listed as Endangered (USFWS 1997) and it is State-listed as Rare. There are currently 44 known occurrences, but only 23 are presumed to be extant.

Within the administrative boundary of the Lassen National Forest, there is one known occurrence of *Tuctoria greenei*, found on private lands within the Murken Lake Vernal Pool. This occurrence is disjunct from the other populations within the Central Valley and two occurrences recently found in Modoc County. Despite numerous surveys within vernal wet areas across the forest, no occurrences have been found on Lassen National Forest lands.

Life History

Tuctoria greenei seeds do not germinate while the vernal pool is still full, but only after they are exposed to light, when the water is almost completely evaporated (USFWS 2005). Germination occurs about 2 months following inundation. During the warm growing season, plants grow and produce seeds for the next year. Individual plants die at the end of the growing season.

Threats

Habitat loss and fragmentation is the single largest threat to the survival and recovery of listed vernal pool plants (USFWS 2005). Habitat loss generally is a result of urbanization, agricultural conversion, and mining. Specific threats to *Tuctoria greenei* are agricultural conversion, urbanization, inappropriate livestock grazing, small population sizes, and herbivory by grasshoppers (USFWS 2005). The Murken Lake Vernal Pool was completely fenced from livestock and OHV in 2010.

***Tuctoria greenei* Designated Critical Habitat**

In 2003 the Fish and Wildlife Service designated 12 critical habitat units for *Tuctoria greenei* (USFWS 2003a). One of the 12 units is located partially on the Lassen National Forest. In the Murken Lake area, 1,702 acres of critical habitat was designated on both Lassen National Forest and private lands; however, only the Murken Lake Vernal Pool itself is believed to contain the primary constituent elements needed to support this species within this critical habitat unit. The Lassen National Forest has approximately 1,551 acres of critical habitat for this species, which includes all Forest Service lands within and adjacent to Murken Lake. The large area of unoccupied habitat was included in the unit to provide protection of the hydrologic processes supporting the species (USFWS 2003a).

The Primary Constituent Elements (PCEs) of designated *Tuctoria greenei* critical habitat include (USFWS 2003b):

1. Vernal pools, swales, and other ephemeral wetlands and depressions of appropriate sizes and depths and the adjacent upland margins of these depressions that sustain *Tuctoria greenei* germination, growth and reproduction, including but not limited to, Northern Claypan, Northern Hardpan, and Northern Basalt flow vernal pools that typically become inundated during winter rains, but are dry during the summer and do not necessarily fill with water every year.
2. The associated watershed(s) and hydrologic features, including the pool basin, swales, and surrounding uplands (which may vary in extent depending on pool size and depth, soil type and depth, hardpan or claypan type and extent, topography, and climate) that contribute to the filling and drying of the vernal pool or ephemeral wetland, and that maintain suitable periods of pool inundation, water quality, and soil moisture for *Tuctoria greenei* germination, growth and reproduction, and dispersal, but not necessarily every year.

The threats to *Tuctoria greenei* critical habitat on the Lassen National Forest include human-caused hydrologic alterations, livestock activity, recreational/OHV use, and vegetative competition from invasive species.

Sensitive Species Information

Aggregating Species for Analysis of Effects

Because OSV effects to various plant species would be expected to be most similar according to their life form and growth habits, the species considered in this analysis are grouped into the following categories:

- **Trees, shrubs, or sub-shrub species**, whose living tissues may be present above or within the snow column, and thus may experience direct effects from OSV uses (physical damage or immediate exposure to exhaust).
- **Perennial herbaceous species**, including grasses and mosses, whose living tissues would be at or below the soil surface, and thus would be unlikely to experience direct effects, but they will be evaluated for impacts by exhaust contaminants trapped by the snow cover or by potential effects from snow compaction.
- **Annual plant species** are generally not growing during the period of authorized OSV use, and thus would not experience direct effects. This group is the least likely to be impacted by the indirect effects of exhaust contaminants and snow compaction.
- **Aquatic plant species** grow underwater and would not be directly affected by OSV use. If an occurrence is located within 100 feet of OSV trails, snowpack contaminants could potentially reach the occupied aquatic habitat when the snow melts. Snow compaction is not expected to affect aquatic habitats in any meaningful or predictable manner.

Survey and Manage Plants

Manage Known Sites Requirement

The 2001 Survey and Manage ROD requires management of known sites of any Category A, B, or E species and high-priority sites of Category C or D species. High-priority sites are those that are needed to provide for reasonable assurance of species persistence. No high-priority sites are located on the Lassen National Forest.

Category A, C, and E species

Currently, six species requiring pre-disturbance surveys are considered to have suitable habitat within the Lassen National Forest.

Table 78. Survey and Manage plant species, Categories A, C, and E

Scientific Name Common Name	Habitat	Known sites within NWFP portion of project?	Potential habitat present?
<i>Botrychium minganense</i> Mingan moonwort Category A	Edge of willow thickets in coniferous forest. No known sites in NWFP area. Also a Region 5 Sensitive species.	No	Yes
<i>Botrychium montanum</i> western goblin Category A	Edge of willow thickets in coniferous forest. No known sites in NWFP area. Also a Region 5 Sensitive species.	No	Yes
<i>Buxbaumia viridis</i> green bug-on-a-stick Category E	Large decay class 3 or 4 logs in streams in coniferous forest. No known sites in NWFP area. Also a Region 5 Sensitive species.	No	Yes
<i>Cypripedium fasciculatum</i> clustered lady's-slipper Category C	Mesic conifer and/or hardwood forest, especially riparian zones. No known sites in NWFP area. Also a Region 5 Sensitive species.	No	Yes

Scientific Name Common Name	Habitat	Known sites within NWFP portion of project?	Potential habitat present?
<i>Cypripedium montanum</i> mountain lady's-slipper Category C	Mesic conifer and/or hardwood forest, especially riparian zones. One site known in NWFP area. Also a Region 5 Sensitive species.	Yes	Yes
<i>Ptilidium californicum</i> California fuzzwort Category A	Lower tree trunks of large-diameter fir or white fir, 3000 to 5000 feet.	Yes	Yes

There are known sites for *Cypripedium montanum* and *Ptilidium californicum* within the NWFP portion of the Lassen National Forest. Because *Cypripedium montanum* is also a Region 5 Sensitive species, it is also being addressed forest-wide in the Biological Assessment/Biological Evaluation for the Lassen OSV Use Designation Project.

Category B species

The 2001 ROD provides direction to perform equivalent effort (project level) field surveys for all Category B Survey and Manage fungi in old-growth habitat in which province-wide strategic surveys (broad scale) have not been completed by September 30, 2010, when ground-disturbing actions are proposed. In 2001 there were 124 Category B fungi on the Survey and Manage list. Strategic survey requirements have been met for 66 of these species, leaving 58 species that call for equivalent effort surveys prior to completion of NEPA analysis. These species are listed in table 79.

Table 79. Survey and Manage Category B fungi with equivalent effort survey requirement

Survey and Manage Category B fungi		
<i>Albatrellus caeruleoporus</i>	<i>Gymnopilus punctifolius</i> In California	<i>Ramaria coulterae</i>
<i>Albatrellus ellisii</i>	<i>Gyromitra californica</i>	<i>Ramaria cyaneigranosa</i>
<i>Albatrellus flettii</i> In Washington and California	<i>Helvella elastica</i>	<i>Ramaria maculatipes</i>
<i>Alpova olivaceotinctus</i>	<i>Hydnotrya inordinata</i> (<i>Hydnotrya</i> sp. nov. #Trappe 787, 792)	<i>Ramaria rainierensis</i>
<i>Balsamia nigrens</i> (<i>Balsamia nigra</i>)	<i>Hydropus marginellus</i> (<i>Mycena</i> <i>marginella</i>)	<i>Ramaria rubribrunnescens</i>
<i>Chamonixia caespitosa</i> (<i>Chamonixia</i> <i>pacifica</i> sp. nov. #Trappe #12768)	<i>Hypomyces luteovirens</i>	<i>Ramaria stuntzii</i>
<i>Choiromyces venosus</i>	<i>Leucogaster microsporus</i>	<i>Ramaria verlotensis</i>
<i>Chrysomphalina grossula</i>	<i>Marasmius applanatipes</i>	<i>Rhizopogon abietis</i>
<i>Clavariadelphus ligula</i>	<i>Martellia fragrans</i>	<i>Rhizopogon brunneiniger</i>
<i>Clavariadelphus subfastigiatus</i>	<i>Martellia idahoensis</i>	<i>Rhizopogon chamaleontinus</i> (<i>Rhizopogon</i> sp. nov. #Trappe 9432)
<i>Cortinarius boulderensis</i>	<i>Octavianina cyanescens</i> (<i>Octavianina</i> sp. nov. #Trappe 7502)	<i>Rhizopogon ellipsosporus</i> (<i>Alpova</i> sp. nov. # Trappe 9730)
<i>Cortinarius cyanites</i>	<i>Otidea smithii</i>	<i>Rhizopogon evadens</i> var. <i>subalpinus</i>
<i>Cudonia monticola</i>	<i>Phaeocollybia californica</i>	<i>Rhizopogon exiguus</i>
<i>Destuntzia fusca</i>	<i>Phaeocollybia piceae</i>	<i>Rhizopogon flavofibrillosus</i>
<i>Destuntzia rubra</i>	<i>Phaeocollybia scatesiae</i>	<i>Rhodocybe speciosa</i>
<i>Entoloma nitidum</i> (<i>Rhodocybe</i> <i>nitida</i>)	<i>Phaeocollybia sipei</i>	<i>Rickenella swartzii</i> (<i>Rickenella setipes</i>)
<i>Gastroboletus ruber</i>	<i>Podostroma alutaceum</i>	<i>Sarcodon fuscoindicus</i>
<i>Gastroboletus vividus</i> (<i>Gastroboletus</i> sp. nov. #Trappe 2897;	<i>Polyozellus multiplex</i>	<i>Sedecula pulvinata</i>

Survey and Manage Category B fungi		
<i>Gastroboletus</i> sp. nov. #Trappe 7515)		
<i>Gastrosuillus umbrinus</i> (<i>Gastroboletus</i> sp. nov. #Trappe 7516)	<i>Ramaria aurantiisiccescens</i>	<i>Tricholomopsis fulvescens</i>
		<i>Tuber asa</i> (<i>Tuber</i> sp. nov. #Trappe 2302)

The following seven Category B fungi are known to occur within the NWFP portion of the Lassen National Forest:

- *Alpova olivaceotinctus*
- *Bondarzewia mesenterica*
- *Clavariadelphus truncatus*
- *Mythicomyces comeipes*
- *Ramaria rubrievanescens*
- *Rhizopogon truncatus*
- *Spathularia flavida*

As an alternative to equivalent effort surveys at the project level, proposed actions may incorporate project design features that meet the management recommendations for conserving fungi habitat in the following ways (derived from Castellano et al. 1999, Castellano et al. 2003, and USDA FS and USDI BLM 1994):

- retention of overstory canopy cover to maintain shade and soil moisture
 - ◆ 50 percent or higher canopy cover will be maintained in all thinning units
- retention of a component of older overstory host trees specific to each fungi species to provide for nutrient transfer
 - ◆ the largest/oldest trees in each unit will be retained, as well as trees with large cavities and other types of deformities
- retention of a component of forest floor organic matter to provide nutrients and fungal diversity, and maintain soil moisture for decomposition processes
 - ◆ soil productivity standards require maintenance of 50 percent or more fine organic matter cover and at least 5 logs per acre in a range of decay classes
- retention of large, woody debris on the forest floor to provide nutrients and fungal recruitment diversity
 - ◆ all snags 19 inches or larger in diameter and an average of 5 tons of logs per acre will be retained

Special Interest Plants

Often referred to as “watch list” species, Special Interest plants are species which do not meet all of the criteria to be included on the Regional Forester’s Sensitive Plant List, but are of sufficient concern that we need to consider them in the planning process. These include species that are locally rare, are of public concern, occur as disjunct populations, are newly described taxa, or lack sufficient information on population size, threats, trend or distribution. To better identify these species, forests have been encouraged to develop watch lists for these Special Interest species. These watch lists are dynamic and

updated as the need arises to reflect changing conditions and new information. Such species make an important contribution to forest biodiversity and are addressed as appropriate through the NEPA process. Effects to these species are evaluated when they are known to occur in project areas. Seventy-eight Special Interest plants are known to occur on the Lassen National Forest. Species which are not known to occur in areas that may be open to OSV use are not included in this analysis. See table 80.

Table 80. Special Interest plant species considered

Scientific Name Common Name	Habitat	Life Form
<i>Allium sanbornii</i> var. <i>sanbornii</i> Sanborn's onion	Granite, volcanic, or serpentine outcrops. West of Mineral, Battle Creek. Flowers May-Sept.	Perennial herb
<i>Anthoxanthum nitens</i> ssp. <i>nitens</i> vanilla grass	Meadows or under lodgepole. Bunchgrass Valley and Brokeoff Meadows. 4,900-6,200 ft. Flowers April-July.	Perennial grass
<i>Arnica fulgens</i> hillside arnica	Eastside meadows. Open damp depressions in sagebrush scrub or grasslands. Clover/Grays Val. Flowers May-Aug.	Perennial herb
<i>Artemisia tripartita</i> ssp. <i>tripartita</i> threetip sagebrush	Upper montane coniferous forest, in rock, volcanic openings. 7,200-8,500 ft. Flowers in August.	Shrub
<i>Asplenium septentrionale</i> northern spleenwort	Dacite rock outcrops or cliffs. LVNP, Manzanita Chutes & Christie Hill. Flowers Jul-Aug.	Perennial herb
<i>Astragalus inversus</i> Susanville milk-vetch	Plains and sparsely wooded hills in sagebrush scrub and yellow pine forests. Frequent. Flowers May-Sept.	Perennial herb
<i>Astragalus pauperculus</i> depauperate milk-vetch	Blue oak woodland and chaparral, or rocky grassland areas. Indian Creek RNA. Flowers March-May.	Perennial herb
<i>Betula glandulosa</i> bog birch	Boggy meadows. Bridge Creek, Big Springs, Humbug Valley. Flowers April-June.	Deciduous Tree/Shrub
<i>Botrychium simplex</i> Yosemite moonwort	Wet meadows. Uncommon. LT Creek, Milkhouse Flat, Magee Lake. Flowers July-Sept.	Perennial herb
<i>Brasenia schreberi</i> watershield	Wetlands, Lakes, Fens. Domingo, Wilson, Shotoverin and Cameron Lakes. Flowers June-Sept.	Aquatic, perennial
<i>Calystegia atriplicifolia</i> ssp. <i>buttensis</i> Butte Co. morning glory	Open dry slopes in pine or oak and pine forests. Graham Pinery RNA. 2,000-4,000 ft. Flowers May-July.	Perennial herb
<i>Cardamine bellidifolia</i> var. <i>pachyphylla</i> alpine bittercress	Rocky outcrops and scree slopes. 7,100-9,200 ft. Flowers June-Aug.	Perennial herb
<i>Carex davyi</i> Davy's sedge	Dry, often sparse meadows and slopes. 4,595-10,830 ft. Flowers May-Aug.	Perennial herb
<i>Carex geyeri</i> Geyer's sedge	Dry slopes and open woods. Cornelia Lott Sank Memorial Spring. Flowers May-June.	Perennial herb
<i>Carex lasiocarpa</i> woolly-fruited sedge	Pond edges and fens. Willow Lake, Domingo Lake, Cooper Swamp, Hay Meadows. Flowers June-July.	Perennial herb
<i>Carex limosa</i> mud sedge	Fens. Willow & Domingo Lakes, Cooper Swamp, Green Island Lake. Flowers June-Aug.	Perennial herb
<i>Carex petasata</i> Liddon's sedge	Meadows, lower montane conifer forests. Patterson Flat. Halls Flat and Burgess Springs. Flowers June-July.	Perennial herb
<i>Caulanthus major</i> var. <i>nevadensis</i> slender jewel-flower	Juniper woodland, open rocky areas. Dow Butte (location uncertain). Flowers June-July.	Perennial herb
<i>Claytonia palustris</i> marsh claytonia	Montane marshes and swamps; Jonesville, Colby, etc. Flowers June-Aug.	Perennial herb
<i>Dimeresia howellii</i> doublet	Dry volcanic areas. North of Sheepshead. Flowers May-July.	Annual herb
<i>Drosera anglica</i> English sundew	Cold bogs in yellow pine or fir forests. Willow Lake, Domingo Lake, Big Springs. Flowers July-Aug.	Perennial herb
<i>Erigeron inornatus</i> var. <i>calidipetris</i> hot rock daisy	Sandy, volcanic soils. Frequent. Flowers June-Sept.	Perennial herb
<i>Erigeron nivalis</i> northern daisy	Subalpine lava outcrops. Lassen Peak, Mt. Harkness, Mt. Shasta; Bogard Buttes. Flowers July-Aug.	Perennial herb
<i>Erigeron petrophilus</i> var. <i>sierrensis</i> northern Sierra daisy	Rocky foothills to forests, sometimes on serpentine. Near Middle Camp. Flowers June-Sept.	Perennial herb

Scientific Name Common Name	Habitat	Life Form
<i>Eriogonum ovalifolium</i> var. <i>depressum</i> depressed wild buckwheat	Low mounds around playas. 5,700 ft. Windy Hollow. Flowers June-Aug.	Perennial herb/subshrub
<i>Eriogonum pyrolifolium</i> var. <i>pyrolifolium</i> pyrola-leaved buckwheat	High elevation volcanic talus. Red Cinder (Caribou) and LNVP. Known site on forest but not mapped in GIS. 5,200-10,800 ft. Flowers July-Sept.	Perennial herb/subshrub
<i>Eriophorum gracile</i> cotton grass	Fens and wet meadows in upper conifer forests. Almanor Fens. Flowers May-Sept.	Perennial herb
<i>Gratiola heterosepala</i> Boggs Lake hedge-hyssop	Vernal pools and wet edges of lakes and reservoirs. Conservation Strategy 1994. Flowers Apr-Aug.	Annual herb
<i>Hackelia amethystina</i> amethyst stickseed	Openings in forest and meadows, dry slopes. Diamond Mts. Flowers June-July.	Perennial herb
<i>Hackelia cusickii</i> Cusick's stickseed	Under large old-growth junipers. Ebey Lake area. Flowers Apr-July.	Perennial herb
<i>Hesperocyparis bakeri</i> Baker cypress	Dry volcanic or serpentine soil, in chaparral or yellow pine forests. Cub Ck, Burney Mtn, and Timbered Crater areas. Flowers all seasons.	Conifer tree
<i>Hulsea nana</i> little hulsea	High elevation Cascade peaks. LVNP, Burney Mt., and Magee Peak in 1,000 Lakes Wilderness. Flowers July-Aug.	Perennial herb
<i>Iliamna bakeri</i> Baker's globe mallow	Volcanic loam or lava beds, especially post-fire. Juniper woodland, chaparral. 3,200-8,200 ft. Flowers July-Aug.	Perennial herb
<i>Juncus hemiendytus</i> var. <i>abjectus</i> Center Basin rush	Damp or vernal wet open areas. Flowers June-July.	Perennial herb
<i>Lilium humboldtii</i> ssp. <i>humboldtii</i> Humboldt lily	Chaparral and lower montane conifer forests on dry forest floor or dry brushy slopes. Near Deer Creek (Barkley Fire). Flowers May-July.	Perennial herb
<i>Limnanthes floccosa</i> ssp. <i>floccosa</i> woolly meadowfoam	Vernal pools, drainages, etc. in woodlands. Cayton; Finley Lake, etc. Flowers Mar-June.	Annual herb
<i>Lupinus dalesiae</i> Quincy lupine	Dry, often rocky slopes in mixed conifer forest on slate soil. 2,500-6,500 ft. Flowers May-July.	Perennial herb
<i>Lycopus uniflorus</i> northern bugleweed	Fens, marshes, swamps. Willow Lake and Willow Creek, Domingo Lake. Flowers July-Sept.	Perennial herb
<i>Lysimachia thyriflora</i> tufted loosestrife	Lake and stream margins, meadows. Willow Lake. 2,625-5,495 ft. Flowers May-August.	Perennial herb
<i>Meesia triquetra</i> 3-ranked hump-moss	Fens and seeps, South of Lassen National Park, Big Springs, Little Grizzly Creek. Flowers any season.	Bryophyte, moss (perennial herb)
<i>Mimulus glaucescens</i> shield-bracted monkeyflower	Wet places in foothill woodland, grassland. Front Country. Frequent. Flowers Mar-May.	Annual herb
<i>Mimulus pygmaeus</i> Egg Lake monkeyflower	Moist soil in open meadows, drainages or edges of pools, in open woods, sage. Flowers May-June.	Annual herb
<i>Muhlenbergia jonesii</i> Jones' muhly	Moist soil in open meadows, drainages or edges of pools, in open woods, sage. Flowers June-Aug.	Perennial grass
<i>Navarretia subuligera</i> awl-leaved navarretia	Rocky plains and slopes, foothill woodland, yellow pine forest. Indian Creek RNA. Flowers Apr-Aug.	Annual herb
<i>Nemophila breviflora</i> basin nemophila	Streambanks, meadows, thickets. Ponds south of Soldier Mt. 4,000-7,910 ft. Flowers May-July.	Annual herb
<i>Packera indecora</i> rayless mountain butterweed	Meadows and seeps, Type locality near Pine Creek. Flowers July-Aug.	Perennial herb
<i>Penstemon cinicola</i> ash beardtongue	Dry or moist volcanic sands, yellow pine or lodgepole forests. Caribou, Butte Ck. Flowers June-Aug.	Perennial herb
<i>Penstemon heterodoxus</i> var. <i>shastensis</i> Shasta beardtongue	Meadowy, open grassy sites in yellow pine to red fir. Flowers June-Aug.	Perennial herb
<i>Penstemon janishiae</i> Janish's beardtongue	Rocky areas or openings in sagebrush or juniper. Diamond Mt. Flowers May-July.	Perennial herb
<i>Phlox muscoides</i> moss phlox	Rocky alpine slopes. Lassen, Loomis Pk. Flowers July-Aug.	Perennial herb
<i>Piperia colemanii</i> Coleman's rein orchid	Chaparral, duff in lower montane coniferous forest, often shaded. 3,600-7,000 ft. Flowers June-Aug.	Perennial herb

Scientific Name Common Name	Habitat	Life Form
<i>Pogogyne floribunda</i> profuse-flowered pogogyne	Vernal pools and similar habitat on Modoc Plateau. 3200-5000 ft. Flowers June-Aug.	Annual herb
<i>Polycetenium fremontii</i> var. <i>fremontii</i> Fremont's combleaf	Vernally moist depressions. Government Lake and Pine Creek. 3,200-6,800 ft. Flowers May-June.	Perennial herb
<i>Polygonum bidwelliae</i> Bidwell's knotweed	Open areas in pine or pine and oak forests. Cayton Valley area, and Indian Creek RNA. Flowers Apr-June.	Annual herb
<i>Polystichum kruckebergii</i> Kruckeberg's swordfern	Cliff crevices and talus slopes, mid to high elevation. Humboldt Pk, Mt. Harkness (LVNP). Green Island Lake RNA. Flowers July-Aug.	Perennial herb
<i>Polystichum lonchitis</i> northern hollyfern	Subalpine and upper montane conifer forests/ granitic or carbonate. Green Island Lake RNA. 5,400-7,800 ft. Flowers June-Sept.	Perennial herb
<i>Potamogeton robbinsii</i> Robbins's pondweed	Deep water. Saucer Lake (Green Island Lake RNA). 4,985-11,485 ft. Flowers July-Aug.	Aquatic perennial herb
<i>Potamogeton praelongus</i> white-stemmed pondweed	Deep water. Willow Lake. Flowers July-Aug.	Aquatic perennial herb
<i>Potentilla newberryi</i> Newberry's cinquefoil	Seasonally flooded flats. Butte Creek Pit and Huckleberry Meadows. Flowers May-Aug.	Perennial herb
<i>Rhynchospora alba</i> white beaked-rush	Fens, freshwater marshes in yellow pine, mixed conifer, or fir. Willow Lake. Flowers July-Aug.	Perennial herb
<i>Schoenoplectus heterochaetus</i> slender bulrush	Lake margins and marshes. Wilson Lake only known location in CA. Flowers in August.	Aquatic perennial herb
<i>Schoenoplectus subterminalis</i> water bulrush	Fen and montane lake margins. Near Wilson Lake, Hay Mdws, Cameron Meadows & Philbrook Reservoir. Flowers July-Aug.	Aquatic perennial herb
<i>Scutellaria galericulata</i> marsh skullcap	Marshes, swamps. Fall River; Lake Almanor near Last Chance. Flowers June-Sept.	Perennial herb
<i>Senecio hydrophiloides</i> sweet marsh ragwort	Wet meadows in eastside pine or lodgepole. Flowers May-July.	Perennial herb
<i>Silene occidentalis</i> ssp. <i>occidentalis</i> western campion	Montane coniferous forest, open dry sites, chaparral. Flowers June-Aug.	Perennial herb
<i>Sparganium natans</i> small bur-reed	Fens and lake margins, cooler places. Green Island Lake; Bear Flat, etc. Flowers in Aug.	Perennial herb
<i>Stellaria longifolia</i> long-leaved starwort	Fens, wet meadows and riparian zones. Jonesville, Goose Valley, Philbrook Res., Last Chance and Mill Creeks. Flowers May-Aug.	Perennial herb
<i>Stellaria obtusa</i> obtuse starwort	Moist soil in red fir or yellow pine forests. Frequent. Flowers June-Aug.	Perennial herb
<i>Stenotus lanuginosus</i> woolly stenotus	Meadow margins or low sage; shallow rocky soil. Flowers May-July.	Perennial herb
<i>Streptanthus longisiliquus</i> long-fruit jewelflower	Broadleaf upland and lower montane conifer forests. Rattlesnake Creek. Flowers Apr-Sept.	Perennial herb
<i>Stuckenia filiformis</i> ssp. <i>alpina</i> slender-leaved pondweed	Shallow freshwater marshes and swamps. Green Island Lake RNA. 985-7,055 ft. Flowers May-July.	Aquatic perennial herb
<i>Subularia aquatica</i> ssp. <i>americana</i> water amlwort	Lake margins and streambanks in upper montane conifer forests. On LNF, but location unmapped. 5,700-9,300 ft. Flowers July-Sept.	Aquatic annual herb
<i>Thermopsis californica</i> var. <i>argentata</i> silvery false-lupine	Somewhat alkaline flats, yellow pine forests. Many locations on district. Flowers Apr-Aug.	Perennial herb
<i>Trifolium andersonii</i> ssp. <i>andersonii</i> Anderson's clover	Open eastside pine, sandy soil. Elysian Valley. 3,000-8,000 ft. Flowers June-July.	Perennial herb
<i>Trillium ovatum</i> ssp. <i>oettingeri</i> Salmon Mtns wakerobin	Damp, shaded mixed conifer forests at the edge of wet or moist drainages. Screwdriver area and Mill Ck. below LVNP. Flowers Feb-July.	Perennial herb
<i>Utricularia intermedia</i> flat-leaved bladderwort	Shallow water/fens. Boundary Fen, Willow Lake, Last Chance Marsh, lake near Hay Mdw, near Snag Lake. Flowers July-Aug.	Aquatic perennial herb
<i>Utricularia minor</i> lesser bladderwort	Shallow water/fens and marshes. Coon Hollow, Papoose Meadows, and Green Island, Willow, and Wilson Lakes. Flowers in July.	Aquatic perennial herb
<i>Utricularia ochroleuca</i> cream-flowered bladderwort	Shallow water, lake margins. Last Chance Marsh (per Rondeau), Boundary Fen, Willow and Little Willow Lks. Flowers June-July.	Aquatic perennial herb

Aggregating Species for Analysis of Effects

Because OSV effects to various plant species would be expected to be most similar according to their life form and growth habits, the species considered in this analysis are grouped into the following categories:

- **Trees, shrubs, or sub-shrub species** have living tissues present above or within the snow column, and thus may experience direct effects from OSV uses (physical damage or immediate exposure to exhaust).
- **Perennial herbaceous species**, including grasses and mosses, have living tissues at or below the soil surface when OSV use occurs, and thus would be unlikely to experience direct effects, but they will be evaluated for impacts by exhaust contaminants trapped by the snow cover or by potential effects from snow compaction.
- **Annual plant species** would generally not be growing during the period of authorized OSV use, and thus would not experience direct effects. This group is the least likely to be impacted by the indirect effects of exhaust contaminants and snow compaction.
- **Aquatic plant species** grow underwater and would not be directly affected by OSV use. If an occurrence is located within 100 feet of OSV trails, it is possible that snowpack contaminants could reach the occupied aquatic habitat when the snow melts. Snow compaction is not expected to affect aquatic habitats in any meaningful or predictable manner.

Other Botanical Resources

Special Interest Areas (SIAs)

All three SIAs designated as Botanical Areas are currently and proposed to be designated for OSV use.

- Montgomery Creek Grove Botanical Area, 4.6 acres
- Murken Botanical Area, 480 acres
- Willow Lake Bog Botanical Area, 59 acres

Environmental Consequences

Effects common to all alternatives

Because the alternatives would be very similar, with the same activities proposed, and the differences are mainly the spatial extent of OSV use, most of the effects are described in this section. The varying areas of authorized OSV use would result in mostly small differences in degree of potential effects. Therefore, each alternative's effects disclosures will mainly summarize the extent of botanical resources affected, and provide the basis for determinations. A summary comparison of alternatives will follow, providing the decision-maker a quick reference for evaluating the alternatives along with the other resources that need to be considered.

TEPS Plants

Effects discussions for TEPS plants are presented in categories of plant life forms because the greatest potential for impacts from OSV activities would be dependent upon the presence of their living tissues within the snow or above the snow surface and whether each species is biologically active during the times that direct and indirect effects may occur. Effects to each life form category are presented after an introduction of direct and indirect effects.

Survey and Manage Plants

For all alternatives, no OSV trails would be proposed in the NWFP portion of the Lassen National Forest, so none of the known Survey and Manage sites would be within 100 feet of OSV trails. However, all of the Survey and Manage sites are in areas that would be open to cross-country OSV travel.

Because the proposed action and alternatives would not produce ground-disturbing impacts, there would be no negative effects on Survey and Manage species or their persistence within the project area; therefore, field surveys and site management for these species would not be required. Without the loss of overstory canopy cover, specific host trees, forest floor organic matter, or large woody debris, habitat characteristics would be retained for conserving Survey and Manage fungi. Occurrences of *Cypripedium montanum* would not be affected because the species is dormant and underground when OSV uses take place. Occurrences of *Ptilidium californicum* would not be affected because the species grows low on the bases of large trees and minimum snow depths would prevent impacts as well as the fact that OSV operators avoid making contact with large trees for safety reasons and to prevent damage to their vehicles.

Special Interest Plants

Effects discussions for Special Interest plants are presented in categories of plant life forms because the greatest potential impacts from OSV activities would be dependent upon the presence of their living tissues within the snow or above the snow surface and whether each species is biologically active during the times that direct and indirect effects may occur. Effects to each life form category are presented after an introduction of direct and indirect effects.

Separate sections follow for invasive plant species and other botanical resources (SIAs).

Direct Effects Introduction

Direct effects are caused by the action and occur at the same time and place. A key difference between OSV use and other types of motor vehicle use is that, when properly operated and managed, OSVs do not make direct contact with soil, water, and ground vegetation, whereas most other types of motor vehicles operate directly on the ground (USDA Forest Service 2014). OSV use and grooming of OSV trails can damage vegetation through direct contact with plant tissues that would be present above the snow or within the snow column that is compacted by the vehicles. Because woody species (trees, shrubs, and sub-shrubs) would be the only plants present within the snow, they would be the only plants that may be directly damaged. All other plant life forms would not be expected to be directly affected by OSV use because minimum snow depths would be expected to prevent direct effects to vegetation at ground level.

It is generally recognized that disturbance to soil and vegetation by OSV use is reduced as snowpack depths increase. Damage to soil and low-growing vegetation is much more likely when OSV use occurs under low snow conditions (Greller et al. 1974, Fahey and Wardle 1998). Thus, the minimum snow depth requirements of all alternatives would be expected to prevent or minimize damage to soil and vegetation.

In a study on Niwot Ridge in the Front Range of the Colorado Rocky Mountains, repeated snowmobile use occurred on snow-covered and snow-free areas between two weather stations, and the effects of this use were evaluated (Greller et al. 1974). General conclusions included: 1) in communities that would be snow-free in winter, damage by snowmobiles was severe to lichens, *Selaginella*, and to relatively prominent, rigid cushion-plants. Part of the damage to these communities may have been due to the manual removal of rocks, necessary for the operation of snowmobiles in snow-free areas. 2) *Kobresia*, present in isolated tussocks in a cushion-plant community, absorbed the major portion of snowmobile impact. As *Kobresia* is thought to form the climatic climax community in this ecosystem, differential damage to it could seriously retard succession. 3) Snowmobile travel in uniform, closed *Kobresia* meadows inflicted much less damage to most plants, including *Kobresia* itself, than did similar travel on a

sparse vegetated community. 4) Plants best able to survive the heaviest snowmobile impact were those with small stature and little woodiness, or with buds well-protected at or below the soil surface. 5) Snowmobile traffic should be carefully restricted to snow-covered areas. Whenever this is not feasible, the least destructive and easiest alternative is travel on mature, well-vegetated *Kobresia* meadows or similar well-drained plant communities.

On the Lassen National Forest, OSV travel on snow-free areas is prohibited in the current and proposed scenarios. By not allowing cross-country OSV use when and where there is less than 12 inches snow depth, the Lassen National Forest minimizes the possibility of direct damage to soils and ground vegetation.

Indirect Effects Introduction

Indirect effects are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable. Three specific topics of indirect effects were identified: snow compaction, pollutants, and invasive plant species. Potential effects from snow compaction and pollutants are described below, and a discussion of potential invasive plant effects will follow in its own section because it is a required analysis topic itself.

Snow Compaction

Snow is compacted by any of the allowed OSVs, including snowmobiles, snow cats, and snow grooming equipment. Snow compaction mechanically alters snow grains and redistributes them. This mechanical disturbance breaks off the small points of new snow crystals, destroying the weak existing bonds between them, and bringing the new grains into much closer contact than occurs naturally. Snow metamorphism is artificially accelerated, and snow density and hardness are increased. In addition, the layered structure of the snowpack is changed (Fahey and Wardle 1998). All this has both thermal and hydrological implications, resulting in lower soil temperatures (Fahey and Wardle 1998, Eagleston and Rubin 2013) and delayed snowmelt (Keddy et al. 1979, Fahey and Wardle 1998, Davenport and Switalski 2006, Gage and Cooper 2013). The thermal conductivity of compacted snow is greater than undisturbed snow, and can reduce the buffering effect against temperature extremes and fluctuations. Thermal conductivity of compacted snow was 11.7 times greater than non-compacted snow (Neumann and Merriam 1972).

Keddy and others (1979) studied the effects of snowmobile use on snow compaction, vegetation composition, and soil temperatures on an abandoned farm in Nova Scotia. They found that snow melted later in areas with compacted snow and that some species showed differences in cover between treatments. Considering the multitude of potential effects and the variety of plant structures and life histories, they were not surprised to find no overall trend for species composition changes. They also noted that the first pass by a snowmobile caused the greatest increase in snow compaction – roughly 75 percent of that observed after 5 sequential passes. While some species composition changes were observed in old field vegetation, they found no changes in species composition in a marsh area, possibly because of solid ice cover during the winter.

In a study of the impact of snowshoe/cross-country ski compaction and snowmelt erosion on groomed trails, Eagleston and Rubin (2013) reported that these non-motorized uses caused snow to remain on the compacted areas an average of 5 days longer than non-compacted areas. They also found that the compacted snow caused increased erosion. Soil temperatures under compacted snow stayed frozen for 3 days longer, and, averaged over the entire winter season, remained 0.1 degree Celsius colder than soil under non-compacted snow.

Fahey and Wardle (1998) examined the effects of snow grooming for downhill ski areas in subalpine and alpine environments. They found that the compacted snow increased frost penetration and delayed snow melt.

However, research does not always support the generalization of lower soil temperatures and delayed snowmelt due to snow compaction. In a study of snow compaction effects from snowmobiles on fens on the Routt National Forest, Gage and Cooper (2013) found no statistically significant differences in the temperature of peat soils between compacted and non-compacted areas. They also found no differences in timing of snow melt, biomass production, or plant phenology. From additional, unpublished data from the Telluride Ski Area, where intense compaction occurred daily, they observed a delayed snowmelt and thawing of the soil of about one month in compacted areas. They noted that the continuous influx of groundwater in fens may limit freezing and maintain more constant soil thermal conditions. They found no evidence conclusively linking snowmobile compaction to impairment of fen function.

Different plants have different levels of vulnerability and ability to recover from the effects of snow compaction. The characteristics which determine their vulnerability are the timing of flowering, and growth form and size (Fahey and Wardle 1998). Prolonged snow lie may adversely affect early spring flowering plants because they could have a shorter growing season and thus possibly reduced seed production due to delayed phenology and perhaps a misalignment of timing with their preferred pollinators. Due to snow compaction, early spring growth of some plant species may be retarded or may not occur under an OSV trail; however, the current and proposed OSV trails would be underlain by existing roads and trails which are already compacted and/or disturbed and little, if any, additional impacts would be expected to the vegetation.

Trail grooming on the Lassen National Forest occurs over an existing road and trail network and does not alter landforms or result in significant soil disturbance that would change water flow patterns or quantities of surface water runoff. Trail grooming does not cause substantial impacts to water quality, perennial, intermittent or ephemeral streams, wetlands or other bodies of water (McNamara 2015).

In summary, the available research supports the assumption that more intensive snow compaction occurring along groomed or heavily used trails would have considerably greater effect on soil temperatures and delayed snowmelt than the compaction caused by dispersed uses in areas open to cross-country OSV use. Due to the intensive, repetitive, and predictable compaction of snow along designated OSV trails (groomed or not), these areas would be much more likely and reasonably foreseeable to have a degree of compaction that could influence vegetation. **Therefore, in this analysis, areas within 100 feet of designated OSV trails are assumed to be at risk from the effects of snow compaction.** Outside the designated OSV trail corridors, dispersed OSV travel is much less likely to compact snow with enough intensity and repetition to measurably or predictably affect ground vegetation, and therefore is not considered in this analysis as a reasonably foreseeable source of indirect effects.

Pollutants

Emissions from over-snow vehicles release pollutants including ammonium, sulfate, benzene, nitrogen oxides, ozone, carbon dioxide, carbon monoxide, aldehydes, polycyclic aromatic hydrocarbons and other toxic compounds into the air. A portion of these compounds may become trapped and stored in the snowpack, to be released during spring runoff. Four-stroke snowmobile engines produce considerably lower amounts of pollutants than two-stroke engines.

Pollutants emitted from exhaust can cause a variety of impacts on vegetation. Carbon dioxide may function as a fertilizer and cause changes in plant species composition (Bazzaz and Garbutt 1998); nitrogen oxides also may function as fertilizers, producing similar effects along roadsides (Falkengren-Grerup 1986). Sulfur dioxide, which can be taken up by vegetation, may result in altered photosynthetic

processes (Winner and Atkison 1986, Mooney et al. 1988). Other toxic compounds may result in reduced metabolism or retarded growth.

Some of the airborne pollutants would enter the snowpack and be released during snowmelt. Similar responses can be assumed to occur in plants that ingest these compounds from snowmelt, although the compounds may undergo chemical changes while in the snowpack, confounding the predictability of effects.

Airborne pollutants can enter the snowpack from both local and regional sources, including but not limited to vehicle emissions, dust storms, and smog. The concentrations of basic cations and acidic anions in the snowpack can be altered and, when released quickly during snow melt, can temporarily lower the pH of surface waters in a process known as “episodic acidification” (Blanchard et al. 1988). Soil acidification and vegetation changes were examined in southern Sweden, where Falkengren-Grerup (1986) found that increased nitrogen deposition and the increased acidity in the humus layer may have caused changes in plant cover, with some species increasing and some species decreasing.

Demonstrating that snowpack chemistry can be used as a quantifiable indicator of airborne pollutants from vehicular traffic, a correlation was shown between pollutant levels and vehicle traffic in Yellowstone National Park (Ingersoll et al. 1997). Ammonium and sulfate levels were consistently higher for the in-road snow compared to off-road snow, but nitrate concentrations did not decrease within a distance of 100 meters from the emission source; thus, the nitrate ion may be used to distinguish between local and regional emission sources (Ingersoll et al. 1997). Studying snow chemistry in Yellowstone National Park, Ingersoll (1998) found that concentrations of ammonium, nitrate, sulfate, benzene, and toluene were positively correlated with snowmobile use. Concentrations of ammonium were up to three times higher for the in-road snow compared to off-road snow. Concentrations decreased rapidly with distance from roadways.

Arnold and Koel (2006) also examined volatile organic compounds in Yellowstone National Park, and found that the snow in heavily used areas contained higher levels of benzene, ethylbenzene, m- and p-xylene, o-xylene, and toluene compared with a control site only 100 meters from the traveled roadways. Even at the most heavily used area (Old Faithful) they found that the concentrations of volatile organic compounds were considerably below U. S. Environmental Protection Agency’s water quality criteria for these compounds. In situ water quality measurements (temperature, dissolved oxygen, pH, specific conductance, and turbidity) were collected; all were found within acceptable limits. Five volatile organic compounds were detected (benzene, ethylbenzene, m- and p-xylene, o-xylene, and toluene). The concentrations were found below EPA criteria and guidelines for the volatile organic compounds analyzed and were below levels that would adversely impact aquatic ecosystems (Arnold and Koel 2006).

Studying air quality and snow chemistry effects from snowmobiles in the Snowy Range, Wyoming, Musselman and Korfmacher (2007) found that heavier snowmobile use resulted in higher levels of nitrogen oxides and carbon monoxide, but ozone and particulate matter were not significantly different. When compared with air quality during the summer, they found that carbon monoxide levels were higher in the winter, but nitrogen oxides and particulate matter were higher in the summer. Air pollutants were well-dispersed and diluted by winds, and air quality was not perceived as being significantly affected by snowmobile emissions. Pollutant concentrations were generally low in both winter and summer. These results differ from those studies examining air pollution from snowmobiles in Yellowstone National Park. However, snow chemistry observations did agree with studies from Yellowstone National Park. Compared with off-trail snow, the snow sampled from snowmobile trails was more acidic with higher amounts of sodium, ammonium, calcium, magnesium, fluoride, and sulfate. Snowmobile activity apparently had no effect on nitrate levels in the snow.

In the winter, plant metabolic rates would be drastically reduced. Airborne compounds would only be taken up by respiring woody plants. Airborne pollutants normally disperse quickly in mountain environments that are prone to windy conditions, such as the Sierra Nevada. Different plants may have different responses to the different pollutants in the snowpack, including damage from toxic, volatile compounds and possibly some benefits from additional nutrients and trace minerals. The levels of OSV exhaust contaminants on the Lassen National Forest (considerably less than those observed in Yellowstone National Park) would not be expected to impair water quality (McNamara 2016).

In a natural plant community with many species competing for resources, and very little research done on each species' responses to OSV emissions or the competitive interactions that may be affected, it is nearly impossible to predict what changes, if any, would occur. It can only be reasonably assumed that there may be some changes in plant species cover and composition. The uptake of harmful pollutants is not expected to result in the death of any individual plants. On the Lassen National Forest, no mortality of roadside TES plants due to vehicle pollutants has been observed, even considering year-round vehicle uses. Therefore, the level of effect to TES plants from OSV pollutants is expected to be minimal, and would not result in loss of individuals.

The available research on OSV pollutants (both airborne and in the snowpack) indicate that some effects to vegetation may occur in the immediate vicinity of heavy use areas. Pollutants that become trapped in the snowpack would be also concentrated in areas of heavy OSV use. **Therefore, in this analysis, areas within 100 feet of designated OSV trails (groomed or not) are assumed to be reasonably at risk from the effects of OSV pollutants.** Outside the designated OSV trail corridors, dispersed OSV travel is much less likely to contribute harmful contaminants with high enough levels and repetition to measurably or predictably affect ground vegetation, and therefore, is not considered in this analysis as a reasonably foreseeable source of indirect effects.

Relative Potential Effects to Plant Life Forms

Considering the combination of direct and indirect effects described above, and the minimum snow depth requirements of all the current alternatives, the effects of proposed OSV uses can be broken down into relative categories of potential damage to the major plant life forms. From the most likely to least likely to experience measurable effects:

- Evergreen trees and shrubs – most likely to be directly affected, due to mechanical damage; indirect effects would be reasonably foreseeable if the species occurs near designated OSV trails. Effects may occur in all areas designated for OSV use.
- Deciduous trees and shrubs – somewhat less likely, due to winter dormancy; indirect effects would be reasonably foreseeable if the species occurs near designated OSV trails. Effects may occur in all areas designated for OSV use.
- Sub-shrubs (low-growing woody species) – less likely due to less exposure to direct effects (but still reasonably foreseeable); indirect effects may be reasonably foreseeable if the species occurs near designated OSV trails. Effects may occur in all areas designated for OSV use.
- Perennial herbaceous species – direct effects would be unlikely (not reasonably foreseeable) due to minimum snow depth requirements; indirect effects may be reasonably foreseeable if the species occurs near designated OSV trails. Effects may occur along designated OSV trails, but would not be likely in areas open to cross-country OSV use.
- Annual species – direct effects would be highly unlikely (not reasonably foreseeable) due to minimum snow depth requirements; indirect effects might be reasonably foreseeable if the species occurs near designated OSV trails and spring flowering could be altered by persistent compacted

snow. Effects may occur along designated OSV trails, but would not be likely in areas open to cross-country OSV use.

- Aquatic species – direct effects would not occur because OSV use is not allowed over open water; indirect effects from pollutants might be reasonably foreseeable if the species occurs near designated OSV trails. Effects may occur along designated OSV trails, but would not be likely in areas open to cross-country OSV use.

Trees, shrubs, or sub-shrub species

Direct Effects

Snowmobile activities may damage vegetation on and along trails and in area open to cross-country OSV use. The most commonly observed effect from snowmobiles was the physical damage to shrubs, saplings, and other vegetation (Neumann and Merriam 1972, Wanek 1971). Winter Wildland Alliance (WWA) analyzed the Gallatin National Forest regeneration survey data collected between 1983 and 1996 in areas that were harvested and replanted. That survey data indicated snowmobiles had damaged between 12 and 720 trees per acre (WWA 2009). Damage to vegetation has been observed in the Greater Yellowstone Area that is caused by winter recreational activities that occur off trail. For example, branches of willows (*Salix* spp.) and sagebrush (*Artemisia* spp.) have been broken, and leaders have been removed from conifers (Stangl 1999). Neumann and Merriam (1972) found that rigid woody stems up to 1 inch in diameter were very susceptible to damage. Stems were snapped off in surface-packed or crusted snow. Neumann and Merriam (1972) also observed that compacted snow conditions caused twigs and branches to bend sharply and break. Stems that were more pliable bent and sprang back although the snowmobile track often removed bark from the stems' upper surfaces. Sub-zero temperatures make stems more prone to snapping rather than bending. Direct mechanical effects by snowmobiles on vegetation at and above snow surface can be severe. After only a single pass by a snowmobile, more than 78 percent of the saplings on a trail were damaged, and nearly 27 percent of them were damaged seriously enough to cause a high probability of death (Neumann and Merriam 1972). Young conifers were found to be extremely susceptible to damage from snowmobiles. Broken stems of any woody species would provide places for pathogens to enter the plant tissues and would reduce the integrity of developing stems or trunks, both of which could lead to additional damage or death of individuals. These direct effects would be expected to be localized, potentially affecting individuals due to dispersed nature of open area OSV use and not result in loss of entire occurrences.

On the Lassen National Forest, OSV use may directly damage individuals of the Lassen National Forest Special Interest plants *Artemisia tripartita* ssp. *tripartita*, *Betula glandulosa*, *Eriogonum ovalifolium* var. *depressum*, *Eriogonum pyrolifolium* var. *pyrolifolium*, and *Hesperocyparis bakeri*.

Indirect Effects

Airborne pollutants from OSVs would be concentrated along OSV trails. Because deciduous trees and shrubs lose their leaves in the winter months, they cannot photosynthesize during fall and winter. Thus respiration is dramatically reduced for deciduous trees and shrubs. Although evergreen trees and shrubs retain their leaves and are thus capable of photosynthesis and respiration during winter, these processes are also considerably reduced during the cold season. Reduced respiration during the winter means that smaller amounts of the airborne pollutants would be ingested through gas exchange. For low-growing woody species that are generally covered by snow when OSV use would occur (*Eriogonum ovalifolium* var. *depressum* and *Eriogonum pyrolifolium* var. *pyrolifolium*), the exposure to airborne pollutants would be negligible.

Pollutants which would be trapped and then released during snowmelt may (or may not) have some adverse and some beneficial effects; however, the extent and direction of specific effects is unknown. It is

expected that pollutant concentrations would be low enough that water quality would not be impaired, and thus it is likely that plant responses, if any, would not be noticeable. Past monitoring has not indicated any impacts that could be attributed to pollutants.

Perennial herbaceous species (including bryophytes)

Direct Effects

With minimum snow depth requirements providing protection of the soil surface and ground vegetation, perennial herbaceous species (which die back each year to buds at or below the soil surface) would not be directly affected by current or proposed OSV uses.

Indirect Effects

Compacted snow may alter the timing of new foliage emergence in the spring, due to delayed snowmelt and colder soil temperatures. This is expected to have minimal effects to perennial herbaceous plants because they would be assumed to be adapted to a wide variety of natural snowmelt times. In some years, some species may emerge from the ground very early in the growing season and subsequent snowfall may accumulate enough afterwards to allow authorized OSV use. In such cases, assuming that minimum snow depths would be present and the OSV use is within authorized operation, the effects to the emerging plants is expected to be minor enough that they would be difficult to distinguish from the wholesale damage of freeze die-back.

Airborne pollutants would not affect perennial herbaceous species because the snow layers would prevent the pollutants from reaching their foliage, that is, if foliage were to even be living during OSV season. As with any of the plant groups, pollutants which would be trapped and then released during snowmelt may (or may not) have some adverse and some beneficial effects; however, the extent and direction of specific effects is unknown. It is expected that pollutant concentrations would be low enough that water quality would not be impaired, and thus it is likely that plant responses, if any, would not be noticeable.

Annual plant species

Direct Effects

Plant species that complete their life cycle within one growing season would not be directly affected by current or proposed OSV uses because they generally would not be growing during the authorized period of OSV use.

Indirect Effects

Compacted snow may alter the timing of seed germination and plant growth in the spring, due to delayed snowmelt and colder soil temperatures. This is expected to have minimal effects to annual plants because they are assumed to be adapted to a wide variety of natural snowmelt times.

Airborne pollutants would not affect annual species because the new generation of plants (seeds) would still be dormant under the snow. As with any of the plant groups, pollutants which would be trapped and then later released during snowmelt may (or may not) have some adverse and some beneficial effects; however, the extent and direction of specific potential effects is unknown. It is expected that pollutant concentrations would be low enough that water quality would not be impaired, and thus it is likely that plant responses, if any, would not be noticeable.

Aquatic Species

Direct Effects

Aquatic plant species would not be directly affected by current or proposed OSV uses because OSVs would not be authorized to operate over aquatic habitats.

Indirect Effects

Delayed snow melt and transfer of sub-freezing temperatures from snow compaction is not expected to affect aquatic plant species.

Airborne pollutants would not affect aquatic species because the plants grow underwater. As with any of the plant groups, pollutants which would be trapped and then later released during snowmelt may (or may not) have some adverse and some beneficial effects; however, the extent and direction of specific effects is unknown. It is expected that pollutant concentrations would be low enough that water quality would not be impaired, and thus it is likely that plant responses, if any, would not be noticeable.

Threatened and Endangered Plants

Orcuttia tenuis

OSV uses are not likely to affect vernal pool habitats. Population monitoring on the Lassen National Forest has not revealed any adverse effects to these habitats from OSV use in previous years. The main populations of *Orcuttia tenuis* on the Lassen National Forest are fenced, mainly to exclude OHV and other impacts of recreational use. These fences also effectively prevent OSV use within the vernal pools unless snow depth is over four or five feet. Although recreational/Off-Highway Vehicles (OHV) uses in vernal pools may affect these habitats and *Orcuttia tenuis* plants during the drier seasons, OSV use during the winter would not result in habitat disturbance because the minimum snow depth of 12 inches would be sufficient to prevent contact between OSVs and the soil surface.

Compacted snow generally causes delayed snowmelt and increases the transfer of freezing temperatures to the ground due to reduced insulating air spaces (Keddy et al. 1979, Fahey and Wardle 1998, Davenport and Switalski 2006, Eagleston and Rubin 2013, Gage and Cooper 2013). For *Orcuttia tenuis*, seed germination occurs when the vernal pools are filled with water, usually well after the majority of snowmelt in the pools. The short delay of snowmelt and colder soil temperatures from OSV-compacted snow would not likely delay or reduce germination of *Orcuttia tenuis*. The effects of snow compaction and OSV emissions would be concentrated in areas of heavy use, such as along designated OSV trails. Only very small portions (totaling 0.4 acres) of three *Orcuttia tenuis* occurrences are present within 100 feet of existing or proposed designated OSV trails. For the purpose of preventing or reducing OHV and other recreation impacts, fencing/barriers are present at two of the sites. One of these occurrences has also been monitored for three consecutive seasons and no evidence of OSV effects has been observed; therefore, it is anticipated that there would be no measurable or predictable indirect effects to *Orcuttia tenuis*.

Because living plants would not be present during the period of OSV use, *Orcuttia tenuis* would not be directly affected. Indirect effects would also be unlikely to affect the species or alter its habitat, as described above. With no direct or indirect effects expected, there would be no cumulative effects to this species. Therefore, it is determined that the Lassen OSV Use Designation project would have **no effect** on *Orcuttia tenuis*.

Orcuttia tenuis Critical Habitat

The Lassen OSV Use Designation project does not involve the construction of any structures which could impede or redirect flood flows, nor any ground surface modifications which could change drainage patterns, impervious surfaces, soil permeability, or other hydrological characteristics such as surface water volumes (McNamara 2016). Water quality is also not expected to be measurably affected in the vernal pools, and the composition of vegetation, including invasive plant species, is not expected to be altered by OSV use. Because the primary constituent elements of *Orcuttia tenuis* critical habitat would be

unaffected by OSV use, it is determined that the Lassen OSV Use Designation project would have **no effect** on *Orcuttia tenuis* critical habitat.

Tuctoria greenei

OSV uses are not likely to affect vernal pool habitats. Population monitoring on the Lassen National Forest has not revealed any adverse effects to these habitats from OSV use in previous years. Because *Tuctoria greenei* is not known to occur on the Lassen National Forest, there would be no direct effects to individuals from OSV use on these lands. The indirect effects of snow compaction and OSV emissions would be concentrated in areas of heavy use, such as along designated OSV trails. No *Tuctoria greenei* occurrences are present within 100 feet of existing or proposed designated OSV trails; therefore, it is anticipated that there would be no measurable or predictable indirect effects to the occurrences.

With no direct or indirect effects expected, there would be no cumulative effects to this species. Therefore, it is determined that the Lassen OSV Use Designation project would have **no effect** on *Tuctoria greenei*.

Tuctoria greenei Critical Habitat

The Lassen OSV Use Designation project does not involve the construction of any structures which could impede or redirect flood flows, nor any ground surface modifications which could change drainage patterns, impervious surfaces, soil permeability, or other hydrological characteristics such as surface water volumes (McNamara 2016). Water quality is also not expected to be measurably affected in the vernal pools, and the composition of vegetation, including invasive plant species, is not expected to be altered by OSV use. Because the primary constituent elements of *Tuctoria greenei* critical habitat would be unaffected by OSV use, it is determined that the Lassen OSV Use Designation project would have **no effect** on *Tuctoria greenei* critical habitat.

Invasive Species

On the Lassen National Forest, 30 invasive plant species are documented. Appendix A includes a list of each species and their acreage of presence near OSV trails and in areas designated for OSV use.

Although seed dispersal by vehicles is a major vector for weed invasions (Ouren et al. 2007, Von der Lippe and Kowarik 2007, Taylor et al. 2011), no literature or observational evidence was found to support the idea that invasive plants are spread by OSV use or grooming activities. However, some weed introduction or expansion could potentially result from these uses. OSVs could bring weed seeds into the project area, especially if the OSVs and/or their trailers are stored outside near weed infestations. Throughout the seasons of non-use (spring, summer, and fall), weed species are actively growing and producing seed, which may get deposited on OSVs and trailers that are stored outside, particularly during windy conditions or if weeds are growing in close proximity. Weed introductions would be most likely to occur at trailheads, where seeds may be brought into the area on trailers, towing vehicles, and OSVs. The movement and jarring of this equipment during unloading may dislodge soil and other debris containing weed seeds. Less likely, but still possible, is that weed seeds may be deposited by the OSVs as they travel along designated trails and through areas open to cross-country travel, although it is unknown whether weed seeds deposited on the snow surface would remain viable and germinate when spring arrives. It is possible that the majority of weed seeds that may be brought into the area would be eaten by birds, mice, or other animals before spring conditions arrive.

Weeds usually gain a foothold in natural communities where soil disturbance has provided suitable conditions for weed seed germination, where ground vegetation is disturbed and unable to outcompete the invaders, and (in forested areas) where tree canopy removal or thinning has allowed additional sunlight to

reach the forest floor. Aside from the potential introduction of weed seeds described above, none of the other typical factors promoting weed infestations would be expected with OSV use.

As with the other indirect effects described above, the most likely places for potential weed introductions is in areas of concentrated OSV use. OSV trailheads would be also accessible by wheeled vehicles during the summer seasons, so the presence of weeds does not necessarily indicate that they were brought to the sites as a result of OSV activities. Although there would be some differences in designated OSV trails in each alternative, the locations and uses of five OSV trailheads would be the same for all alternatives. The following weed species have been found at the OSV trailheads:

- Ashpan – no weeds documented
- Fredonyer – *Lepidium latifolium* and *Leucanthemum vulgare*
- Jonesville – no weeds documented
- Morgan Summit – *Centaurea solstitialis*
- Swain Mountain – *Lepidium latifolium* and *Hypericum perforatum*

On the Lassen National Forest, there have been no observations of weed introductions or spread specifically tied to OSV use (Sanger pers. comm. 2015). Roadside weed infestations are routinely treated during their active growing season each year. Given the uncertainties described above and overall lack of evidence of OSV use contributing to weed infestations, the risk of weed increases due to OSV use is expected to be very low for all alternatives.

Other Botanical Resources

Special Interest Areas

The purpose of this SIA analysis is to determine compliance with the intended focus of each of the three areas that are established as a Botanical Special Interest Area. There is no variation between alternatives regarding OSV uses in these SIAs, so this section will apply for all alternatives.

Montgomery Creek Grove Botanical Area is less than 5 acres in size, and is heavily forested. Although the area is open to OSV use, recreational OSV users would not likely visit the area due to the difficulty in maneuvering snow machines through the dense forest. Therefore, OSV use is not expected to alter any of the vegetation and habitat characteristics for which the Special Interest Area was established.

At 480 acres, the Murken Botanical Area is the largest of the three botanical SIAs, and is easily accessible. With the minimum snow depth requirements for all alternatives, OSV use is not expected to alter any of the vegetation and habitat characteristics for which the Special Interest Area was established.

Willow Lake Bog Botanical Area encompasses 59 acres, most of which is open water. OSVs would not be authorized to operate over lakes, so the area would receive little OSV use. Due to the restrictions on OSV use on lakes, and minimum snow depth requirements, OSV use is not expected to alter any of the vegetation and habitat characteristics for which the Special Interest Area was established.

Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Snow plowing at the established OSV trailheads is an ancillary activity associated with the Lassen National Forest OSV Use Designation project, and is not analyzed as a part of the proposal. Snow plowing is not expected to affect botanical resources, other than providing an additional vector for the

potential transport of noxious/invasive weed species. Other ongoing and foreseeable future actions include livestock grazing, recreation, timber harvest, fuels reduction, woodcutting activities, wildfire suppression, and other activities. These activities may affect some Sensitive plants individually, but no trends toward federal listing or loss of species viability would be expected due to protective measures deemed necessary during environmental analysis and implemented as required.

Among others, specific future actions include:

- Forest-wide evaluation of maintenance level changes and mixed use on maintenance level 3 roads. Proposal is being developed.
- The Mudplant project proposes to salvage harvest windthrown trees and trees structurally damaged by the 2/6/2015 extreme wind event. Almanor Ranger District, 250 acres. Proposal developed, timber sale scheduled to be awarded in 2016.
- Storrie Aquatic Organism Passage project is currently being implemented, removing three road-stream crossing structures that are barriers to aquatic organism passage. They are being replaced with new structures that allow aquatic organisms to pass above and below the road crossings and that are capable of passing a 100-year storm flow. Almanor Ranger District.
- Rust Resistant Sugar Pine Maintenance is also in progress, thinning areas around proven rust resistant sugar pine trees to increase sustainability by reducing direct vegetative competition, wildfire risk, over-wintering habitat for cone boring insects, and squirrel access to crowns. Eagle Lake Ranger District, few acres.
- Pacific Gas and Electric (PG&E) Utility Pole Replacement is in progress, with annual permits issued to replace individual deteriorated electric distribution poles as needed within the existing utility corridor easement. Lassen National Forest.

Major ongoing and future actions include:

- Bald Fire Salvage and Restoration, Jellico Fire Salvage and Restoration (Formerly Bald Fire Salvage is beginning implementation in 2016, with salvage and vegetation treatments on approximately 14,000 acres. With one documented occurrence along the shoulder of an access road, and protections from road maintenance activities in place, it was determined that *Eriastrum tracyi* habitat and possibly some individuals would be affected by the activity. These effects would be minimal and mostly short-term, and both beneficial and adverse. The determination for *Eriastrum tracyi* is that either of the action alternatives may affect individuals, but is not likely to result in a trend toward federal listing or a loss of viability (Kellison 2015).
- Lassen Day Fire Salvage was analyzed for effects, and is still awaiting implementation. The project is salvage of dead and/or dying trees within approximately 200 acres of the Day Fire area on the Lassen National Forest. No Special Interest plants are known to occur in this project area.
- Tamarack Fire Salvage, Dutch Fire Salvage (Formerly Eiler Fire Salvage) (Ongoing) Description: Treat approximately 3,048 acres of area salvage, 1,174 acres of roadside hazard trees, 4,480 acres of fuels treatments, and reforest 5,645 acres within the fire perimeter. Bring 2.4 miles of existing non-system roads (needed to implement the project for multiple entries) into the Forest Road System as Maintenance Level 2 roads. These roads currently meet forest transportation standards. Construct one-half mile of new construction that would be needed for access during project implementation and for long-term management. This road would be classified as Maintenance Level 1 and thus closed to wheeled motor vehicle traffic once all project activities are complete. Bring one water source proposed for use in implementing the project up to best management.

o TEPS plants are known to occur in the Dutch Fire project area. In the Tamarack Fire project, due to protection measures in place to avoid known TEPS plant occurrences (*Pinus albicaulis*), it was determined that there would be no effects to these species. Therefore, these projects would not contribute to cumulative effects.

- Castle Timber Sale, Lost Timber Sale and Ursa Timber Sale area contains occurrences of *Meesia uliginosa*, but these are in protected wetland sites and no effects to TEPS plant species would be expected.
- Castle Timber Sale, Lost Timber Sale, Ursa Timber Sale, and Yellow Modified Contract Timber Sale areas contain no known Special Interest plants.

Threatened and Endangered Plants

Since there would be no direct or indirect effects to *Orcuttia tenuis* or *Tuctoria greenei* or their associated critical habitat, there would be no cumulative effects to consider for these species.

Sensitive Plants

The effects of present and future projects on TEPS species would likely be minimal because all projects are analyzed and mitigation measures would be designed for those species for which viability is a concern, on a project-by-project basis. When the minimal effects from other projects and activities are combined with the effects from the current proposal, there would be no loss of viability for any plant species and none would trend toward federal listing, for all alternatives.

Survey and Manage and Special Interest Plants

The effects of present and future projects on Survey and Manage and Special Interest plants would likely be minimal because all projects are analyzed and mitigation measures are designed for those species for which viability is a concern, on a project-by-project basis.

Invasive Plants

Invasive plants are also analyzed for each project, and design features are typically incorporated into project plans where ground disturbance may occur. In addition, weeds are routinely treated each year as part of the Lassen National Forest weeds program. The very low weed risk of the Lassen National Forest OSV Use Designation project would add minimal risk to the ongoing and foreseeable actions in the planning area.

Special Interest Areas

Because OSV use would not have direct or indirect effects to Special Interest Areas, there would be no cumulative effects from OSV use.

Alternative 1 – No Action

The No Action alternative is required by the National Environmental Policy Act and serves as a baseline to compare effects of action alternatives. Under alternative 1, there would be no changes to the existing system of OSV use on roads, trails, and areas within the Lassen National Forest except as prohibited by Forest Order. In addition, only those seasonal restrictions as specified in the Lassen Forest Plan and contained in existing Forest Orders would be continued. The 2005 Travel Management Regulations, Subpart C, would not be implemented, and no OSV use map would be produced.

The following summarizes how the Forest Service currently manages OSV use on the approximately 1,150,020-acre Lassen National Forest:

- Approximately 964,020 acres of National Forest System land open to off-trail cross-country OSV use;
- Approximately 186,000 acres of National Forest System land closed to OSV use;
- Approximately 2,760 miles of OSV trails open to OSV use;
- Minimum snow depth for OSV use on snow trails is 12 inches;
- Minimum snow depth for OSV snow trail grooming is 18 inches; and
- Minimum snow depth for off-trail, cross-country OSV use is 12 inches.

Alternative 1 Effects to Botanical Resources

Detailed indicators and measures for botanical resources are presented in appendix A in the botany specialist reports. The following table summarizes these same measures by the major analysis topics.

Table 81. Botanical resources indicators and measures for alternative 1

Analysis Topic	Total acres on Lassen National Forest	Acres within 100 feet of OSV trails	Acres in areas open to OSV use
Threatened and Endangered plants	74	0.004	68
Threatened and Endangered plant Critical Habitats	23,809	30	21,079
Sensitive plants	2,524	24	1,540
Survey and Manage Plants and Fungi	8.4 (NWFP area only)	0	8.4
Special Interest plants	5,882	58	5,693
Invasive plants	8,475	58	7,172
Special Interest Areas	544	0	544

There would be no additional effects to botanical resources beyond those described in Effects Common to All Alternatives that would be specific to alternative 1. This alternative would generally have the greatest potential for direct effects to botanical resources due to largest areas open OSV use.

Threatened and Endangered Plants

As described above in Effects Common to All Alternatives, there would be no direct, indirect, or cumulative effects to *Orcuttia tenuis*, *Tuctoria greenei*, or their critical habitats.

Sensitive Plants

Sensitive plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they too may also experience indirect effects if they occur near designated OSV trails.

Sensitive Plant Determinations for Alternative 1:

For the five Sensitive woody plant species, *Eriogonum prociduum*, *Eriogonum spectabile*, *Frangula purshiana* ssp. *ultramafica*, *Monardella follettii*, and *Pinus albicaulis*, due to the potential for direct damage where they occur in areas that would be open to OSV use and indirect effects to occurrences

within 100 feet of designated OSV trails, alternative 1 of the Lassen OSV Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For seven of the Sensitive perennial herbaceous plant species, *Astragalus pulsiferae* var. *suksdorfii*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Meesia uliginosa*, *Penstemon sudans*, and *Silene occidentalis* ssp. *longistipitata*, due to the potential for indirect effects to occurrences within 100 feet of OSV trails, alternative 1 of the Lassen OSV Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all seven Sensitive annual plant species, *Clarkia gracilis* ssp. *albicaulis*, *Clarkia mildrediae* ssp. *mildrediae*, *Cryptantha crinita*, *Eriastrum tracyi*, *Limnanthes floccosa* ssp. *bellingiana*, *Mimulus evanescens*, and *Phacelia inundata*, because living plants would not be present during the period of OSV use and they do not occur within 100 feet of OSV trails, alternative 1 of the Lassen OSV Designation project would have **no impact** to these species.

For the Sensitive aquatic plant species, *Peltigera gowardii*, due to the potential for indirect effects from pollutants in the snowpack to occurrences within 100 feet of OSV trails, alternative 1 of the Lassen OSV Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all other Sensitive plant not specifically mentioned above, because they would not be present within 100 feet of OSV trails, alternative 1 of the Lassen OSV Designation project would have **no impact** to these species.

Survey and Manage Species

As described in Effects Common to All Alternatives, because no ground-disturbing actions would be proposed, there would be no negative effects on Survey and Manage species or their habitats within the project area.

Special Interest Plants

Special Interest plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas open to OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they too may also experience indirect effects if they occur near designated OSV trails.

Because there is potential for direct damage where they occur in areas open to OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, the five Special Interest woody plant species, *Artemisia tripartita* ssp. *tripartita*, *Betula glandulosa*, *Eriogonum ovalifolium* var. *depressum*, *Eriogonum pyrolifolium* var. *pyrolifolium*, and *Hesperocyparis bakeri*, **may be affected** by alternative 1 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

Because there is potential for indirect effects to occurrences within 100 feet of designated OSV trails, eleven of the Special Interest perennial herbaceous plant species, *Asplenium septentrionale*, *Astragalus inversus*, *Carex davayi*, *Carex petasata*, *Claytonia palustris*, *Erigeron inornatus* var. *calidipetris*, *Juncus hemiendytus* var. *abjectus*, *Muhlenbergia jonesii*, *Penstemon cinicola*, *Penstemon heterodoxus* var.

shastensis, and *Piperia colemanii*, and one of the annual plant species, *Mimulus pygmaeus*, **may be affected** by alternative 1 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester’s Sensitive Plant List.

For all other Special Interest plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 1 of the Lassen OSV Use Designation project **will not affect** these species.

Invasive Plants

As described above in Effects Common to All Alternatives, the risk of weed introduction and/or spread due to OSV use is very low.

Special Interest Areas

As described above in Effects Common to All Alternatives, all Botanical Special Interest areas would remain open to OSV use, but this use is not expected to alter any of the characteristics for which each Special Interest Area was established.

Alternative 2 – Modified Proposed Action

Alternative 2 Effects to Botanical Resources

Detailed indicators and measures for botanical resources are presented in appendix A of the botany specialist reports. The following table summarizes these same measures by the major analysis topics.

Table 82. Botanical resources indicators and measures for alternative 2

Analysis Topic	Total acres on Lassen National Forest	Acres within 100 feet of OSV trails	Acres in areas designated for OSV use
Threatened and Endangered plants	74	0.004	59
Threatened and Endangered plant Critical Habitats	23,809	30	21,168
Sensitive plants	2,524	148	1,403
Survey and Manage Plants and Fungi	8.4 (NWFP area only)	0	8.4
Special Interest plants	5,882	52	5,165
Invasive plants	8,475	17	4,772
Special Interest Areas	544	0	544

There would be no additional effects to botanical resources beyond those described in Effects Common to All Alternatives that would be specific to alternative 2. The reduction of minimum snow depth from 18 to 12 inches for grooming would result in no different effects to botanical resources. This alternative would generally have less potential for direct effects to botanical resources due to fewer areas open OSV use. The area of potential indirect effects would be the same as for alternative 1.

Threatened and Endangered Plants

As described above in Effects Common to All Alternatives, there would be no direct, indirect, or cumulative effects to *Orcuttia tenuis*, *Tuctoria greenei*, or their critical habitats.

Sensitive Plants

Sensitive plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they too may also experience indirect effects if they occur near designated OSV trails.

Sensitive Plant Determinations for Alternative 2:

For the five Sensitive woody plant species, *Eriogonum prociduum*, *Eriogonum spectabile*, *Frangula purshiana* ssp. *ultramafica*, *Monardella follettii*, and *Pinus albicaulis*, due to the potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For seven of the Sensitive perennial herbaceous plant species, *Astragalus pulsiferae* var. *suksdorfii*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Meesia uliginosa*, *Penstemon sudans*, and *Silene occidentalis* ssp. *longistipitata*, due to the potential for indirect effects to occurrences within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all seven Sensitive annual plant species, *Clarkia gracilis* ssp. *albicaulis*, *Clarkia mildrediae* ssp. *mildrediae*, *Cryptantha crinita*, *Eriastrum tracyi*, *Limnanthes floccosa* ssp. *bellingneriana*, *Mimulus evanescens*, and *Phacelia inundata*, because living plants would not be present during the period of OSV use and they do not occur within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project would have **no impact** to these species.

For the Sensitive aquatic plant species, *Peltigera gowardii*, due to the potential for indirect effects from pollutants in the snowpack to occurrences within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all other Sensitive plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project would have **no impact** to these species

Survey and Manage Species

As described in Effects Common to All Alternatives, because no ground-disturbing actions would be proposed, there would be no negative effects on Survey and Manage species or their habitats within the project area.

Special Interest Plants

Special Interest plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they too may also experience indirect effects if they occur near designated OSV trails.

Because there is potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, the five Special Interest woody plant species, *Artemisia tripartita* ssp. *tripartita*, *Betula glandulosa*, *Eriogonum ovalifolium* var. *depressum*, *Eriogonum pyrolifolium* var. *pyrolifolium*, and *Hesperocyparis bakeri*, **may be affected** by alternative 2 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

Because there is potential for indirect effects to occurrences within 100 feet of designated OSV trails, eleven of the Special Interest perennial herbaceous plant species, *Asplenium septentrionale*, *Astragalus inversus*, *Carex davyi*, *Carex petasata*, *Claytonia palustris*, *Erigeron inornatus* var. *calidipetris*, *Juncus hemiendytus* var. *abjectus*, *Muhlenbergia jonesii*, *Penstemon cinicola*, *Penstemon heterodoxus* var. *shastensis*, and *Piperia colemanii*, and one of the annual plant species, *Mimulus pygmaeus*, **may be affected** by alternative 2 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

For all other Special Interest plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project **will not affect** these species.

Invasive Plants

As described above in Effects Common to All Alternatives, the risk of weed introduction and/or spread due to OSV use is very low.

Special Interest Areas

As described above in Effects Common to All Alternatives, all Botanical Special Interest areas would remain open to OSV use, but this use is not expected to alter any of the characteristics for which each Special Interest Area was established.

Alternative 3

Alternative 3 Effects to Botanical Resources

Detailed indicators and measures for botanical resources are presented in appendix A of the botany specialist reports. The following table summarizes these same measures by the major analysis topics.

Table 83. Botanical resources indicators and measures for alternative 3

Analysis Topic	Total acres on Lassen National Forest	Acres within 100 feet of OSV trails	Acres in areas designated for OSV use
Threatened and Endangered plants	74	0.004	44
Threatened and Endangered plant Critical Habitats	23,809	30	19,668
Sensitive plants	2,524	149	1,363
Survey and Manage Plants and Fungi	8.4 (NWFP area only)	0	8.3
Special Interest plants	5,882	52	5,004
Invasive plants	8,475	58	4,095
Special Interest Areas	544	0	487

There would be no additional effects to botanical resources beyond those described in Effects Common to All Alternatives that would be specific to alternative 3. This alternative would have the least potential for direct effects to botanical resources due to the fewest areas of open OSV use. The area of potential indirect effects is larger than alternatives 1 and 2 because additional miles of OSV trails would be designated.

Threatened and Endangered Plants

As described above in Effects Common to All Alternatives, there would be no direct, indirect, or cumulative effects to *Orcuttia tenuis*, *Tuctoria greenei*, or their critical habitats.

Sensitive Plants

Sensitive plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they also may experience indirect effects if they occur near designated OSV trails.

Sensitive Plant Determinations for Alternative 3:

For the five Sensitive woody plant species, *Eriogonum prociduum*, *Eriogonum spectabile*, *Frangula purshiana* ssp. *ultramafica*, *Monardella follettii*, and *Pinus albicaulis*, due to the potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, alternative 3 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For seven of the Sensitive perennial herbaceous plant species, *Astragalus pulsiferae* var. *suksdorfii*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Meesia uliginosa*, *Penstemon sudans*, and *Silene occidentalis* ssp. *longistipitata*, due to the potential for indirect effects to occurrences within 100 feet of designated OSV trails, alternative 3 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all seven Sensitive annual plant species, *Clarkia gracilis* ssp. *albicaulis*, *Clarkia mildrediae* ssp. *mildrediae*, *Cryptantha crinita*, *Eriastrum tracyi*, *Limnanthes floccosa* ssp. *bellingiana*, *Mimulus*

evanescens, and *Phacelia inundata*, because living plants would not be present during the period of OSV use and they do not occur within 100 feet of designated OSV trails, alternative 3 of the Lassen OSV Use Designation project would have **no impact** to these species.

For the Sensitive aquatic plant species, *Peltigera gowardii*, due to the potential for indirect effects from pollutants in the snowpack to occurrences within 100 feet of designated OSV trails, alternative 2 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all other Sensitive plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 3 of the Lassen OSV Use Designation project would have **no impact** to these species.

Survey and Manage Species

As described in Effects Common to All Alternatives, because no ground-disturbing actions are proposed, there would be no negative effects on Survey and Manage species or their habitats within the project area.

Special Interest Plants

Special Interest plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they also may experience indirect effects if they occur near designated OSV trails.

Because there is potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, four of the five Special Interest woody plant species, *Artemisia tripartita* ssp. *tripartita*, *Betula glandulosa*, *Eriogonum ovalifolium* var. *depressum*, and *Hesperocyparis bakeri*, **may be affected** by alternative 3 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List. Different from all other alternatives, *Eriogonum pyrolifolium* var. *pyrolifolium* would **not be affected** in alternative 3 because it is not present in areas designated for OSV use or in areas within 100 feet of designated OSV trails.

Because there is potential for indirect effects to occurrences within 100 feet of designated OSV trails, eleven of the Special Interest perennial herbaceous plant species, *Asplenium septentrionale*, *Astragalus inversus*, *Carex davyi*, *Carex petasata*, *Claytonia palustris*, *Erigeron inornatus* var. *calidipetris*, *Juncus hemiendytus* var. *abjectus*, *Muhlenbergia jonesii*, *Penstemon cinicola*, *Penstemon heterodoxus* var. *shastensis*, and *Piperia colemanii*, and one of the annual plant species, *Mimulus pygmaeus*, **may be affected** by alternative 3 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

For all other Special Interest plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 3 of the Lassen OSV Use Designation project **will not affect** these species.

Invasive Plants

As described above in Effects Common to All Alternatives, the risk of weed introduction and/or spread due to OSV use is very low.

Special Interest Areas

As described above in Effects Common to All Alternatives, all Botanical Special Interest areas would remain open to OSV use, but this use is not expected to alter any of the characteristics for which each Special Interest Area was established.

Alternative 4

Alternative 4 Effects to Botanical Resources

Detailed indicators and measures for botanical resources are presented in appendix A of the botany specialist reports. The following table summarizes these same measures by the major analysis topics.

Table 84. Botanical resources indicators and measures for alternative 4

Analysis Topic	Total acres on Lassen National Forest	Acres within 100 feet of OSV trails	Acres in areas designated for OSV use
Threatened and Endangered plants	74	0.004	68
Threatened and Endangered plant Critical Habitats	23,809	30	22,001
Sensitive plants	2,524	149	1,570
Survey and Manage Plants and Fungi	8.4 (NWFP area only)	0	8.4
Special Interest plants	5,882	52	5,677
Invasive plants	8,475	55	7,172
Special Interest Areas	544	0	544

There would be no additional effects to botanical resources beyond those described in Effects Common to All Alternatives that would be specific to alternative 4. With this alternative, the reduction of minimum snow depth from 18 to 6 inches for grooming would result in no different effects to botanical resources. This alternative would have a greater potential than alternative 2 for direct effects to botanical resources due to areas below 3,500 feet being open OSV use. The area of potential indirect effects would be similar to alternative 3.

Threatened and Endangered Plants

As described above in Effects Common to All Alternatives, there would be no direct, indirect, or cumulative effects to *Orcuttia tenuis*, *Tuctoria greenei*, or their critical habitats.

Sensitive Plants

Sensitive plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they too may also experience indirect effects if they occur near designated OSV trails.

Sensitive Plant Determinations for Alternative 4:

For the five Sensitive woody plant species, *Eriogonum prociduum*, *Eriogonum spectabile*, *Frangula purshiana* ssp. *ultramafica*, *Monardella follettii*, and *Pinus albicaulis*, due to the potential for direct

damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, alternative 4 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For seven of the Sensitive perennial herbaceous plant species, *Astragalus pulsiferae* var. *suksdorfii*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Meesia uliginosa*, *Penstemon sudans*, and *Silene occidentalis* ssp. *longistipitata*, due to the potential for indirect effects to occurrences within 100 feet of designated OSV trails, alternative 4 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all seven Sensitive annual plant species, *Clarkia gracilis* ssp. *albicaulis*, *Clarkia mildrediae* ssp. *mildrediae*, *Cryptantha crinita*, *Eriastrum tracyi*, *Limnanthes floccosa* ssp. *bellingermana*, *Mimulus evanescens*, and *Phacelia inundata*, because living plants would not be present during the period of OSV use and they do not occur within 100 feet of designated OSV trails, alternative 4 of the Lassen OSV Use Designation project would have **no impact** to these species.

For the Sensitive aquatic plant species, *Peltigera gowardii*, due to the potential for indirect effects from pollutants in the snowpack to occurrences within 100 feet of designated OSV trails, alternative 4 of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all other Sensitive plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 4 of the Lassen OSV Use Designation project would have **no impact** to these species.

Survey and Manage Species

As described in Effects Common to All Alternatives, because no ground-disturbing actions are proposed, there would be no negative effects on Survey and Manage species or their habitats within the project area.

Special Interest Plants

Special Interest plant species in the various plant life form categories would be affected differently, as described above in Effects Common to All Alternatives. Trees, shrubs, and sub-shrubs (woody plants) may be directly damaged by OSVs where they occur in areas designated for OSV use, and they may also experience indirect effects where they occur near designated OSV trails. Perennial herbaceous species, annual species and aquatic species would not be directly affected, but they too may also experience indirect effects if they occur near designated OSV trails.

Because there is potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, the five Special Interest woody plant species, *Artemisia tripartita* ssp. *tripartita*, *Betula glandulosa*, *Eriogonum ovalifolium* var. *depressum*, *Eriogonum pyrolifolium* var. *pyrolifolium*, and *Hesperocyparis bakeri*, **may be affected** by alternative 4 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

Because there is potential for indirect effects to occurrences within 100 feet of designated OSV trails, eleven of the Special Interest perennial herbaceous plant species, *Asplenium septentrionale*, *Astragalus inversus*, *Carex davyi*, *Carex petasata*, *Claytonia palustris*, *Erigeron inornatus* var. *calidipetris*, *Juncus hemiendytus* var. *abjectus*, *Muhlenbergia jonesii*, *Penstemon cinicola*, *Penstemon heterodoxus* var.

shastensis, and *Piperia colemanii*, and one of the annual plant species, *Mimulus pygmaeus*, **may be affected** by alternative 4 of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester’s Sensitive Plant List.

For all other Special Interest plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, alternative 4 of the Lassen OSV Use Designation project **will not affect** these species.

Invasive Plants

As described above in Effects Common to All Alternatives, the risk of weed introduction and/or spread due to OSV use is very low.

Special Interest Areas

As described above in Effects Common to All Alternatives, all Botanical Special Interest areas would remain open to OSV use, but this use is not expected to alter any of the characteristics for which each Special Interest Area was established.

Degree to Which the Alternatives Address the Issues

Table 85. Relative comparison of alternatives by botanical resource issue topics

Analysis Topic	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Threatened and Endangered plants	All alternatives equal (issue sufficiently addressed – no effects)	All alternatives equal	All alternatives equal	All alternatives equal
Threatened and Endangered plant Critical Habitats	All alternatives equal (issue sufficiently addressed – no effects)	All alternatives equal	All alternatives equal	All alternatives equal
Sensitive plants	All alternatives equal (issue sufficiently addressed – minor potential effects)	All alternatives equal	All alternatives equal	All alternatives equal
Survey and Manage plants	All alternatives equal (issue sufficiently addressed)	All alternatives equal	All alternatives equal	All alternatives equal
Special Interest plants	Alternative 1 holds the greatest potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 2 has the second to least potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 3 holds the least potential for effects (issue sufficiently addressed – minor potential effects)	Alternative 4 has the second greatest potential for effects (issue sufficiently addressed – minor potential effects)
Invasive plants	All alternatives equal (issue sufficiently addressed – very low risk)	All alternatives equal (very low risk)	All alternatives equal (very low risk)	All alternatives equal (very low risk)
Special Interest Areas	All alternatives equal (issue sufficiently addressed)	All alternatives equal	All alternatives equal	All alternatives equal

Summary of Botanical Resource Measures and Determinations

Table 86. Botanical resources summary of measures for all alternatives

Analysis Topic	Total acres on Lassen National Forest	Acres within 100 feet of OSV trails	Acres in areas designated for OSV use
Threatened and Endangered plants	74	0.004 all alternatives	68 Alt. 1 59 Alt. 2 44 Alt. 3 68 Alt. 4
Threatened and Endangered plant Critical Habitats	23,809	30 all alternatives	22,001 Alt. 1 21,168 Alt. 2 19,668 Alt. 3 22,001 Alt. 4
Sensitive plants	2,524	149 Alt. 1 148 Alt. 2 149 Alt. 3 149 Alt. 4	1,540 Alt. 1 1,403 Alt. 2 1,363 Alt. 3 1,570 Alt. 4
Survey and Manage Plants and Fungi (NWFP area only)	8.4 all alternatives	0 all alternatives	8.4 Alt. 1 8.4 Alt. 2 8.3 Alt. 3 8.4 Alt. 4
Special Interest plants	5,882	58 Alt. 1 52 Alt. 2 52 Alt. 3 52 Alt. 4	5,693 Alt. 1 5,165 Alt. 2 5,004 Alt. 3 5,677 Alt. 4
Invasive plants	8,475	58 Alt. 1 17 Alt. 2 58 Alt. 3 55 Alt. 4	7,169 Alt. 1 4,772 Alt. 2 4,095 Alt. 3 7,172 Alt. 4
Special Interest Areas	544	0 all alternatives	544 Alt. 1 544 Alt. 2 487 Alt. 3 544 Alt. 4

Threatened and Endangered Plants

Although occurrences and critical habitat for *Orcuttia tenuis* and critical habitat for *Tuctoria greenei* are located within the Lassen National Forest OSV Use Designation project, proposed activities would not be expected to affect the critical habitats or occurrences of any proposed or listed species because authorized activities would occur at a time of year when the plants would not be growing, occurrences would be located greater than 100 feet from OSV trails, and OSV use on the required minimum snow depths is not expected to result in any changes to vegetation or hydrology of their vernal pool habitats. Therefore, it is determined that the Lassen National Forest OSV Use Designation project would have **no effect** on *Orcuttia tenuis* or critical habitats for *Orcuttia tenuis* and *Tuctoria greenei* on the Lassen National Forest.

Sensitive Plants

Sensitive woody plant species may be directly affected by crushing, breaking, or abrasion of stems and evergreen foliage where they occur in any areas designated for OSV use. Plants of other life form categories would not be directly affected because their living tissues would not be present above ground,

and would not be directly damaged by OSVs. Any of the Sensitive plants may be indirectly affected by snow compaction and/or OSV emissions containing pollutants where they occur in close proximity to areas of concentrated use (within 100 feet of designated OSV trails). Thus, these plant species would be reasonably at risk to some level of effects, dependent on their life forms, timing of growth, and proximity to heavy OSV use. Potential indirect effects would be expected to be minor, and all effects would be minimized by the required minimum snow depths proposed. Although some individuals may be severely damaged and may eventually die from intensive OSV damage (*Pinus albicaulis* is the most likely species to be damaged to this extent), OSV use is not expected to result in a trend toward federal listing or loss of viability for any Sensitive plants.

Sensitive Plant Determinations:

For the five Sensitive woody plant species, *Eriogonum prociduum*, *Eriogonum spectabile*, *Frangula purshiana* ssp. *ultramafica*, *Monardella follettii*, and *Pinus albicaulis*, due to the potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, all alternatives of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For seven of the Sensitive perennial herbaceous plant species, *Astragalus pulsiferae* var. *suksdorfii*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum*, *Meesia uliginosa*, *Penstemon sudans*, and *Silene occidentalis* ssp. *longistipitata*, due to the potential for indirect effects to occurrences within 100 feet of designated OSV trails, all alternatives of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all seven Sensitive annual plant species, *Clarkia gracilis* ssp. *albicaulis*, *Clarkia mildrediae* ssp. *mildrediae*, *Cryptantha crinita*, *Eriastrum tracyi*, *Limnanthes floccosa* ssp. *bellingermaniana*, *Mimulus evanescens*, and *Phacelia inundata*, because living plants would not be present during the period of OSV use and they do not occur within 100 feet of designated OSV trails, all alternatives of the Lassen OSV Use Designation project would have **no impact** to these species.

For the Sensitive aquatic plant species, *Peltigera gowardii*, due to the potential for indirect effects from pollutants in the snowpack to occurrences within 100 feet of designated OSV trails, all alternatives of the Lassen OSV Use Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.**

For all other Sensitive plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, all alternatives of the Lassen OSV Use Designation project would have **no impact** to these species.

Survey and Manage Species

For all alternatives, no OSV trails would be proposed in the NWFP portion of the Lassen National Forest, so none of the known Survey and Manage sites would be within 100 feet of OSV trails. However, all of the Survey and Manage sites would be in areas open to cross-country OSV travel.

Because the proposed action and alternatives would not produce ground-disturbing impacts, there would be no negative effects on Survey and Manage species or their persistence within the project area; therefore, field surveys and site management for these species are not required. Without the loss of overstory canopy cover, specific host trees, forest floor organic matter, or large woody debris, habitat characteristics would be retained for conserving Survey and Manage fungi. Occurrences of *Cypripedium*

montanum would not be affected because the species is dormant and underground when OSV uses take place. Occurrences of *Ptilidium californicum* would not be affected because the species grows on the bases of large trees and minimum snow depths would prevent impacts as well as the fact that OSV operators avoid impacting large trees for safety reasons.

Special Interest Plants

Special Interest woody plant species may be directly affected by crushing, breaking, or abrasion of stems and evergreen foliage where they occur in any areas designated for OSV use. Plants of other life form categories would not be directly affected because their living tissues would not be present above ground, and would not be directly damaged by OSVs. Any of the Special Interest plants may be indirectly affected by snow compaction and/or OSV emissions containing pollutants where they occur in close proximity to areas of concentrated use (within 100 feet of designated OSV trails). Thus, these plant species would be reasonably at risk to some level of effects, dependent on their life forms, timing of growth, and proximity to heavy OSV use. Potential indirect effects would be expected to be minor, and all effects would be minimized by the required minimum snow depths proposed. Although some individuals may be severely damaged and may eventually die from intensive OSV damage, OSV use is not expected to result in a trend toward federal listing or loss of viability for any Special Interest plants.

Special Interest Plant Determinations:

Because there is potential for direct damage where they occur in areas designated for OSV use and indirect effects to occurrences within 100 feet of designated OSV trails, four of the five Special Interest woody plant species, *Artemisia tripartita* ssp. *tripartita*, *Betula glandulosa*, *Eriogonum ovalifolium* var. *depressum*, *Eriogonum pyrolifolium* var. *pyrolifolium*, and *Hesperocyparis bakeri*, **may be affected** by all alternatives of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

Because there is potential for indirect effects to occurrences within 100 feet of designated OSV trails, eleven of the Special Interest perennial herbaceous plant species, *Asplenium septentrionale*, *Astragalus inversus*, *Carex davyi*, *Carex petasata*, *Claytonia palustris*, *Erigeron inornatus* var. *calidipetris*, *Juncus hemiendytus* var. *abjectus*, *Muhlenbergia jonesii*, *Penstemon cinicola*, *Penstemon heterodoxus* var. *shastensis*, and *Piperia colemanii*, and one of the annual plant species, *Mimulus pygmaeus*, **may be affected** by all alternatives of the Lassen OSV Use Designation project, but the potential effects would not contribute to a downward trend or the species being added to the Regional Forester's Sensitive Plant List.

For all other Special Interest plants not specifically mentioned above, because they would not be present within 100 feet of designated OSV trails, all alternatives of the Lassen OSV Use Designation project **will not affect** these species.

Invasive Plants

Thirty invasive plant species are documented in the project area, and most infestations along roadsides are treated each year. There is some potential for weeds to be introduced to OSV trailheads and into areas designated for OSV use (possibly transported on trailers, towing vehicles, or OSVs), but the other typical factors promoting the spread and establishment of weeds (soil disturbance and vegetation cover reductions) would not be expected to occur with the proposed OSV uses. There have been no observations or literature found that point to OSV use causing introduction or spread of invasive plants, but it may be possible, especially at trailheads, where vehicle use is concentrated. Given these uncertainties and the overall lack of evidence of OSV use contributing to weed infestations, the risk of weed increases due to OSV use is expected to be very low for all alternatives.

Special Interest Areas

For all alternatives, the vegetation and habitat characteristics for which each of the three Botanical Areas (Montgomery Creek Grove, Murken, and Willow Lake Bog) were established would be maintained. The required minimum snow depths for OSV use, and design features that prohibit OSV use from operating over open water would protect these resources from damage.

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

All alternatives would comply with the Endangered Species Act because no federally listed or proposed species would be affected. With this Biological Evaluation/Biological Assessment, the proposed project effects on TEPS plants have been evaluated and measures taken to ensure that Sensitive plants do not become Threatened or Endangered because of Forest Service actions. All alternatives would maintain viable populations of all native and desired nonnative plants, and the proposed activities were reviewed for potential effects on rare species, and thus would be compliant with Forest Service Manual direction. All alternatives would also comply with the Lassen National Forest Land and Resource Management Plan (LRMP) and the Sierra Nevada Forest Plan Amendment because Sensitive plant populations would remain viable and their habitats would be maintained.

Because the proposed action and alternatives do not involve ground disturbance, and would not affect Survey and Manage plants or fungi, the actions are in compliance with the Northwest Forest Plan as amended by the 2001 ROD.

All alternatives would maintain viable populations of all native and desired nonnative plants, and the proposed activities were reviewed for potential effects on Special Interest species, and thus would be compliant with Forest Service Manual direction. In addition, noxious/invasive weeds were evaluated for effects from the proposed actions and suitable prevention measures taken, thus complying with the Lassen LRMP and Forest Service Manual direction, as well as Executive Order 13112.

Special Interest Areas with a botanical focus would be managed to preserve the characteristics for which the areas were established, and thus would comply with the Lassen LRMP.

Other Relevant Mandatory Disclosures

Unavoidable Adverse Effects

As described in Effects Common to All Alternatives, Sensitive and Special Interest woody plants and other Sensitive and Special Interest plants in close proximity to OSV trails may be affected by OSV use. Without placing restrictions in areas where these species occur, there could be unavoidable adverse effects to some individuals.

Irreversible and Irrecoverable Commitments of Resources

Although some adverse effects to Sensitive and Special Interest plants may occur, these plants are a renewable resource, and thus, there would be no irreversible commitments of the resource. To a small extent, excessive damage to individuals could cause mortality, and thus, may constitute an irretrievable commitment for Special Interest plant species.

Impacts on Terrestrial Wildlife

Introduction

This section summarizes potential effects of the alternatives for the Lassen Over-snow Vehicle Use Designation on federally listed and Regional Forester's sensitive species (i.e., sensitive species) as disclosed in the project Biological Evaluation (BE) and Biological Assessment (BA), as well as Management Indicator Species (MIS), migratory landbirds, and survey and manage species. The complete reports are attached to the FEIS as appendices F, G, H, and I; maps are available on the project website and in the project record. Potential effects of OSV use and trail grooming, including associated actions, to terrestrial wildlife species of public interest are also disclosed and analyzed.

The following sections apply to both federally listed and Forest Service sensitive species: Topics and Issues Addressed in this Analysis, Methodology, Information and Data Sources, Incomplete and Unavailable Information, and Spatial and Temporal Context for Effects Analysis.

Issues Addressed in This Analysis

Issues

The public identified several non-significant issues during scoping. Designating roads, trails and areas for OSV use and grooming trails for OSV use has the potential to impact terrestrial wildlife through direct, indirect, or cumulative:

1. Injury or mortality
2. Disturbance to individuals (e.g., increased noise and human presence resulting in a loss of breeding and/or feeding)
3. Impacts to wildlife habitats including
 - Habitat fragmentation or modification
 - Snow compaction in the habitat of species that hibernate, subnivean species habitat, or in or near denning sites.

Resource Indicators and Measures

We used the following resource indicators and measures (table 87) in the analysis to measure and disclose effects to threatened, endangered, proposed, candidate, and sensitive (TEPCS) species and other species of public interest:

Table 87. Resource indicators and measures for assessing effects to wildlife resources

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: P/N, or key issue?	Source
Federally Listed, Proposed Species Forest Service Sensitive Species	Potential for disturbance to individuals from noise associated with OSV use and related activities ⁸	All species unless otherwise noted below: Acres and percentage of habitat most likely to be impacted by OSV use Acres and percentage of buffered Northern spotted owl (NSO), California spotted owl (CSO) activity centers and northern goshawk (NGO) protected activity centers (PACs) most likely to be impacted by OSV use Acres and percentage of buffered bald eagle nests most likely to be impacted by OSV use Species that Migrate or Hibernate: Qualitative discussion only	Yes	FSM 2672.4
Federally Listed, Proposed Species Forest Service Sensitive Species	Potential for injury or mortality of individuals from OSV use or related activities	All species unless otherwise noted below: Acres and percentage of habitat most likely to be impacted by OSV use Acres and percentage of buffered California spotted owl (CSO) activity centers and northern goshawk (NGO) PACs most likely to be impacted by OSV use Acres and percentage of buffered bald eagle nests most likely to be impacted by OSV use	Yes	FSM 2672.4
Applicable Federally Listed, Proposed Species Applicable Forest Service Sensitive Species (marten, Sierra Nevada red fox, wolverine)	Potential for habitat fragmentation or modification	Acres and percentage of habitat most likely to be impacted by OSV use	Yes	FSM 2672.4
Marten	Potential for loss of habitat connectivity	Acres and percentage of connectivity corridors impacted by OSV use	Yes	FSM 2672.4

⁸ Related activities include snow plowing of roads, parking lots, and trailheads (i.e., staging areas)

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: P/N, or key issue?	Source
Applicable Forest Service Sensitive Species (willow flycatcher, western pond turtle, Shasta Hesperian snail, western bumble bee, bats)	Potential for habitat degradation	Qualitative discussion	Yes	FSM 2672.4
Applicable Federally Listed, Proposed Species, marten, and Sierra Nevada red fox	Potential for effects of snow compaction or snow compaction effects to foraging (marten) or denning (Sierra Nevada red fox) individuals	Acres and percentage of habitat most likely to be impacted by OSV use	Yes	FSM 2672.4
Subnivean Species (prey for Federally Listed and Proposed Species and Forest Service Sensitive Species)	Potential for effects of snow compaction by OSV use or related activities on subnivean species habitat	Acres and percentage of habitat impacted by OSV use for applicable species (NSO, fisher, marten, CSO, Sierra Nevada red fox)	Yes	FSM 2672.4

Methodology

Species biology, habitat information, and potential for OSV-related effects, from the best available scientific information, were discussed in species account sections. Species occurrence information specific to the Lassen National Forest was disclosed. For quantitative assessment, the amount of suitable habitat with potential to be impacted by OSV use was used to measure effects to species for the purpose of comparison by alternative. Specific reproductive site information, when available, was also used to measure effects to species.

Analysis Process

Using Geographic Information Systems (GIS), modeled habitat and reproductive sites, when available, for each species was intersected with areas conducive to OSV use assumptions criteria (canopy cover less than 70 percent, slopes less than 21 percent; see below) and areas in which OSV use would be permitted under each alternative. The resulting total acres and percentages of habitat, by assumption and alternative, were disclosed and compared. Using best available scientific information, known reproductive sites were buffered [Northern spotted owl and California spotted owl activity center points (0.70 mile), goshawk protected activity centers (PACs) (0.25 mile), and bald eagle nest site points (660 feet)] to identify habitats with the greatest potential to be impacted by OSV use and associated activities.

Assumptions Specific to the Wildlife Resources Analysis

Snowmobile use patterns vary by day of the week, time of the day, topography, terrain, and vegetation. With assistance from Lassen National Forest staff, we developed the following use patterns and categories to create a more accurate description of potential impacts of each alternative to species and habitats. Refer to the FEIS for mapped assumptions.

General OSV use patterns:

- Primarily day use (generally 10:00 am to 3:00 pm; grooming occurs at night).
- OSV use is highest on weekends and holidays.
- Highest concentrations of OSV use occur along groomed trails (this is supported by research documented in State Environmental Impact Report (EIR). Generally, groomed routes are used to access cross-country areas.
- Use is concentrated at trailheads.
- Higher use occurs in open meadows adjacent to groomed trail access and in flatter areas.
- OSV “high marking” occurs primarily on slopes with open vegetation, near groomed trails.
- Lower elevations generally have less OSV use – snow occurs at lower elevations less frequently and persists for short periods of time (2 to 5 days).
- Ungroomed routes receive 50 percent less use than groomed routes (only 25,000 registered OSVs in California per State EIR, most use on groomed trails; if OSV trail grooming were discontinued, assume that use would decline by 50 percent).
- OSV use is assumed to be very low (fewer than 10 riders per site per day on a weekend), depending on specific snow depths and daily temperatures, after the March 31 termination date closing roads for exclusive OSV use. Based on surveys of Forest Snow Parks and designated OSV route access points, OSV use was documented until the end of April, at which point snow levels no longer allow continued use of designated OSV routes (California Department of Parks and Recreation 2010).

Therefore, for the purpose of this analysis, April 30 is used as a cut-off date for the maximum period of interaction between snowmobiles and wildlife.

Areas Conducive to OSV Use (Moderate to High Use):

- Canopy cover less than 70 percent: CWHR vegetation (California Department of Fish and Wildlife (CDFW) 2014) 1S, 1P, 1M, 2S, 2P, 2M, 3S, 3P, 3M, 4S, 4P
- Slope less than or equal to 20 percent

High Use:

- Areas within 0.5 mile of snowmobile staging areas
- Areas within 0.5 mile of groomed trails
- Meadows within 0.5 mile of a designated OSV trail

Moderate Use:

- Areas within 0.5 mile of marked (not groomed) OSV trails
- Areas between 0.5 and 1.5 miles from groomed trails
- Meadows 10 acres or greater in size, or 0.5 to 1.5 miles from an OSV trail

Areas Not Conducive to OSV Use (Low-to-No Use):

Low Use:

- Areas where OSV use is prohibited or restricted under current management. Unauthorized uses will be addressed as law enforcement issues and may prompt corrective actions.
- Areas below 3,500 feet elevation
- Canopy cover greater than 70 percent: CWHR vegetation 2D, 3D, 4D, 4M; vegetation size 5 and 6
- Slope greater than or equal to 21 percent
- Meadows 30 acres or greater, 1.5 miles or more from an OSV trail
- Areas more than 1.5 miles from a groomed OSV trail
- Areas more than 0.5 mile from a marked (not groomed) OSV trail

Potential Use:

CWHR vegetation open areas (annual grass, barren, lacustrine, mixed chaparral, montane chaparral, perennial grass, sagebrush, wet meadow and urban).

Indirect Effects (Snow Compaction)

Potential indirect effects, including snow compaction and vehicle emissions, are likely to be concentrated in areas conducive to OSV use.

New Information:

Future studies or monitoring may identify new information or unexpected types or levels of impacts to terrestrial wildlife resources, and may prompt corrective actions as necessary.

Information and Data Sources

We used the best available scientific information with respect to terrestrial wildlife species information and data sources for this project, which include the following:

- California Department of Parks and Recreation (DEIR and FEIR 2010)
- Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement (U.S. Forest Service 2001) and Record of Decision for Sierra Nevada Forest Plan Amendment (U.S. Forest Service 2004)
- Assessing the Cumulative Effects of Linear Recreation Routes on Wildlife Habitats on the Okanogan and Wenatchee National Forests. Gen. Tech. Rep. PNW-GTR-586 (Gaines et al. 2003)
- Species' literature
- Personal communications with researchers, Forest Service Region 5 Regional Office staff and Lassen National Forest staff
- California Wildlife Habitat Relationships (California Department of Fish and Wildlife (CDFW) 2014)
- EVEG data
- Available Lassen National Forest GIS Data
- Natural Resources Management (NRM) Wildlife Data

Incomplete and Unavailable Information

OSV use is not consistent across all available habitat. Although we don't know specifically where impacts will occur at any given time and we cannot quantify the amount of impact from noise-based disturbance, the amount of impact contributing to snow compaction to the subnivean space, or the amount of impact on habitat connectivity, we know the potential for impacts would be greatest in areas most conducive to OSV use and in high-use areas (see assumptions).

It is also unknown whether compacted trails resulting from snowmobile use are facilitating predator or competitor incursion into deep snow areas; if it is occurring, the extent to which it is occurring, as a result of OSV use and related activities on the Lassen National Forest, is unknown.

Climate change, when identified as a specific threat (marten) or stressor (Sierra Nevada red fox) to a species, is disclosed, by species. However, synergistic impacts of climate change with those of OSV use and related activities are largely unknown at this time.

Spatial and Temporal Context for Effects Analysis

Direct, Indirect, and Cumulative Effects Boundaries

The spatial boundaries for analyzing the direct, indirect, and cumulative effects to all of the species under consideration for analysis, including threatened, endangered, proposed, candidate, Forest Service sensitive species, and species of public interest is the Lassen National Forest boundary (unless otherwise specified) for the following reasons: the forest boundary is large enough to address wide-ranging species and Forest Service Sensitive Species' viability is assessed at the Forest Plan area. The temporal boundary for this analysis is 10 years from the signing of the decision document and is based on adequate time for an effectiveness monitoring program to be designed and implemented and for results to be assessed.

Appendix C of the FEIS discloses how cumulative impacts were considered. The potential impacts of the alternatives would accumulate with the impacts of past, other present and reasonably foreseeable future

actions in both time and geographic space (FSH 1909.15, Sec. 15.2).). If the proposed action or alternatives being analyzed in this FEIS would result in no direct or indirect impacts, there could be no cumulative impacts. If the direct and indirect impacts of the action would occur within a different context than the impacts of past, present, and reasonably foreseeable future actions, there would also be no potential for impacts to accumulate in time and geographic space.

Only those residual impacts from past actions that are of the same type, occur within the same geographic area, and have a cause-and-effect relationship with the direct and indirect impacts of the proposed action and the alternatives are considered relevant and useful for the cumulative impacts analysis; this analysis relies on current environmental conditions as a proxy for the impacts of past actions.

Cumulative impacts can only occur when the likely impacts resulting from the proposed action or alternatives overlap spatially and temporally with the likely impacts of reasonably foreseeable future actions (FSH 1909.15, Sec. 15.2). Present and reasonably foreseeable future actions are listed in Appendix C of the FEIS and include vegetation management activities, routine maintenance throughout the project area on roads and in campgrounds; routine Forest Service use of mineral material sources in designated areas throughout the project area; routine noxious weed management (hand pulling/digging) along forest roads throughout the project area; a wide range of recreational use, in all seasons, across the forest; ongoing maintenance and use of communication sites; personal use woodcutting throughout the project area; grazing on range allotments, primarily between June 1 and October 31, annually, although grazing occurs between April 16 and May 31 on a handful of allotments.

Potential effects of the Lassen National Forest Over-snow Vehicle Use Designation project that are most likely to combine with past, present, or reasonably foreseeable future actions, include disturbance to individuals from OSV use and increased human presence; habitat fragmentation or modification that facilitate predation or competition for wide-ranging forest carnivores; loss of habitat connectivity for marten; and snow compaction effects on subnivean species habitat. OSV use, and associated activities, would not alter vegetative structure or composition of habitats. Past, present, and reasonably foreseeable future actions overlapping in time (mid-December through the end of April; refer to General OSV Use Patterns under the Assumptions Specific to the Wildlife Resources Analysis section above) and space with the Lassen National Forest Over-snow Vehicle Use Designation project, and with similar potential effects, include the following:

- Noise-based disturbance or disruption to individuals from routine maintenance of roads across the forest during the time of overlap between OSV use and wheeled vehicles; winter recreational use across the forest; personal use woodcutting throughout the project area during the time of overlap between OSV use and wheeled vehicles; and salvage and fuels reduction projects, along with associated actions, toward the beginning and end of the OSV season;
- Habitat fragmentation or modification that facilitate predation or competition for wide-ranging forest carnivores or loss of habitat connectivity for marten, during the time of overlap between OSV use and salvage and fuels reduction projects; or
- Snow compaction effects on subnivean species habitat during the time of overlap between OSV use and wheeled vehicle use or salvage and fuels reduction projects.

Based upon spatial data provided by the Lassen National Forest, the vegetation management/restoration projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. In addition, seasonal limited operating periods required for vegetation projects, for most sensitive species, would prevent disturbance to breeding individuals. Wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas

trees (USDA Forest Service 2014). Therefore, there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31), and disturbance or displacement from these activities would occur outside of the breeding season for all species, under all of the alternatives.

Environmental Consequences

Federally Listed Species and Critical Habitat

This section summarizes findings from the project Biological Assessment and Biological Evaluation (appendices F and G of this FEIS), prepared in accordance with the Endangered Species Act of 1973, as amended, and follows policy established in Forest Service Manual Direction (FSM 2670) for TEPCS wildlife species.

Consultation to Date

Official species lists for the Lassen National Forest Over-snow Vehicle Use Designation Project were obtained on March 9, 2016, from the Klamath Falls, Sacramento, Yreka, and Nevada Field Offices of the U.S. Department of the Interior, Fish and Wildlife Service (USDI Fish and Wildlife Service 2016a, 2016b, 2016c, 2016d). The lists identify wildlife species to consider, because they may be present within the general area of the Lassen National Forest. Since that time, wolverine has been proposed as threatened throughout its range, although it has not been officially announced in the Federal Register as of July 22, 2016. A letter of concurrence was requested from the Service. Federally listed species considered for analysis are shown in table 88.

Table 88. Terrestrial threatened, endangered, proposed, and candidate (TEPC) species and designated or proposed critical habitat considered within this analysis

Species Name	TEPC Status ⁹	Project Area Within Species' Range	Detections in or Near the Project Area	Suitable Habitat Present	Species Addressed Further/Rationale
Giant garter snake (<i>Thamnophis gigas</i>)	FT	No	No	No	No Project area is outside the known distribution of this species
Sierra Nevada red fox (<i>Vulpes vulpes necator</i>), Southern Cascades Distinct Population Segment	FC/FSS	Yes	Yes	Yes	Yes
Gray wolf (<i>Canis lupus</i>)	FE	Yes	Yes	Yes	Yes
California wolverine (<i>Gulo gulo luteus</i>)	FP/FSS	Yes	Tahoe NF (~150 – 200 miles)	Yes	Yes
Northern spotted owl (<i>Strix occidentalis caurina</i>)	FT	Yes	Yes	Yes	Yes
Northern spotted owl designated critical habitat	NA	NA	NA	NA	See northern spotted owl section
Valley elderberry long-horned beetle (<i>Desmocerus californicus dimorphus</i>)	FT	No	No	Yes (within historical distribution)	No Project area is outside the known distribution of this species
Valley elderberry long-horned beetle designated critical habitat	NA	No	No	No	No; Project area is outside the designated critical habitat
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	FT	No	No	No	No Project area is outside the known distribution of this species
Yellow-billed cuckoo proposed critical habitat	NA	No	No	No	No; Project area is outside the proposed critical habitat

Table 89 summarizes the determinations of effect for federally listed species and critical habitats.

⁹ FE = federally endangered; FT = federally listed as threatened; FP = federal proposed for listing; FC = federal candidate for listing; FSS = Forest Service sensitive. Sources: Official federally endangered, threatened, proposed, and candidate species list obtained on March 9, 2016, from the Klamath Falls, Sacramento, Yreka, and Nevada U.S. Fish and Wildlife Service (USFWS) Field Offices and USDA Forest Service, Pacific Southwest Region, Sensitive Animal Species by Forest, June 30, 2013.

Table 89. Summary of determinations of effect for federally listed threatened, endangered, proposed, and candidate species and designated or proposed critical habitats, by alternative

Species Name	TEPC Status ¹⁰	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Giant garter snake (<i>Thamnophis gigas</i>)	FT	NE	NE	NE	NE
Sierra Nevada red fox (<i>Vulpes vulpes necator</i>), Southern Cascades Distinct Population Segment	FC/FSS	NLAA	NLAA	NLAA	NLAA
Gray wolf (<i>Canis lupus</i>)	FE	NLAA	NLAA	NLAA	NLAA
California wolverine (<i>Gulo gulo luteus</i>)	FP/FSS	NLAA	NLAA	NLAA	NLAA
Northern spotted owl (<i>Strix occidentalis caurina</i>)	FT	NLAA	NLAA	NLAA	NLAA
Northern spotted owl designated critical habitat	NA	NE	NE	NE	NE
Valley elderberry long-horned beetle (<i>Desmocerus californicus dimorphus</i>)	FT	NE	NE	NE	NE
Valley elderberry longhorn beetle critical habitat	NA	NE	NE	NE	NE
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	FSS	NE	NE	NE	NE
Yellow-billed cuckoo proposed critical habitat	NA	NE	NE	NE	NE

Species Not Analyzed in Detail

Valley elderberry longhorn beetle

The valley elderberry longhorn beetle originally occurred in elderberry thickets in moist valley oak woodland along the margins of the Central Valley in California (USDI Fish and Wildlife Service 1984). The habitat of this insect has now largely disappeared throughout much of its former range due to agricultural conversion, levee construction, and stream channelization. Remnant populations are found in the few remaining natural woodlands and in some State and county parks. Critical habitat has been designated in Sacramento County along the American River in the City of Sacramento and along the American River Parkway.

The analysis area falls within the historical range of this species and potential suitable habitat occurs below 3,000 feet in elevation along the foothills in the southwest portion of the forest (watersheds of Antelope, Deer, Mill and Butte Creeks, Tehama and Butte Counties). Other riparian zones below 3,000 feet in elevation are within the Pitt River watershed around Lake Britton, Shasta County. However, review of USFWS species location information (USFWS 2014a) shows that lands administered by the LNF (i.e., project area) occur outside the distribution of the nearest presumed extant species occurrences (i.e., southern and western Butte County; south-central and central Tehama County).

This species is known to use riparian habitats. Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that

¹⁰ FE = federally endangered; FT = federally listed as threatened; FP = federal proposed for listing; FC = federal candidate for listing; FSS = Forest Service sensitive.

are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016). Due to the project area being outside the range of the species, and due to a lack of downstream effects from project activities,

Western yellow-billed cuckoo

This is an uncommon to rare summer resident of valley foothill and desert riparian habitats in scattered locations in California (CDFW 1999). Along the Colorado River, breeding population on California side was estimated at 180 pairs in 1977. Additional pairs reside in the Sacramento and other riverine habitats found in southern California. Formerly, the species was much more common and widespread throughout lowland California, but numbers drastically reduced by habitat loss and current population estimations show about 50 pairs existing in California.

There are no known occurrences of this species found on the Lassen National Forest. In addition, cuckoos are migratory and are not expected to be in the general vicinity of the project area when snow is on the ground. Proposed critical habitat is located more than 10 miles from the project area.

Yellow-billed cuckoos use riparian environments during the breeding season. Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016). Due to the project area being outside the range of the species, and due to a lack of downstream effects from project activities, all alternatives will have **no effect** on yellow-billed cuckoo or its proposed critical habitat.

Giant garter snake (Thamnophis gigas)

The giant garter snake inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley (USFWS 2008). Because of the direct loss of natural habitat, the giant garter snake relies heavily on rice fields in the Sacramento Valley, as well as managed marsh areas in Federal and State refuge areas. Giant garter snakes are typically absent from larger rivers because of lack of suitable habitat and emergent vegetative cover, and from wetlands with sand, gravel, or rock substrates. Riparian woodlands typically do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations. Potential suitable habitats occur downstream from the Lassen National Forest and outside the project area. Because the project area is outside the range of the species, or the lack of suitable habitat or habitat components in the project area, all alternatives would have **no effect** on the giant garter snake.

Species Analyzed in Detail

Northern Spotted Owl (*Strix occidentalis caurina*)

Direct and Indirect Effects

Resource Indicators and Measures

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to northern spotted owl (NSO) are listed in table 90.

Table 90. Resource indicators and measures for assessing effects to northern spotted owl

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to or displacement of individuals from noise and increased human presence, injury or mortality of individuals	Acres and percentage of important habitat impacted by OSV use	49 acres (< 1%) nest/roost habitat; 6,176 acres (46%) forage habitat	44 acres (< 1%) nest/roost habitat; 5,798 acres (43%) forage habitat	9 acres (< 1%) nest/roost habitat; 747 acres (6%) forage habitat	49 acres (< 1%) nest/roost habitat; 6,176 acres (46%) forage habitat
Potential for disturbance to or displacement of individuals from OSV use and increased human presence, injury or mortality of individuals	Acres and percentage of buffered NSO activity center impacted by OSV use	2 (0%)	2 (0%)	2 (0%)	2 (0%)

The NSO is associated with late-successional forests that can be impacted by activities associated with routes. Gaines et al. (2003) conducted a literature review of 71 late-successional-forest-associated wildlife species and identified negative effects on these species that can result from route-associated factors. These impacts include direct loss of habitat from type conversion, diminished quality of habitat attributes or fragmentation, and road avoidance or displacement resulting from direct harassment or noise disturbance. Individuals, environmental groups, and agency biologists have expressed growing concern over habitat fragmentation for late-successional forest-associated species. Various studies have shown that this species group is vulnerable to disturbance, changes in habitat, or displacement by habitat generalists.

As found in the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004), habitat types important for late-successional forest include stands typed as 4M, 4D, 5M, 5D, and 6 by California Wildlife Habitat Relationship (CWHR), which are all stands of trees greater than 11 inches diameter at breast height (d.b.h.) with greater than 40 percent canopy cover. The Sierra Nevada Forest Plan Amendment provides management direction for Old Forest Emphasis Areas to maintain or develop old forest habitat in areas containing the best remaining large blocks or landscape concentrations of old forest. Direction also includes providing for old forest functions, such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species.

Snowmobile use within late-successional forest habitats can have the following direct effects to individuals or their habitat (Gaines et al. 2003): Disturbance and potential for injury or mortality to individuals from vehicle collisions.

Disturbance:

- Displacement of populations or individual animals from a route, related to human activities.
- Disturbance and displacement of individuals from breeding or rearing habitats.
- Physiological response to disturbance, resulting in changes in heart rate or level of stress hormones.

Potential for Injury or Mortality to Individuals from Vehicle Collision:

As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds.

Potential indirect effects include:

- Altered or dispersed movement as caused by a route or human activities on or near a route.
- Snow compaction (prey base for several of the other late-successional forest species under consideration).

In addition, Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow. Adverse effects to subnivean animals could indirectly affect the prey base for many Forest Service sensitive species, including northern spotted owl.

Forsman et al. (1984) indicate that NSO courtship behavior usually begins in February or March with the timing of nesting and fledging varying by elevation and latitude. April 1 coincides with incubation in most areas (USFWS 2012). The OSV grooming season generally begins in mid-December and continues through March. Start and stop times vary by trail location and are dependent upon the presence and depth of snow. Inspections of the Lassen National Forest snow parks on April 17 and May 1, 2010, showed that OSV user activity extends beyond the March 31 termination date closing roads for exclusive OSV use. OSV use was assumed to be very low (fewer than 10 riders per site per day on a weekend), depending on specific snow depths and daily temperatures. OSV use was documented until the end of April, at which point snow levels no longer allow continued use of designated OSV routes. For purposes of analysis, April 30 is used as a cut-off date for the maximum period of interaction (California Department of Parks and Recreation 2010).

Under all alternatives (1, 2, 3, and 4) there are no groomed routes, designated ungroomed routes, or plowed parking areas within one-quarter mile of known NSO activity or past observations. The nearest such feature consists of a groomed route located approximately 17 miles from the NSO range delineation for lands administered by the Lassen National Forest. Therefore, there would be no effect to NSO resulting from groomed routes, designated ungroomed routes, trail maintenance (including removal of obstacles such as down trees), or plowed parking activities.

Areas within NSO range are open to use of existing routes (roads and trails) as well as open to cross-country travel by OSVs. However, due to the structural nature of suitable habitat (i.e., dense forested stands), the level of cross-country travel in NSO suitable habitat is expected to be low, and most disturbance is likely to occur primarily along existing roads and trails. Review of past observations and mapping shows that NSO locations vary in proximity to roads, with several observations occurring adjacent to existing roads designated as open to vehicular traffic under the travel management system (USDA Forest Service 2011). The activity center for the known owl pair in the Snow Mountain area occurs immediately adjacent to Road 37N08 (Snow Camp Road), which is maintained for high-clearance vehicle travel. Non-OSV as well as OSV access, including a low potential for cross-country travel, has

been occurring over the past 30-plus years. Some species can habituate to disturbance and individuals or pairs can successfully reproduce with a range of minor to substantial disturbance depending on their adaptability and rate of previous exposure. The presumed levels of variable tolerance do not relieve the impacts of disturbance, however, those impacts are difficult to detect or measure (USFWS 1998).

There is some potential for direct effects due to collisions with vehicles. However, because NSO spend little time at ground level, the potential for injury or mortality due to colliding with an OSV is very low.

The Forest Service considers activities greater than one-quarter mile (400 meters) from a spotted owl nest site to have little potential to affect spotted owl nesting. In addition, Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than one-quarter mile. Results of an NSO study on the Mendocino National Forest in northern California indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 70 meters (230 feet) away and sound levels were less than 76 owl-weighted decibels (dBO) (Delaney and Grubb 2003). Noise levels of OSVs (e.g., snowmobiles) are considered in this analysis to be comparable to those generated by motorcycles.

Behavioral responses to disturbance, such as leaving an area, can be readily observed (Tempel and Gutierrez 2003). Physiological responses to disturbance are not as easy to detect because they are not necessarily associated with behavioral responses (Tempel and Gutierrez 2003). Research has been conducted to measure the effects of noise on physiological stress levels of northern and California spotted owls by analyzing fecal corticosterone (e.g., Wasser et al. 1997, Tempel and Gutierrez 2003) and fecal glucocorticoid (Hayward et al. 2011). It is difficult to tease out background differences in fecal corticosterone and fecal glucocorticoid levels from variables such as environment, body condition, and gender (Tempel and Gutierrez 2003; Hayward et al. 2011), making cause and effect determinations of whether disturbance is related to the action being tested or some other factor. The studies varied in design, analysis, and conclusions. The study by Hayward et al. (2011) is most similar to conditions in this project in that it used OHVs. The vehicles traveled back and forth along a 0.5-mile length of road within 5 to 800 meters of roost or nest locations for a period of one hour. Results from this study indicate that there were increased levels of fecal glucocorticoid and reduced reproductive success in response to this level of activity (Hayward et al. 2011).

Comparison of the Alternatives

A total of 13,432 acres of NSO suitable habitat occurs within the analysis area. Of this, 13,146 acres (98 percent) is currently open to OSV use (table 91). However, 46 percent is open to and conducive (less than 70 percent canopy closure and less than 21 percent slope; see assumptions section) to OSV use (map BE-1); the same would be true under alternative 4 (map BE-4). This is the area with potential for direct and indirect effects to NSO from OSV use and related activities to occur. Under alternative 2, 43 percent of suitable habitat that would be open to OSV use would be conducive to OSV use (map BE-2). Under alternative 3, only 6 percent of suitable habitat would be open to and conducive to OSV use (map BE-3).

Table 91. Acres of suitable northern spotted owl habitat with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Nest/ Roost	Forage	Nest/ Roost	Forage	Nest/ Roost	Forage	Nest/ Roost	Forage
Open to OSV use	744	12,402	704	11,397	245	3,916	744	12,402
Closed to OSV use	6	280	46	1,285	505	8,766	6	280
OSV use restricted to trails	NA	NA	NA	NA	0	0	NA	NA
Total	13,432 acres (750 acres nest/roost habitat; 12,682 acres forage habitat)							
Open to OSV use and conducive to OSV use	49	6,176	44	5,798	9	747	49	6,176
Closed to OSV use and conducive to OSV use	1	82	6	460	41	5,511	1	82
Conducive to OSV use and OSV use restricted to trails	NA	NA	NA	NA	0	0	NA	NA
Total	6,308 acres (50 acres nest/roost; 6,258 acres forage)							

When considering the single northern spotted owl activity center within the analysis area, the entire activity center buffered by 0.7 mile is open to OSV use. However, none of that open area is conducive to OSV use under any of the alternatives (table 92; maps, BE-5, BE-6, BE-7, BE-8).

Table 92. Acres of known northern spotted owl activity centers, buffered by 0.70 mile, with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	642	642	639	642
Closed to OSV use	0	0	3	0
Conducive to OSV use and OSV use restricted to trails	NA	NA	0	NA
Total	642			
Open to OSV use and conducive to OSV use	2	2	2	2
Closed to OSV use and conducive to OSV use	0	0	0	0
OSV use restricted to trails	NA	NA	0	NA
Total	2			

OSVs passing within 0.25 mile of unsurveyed nesting/roosting habitat or an active nest have the potential to disturb nesting NSOs. The highest reproductive status observed in the project area was pair status; however, no NSO surveys have occurred in the project area since 2011. The intensity and duration of noise-generating activities tested by Hayward et al. (2011) are not expected to occur as a result of the proposed action. The noise associated with OSV use in the action area is expected to be of short duration (amount of time it would take to travel through any one given area) and of intermittent intensity (amount of concentrated noise). In addition, the area containing NSO suitable habitat is not near infrastructure that may facilitate OSV use of the area, including snowparks, and parking lots, as well as designated ungroomed and groomed trails. Therefore, OSV use in NSO habitats is expected to be low.

None of the alternatives propose to alter vegetation; therefore, they would not remove, downgrade, or degrade habitat for the northern spotted owl. Snowmobile use is not expected to substantially impact northern spotted owl foraging behavior or their ability to locate prey. While northern spotted owls may

opportunistically forage during the day (e.g., capture prey at the immediate roost or nest site), they primarily forage at night when snowmobile activity is much less likely to occur. Prey are not expected to be impacted by snowmobile use as they are not likely to reside in the immediate footprint of the road or trail, and because material removed from the trails for safety that could provide cover will be left on site. As stated previously, there is low potential for cross-country OSV travel in dense stands used by NSO and their prey. Prey may be temporarily startled by noise as a snowmobile passes by; however, the overall abundance and availability of prey would not change as a result of the proposed action.

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, no foreseeable vegetation management or fuels management projects are projected to occur within NSO habitats on lands administered by the Lassen National Forest and adjacent National Forest System lands. Both firewood cutting and Christmas tree cutting are restricted from areas with known NSO observations (USDA Forest Service 2014). Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from spotted owl reproductive habitat (i.e., Late Seral Reserves). Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of large conifer, over a 20-year period. These are all important habitat attributes for spotted owl foraging habitat. Livestock grazing allotments are located within NSO distribution, but because livestock are normally present on allotments during the snow-free period, overlap of effects with this project are unlikely.

Recreational activities such as hunting and fishing are expected to continue at levels similar to existing. Use of roads within NSO habitats for hunting access contributes a level of disturbance during the end of the NSO breeding season. This is incorporated into the environmental baseline for disturbance. Timber harvest and State and private lands within one-quarter mile of NSO habitats may impact habitat availability outside National Forest System lands and may increase disturbance locally. However, existing availability of suitable NSO habitat on private lands is expected to be low.

In summary, ongoing and reasonably foreseeable actions may be additive locally, but are not expected to contribute substantial impacts to effects discussed for the project under any alternative.

Determination Statement

Based on the above discussions, the Lassen National Forest Over-snow Vehicle Use Designation Project **may affect, but is not likely to adversely affect** the northern spotted owl, for **all alternatives**, based on the following rationale:

- The OSV proposed actions would not modify any suitable (nesting, roosting or foraging), dispersal, or capable habitat within the OSV area.
- Although the potential for noise-based disturbance to individuals within suitable habitat ranges from 6 percent, under alternative 3, to 43 to 46 percent under alternatives 1, 2, and 4, the percentage of habitats impacted would actually be lower considering that the concentration of OSV use is not equal across the landscape. NSO habitats are not near infrastructure, including snowparks, and parking lots, as well as designated ungroomed and groomed trails, that may facilitate OSV use of the area. Although the whole of the single activity center within the analysis area is open to OSV use, none of it is conducive to OSV use. Therefore, OSV use in NSO habitats is expected to be low.
- NSO habitats are not near infrastructure, including snowparks, and parking lots, as well as designated ungroomed and groomed trails, that may facilitate OSV use of the area. Therefore, OSV use in NSO habitats is expected to be low.

- Noise generated through OSV use is expected to be intermittent and of short duration within and near unsurveyed suitable habitat, and would occur within the early part of the breeding season.
- OSV use is unlikely to influence NSO foraging or prey availability because owls forage at night when OSV use is low to non-existent.
- OSV use is dispersed across the landscape and is not concentrated in space or time.
- The potential for OSV collision with individual NSOs is very low.

Northern Spotted Owl Designated Critical Habitat

Northern spotted owl critical habitat was originally designated in 1992, revised in 2008, and most recently revised in 2012 (USFWS 2012). Approximately 2,736 acres of designated critical habitat within the Interior California Coast, Subunit 8 (ICC-8) overlap lands administered by the Lassen National Forest in the northwestern portion of the Hat Creek Ranger District and includes areas of Late Successional Reserve (LSR; 236 acres). Only about 440 acres within designated critical habitat constitute suitable nesting and roosting habitat (CWHR 5D stands), with an additional 1,622 acres in CWHR 4D stands.

Primary Constituent Elements

The 2012 designation of critical habitat for the NSO identifies the physical and biological features essential to the conservation of the NSO as forested lands that can be used for nesting, roosting, foraging, or dispersal (USFWS 2012). The primary constituent elements (PCEs) of the physical or biological features that are essential to the conservation of the NSO are:

- PCE 1: forest types that may be in early-, mid-, or late-seral stages and that support the northern spotted owl across its geographical range¹¹;
- PCE 2: nesting/roosting habitat;
- PCE 3: foraging habitat;
- PCE 4: dispersal habitat

Determination Statement

No vegetation treatments or alterations are proposed under any alternative. The primary constituent elements of the physical and biological features that are essential to the recovery of the species would not be affected by proposed activities under any alternative. Therefore, there would be **no effect** to NSO designated critical habitat.

Gray Wolf (*Canis lupus*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to the gray wolf are listed in table 93.

Table 93. Resource indicators and measures for assessing effects to the gray wolf

Resource Element	Resource Indicator	Measure (Quantify if possible)	All Alternatives
Habitat Quality	Habitat Removal or Degradation	Acres and percentage of Habitat Removed or Degraded	0

¹¹ PCE1 must occur with PCE 2, 3, or 4

Resource Element	Resource Indicator	Measure (Quantify if possible)	All Alternatives
Species Use of Available Habitats	Disturbance and/or Displacement from All or Portions of a Species Home Range	Overlap of acres of disturbing or potentially displacing activity within species' disturbance distance thresholds	See analysis
Injury or Mortality	Potential for Injury or Mortality of Individuals	Risk Level of Potential for Injury or Mortality	Very Low

Snowmobile use and associated activities within habitats for wide-ranging carnivores can have the following effects to individuals or their habitat (Gaines et al. 2003). Potential direct effects include: (1) Displacement or avoidance away from human activity on or near roads; (2) Displacement of individual animals from breeding or rearing habitat; and (3) Physiological response to disturbance resulting in changes in heart rate or level of stress hormones.

There is also a potential for injury or mortality to individuals from vehicle collision. As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds. Vehicle collision with a Sierra Nevada red fox or wolverine would negatively affect that particular animal, but the likelihood of occurrence is assumed to be rare.

Potential indirect effects include behavioral modification such as altered or dispersed movement as caused by a route or human activities on a near a route.

Common Effects of Travel Management

Effects to gray wolves are described in terms of threats to wolves through human contact and conflict (i.e., livestock or grazing concerns), through activities that compromise denning or rendezvous sites, or through activities that affect prey base.

Human Conflict

Wolves initially experienced population declines due mainly to conflicts with humans. This included human settlement, direct conflict with livestock, and a lack of understanding of wolf ecology and habits as well as subsequent eradication programs (USFWS 1987). Today, human conflict still exists, most notably over livestock depredations and the associated economic losses.

Denning and Rendezvous Sites

Wolves may use den sites from year to year, and certain areas may contain several den sites that wolves use in different years (USFWS 1987). Wolf packs appear sensitive to human disturbance near den sites and may abandon the site (Ballard et al. 1987). Subsequently, most den sites are located away from trails and backcountry campsites.

Rendezvous sites refer to specific resting and gathering areas wolves use during the summer and early fall. Several rendezvous sites are used with the first one generally located between 1 to 6 miles from the natal den. A pack uses rendezvous sites until the pups are mature enough to travel with the adults, generally early autumn. Wolves appear to be most sensitive to human disturbance at the first rendezvous site and become less sensitive at later sites. However, wolf response to human disturbance is due to a variety of factors including specific setting, individuality of wolves, and whether the population is exploited or protected (USFWS 1987).

Prey Base

Wolves prey primarily on ungulates (USFWS 1987). During all seasons, ungulates constitute the highest percentage of biomass. Because they are an important prey item, factors affecting ungulate distribution and abundance (e.g., habitat and access management, winter range productivity) also affect wolves. Mule deer can be expected to provide the most frequent foraging opportunities for wolves because they are the most numerous and accessible ungulate within the project area. Due to seasonal overlap between the proposed activities (OSV use) and potential effects to wolf prey base, impacts considered in this analysis are confined primarily to mule deer occurrence on winter range.

There would be no effects to den or rendezvous sites, because these sites are not present in the project area. No impacts to structure and composition of habitats would occur under any alternative. Because there are known wolf locations to the north, wolves may be transient in the project area. However, since there have been no recent reported sightings and no known mortalities, it is assumed that the existing potential for direct effects resulting from injury or mortality due to vehicle collisions is very low.

Incidental disturbance of individual wolves from OSV use of established routes and cross-country travel is possible. The degree of effect is likely related to the intensity and duration of OSV disturbance. Studies of snowmobile use and wolf movements in Voyagers National Park (Olliff et al. 1999) have shown that wolves tend to avoid areas of snowmobile activity in restricted-use areas. The studies also showed that repeated avoidance or displacement could result in permanent displacement, an impact to an animal's winter energy budget, and/or a conditioning of the animal to avoid certain areas. The literature also shows that wolves both used and avoided roads and trails designated for winter use. Although wolves use snowmobile trails for travel and foraging, they show decreased use or avoidance of roads and trails that had higher levels of human presence (Olliff et al. 1999, Whittington et al. 2005).

OSV use of groomed routes is expected to be frequent under all alternatives. Consequently, there is an increased likelihood that wolves would avoid these areas. All alternatives contain nearly identical amounts of groomed trails (406 to 408 miles); therefore, the effect of groomed trails is similar. Existing linear routes (i.e., roads and trails) in areas outside groomed routes open to OSV travel (including existing roads and trails) are expected to receive less human use, resulting in decreased disturbance and potential displacement of wolves. Areas outside of existing linear routes and open to cross-country travel are also expected to receive less OSV use due to potential for physical barriers and slope limitations, although open meadows or parks adjacent to linear routes may attract more use. The amount of area open to OSV travel varies by alternative. Alternative 1 is the least restrictive, prohibiting OSV use within 186,000 acres. Alternative 4 restricts travel within 191,090 acres, while the proposed action provides restrictions on 228,890 acres. Alternative 3 is the most restrictive, prohibiting OSV travel on 315,360 acres. Alternative 3 restricts travel in areas below 3,500 feet elevation that includes portions of mapped mule deer winter range.

Impacts to Primary Prey

Wintering deer are sensitive to disturbances of all kinds. Both snowmobiles and cross-country skiers are known to cause wintering ungulates to flee (Freddy et al. 1986). Dorrance et al. (1975) found that snowmobile traffic resulted in increased home range size, increased movement, and displacement of deer from areas along trails. Direct environmental impacts of snowmobiles include collisions causing mortality and harassment that increased metabolic rates and stress responses (Canfield et al. 1999).

No groomed or ungroomed designated OSV routes occur within mule deer winter range under any alternative. However, OSV use of existing linear routes and cross-country travel is allowed within winter range at some level under all alternatives. Approximately 119,333 acres of mule deer winter range occurs within the project area. A total of 59,453 acres of winter range (roughly 50 percent of existing) is closed

to OSV use under alternatives 1 and 4 (table 94; maps BE-9 and BE-12). Roughly 59,453 acres (50 percent) are open, but only 19,980 acres are open to and conducive to OSV use under the OSV use assumptions. Therefore, under alternatives 1 and 4, mule deer would have the potential to be subject to disturbance, mortality, injury, or altered movement from low to no OSV use across 17 percent of their winter range. OSV use would be restricted on additional winter range under both the proposed action and alternative 3 (maps BE-10 and BE-11). Therefore, under alternatives 2 and 3, mule deer would have the potential to be subject to disturbance, mortality, injury, or altered movement across only 8 to 13 percent of their winter range.

Table 94. OSV area restrictions by alternative

OSV Management	Current OSV Management	Proposed Action Designations	Alternative 3 Designations	Alternative 4 Designations
Total Area (Acres)	186,000	228,890	315,360	191,090
Below 3,500 Feet in Elevation Included in Above Total (Acres)	0	0	59,130	0
OSV Use Restricted within Mule Deer Winter Range (Acres)	59,453	78,116	90,552	59,453
Open to OSV Use and Conducive to OSV Use (acres)	19,980	15,871	9,959	19,980

Summary of Effects

Public OSV use would not be designated on at least 50 percent of mule deer winter range under all alternatives. By comparison, alternative 3 provides the largest amount of area where OSVs would be excluded, thereby potentially producing the lowest amount of disturbance spatially. The proposed action, alternative 4, and alternative 1 follow in order of increasing disturbance potential to wolves based on total acres available for OSV use. However, because wolves are known to follow prey species seasonally, potential effects during the project's active period (December through April) are more likely to occur at lower elevations where deer would be distributed during that time of year. While all alternatives provide some disturbance-free portions within winter range, alternative 3 provides the largest amount of OSV-restricted area within mule deer winter range.

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, vegetation management or fuels management projects are projected to occur within National Forest System lands suitable for use by wolves. These include timber harvest, fuels reduction, and associated activities, as well as road maintenance, firewood gathering, and special use activities. Vegetation management projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. Recreational activities such as camping, hiking, hunting, and fishing are ongoing and expected to continue at levels similar to existing. Existing levels of livestock grazing may incur wolf-livestock conflicts if wolves become established, but because livestock are normally present on allotments during the snow-free period, overlap of effects with this project are unlikely. Use of roads for public and administrative access contributes a level of disturbance primarily during the snow-free period. This is incorporated into the environmental baseline for disturbance. Livestock on State and private lands adjacent to suitable habitats may increase risk of conflicts locally. In summary, ongoing and reasonably foreseeable actions may be additive locally, but are not expected to contribute substantial impacts to effects discussed for the project under any alternative.

Determination Statement

All alternatives would have a low level of risk to wolves. Therefore, alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect, but are not likely to adversely affect gray wolves based on the following rationale:

- There are no known established wolf packs within the project area.
- There are no known denning or rendezvous sites within the project area.
- Wolves are less likely to occur within most of the project area from December through April due to seasonal elevation shifts of prey species to winter range. Noise-based disturbance would largely be limited to only 8 to 17 percent of winter range conducive to OSV use.
- Potential for direct impacts to wolves from collisions with OSVs is very low.

North American Wolverine (*Gulo luscus*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to wolverine are listed in table 95.

Table 95. Resource indicators and measures for assessing effects to wolverine

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from noise and increased human presence, or injury or mortality of individuals	Acres and percentage of habitat affected and percentage of habitat impacted by OSV use	22,725 (56%)	22,572 (56%)	20,841 (52%)	22,693 (56%)

Gray wolf, Sierra Nevada red fox, and California wolverine are considered sensitive to the presence of humans and human activities.

The most common interactions between snowmobile routes and wildlife that Gaines et al. (2003) documented from the literature included trapping as facilitated by winter human access, disturbance-based displacement and avoidance,¹² and disturbance at a specific site,¹³ usually wintering areas. To a lesser degree, hunting, trapping, poaching, collection, and habitat loss and fragmentation were other interactions identified. Trapping of wolverine, or any of the special-status species under consideration, is not legal in California and, therefore, would not be considered as a potential impact in this analysis.

Snowmobile use and associated activities within habitats for wide-ranging carnivores, such as wolverine, have the potential to affect individuals or their habitat (Gaines et al. 2003). Direct effects include disturbance by: (1) displacement from or avoidance of human activity on or near roads; (2) displacement of individual animals from breeding or rearing habitat; and (3) physiological response to disturbance resulting in changes in heart rate or level of stress hormones. There is also potential for injury or mortality to individuals from vehicle collision. As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds, but the likelihood is extremely low in the case of wolverines given that wolverines have not been

¹² Spatial shifts in populations or individual animals away from human activities on or near roads, trails, or networks

¹³ Displacement of individual animals from a specific location that is being used for reproduction and rearing of young

documented on the Lassen National Forest and the tendency for wolverines to avoid areas used by humans. Potential indirect effects include behavioral modification such as altered or dispersed movement as caused by a route or human activities on or near a route.

Although recreational activities such as snowmobiling and backcountry skiing have the potential to affect wolverines (USFWS 2013), there are no verified detections of wolverine within one-quarter mile of snowmobile routes or anywhere on the Lassen National Forest. Except for the anomaly of one recent wolverine detection on the Tahoe National Forest, genetically related to the Rocky Mountain population (Moriarty et al. 2009), the species is thought to be extirpated from the Sierra Nevada.

OSV use and related activities would not physically modify vegetative composition or structure of suitable wolverine habitat. Wolverine, if present, would be expected to have little interaction with snowmobiles or snow grooming equipment: whereas the majority of snowmobile use on the Lassen National Forest occurs during the daytime, wolverine are highly nocturnal. In addition, wolverines are known to avoid roads and areas of human habitation; areas within 0.5 mile of OSV trails and staging areas receive the highest use and no new trails are proposed under any of the alternatives.

Comparison of the Alternatives

Table 96 shows the amounts and percentages of wolverine habitat in which a wolverine, if present on the Lassen National Forest, could be subject to direct or indirect effects of OSV use and associated activities. Eighty-one percent of suitable wolverine habitat is currently open to OSV use (alternative 1), but 56 percent is open to OSV use and conducive to OSV use (map BE-13). The potential for OSV-related noise-based disturbance, injury or mortality impacting individual wolverines, should they be present, would be most likely to occur within that 56 percent of suitable habitat. In addition, of that 56 percent of habitat, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs within less than that 56 percent of wolverine habitat. Similarly, under alternatives 2 and 4, 56 percent of wolverine habitat would be open and conducive to OSV use (maps BE-14 and BE-16, respectively). Under alternative 3, 52 percent of wolverine habitat would be open to and conducive to OSV use (map BE-15). If a wolverine were detected, an analysis would be conducted 5 miles around the sighting area to determine if activities have potential to affect the individual and if changes in management, including application of a limited operating period, are necessary, thereby minimizing impacts to wolverine. In addition, the objective of minimizing impacts to wildlife during the winter would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Table 96. Acres of wolverine habitat¹⁴ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	32,632	32,404	29,510	32,568
Closed to OSV use	7,644	7,872	10,760	7,708
OSV use restricted to trails	NA	NA	6	NA
Total	40,276			
Open to OSV use and conducive to OSV use	22,725	22,572	20,841	22,693
Closed to OSV use and conducive to OSV use	5,266	5,419	7,145	5,298
Conducive to OSV use and OSV use restricted to trails	NA	NA	5	NA
Total	27,991			

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, actions that could result in a cumulative impact to wolverine, when combined with alternatives 1, 2, 3 or 4, include vegetation management projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from larger CWHR types and management prescriptions emphasize recruitment of large snags and logs, as well as retention of large conifer that are attributes of wolverine habitat. In addition, seasonal limited operating periods required for wolverine for vegetation projects prevent disturbance to breeding individuals.

Wolverine habitat overlaps with areas open to Christmas tree and firewood cutting and use of roads within wolverine suitable wolverine habitat after the March 31 termination date of the Forest Order closing roads for exclusive OSV use could occur. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014) and, due to their secretive nature, wolverines are likely to avoid roaded or heavily used roaded areas where disturbance or displacement would be more likely. Similarly, most non-motorized winter recreation occurs along designated trails and wolverine would probably avoid heavily used trails. Similar activities on State and private lands within the Forest boundary may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the Forest boundary.

In summary, ongoing and reasonably foreseeable actions may be additive locally, but are not expected to contribute significantly to potential impacts to wolverine discussed for the project under any of the alternatives. In addition, seasonal limited operating periods that prevent disturbance to wolverine denning sites would be used to minimize disturbance to these sites if they are identified.

¹⁴ Subalpine conifer habitats interspersed with meadows (USDA Forest Service 2001)

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect, but are not likely to adversely affect wolverine based on the following rationale:

- The single male wolverine detected near Truckee, California, is genetically most closely related to, and most likely came from, a population on the western edge of the Rocky Mountains, rather than either the historic California population. Although incidental, unconfirmed sightings of wolverine have been reported throughout the Sierra Nevada, including Lassen National Forest, there is no evidence that California currently hosts a wolverine population or that female wolverines have made, or are likely to make, similar dispersal movements into the area. Therefore, wolverine is not currently known to be present on the Lassen National Forest and there is no evidence that California currently hosts a wolverine population.
- Vegetative composition or structure of suitable wolverine habitat would not be physically modified by OSV use or related activities.
- Although the potential for noise-based disturbance to individuals within suitable habitat ranges from 52 to 56 percent of suitable habitat under all of the alternatives, the percentage of suitable wolverine habitat impacted would actually be lower considering that the concentration of OSV use is not equal across the landscape. In addition, if a wolverine were detected, an analysis would be conducted five miles around the sighting area to determine if activities have potential to affect the individual and if changes in management, including application of a limited operating period, are necessary, thereby minimizing impacts to wolverine.
- Wolverines, if present, would be expected to have little interaction with snowmobiles or snow grooming equipment: whereas the majority of snowmobile use occurs during the daytime, wolverine are highly nocturnal and snow grooming equipment moves at a very slow speed not likely to impact individuals. In addition, wolverines are known to avoid roads and areas of human habitation.
- In addition, the objective of minimizing impacts to wildlife would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Forest Service Sensitive Species

This section summarizes findings on Forest Service sensitive species from the project Biological Evaluation (appendix G) that was prepared in accordance with policy established in Forest Service Manual direction (FSM 2670). Federally listed species considered for analysis are shown in table 97.

Table 97. Terrestrial Forest Service Sensitive Species considered in this analysis

Species Name	Project Area Within Species' Range	Detections in or Near the Project Area	Suitable Habitat Present	Species Addressed Further/Rationale
Mammals				
Fisher (<i>Pekania pennanti</i>)	Yes	Yes	Yes	Yes
Pacific marten (<i>Martes caurina</i>)	Yes	Yes	Yes	Yes
Fringed myotis (<i>Myotis thysanodes</i>)	Yes	Yes	Yes	Yes
Pallid bat (<i>Antrozous pallidus</i>)	Yes	Yes	Yes	Yes
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Yes	Yes	Yes	Yes
Birds				
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Yes	Yes	Yes	Yes
California spotted owl (<i>Strix occidentalis occidentalis</i>)	Yes	Yes	Yes	Yes
Great gray owl (<i>Strix nebulosa</i>)	Yes	Near	Yes	Yes
Greater Sandhill crane (<i>Grus canadensis tabida</i>)	Yes	Yes	Yes	Yes
Northern goshawk (<i>Accipiter gentilis</i>)	Yes	Yes	Yes	Yes
Willow flycatcher (<i>Empidonax traillii</i>)	Yes	Yes	Yes	Yes
Yellow rail (<i>Coturnicops noveboracensis</i>)	Yes	Yes	Yes	Yes
Reptiles				
Western pond turtle (<i>Emys marmorata</i>)	Yes	Yes	Yes	Yes
Invertebrates				
Shasta Hesperian snail (<i>Vespericola shasta</i>)	Yes	Yes	Yes	Yes
Western bumble bee (<i>Bombus occidentalis</i>)	Yes	Yes	Yes	Yes

Table 98 summarizes the determinations of impact for Forest Service sensitive species.

Table 98. Summary of determinations¹⁵ of impact for Forest Service Sensitive Species, by alternative

Species Name	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fisher (<i>Pekania pennanti</i>)	MINL	MINL	MINL	MINL
Pacific marten (<i>Martes caurina</i>)	MINL	MINL	MINL	MINL
Fringed myotis (<i>Myotis thysanodes</i>)	MINL	MINL	MINL	MINL
Pallid bat (<i>Antrozous pallidus</i>)	MINL	MINL	MINL	MINL
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	MINL	MINL	MINL	MINL
Bald eagle (<i>Haliaeetus leucocephalus</i>)	MINL	MINL	MINL	MINL
California spotted owl (<i>Strix occidentalis occidentalis</i>)	MINL	MINL	MINL	MINL
Great gray owl (<i>Strix nebulosa</i>)	MINL	MINL	MINL	MINL
Greater Sandhill crane (<i>Grus canadensis tabida</i>)	NI	NI	NI	NI
Northern goshawk (<i>Accipiter gentilis</i>)	MINL	MINL	MINL	MINL
Willow flycatcher (<i>Empidonax traillii</i>)	NI	NI	NI	NI
Yellow rail (<i>Coturnicops noveboracensis</i>)	NI	NI	NI	NI
Western pond turtle (<i>Emys marmorata</i>)	MINL	MINL	MINL	MINL
Shasta Hesperian snail (<i>Vespericola shasta</i>)	NI	NI	NI	NI
Western bumble bee (<i>Bombus occidentalis</i>)	NI	NI	NI	NI

Late-successional Forest Species

Pacific Fisher (*Pekania pennanti*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to fisher are listed in table 99.

Table 99. Resource indicators and measures for assessing effects to Pacific fisher

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from noise and increased human presence, injury or mortality of individuals, increased predation, or snow compaction impacting subnivean prey	Acres and percentage of suitable fisher habitat ¹⁶ impacted by OSV use	40,474 (26%)	43,517 (28%)	39,586 (25%)	45,452 (29%)

Fisher is associated with late-successional forests that can be impacted by activities associated with routes. Gaines et al. (2003) conducted a literature review of 71 late-successional forest-associated wildlife species and identified negative effects on these species that can result from route-associated factors. These impacts include direct loss of habitat from type conversion, diminished quality of habitat attributes or

¹⁵ NI = Will not impact; MINL = may impact individuals, but is not likely to lead to a trend toward Federal listing or loss of viability for the species; MIL = may impact individuals and is likely to lead to a trend toward Federal listing or loss of viability for the species.

¹⁶ Based on U.S. Fish and Wildlife Service (2016)

fragmentation, and road avoidance or displacement resulting from direct harassment or noise disturbance. Individuals, environmental groups, and agency biologists have expressed growing concern over habitat fragmentation for late-successional forest-associated species. Various studies have shown that this species group is vulnerable to disturbance, changes in habitat, or displacement by habitat generalists.

As found in the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004), habitat types important for late-successional forest include stands typed as 4M, 4D, 5M, 5D, and 6 by California Wildlife Habitat Relationship (CWHR), which are all stands of trees greater than 11 inches d.b.h. with greater than 40 percent canopy cover. The Sierra Nevada Forest Plan Amendment provides management direction for Old Forest Emphasis Areas to maintain or develop old forest habitat in areas containing the best remaining large blocks or landscape concentrations of old forest. Direction also includes providing for old forest functions, such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species.

Snowmobile use within late-successional forest habitats can have the following potential direct effects to individuals or their habitat (Gaines et al. 2003): Disturbance and potential for injury or mortality to individuals from vehicle collisions.

Disturbance:

1. Displacement of populations or individual animals from a route, related to human activities.
2. Disturbance and displacement of individuals from breeding or rearing habitats.
3. Physiological response to disturbance, resulting in changes in heart rate or level of stress hormones.

Potential for Injury or Mortality to Individuals from Vehicle Collision:

As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds. This effect would be most specific to mammals.

Potential indirect effects include:

- Altered or dispersed movement as caused by a route or human activities on or near a route.

In addition, Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow. Adverse effects to subnivean animals could indirectly affect the prey base for many Forest Service sensitive species, including fisher.

Trails as routes for competitors and predators on packed trails resulting from snowmobile use facilitate coyote incursion into deep snow areas (Bunnell et al. 2006) and can negatively impact fisher or other mammal populations through increased competition or predation. A study in Utah found that 90 percent of coyote movement was made within 1,150 feet of packed trails (Bunnell et al. 2006). Whether this is occurring or the extent to which it is occurring, as a result of OSV use and related activities on the Lassen National Forest, or whether it is impacting individual fishers or the fisher population, is unknown at this time. Predation, if occurring, would be predictably restricted to areas in the immediate vicinity of trails. The use of OSV trails and regular grooming is an existing condition that has been in operation for numerous years; and no new trail expansion is proposed at this time. Therefore, predator incursion, if occurring, would continue, but would not increase in size of area as a result of OSV program activities.

Based on CWHR (CDFW 2014) habitat types, there are 155,139 acres of high-capability reproduction habitats for fisher on Lassen National Forest.

Areas on Lassen National Forest with a combination of fewer roads, higher canopy cover, and physical structure are typically more abundant in steep slopes and canyons on the Sierran portion of Lassen National Forest (e.g., North Fork Feather River) and Rock Creek/Screwdriver Creek, draining east off of Chalk Mountain into the Pit River west of Lake Britton.

Comparison of the Alternatives

Snow has been posited as limiting suitable fisher habitat and fisher distribution at higher elevations (Aubry and Houston 1992, Powell and Zielinski 1994, Weir et al. 2003, all cited in Lofroth et al. 2010). This is consistent with fisher studies elsewhere in North America indicating that some snow conditions may limit fishers because they are not efficient at traveling and hunting in terrain covered by soft deep snow. However, other factors associated with increasing elevation (e.g., lower forest productivity, changes in forest structure) may also limit fisher distribution through their influence on the abundance of structures critical for denning and resting, and abundance and availability of prey (Franklin and Dyrness 1988, Meidinger and Pojar 1991, McNab and Avers 1994, all cited in Lofroth et al. 2010). Composition or structure of suitable fisher habitat within the action area would not be physically modified under any of the alternatives.

Gaines et al. (2003) describe a number of potential direct and indirect effects of linear travel routes to fisher, but they identify increased vulnerability to trapping mortality as the single risk factor associated with winter recreation/snowmobiling routes. However, increased vulnerability is unlikely to be a risk factor under any alternative, because trapping of fisher is prohibited in California.

Fishers' tolerance of human presence and various activities appears to range from little effect resulting from moderate degrees of human activities to avoidance and displacement if disturbance occurs near den sites. Foraging behavior of mid-sized carnivores in forested areas may be disrupted along groomed trails and other travel corridors. Displacement or avoidance may occur due to noise of snow machines or to human presence. Snowmobile trails may facilitate travel for some carnivores, but compaction of snow due to grooming or from snowmobile use off existing roads or trails may adversely affect the subnivean habitat of prey species and, therefore, impact foraging opportunities for carnivores. Intentional killing of carnivores by a snowmobiler is possible, but most likely it would only occur in rare, isolated incidents (Olliff et al. 1999).

Although initially believed to be primarily nocturnal, more recent studies have reported that fishers tend to be crepuscular (i.e., most active at sunrise and sunset). Periods of activity are generally 2 to 5 hours long and are often separated by longer stretches (10 hours) of inactivity (Arthur and Krohn 1991; Johnson 1984; Kelly 1977; Powell 1993, all cited in Weir and Corbould 2007). As a result, fishers tend to be inactive during the time when OSV use on Lassen National Forest is highest. Therefore, the probability of mortality resulting from an accidental collision with a snowmobile would be quite low and the potential for mortality resulting from collision with snow grooming would be even lower, given the slow speed at which the equipment moves.

High-value habitat acreages were derived from habitat modeling based on CWHR (CDFW 2014) habitat types and value rankings. Gaines et al. (2003) suggest a human influence scale where less than 30 percent influence in high-value habitat is rated low, 30 to 50 percent influence is rated moderate, and greater than 50 percent influence is rated high. The trail-effect zone from noise and sight disturbance (200 meters; 656 feet) along designated groomed routes would affect 9,423 acres or 5.9 percent of existing high-value habitat acres (table 100), which, at 5.9 percent, is a very low human influence rating. Designated

ungroomed routes under all alternatives would influence 2,160 acres (1.3 percent), which again is very low disturbance. In addition, route densities under each of the alternatives are as follows: alternative 1, 1.5 mi/m²; alternative 2, 0.2 mi/m²; alternative 3, 0.2 mi/m²; and alternative 4, 0.2 mi/m². The Lassen National Forest Land and Resource Management Plan (LRMP) has recommended 0 to less than 0.5 mi/m² (preferred) route densities for fisher. Therefore, all of the action alternatives would be consistent with preferred LRMP road density recommendations and improve route densities with respect to the existing condition for fisher. And because the majority of OSV use occurs on or within 0.5 mile of groomed trails and staging areas, or within meadows within 0.5 mile of designated trails, the potential for predator or competitor incursion into suitable fisher habitat, as well as the potential for impacts to subnivean prey species, would be expected to decline with reduced route densities under alternatives 2, 3, and 4.

Table 100. Acres of fisher high-value suitable habitat within 200 meters of designated groomed and designated ungroomed routes

Habitat	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Groomed Route	9,423	9,423	9,423	9,423
Ungroomed Route	2,160	2,160	2,160	2,160

Source: GIS query, 10/10/2015

Areas open to cross-country OSV use vary among the alternatives.

Using a suitable fisher habitat model developed by the U.S. Fish and Wildlife Service (2016e), 156,606 acres of fisher habitat occur within Lassen National Forest System lands (table 101); map BE-17). Of those, 132,677 acres (85 percent) of habitat are currently open to OSV use (table 101). Intersecting suitable fisher habitat with areas most conducive to OSV use (slopes less than or equal to 21 percent and canopy cover less than 70 percent) results in 40,474 acres of fisher habitat (26 percent) conducive to OSV use. The potential for OSV-related impacts to fisher (injury or mortality, noise-based disturbance, predation facilitated by OSV trails, impacts to subnivean prey species) would be most likely to occur within that 26 percent of suitable habitat). However, of that 36 percent of habitat, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use actually occurs within less than that 26 percent of fisher habitat and the majority of areas proposed as open to OSVs are not known to currently support fishers. Under alternative 2, 28 percent of suitable fisher habitat would be open and conducive to OSV use (map BE-18). Similarly, 25 percent of suitable habitat would be open and conducive to OSV under alternative 3 (map BE-19) and 29 percent under alternative 4 (map BE-20). Ongoing inventory and monitoring would be used to evaluate habitat conditions and mitigation measures to retain suitable habitat would be implemented, where necessary. Similarly, as fisher den sites are found within the portion of the action area open to OSV, den sites with potential to be impacted would be monitored to determine whether or not disturbance is occurring and if changes in management, including a limited operating period around den sites, are necessary, thereby minimizing impacts to fisher. The potential for noise-based disturbance would largely overlap with roughly the first quarter of the March 1 through June 30 fisher breeding season under alternatives 1, 2, and 3, and may extend through the first half of the breeding season under alternative 4.

Table 101. Acres of suitable fisher habitat with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	132,677	122,236	114,648	132,208
Closed to OSV use	23,929	34,370	41,954	24,398
OSV use restricted to trails	NA	NA	4	NA
Total	156,606			
Open to OSV use and conducive to OSV use	40,474	43,517	39,583	45,452
Closed to OSV use and conducive to OSV use	7,602	4,559	8,490	2,624
Conducive to OSV use and OSV use restricted to trails	NA	NA	3	NA
Total	48,076			

Area Currently Known to be Utilized and/or Occupied by Fisher

As stated above, fishers currently use only a small portion of the project area as a result of movements from the population introduced onto Sierra Pacific Industries lands. These occurrences are concentrated within a total of 8 watersheds which contain approximately 245,220 acres of land administered by the Lassen National Forest. Under the existing condition (alternative 1) OSV use is restricted from use primarily within designated wilderness areas on about 87,515 acres, leaving about 64 percent of the watersheds open to OSVs (table 102). Additional restricted areas proposed under alternative 2 decrease OSV open areas to about 58 percent of the watershed area. Alternative 3 proposes the most restricted area within the watersheds, leaving 56 percent of the area open to OSVs. Alternative 4 would increase restricted area slightly (by 119 acres) in comparison to alternative 1. Additional areas, located in dense stands (70 percent or greater canopy closure) and on steeper terrain (greater than 20 percent slope) where conditions are likely to be less conducive to OSV use, would further decrease fisher exposure to potential impacts.

Increased vulnerability to trapping resulting from available access is not a risk factor for the species. Trapping of fishers is currently illegal in California.

Table 102. OSV open area within fisher concentration areas

Habitat	Alternative 1	Alternative 2	Alternative 3	Alternative 4
OSV Open Area (acres)	157,705	141,922	137,451	157,586
OSV Open Area (percent of existing)	64.3	57.9	56.0	64.3

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest vegetation management or fuels management projects are projected to occur within Lassen National Forest lands occupied, used, or suitable for use by fishers. These include timber harvest, fuels reduction, and associated activities, as well as road maintenance, firewood gathering, and special use activities. Vegetation management projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from larger CWHR types and management prescriptions emphasize recruitment of large snags

and logs, as well as retention of large conifer that are attributes of fisher habitat. In addition, seasonal limited operating periods required for fisher for vegetation projects prevent disturbance to breeding individuals. Use of roads within fisher habitats for public and administrative access contributes a level of disturbance during a portion of the breeding season. This is incorporated into the environmental baseline for disturbance. Timber harvest and State and private lands within one-quarter mile of fisher habitats may impact habitat availability outside National Forest System lands and may increase disturbance locally. In summary, ongoing and reasonably foreseeable actions may be additive locally, but are not expected to contribute substantial impacts to effects discussed for this project under any alternative.

Determination Statement

Alternatives 2, 3, and 4 would have a low level of risk to existing and future introduced fisher. Therefore, alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for fisher in the Forest Plan area based on the following rationale:

- Vegetative structure of fisher habitat would not be physically modified by OSV use and related activities under any of the alternatives.
- Although the potential for noise-based disturbance to individuals within suitable habitat ranges from 25 to 29 percent under all of the alternatives, the percentage of suitable fisher habitat impacted would actually be lower considering that the concentration of OSV use is not equal across the landscape. In addition, the Forest would use the results of ongoing inventory and monitoring to determine whether disturbance is occurring and if changes in management, including application of a limited operating period around den sites, are necessary, thereby minimizing impacts to fisher.
- OSV use is unlikely to influence foraging because fishers tend to be crepuscular when OSV use is low to non-existent on the Lassen National Forest.
- Improved (i.e., reduced) route densities, under alternatives 2, 3, and 4, that would be consistent with LRMP preferred route densities for fisher are likely to reduce the potential for predator or competitor incursion into suitable fisher habitat, as well as the potential for impacts to subnivean prey species.
- Potential for direct impacts to fisher from collisions with OSVs is very low.

Pacific Marten (*Martes caurina*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to marten are listed in table 103.

Table 103. Resource indicators and measures for assessing effects to marten

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from noise and increased human presence, injury or mortality of individuals, increased competition or predation due to habitat modification, or snow compaction effects to foraging or denning individuals	Acres and percentage of suitable habitat impacted by OSV use	29,291 (24%)	28,555 (23%)	25,999 (21%)	27,838 (23%)

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for loss of habitat connectivity	Acres and percentage of connectivity corridors impacted by OSV use	71,494 (38%)	70,308 (38%)	64,500 (34%)	71,039 (40%)

Marten associated with late-successional forests that can be impacted by activities associated with routes. Gaines et al. (2003) conducted a literature review of 71 late-successional forest-associated wildlife species and identified negative effects on these species that can result from route-associated factors. These impacts include direct loss of habitat from type conversion, diminished quality of habitat attributes or fragmentation, and road avoidance or displacement resulting from direct harassment or noise disturbance. Individuals, environmental groups, and agency biologists have expressed growing concern over habitat fragmentation for late-successional forest-associated species. Various studies have shown that this species group is vulnerable to disturbance, changes in habitat, or displacement by habitat generalists.

The most common interactions between snowmobile routes and wildlife that Gaines et al. (2003) documented from the literature included trapping as facilitated by winter human access, disturbance-based displacement and avoidance,¹⁷ and disturbance at a specific site,¹⁸ usually wintering areas. To a lesser degree, hunting, trapping, poaching, collection, and habitat loss and fragmentation were other interactions identified. Trapping of marten, or any of the special-status species under consideration, is not legal in California and, therefore, will not be considered as a potential impact in this analysis.

Snowmobile use within late-successional forest habitats can have the following potential direct effects to individuals or their habitat (Gaines et al. 2003): Disturbance and potential for injury or mortality to individuals from vehicle collisions.

Disturbance:

- Displacement of populations or individual animals from a route, related to human activities.
- Disturbance and displacement of individuals from breeding or rearing habitats.
- Physiological response to disturbance, resulting in changes in heart rate or level of stress hormones.

Potential for Injury or Mortality to Individuals from Vehicle Collision:

As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds.

Possible indirect effects include:

- Altered or dispersed movement as caused by a route or human activities on or near a route.
- Creation of a vector pathway for competitors or predators.
- Snow compaction impacts to den sites or subnivean prey.

In addition to the roads and trails themselves and associated infrastructure, human use of the trails and roads for dispersed recreation activities (e.g., driving, hiking, mountain biking, OHV and OSV use) can

¹⁷ Spatial shifts in populations or individual animals away from human activities on or near roads, trails, or networks

¹⁸ Displacement of individual animals from a specific location that is being used for reproduction and rearing of young

lead to direct mortality and injury in the form of vehicle strikes; temporary and permanent displacement of wildlife; alteration of normal behavior and activities by wildlife species (e.g., foraging, nesting, denning, etc.); and spread of noxious weeds. Prolonged or consistent use of trails and roads can lead to permanent displacement of individuals from territories, nest or den abandonment, and/or alteration of foraging behavior and species-specific effects can lead community-wide effects. Higher trophic level species, such as marten, may be particularly vulnerable to disturbances from dispersed recreation activities (Manley et al. 2004). OSV use does not modify vegetative composition or structure.

Disturbance

As OSV trail use is an existing condition, animals that occur in the areas affected by the OSV Program during winter may be habituated to OSV disturbance or may have already modified their behavior to avoid areas adjacent to trails or OSV noise resonating in the forest may cause an alert or startle response in individual animals or may be accepted as ambient noise conditions of the environment as suggested by the study on martens (Zielinski et al. 2007). Although Zielinski et al. (2007), in investigating the response of marten to OHV and OSV-related disturbance in the Sierra Nevada Mountains in California, did not demonstrate an effect of OHV/OSV use on marten occupancy, probability of detection, sex ratio, or activity patterns, the study did not measure behavioral, physiological, or demographic responses, so it is possible that OHV/OSVs may have effects, alone or in concert with other threats (e.g., timber harvest) that were not quantified in this study. However, those types of responses would be expected to affect individuals rather than the population as a whole.

Potential for Injury or Mortality to Individuals from Vehicle Collision

Although there is a greater likelihood of collision of individual martens with OSVs than trail grooming equipment due to higher frequency of OSV use and higher speeds, OSV use occurs in more open areas (canopy cover less than 70 percent), martens generally avoid habitats that lack overhead cover (canopy cover less than 30 percent), such as trails and meadows, where OSV use would most pronounced. Presumably, a marten would hear an OSV and flee prior to injury or collision.

Competition and Predation

In the winter, OSV use compacts snow and some predators may use compacted snow for travel, changing the spatial pattern of their movements and predation (Manley et al. 2004). Buskirk and Powell (1994) documented predation on marten by coyotes, red foxes, and great-horned owls. Roads driven during the winter months provide travel corridors for coyotes to enter into marten winter habitat, affecting marten through competition or direct predation. Since martens have unique morphology that allows them to occupy deep snow habitats where they have a competitive advantage over carnivores, such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel, and snowmobile trails, can eliminate this advantage and increase access for predators and competitors. Perrine et al. (2010) reported in the Sierra Nevada Red fox conservation assessment that coyotes appear to be expanding their winter season range and identified this as a risk factor to the endemic red fox, needing further investigation. However, the recent species report (USFWS 2015b) noted there isn't any information to indicate that coyotes are increasing at any of the Sierra Nevada red fox sighting areas; red fox sighting areas largely overlap with marten observation areas. It is unknown if or how much competition with or predation on martens by coyotes is occurring on the Lassen National Forest as the result of OSV-related snow compaction or other OSV-related activities.

Snow Compaction Effects to Denning Individuals or Subnivean Prey

Martens access subnivean space beneath the snow to prey on subnivean species and use a variety of structures including rock crevices, for maternal den sites. Potential impacts of OSV use on marten den sites are unknown at this time, but could be an issue given the overlap marten whelping (March/April)

season with the OSV use season and the potential for compaction of subnivean habitat where some natal and maternal dens may be found (B. Zielinski, 2015, pers. comm.). Although there currently are no documented marten den sites on the Lassen National Forest, as they are located, Sierra Nevada Forest Plan Amendment standards and guidelines designed to protect marten den sites¹⁹ would apply. OSV-related impacts to marten dens that consist of underground squirrel middens, snags, or logs for denning sites would be expected to be minor and primarily noise disturbance-based due to their structure. Rock crevice-based dens could be subject to a greater degree of impact if the rocks are small enough to compact under the weight of an OSV, in which case they could lead to crushing or burying of individuals.

Although OSV use or related activities would not physically alter the vegetative composition or structure of marten habitat, martens, or their prey species, could be subject to OSV-related impacts from snow compaction, including suffocation or alteration of movement while foraging in the subnivean space beneath the snow. In addition, some small mammals (i.e., voles) may have difficulty navigating through compact snow layers (Manley et al. 2004).

Comparison of the Alternatives

Although we don't know where, specifically, impacts will occur at any given time and we cannot quantify the amount of impact, we know the potential for impacts would be greatest in areas most conducive to OSV use (high OSV-use areas). As described in the assumptions section, flatter areas with slopes less than 21 percent and canopy cover less than 70 percent, including the routes and staging areas, themselves, are more conducive to OSV than others and, therefore, likely to receive the highest use. Those assumptions have been incorporated into the following analysis.

Eighty-one percent of marten winter habitat is currently open to OSV use (alternative 1). However, only 24 percent is open to OSV use and conducive to OSV use (map BE-21). The potential for OSV-related noise-based disturbance, injury or mortality, competition or predation, or snow compaction effects (den sites or subnivean prey) impacting individual martens would be most likely to occur within that 24 percent of winter habitat. The amount of marten under the remaining alternatives is similar to alternative 1: alternative 2, 23 percent (map BE-22); alternative 3, 21 percent (map BE-23), and alternative 4, 23 percent (map BE-24).

Table 104. Acres of marten winter habitat²⁰ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	99,740	69,515	64,893	69,364
Closed to OSV use	22,733	52,958	57,578	53,109
OSV use restricted to trails	NA	NA	2	NA
Total	122,473			
Open to OSV use and conducive to OSV use	29,291	28,555	25,999	27,838
Closed to OSV use and conducive to OSV use	22,733	23,469	26,024	24,186
Conducive to OSV use and OSV use restricted to trails	NA	NA	1	NA

¹⁹ "Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreations, off-highway vehicle routes, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb den sites."

²⁰ Rustigian-Romsos and Spencer (2010) Conservation Biology Institute Marten Habitat Suitability Model

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Total	52,024			

Marten whelping season (March through April) overlaps with the latter portion of the OSV season. Although den sites occurring within the subnivean space could be physically impacted, the Forest would use the results of natal and maternal den research to determine whether or not disturbance is occurring and if changes in management are necessary. As previously described, once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent and, therefore, the potential for direct and indirect effects to marten dens is expected to be low.

Of the modeled marten connectivity habitat (i.e., dispersal corridors) on the Lassen National Forest, 84 percent are currently open to OSV use (table 105). However, 38 percent is open to OSV use and conducive to OSV use (map BE-25). Of that 38 percent of habitat, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs within less than 38 percent of marten habitat. This would be the same under alternative 2 (map BE-26). There is little difference in the amount of marten connectivity habitat that would be open to and conducive to OSV use under the other two alternatives [34 percent under alternative 3 (map BE-27) and 40 percent under alternative 4 (map BE-28)], but alternative 3 would have the least impact on marten connectivity habitat overall.

Table 105. Acres of marten habitat connectivity corridors²¹ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	156,995	152,303	143,292	156,381
Closed to OSV use	30,245	34,937	43,949	30,859
OSV use restricted to trails	NA	NA	0	NA
Total	187,240			
Open to OSV use and conducive to OSV use	71,494	70,308	64,500	71,039
Closed to OSV use and conducive to OSV use	10,402	11,588	17,395	10,857
Conductive to OSV use and OSV use restricted to trails	NA	NA	0	NA
Total	81,896			

Several marten observations that were concentrated in a 200-acre area fell outside of either the CBI Marten Habitat Suitability Model or the Least Cost 25 percent Corridor Model. Although the individual occurrences are based upon all available observational data, regardless of time of year, we created a polygon to determine how much of the area falls within areas conducive to OSV use; 54 percent of the polygon area is conducive to OSV use under all of the alternatives (maps BE-21, BE-22, BE-23, and BE-24). Impacts to individual marten or marten dens would be expected to be similar as previously discussed for winter habitat in general and similar management actions would be taken as den sites are identified.

It is unknown if OSV use or related activities on the Lassen National Forest is negatively impacting marten using winter habitat or connectivity habitat. As previously noted, data from the Lake Tahoe Basin Management Unit indicate that OHV/OSV use did not affect marten occupancy or probability of detection when overall OHV/OSV use in the study areas was low (1 OHV/OSV pass every 2 hours; Zielinski et al.

²¹ Least Cost 25% Corridor Modeling (Kirk and Zielinski 2010)

2008). High OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail and moderate use occurs within 0.5 mile of marked trails and in areas between 0.5 and 1.5 miles of groomed trails. Therefore, the majority of OSV use would occur within less than 21 to 24 percent of marten winter habitat or 34 to 40 percent of connectivity habitat. Similar to the results of natal and maternal den research, the results of other types of research, as it becomes available, would be used to determine whether or not disturbance is occurring and if changes in management are necessary. In addition, the objective of minimizing impacts to wildlife during the winter would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Under all of the action alternatives (i.e., alternatives 2, 3, and 4), route densities would decline from 1.5 mi/m² to 0.2 mi/m². And, because the majority of OSV use occurs on or within 0.5 mile of groomed trails and staging areas, or within meadows within 0.5 mile of designated trails, the potential for impacts to subnivean prey species, would be expected to decline with reduced route densities under alternatives 2, 3, and 4.

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, actions that could result in a cumulative impact to marten, when combined with alternatives 1, 2, 3 or 4, include vegetation management projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from larger CWHR types and management prescriptions emphasize recruitment of large snags and logs, as well as retention of large conifer that are attributes of wolverine habitat. In addition, seasonal limited operating periods required for marten for vegetation projects prevent disturbance to breeding individuals.

Marten habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, because wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), and disturbance or displacement from this activity would occur outside of the marten breeding season under alternatives 1, 2, and 3. Under alternative 4, in which trail grooming would begin at the discretion of the groomer, there is the potential for a somewhat larger degree of overlap during years in which heavy snowfall begins early. Use of roads within marten habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use could contribute additional disturbance during the early part of the denning season, but the potential for impact would be expected to be localized.

In general, most non-motorized winter recreation occurs along designated trails, where individuals would either avoid a specific area, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands within the Forest boundary may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the forest boundary. In summary, ongoing and reasonably foreseeable actions may be additive locally, but are not expected to contribute significant impacts to those discussed for marten for the project under any of the alternatives.

In addition, seasonal limited operating periods that prevent disturbance to marten denning sites would be used to minimize disturbance to these sites once they have been identified.

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for marten in the Forest Plan area based on the following rationale:

- Vegetative structure or composition of marten habitat would not be physically modified by OSV use and related activities under any of the alternatives.
- Although the potential for impacts to individuals within winter habitat ranges from 21 to 24 percent under all of the alternatives, and connectivity habitat ranges from 34 percent under alternative 3 to 40 percent under alternative 4, it is unknown if OSV use or related activities on the Lassen National Forest is negatively impacting marten using winter habitat or connectivity habitat, and the percentage of winter habitat and connectivity habitat impacted by OSV use would actually be lower considering that the concentration of OSV use is not equal across the landscape, with the highest use occurring on or within 0.5 mile of groomed routes and staging areas. Available research suggests that OHV/OSV use did not affect marten occupancy or probability of detection when overall OHV/OSV use in the study areas was low.
- Martens tend to avoid the open areas where the majority of OSV use occurs, so the potential for disturbance or collisions is expected to be low under all alternatives.
- Den sites within above-ground structures (trees, snags) would not be physically impacted due to the types of structures that are used.
- Marten whelping season (March through April) overlaps with the latter portion of the OSV season, but the results of natal and maternal den and other types of research would be used to determine whether or not disturbance is occurring and if changes in management are necessary, thereby minimizing impacts to marten.
- It is unknown if or how much competition with or predation on martens by coyotes is occurring on the Lassen National Forest as the result of OSV-related snow compaction or other OSV-related activities, however reduced route densities under alternatives 2, 3, and 4, are likely to reduce the potential for predation because most OSV use on the Lassen National Forest occurs on groomed routes.
- Reduced route densities, under alternatives 2, 3, and 4, are likely to reduce the potential for impacts to subnivean prey species.
- In addition, the objective of minimizing impacts to wildlife would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

California Spotted Owl (*Strix Occidentalis occidentalis*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to California spotted owl are listed in table 106.

Table 106. Resource indicators and measures for assessing effects to California spotted owl

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to or displacement of individuals from noise and increased human presence, injury or mortality of individuals	Acres and percentage of important habitat impacted by OSV use	112,300 (34%)	108,305 (33%)	99,309 (30%)	111,459 (34%)
Potential for disturbance to or displacement of individuals from OSV use and increased human presence, injury or mortality of individuals	Acres and percentage of buffered CSO activity centers impacted by OSV use	38,416 (32%)	38,197 (32%)	33,054 (27%)	37,631 (31%)

California spotted owl is associated with late-successional forests that can be impacted by activities associated with routes. Gaines et al. (2003) conducted a literature review of 71 late-successional-forest-associated wildlife species and identified negative effects on these species that can result from route-associated factors. These impacts include direct loss of habitat from type conversion, diminished quality of habitat attributes or fragmentation, and road avoidance or displacement resulting from direct harassment or noise disturbance. Individuals, environmental groups, and agency biologists have expressed growing concern over habitat fragmentation for late-successional forest-associated species. Various studies have shown that this species group is vulnerable to disturbance, changes in habitat, or displacement by habitat generalists.

Snowmobile use within late-successional forest habitats can have the following direct effects to individuals or their habitat (Gaines et al. 2003): Disturbance and potential for injury or mortality to individuals from vehicle collisions.

Disturbance:

- Displacement of populations or individual animals from a route, related to human activities.
- Disturbance and displacement of individuals from breeding or rearing habitats.
- Physiological response to disturbance, resulting in changes in heart rate or level of stress hormones.

Potential for Injury or Mortality to Individuals from Vehicle Collision:

Although there is the potential for collision of California spotted owls with OSVs or grooming equipment, the likelihood of it is very low for the following reasons: spotted owls spend little time at ground level; whereas spotted owls are nocturnal, most OSV use on the Lassen occurs during daytime hours; and although snow grooming equipment operates during darkness, the equipment travels slowly (3 to 6 mph).

Potential indirect effects include:

- Altered or dispersed movement as caused by a route or human activities on or near a route.
- Snow compaction (prey base for several of the other late-successional forest species under consideration).

In addition, Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small

mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow. Adverse effects to subnivean animals could indirectly affect the prey base for many Forest Service sensitive species, including California spotted owl.

According to Forsman et al. (1984) spotted owl courtship behavior usually begins in February or March with the timing of nesting and fledging varying by elevation and latitude. April 1 coincides with incubation in most areas (USFWS 2012). The OSV grooming season generally begins in mid-December and continues through March. Start and stop times vary by trail location and are dependent upon the presence and depth of snow. As described in the assumptions section, for the purpose of this analysis, April 30 will be used as the cut-off date for the maximum period of interaction between California spotted owls and OSV use and related activities.

The Forest Service considers activities greater than one-quarter mile (400 meters) from a spotted owl nest site to have little potential to affect nesting spotted owls. Snowmobiles passing within 0.25 mile of unsurveyed nesting/roosting habitat or an active nest have the potential to disturb nesting spotted owls. Under all alternatives, groomed and ungroomed routes and staging areas occur within 0.25 mile of California spotted activity centers and/or important habitat. However, OSV use is not consistent across all available habitat. Although we don't know specifically where impacts will occur at any given time and we cannot quantify the amount of impact, we know the potential for impacts would be greatest in areas most conducive to OSV use (high OSV-use areas). As described in the assumptions section, flatter areas with slopes less than 21 percent and canopy cover less than 70 percent, including the routes and staging areas, themselves, are more conducive to OSV than others and, therefore, likely to receive the highest use. Those assumptions have been incorporated into the following analysis.

As previously discussed, behavioral responses to disturbance, such as leaving an area, can be readily observed in spotted owls (Tempel and Gutierrez 2003) and sensitivity in adult male spotted owls in response to acute traffic exposure was highest in May (Hayward et al. 2011). A total of 120,312 acres of buffered California spotted owl activity sites and 330,312 acres of important habitat occurs within the analysis area. The intensity and duration of noise-generating activities tested by Hayward et al. (2011) are not expected to occur as a result of the proposed action because the maximum period of interaction between OSVs, and related activities occurs prior to May, when breeding adult males are most sensitive to noise, and noise associated with snowmobile use and associated activities in the action area is expected to be of short duration (amount of time it would take to travel through any one given area) and of intermittent intensity (amount of concentrated noise).

In addition, monitoring of PACs by Lassen National Forest found no apparent relationship between a PAC's distance from a snow park and whether it was recently occupied (California Department of Parks and Recreation 2010). Based on the overlap with the breeding seasons for both northern goshawk and California spotted owl, it was recommended that snow grooming activities not be allowed to extend beyond the Forest Order expiration date of March 31, and under the existing condition, it does not.

Based upon OSV use patterns described in the assumptions section, once OSV trail grooming ends, it is estimated that use of those trails declines by 50 percent. Therefore, the potential for direct and indirect effects to activity centers within 0.25 mile of groomed trails would decrease substantially after March 31 for alternatives 1 through 3, but not necessarily for alternative 4. Due to the structural nature of important spotted owl habitat (i.e., dense forested stands), the level of cross-country travel occurring in this habitat is less than the amount of available habitat. The potential for noise-based disturbance is actually expected to be lower because use, and therefore the highest potential for disturbance is expected within 0.5 mile of existing roads, trails and staging areas, under all alternatives. Vegetative structure of habitat would not be physically modified by OSV use and related activities.

Trail grooming occurs on existing roads and trails and primarily occurs at night when fewer species are active, but when spotted owls are more active. Under alternatives 1, 2, and 3, the snow grooming season would conclude on March 31; under alternative 4, it would be left to the discretion of the groomer and could extend for as long as 12 inches of snow remain on the ground. Therefore, under all of the alternatives, snow grooming season overlaps with a portion of the March 1 through August 15 California spotted owl breeding season. However, under alternative 4, it has the potential to last longer, which is not consistent with Lassen National Forest OSV monitoring report recommendations. Potential effects of noise disturbance would be the same as those noted due to OSV use. In addition, trail grooming and night riding could disturb owls that forage at night. A passing trail grooming machine or OSV may interrupt owl foraging, result in owl prey taking refuge, or cause owls to redirect their foraging away from trail areas. However, due to the limited frequency²² and duration of trail grooming at any trail segment location, as well as grooming activity being an ongoing operation for many years on the same trail routes, the noise disturbance from trail grooming would not have a significant impact on breeding or foraging spotted owls.

Although OSV use or related activities would not physically alter the vegetative structure of spotted owl habitat, spotted owl prey species, that use the subnivean space could be subject to OSV-related impacts from snow compaction, including suffocation or alteration of movement while foraging in the subnivean space beneath the snow. The degree of this impact is unknown, but would be more likely in areas most conducive to OSV.

Comparison of the Alternatives

Table 107 and table 108 show and compare, by alternative, the acres of known activity centers buffered by 0.70 mile and important California spotted owl habitats, respectively, with the potential for direct and indirect effects from OSV use and related activities. Ninety-five percent of California spotted owl activity centers buffered by 0.70 mile are currently open to OSV use (alternative 1). However only 32 percent is open to OSV use and conducive to OSV use (map BE-29). Similarly, 88 percent of important California spotted owl habitat is currently open to OSV use, but only 34 percent is open to OSV use and conducive to OSV use (map BE-33). The potential for OSV-related impacts to California spotted owls, including noise-based disturbance, snow compaction impacting subnivean space of prey species, or injury/mortality, would be most likely to occur in those areas conducive to OSV use. In addition, of the 32 percent of buffered activity centers and the 34 percent of important habitat open to and conducive to OSV use, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs within in an even smaller percentage of each of those habitats. This would be similar under the other three alternatives.

Table 107. Acres of known California spotted owl activity centers, buffered by 0.70 mile, with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	114,001	112,796	99,140	111,669
Closed to OSV use	6,311	7,516	21,159	8,643

²² Grooming operations at most trail systems currently operate near a maximum level. Trails are prioritized for grooming based on visitor use. Grooming on priority trails occurs several times per week and after significant storms. The total hours of trail grooming occurring expected at each site for an average season vary from 94 annual snowcat hours at Swain Mountain to 680 hours at Bogard and Fredonyer on the Lassen National Forest. Snow removal on access roads and trailhead parking areas, serving the OSV Program trail systems, occurs several times during storm events as necessary dependent upon weather conditions (California Department of Parks and Recreation 2010).

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Conductive to OSV use and OSV use restricted to trails	NA	NA	13	NA
Total	120,312			
Open to OSV use and conducive to OSV use	38,416	38,197	33,054	37,631
Closed to OSV use and conducive to OSV use	1,341	1,560	5,697	2,126
OSV use restricted to trails	NA	NA	6	NA
Total	39,757			

Under alternative 2, 33 percent of important California spotted owl habitat (map BE-34) and 33 percent of buffered PACs (map BE-30) would be open and conducive to OSV use. Similarly, 30 percent of important habitat and 27 percent of buffered PACs would be open and conducive to OSV under alternative 3 (map BE-31) and 34 percent of important habitat and 31 percent of buffered PACs under alternative 4 (map BE-36). The Forest would use the results of ongoing inventory and monitoring of California spotted owl activity centers to determine whether or not disturbance is occurring and if changes in management are necessary. The potential for noise-based disturbance would largely overlap with roughly the first 20 percent, or the pair bonding, mating, and egg laying stages, of the March 1 through August 15th California spotted owl breeding season under alternatives 1, 2, and 3, and may extend up through the first 1/3 of the breeding season, into the hatching stage, under alternative 4. As previously described, once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent and, therefore, the potential for direct and indirect effects to activity centers within 0.25 mile of groomed trails would decrease by an estimated 50 percent after March 31 for alternatives 1 through 3 (and not long, thereafter, for alternative 4, with the exception of extremely high snowfall years).

Under all of the action alternatives (i.e., alternatives 2, 3, and 4) route densities would decline from 1.5 mi/m² to 0.2 mi/m². And because the majority of OSV use occurs on or within 0.5 mile of groomed trails and staging areas, or within meadows within 0.5 mile of designated trails, the potential for impacts to subnivean prey species, would be expected to decline with reduced route densities under alternatives 2, 3 and 4.

Table 108. Acres of important California spotted owl habitat²³ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	289,906	275,386	250,671	288,372
Closed to OSV use	40,406	54,926	79,589	40,940
OSV use restricted to trails	NA	NA	52	NA
Total	330,312			
Open to OSV use and conducive to OSV use	112,300	108,305	99,280	111,459
Closed to OSV use and conducive to OSV use	9,346	13,341	22,337	10,187
Conductive to OSV use and OSV use restricted to trails	NA	NA	29	NA
Total	121,646			

²³ Habitat types important for late-successional forest species include stands typed as 4M, 4D, 5M, 5D, and 6 by California Wildlife Habitat Relationship (CWHR (CFDW 2014)), which are all stands of trees greater than 11 inches d.b.h. with greater than 40 percent canopy cover (Sierra Nevada Forest Plan Amendment, USDA Forest Service 2004).

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to California spotted owl, when combined with alternatives 1, 2, 3 or 4, include vegetation management projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example, the Castle DFPZ 2 is proposed on 39 acres within 0.25 mile of PAC PL 121; PL 121 is also within 0.25 mile of groomed OSV trail 27N11. However, seasonal limited operating periods required for vegetation projects would prevent disturbance to breeding individuals. In another example, the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest including Sierran mixed conifer, suitable California spotted owl habitat, in the northwestern portion of the analysis area. However, the area does not overlap with any known csoPACs. In addition, vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from spotted owl reproductive habitat. Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of large conifer, over a 20-year period. These are all important habitat attributes for spotted owl foraging habitat.

California spotted owl habitat also overlaps with areas open to Christmas tree and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), and disturbance or displacement from these activities would occur outside of the California spotted owl breeding season under alternatives 1, 2, and 3. Under alternative 4, in which trail grooming would begin at the discretion of the groomer, there is the potential for a somewhat larger degree of overlap during years in which heavy snowfall begins early. Use of roads within California spotted owl habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use can contribute additional disturbance during the early part of the breeding season, particularly for nests within 0.25 mile of roads. In general, most non-motorized winter recreation occurs along designated trails and California spotted owl would either avoid roosting in those areas, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands within the Forest boundary and within one-quarter mile of California spotted owl habitats may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the forest boundary. In summary, ongoing and reasonably foreseeable actions may be additive locally to individual California spotted owls, but, given the small scale for the potential of overlap of cumulative effects in time and space with any of the alternatives, they are not expected to contribute substantial impacts to effects discussed for the project under any of the alternatives.

Determination Statement

Based upon the best available data and scientific information, all of the alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project would impact individuals, but are not likely to lead to a trend toward Federal listing or a loss of viability for California spotted owl in the Forest Plan area based on the following rationale:

- OSV proposed actions would not physically modify the vegetative structure or composition of any suitable (nesting, roosting or foraging), dispersal, or capable habitat within the project area.
- Due to the structural nature of suitable habitat (i.e., dense forested stands), the level of cross-country OSV travel in California spotted owl suitable habitat is expected to be relatively low, and most disturbance is likely to occur primarily along existing roads and trails. Although the potential for noise-based disturbance to individuals within important habitat ranges from 30 to 34 percent, and individuals within buffered PACs ranges from 27 to 32 percent, under all of the alternatives, the percentage of habitats impacted would actually be lower considering that the concentration of OSV use is not equal across the landscape.
- The potential for OSV-related noise-based disturbance would overlap with only the early part of the March 1 through August 31 California spotted owl breeding season.
- OSV use is most common on trails. Once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent and, therefore, the potential for direct and indirect effects to activity centers within 0.25 mile of groomed trails would decrease by an estimated 50 percent after March 31 for alternatives 1 through 3 (and not long, thereafter, for alternative 4, with the exception of extremely high snowfall years).
- The Forest would use the results of ongoing inventory and monitoring of spotted owl activity centers to determine whether or not disturbance is occurring and if changes in management are necessary, thereby minimizing impacts to California spotted owl.
- Based upon analysis of previous monitoring data, Lassen National Forest found no apparent relationship between a csoPAC's distance from a snow park and whether it was recently occupied.
- Other than a single OHV study, with uncharacteristically high disturbance exposure times, there is no evidence of a disturbance impact to individuals or reproductive output.
- There is no evidence linking OSV noise-based disturbance to long-term population declines.
- Disturbance to California spotted owl foraging behavior would largely be limited to areas adjacent to OSV trails and short-term in nature during trail grooming because the species is nocturnal and OSV use largely occurs during the daytime.
- The potential for OSV collision with individual California spotted owls is very low.
- Reduced route densities, under alternatives 2, 3, and 4, are likely to reduce the potential for impacts to subnivean prey species.

Northern Goshawk (*Accipiter gentilis*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to northern goshawk are listed in table 109.

Table 109. Resource indicators and measures for assessing effects to northern goshawk

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from noise and increased human presence, injury or mortality of individuals	Acres and percentage of important habitat impacted by OSV use	117,272 (35%)	113,595 (35%)	105,804 (33%)	116,471 (36%)

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from OSV use and increased human presence, injury or mortality of individuals	Acres and percentage of buffered NGO PACs impacted by OSV use	49,860 (44%)	49,539 (44%)	45,672 (40%)	49,344 (40%)

Northern goshawk is associated with late-successional forests that can be impacted by activities associated with routes. Gaines et al. (2003) conducted a literature review of 71 late-successional forest-associated wildlife species and identified negative effects on these species that can result from route-associated factors. These impacts include direct loss of habitat from type conversion, diminished quality of habitat attributes or fragmentation, and road avoidance or displacement resulting from direct harassment or noise disturbance. Individuals, environmental groups, and agency biologists expressed growing concern over habitat fragmentation for late-successional forest-associated species. Various studies have shown that this species group is vulnerable to disturbance, changes in habitat, or displacement by habitat generalists.

Snowmobile use within late-successional forest habitats can have the following potential direct effects to individuals or their habitat (Gaines et al. 2003): Disturbance and potential for injury or mortality to individuals from vehicle collisions.

Disturbance:

- Displacement of populations or individual animals from a route, related to human activities.
- Disturbance and displacement of individuals from breeding or rearing habitats.
- Physiological response to disturbance, resulting in changes in heart rate or level of stress hormones.

Potential for Injury or Mortality to Individuals from Vehicle Collision:

As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds. However, the potential for this effect on goshawks would be low given that they spend little time at ground level.

Possible indirect effects include:

- Altered or dispersed movement as caused by a route or human activities on or near a route.

In addition, Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow. Adverse effects to subnivean animals could indirectly affect the prey base for many Forest Service sensitive species, including goshawk.

There are 113,550 acres of ngoPACs, when each of the 172 PACs is buffered by 0.25 mile (map BE-37), and 325,070 acres of northern goshawk important habitat²⁴ (map BE-41), including high-reproductive habitat, on the Lassen National Forest.

²⁴ Habitat types important for late-successional forest species include stands typed as 4M, 4D, 5M, 5D, and 6 by California Wildlife Habitat Relationship (CWHR (CDFW 2014)), which are all stands of trees greater than 11 inches d.b.h. with greater

Activities greater than one-quarter mile (400 meters) from a northern goshawk nest site have little potential to affect nesting northern goshawks.²⁵ The OSV season overlaps with the courtship through incubation phases of the northern goshawk breeding season (Woodbridge and Hargis 2006; Lassen National Forest 2010), so OSVs passing within 0.25 mile of unsurveyed nesting/roosting habitat or an active nest have the potential to disturb nesting goshawks. Although Dunk et al. (2011) found sustained ATV use near nests had a significant effect on the percentage of time that female goshawks spent off the nest during the treatment, they also noted the kind of activity goshawks were exposed to during sustained-ATV treatments was more intensive than was typical recreational use of ATVs on the Plumas National Forest. The same would be expected of OSV use on the Lassen National Forest. In addition, Dunk et al. (2011) found no evidence indicating experimental treatments, or research visits in general, influenced goshawk reproduction. As previously described in the California spotted owl section, monitoring and analysis specific to California spotted owl and northern goshawk PACs and OSV use was conducted on the Lassen National Forest. Lassen National Forest had 174 northern goshawk PACs, at the time, of which 33 (19 percent) were within 400 meters of designated OSV routes. Twenty-three northern goshawk PACs fell within the scope of the GIS analysis conducted. No relationship was apparent between a PAC's distance from a snow park and whether it has been recently occupied.

Although the potential for OSV-related noise-based disturbance overlaps with only the early part of the February 15 through September 15 northern goshawk breeding season, once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent. Therefore, the potential for direct and indirect effects to ngoPACs within 0.25 mile of groomed trails would decrease by an estimated 50 percent after March 31 for alternatives 1 through 3 (and not long, thereafter, for alternative 4, with the exception of extremely high snowfall years).

Although OSV use or related activities would not physically alter the vegetative structure of northern goshawk habitat, prey species that use the subnivean space could be subject to OSV-related impacts from snow compaction, including suffocation or alteration of movement while foraging beneath the snow. The degree of this impact is unknown, but would be more likely in areas most conducive to OSV.

Comparison of the Alternatives

Table 110 and table 111 show and compare, by alternative, the amount of northern goshawk PACs and important habitat, respectively, with the potential for direct (disturbance or displacement, injury or mortality from collision) and indirect (snow compaction effects to subnivean prey) effects, as previously described, and taking slope and canopy cover assumptions into account. Due to the structural nature of important goshawk habitat (i.e., dense forested stands), the level of cross-country travel in goshawk important habitat is less than the amount of available habitat. Ninety-six percent of northern goshawk PACs buffered by 0.25 mile are currently open to OSV use (alternative 1). However 44 percent is open to OSV use and conducive to OSV use (table 24; map BE-37). Similarly, 87 percent of important northern goshawk habitat is currently open to OSV use, but 35 percent is open to OSV use and conducive to OSV use (table 25; map BE-41). The potential for OSV-related impacts to northern goshawk, including noise-based disturbance, snow compaction impacting subnivean space of prey species, or injury/mortality, would be most likely to occur in those areas conducive to OSV use. In addition, of the 44 percent of buffered activity centers and the 35 percent of important habitat open to and conducive to OSV use, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs

than 40 percent canopy cover (Sierra Nevada Forest Plan Amendment, USDA Forest Service 2004). PACs buffered by 1 mile from the center point of each PAC were subtracted from the total amount of important habitat, based on Woodbridge and Hargis (2006), to prevent double counting with PAC analysis.

²⁵ Based on Sierra Nevada Forest Plan amendment standard/guideline #76 that assigns a 0.25-mile LOP around northern goshawk PACs - applicable to disturbance from vegetation management activities.

within in an even smaller percentage of each of those habitats; 52 northern goshawk PACs buffered by 0.25 mile (30 percent) fall within 0.5 mile of a groomed trail or OSV staging area. This would be similar under the other three alternatives.

Table 110. Acres of northern goshawk PACs, buffered by 0.25 mile, with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	109,087	107,105	97,547	107,723
Closed to OSV use	4,463	6,444	15,986	5,827
OSV use restricted to trails	NA	NA	17	NA
Total	113,550			
Open to OSV use and conducive to OSV use	49,860	49,539	45,664	49,344
Closed to OSV use and conducive to OSV use	1,487	1,808	5,674	2,003
Conducive to OSV use and OSV use restricted to trails	NA	NA	8	NA
Total	51,347			

Under alternative 2, 35 percent of important northern goshawk habitat (map BE-42) and 44 percent of buffered PACs would be open and conducive to OSV use (map BE-38). Similarly, 33 percent of important habitat (map BE-43) and 40 percent of buffered PACs (map BE-39) would be open and conducive to OSV under alternative 3 and 36 percent of important habitat (map BE-44) and 40 percent of buffered PACs (map BE-40) under alternative 4. The Forest would use the results of ongoing inventory and monitoring of northern goshawk activity centers to determine whether disturbance is occurring and if changes in management are necessary. The potential for noise-based disturbance would largely overlap with roughly the first 20 percent, or the courtship (formation of breeding pairs, nest building, and copulation) phase of the February 15 through September 15 northern goshawk breeding season under alternatives 1, 2, and 3, and may extend up through the first one-third of the breeding season, into the incubation period, under alternative 4. As previously described, once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent and, therefore, the potential for direct and indirect effects to activity centers within 0.25 mile of groomed trails would decrease by an estimated 50 percent after March 31 for alternatives 1 through 3 (and not long, thereafter, for alternative 4, with the exception of extremely high snowfall years). In addition, the objective of minimizing impacts to wildlife during the winter would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Under all of the action alternatives (i.e., alternatives 2, 3, and 4) route densities would decline from 1.5 mi/m² to 0.2 mi/m². And because the majority of OSV use occurs on or within 0.5 mile of groomed trails and staging areas, or within meadows within 0.5 mile of designated trails, the potential for impacts to subnivean prey species, would be expected to decline with reduced route densities under alternatives 2, 3 and 4.

Table 111. Acres of important northern goshawk habitat²⁶ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	283,076	270,055	248,077	281,570
Closed to OSV use	41,994	55,015	76,953	43,500
OSV use restricted to trails	NA	NA	40	NA
Total	325,070			
Open to OSV use and conducive to OSV use	117,272	113,595	105,804	116,471
Closed to OSV use and conducive to OSV use	10,551	14,228	21,997	11,352
Conducive to OSV use and OSV use restricted to trails	NA	NA	22	NA
Total	127,823			

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to goshawk, when combined with alternatives 1, 2, 3 or 4, include vegetation management projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management and salvage projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example, the Castle DFPZ 2 is proposed on 39 acres within 0.25 mile of the Little Grizzly PAC that is also within 0.25 mile of groomed OSV trail 27N11. However, seasonal limited operating periods required for vegetation projects would prevent disturbance to breeding individuals. As another example, the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest including Sierran mixed conifer, suitable northern goshawk reproductive habitat, in the northwestern portion of the analysis area. However, the area does not overlap with any known ngoPACs. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from goshawk reproductive habitat. Management prescriptions have emphasized recruitment of large snags and logs and retention of large conifer that are important attributes of goshawk habitat.

Goshawk habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), and disturbance or displacement from this activity would occur outside of the NGO breeding season under alternatives 1, 2, and 3. Under alternative 4, in which trail grooming would begin at the discretion of the groomer, there is the potential for a somewhat larger degree of overlap during years in which heavy snowfall begins early. Use of roads within northern goshawk habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use can contribute additional disturbance during the early part of the northern goshawk breeding season, particularly for nests within 0.25 mile of roads. However, current research shows no evidence that recreational vehicle use influences goshawk reproduction. In general, most non-motorized winter recreation occurs along designated trails, and northern goshawk would either

²⁶ Habitat types important for late-successional forest species include stands typed as 4M, 4D, 5M, 5D, and 6 by California Wildlife Habitat Relationship (CWHR 2014), which are all stands of trees greater than 11 inches d.b.h. with greater than 40 percent canopy cover (Sierra Nevada Forest Plan Amendment, USDA Forest Service 2004).

avoid roosting in those areas, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands within the Forest boundary and within one-quarter mile of northern goshawk habitats may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the Forest boundary. In summary, ongoing and reasonably foreseeable actions may be additive locally to individual northern goshawks, but are not expected to contribute substantial impacts to those discussed for the project under any of the alternatives.

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect individuals, but are not likely to lead to a trend toward Federal listing or loss of viability for northern goshawk in the Forest Plan area based on the following rationale:

- Vegetative structure or composition of habitat would not be physically modified by OSV use and related activities under any of the alternatives.
- Due to the structural nature of suitable habitat (i.e., dense forested stands), the level of cross-country OSV travel in northern goshawk suitable habitat is expected to be relatively low, and most disturbance is likely to occur primarily along existing roads and trails under all alternatives.
- Although the potential for noise-based disturbance to individuals within important habitat ranges from 33 to 36 percent, and individuals within buffered PACs ranges from 40 to 44 percent, under all of the alternatives, the percentage of habitats impacted would actually be lower considering that the concentration of OSV use is not equal across the landscape; 30 percent of buffered goshawk PACs fall within 0.5 mile of a groomed trail or OSV staging area, the highest OSV use areas.
- The potential for OSV-related noise-based disturbance would overlap with only the early part of the February 15 through September 15 northern goshawk breeding season.
- OSV use is most common on trails and once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent. As a result, the potential for direct and indirect effects to ngoPACs within 0.25 mile of groomed trails would decrease by an estimated 50 percent after March 31 for alternatives 1 through 3 (and not long, thereafter, for alternative 4, with the exception of extremely high snowfall years).
- The Forest would use the results of ongoing inventory and monitoring of northern goshawk activity centers to determine whether or not disturbance is occurring and if changes in management are necessary, thereby minimizing impacts to northern goshawk.
- Lassen National Forest monitoring found no apparent relationship between an ngoPAC's distance from a snow park and whether it was recently occupied, and Dunk et al. (2011) found no evidence indicating experimental recreational treatments influenced northern goshawk reproduction.
- The potential for OSV collision with individual northern goshawks is very low.
- In addition, the objective of minimizing impacts to wildlife would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Wide-ranging Carnivores

Sierra Nevada Red Fox (*Vulpes vulpes necator*), Southern Cascades Distinct Population Segment (DPS)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to Sierra Nevada red fox are listed in table 112

Table 112. Resource indicators and measures for assessment of effects to Sierra Nevada red fox

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from Noise and increased human presence, injury or mortality of individuals, habitat modification, or snow compaction near denning sites	Acres and percentage of suitable Sierra Nevada red fox habitat ²⁷ impacted by OSV use	32,986 (32%)	31,434 (30%)	28,986 (28%)	28,902 (28%)

Gray wolf, Sierra Nevada red fox, and California wolverine are sensitive to the presence of humans and human activities. The most common interactions between snowmobile routes and wildlife that Gaines et al. (2003) documented from the literature included trapping as facilitated by winter human access, disturbance-based displacement and avoidance, and disturbance at a specific site, usually wintering areas. To a lesser degree, hunting, trapping, poaching, collection, and habitat loss and fragmentation were other interactions identified. Trapping of Sierra Nevada red fox, or any of the special-status species under consideration, is not legal in California and, therefore, will not be considered as a potential impact in this analysis.

Snowmobile use and associated activities within habitats for wide-ranging carnivores can have the following potential effects to individuals or their habitat (Gaines et al. 2003). Potential direct effects include (1) Displacement or avoidance away from human activity on or near roads; (2) Displacement of individual animals from breeding or rearing habitat; and (3) Physiological response to disturbance resulting in changes in heart rate or level of stress hormones.

There is also potential for injury or mortality to individuals from vehicle collision or OSV-related snow compaction because Sierra Nevada red fox dens under the snow. As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds. Vehicle collision with a Sierra Nevada red fox or wolverine would negatively affect that particular animal, but the likelihood of occurrence is assumed to be rare.

Possible indirect effects include behavioral modification such as altered or dispersed movement as caused by a route or human activities on or near a route and, secondarily, creation of a vector pathway for competitors or predators.

OSV use and related activities would not physically modify the vegetative structure of Sierra Nevada red fox habitat. No studies have been conducted on OSV use related to this population at the current time.

²⁷ Based on Cleve et al. (2011)

However, in its finding (USFWS 2015a), the USFWS analyzed potential stressors on the subspecies, including those that may be caused or exacerbated by OSV use, such as competition and predation by coyotes and vehicle collisions.

Potential for Injury or Mortality to Individuals from Vehicle Collision:

As previously discussed, In addition, the best available information suggests no significant increases in vehicular traffic or new roads are likely in areas where the subspecies occurs. Therefore, based on the information presented above and in the Species Report (USFWS 2015b, pp. 53–55), the best available data indicate that the impact of vehicle collisions on Sierra Nevada red fox would be minor and continue at similar levels into the future, resulting in a low-level impact on the subspecies (i.e., impacts to individual Sierra Nevada red foxes as opposed to populations).

Habitat Modification: (USFWS 2015b, unless otherwise noted):

Both coyotes and Sierra Nevada red foxes are opportunistic predators with considerable overlap in food consumed (Perrine 2005, pp. 36–37). Perrine (2005, pp. 84, 105) suggests that competition with coyotes, as well as predation, is likely a primary reason why the range of Sierra Nevada red fox is restricted to such high elevations. Any competition likely varies in intensity with prey availability, specifically in the Lassen sighting area where competition may be stronger during winter months when Sierra Nevada red fox descend in elevation.

Coyotes occur throughout the current range of the Sierra Nevada red fox, but typically at lower elevations during winter and early spring when snowpacks are high. If snowpacks are reduced in the area because of climate change, coyotes would likely encroach into high-elevation areas during early spring when Sierra Nevada red fox are establishing territories and raising pups. Even in the absence of direct predation, the tendency of coyotes to chase off red foxes, generally, and to compete with Sierra Nevada red fox for prey, may interfere with the ability of the subspecies to successfully raise offspring (USFWS 2015b, pp. 48–51).

Overall, the potential increase of coyote competition as it relates to shifting or modified habitats, or diminished snowpack levels from potential climate change impacts, may still occur throughout the range of the subspecies. The best available data indicate presence of coyotes at the same elevations as Sierra Nevada red fox during certain times of the year; however, there is no information to indicate any population-level impacts.

Sierra Nevada red fox could also be preyed by coyotes. Sierra Nevada red fox and coyotes both are opportunistic predators with considerable overlap in food consumed (Perrine 2005, pp. 36–37). Although no direct documentation of coyote predation on Sierra Nevada red fox is available, coyotes will chase and occasionally kill other North American red fox subspecies, and are considered important competitors of red fox generally (Perrine 2005, pp. 36, 55; Perrine et al. 2010, p. 17). Thus, red foxes tend to avoid areas frequented by coyotes (though not necessarily to the point of complete exclusion) (Perrine 2005, p. 55).

The general tendency of red foxes to avoid coyotes often relegates them to suboptimal habitats and has likely been an important factor determining red fox distribution (Perrine 2010, p. 20; Sacks et al. 2010, p. 17). Perrine (2005, pp. 84, 105) suggests that predation (and competition; see above) from coyotes is likely a primary reason why the range of Sierra Nevada red fox is restricted to such high elevations.

During winter months in the Lassen sighting area, Perrine (2005, pp. 30, 78) found that both Sierra Nevada red fox and coyotes descended to lower elevations, where mule deer (*Odocoileus hemionus*) (and more specifically in the case of Sierra Nevada red fox, mule deer carrion) became important components of their diets. Perrine (2005, p. 31) also notes that Sierra Nevada red fox may potentially benefit from the

presence of coyotes during winter by scavenging carcasses of deer killed by coyotes. However, Sierra Nevada red fox, whose main winter food source (at the Lassen study site) was small rodents rather than deer (Perrine 2005, p. 24), tend to stay at higher elevations than coyotes, thereby reducing potential predation.

It is unknown if or how much competition or predation on Sierra Nevada red fox is occurring on the Lassen National Forest as the result of OSV-related snow compaction or other OSV-related activities. At this time, the best available data indicate that coyotes are present year-round throughout the subspecies' range, but generally at lower elevations than Sierra Nevada red fox during winter and early spring when snowpacks are high (USFWS 2015b, p. 52). Regardless, information does not indicate there has been any coyote predation on Sierra Nevada red fox, nor is there any information to indicate that coyotes are increasing at any of the sighting areas. However, as climate change progresses, climatologists predict that snowpacks are expected to diminish in the future (Kapnick and Hall 2010, pp. 3446, 3448; Halofsky et al. 2011, p. 21). Thus, higher elevations with deep snowpack that currently deter coyotes may become more favorable to them, potentially increasing the likelihood of coyote predation in the future.

Recently, two packs of gray wolves became established in the Southern Cascades between the Crater Lake and Lassen sighting areas (one pack each in Oregon and California). It is probable that restoration of wolves to the Southern Cascades in sustainable populations would lower coyote population numbers or exclude them from higher elevation forested areas, thereby facilitating the persistence of nearby Sierra Nevada red fox populations (Levi and Wilmers 2012, p. 926); wolves are unlikely to compete heavily with Sierra Nevada red fox because they tend to take larger game (ODFW 2015, p. 8).

Based on the best available scientific and commercial data, the USFWS found that predation may have had an overall low-level impact to the Sierra Nevada red fox due to the presence of coyotes co-occurring at multiple sighting areas within the subspecies' range; the potential for predation in the Crater Lake, Lassen, and Sonora Pass sighting areas into the future, given climate model projections of decreased snowpack levels that may make the habitat more favorable to coyotes; and the overall inability of the populations at those three locations to shift up in elevation (i.e., the Crater Lake, Lassen, and Sonora Pass populations appear at or near the highest elevations available for the subspecies). However, at this time, the best available data indicate that predation is not impacting the Sierra Nevada red fox at the subspecies-level to the degree that any more than individuals at a couple of the sighting areas may be affected both currently and into the future. Further, the best available data do not indicate that potential future changes in shifting habitat at high elevations (as suggested by climate models) would occur within the next 50 years to such a degree that coyote numbers would increase significantly throughout the subspecies' range to the point that coyote predation would rise to the level of a threat. Therefore, based on the analysis contained within the Species Report and summarized above, the Service has determined that predation does not rise to the level of a threat currently nor is it likely to increase into the future.

Disturbance:

Sierra Nevada red fox tends to be nocturnal and, OSV use within the Lassen National Forest primarily occurs during daylight. Therefore, potential impacts to foraging behavior or movement would be low. As OSV trail use is an existing condition, Sierra Nevada red fox that occur in the areas affected by the OSV Program during winter may be habituated to OSV disturbance or may have already modified their behavior to avoid trail areas or OSV noise resonating in the forest may cause an alert or startle response in individual Sierra Nevada red foxes or may be accepted as ambient noise conditions of the environment.

Snow Compaction near Denning Sites (Potential for Injury or Mortality to Denning Individuals):

Although the March through May denning period overlaps with the OSV season, Sierra Nevada red fox use natural openings in rock piles at the base of cliffs and slopes and earthen dens as denning sites. If the

Sierra Nevada red fox, uses earthen dens for denning sites, then OSV use would not be expected to have a potential direct effect on dens due to minimum snow depth requirements under each of the alternatives. If rock piles at the bases of cliffs and slopes are used, then the potential for injury or mortality to denning individuals would be expected to be low due to the rocky structure of the dens and because most OSV use occurs in flatter areas. Although there currently are no documented Sierra Nevada red fox dens on the Lassen National Forest, as they are located, a January 1 to June 30 limited operating period could be applied to avoid adverse impacts to potential breeding, if determined to be necessary.

Comparison of the Alternatives:

Although we don't know where, specifically, impacts will occur at any given time and we cannot quantify the amount of impact, we know the potential for impacts would be greatest in areas most conducive to OSV use (high OSV-use areas). As described in the assumptions section, flatter areas with slopes less than 21 percent and canopy cover less than 70 percent, including the routes and staging areas, themselves, are more conducive to OSV than others and, therefore, likely to receive the highest use. Those assumptions have been incorporated into the following analysis.

Using a habitat model developed by Cleve et al. (2011) that utilized occurrence data from the Lassen Peak region population combined with climatic and remotely sensed variables, 103,803 acres of Sierra Nevada red fox habitat occur within Lassen National Forest System lands (map BE-45). Based upon the information displayed in table 113, 83 percent of suitable Sierra Nevada red fox habitat is currently open to OSV use (alternative 1). However, only 32 percent is open to OSV use and conducive to OSV use. The potential for OSV-related injury or mortality, competition with coyotes, noise-based disturbance impacting individual foxes would be most likely to occur within that 32 percent of suitable habitat. High OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs within less than 32 percent of Sierra Nevada red fox habitat. Under alternative 2, 30 percent of habitat is open to and conducive to OSV use (map BE-46). Under alternative 3, 28 percent of habitat is open to and conducive to OSV use (map BE-47²⁸) and under alternative 4, 28 percent (map BE-48).

²⁸ Sierra Nevada red fox occurrence information shown on maps is based upon all available observational data, regardless of time of year.

Table 113. Acres of suitable Sierra Nevada red fox habitat²⁹ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	85,956	82,910	76,345	81,756
Closed to OSV use	17,847	20,893	27,456	22,047
OSV use restricted to trails	NA	NA	2	NA
Total	103,803			
Open to OSV use and conducive to OSV use	32,986	31,434	28,986	28,902
Closed to OSV use and conducive to OSV use	7,602	9,154	11,601	11,686
Conducive to OSV use and OSV use restricted to trails	NA	NA	1	NA
Total	40,588			

Based upon Sierra Nevada red fox monitoring conducted on the Lassen National Forest in 2012, interaction between Sierra Nevada red fox and OSV users was considered to be unlikely due to inverse differences in peak activity hours, with peak activity for the fox occurring from approximately 2 hours after sunset until 2 hours prior to sunrise (Perrine 2005), while almost all OSV usage on the Lassen occurs during daylight hours. Therefore, the potential for injury, mortality, noise-based disruption of feeding or breeding is expected to be very low. However, as Sierra Nevada red fox den sites are located within the portion of the action area open to OSV, den sites with potential to be impacted would be monitored to determine whether or not disturbance is occurring and if changes in management, including a January 1 to June 30 limited operating period around den sites, are necessary, thereby minimizing impacts to Sierra Nevada red fox. Snow compaction near denning sites would be limited to a much smaller area and unlikely due to the specific denning requirements of the species, as previously described. In addition, the objective of minimizing impacts to wildlife during the winter would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Under all of the action alternatives (alternatives 2, 3, and 4) route densities would decline from 1.5 mi/m² to 0.2 mi/m². And, because the majority of OSV use occurs on or within 0.5 mile of groomed trails and staging areas, or within meadows within 0.5 mile of designated trails, the potential for impacts to subnivean prey species, would be expected to decline with reduced route densities under alternatives 2, 3, and 4.

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to Sierra Nevada red fox, when combined with alternatives 1, 2, 3 or 4, include vegetation management projects, fire salvage projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management and salvage projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example, the Castle DFPZ 2 is proposed on 39 acres and the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest including some suitable Sierra Nevada red fox reproductive habitat. Limited operating periods are required for Sierra Nevada red fox for vegetation management projects to prevent potential

²⁹ Cleve et al. (2011)

impacts to breeding individuals. In addition, vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires which can benefit species such as Sierra Nevada red fox for which wildfire is a threat.

Sierra Nevada red fox habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), and disturbance or displacement from this activity would occur outside of the Sierra Nevada red fox breeding season under alternatives 1, 2, and 3. Under alternative 4, in which trail grooming would begin at the discretion of the groomer, there is the potential for a somewhat larger degree of overlap during years in which heavy snowfall begins early. Use of roads within Sierra Nevada red fox habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use could contribute additional disturbance during the early part of the denning season. In general, most non-motorized winter recreation occurs along designated trails, where individuals would either avoid the area, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands within the Forest boundary may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the Forest boundary.

In summary, ongoing and reasonably foreseeable actions are not expected to contribute significant impacts to effects discussed for Southern Cascades DPS of Sierra Nevada red fox for the project under any of the alternatives. Although impacts may be additive locally, particularly to foraging individuals, they would be much less likely to individuals utilizing reproductive dens in rocky areas at the base of cliffs and slopes.

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for Southern Cascades DPS of Sierra Nevada red fox in the Forest Plan area based on the following rationale:

- The vegetative structure or composition of suitable Sierra Nevada red fox habitat would not be physically modified by OSV use and related activities.
- Although the potential for impacts to individuals within suitable habitat ranges from 28 to 32 percent under all of the alternatives, the percentage of suitable Sierra Nevada red fox habitat impacted would actually be lower considering that the concentration of OSV use is not equal across the landscape, and based upon Sierra Nevada red fox monitoring conducted on the Lassen National Forest in 2012, interaction between Sierra Nevada red fox and OSV users was considered to be unlikely due to inverse differences in peak activity hours. Therefore, the potential for injury, mortality, noise-based disruption of feeding or breeding is expected to be very low under all of the alternatives.
- At this time, the best available data indicate that predation is not impacting the Sierra Nevada red fox at the subspecies-level to the degree that any more than individuals at a couple of the sighting areas may be affected both currently and into the future. Further, the best available data do not indicate that potential future changes in shifting habitat at high elevations (as suggested by climate models) would occur within the next 50 years to such a degree that coyote numbers would increase significantly throughout the subspecies' range to the point that coyote predation would rise to the level of a threat to the Sierra Nevada red fox.

- OSV use would not be expected to have a potential direct effect on dens due to minimum snow depth requirements under each of the alternatives, the rocky structure of the dens and because most OSV use occurs in flatter areas. However, as Sierra Nevada red fox den sites are located within the portion of the action area open to OSV, den sites with potential to be impacted would be monitored to determine whether or not disturbance is occurring and if changes in management, including a January 1 to June 30 limited operating period around den sites, are necessary, thereby minimizing impacts to Sierra Nevada red fox.
- In addition, the objective of minimizing impacts to wildlife would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.
- Reduced route densities, under alternatives 2, 3, and 4, are likely to reduce the potential for impacts to subnivean prey species.

Bats

Fringed Myotis (*Myotis thysanodes*)

Direct and indirect Effects

OSV use on the Lassen National Forest would not change the habitat for fringed myotis bat as no habitat modifications are anticipated

Very little is known about the wintering behavior of fringed myotis bats. Some limited migration to lower elevation may occur. However, if fringed myotis remain on the landscape in winter, there is a low likelihood that behavior of individuals could be modified by the noise or disruption associated with OSV use or grooming of OSV trails. This would be entirely dependent on the location of the winter roost in proximity to a bridge, building, cavity, mine, or tree. Since there are no known winter roosts on the Lassen, noise cannot be mitigated should there be a noise impact from OSV activities. Should OSV activities create a temporary disturbance, breeding could be impacted, however, it would not preclude breeding at a later time. There should be no impact to the maternal roosts, as they would start in April or May, following snowmelt.

Fringed myotis bats drink water from streams or lakes when they emerge from roosts. In addition, they forage in riparian areas and meadows. Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs, and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches for all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016).

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to *M. thysanodes*, when combined with alternatives 1, 2, 3, or 4, include vegetation management and fire salvage projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management and salvage projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example,

the Castle DFPZ 2 is proposed on 39 acres. However, seasonal limited operating periods required for raptor and other sensitive species for vegetation projects to prevent disturbance to breeding individuals could also prevent disturbance to breeding bats. As another example, the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest in the northwestern portion of the analysis area. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from areas with larger, mature trees that serve as roosts for bats. In addition, management prescriptions have emphasized recruitment of large snags and logs and retention of large conifer.

M. thysanodes habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), minimizing the potential for disturbance or displacement of roosting bats. Use of roads within fringed myotis bat habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use can contribute additional disturbance during the early part of the *M. thysanodes* breeding season. There is a small potential for an additive effect from vehicle fluids from wheeled vehicles used to access firewood and Christmas trees, as well as from the use of wheeled vehicles during the overlap season between OSVs and wheeled vehicles, to enter waterways, modifying pallid bat prey/food base. However, the risk for this impact is low because vehicle use does not occur in waterways and fluids would not normally reach waterways.

In general, most non-motorized winter recreation occurs along designated trails, and individual bats would either avoid roosting in those areas, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands that make up about 20 percent of the area within the Forest boundary may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown. In summary, ongoing and reasonably foreseeable actions may be additive locally to individual bats, but are not expected to contribute substantial impacts to those discussed for the project under any of the alternatives.

Determination Statement

All alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project may impact individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for fringed myotis in the Forest Plan area based on the following:

- Proposed actions would not physically modify fringed myotis bat habitat.
- Proposed actions would generally occur when the species is hibernating and is generally inactive. However, individuals that emerge to forage during warmer weather could experience missed feeding when snow grooming activities occur during the early evening.
- Depending upon the location of winter roost structures with respect to OSV use, individual bats within winter roosts could be disturbed by noise associated with OSVs and human presence, and missed breeding attempts could result.
- The low risk of modification of the prey/food base or impact on drinking water quality from oil, gas, or other vehicle fluids entering waterways would be mitigated by the 12-inch minimum snow depth that would protect aquatic and riparian habitats from measurable impacts to vegetation or water quality.

Pallid Bat (*Antrozous pallidus*)

Direct and indirect Effects

OSV use and related activities on the Lassen National Forest would not change the habitat for pallid bat, as no habitat modifications are anticipated. Due to the behavior of pallid bats that they can be seen in winter on warmer nights (39 degrees F), or males moving between winter roosts, or an occasional feeding (once every six nights), there is a low likelihood that pallid bat behavior could be modified by OSV noise or disruption of grooming trails for OSV use.

OSV noise could cause disturbance at the winter roost. This would be entirely dependent on the location of the winter roost in proximity to a bridge, building, cavity, mine or tree. Since there are no known winter roosts on the Lassen, no reduction of noise can be mitigated should there be a noise impact from OSV activities. Should OSV activities have a temporary disturbance, breeding could be impacted, however, it would not preclude breeding at a later time. There should be no impact to the maternal roosts, as they would start in April or May, following snowmelt.

Species such as pallid bat forage on invertebrates in areas with riparian and/or aquatic environments. Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016).

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to pallid bats, when combined with alternatives 1, 2, 3 or 4, include vegetation management and salvage projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management and salvage projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example, the Castle DFPZ 2 is proposed on 39 acres. However, seasonal limited operating periods required for raptor species for vegetation projects to prevent disturbance to breeding individuals could also prevent disturbance to breeding bats. As another example, the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest in the northwestern portion of the analysis area. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from areas with larger, mature trees that serve as reproductive habitat and roosts for bats. In addition, management prescriptions have emphasized recruitment of large snags and logs and retention of large conifer.

Pallid bat habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), minimizing the potential for disturbance or displacement of roosting bats from this activity. Use of roads within pallid bat habitats

after the March 31 termination date of the Forest Order closing roads for exclusive OSV use can contribute additional disturbance during the early part of the pallid bat breeding season. There is a small potential for an additive effect from vehicle fluids from wheeled vehicles used to access firewood and Christmas trees, as well as from the use of wheeled vehicles during the overlap season between OSVs and wheeled vehicles, to enter waterways, modifying pallid bat prey/food base. However, the risk for this impact is low because vehicle use does not occur in waterways and fluids would not normally reach waterways.

In general, most non-motorized winter recreation occurs along designated trails, and pallid bats would either avoid roosting in those areas, if too great a disturbance, or become habituate to the noise. Similar activities on state and private lands that make up about 20 percent of the area within the Forest boundary may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown. In summary, ongoing and reasonably foreseeable actions may be additive locally to individual pallid bats, but are not expected to contribute substantial impacts to those discussed for the project under any of the alternatives.

Determination Statement

All alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project may impact individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for pallid bat in the Forest Plan area based on the following:

- Proposed actions will not physically modify pallid bat habitat.
- Proposed actions will generally occur when the species is hibernating and is generally inactive. However, individuals that emerge to forage during warmer weather could experience missed feeding when snow grooming activities occur during the early evening.
- Depending upon the location of winter roost structures with respect to OSV use, individual bats within winter roosts could be disturbed by noise associated with OSVs and human presence and missed breeding attempts could result.
- The low risk of modification of the prey/food base from oil, gas, or other vehicle fluids entering waterways would be mitigated by the 12-inch minimum snow depth that would protect aquatic and riparian habitats from measurable impacts to vegetation or water quality.

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

Direct and Indirect Effects

OSV use on the Lassen National Forest would not change the habitat for Townsend's big-eared bat, as no habitat modifications are anticipated

Very little is known about Townsend's big-eared bats' wintering behavior. Some limited migration to lower elevation may occur. However, if Townsend's big-eared bats remain on the landscape in winter, there is a low likelihood that their behavior could be modified by the noise or disruption associated with OSV use or grooming of OSV trails. This would be entirely dependent on the location of the winter roost in proximity to a bridge, building, cavity, mine, or tree. Since there are no known winter roosts on the Lassen, no reduction of noise can be mitigated should there be a noise impact from OSV. Should OSV activities have a temporary disturbance, breeding could be impacted, however it would not preclude breeding at a later time. There should be no impact to the maternal roosts, as they would start in April or May, following snowmelt.

Townsend's big-eared bats forage in riparian areas and meadows outside of the hibernation period. Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016).

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to Townsend's big-eared bats, when combined with alternatives 1, 2, 3 or 4, include vegetation management projects, fire salvage projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management and salvage projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example, the Castle DFPZ 2 is proposed on 39 acres. However, seasonal limited operating periods required for raptor species for vegetation projects to prevent disturbance to breeding individuals could also prevent disturbance to breeding bats. As another example, the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest in the northwestern portion of the analysis area. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from areas with larger, mature trees that serve as roosts for bats. In addition, management prescriptions have emphasized recruitment of large snags and logs and retention of large conifer.

Townsend's big-eared bat habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), minimizing the potential for disturbance or displacement of roosting bats from this activity. Use of roads within Townsend's big-eared bat habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use can contribute additional disturbance during the early part of the Townsend's big-eared bat breeding season. There is a small potential for an additive effect from vehicle fluids from wheeled vehicles used to access firewood and Christmas trees, as well as from the use of wheeled vehicles during the overlap season between OSVs and wheeled vehicles, to enter waterways, modifying Townsend's big-eared bat prey base. However, the risk for this impact is low because vehicle use does not occur in waterways and fluids would not normally reach waterways.

In general, most non-motorized winter recreation occurs along designated trails, and individual bats would either avoid roosting in those areas, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands that make up about 20 percent of the area within the Forest boundary may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown. In summary, ongoing and reasonably foreseeable actions may be additive locally to individual bats, but are not expected to contribute substantial impacts to those discussed for the project under any of the alternatives.

Determination Statement

All alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project may impact individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for Townsend’s big-eared bat in the Forest Plan area based on the following:

- Proposed actions would not physically modify Townsend’s big-eared bat habitat.
- Proposed actions would generally occur when the species is hibernating and is generally inactive.
- Depending upon the location of winter roost structures with respect to OSV use, individual bats within winter roosts could be disturbed by noise associated with OSVs and human presence and missed breeding attempts could result.
- The low risk of modification of the prey/food base from oil, gas, or other vehicle fluids entering waterways would be mitigated by the 12-inch minimum snow depth that would protect aquatic and riparian habitats from measurable impacts to vegetation or water quality.

Species that Utilize Riparian or Wetland Habitats

Bald Eagle (*Haliaeetus leucocephalus*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to bald eagle are listed in table 114.

Table 114. Resource indicators and measures for assessing effects to bald eagles

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from noise and increased human presence, injury or mortality of individuals	Acres and percentage of reproductive habitat impacted by OSV use	7,962 (30%)	7,374 (28%)	7,096 (27%)	7,962 (30%)
Potential for disturbance to individuals from OSV use and increased human presence, injury or mortality of individuals	Acres and percentage of buffered bald eagle nests impacted by OSV use	741 (60%)	663 (54%)	454 (37%)	741 (60%)

The Lassen National Forest currently has 26,668 total acres of high-value reproductive habitat (map BE-49) and 1,239 acres of bald eagle nest trees on National Forest System Lands buffered by 660 feet (map BE-53).

The majority of associated risk factors within wetland and riparian habitats apply to roads and trails and primarily include the following direct effects (Gaines et al. 2003): site disturbance and potential for injury or mortality to individuals from vehicle collisions. Site disturbance includes (1) Displacement or avoidance by populations or individual animals away from human activities; and (2) Disturbance and displacement of individuals from breeding or rearing habitats. Potential for injury or mortality to individuals from vehicle collision: The likelihood of a collision between snow grooming equipment and bald eagles is extremely low because the equipment travels slowly (3 to 6 mph) and snow grooming occurs at night when eagles are roosting. There is an increased likelihood of collision with OSVs due to

higher frequency of OSV use and higher speeds, but the potential is still very low. OSV proposed actions would not physically modify any suitable bald eagle habitat within the project area.

Comparison of the Alternatives

Table 115 and table 116 show and compare, by alternative, the amount of buffered bald eagle nest sites and reproductive habitat, respectively, with the potential for direct and indirect effects (disturbance, injury, or mortality) from OSV use and related activities.

Ninety-five percent of eagle nest sites buffered by 660 feet are currently open to OSV use (alternative 1). However, 60 percent are open to OSV use and conducive to OSV use (map BE-49). Similarly, 83 percent of reproductive habitat is currently open to OSV use, but 30 percent is open to OSV use and conducive to OSV use (map BE-53). The potential for OSV-related impacts to bald eagle, including noise-based disturbance or injury/mortality, would be most likely to occur in those areas conducive to OSV use. In addition, of the 60 percent of buffered activity centers and the 30 percent of reproductive habitat open to and conducive to OSV use, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs within in an even smaller percentage of each of those habitats; no nest sites are located within high OSV-use areas and only 4 nest sites are located within 1.5 miles of designated OSV trails, where moderate use would be expected to occur. The U.S. Fish and Wildlife Service (2007) recommended nest buffer for off-road vehicle use to prevent impacts to nesting bald eagles is 660 feet. Therefore, bald eagle nest sites are not expected to be impacted under the current condition. In addition, bald eagles and their habitat are subject to the Bald Eagle Protection Act of 1940 that prohibits disturbance to bald eagles that results in injury, a decrease in productivity, or nest abandonment. The Forest would use the results of ongoing inventory and monitoring of bald eagle nest sites to determine whether or not disturbance is occurring and if changes in management are necessary. In addition, the objective of minimizing impacts to wildlife during the winter would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.

Table 115. Acres of bald eagle nest sites, buffered by 660 feet,³⁰ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	1,175	1,076	695	1,175
Closed to OSV use	64	163	544	64
OSV use restricted to trails	NA	NA	0	NA
Total	1,239			
Open to OSV use and conducive to OSV use	741	663	454	741
Closed to OSV use and conducive to OSV use	48	126	335	48
Conductive to OSV use and OSV use restricted to trails	NA	NA	0	NA
Total	789			

Under alternative 4, the same amounts of buffered eagle nest sites (map BE-52) and reproductive habitat (map BE-56) as alternative 1 have the potential to be impacted by OSV use and 2 additional nest sites would be located within 1.5 miles of designated OSV use trails. Under alternative 2, the percentage of buffered eagle nests and bald eagle reproductive habitat with the potential to be impacted by OSV use is

³⁰ 660 foot nest site buffers based on USFWS (2007)

slightly less at 28 percent (map BE-50) and 54 percent (map BE-54), respectively. Under alternative 3, the percentage of reproductive habitat with the potential to be impacted by OSV use is similar to the other alternatives (28 percent; map BE-55), but the percentage of buffered nest sites with the potential to be impacted by OSV use under alternative 3 (37 percent; map BE-51) would be substantially less than the other alternatives because areas under 3,500 feet would not be designated for OSV use. Under both alternatives 2 and 3, only two eagle nest sites would be located within OSV moderate use areas. However, like alternative 1, no bald eagle nest sites are within 660 feet of high or moderate OSV use areas under alternatives 2, 3, or 4 and, therefore, no disturbance impacts to breeding bald eagles are expected under any of the alternatives.

Table 116. Acres of high-value bald eagle reproductive habitat³¹ with potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	22,049	21,044	20,015	21,806
Closed to OSV use	4,619	5,624	6,651	4,862
OSV use restricted to trails	NA	NA	1	NA
Total	26,668			
Open to OSV use and conducive to OSV use	7,962	7,374	7,095	7,926
Closed to OSV use and conducive to OSV use	1,588	2,176	2,454	1,624
Conducive to OSV use and OSV use restricted to trails	NA	NA	1	NA
Total	9,550			

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to bald eagles, when combined with alternatives 1, 2, 3 or 4, include firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Bald eagle habitat overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), and disturbance or displacement from this activity would occur outside of the bald eagle breeding season under alternatives 1, 2, and 3. Under alternative 4, in which trail grooming would begin at the discretion of the groomer, there is the potential for a somewhat larger degree of overlap during years in which heavy snowfall begins early. Use of roads within bald eagle habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use can contribute additional disturbance during the early part of the bald eagle breeding season, particularly for nests within 0.25 mile of roads. In general, most non-motorized winter recreation occurs along designated trails, where birds would either avoid the area, if too great an impact, or habituate to the noise. Similar activities on State and private lands within the Forest boundary and within one-quarter mile of bald eagle nests may impact habitat outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the Forest boundary. In

³¹ Ponderosa pine [CWHR (2014) types 5S, 5P, 5M, 5D)] and Sierran mixed conifer and white fir [CWHR (2014) types 5S, 5P, 5M, 5D, and 6)] within 1 mile of waterbodies and major rivers. Buffered nest sites are not included in total to prevent double counting with nest site analysis.

summary, ongoing and reasonably foreseeable actions may locally increase the potential for disturbance to or displacement of bald eagles, but are not expected to contribute substantial impacts to those discussed for the project under any of the alternatives.

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for bald eagle in the Forest Plan area for the following reasons:

- OSV proposed actions would not physically modify the structure or composition of suitable bald eagle habitat within the project area.
- Although the potential for noise-based disturbance to individuals within high-reproductive habitat ranges from 27 to 30 percent under all of the alternatives, the Forest would use the results of ongoing inventory and monitoring of bald eagle nest sites to determine whether or not disturbance is occurring and if changes in management are necessary, thereby minimizing impacts to bald eagle.
- Although 37 percent of buffered bald eagle nests under alternative 3 and 54 to 60 percent of buffered bald eagle nests under alternatives 1, 2, and 4, no bald eagle nest sites are within 660 feet of high OSV use areas under any of the alternatives and, therefore, no disturbance impacts to breeding bald eagles are expected.
- In addition, the objective of minimizing impacts to wildlife would be addressed by developing a public outreach program to raise public awareness of winter wildlife habitat, wildlife behavior, and ways to minimize user impacts, as time and funding allow.
- The potential for injury or mortality from OSV collision with individual bald eagles is very low under all of the alternatives.

Great Gray Owl (*Strix nebulosa*)

Direct and Indirect Effects

Resource indicators and measures (FSH 1909.15, 12.5) used in this analysis to measure and disclose effects to great gray owl are listed in table 117.

Table 117. Resource indicators and measures for assessing effects to great gray owl

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from noise and increased human presence, injury or mortality of individuals, or habitat modification	Acres and percentage of high-reproductive habitat impacted by OSV use	32,228 (37%)	31,496 (36%)	29,900 (34%)	31,858 (37%)

The majority of associated risk factors within wetland and riparian habitats apply to roads and trails and primarily include the following potential direct effects (Gaines et al. 2003): site disturbance and potential for injury or mortality to individuals from vehicle collisions. Site disturbance includes (1) Displacement or avoidance by populations or individual animals away from human activities; and (2) Disturbance and displacement of individuals from breeding or rearing habitats.

In addition, Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow. Adverse effects to subnivean animals could indirectly affect the prey base for many Forest Service sensitive species, including great gray owl, should it be present.

Although great gray owls have not been confirmed on the Lassen National Forest, they have been observed in the nearby vicinity and, over time, could have the potential to be affected by Forest OSV activities. Snowplay in meadows may prevent great gray owl use of in or adjacent to those meadows. Like the other raptor species under consideration in this analysis, potential noise-based disturbance to breeding individuals is the primary concern. If great gray owls are present on the Lassen National Forest, the potential for disturbance to breeding individuals would be limited to the early portion of the March 1 through August 15 great gray owl breeding season that overlaps with the OSV use season.

Owls are nocturnal whereas the majority of OSV use and associated activities on the Lassen National Forest, with the exception of trail grooming, occur during the daytime, so the potential for collisions of OSVs with great gray owls, should they be present, would be negligible and foraging behavior would generally not be interrupted.

Potential effects of noise disturbance would be the same as those noted due to OSV use. In addition, trail grooming and night riding could disturb owls that forage at night. Trails are generally located away from meadows, but the passage of a trail grooming machine on a trail adjacent to or nearby a meadow, may interrupt owl foraging, result in owl prey taking refuge, or cause owls to redirect their foraging away from that particular area. However, due to the limited frequency³² and duration of trail grooming at any trail segment location, noise disturbance from trail grooming would probably not have a significant impact on breeding or foraging great gray owls. Although night riding could have similar impacts to foraging owls, it would be uncommon because most OSV use on the Lassen National Forest occurs during daytime hours.

Based upon OSV use patterns described in the assumptions section, once OSV trail grooming ends, it is estimated that use of those trails declines by 50 percent. Therefore, the potential for direct and indirect effects to activity centers within 0.25 mile of groomed trails would decrease substantially after March 31 for alternatives 1 through 3, limiting impacts to the first month of the great gray owl breeding season, but not necessarily for alternative 4. However, potential impacts under alternative 4 would still largely be limited to the early portion of the breeding season.

Although OSV use or related activities would not physically alter the vegetative structure of spotted owl habitat, spotted owl prey species, that use the subnivean space could be subject to OSV-related impacts from snow compaction, including suffocation or alteration of movement while foraging in the subnivean space beneath the snow. The degree of this impact is unknown, but would be more likely in areas most conducive to OSV, including meadows used by great gray owls for foraging.

Comparison of the Alternatives

Table 118 displays, by alternative, the acres of great gray owl reproductive habitat, with the potential for direct and indirect effects from OSV use and related activities. Eighty-nine percent of great gray owl

³² Grooming operations at most trail systems currently operate near a maximum level. Trails are prioritized for grooming based on visitor use. Grooming on priority trails occurs several times per week and after significant storms. The total hours of trail grooming occurring expected at each site for an average season vary from 94 annual snowcat hours at Swain Mountain to 680 hours at Bogard and Fredonyer on the Lassen National Forest. Snow removal on access roads and trailhead parking areas, serving the OSV Program trail systems, occurs several times during storm events, as necessary dependent upon weather conditions (CA Parks and Recreation 2010).

reproductive habitat is currently open to OSV use (alternative 1). However 37 percent is open to OSV use and conducive to OSV use (map BE-57). The potential for OSV-related impacts (noise-based disturbance, snow compaction impacting subnivean space of prey species, or injury/mortality) to great gray owls, should they be present, would be most likely to occur in those areas conducive to OSV use. In addition, of the 37 percent of habitat open to and conducive to OSV use, high OSV use is concentrated within 0.5 mile of snowmobile staging areas, on and within 0.5 mile of groomed trails, and in meadows within 0.5 mile of a designated OSV trail, so the majority of OSV use occurs within in an even smaller percentage of each of those habitats. This would be true under the other three alternatives.

Under alternative 2, 36 percent of great gray owl reproductive habitat would be open and conducive to OSV use (map BE-58). Similarly, 34 percent would be open and conducive to OSV use under alternative 3 (map BE-59), and 37 percent under alternative 4 (map BE-60). In the event that great gray owls are found on the Forest, as previously noted, the potential for OSV-related noise-based disturbance would overlap with only the early part of the March 1 through August 15 great gray owl breeding season. In addition, nest sites with potential to be impacted would be monitored to determine whether or not disturbance is occurring and if changes in management, including a limited operating period around nest sites, are necessary, thereby minimizing impacts to great gray owl.

Table 118. Acres of high-value great gray owl reproductive habitat³³ with highest potential to be impacted by OSV use and related activities, by alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	77,460	75,255	70,736	76,868
Closed to OSV use	9,285	11,490	15,993	9,877
OSV use restricted to trails	NA	NA	16	NA
Total	86,745			
Open to OSV use and conducive to OSV use	32,228	31,496	29,892	31,858
Closed to OSV use and conducive to OSV use	3,669	4,401	5,997	4,039
Conducive to OSV use and OSV use restricted to trails	NA	NA	8	NA
Total	35,897			

Cumulative Effects

Based upon spatial data provided by the Lassen National Forest, past, present, and foreseeable future actions that could result in a cumulative impact to great gray owl, when combined with alternatives 1, 2, 3, or 4, include those with the potential for disturbance to or displacement of great gray owls such as the vegetation management projects, fire salvage projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Vegetation management and salvage projects identified above are very small in comparison to the OSV Use Designation action area and/or do not overlap with groomed and ungroomed OSV routes or staging areas where the highest OSV use occurs. For example, the Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest, including some within or adjacent to suitable great gray owl reproductive habitat. However, limited operating periods required for vegetation management and road construction prevent impacts to breeding great gray owls. In addition, vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned

³³ Areas less than 440 yards (approximately 400 m) to montane meadows greater than 10 acres in size and between 2,000 and 8,000 feet in elevation with forest canopy closures greater 60 percent [CWHR (2014) closure class "D"] in at least some portion of the forest stands adjacent to meadows; habitat query includes adjacent meadows that are foraging habitat.

vegetation to reduce the potential for catastrophic wildfires that benefit great gray owl. These projects are usually excluded from larger CWHR types.

Great gray owl habitat also overlaps with areas open to Christmas tree cutting and firewood cutting. However, wheeled motorized vehicles may not be used off of authorized National Forest System roads or motorized trails to scout for fuelwood or to harvest Christmas trees (USDA Forest Service 2014), there would be minimal overlap between the Christmas tree and firewood cutting season (annually between November 1 and December 31) and OSV trail grooming season (beginning December 26), and disturbance or displacement from this activity would occur outside of the great gray owl breeding season under alternatives 1, 2, and 3. Under alternative 4, in which trail grooming would begin at the discretion of the groomer, there is the potential for a somewhat larger degree of overlap during years in which heavy snowfall begins early. Use of roads within great gray owl habitats after the March 31 termination date of the Forest Order closing roads for exclusive OSV use could contribute additional disturbance during the early part of the great gray owl breeding season, particularly for nests within 0.25 mile of roads. However, no great gray owl nests have been identified on the Lassen National Forest.

In general, most non-motorized winter recreation occurs along designated trails, where birds would avoid roosting in the area, if too great a disturbance, or habituate to the noise. Similar activities on State and private lands within the Forest boundary and within one-quarter mile of goshawk habitats may impact habitat availability outside of National Forest System lands and may increase disturbance locally. However, the potential for this type of disturbance is unknown; State and privately held lands make up about 20 percent of the area within the Forest boundary. In summary, ongoing and reasonably foreseeable actions could be additive locally to individual great gray owls, but are not expected to contribute substantial impacts to those discussed for the project under any of the alternatives.

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may affect individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for great gray owl in the Forest Plan area for the following reasons:

- Structure or composition of great gray owl habitat would not be physically modified by OSV use and related activities.
- Although the potential for noise-based disturbance to individuals within high-reproductive habitat ranges from 34 to 37 percent under all of the alternatives, great gray owls have not been confirmed on the Lassen National Forest. In the event that great gray owls are found on the Forest, the potential for OSV-related noise-based disturbance would overlap with only the early part of the March 1 through August 15 great gray owl breeding season, and nest sites with potential to be impacted would be monitored to determine whether or not disturbance is occurring and if changes in management, including a limited operating period around nest sites, are necessary, thereby minimizing impacts to great gray owl.
- Due to their nocturnal behavior, great gray owls, if present, would be expected to have little interaction with snowmobiles or snow grooming equipment resulting in very little potential for direct effects from snowmobiles or grooming equipment.

*Willow Flycatcher (*Empidonax traillii*)*

Direct and Indirect Effects

Green et al. (2003) identified meadow degradation, which results in meadow drying, loss of nesting and foraging substrates, increased predator access to meadow interiors, and potentially cowbird parasitism as

among the key factors likely responsible for the decline of the willow flycatcher. The minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect vegetation from measurable impacts (McNamara 2016). Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the action alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to water quality (McNamara 2016).

Cumulative Effects

None; the Lassen National Forest Over-snow Vehicle Use Designation Project would not result in measurable direct or indirect impacts to the willow flycatcher and, therefore, there would be no cumulative impacts to this species.

Determination Statement

None of the alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project would impact willow flycatcher or its habitat in the Forest Plan area for the following reasons:

- Willow flycatcher is a neotropical migrant that arrives well past the end of the OSV season of use, so no direct impacts to the species would occur.
- OSV use has not been identified as a factor in meadow degradation for this species, and the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to protect meadow and riparian habitats from measurable impacts to water quality or vegetation.

Greater Sandhill Crane (*Grus Canadensis tabida*)

Direct and Indirect Effects

Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016).

Cumulative Effects

None; the Lassen National Forest Over-snow Vehicle Use Designation Project would not result in measurable direct or indirect impacts to greater sandhill crane and, therefore, there would be no cumulative impacts to this species.

Determination Statement

None of the alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project would impact greater sandhill crane or its habitat in the Forest Plan area for the following reasons:

- Greater sandhill crane is a migratory species that breeds outside of the OSV season of use, so no direct impacts to the species would occur.
- OSV use has not been identified as a factor in meadow degradation for this species, and the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect wet meadow and fresh emergent wetland habitats utilized by this species from measurable impacts to vegetation or water quality.

Yellow Rail (*Coturnicops noveboracensis*)

Direct and Indirect Effects

California is outside of the continuous breeding range of the yellow rail and it appears to be primarily a winter visitor to the coastal and central portion of the state, as there are no recent records of reproduction in the state. The minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect grasslands, wet meadow and fresh emergent wetland habitats used by this species from measurable impacts to vegetation or water quality. Therefore, no direct or indirect impacts are expected from the actions.

Cumulative Effects

None; the Lassen National Forest Over-snow Vehicle Use Designation Project would not result in measurable direct or indirect impacts to the yellow rail and, therefore, there would be no cumulative impacts to this species.

Determination Statement

None of the alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project would impact yellow rail or its habitat in the Forest Plan area based on the following:

- There are no recent records of yellow rail reproduction within California.
- Based upon available information, the species appears to be limited to being a seasonal migrant within the project area, so no direct impacts to the species would occur.
- The minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect grasslands, wet meadow and fresh emergent wetland habitats used by this species from measurable impacts to vegetation or water quality.

Western Pond Turtle (*Emys marmorata*)

Direct and Indirect Effects

Western pond turtles have been documented to overwinter under litter or buried in soil in areas with dense understories consisting of vegetation such as blackberry, poison oak and stinging nettle, which reduces the likelihood of predation (Davis 1998). Since these areas would be under snow, there should not be a direct impact to the species unless individuals leave their hibernation burrows for brief periods of time, in which case there would be a low likelihood for trampling by OSVs or grooming equipment. There are no known areas of overwintering on the Lassen.

Indirect effects include the risk of oil, gas, or other vehicle fluids entering the waterway and modifying the prey/food base or water quality for breeding and basking. The potential for these risks is extremely low as no OSV use occurs on waterways.

Western pond turtles hibernate and, therefore, would be absent from the area of potential effect during the OSV season of use. Since they are known to either build a burrow or overwinter amongst shrubs, or other underground structures that would not be impacted by OSVs or underground. OSVs generally do not create a permanent trail or have direct impact on soil and ground vegetation when snow depths are sufficient to protect the ground surface (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the McNamara (2016) for additional information). All of the project alternatives would maintain a minimum snow depth of 12 inches in areas open to cross-country use, which should provide sufficient depth to protect the ground surface.

Western pond turtles utilize riparian and/or aquatic environments during the breeding season. Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the action alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016).

Cumulative Effects

Past, present, and foreseeable future actions identified to have the potential to result in a cumulative impact to terrestrial wildlife species, when combined with alternatives 1, 2, 3 or 4, include the Castle DFPZ 2 vegetation management project, Dutch and Tamarack fire salvage projects, firewood cutting, Christmas tree cutting, non-motorized winter recreational activities, or use of roads by wheeled vehicles during the season of overlap between OSVs and wheeled vehicles. Firewood and Christmas tree cutting, and non-motorized winter recreational activities are unlikely to directly impact western pond turtles that are hibernating under the snow. There is a small potential for an additive effect from vehicle fluids from wheeled vehicles used to access firewood and Christmas trees, as well as from the use of wheeled vehicles during the overlap season between OSVs and wheeled vehicles, to enter waterways, modifying the prey/food base or water quality for breeding and basking. However, the risk for this impact is low because vehicle use does not occur in waterways and fluids would not normally reach waterways. The Castle DFPZ 2 is proposed on 39 acres. The Dutch and Tamarack fire salvage projects would remove standing dead or dying trees across roughly 1,500 and 1,300 acres, respectively, of coniferous forest. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires and include riparian area protections. Similar activities on State and private lands that make up about 20 percent of the area within the Forest boundary may have the similar potential for limited impacts to western pond turtles and their habitat.

Determination Statement

Alternatives 1, 2, 3, and 4 of the Lassen National Forest Over-snow Vehicle Use Designation Project may impact individuals, but are not likely to lead to a loss of viability or a trend toward Federal listing for western pond turtle in the Forest Plan area based on the following:

- Proposed actions would not physically modify western pond turtle habitat.
- Proposed actions would occur when the species is hibernating under the snow and, therefore, would not result in noise impacts or impacts to foraging or breeding unless individuals leave their hibernation burrows for brief periods of time, in which case, there would be a low likelihood for trampling by OSVs or grooming equipment.

- The low risk of modification of the prey/food base or water quality for breeding and basking from oil, gas, or other vehicle fluids entering waterways would be mitigated by the minimum cross-country snow depth of 12 inches that would protect aquatic and riparian habitats from measurable impacts to vegetation or water quality.

Shasta Hesperian Snail (*Vespericola Shasta*)

Direct and Indirect Effects

All observations were made in 2000 near the northeastern portion of the Forest in areas that would be expected to receive low OSV use. In the event the records are accurate, the Shasta Hesperian snail would be expected to hibernate or be beneath the snow surface where no OSV-related impact would occur. In addition, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect moist bottomland habitats utilized by this species from measurable impacts to vegetation or water quality (McNamara 2016).

Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants like ammonium, sulfate, benzene, PAHs and other toxic compounds that are stored in the snowpack; during spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies (USFS National Core BMP Rec-7: Over-Snow Vehicle Use; please refer to the project hydrology report for additional information). However, the minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect aquatic and riparian habitats from measurable impacts to vegetation or water quality (McNamara 2016).

Cumulative Effects

None; the Lassen National Forest Over-snow Vehicle Use Designation Project would not result in measurable direct or indirect impacts to the Shasta Hesperian snail and, therefore, there would be no cumulative impacts to this species.

Determination Statement

None of the alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project would impact Shasta Hesperian snail or its habitat in the Forest Plan area because it based on the following:

- Proposed actions would occur when the species is hibernating under the snow and, therefore, would not result in noise impacts or impacts to foraging or breeding.
- The minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect moist bottomland habitats used by this species from measurable impacts to vegetation or water quality.

Terrestrial Invertebrates

Western Bumble Bee (*Bombus occidentalis*)

Direct and Indirect Effects

Bumble bees require habitats with rich supplies of floral resources with continuous blooming from spring to autumn. Isolated patches of habitat are not sufficient to fully support bumble bee populations. Bumblebee colonies are annual. In the late winter or early spring, the queen emerges from hibernation and then selects a nest site, which is often a pre-existing hole, such as an abandoned rodent hole. Although little is known about queen habitat preferences for hibernation sites, extrapolations are made from the

limited knowledge available for a few bumble bee species (R. Thorp, pers. comm.): Generally, observations suggest most Northern Hemisphere species prefer well-drained slopes facing north, which may prevent them from emerging too early. The only published record of a hibernaculum of *B. occidentalis* was based on an observation in a mating and hibernation cage. In this instance, the female dug 2 inches into sandy soil of a steep west-facing slope. The most detailed published observations for hibernating bumble bees came from studies conducted in southern England. Two of the species are closely related to *B. occidentalis* and may serve as examples of what might be expected in *B. occidentalis*. Those two species showed a preference for digging the hibernaculum just below the litter and soil interface, and most were under trees rather than on exposed slopes.

Habitat loss and fragmentation may be playing a role in the decline of these bumble bee species. Habitat alterations that destroy, fragment, degrade, or reduce their food supplies, nest sites (e.g., abandoned rodent burrows or undisturbed grass), and hibernation sites for overwintering queens can harm these species (Evans et al. 2008). The minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to be adequate to protect vegetation from measurable impacts (McNamara 2016).

Cumulative Effects

None; the Lassen National Forest Over-snow Vehicle Use Designation Project would not result in measurable direct or indirect impacts to the western bumble bee and, therefore, there would be no cumulative impacts to this species.

Determination Statement

None of the alternatives of the Lassen National Forest Over-snow Vehicle Use Designation Project would impact western bumble bee or its habitat in the Forest Plan area based on the following rationale:

- Colonies are annual outside of the OSV season.
- Queens of the species hibernate during the OSV season of use and, therefore, proposed actions would not result in noise impacts or impacts to foraging or breeding.
- Known information suggests that queens burrow under duff under trees and on steeper slopes where OSV use does not occur (refer to OSV use assumptions).
- OSV use is not expected to degrade terrestrial habitat based upon a minimum cross-country snow depth of 12 inches to be maintained under all of the alternatives.

Terrestrial Wildlife Species of Public Interest

Table 119. Additional terrestrial species of interest identified during public scoping

Species Name	TEPCS Status	Project Area Within Species' Range	Detections in or Near the Project Area	Suitable Habitat Present	Species Addressed Further/Rationale
Canada lynx (<i>Lynx Canadensis</i>)	FT	No	No	NA	No/The analysis area is outside of the range of the species.
Grizzly (brown) bear (<i>Ursus arctos horribilis</i>)	Depends upon population (FT, Under Review, Experimental, None)	Historic but not current	No	NA	No/ The analysis area is outside of the range of the species.

Species Name	TEPCS Status	Project Area Within Species' Range	Detections in or Near the Project Area	Suitable Habitat Present	Species Addressed Further/Rationale
Bighorn sheep (<i>Ovis Canadensis sierrae</i> and <i>Ovis Canadensis nelsoni</i>)	No special status within the analysis area	No	No	NA	No/The analysis area is outside of the range of the species.
Mountain goat (<i>Oreamnos americanus</i>)	No special status within the analysis area	No	No	NA	No/The analysis area is outside of the range of the species.
Moose (<i>Alces alces</i>)	No special status within the analysis area	No	No	NA	No/The analysis area is outside of the range of the species.
White-tailed deer (<i>Odocoileus virginianus</i>)	None	No	No	NA	No/The analysis area is outside of the range of the species.
Mule deer (<i>Odocoileus hemionus</i>)	MIS	Yes	Yes	Yes	Yes/Addressed in this report with respect to impacts associated with winter range. Otherwise, addressed as a MIS in the project MIS report.
American Bison (<i>Bison bison</i>)	None	No	No	No	No/The analysis area is outside of the range of the species.
Subnivean species: Shrews (<i>Sorex</i> spp.), Voles (<i>Microtus</i> spp.), and Deer mouse (<i>Peromyscus maniculatus</i>)	None	Yes	Yes	Yes	Yes

Mule Deer

Management Indicator Species for oak-associated hardwood and hardwood conifer in the Sierra Nevada bioregion.

Potential effects to mule deer on their winter range was identified as a non-significant issue during public scoping. Please refer to the Management Indicator Species section for mule deer population status and trend, habitat status and trend, and project-level habitat impacts.

Table 120. Resource indicators and measures for assessing effects to mule deer on winter range

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for disturbance to individuals from OSV use and increased human presence, injury or mortality of individuals, or habitat modification (i.e., altered movement due to OSV use)	Acres and percentage of winter range affected by OSV use	19,980 (17%)	15,871 (13%)	9,959 (8%)	19,980 (17%)

Species Account

Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments (CDFW 2014). Many mule deer migrate seasonally between higher elevation summer range and low elevation winter range (Ibid).

Mule Deer Habitat Status

Lassen National Forest contains 119,333 acres of mule deer winter range (map BE-9).

Direct and Indirect Effects

The cumulative effects of roads and recreation trails on mule deer and elk should be assessed during winter when disturbance has the potential to be the most detrimental (Canfield et al. 1999). This means evaluating the effects of roads, ski trails, and snowmobile routes on the winter ranges for these species.

Wintering deer are sensitive to disturbances of all kinds. Both snowmobiles and cross country skiers are known to cause wintering ungulates to flee (Freddy et al. 1986). Dorrance et al. (1975) found that snowmobile traffic resulted in increased home range size, increased movement, and displacement of deer from areas along trails. Direct environmental impacts of snowmobiles include collisions causing mortality and harassment that increased metabolic rates and stress responses (Canfield et al. 1999). Based upon Freddy et al. (1986), the distance at which mule deer have been shown to be displaced by OSVs is 133 meters (436 feet).

Snowmobile use within mule deer winter range can have the following direct effects on individual mule deer or their habitat (Gaines et al. 2003): (1) displacement of populations or individual animals from a route, related to human activities; (2) disturbance and displacement of individuals from breeding or rearing habitats; (3) physiological response to disturbance, resulting in changes in heart rate or level of stress hormones; and (4) potential for injury or mortality to individuals from vehicle collision. Potential indirect effects include altered or dispersed movement as caused by a route or human activities on or near a route.

Table 121 displays the amount of deer winter range, by alternative, with the potential for direct (disturbance and vehicle collision) and indirect (habitat modification) effects as described above. As previously discussed, the likelihood of a collision between snow grooming equipment and wildlife is extremely low because the equipment travels slowly (3 to 6 mph). There is an increased likelihood of collision with OSVs due to higher frequency of OSV use and higher speeds. Vehicle collision with a mule deer would negatively affect the individual, but the likelihood of occurrence is assumed to be rare.

Table 121. Acres of mule deer winter range with potential to be impacted by OSV use and related activities

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Open to OSV use	59,880	41,217	28,782	59,880
Closed to OSV use	59,453	78,116	90,552	59,453
OSV use restricted to trails	NA	NA	0	NA
Total	119,333			
Open to OSV use and conducive to OSV use	19,980	15,871	9,959	19,980
Closed to OSV use and conducive to OSV use	6,204	10,313	16,224	6,204
Conducive to OSV use and OSV use restricted to trails	NA	NA	0	NA
Total	26,184			

Groomed or ungroomed OSV routes in the project area do not cross deer winter range under any of the alternatives. However, OSV use of existing linear routes and cross-country travel is allowed within winter range, at some level, under all alternatives. Under the current condition (alternative 1), 59,453 acres (roughly 50 percent) of mule deer winter range is closed to OSV use. Therefore, deer using that portion of winter range would not be impacted by authorized OSV use. Roughly 50 percent of winter range is open to OSV use. However, only 19,980 acres or 17 percent of winter range are open to and conducive to OSV use (slopes less than 21 percent and canopy cover less than 70 percent). The amount of winter range with potential for impacts would be about the same under alternative 2 (13 percent) and the same under alternative 4 (17 percent) as under alternative 1. It would be substantially less under alternative 3, in which 8 percent of winter range would be open and conducive to OSV use. However, of the 17 percent of winter range open and conducive to OSV use under alternative 1, no groomed or ungroomed designated OSV routes or staging areas are located within 0.5 mile of winter range, precluding high OSV use in mule deer winter range. The same is true under the other alternatives.

Summary

- At least 50 percent of mule deer winter range is closed to OSV use under all of the alternatives
- Following are the amounts of mule deer winter range that are open to and conducive to OSV use under each of the alternatives: alternative 1, 17 percent; alternative 2, 13 percent; alternative 3, 8 percent; alternative 4, 17 percent.
- Groomed and ungroomed trails or staging areas, where the majority of OSV use occurs, do not occur in mule deer winter range under any of the alternatives, precluding high OSV use in mule deer winter range under any of the alternatives.

Subnivean Species

Potential effects to subnivean was identified as a non-significant issue during public scoping.

Table 122. Resource indicators and measures for assessing effects to subnivean species

Resource Indicator and Effect	Measure (Quantify if possible)	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for effects of snow compaction on subnivean species habitat	Acres and percentage of habitat impacted by OSV use [addressed under each applicable predator species (fisher, marten, CSO, Sierra Nevada red fox)]	NA	NA	NA	NA

Species Account

Subnivean species [shrews (*Sorex* spp.), voles (*Microtus* spp.), and deer mouse *Peromyscus maniculatus*] do not warrant special status at this time because populations are assumed to be secure. However, Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow.

Habitat Status

Adaptations to snowpack are an important component of the ecology of small mammals in temperate climates. Some small mammals, such as chipmunks (*Tamias* spp), hibernate and have limited interaction with the snowpack environment. However, shrews and voles stay active throughout the winter, and much of their activity occurs in the subnivean space under the snowpack. Other species (deer mouse) undergo bouts of torpor between periods of activity. Subnivean mammals are dependent on the subnivean space between the basal layer of snow and the ground for shelter, foraging and travel.

Subnivean space may be formed in one of two ways: mechanically or thermally, and varies by region and type of snow. Subnivean space forms mechanically when the weight of the snowpack is supported by vegetation, woody debris, or complex rocky environments. Extensive subnivean space may be formed thermally in environments with a temperature gradient between the bottom and top of the snowpack. As water vapor migrates up from warmer to colder regions of the snow, depth hoar forms just above the ground at the base of the snowpack. Depth hoar is brittle, loosely arranged crystals that create space in the subnivean environment and facilitate travel by small mammals that readily move through the fragile crystals. Depth hoar commonly forms and is most well-developed in cold, continental-type regions where temperature throughout the snowpack varies significantly. Depth hoar is rare to nonexistent in snow classified as maritime, such as that in the Sierra Nevada, which also tends to be more isothermal.

Studies cited as the basis for impacts to the subnivean environment and subnivean animals have generally been conducted in locations with continental snowpacks (e.g., alpine) where depth hoar develops (Wildlife Resource Consultants 2004). A lack of studies investigating the distribution of subnivean space and the effects of winter recreation on subnivean space in maritime snowpack conditions, such as those found in the Sierra Nevada Mountains, resulted in the Forest Service commissioning a study (Wildlife Resource Consultants 2004) designed to examine the distribution of subnivean space in Sierra meadows, how it is formed, and the impacts of winter recreation on snowpack characteristics and subnivean space. Key findings from the 65 snow pits examined for subnivean space, density characteristics, temperature, vegetation type, and the presence of small mammal sign included the following:

- The subnivean space did not contain depth hoar.
- Vegetation community types should be considered in managing winter recreation use in the Sierra Nevada; wet meadows at low elevations (1,917 to 1,933 meters; 6,289 to 6,342 feet in study) with low snow depth probably have the most subnivean space.
- Findings were not as conclusive regarding the effects of recreational use on subnivean space. But there is some suggestion that winter recreation may impact subnivean space at low elevations [pooled data for all sites were analyzed by recreational use category; pits classified as concentrated over-snow vehicle use had the least subnivean space, an average of 6.0 percent (n=7)]. Winter recreation probably has the greatest effect at low snow depths (0 to 64 centimeters; 0 to 25 inches).

The habitat of species active in the winter includes mesic and dry meadows throughout the Sierra Nevada. With the exception of trails, meadows are where some of the highest OSV use occurs and, therefore, the potential for effects to subnivean species are greatest.

Direct and Indirect Effects

Gaines et al. (2003) found an interaction that occurred on winter recreation routes was the indirect effect of snow compaction on the subnivean sites used by small mammals in which small mammals can either be suffocated as a result of the compaction, or their subnivean movements can be altered owing to impenetrable compact snow. As reflected in public comments during scoping, any adverse effects to subnivean animals could indirectly affect the prey base for many Forest Service sensitive species, including California spotted owl, northern goshawk, marten, fisher, and Sierra Nevada red fox. Therefore, quantitative impacts to subnivean species habitat are addressed under each of the aforementioned sensitive species.

Climate Change

Temperature changes associated with changing climate are expected to result in the following general changes to mammals, birds, reptiles and amphibians. Increased temperatures due to climate change may directly affect birds by forcing them to use more energy for thermoregulation that can disrupt maintenance, reproduction, timing of breeding and migration, and reduce survival or fitness. Birds may respond to these costs by shifting their ranges over time to areas with more suitable thermal conditions, but habitat and other resources may be insufficient or unsuitable for their needs. (King and Finch 2003)

Some mammals have very specific climatic adaptations, such as requirements for snow or temperatures within a narrow range (e.g. hibernation). Some have distributions that are dependent on climate. Most mammals will not be able to avoid the effects of climate change, with both positive and negative effects possible. Places to hide, forage, drink, and breed are distinct and may change seasonally. As a result, there are many opportunities for climate change to disrupt mammalian life histories. Most mammals are also highly mobile and have relatively short (generally less than 20 years) life spans, so if climates become unsuitable, mammalian response can be expected to be rapid. Mammals play dominant roles in many systems and make up most of the terrestrial large-bodied predators in North America. Large, high-trophic mammals have significant impacts on the ecosystems they inhabit. Rodents and lagomorphs (hares, pikas, and rabbits), the primary prey for many mammalian and avian predators can affect the composition of vegetative communities through seed predation. Small terrestrial mammals, including rodents and insectivores, including shrews, typically comprise the largest and most diverse group of mammals in many ecosystems. Therefore, most of the changes in mammal abundances and distributions resulting from climate change are expected to be in this group. (McKelvey et al. 2013)

Climate change may alter habitats and increase fragmentation in aquatic habitats impacting aquatic species such as turtles and amphibians that are sensitive to changes in water availability and its thermal

properties. In addition, turtles have temperature-sensitive sex determination: cooler temperatures may produce nests of only males; warmer temperatures may produce nests of only females. Temperature changes in a local area may have the effect of altering the sex ratios of populations - potentially affecting future reproduction and over time compromising their evolutionary fitness. (Olson and Saenz 2013).

Management activities that focus on landscape connectivity, diversity, and resilience may help reduce stresses on wildlife species that could be compounded by changes to climate (King and Finch 2013, McKelvey et al. 2013). For reptiles, maintenance and restoration of existing habitats and management actions that reduce environmental stressors are important management considerations with respect to climate change (Olson and Saenz 2013).

Degree to Which the Alternatives Address the Issues and Summary of Environmental Effects

Table 123. Summary comparison of how the alternatives address the key issues and environmental effects for federally listed species, Forest Service sensitive species, and species of public interest

Resource Indicator and Effect ³⁴	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Potential for noise-based disturbance or injury or mortality ³⁵ to individuals; or snow compaction effects from OSV use and related activities	Acres and percentage of buffered Northern spotted owl (NSO) activity centers with potential to be impacted by OSV use	2 (0%)	2 (0%)	2 (0%)	2 (0%)
	Acres and percentage of NSO suitable habitat with potential to be impacted by OSV use	49 acres (<1%) nest/roost habitat; 6,176 acres (46%) forage habitat	44 acres (<1%) nest/roost habitat; 5,798 acres (43%) forage habitat	9 acres (<1%) nest/roost habitat; 747 acres (6%) forage habitat	49 acres (<1%) nest/roost habitat; 6,176 acres (46%) forage habitat
	Acres and percentage of buffered California spotted owl (CSO) activity centers with potential to be impacted by OSV use	38,416 (32%)	38,197 (32%)	33,054 (27%)	37,631 (31%)
	Acres and percentage of CSO important habitat with potential to be impacted by OSV use	112,300 (34%)	108,305 (33%)	99,309 (30%)	111,459 (34%)
	Acres and percentage of buffered northern goshawk (NGO) PACs with potential to be impacted by OSV use	49,860 (44%)	49,539 (44%)	45,672 (40%)	49,344 (40%)
	Acres and percentage of NGO important habitat with potential to be impacted by OSV use	117,272 (35%)	113,595 (35%)	105,804 (33%)	116,471 (36%)
	Acres and percentage of buffered bald eagle nest sites with potential to be impacted by OSV use	741 (60%)	663 (54%)	454 (37%)	741 (60%)
	Acres and percentage of bald reproductive habitat with potential to be impacted by OSV use	7,962 (30%)	7,374 (28%)	7,096 (27%)	7,962 (30%)

³⁴ The percentage of habitats impacted would actually be lower considering the following: the concentration of OSV use is not equal across the landscape or most species, the potential for noise-based disturbance would only overlap with the early part of the breeding season; OSV use is most common on trails - once OSV trail grooming season ends on March 31, trail use declines by roughly 50 percent. In addition, the Forest would use the results of ongoing inventory and monitoring and research to determine whether or not disturbance is occurring and if changes in management are necessary, thereby minimizing impacts to species.

³⁵ Under all alternatives, the potential for injury or mortality to individual animals from OSVs or grooming equipment is low to very low for all species considered.

Resource Indicator and Effect ³⁴	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Acres and percentage of great gray owl habitat with potential to be impacted by OSV use	32,228 (37%)	31,496 (36%)	29,900 (34%)	31,858 (37%)
Potential for noise-based disturbance or injury or mortality to individuals from OSV use and related activities	Acres and percentage of gray wolf habitat (mule deer winter range) ³⁶ with potential to be impacted by OSV use	19,980 (17%)	15,871 (13%)	9,959 (8%)	19,980 (17%)
	Acres and percentage of wolverine habitat with potential to be impacted by OSV use	22,725 (56%)	22,572 (56%)	20,841 (52%)	22,693 (56%)
Potential for noise-based disturbance or injury or mortality to individuals; habitat fragmentation; or snow compaction effects ³⁷ from OSV use and related activities	Acres and percentage of suitable fisher habitat with potential to be impacted by OSV use	40,474 (26%)	43,517 (28%)	39,586 (25%)	45,452 (29%)
	Acres and percentage of marten winter habitat with potential to be impacted by OSV use	29,291 (24%)	28,555 (23%)	25,999 (21%)	27,838 (23%)
	Acres and percentage of suitable Sierra Nevada red fox habitat with potential to be impacted by OSV use	32,986 (32%)	31,434 (30%)	28,986 (28%)	28,902 (28%)
Potential for loss of habitat connectivity	Acres and percentage of connectivity habitat with potential to be impacted by OSV use	71,494 (38%)	70,308 (38%)	64,500 (34%)	71,039 (40%)
Potential for noise-based disturbance or habitat degradation from OSV use and related activities	Qualitative assessment for fringed myotis, pallid, and Townsend's big-eared bats	Under all alternatives: individuals that emerge to forage during warmer weather could experience missed feeding when snow grooming activities occur during the early evening; The low risk of modification of the prey/food base or impact on drinking water quality from oil, gas, or other vehicle fluids entering waterways would be mitigated by the 12-inch minimum snow depth that would protect aquatic and riparian habitats from measurable impacts to vegetation or water quality			
Potential for habitat degradation from OSV use and related activities	Migratory species and species that hibernate (willow flycatcher, greater sandhill crane, yellow rail, western pond turtle, Shasta Hesperian snail, western bumble bee)	The minimum cross-country snow depth of 12 inches under all of the alternatives, including the existing condition, is expected to protect meadow, riparian, wetland, and moist bottomland habitats from measurable impacts to water quality or vegetation.			

³⁶ Mule deer winter range is also the measure for gray wolf habitat with potential to be impacted by OSV use

³⁷ Reduced route densities, under alternatives 2, 3, and 4, are likely to reduce the potential for impacts to subnivean prey species.

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

Table 124. Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Lassen National Forest LRMP					
Desired Future Condition	Biological diversity remains high with viable populations of all native wildlife and plant species maintained.	Meets for all species	Would meet for all species	Would meet for all species	Would meet for all species
Forest Goals	Manage habitat for Sensitive wildlife species to insure that these species do not become Threatened or Endangered due to Forest Service actions.	Meets for all species	Would meet for all species	Would meet for all species	Would meet for all species
Forest Standards and Guidelines	Manage habitat for Sensitive wildlife species to insure that these species do not become Threatened or Endangered due to Forest Service actions (1) Management activities within habitat occupied by Sensitive species, or where potential habitat exists, will not be permitted unless supported by a biological evaluation	Meets for all species	Would meet for all species	Would meet for all species	Would meet for all species
Appendix T: Furbearer Management	Using the Appendix T methodology, marten and fisher habitat is managed under a no scheduled harvest prescription.	NA: Applies to timber; however, alternative 1 maintains fisher and marten habitat connectivity	NA: Applies to timber; however, alternative 2 would maintain fisher and marten habitat connectivity	NA: Applies to timber; however, alternative 3 would maintain fisher and marten habitat connectivity	NA: Applies to timber; however, alternative 4 would maintain fisher and marten habitat connectivity

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Sierra Nevada Forest Plan Amendment					
Management Goals and Strategies	<p>Goals: The broad goals of the old forest and associated species conservation strategy are to:</p> <ol style="list-style-type: none"> 1) Protect, increase, and perpetuate desired conditions of old forest ecosystems and conserve species associated with these ecosystems while meeting people's needs for commodities and outdoor recreation activities; 2) Increase the frequency of large trees, increase structural diversity of vegetation, and improve the continuity and distribution of old forests across the landscape; and 3) Restore forest species composition and structure following large scale, stand-replacing disturbance events. 	Meets old forest ecosystem species habitat needs with respect to habitat composition and structure	Would meet old forest ecosystem species habitat needs with respect to habitat composition and structure	Would meet old forest ecosystem species habitat needs with respect to habitat composition and structure	Would meet old forest ecosystem species habitat needs with respect to habitat composition and structure
Strategy: The old forest ecosystem strategy	<p>Strategy: The old forest ecosystem strategy has the following key elements:</p> <p>A network of land allocations, including CSO and NGO PACs, CSO HRCAs, forest carnivore den sites, and the southern Sierra fisher conservation area, with management direction specifically aimed at sustaining viable populations of at-risk species associated with old forest ecosystems well distributed across Sierra Nevada national forests;</p> <p>A network of old forest emphasis areas managed to maintain or develop old forest habitat in areas containing the best remaining large blocks or landscape concentrations of old forest and areas that provide old forest functions such as connectivity of habitat.</p>	Meets old forest ecosystem species habitat needs with respect to habitat composition and structure	Would meet old forest ecosystem species habitat needs with respect to habitat composition and structure	Would meet old forest ecosystem species habitat needs with respect to habitat composition and structure	Would meet old forest ecosystem species habitat needs with respect to habitat composition and structure

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	<p>Direction for restoring ecosystems across all land allocations following large-scale catastrophic disturbance events; and</p> <p>A proactive approach for improving forest health with management objectives to reduce susceptibility of forest stands to insect and drought-related tree mortality by managing stand density levels.</p>				
Land Allocations and Desired Conditions	California Spotted Owl PACs	Meets designation, desired condition and intent for habitat conditions	Would meet designation, desired condition and intent for habitat conditions	Would meet designation, desired condition and intent for habitat conditions	Would meet designation, desired condition and intent for habitat conditions
	Northern Goshawk PACs	Meets designation, desired condition and intent for habitat conditions	Would meet designation, desired condition and intent for habitat conditions	Would meet designation, desired condition and intent for habitat conditions	Would meet designation, desired condition and intent for habitat conditions
	Great Gray Owl PACs	NA: Currently no verified great gray owl observations on Forest	NA: Currently no verified great gray owl observations on Forest	NA: Currently no verified great gray owl observations on Forest	NA: Currently no verified great gray owl observations on Forest
	Forest Carnivore Den Site Buffers	NA: Currently no known fisher or marten den sites on Forest	NA: Currently no known fisher or marten den sites on Forest	NA: Currently no known fisher or marten den sites on Forest	NA: Currently no known fisher or marten den sites on Forest
	California Spotted Owl HRCAs	Meets designation and desired condition for habitat conditions	Meets designation and desired condition for habitat conditions	Meets designation and desired condition for habitat conditions	Meets designation and desired condition for habitat conditions

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest-wide Standards and Guidelines	27. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (marten) in biological evaluations.	Meets: alternative 1 maintains forest structure	Meets: alternative 2 would maintain forest structure	Meets: alternative 3 would maintain forest structure	Meets: alternative 4 would maintain forest structure
	28. Assess the potential impact of projects on the connectivity of habitat for old forest associated species.	Meets: alternative 1 maintains forest structure habitat connectivity	Meets: alternative 2 would maintain forest structure and habitat connectivity	Meets: alternative 3 would maintain forest structure and habitat connectivity	Meets: alternative 4 would maintain forest structure and habitat connectivity
	29. Consider retaining forested linkages (with canopy cover greater than 40 percent) that are interconnected via riparian areas and ridge top saddles during project-level analysis.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.
	30. If fishers are detected outside the southern Sierra fisher conservation area, evaluate habitat conditions and implement appropriate mitigation measures to retain suitable habitat within the estimated home range. Institute project-level surveys over the appropriate area, as determined by an interdisciplinary team.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives.
	32. Detection of a wolverine or Sierra Nevada red fox will be validated by a forest carnivore specialist. When verified sightings occur, conduct an analysis to determine if activities within 5 miles of the detection have a potential to affect the species. If necessary, apply a limited operating period from January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-year period for detections not associated with a den site. Limited operating periods for old forest dependent species apply only to vegetation management activities.	Meets/would meet for all alternatives: No current wolverine detections on Lassen National Forest. OSV activities with respect to SN red fox were analyzed in 2010 and 2011; LOPs were not determined to be necessary.	Meets/would meet for all alternatives: No current wolverine detections on Lassen National Forest. OSV activities with respect to SN red fox were analyzed in 2010 and 2011; LOPs were not determined to be necessary.	Meets/would meet for all alternatives: No current wolverine detections on Lassen National Forest. OSV activities with respect to SN red fox were analyzed in 2010 and 2011; LOPs were not determined to be necessary.	Meets/would meet for all alternatives: No current wolverine detections on Lassen National Forest. OSV activities with respect to SN red fox were analyzed in 2010 and 2011; LOPs were not determined to be necessary.

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest-wide Standards and Guidelines (continued)	69. Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Unless otherwise restricted by current forest plans or other specific area standards and guidelines, cross-country travel by over-snow vehicles would continue.	Meets	Would meet	Would meet	Would meet
	75. For California spotted owl PACs: Maintain a limited operating period (LOP), prohibiting vegetation treatments within approximately ¼ mile of the activity center during the breeding season (March 1 through August 31), unless surveys confirm that California spotted owls are not nesting.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives
	76. For northern goshawk PACs: Maintain a limited operating period (LOP), prohibiting vegetation treatments within approximately ¼ mile of the nest site during the breeding season (February 15 through September 15) unless surveys confirm that northern goshawks are not nesting.	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No vegetation management is proposed under any of the alternatives
	77. The [CSO or NGO] LOP may be waived for vegetation treatments of limited scope and duration, when a biological evaluation determines that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. Where a biological evaluation concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the LOP buffer distance may be modified.	NA	NA	NA	NA

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest-wide Standards and Guidelines (continued)	82. Mitigate impacts where there is documented evidence of disturbance to the [CSO or NGO] nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.	Meets: Biologists on Lassen National Forest monitored CSO and NGO PACs relative to their proximity, or sensitivity to designated OSV routes. No relationship was apparent between a PAC's distance from a snow park and whether it has been recently occupied.	Would meet: See alternative 1	Would meet: See alternative 1	Would meet: See alternative 1
	83. Apply a limited operating period, prohibiting vegetation treatments and road construction within ¼ mile of an active great gray owl nest stand, during the nesting period (typically March 1 to August 15).	Meets/would meet for all alternatives: No known GGO nests and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known GGO nests and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known GGO nests and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known GGO nests and no vegetation management is proposed under any of the alternatives
	85. Protect fisher den site buffers from disturbance with a limited operating period (LOP) from March 1 through June 30 for vegetation treatments as long as habitat remains suitable or until another Regionally-approved management strategy is implemented. The LOP may be waived for individual projects of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location.	Meets/would meet for all alternatives: No known fisher den sites and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known fisher den sites and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known fisher den sites and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known fisher den sites and no vegetation management is proposed under any of the alternatives

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest-wide Standards and Guidelines (continued)	87 and 89. Mitigate impacts where there is documented evidence of disturbance to the [fisher or marten] den site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.	Meets/would meet for all alternatives: No known fisher or marten den sites	Meets/would meet for all alternatives: No known fisher or marten den sites	Meets/would meet for all alternatives: No known fisher or marten den sites	Meets/would meet for all alternatives: No known fisher or marten den sites
	88. Protect marten den site buffers from disturbance from vegetation treatments with a limited operating period (LOP) from May 1 through July 31 as long as habitat remains suitable or until another Regionally approved management strategy is implemented. The LOP may be waived for individual projects of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location. Limited operating periods for old forest dependent species apply only to vegetation management activities.	Meets/would meet for all alternatives: No known marten den sites and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known marten den sites and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known marten den sites and no vegetation management is proposed under any of the alternatives	Meets/would meet for all alternatives: No known marten den sites and no vegetation management is proposed under any of the alternatives
Federal Law					
Endangered Species Act	It is Forest Service policy to analyze impacts to TE species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of critical habitat for these species.	Meets	Would meet	Would meet	Would meet
Bald Eagle Protection Act	Prohibits, except under certain specified conditions, the taking (pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb ³⁸), possession and commerce of such birds	Meets: Is not resulting in the taking of bald eagles	Would Meet: Would not result in the taking of bald eagles	Would Meet: Would not result in the taking of bald eagles	Would Meet: Would not result in the taking of bald eagles

Type	Direction	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Forest Service Manual (2670)					
	2670.22 – Objectives for Sensitive Species: Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.	Meets for all species	Would meet for all species	Would meet for all species	Would meet for all species
	2670.32 – Policy for Sensitive Species: Review programs and activities as part of the National Environmental Policy Act of 1969 process through a biological evaluation, to determine their potential effect on sensitive species. Avoid or minimize impacts to species whose viability has been identified as a concern. Analyze, if impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.	Meets for all species	Would meet for all species	Would meet for all species	Would meet for all species
	2672.4 – Biological Evaluations: Review all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on endangered, threatened, proposed, or 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.	Meets	Meets	Meets	Meets
	2672.41 – Objectives of the Biological Evaluation:	Meets	Meets	Meets	Meets
	2672.42 – Standards for Biological Evaluations	Meets	Meets	Meets	Meets

³⁸ Disturb means to agitate or bother a bald or golden eagle to a degree that causes, based on the best scientific information available, 1) injury, to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Management Indicator Species

This section summarizes findings from the project Management Indicator Species Report (see appendix H). MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project include aquatic invertebrates, fox sparrow, yellow warbler, Pacific chorus frog, hairy woodpecker, and black-backed woodpecker (table 125). MIS whose habitat would be either directly or indirectly affected by the project include mule deer, mountain quail, blue grouse, and late seral closed canopy species (California spotted owl, Pacific marten, and northern flying squirrel). To summarize, the project alternatives would cause minimal change in mule deer, mountain quail, blue grouse, California spotted owl, marten, or northern flying squirrel populations, trends, or habitats they are associated with.

Table 125. Summary of effects of Lassen over-snow vehicle use designation project on management indicator species

Habitat or Ecosystem Component	Sierra Nevada Forests Management Indicator Species Scientific Name	Alt 1 - MIS Habitat in OSV Prohibited areas	Alt 2 - MIS Habitat in OSV Prohibited areas	Alt 3 - MIS Habitat in OSV Prohibited areas	Alt 4 - MIS Habitat in OSV Prohibited areas	Summary
Riverine & Lacustrine	Aquatic macroinvertebrates	Habitat is in or adjacent to project area, but would not be either directly or indirectly affected under any of the alternatives.				Won't exceed any critical thresholds. See aquatics and hydrology report.
Shrubland (west-slope chaparral types)	Fox sparrow (<i>Passerella iliaca</i>)	Habitat is in or adjacent to project area, but would not be either directly or indirectly affected under any of the alternatives.				
Oak-associated Hardwood & Hardwood/conifer (54,653 acres)	Mule deer (<i>Odocoileus hemionus</i>)	27,550 ac (50.4%)	37,517 ac (68.6%)	43,139 ac (78.9%)	27,593 ac (50.4%)	The project alternatives would cause minimal change in mule deer populations, trends, or the montane hardwood/conifer habitat associated with mule deer. The proposed project amounts to a maximum of nearly 29% improvement within the Lassen OSV Project Area (alternative 3) by prohibiting off-trail OSV use in areas below 3,500 feet. Given the ubiquity of mule deer MIS habitat across the bioregion, this small change at the project level would not alter the bioregional trend in the habitat, nor would it lead to a change in the population or distribution of mule deer across the Sierra Nevada bioregion.
Riparian	Yellow warbler (<i>Dendroica petechial</i>)	Habitat is in or adjacent to project area, but would not be either directly or indirectly affected under any of the alternatives.				

Habitat or Ecosystem Component	Sierra Nevada Forests Management Indicator Species Scientific Name	Alt 1 - MIS Habitat in OSV Prohibited areas	Alt 2 - MIS Habitat in OSV Prohibited areas	Alt 3 - MIS Habitat in OSV Prohibited areas	Alt 4 - MIS Habitat in OSV Prohibited areas	Summary
Wet Meadow	Pacific tree (chorus) frog (<i>Pseudacris regilla</i>)	Habitat is in or adjacent to project area, but would not be either directly or indirectly affected under any of the alternatives.				Won't exceed any critical thresholds. See aquatics and hydrology report.
Early Seral Coniferous Forest (73,184 acres)	Mountain quail (<i>Oreortyx pictus</i>)	3,329 ac (4.5%)	4,687 ac (6.4%)	8,786 ac (12%)	3,603 ac (4.9%)	As a result of the action alternatives, there would minimal expected change in trends for mountain quail or the early seral and mid-seral conifer habitat component. The project level changes between alternatives represent an improvement by increasing the areas where OSV use is prohibited within the ecosystem component. However, those improvements are small (up to 7.5% improvement within early seral habitat and up to 12.8% improvement within mid-seral habitat) when compared to the existing condition (alternative 1) with alternative 3 being the most improved. Given the ubiquity of this ecosystem component across the bioregion, this small change at the project level would not alter the stable bioregional trend in the habitat component, nor would it lead to a change in the population or distribution of mountain quail across the Sierra Nevada bioregion.
Mid Seral Coniferous Forest (535,040 acres)	Mountain quail (<i>Oreortyx pictus</i>)	38,154 ac (5.2%)	49,069 ac (9.2%)	96,547 ac (18%)	41,886 ac (7.8%)	

Habitat or Ecosystem Component	Sierra Nevada Forests Management Indicator Species Scientific Name	Alt 1 - MIS Habitat in OSV Prohibited areas	Alt 2 - MIS Habitat in OSV Prohibited areas	Alt 3 - MIS Habitat in OSV Prohibited areas	Alt 4 - MIS Habitat in OSV Prohibited areas	Summary
Late Seral Open Canopy Coniferous Forest (16,020 acres)	Sooty (blue) grouse (<i>Dendragapus obscurus</i>)	3,666 ac (22.8%)	3,911 ac (24.4%)	5,361 ac (33.4%)	3,716 ac (23.2%)	As a result of the action alternatives, there would minimal expected change in populations or population trends for sooty grouse, nor to the late-seral open canopy ecosystem component with which they are associated. The current condition in the project area indicates that OSV use may be occurring in approximately 77% of the ecosystem component. In comparison to the current condition (Alt. 1), alternatives 2 and 4 represents no change in OSV use as it relates to this MIS. Alternative 3 indicates a small improvement over the current condition by increasing the acreage where OSV use is prohibited. Given the ubiquity of this ecosystem component across the bioregion, the small effects at the project level would not alter the bioregional trend in the ecosystem component, nor would it lead to a change in the distribution or population of sooty grouse across the project area or the Sierra Nevada bioregion

Habitat or Ecosystem Component	Sierra Nevada Forests Management Indicator Species Scientific Name	Alt 1 - MIS Habitat in OSV Prohibited areas	Alt 2 - MIS Habitat in OSV Prohibited areas	Alt 3 - MIS Habitat in OSV Prohibited areas	Alt 4 - MIS Habitat in OSV Prohibited areas	Summary
Late Seral Closed Canopy Coniferous Forest (80,938 acres)	California spotted owl Marten Northern flying Squirrel (<i>Glaucomys sabrinus</i>)	11,257 ac (14%)	14,459 ac (17.8%)	18,381 ac (22.7%)	11,801 ac (14.5%)	As a result of the action alternatives, there would minimal expected change in populations or population trends for California spotted owls, Pacific marten, or northern flying squirrels, nor to the late-seral closed canopy habitat component with which they are associated. The current condition in the project area indicates that OSV use may be occurring in approximately 87.8% of the habitat component. However, due to the dense forested stands that make up this habitat component, most areas are expected to experience low OSV use except along existing roads and trails. Considering that vegetation management (tree removal or forest management) is not a part of the proposal, the complex nature of this habitat type is expected to remain intact and unaffected. Alternatives 2, 3 and 4 indicate an improvement over the current condition ranging between 0.5% (alt. 4) to 8.7% (alt. 3) by increasing the acreage where OSV use is prohibited. Given the small effects at the project level, the project would not alter the bioregional trend in the habitat component, nor would it lead to a change in the distribution of California spotted owls, Pacific marten, or northern flying squirrels across the Sierra Nevada bioregion.
Snags in Green Forest	Hairy woodpecker (<i>Picoides villosus</i>)	Habitat is in or adjacent to project area, but would not be either directly or indirectly affected under any of the alternatives.				
Snags in Burned Forest	Black-backed woodpecker (<i>Picoides arcticus</i>)	Habitat is in or adjacent to project area, but would not be either directly or indirectly affected under any of the alternatives.				

Migratory Landbirds

This section summarizes findings from the project Migratory Landbirds Report (appendix H in volume II of this FEIS). Effects to various habitats would be minimal to none considering that forested cover is not modified. Similarly, OSV use is concentrated between December 26 and March 31, which predominately avoids overlap with the active breeding season for most migratory bird species. The Lassen Over-snow Vehicle Use Designation project would not cause adverse effects (BA), would not cause a trend toward a loss of viability (BE), nor would it degrade various MIS habitats to a level that affects trends in the Sierra Nevada bioregion. In addition, potential impacts to migratory species are minimized through the adherence of LRMP Standards and Guidelines for snags/down woody debris, avoidance of streamside management zones, and no degradation in riparian areas and wetlands.

The Lassen OSV Project would have minimal impacts to individual migratory birds and would not adversely affect migratory landbird conservation. This finding is based on the results of analysis conducted in the BA, BE, and MIS reports, and that adherence to LRMP standards are incorporated into project design which in turn will maintain habitat diversity. The project meets the intent of the Migratory Landbird MOU.

Survey and Manage Species

This section summarizes findings from the project Survey and Manage Species report (appendix I in volume II of this FEIS). Currently, only one species requiring pre-disturbance surveys, if habitat-disturbing activities are suspected, has suitable habitat within the Lassen National Forest: great gray owl. The 2001 ROD requires specific mitigation measures for the great gray owl, within the range of the northern spotted: provide a no-harvest buffer of 300 feet around meadows and natural openings and establish one-quarter-mile protection zones around known nest sites. The 2001 ROD provides direction to perform equivalent effort (project level) field surveys for all Category B Survey and Manage species. There are no category B terrestrial wildlife species within the Lassen National Forest.

None of the alternatives under consideration as part of the Lassen Over-snow Vehicle Designation project would physically modify structure or composition of great gray owl habitat and, therefore, the mitigation measures in the 2001 ROD for the great gray owl, within the range of the northern spotted owl would not apply. In addition, OSV use and related activities are an ongoing use on the Lassen National Forest.

Although the potential for noise-based disturbance to individuals within high-reproductive habitat ranges from 34 to 37 percent under all of the alternatives, great gray owls have not been confirmed on the Lassen National Forest. In the event that great gray owls are found on the Forest, the potential for OSV-related noise-based disturbance would overlap with only the early part of the March 1 through August 15 great gray owl breeding season, and nest sites with potential to be impacted would be monitored to determine whether or not disturbance is occurring and if changes in management, including a limited operating period around nest sites, are necessary, thereby minimizing impacts to great gray owl. In addition, due to their nocturnal behavior, great gray owls, if present, would be expected to have little interaction with snowmobiles or snow grooming equipment resulting in very little potential for direct effects from snowmobiles or grooming equipment.

Impacts on Fisheries and Aquatic Resources

Introduction

OSV use has the potential to impact aquatic species and their habitat through chemical contamination, ground surface disturbance, runoff timing, or through altering stream side vegetation. The Forest Service adheres to a variety of laws, regulations and policy that provide guidelines and standards for managing OSV impacts on the Lassen National Forest. Direct, indirect, and cumulative effects of OSV use on aquatic species and their habitat from implementation of this plan, and specific actions identified in the alternatives, will be analyzed.

This section will describe the area affected by the alternatives and existing resource conditions within watersheds where aquatic species and their habitat overlap with OSV use. Hydrology and aquatic resource measurement indicators are used to describe the existing conditions for watersheds within the analysis area and for analysis to compare, quantify, and describe how each alternative addresses resource concerns as they pertain to aquatic resources. The analysis includes all aquatic resources that could be affected by OSVs. This includes perennial and seasonal streams, lakes, ponds, meadows, and springs.

Aquatic Species Biological Evaluation/Biological Assessment

Because OSV use and snow trail grooming has the potential to affect some aquatic species and their habitat, this analysis will evaluate the direct, indirect, and cumulative effects of the alternatives on aquatic species and their habitat, including Threatened, Endangered, Proposed or Sensitive species (TEPS) that could result from the proposed actions.

The main body of this section contains a Biological Evaluation/Biological Assessment to evaluate and disclose effects of the proposed action and alternatives on Federal threatened, endangered, proposed, or candidate aquatic species, and Forest Service Region 5 sensitive species. Collectively, these aquatic species are referred to as TEPS.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

The Lassen National Forest Land and Resource Management Plan (LRMP) (USDA Forest Service 1993) provides direction specific to management of fish, water and riparian areas, and is found as goals, objectives, and standards and guidelines in Chapter 4 of the Lassen National Forest LRMP as well as in the Northwest Forest Plan and Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001b), both of which include aquatic conservation strategies (including a long-term strategy in the Sierra Nevada Forest Plan Amendment for management of anadromous fishes on the Lassen National Forest). Aquatic Conservation Strategies are found in their entirety in each of the aforementioned amendments to the LRMP.

Endangered Species Act

The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE) species, or result in the destruction or adverse modification of critical habitat for these species. Section 7 of the Endangered Species Act, as amended, requires the responsible federal agency to consult the U.S.

Department of Interior Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of critical habitat for these species. This assessment is documented in a Biological Assessment.

Magnuson–Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a federal fisheries management plan. The MSA requires federal agencies to consult with the National Marine Fisheries Service on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (MSA '305(b)(2)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA '3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity covers a species' full life cycle (50 CFR §600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR §600.810).

EFH for the Pacific coast salmon fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. To achieve that level of production, EFH must include all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho, and California. In the estuarine and marine areas, salmon EFH extends from the near shore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception. Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the Pacific Fishery Management Council), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years).

Essential fish habitat determinations can be either “May Adversely Affect” (MAA) or “Not Adversely Affect” (NAA). EFH is the same area as Designated Critical Habitat for species discussed in the aquatics report and is used interchangeably in the analysis.

Forest Service Manual and Handbooks (FSM/H 2670)

Forest Service Sensitive species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on national forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE).

Forest Service Manual 2670.32 (USDA Forest Service 2005) directs the Forest to avoid or minimize impacts to species whose viability has been identified as a concern, and therefore listed as sensitive by the Regional Forester. If impacts cannot be avoided then the Forest must analyze the significance of the potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. Impacts may be allowed but the decision must not result in a trend toward federal listing.

Forest Service Manual 2670.22 (USDA Forest Service 2005) directs national forests to “maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.” To comply with this direction, Forests are encouraged to track and evaluate effects to additional species that may be of concern even though they are not currently listed as sensitive. Such plant species are referred to as Species of Interest or watch list species.

Sierra Nevada Forest Plan Amendment

The Sierra Nevada Forest Plan Amendment (2001b) amended each of the forest plans in the Sierra Nevada and provides regional direction to restore aquatic, riparian, and meadow ecosystems and provide for the viability of native plant and animal species associated with these ecosystems. This includes mountain yellow-legged frogs, Yosemite toads, and their habitats. This regional direction is represented by an array of features that, in their entirety, constitute an aquatic management strategy (AMS) for the Sierra Nevada. The fundamental principle of the AMS is to retain, restore, and protect the processes and landforms that provide habitat for aquatic and riparian-dependent organisms. Accomplishment of these objectives are achieved through a combination of tactics such as Standards and Guidelines (S&Gs) and policies that are intended to work collectively, and include a suite of interrelated actions that work together to manage and conserve aquatic habitats.

Riparian Conservation Areas (RCA): Activity-Related Standards and Guidelines

Where a proposed project encompasses an RCA or a Critical Aquatic Refuge (CAR), conduct a site-specific project area analysis to determine the appropriate level of management within the RCA (or CAR). Determine the type and level of allowable management activities by assessing how proposed activities measure against the Riparian Conservation Objectives (RCO) and their associated standards and guidelines. Areas included in RCAs are: 300 feet on each side of perennial streams, 150 feet on each side of intermittent and ephemeral streams, and 300 feet from lakes, meadow, bogs, fens, wetlands, vernal pools, and springs.

Issues Addressed in This Analysis

To protect aquatic resources, it is important to ensure that OSVs are operated on adequate snow depths. As an integral part of the development and analysis of the alternatives, the minimization criteria at 36 CFR §212.55(b) described below, was used to compare and contrast alternatives as to how they would minimize damage to aquatic resources.

§ 212.55(b) Criteria for designation of roads, trails, and areas:

(b) Specific criteria for designation of trails and areas in National Forest System trails and areas on National Forest System lands, the responsible official shall consider effects on the following, with the objective of minimizing:

- (1) Damage to soil, watershed, vegetation, and other forest resources;
- (2) Harassment of wildlife and significant disruption of wildlife habitats;

(3) Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands; and

(4) Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands.

In addition, the responsible official shall consider:

(5) Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.

Issues

Designating roads, trails and areas for OSV use has the potential to impact aquatic wildlife through direct/indirect or cumulative disturbance to individuals and direct/indirect or cumulative disturbance or impacts to aquatic wildlife habitats.

OSV use also has the potential for releasing burned and unburned fuel and lubricants into the environment. These potential impacts can then indirectly result in adverse impacts to water quality and alter snowmelt patterns.

Snowmobiles when operated cross-country instead of on designated trails have the potential for more widespread impacts due to the potential for ground disturbance (similar in nature to summer motorized use if there is inadequate snow cover). These potential effects are highly dependent on location, particularly areas of thin snow cover, and the amount and timing of use. Wet meadows, springs, seeps, fens, and bogs are particularly sensitive to disruption.

Resource Indicators and Measures

Table 126. Aquatic species resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)
Aquatic species	Species presence	Occurrence of TEPS species within areas designated for OSV use. Occurrence of TEPS species in proximity to routes designated for OSV use.
	Minimum Snow Depth for OSV Use on Designated Trails	Minimum snow depths on trails can be evaluated for effectiveness for protecting the trail surface and potential for sediment delivery to waterways
Aquatic habitat	Minimum Snow Depth for Cross-country OSV Use	Minimum snow depths for cross-country OSV travel can be evaluated for effectiveness for protecting aquatic habitats
Aquatic habitat	*Consistency with Riparian Conservation Objectives 1, 2, 4, 5, and 6 (analyzed in the hydrology report)	Evaluation of the effects to RCAs, water quality and beneficial uses of water

*Note: The Sierra Nevada Forest Plan Amendment requires that Riparian Conservation Objectives (RCO) analyses be conducted during environmental analyses for new proposed management activities within CAR's and RCA's (Standard and Guideline 92). There are no additional routes proposed for addition to the National Forest Transportation System within CARs in the analysis area. Consequently, consistency with the RCOs is an indicator to ensure that goals of Aquatic Management Strategy are met (USDA Forest Service 2000: 32). The RCO Analysis is in appendix F of the hydrology report.

Methodology and Information Sources

This analysis uses relevant Geographic Information System (GIS) data layers from the Lassen National Forest. The GIS layers of proposed OSV designations and groomed trails were overlain with the aquatic resource (i.e., species distribution, critical habitat, surveys) layers to identify areas of potential effects.

This biological evaluation/biological assessment reviews the Proposed Action and alternatives in sufficient detail to determine the level of effect that would occur to federally listed aquatic and Region 5 sensitive species. One of four possible determinations is chosen based on the available literature, a thorough analysis of the potential effects of the project, and the professional judgment of the biologist who completed the evaluation. The four possible determinations (from FSM 2672.42) are:

1. “No impact” – where no impact is expected;
2. “Beneficial impact” – where impacts are expected to be beneficial;
3. “May adversely impact individuals, but is not likely to result in a trend toward federal listing or loss of viability in the planning area” – where impacts are expected to be immeasurable or extremely unlikely; and
4. “May affect individuals, and is likely to result in a trend toward Federal listing or loss of viability in the planning area” – where impacts are expected to be detrimental and substantial.

Similar categories for federally listed threatened and endangered species are:

- No effect
- Beneficial effect
- May affect, not likely to adversely affect
- May affect, likely to adversely affect

Incomplete and Unavailable Information

There is little research and information available regarding the responses of each aquatic species from OSV uses, including indirect effects from snow compaction and vehicle emissions during the winter.

No field observations, site-specific aquatic surveys, or monitoring related to OSV use and their potential effects to aquatic species was done to support this analysis. Lassen National Forest recreation staff monitor snowmobile and other winter recreation use on the forest, but no water quality sampling or assessments on effects of OSV use on aquatic species have been conducted. Assessments of impacts of snowmobiles were primarily based on current scientific literature and professional judgement.

Spatial and Temporal Context for Effects Analysis

The project area boundary serves as the analysis boundary for direct, indirect, and cumulative effects. Effects to aquatic species or their habitat would be expected to have occurred or become evident within one or two years of disturbance and this constitutes the short term. Effects that linger beyond 2 years are considered long-term effects. Long-term effects beyond 2 years become increasingly difficult to predict due to unknown interactions and the many environmental variables with numerous possible outcomes.

Direct/Indirect Effects Boundaries

The spatial boundary for analyzing the direct and indirect effects to aquatic resources is the project area boundary, because all expected effects relevant to this resource would occur and remain within this area.

Cumulative Effects Boundaries

Because effects from the proposed activities would interact with effects from other ongoing or future projects only within the project area boundary, the cumulative effects boundary is also the project area boundary. The project area boundary is the National Forest boundary for the Lassen National Forest.

Assumptions specific to the aquatic resources analysis:

- Aquatic species are unlikely to be directly affected by authorized OSV use (with the specified snow depth requirements).
- Indirect effects, such as those possibly resulting from snow compaction and vehicle emissions, are likely to be concentrated in the corridors along designated OSV trails (groomed or ungroomed). Therefore, an area within 100 feet of designated OSV trails is reasonably foreseeable to be affected by snow compaction, emissions, or other contamination. Areas open to OSV use outside these concentrated use corridors are much less likely to experience measurable indirect effects.
- Only authorized OSV uses will be analyzed. Concerns arising from unauthorized uses will be addressed as law enforcement issues and may prompt corrective actions.
- Future aquatic resource-related monitoring may identify unexpected types or levels of impacts to aquatic resources, and may prompt corrective actions as warranted.

Affected Environment

Existing Condition

Threatened, Endangered, and Proposed Aquatics Species

Official species lists for this project were obtained on September 29, 2015, from the Klamath Falls, Sacramento, Yreka, and Nevada Field Offices of the United States Department of the Interior, Fish and Wildlife Service (USFWS 2015a, USFWS 2015b, USFWS 2015c, USFWS 2015d). The lists identify aquatic species to consider because they may be present within the general area of the Lassen National Forest:

Species Considered in the Analysis

Species or critical habitat that may occur in the action area or be affected by activities associated with the proposed action and alternatives were reviewed. The species and critical habitat in table 127 were evaluated for potential presence in the action area. Species which are not known or suspected to occur in areas that may be open to OSV use are not carried forward into the effects analysis.

Table 127. Threatened, endangered, proposed, and sensitive aquatic species considered

Species	Status	Known or Potential Occurrence	Finding/Rationale
Amphibians			
California red-legged frog (<i>Rana draytonii</i>)	Threatened	No Potential Occurrence	No Effect. No Designated Critical Habitat on Lassen National Forest
Oregon spotted frog (<i>Rana pretiosa</i>)	Threatened	No Potential Occurrence	No Effect. Species is not suspected to occur on Lassen National Forest. Historically, in California this species ranged in extreme northeast California, where it was known from only a few scattered localities including Pine Creek, S. Fork Pitt River near Alturas, Warner Mtns., and the southwest side of Lower Klamath Lake.
Sierra Nevada yellow-legged frog (<i>Rana sierrae</i>)	Endangered	Potential Occurrence	Historical occurrence but no known extant populations on the Lassen National Forest. Currently classified under 'utilization unknown' FWS suitable habitat category therefore presence is assumed.
Fishes			
Chinook salmon (<i>Oncorhynchus tshawytscha</i>) Central Valley Spring Run ESU	Threatened	Potential Occurrence	Habitat currently located in the southwest portion within Lassen National Forest administrative boundaries.
Coho salmon (<i>Oncorhynchus (=salmo) kisutch</i>)	Threatened	No Potential Occurrence	No Effect. Species and habitat does not exist on Lassen National Forest.
Delta smelt (<i>Hypomesus transpacificus</i>)	Threatened	No Potential Occurrence	No Effect. The geographic range of the Delta smelt (USDI FWS 1993) is outside the project area. ¹
Longfin, San Francisco Bay Delta Population smelt (<i>Spirinchus thaleichthys</i>)	Candidate	No Potential Occurrence	No Effect. Species and habitat does not exist on Lassen National Forest.
Central Valley steelhead (<i>Oncorhynchus (=salmo) mykiss</i>)	Threatened	Potential Occurrence	Habitat currently located in the southwest portion within Lassen National Forest administrative boundaries.
Aquatic Invertebrates			
Conservancy fairy shrimp (<i>Branchinecta conservatio</i>)	Endangered	No Potential Occurrence	No Effect. Forest is outside the elevational range of this species, and specific habitat (Central Valley vernal pools) does not exist within its boundaries. ²
Shasta crayfish (<i>Pacifastacus fortis</i>)	Endangered	No Potential Occurrence	No Effect. Project area is located outside range of species. ³
Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>)	Threatened	No Potential Occurrence	No Effect. Forest is outside the elevational range of this species, and specific habitat (Central Valley vernal pools) does not exist within its boundaries. ⁴
Vernal pool tadpole shrimp (<i>Lepidurus packardii</i>)	Endangered	No Potential Occurrence	No Effect. Forest is outside the elevational range of this species, and specific habitat (Central Valley vernal pools) does not exist within its boundaries. ⁵
CRITICAL HABITATS WITHIN THE PROJECT AREA			
Species	Status	Occurrence	Analysis
Sierra Nevada yellow-legged frog (<i>Rana sierrae</i>)	Proposed Critical Habitat (PCH)	Known Occurrence	Yes, PCH

Species	Status	Known or Potential Occurrence	Finding/Rationale
Chinook salmon (<i>Oncorhynchus tshawytscha</i>) Central Valley Spring Run	Final Designated	Known Occurrence	Yes. There is Designated Critical Habitat (DCH) for this species and Essential Fish Habitat (EFH) designated for Chinook salmon on Lassen National Forest. ⁶
Steelhead (<i>Oncorhynchus (=salmo) mykiss</i>)	Final Designated	Known Occurrence	Yes. There is DCH for this species and Essential Fish Habitat designated for this species on Lassen National Forest.
Forest Sensitive Species			
Species	Status	Occurrence	Analysis
Cascades frog (<i>Rana cascadae</i>)	Sensitive	Known Occurrence	Known presence; considered in analysis.
Black juga (<i>Juga nigrina</i>)	Sensitive	Likely Occurrence	Present within stream located within project boundaries; considered in analysis.

¹ Department of the Interior, Fish and Wildlife Service [USFWS]. 1993. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Delta Smelt. Division of Endangered Species. Adapted from the Federal Register for Friday, March 5, 1993.

² USDI Fish and Wildlife Service. 2007. Conservancy Fairy Shrimp (*Branchinecta conservatio*) Five-year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office, Sacramento, CA. 32 pp.

³ U.S. Department of Agriculture, Forest Service, Lassen National Forest. 2010. Existing Environment for Federally-listed (non-anadromous) and Forest Service Sensitive Aquatic Species, Part D: Federally-listed (non-anadromous) Aquatic Species. Unpublished internal document. (Version 4.29.10).

⁴ USDI Fish and Wildlife Service. 2007. Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) Five-year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office, Sacramento, CA. 76 pp.

⁵ USDI Fish and Wildlife Service. 2007. Vernal Pool Tadpole Fairy Shrimp (*Lepidurus packardii*) Five-year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office, Sacramento, CA. 50 pp.

⁶http://www.westcoast.fisheries.noaa.gov/publications/gis_maps/maps/salmon_steelhead/critical_habitat/chin/chinook_cvsvr.pdf

Because they are not present and not suspected of occurring within areas currently or proposed for OSV use, the following species would not be affected and are not carried forward into the effects analysis:

Threatened or Endangered

- California red-legged frog (*Rana draytonii*)
- Oregon spotted frog (*Rana pretiosa*)
- Sierra Nevada yellow-legged frog (*Rana sierrae*)
- Coho salmon (*Oncorhynchus kisutch*)
- Delta smelt (*Hypomesus transpacificus*)
- Longfin, San Francisco Bay Delta Population smelt (*Spirinchus thaleichthys*)

Sensitive

- Foothill yellow-legged frog (*Rana boylei*)
- California floater (*Anodonta californiensis*)
- Great Basin Rams-horn (*Helisoma newberryi newberryi*)
- Scalloped Juga (*Juga (Calibasis) acutifilosa*)
- Topaz Juga (*Juga (Calibasis) occata*)
- Montane Peaclam (*Pisidium (Cyclocalyx) ultramontanum*)
- Nugget pebblesnail (*Fluminicola seminalis*)

- Kneecap lanx (*Lanx patelloides*)
- Eagle Lake rainbow trout (*Oncorhynchus mykiss aquilarum*)
- Goose Lake redband trout (*Oncorhynchus mykiss pop. 6*)
- Hardhead (*Mylopharodon conocephalus*)

Listed Species and Critical Habitat Information

Chinook salmon (*Oncorhynchus tshawytscha*) Central Valley Spring Run ESU and Central Valley Steelhead (*Oncorhynchus (=salmo) mykiss*)

Affected Environment

In 1999, the National Marine Fisheries Service listed the Central Valley spring-run Chinook salmon evolutionarily significant unit (ESU) as threatened under the Federal Endangered Species Act (NMFS 1999). The Central Valley ESU includes all naturally spawned populations in the Sacramento River, tributaries of the Sacramento River, and the Feather River (DWR 2007). In 2005, the National Marine Fisheries Service published a final listing determination for Central Valley spring-run that added Feather River Hatchery spring-run to the designation (DWR 2007). In 2005, the National Marine Fisheries Service published the final designation of critical habitat, which includes the Sacramento, lower Feather, and Yuba Rivers; and Beegum, Battle, Clear, Cottonwood, Antelope, Mill, Deer, Butte, and Big Chico Creeks (DWR 2007).

Of five fourth-field sub-basins occupied by these two federally listed species, only two are occupied by the species within the Lassen National Forest boundary: Sacramento-Thomes-Elder-Mill (containing Mill and Antelope Creeks) and Sacramento-Deer (containing Deer Creek). Total miles of anadromous habitat present within the boundary of the Lassen National Forest are estimated at 25 miles for Deer Creek, 43 miles for Mill Creek, and 7 miles for Antelope Creek.

Currently, the California Department of Fish and Game (CDFG) is working with Pacific Gas and Electric (PG&E) and other interested parties to restore and enhance anadromous fish passage around several water diversion dams located on both forks of Battle Creek. As of November 2011, fish passage work has been mostly completed on all water diversions found on North Fork Battle Creek, with the upper limit to anadromy now located at a natural fish barrier located approximately 13 miles downstream of the Lassen National Forest boundary and 2 miles upstream of the confluence of Bailey and North Fork Battle creeks. Work is currently underway on fish passage enhancement around three diversion dams located on South Fork Battle Creek. It is anticipated that spring-run Chinook salmon will have access to habitat upstream of these dams with upstream migration of spring-run Chinook salmon anticipated to come within 2 to 3 miles of NFS lands in the vicinity of Angel Falls, a natural barrier to anadromy. Current utilization of habitat downstream of Angel Falls by steelhead is unknown. However, like with spring-run Chinook salmon, completion of restoration efforts is expected to improve access for steelhead to habitat on the South Fork upstream to Angel Falls as well (Mayes personal comm. 2016).

Designated Critical Habitat for both species is identified within the Lassen National Forest boundary in Antelope, Mill, and Deer Creeks. In the Panther Creek drainage (Upper South Fork Battle Creek subwatershed), critical habitat has also been designated for steelhead. The latter DCH within the project area, however, is associated with a small, headwater stream/shallow intermittent lake (Panther Creek/Dry Lake) which lacks suitable habitat for steelhead. Specifically, and Dry Lake in particular, there is no stream habitat that provides any of the following three primary constituent elements of DCH: spawning, rearing, or migration habitat. Additionally, the species is not in close proximity to the Lassen National Forest boundary; the upper extent of habitat known to be currently occupied by steelhead is more than 10 miles downstream of the Lassen National Forest boundary in the South Fork of Battle Creek.

Therefore, due to the lack of primary constituent habitat elements in the Panther Creek drainage DCH, and the lack of proximity to this DCH, the primary area of analysis for the two listed anadromous fish considers the aquatic features (perennial streams) designated as critical habitat that are occupied by the species and, their associated RCAs on Lassen National Forest lands within the project area in the Antelope, Mill, and Deer Creek DCHs.

Sierra Nevada yellow-legged frog (*Rana sierrae*)

Affected Environment

The project area supports potential suitable habitat for the Sierra Nevada yellow-legged frog (*Rana sierrae*), a species federally listed as endangered on April 29, 2014, under the Endangered Species Act of 1973, as amended (USFWS 2014). The Sierra Nevada yellow-legged frog is endemic to the northern and central Sierra Nevada and adjacent Nevada ranging from north of the Feather River (including the Plumas and southern edge of the Lassen National Forests) south to the Monarch Divide on the west side of the Sierra Nevada crest (Sierra National Forest) and near Independence Creek on the east side of the Sierra Nevada crest (Inyo National Forest).

Suitable habitat typically occurs above 4,500 feet in elevation, but in some areas, including the west side of the Plumas National Forest, it is thought to occur as low as 3,500 feet in elevation. Suitable habitat includes permanent water bodies or those hydrologically connected with permanent water such as wet meadows, lakes, streams, rivers, tarns, perennial creeks, permanent plunge pools within intermittent creeks, and pools, such as a body of impounded water contained above a natural dam. Suitable habitat includes adjacent areas, up to a distance of 82 feet. When water bodies occur within 984 feet of one another, as is typical of some high mountain lake habitat, suitable habitat for dispersal and movement includes the overland areas between lake shorelines. In mesic areas such as lake and meadow systems, the entire contiguous or proximate areas are suitable habitat for dispersal and foraging.

R. sierrae inhabits a variety of habitats including lakes, ponds, tarns, wet meadows, and streams from near 4,500 feet to 12,000 feet (CDFW 2014; Zweifel 1955; Stebbins 1985; Vredenburg et al. 2005). At lower elevations, particularly in the northern part of their historic range, Sierra Nevada yellow-legged frog are known to be associated with rocky streambed and wet meadows surrounded by coniferous forest (Vredenburg et al 2005; Zweifel 1955; Zeiner et al 1988). *R. sierrae* utilize a variety of different habitats throughout the year for breeding, feeding, and overwintering sites (Matthews and Preisler 2010).

Breeding occurs in the spring, from April to July depending on elevation, as soon as the ice on the lakes, ponds, and streams recedes. Females deposit eggs in clusters attached to vegetation, granite, and under undercut banks (Pope 1999, Vredenburg et al. 2004, Zweifel 1955). Females lay 40 to 300 eggs in a compact cluster. Emergence from the egg occurs after approximately 2 to 3 weeks. Tadpoles often congregate in the warm shallows near shore where they feed on algae. *R. sierrae* tadpoles may overwinter 2 to 3 times before metamorphosing (Zweifel 1955; Vredenburg et al. 2005). Due to their long larval life stage breeding sites must remain a permanent water source year round. After metamorphosis, *R. sierrae* can remain juveniles for up to four years before reaching sexual maturity. *R. sierrae* are long lived with a maximum recorded estimated age of 14 years (Matthews and Miaud 2007).

After breeding, adults may disperse into a larger variety of aquatic habitats (Pope and Matthews 2001). *R. sierrae* often move hundreds of meters between breeding, feeding, and overwintering habitats (Pope and Matthews 2001). They appear to use a restricted set of lakes that provide suitable microhabitats for breeding and overwintering then disperse into a greater number of sites during the summer months for feeding (Matthews and Pope 1999, Matthews and Preisler 2010, Pope and Matthews 2001). Frogs can be found along shallow, rocky shorelines often interspersed with vegetation (Mullally and Cunningham 1956). *R. sierrae* use a variety of cover including vegetation, logs, and partially submerged trees. Similar

to tadpoles, adults and subadults seek areas with warmer water (Bradford 1984). In high elevation habitats, Sierra Nevada yellow-legged frog may spend up to nine months overwintering under ice in lakes and streams. Frogs have been found overwintering in the bottoms of lakes and in protected nearshore microhabitats including deep underwater rock crevices under banks and under ledges (Bradford 1983, Matthews and Pope 1999).

Genetic analyses of the *R. sierrae* indicate that the species is divided into three distinct subpopulations called “clades” (Vredenburg et al. 2007). Clade 1 is in the northwest portion of *R. sierrae* range and occurs on the Lassen and Plumas National Forests. This region is relatively low elevation and contains some of the lowest known *R. sierrae* populations. Environments in this clade are relatively unique for this species because they are predominantly forested. The species commonly inhabits streams in this area, likely because lakes are scarce. Little is known about the ecology of the species in this region including its historic distribution and abundance, where it breeds, and how it uses stream habitats. Only 5 to 6 known populations exist within this clade and all are on the Plumas National Forest.

The Lassen National Forest is the northernmost forest in the Sierra Nevada with documented distribution of *R. sierrae*. Based on historic records from museum collections (Museum of Vertebrate Zoology, University of California at Berkeley; California State University, Chico; California Academy of Sciences, San Francisco) the range of the species has been determined to be limited to certain watersheds on the Almanor Ranger District of the Lassen National Forest (USDA, Forest Service 2010). Considering historic records (HR), recent positive detections (RPD) and/or potential suitable habitat (PSH), there are five fifth-field watersheds considered to represent the range of the species on the Lassen National Forest; Butt Creek (HR), Yellow Creek (PSH), Upper Butte Creek (HR), West Branch Feather River (HR) and Middle North Fork Feather River (RPD).

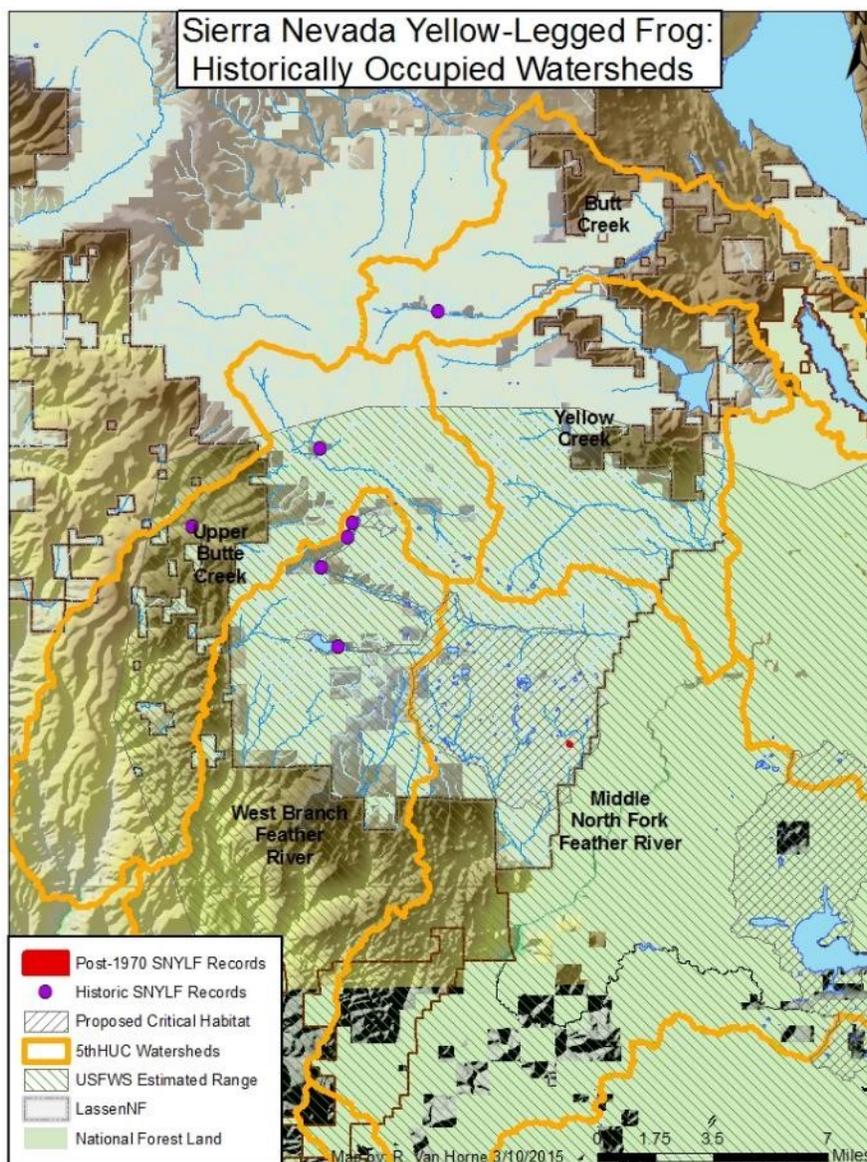


Figure 6. Sierra Nevada yellow-legged frog historically occupied watersheds

No extant populations of *R. sierrae* are currently known to exist on the Lassen National Forest. The only (remnant) population of the species last discovered on the Lassen National Forest was in a remote lake (Oliver) and associated pond in 2005, in the Mill Ranch Creek sixth-field subwatershed. Three subsequent surveys conducted by the California Department of Fish and Wildlife had no positive detections, thus, the population is believed to be extirpated.

Cross-country OSV use has the potential to occur over perennial streams that have the habitat characteristics that could support *R. sierra*.

Some areas contain overlap between critical habitat and the project actions. These areas, therefore, fall within the FWS designated “**utilization unknown**” suitable habitat category because, while the species has not been observed, it does not meet the FWS criteria for “unutilized potential,” meaning three negative detection surveys have not been conducted in the last 10 calendar years where at least one of those surveys occurred during an 80 percent or greater snowpack year.

Cascades frog (*Rana cascadae*) Forest Sensitive

Affected Environment

The Cascades frog is known (historically and/or currently) to utilize habitat above approximately 4,500 feet in elevation in the following 16 sixth-field subwatersheds that encompass, in whole or in part, Lassen National Forest: Headwaters of Hat Creek, Upper Old Cow Creek, Upper SF Battle Creek, Bailey Creek (within Battle Creek system), Upper NF Battle Creek, Upper Mill Creek, Sacramento-Deer, Butte Creek, Bailey Creek (within Feather River system), Louse Creek, Rice Creek, Butt Valley Reservoir, Juniper Lake, Big Kimsheew Creek, Upper West Branch Feather River, and Lower Yellow Creek (refer to maps in the FEIS for general locations of all these subwatersheds).

For subwatersheds where historic information is available (e.g., via voucher specimens), almost all collections have enough information to indicate which sixth-field subwatershed the specimens were associated with. In only one or two subwatersheds is there some uncertainty of the specific collection location; in these circumstances, nearby subwatersheds with potential suitable habitat were included in the analysis (e.g., Coyote Flat). In the Upper Yellow Creek subwatershed, 4,250 feet is presumed to be the approximate lower elevation for this species, based on existing habitat conditions. In the Screwdriver Creek subwatershed, the Cascades frog is known (presently) above approximately 2,500 feet in elevation (EA Engineering 1995; Fellers 1998).

Present occupancy (defined here as more than one individual observed at one time since the 1990s and, with one or more individuals still present) is only known within five sixth-field subwatersheds: Upper Old Cow Creek, Sacramento-Deer, Butte Creek, Juniper Lake, and Screwdriver Creek (Pope 2008). Only two incidental observations of individual Cascades frogs have been made outside known breeding populations; one adult frog was observed in the Sacramento-Deer subwatershed in Alder Creek in 2002 (Roby 2002) and one adult was observed in the Shanghai Creek subwatershed on Butt Creek in 1996 (Brown 2000). Within the Rice Creek subwatershed, two Cascade frogs were also found in Crumbaugh Creek (in Lassen Volcanic National Park) in the early 1990s, but this species has not been found there since 1994 (Fellers et. al. 2008).

Three sixth-field subwatersheds (Shanghai, Coyote Flat and Upper Yellow Creek) are not known historically to have contained the Cascades frog but, for purposes of this analysis, are considered as having potential suitable habitat based on existing habitat, their proximity to adjacent subwatersheds with historical occupancy and/or an incidental observation.

From extensive amphibian surveys conducted on Lassen National Forest (Fellers et al. 2008) it is probable that this species is no longer present in the remaining 10 subwatersheds where it historically occurred (e.g., pre-1970s), as documented from available sources of historical accounts including, but not limited to, Zweifel (1955), Grinnell et al. (1930), various museums (e.g., California State University Chico, Museum of Vertebrate Zoology), Fellers and Drost (1993), and Koo et al. (2004)). According to Fellers et al. (2008), there could be a few populations that went undetected in the surveys conducted, but “it is unlikely that any large *R. cascadae* populations exist in the Lassen area” (the Lassen area referred to is defined as lands within a 50-kilometer radius of Lassen Peak so this excludes the northern area with existing populations within Screwdriver Creek subwatershed). Fellers (ibid) concluded “the small size of, and lack of connectivity between, the current populations of *R. cascadae* in the Lassen area greatly reduces their long-term viability, potentially leading to a genetic bottleneck” (Young and Clarke 2000). The existing Cow Creek population (represented by a minimum of two breedings sites) on private lands off Lassen National Forest, however, “...may represent the largest extant population of *R. cascadae* in the Lassen region...” (Stead and Pope 2007).

The area of effect for the Cascades frog conservatively considers all of the following aquatic features; springs, perennial streams, lakes, ponds, wetlands and fens, and their associated RCAs on Lassen National Forest lands above the elevational range for all 18 subwatersheds listed previously within the project area. Additionally, within the Sacramento-Deer and Butte Creek sixth-field subwatersheds, Carter and Colby/Willow Critical Aquatic Refuges (CARs) are designated for the Cascades frog (USDA Forest Service 2004). Populations are present in both the Carter and Colby/Willow CARs.

Black Juga (*Juga nigrina*)

Affected Environment

The black juga is an aquatic mollusk occupying perennial stream and spring habitat in the Lassen, Tahoe, and perhaps Shasta-Trinity National Forests. This species occurs in the upper Sacramento, McCloud, and Pit River systems (Frest and Johannes, 1995). Brim Box et al. (2005) reported finding 575 individuals at 22 of 113 survey sites on the Lassen National Forest. In general, this species is located within large tributaries and some springs of Hat Creek, Lost Creek, Deer Creek, Domingo Creek, Davis Spring, Soldier Creek, Beaver Creek, Antelope Creek, North Fork Feather River, Gurnsey Creek, and the Pit River. Brim Box et al. (2005) noted that this species is not restricted to a particular area on the Lassen National Forest. Additionally, this species is fairly common within the region where populations currently exist; however, it appears that the species has been extirpated from many historic locations within tributaries to the upper Sacramento River.

Suitable habitat for this species has been identified as perennial streams and springs with prominent channel substrate being comprised of boulders/cobble, gravel, sand, and in some cases mud (Brim Box 2002). Black juga habitat is threatened by excessive sedimentation resulting from various land management activities, including mining, logging, road and railroad grade construction, and grazing. Increased sedimentation may result in smothering of suitable channel substrate, increased stress and mortality, and impairment of egg-laying or survival of eggs and young. Livestock utilization in close proximity to suitable habitat may result in reduced dissolved oxygen levels, and elevated water temperature if removal of riparian vegetation and/or increases in channel width-to-depth ratios occur. Additionally, water diversions can result in reduced spring/stream flow, elevated water temperature, increased sedimentation, and lower dissolved oxygen.

Environmental Consequences

Effects Common to All Alternatives

Because the alternatives are very similar, with the same activities proposed, and the differences would be mainly the spatial extent of OSV use, most of the effects are described in this section. The varying areas of authorized OSV use would result in mostly small differences in degree of potential effects. Therefore, each alternative's effects disclosures will mainly summarize the extent of aquatic resources affected, and provide the basis for determinations. A summary comparison of alternatives will follow, providing the decision-maker a quick reference for evaluating the alternatives along with the other resources that need to be considered.

Direct Effects Introduction

Direct effects are caused by the action and occur at the same time and place. A key difference between OSV use and other types of motor vehicle use is that, when properly operated and managed, OSVs do not make direct contact with soil, water, and ground vegetation, whereas most other types of motor vehicles operate directly on the ground (USDA Forest Service 2014).

Direct impacts to fish and amphibians would be extremely rare as amphibians hibernate during the winter, and OSVs would have to travel through water to collide with fish. Due to the rarity of this occurring, the direct impacts to fish and amphibians are considered **less than significant**.

Indirect Effects Introduction

Indirect effects are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable. Potential indirect impacts include snow compaction and impaired water quality or pollutants entering waterways. Potential indirect effects from snow compaction and pollutants are described below.

Snow Compaction

Snow compaction could indirectly affect aquatic species through delayed snowmelt, affecting the hydrologic regime, and alteration of habitat or riparian vegetation potentially leading to erosion and sediment into waterways.

Widespread snow compaction from cross-country OSV use can potentially affect melt patterns, and in turn, the hydrologic regime. Studies have found delayed snowmelt in areas compacted by snowmobiles versus areas of uncompacted snow (Keddy et al. 1979, Neumann and Merriam 1972). During spring snowmelt, these effects can reduce the ability of the snow to slow runoff. It is unknown how much OSV-related snow compaction would affect runoff rate and timing, but some studies suggest up to a 2-week delay. Because snow compaction from off-trail cross-country use is currently not extensive on a watershed scale, measureable changes in hydrology are not expected (McNamara 2015).

Riparian vegetation important to aquatic species could potentially be affected by snow compaction. Due to snow compaction, early spring growth of some plant species may be retarded or may not occur under an OSV trail; however, the current and proposed OSV trails are underlain by existing roads and trails which are already compacted and/or disturbed and little, if any, additional impacts are expected to the vegetation. Trail grooming on the Lassen National Forest occurs over an existing road and trail network and does not alter landforms or result in significant soil disturbance that would change water flow patterns or quantities of surface water runoff. Trail grooming would not cause substantial impacts to water quality, perennial, intermittent or ephemeral streams, wetlands or other bodies of water (McNamara 2015).

Cross-country OSV use has the potential to affect woody riparian species by the bending and breaking of branches by recreationists running over the branches (Neumann and Merriam, 1972). This is most likely to occur with lower snow depths at the beginning of the winter season, before sufficient snow has accumulated to protect vegetation, and during spring snowmelt. Regenerating timber could also be affected by bending and breaking of leaders with inadequate snow depth. However, both the hydrology report (McNamara 2015) and botany report (Davidson 2015) concluded that vegetation trampling from snowmobiles and potential impacts to riparian resources from OSV use would be considered negligible with adequate snowpack coverage.

Disturbance to soil and vegetation by OSV use is reduced as snowpack depths increase. Damage to soil and low-growing vegetation is much more likely when OSV use occurs under low snow conditions (Greller et al. 1974, Fahey and Wardle 1998). Thus, the minimum snow depth requirements of all alternatives are expected to prevent or minimize damage to soil and vegetation (Davidson 2015). On the Lassen National Forest, OSV travel on snow-free areas is prohibited in the current and proposed scenarios. By not allowing cross-country OSV use when and where there is less than 12 inches snow depth, the Forest Service minimizes the possibility of direct damage to soils and ground vegetation on the Lassen National Forest.

Similarly, the hydrology analysis (McNamara 2015) found that with adequate snow depth, cross-country use of OSVs would have a negligible effect on ground disturbance that could lead to erosion and sedimentation in streams or other water bodies, and a negligible effect on vegetation, especially along streams and other water bodies.

It further states "...off-trail OSV use would be generally dispersed and would not result in high concentration of OSV use on bare soil. Also, travel over bare soil can damage machines so is generally avoided by operators. With adequate minimum snow levels, this plan would result in no more than incidental soil erosion and therefore would not create water quality impacts to streams or water bodies by introducing sediment in water runoff."

These conclusions are generally attributed to the fact that OSV use on the Lassen National Forest is considerably less than Yellowstone National Park where detailed studies were conducted on OSV use and their potential effects to the aquatic environment and hydrologic regime.

The number of snowmobiles that entered Yellowstone in 2003 and 2004 was 47,799 and 22,423 respectively (Arnold and Koel 2007). The estimated seasonal day use of OSV Program trails across the Lassen National Forest is around 10,000 OSVs. These visitations are spread across multiple trailheads and trail systems and do not all occur in the same location. As a result OSV seasonal use levels at any Lassen National Forest trailhead or trail system are considerably less than OSV use that occurred at Yellowstone National Park, and are considered very low. Since Yellowstone OSV use levels studied had **not resulted in impaired water quality**, due to much lower use numbers, it follows that the OSV use in the Project Area from this Plan would not adversely affect water quality of snowmelt.

Snow Compaction Effects Summary

There would be no effects to aquatic species from snow compaction along designated OSV trails because aquatic species are not present. Outside the designated OSV trail corridors, dispersed cross-country OSV travel is much less likely to compact snow with enough intensity and repetition to measurably or predictably affect ground vegetation or the hydrologic regime, and therefore *snow compaction* is not considered further in this analysis as a reasonably foreseeable source of indirect effects to aquatic species.

Pollutants

Emissions from OSVs, particularly two-stroke engines on snowmobiles, release pollutants including ammonium, sulfate, benzene, nitrogen oxides, ozone, carbon dioxide, carbon monoxide, aldehydes, polycyclic aromatic hydrocarbons and other toxic compounds into the air. A portion of these compounds may potentially become trapped and stored in the snowpack, to be released during spring runoff. Four-stroke snowmobile engines produce considerably lower amounts of pollutants.

Some of the airborne pollutants would enter the snowpack and be released during snowmelt. Similar responses can be assumed to occur in aquatic species that ingest these compounds from snowmelt, although the compounds may undergo chemical changes while in the snowpack, confounding the predictability of effects.

Airborne pollutants can enter the snowpack from both local and regional sources, including but not limited to vehicle emissions, dust storms, and smog. The concentrations of basic cations and acidic anions in the snowpack can be altered and, when released quickly during snow melt, can temporarily lower the pH of surface waters in a process known as "episodic acidification" (Blanchard et al. 1988).

Demonstrating that snowpack chemistry can be used as a quantifiable indicator of airborne pollutants from vehicular traffic, a correlation was shown between pollutant levels and vehicle traffic in Yellowstone National Park (Ingersoll et al. 1997). Ammonium and sulfate levels were consistently higher for the in-

road snow compared to off-road snow, but nitrate concentrations did not decrease within a distance of 100 meters from the emission source; thus, the nitrate ion may be used to distinguish between local and regional emission sources (Ingersoll et al. 1997). Studying snow chemistry in Yellowstone National Park, Ingersoll (1999) found that concentrations of ammonium, nitrate, sulfate, benzene, and toluene were positively correlated with snowmobile use. Concentrations of ammonium were up to three times higher for the in-road snow compared to off-road snow. Concentrations decreased rapidly with distance from roadways.

Arnold and Koel (2007) also examined volatile organic compounds in Yellowstone National Park, and found that the snow in heavily used areas contained higher levels of benzene, ethylbenzene, m- and p-xylene, o-xylene, and toluene compared with a control site only 100 meters from the traveled roadways. Even at the most heavily used area (Old Faithful) they found that the concentrations of volatile organic compounds were considerably below the U.S. Environmental Protection Agency's water quality criteria for these compounds.

In situ water quality measurements (temperature, dissolved oxygen, pH, specific conductance, and turbidity) were collected; all were found within acceptable limits. Five volatile organic compounds were detected (benzene, ethylbenzene, m- and p-xylene, o-xylene, and toluene). The concentrations were found below EPA criteria and guidelines for the volatile organic compounds analyzed and were below levels that would adversely impact aquatic ecosystems (Arnold and Koel 2007).

Studying air quality and snow chemistry effects from snowmobiles in the Snowy Range, Wyoming, Musselman and Korfmacher (2007) found that heavier snowmobile use resulted in higher levels of nitrogen oxides and carbon monoxide, but ozone and particulate matter were not significantly different. When compared with air quality during the summer, they found that carbon monoxide levels were higher in the winter, but nitrogen oxides and particulate matter were higher in the summer. Air pollutants were well-dispersed and diluted by winds, and air quality was not perceived as being significantly affected by snowmobile emissions. Pollutant concentrations were generally low in both winter and summer. These results differ from those studies examining air pollution from snowmobiles in Yellowstone National Park. However, snow chemistry observations did agree with studies from Yellowstone National Park. Compared with off-trail snow, the snow sampled from snowmobile trails was more acidic with higher amounts of sodium, ammonium, calcium, magnesium, fluoride, and sulfate. Snowmobile activity apparently had no effect on nitrate levels in the snow.

In the winter, overwintering amphibians are typically hibernating. Airborne compounds would only be taken up by respiring species. Airborne pollutants normally disperse quickly in mountain environments that are prone to windy conditions, such as the Sierra Nevada. The levels of OSV exhaust contaminants on the Lassen National Forest (considerably less than those observed in Yellowstone National Park) are not expected to impair water quality (McNamara 2015).

The available research on OSV pollutants (both airborne and in the snowpack) indicate that some effects to aquatic species may occur in the immediate vicinity of heavy use areas. Pollutants that become trapped in the snowpack are also concentrated in areas of heavy OSV use.

Outside the designated OSV trail corridors, dispersed OSV travel is much less likely to contribute harmful contaminants with high enough levels and repetition to measurably or predictably affect aquatic resources, and therefore is not considered in this analysis as a reasonably foreseeable source of indirect effects.

Based on multi-year studies in Yellowstone National Park, researchers concluded that Yellowstone OSV use levels have not resulted in impaired water quality. Given that OSV use levels on the Lassen National

Forest at OSV trailheads are less than OSV use levels occurring at Yellowstone during the study period, it is determined that water quality is not impaired by the OSV Program (McNamara 2015).

There are few studies regarding effects of snowmobiles on aquatic biota but, Adams (1975), addressed the effects of high levels of lead and hydrocarbons from snowmachine exhaust on brown trout (*Salvelinus fontinalis*). His study found that that high-level exposure to lead and hydrocarbon can lower activity levels and feeding. The alternatives of the project are expected to have negligible effects to water quality and fish because snowmachine use on the Lassen National Forest is widely dispersed and does not occur at concentrations that have been shown to cause adverse effects to water quality or aquatic organisms. The results of the Adams Study support this contention and state that the levels of hydrocarbons found in the study are “unrealistic for all but a few small lakes in well populated areas.”

Pollutants Effects Summary

The uptake of harmful pollutants is not expected to result in the death of any individual aquatic species on the Lassen National Forest, based on the studies described, and the findings related to water quality impacts. Therefore, the level of effect to TEPS aquatic species from OSV pollutants is expected to be minimal, and would not result in loss of individuals.

Based on findings on studies of OSV-related effects to aquatic species and/or their habitat, negative impacts to special-status fish and amphibians due to impaired water quality are considered less than significant.

In addition, effects would be more likely to occur along designated OSV trails compared to areas open to cross-country OSV use because dispersed OSV travel is much less likely to contribute harmful contaminants with high enough levels and repetition to measurably or predictably affect aquatic resources.

Effects to Aquatic Species

Threatened and Endangered

Chinook salmon (*Oncorhynchus tshawytscha*) Central Valley Spring Run ESU and Central Valley Steelhead (*Oncorhynchus (=salmo) mykiss*)

Direct and Indirect Effects

Direct effects to *O. tshawytscha* and *O. mykiss* individuals from OSV use would not occur because OSV use would be prohibited over open water.

Pollutants which would be trapped and then later released during snowmelt could have some adverse indirect effects if in close proximity to *O. tshawytscha* or *O. mykiss* occupied streams. However the probability of this occurring and the potential resultant pollutant concentration is expected to be low because of the widely dispersed nature of cross-country OSV use in space and time. Similar conclusions are supported by the hydrology analysis which determined that pollutant concentrations from OSV use entering waterways would be low enough that water quality would not be impaired.

There are no designated OSV roads or trails that would cross occupied *O. tshawytscha* streams. Two crossings would exist for *O. mykiss* and are described in table 128.

Chinook salmon (*Oncorhynchus tshawytscha*) Central Valley Spring Run ESU and Central Valley Steelhead (*Oncorhynchus (=salmo) mykiss*) Critical Habitat

Direct and Indirect Effects

There are a total of 62.9 miles of steelhead critical habitat and 52.73 miles of Chinook critical habitat within the Lassen National Forest administrative boundary.

Under the no-action alternative, there are a total of 18.34 miles and 22.73 miles of critical habitat for Chinook salmon and steelhead, respectively, within areas that would be designated for cross-country OSV use (table 128).

For alternatives 2, 3, and 4, the total number of miles of critical habitat that would be designated for cross-country OSV use are 9.64, 10.73, and 18.34, respectively (table 128).

There would be no crossings of Chinook critical habitat with designated OSV roads or trails for any of the alternatives.

Two crossings would exist under alternatives 1, 2, and 4 where steelhead critical habitat would intersect with designated OSV roads or trails, and one crossing under alternative 3 (table 128).

Table 128. Alternatives comparison of potential effects to Central Valley spring-run Chinook and steelhead critical habitat

Species	Alternative 1 (no action)	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Notes
Chinook					
Critical habitat within areas open to cross-country OSV use (miles)	18.34	9.64	10.73	18.34	A total of 52.73 miles of critical habitat are within the Lassen National Forest
Number of crossings with a designated OSV road or trail	0	0	0	0	
Steelhead					
Critical habitat within areas open to cross-country OSV use (miles)	22.73	13.14	13.58	22.73	A total of 62.9 miles of critical habitat are within the Lassen National Forest
Number of crossings with a designated OSV road or trail	2	2	1 (upstream of crossing closed to OSV use for Alt 3)	2	First crossing located at intersection of road 29N48 with Rock Gulch Cr. Second crossing located at intersection road 31N17 with Panther Cr. below Dry Lake.

OSV use during the winter is not expected to result in habitat disturbance because the minimum snow depth of 12 inches would be likely sufficient to prevent contact between OSVs and the soil surface. Based upon these factors discussed in the effects common to all alternatives, no soil disturbance would occur that would contribute to instream sediment increases.

The Lassen National Forest OSV Designation project would not involve the construction of any structures that could impede or redirect flood flows, nor any ground surface modifications that could change drainage patterns, impervious surfaces, soil permeability, or other hydrological characteristics such as surface water volumes (McNamara 2015).

Sierra Nevada Yellow-legged Frog Critical Habitat

Direct and Indirect Effects

Of the total 1,104,579 acres of *R. sierrae* PCH, approximately 17,853 acres are within the Lassen National Forest. Of the area of PCH within the Lassen National Forest, a total of approximately 8,078.4 acres lay within areas that would be designated for cross-country OSV use under alternatives 1, 3, and 4. Alternative 2 has 168 less acres of *R. sierrae* PCH that would be designated for cross-country OSV use.

Table 129. Alternatives comparison of potential effects to Sierra Nevada yellow-legged frog proposed critical habitat

Sierra Nevada yellow-legged frog	Alternative 1 (no action)	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4
OSV roads or trails crossing Sierra Nevada yellow-legged frog PCH	0	0	0	0
PCH within areas open to cross-country OSV use (acres)	8,078.4	7,910.4	8,078.4	8,078.4

No designated OSV roads or trails would cross or overlap with *R. sierrae* PCH for any of the alternatives.

Based upon factors described in the effects section, soil disturbance is not expected to occur that would contribute to instream sediment increases.

The Lassen National Forest OSV Designation project would not involve the construction of any structures which could impede or redirect flood flows, nor any ground surface modifications which could change drainage patterns, impervious surfaces, soil permeability, or other hydrological characteristics such as surface water volumes (McNamara 2015).

OSV use during the winter would not be expected to result in habitat disturbance because the minimum snow depth of 12 inches would likely be sufficient to prevent contact between OSVs and the soil surface. However, there is currently a lack of direct studies examining snow depth and OSV use in relation to the potential effects to aquatic species or their habitat.

Sensitive Species

Cascades frog (*Rana cascadae*)

Direct and Indirect Effects

Compacted snow generally causes delayed snowmelt and increases the transfer of freezing temperatures to the ground due to reduced insulating air spaces (Keddy et al. 1979, Fahey and Wardle 1998, Davenport and Switalski 2006, Eagleston and Rubin 2013, Gage and Cooper 2013).

For Cascades frog, breeding occurs when snow begins to melt. The short delay of snowmelt and colder soil temperatures from OSV-compacted snow would not likely delay or reduce Cascades frog occurrences. The effects of snow compaction and OSV emissions would be concentrated in areas of heavy

use, such as along designated OSV trails. No Cascades frog occurrences would be present within 100 feet of existing or proposed designated OSV trails; therefore, it is anticipated that there would be no measurable or predictable indirect effects to the occurrences.

Black Juga (*Juga nigrina*)

Direct and Indirect Effects

Black Juga would not be directly affected by current management or proposed OSV uses because OSVs would not be authorized to operate over unfrozen open water where Black Juga may be present.

Pollutants which are trapped and then later released during snowmelt may cause some adverse effects; however, the extent and direction of specific effects is unknown. It is expected that pollutant concentrations would be low enough that water quality would not be impaired, and thus it is likely that *juga nigrina* responses would not be noteworthy.

Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Snow plowing at the established OSV trailheads is an ancillary activity associated with the Lassen National Forest OSV Designation project, and is not analyzed as a part of the proposal. Snow plowing is not expected to affect aquatic resources. Other ongoing and foreseeable future actions include livestock grazing, recreation, timber harvest, fuels reduction, woodcutting activities, wildfire suppression, and other activities.

Threatened and Endangered and Sensitive Species

The effects of present and future projects on TESP species would likely be minimal since all projects are analyzed and mitigation measures are designed for those species for which viability is a concern, on a project-by-project basis.

Alternatives Comparison

For all alternatives including the no-action alternative, OSV use is allowed in the plan area. A comparison of alternatives based on trails and areas open to OSV use, and minimum snow depth for OSV use on trails and cross-country are shown in table 130. Effects common to all alternatives from OSV uses are outlined in the previous section and include effects to aquatic species and their habitat from OSV exhaust and lubricants, and snow compaction and trampling of vegetation from OSV tracks.

Table 130. Summary comparing current OSV management with the modified proposed action for minimum snow depth (in inches) and OSV trail grooming season on the Lassen National Forest

OSV Management	Alternative 1 Current Management (no action)	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4
National Forest System (NFS) Lands within the Lassen National Forest (Acres)	1,150,020	1,150,020	1,150,020	1,150,020
OSV Use Allowed:				
Designated OSV Areas (Acres)	964,020	921,130	834,660	958,930
Percentage of NFS Land Area Open (Designated in alternatives 2 and 3) for Cross-country OSV Use	83.8%	80.1%	72.6%	83.4%
Total Areas OSVs Not Allowed and Not Designated for OSV Use in alternatives 2 and 3 (Acres)	186,000	228,890	315,360	191,090
Minimum Snow Depth for OSV Use on Designated Trails (Inches)	12	6 inches on snow trails overlaying roads and trails 12 inches on 0.1 mile of trail not overlaying roads or trails	12 inches, generally. 6 inches only where site review determines there would be no damage to underlying resources	No restriction with 6 or more inches
Minimum Snow Depth for Public, Cross-country OSV Use (Inches)	12	12*	12	12
OSV Trail Grooming Season	12/26 – 3/31	12/26 – 3/31	12/26 – 3/31	12/26 – 3/31

*The originally scoped proposed action has been modified to be consistent with the state grooming standard which states, “Begin grooming when the snow depth is at least 12 to 18 inches” (OSV Program Draft EIR, Program Years 2010-2020 – October 2010, California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, page 2-12)

Alternative 1 Effects to Aquatic Resources

There would be no additional effects to aquatic resources beyond those described in “Effects Common to All Alternatives” that are specific to alternative 1. This alternative would generally have the greatest potential for direct effects to aquatic resources due to larger areas of open OSV use.

Threatened and Endangered Species

As described above in “Effects Common to All Alternatives,” there would be less than significant direct and indirect effects to *O. tshawytscha*, *O. mykiss*, and *Rana sierrae* or their critical habitats.

Alternative 2, 3, and 4 Effects to Aquatic Resources

The effects of alternative 2, 3, and 4 would be similar to alternative 1, except for a slightly lower number of acres designated as areas for cross-country OSV use, and the snow depth requirement for use of OSV trails. Approximately 921,130 acres, 834,660 acres, and 958,930 acres of Lassen National Forest would be designated for cross-country OSV use for alternatives 2, 3, and 4 respectively. Because direct and indirect effects would be negligible, having less acreage open to OSVs would lead to a minimal increase in direct or indirect effects on aquatic species or their habitat.

Summary of Environmental Effects

Table 131. Summary comparison of potential environmental effects to aquatic resources

Resource Element	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Threatened and Endangered Fish Species	Greater potential for effects (issue sufficiently addressed – minor potential effects)	Least potential for effects	Greater potential than 2 and less than 1 and 4	Equal to Alt. 1 and greater than 2 or 3
Threatened and Endangered Aquatic Species	Greater potential for effects (issue sufficiently addressed – minor potential effects)	Least potential for effects	Greater than 2 and equal to 1 and 4	Greater than 2 and equal to 1 and 3
Sensitive Species (Cascade frog)	Greater potential for effects	Greater than 3 and less than 4 or 1	Least potential for effects	Greater than 3 and 2 but less than 1
Sensitive Species (Black Jugu)	Greater potential for effects	Greater than 3 and less than 4 and 1	Least potential for effects	Greater than 3 and 2 and less than 1

Threatened and Endangered Aquatic Species Determinations

Central Valley spring-run Chinook (*Oncorhynchus tshawytscha*)

Although occurrences for *O. tshawytscha* are located within the Lassen National Forest OSV Designation project, proposed activities are not expected to directly affect *O. tshawytscha* because occurrence of *O. tshawytscha* are located in water or open water areas that would be prohibited from OSV use.

Direct effects to *O. tshawytscha* from OSV use on designated roads or trails would not occur because there would be no crossings of Chinook occupied streams with trails designated for OSV use under any of the alternatives.

Indirect effects to *O. tshawytscha* from cross-country OSV use would be expected to be minimal because of implementation of a required minimum snow depth, the dispersed nature of cross-country OSV use, and the conclusions of the hydrology analysis that little change would be expected to soils, vegetation, or hydrology of aquatic habitats.

Therefore, it is determined that the Lassen National Forest OSV Designation project **may affect, not likely to adversely affect** *O. tshawytscha*.

Central Valley spring-run Chinook Critical Habitat

Direct effects to *O. tshawytscha* critical habitat from OSV use on designated roads or trails would not occur because there would be no crossings of Chinook critical habitat with trails designated for OSV use under any of the alternatives.

Potential direct or indirect effects to *O. tshawytscha* critical habitat from cross-country OSV use would be expected to be minimal because of implementation of a required minimum snow depth, the dispersed nature of cross-country OSV use, and the conclusions of the hydrology analysis that little change would be expected to soils, vegetation, or hydrology of aquatic habitats.

Therefore, it is determined that the Lassen National Forest OSV Designation project **may affect, not likely to adversely affect** *O. tshawytscha* critical habitat.

Central Valley steelhead (*Oncorhynchus (=salmo) mykiss*)

Although occurrences for *O. mykiss* are located within the Lassen National Forest OSV Designation project, proposed activities would not be expected to directly affect *O. mykiss* because occurrence of *O. mykiss* are located in water or open water areas that would be prohibited from OSV use.

Potential indirect effects to *O. mykiss* from cross-country OSV use would be expected to be minimal because of implementation of a required minimum snow depth, the dispersed nature of cross-country OSV use, and the conclusions of the hydrology analysis that little change would be expected to soils, vegetation, or hydrology of aquatic habitats.

Therefore, it is determined that the Lassen National Forest OSV Designation project **may affect, not likely to adversely affect** *O. mykiss*.

Central Valley steelhead Critical Habitat

Direct effects to *O. mykiss* critical habitat from OSV use on trails designated for OSV use is expected to be minimal because there would only be two crossings of steelhead critical habitat with designated OSV trails under any of the alternatives.

Direct or indirect effects to *O. mykiss* critical habitat from cross-country OSV use are expected to be minimal because of implementation of a required minimum snow depth, the dispersed nature of cross-country OSV use, and the conclusions of the hydrology analysis that little change is expected to soils, vegetation, or hydrology of aquatic habitats.

Therefore, it is determined that the Lassen National Forest OSV Designation project **may affect, not likely to adversely affect** *O. mykiss* critical habitat.

Sierra Nevada Yellow Legged Frog

It is determined that the OSV project **may affect, not likely to adversely affect** suitable habitat of *R. sierrae*.

Sensitive Species Determinations

The Lassen National Forest OSV Designation project would not involve the construction of any structures which could impede or redirect flood flows, nor any ground surface modifications which could change drainage patterns, impervious surfaces, soil permeability, or other hydrological characteristics such as surface water volumes.

Cascades Frog

Because *Rana cascadae* would not be active and/or present during the period of OSV use, *Rana cascadae* would not be directly affected. Potential indirect effects are expected to be minor, and all effects would be minimized by the required minimum snow depths proposed. OSV use is not expected to result in a trend toward Federal listing or loss of viability for *Rana cascadae*. Therefore, it is determined that the Lassen National Forest OSV Designation project **may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area**.

Black Juga

Direct impacts to *Juga nigrina* would be extremely rare as OSVs would have to travel through water to harm *J. nigrina*. Due to the rarity of this occurring, the direct impacts to *J. nigrina* are considered less than significant. Potential indirect effects are undetectable and unlikely to affect the species or alter its habitat, as described above. With slight direct or indirect effects expected, there would be no cumulative effects to this species. It is determined that the Lassen National Forest OSV Designation project **may**

affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability in the planning area.

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

With this Biological Evaluation/Biological Assessment, the proposed project effects on TESP aquatic species have been evaluated and measures taken to ensure that sensitive species do not become Threatened or Endangered because of Forest Service actions.

All alternatives would maintain viable populations of all native and desired nonnative species and would be compliant with Forest Service Manual direction. All alternatives would also comply with the Lassen National Forest Land and Resource Management Plan (LRMP) and the Sierra Nevada Forest Plan Amendment because sensitive aquatic species populations would remain viable and their habitats would be maintained.

Impacts on Socioeconomic Conditions

Introduction

This section of the EIS analyzes the social and economic consequences of management alternatives to designate trails and areas for public over-snow vehicle (OSV) use on the Lassen National Forest. These designations will comply with Subpart C - Use by Over-Snow Vehicles, of the Forest Service Travel Management Regulation. In addition, the Lassen National Forest will combine the analysis needed for OSV use designations with analysis to formalize the identification of National Forest System Snow Trails that will be groomed for OSV use.

The human environment is central to the purpose and need for this project. OSV use designation on the Lassen National Forest seeks to protect public values related to access, safety, recreational enjoyment, and natural and cultural resources (ecosystem services). This section discloses the results of the analysis of the social and economic dimensions of designating trails and areas for public OSV use.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

The 1992 Lassen National Forest Land and Resource Management Plan (LRMP) does not specify goals and objectives for the social and economic environment. However, the LRMP's goals and objectives for cultural resources, facilities, and recreation are relevant to the social and economic analysis. In particular, the following goals help to frame the social and economic analysis in this section:

- ◆ Ensure that Forest Service actions are not detrimental to traditional Native American religious rights and practices (pg. 4-3)
- ◆ Provide stable and cost-efficient road and trail systems (pg. 4-3)
- ◆ Provide a wide range of outdoor recreation opportunities to meet public demand (pg. 4-4)
- ◆ Provide diverse opportunities for off-highway vehicle recreation (pg. 4-4)
- ◆ Provide diverse opportunities for winter sports (pg. 4-4)
- ◆ Work in partnership with local communities to expand recreational facilities, programs, and trails on both public and private land (pg. 4-5)

Travel Management Regulation Subpart C

The Forest Service's 2005 Travel Management Regulation requires the designation of roads, trails, and areas on national forests and grasslands that are open to motor vehicle use. Subpart C mandates the designation of routes and areas for over-snow vehicle use.

Federal Law

Multiple Use and Sustained Yield Act

The Multiple Use and Sustained Yield Act requires that economic impacts are considered when establishing management plans or decisions that may affect the management of renewable forest and rangeland resources. This EIS meets the requirements of this law by addressing the economic impacts of OSV use designation on the local economy.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires that economic and social impacts of Federal actions be considered as part of the environmental analysis. This section includes analysis on social and economic issues identified during the scoping process to meet the terms of NEPA and regulations.

National Forest Management Act

The National Forest Management Act (NFMA) and regulations require that the economic impacts of decisions or plans affecting the management of renewable resources are analyzed and that the economic stability of communities whose economies are dependent on National Forest System lands is considered. This analysis meets the requirements of the NFMA by specifically considering the economic impacts of the implementation of the OSV use designation project and its impacts on local communities and minority populations.

Executive Orders

Environmental Justice, EO 12898 of February 11, 1994

Executive Order 12898 directs Federal agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. This section identifies minority and low-income populations in the analysis area and addresses the potential for disproportionate and adverse effects to these populations.

Topics and Issues Addressed in This Analysis

Resource Indicators and Measures

Table 132. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: P/N, or key issue?	Source (LRMP S/G; law or policy, BMPs, etc.)?
Economic activity	Employment	Number of jobs and amount of labor income	No	--
Quality of life	Recreation visitation	Number of recreation visits	No	--
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes	No	--
Environmental Justice	Effects to low-income and minority populations	Qualitative evaluation of disproportionate effects to low-income and minority populations	No	Executive Order 12898

Methodology

Economic Analysis

Economic impacts were modeled using IMPLAN Professional Version 3.0 with 2012 data. IMPLAN is an input-output model that estimates the economic impacts of projects, programs, policies, and economic changes on a region. IMPLAN analyzes the direct, indirect, and induced economic impacts. Direct economic impacts are generated by the activity itself, such as visitor spending associated with recreational OSV use on the Lassen National Forest. Indirect employment and labor income contributions occur when

a sector purchases supplies and services from other industries to produce their product. Induced contributions are the employment and labor income generated as a result of spending new household income generated by direct and indirect employment. The employment estimated is defined as any part-time, seasonal, or full-time job. In the economic impact tables, direct, indirect and induced contributions are included in the estimated impacts. The IMPLAN database describes the economy in 440 sectors using Federal data from 2012.

Data on use levels under each alternative were collected from Forest Service resource specialists. In most instances, the precise change is unknown. Therefore, the changes are based on the professional expertise of Forest Service resource specialists. Regional economic impacts are estimated based on the assumption of full implementation of each alternative. The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported by each alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the economic impact would be different from what is estimated in this analysis.

Social Analysis

Social effects analysis uses the baseline social conditions presented in the Affected Environment section, National Visitor Use Monitoring (NVUM) profiles (USFS 2015b), and public comments to discern the primary values that the Lassen National Forest provides to area residents and visitors. Social effects are based on the interaction of the identified values with estimated changes to resource availability and uses. Key determinants of quality of life that may be affected by OSV route and area designation were identified through the scoping process.

Information Sources

Key data sources for the social and economic analysis include:

- Economic Profile System (EPS), Headwaters Economics
- U.S. Census Bureau, American Community Survey
- U.S. Forest Service, Ecosystem Management Coordination, National Forest Recreation Economic Contributions website
- National Visitor Use Monitoring program data for the Lassen National Forest, last collected in FY 2010
- Public scoping comments

Incomplete and Unavailable Information

Due to incomplete and unavailable information, the socioeconomic analysis uses the following assumptions:

1. Local economic composition (e.g., sectoral specialization, size of labor market) is constant throughout the analysis period.
2. OSV trail grooming increases OSV visitor use.
3. Forest visitors' recreation preferences do not change during the analysis period.
4. OSV and non-motorized winter recreation visitors have similar characteristics to forest visitors overall (e.g., place of residence).

Spatial and Temporal Context for Effects Analysis

The Lassen National Forest is located in northeastern California. Forest Service economists have defined economic analysis areas for all national forests and grasslands using a protocol that identifies interactions between Forest Service resource management and local economic activity. Based on this protocol, the Lassen National Forest’s economic area of influence encompasses Butte, Lassen, Plumas, Shasta, and Tehama counties. These five counties form the social and economic analysis area for this analysis.

The temporal boundaries for analyzing effects to the social and economic environment extend 10 years into the future (2025). This is the period for which social and economic consequences are foreseeable. Social and economic change, including changes in recreation preferences, cannot plausibly be predicted outside this temporal frame.

Affected Environment

Existing Condition

Table 133. Resource indicators and measures for the existing condition

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)
Economic activity	Employment	Number of jobs and amount of labor income
Quality of life	Recreation visitation	Number of recreation visits
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes
Environmental Justice	Low-income and minority populations	Identification of low-income and minority populations in the analysis area

Demographic and Economic Characteristics

The Lassen National Forest is located in northeastern California in Butte, Lassen, Plumas, Shasta, and Tehama counties. The area around the Forest is mostly non-metropolitan; the nearest major population centers are Redding, California (in Shasta County) to the west and Chico, California (in Butte County) to the south.

The analysis area counties have higher shares of older residents than the state. Plumas County has nearly double the share of residents over the age of 65 compared to California. Older populations may have different recreational preferences. For instance, mobility limitations associated with age may increase the importance of easy access to recreational sites.

Table 134. Demographic characteristics by county

Location	Population (ACS 2013 5-year Estimate)	Rural-Urban Continuum Code (ERS 2013)	Share of Population Over 65 (ACS 2013 5- year Estimate)
Butte County	220,542	3 (Metro, less than 250,000)	15.8%
Lassen County	34,018	7 (Nonmetro, not adjacent to metro)	10.3%
Plumas County	19,586	7 (Nonmetro, not adjacent to metro)	22.1%
Shasta County	177,966	3 (Metro, less than 250,000)	17.6%
Tehama County	63,241	4 (Nonmetro, adjacent to metro)	16.4%
California	37,659,181	--	11.8%

Source: U.S. Census Bureau 2015a and USDA ERS 2013

The five counties in the analysis area experience a greater degree of economic insecurity than the state overall. Median household incomes are lower and unemployment rates are higher in every county compared to the state. These economic characteristics suggest that changes in local employment and income may be felt acutely. Lassen National Forest recreation visitors spend money on lodging, food, fuel, and other goods and services in the economic analysis area. The designation of OSV trails and areas may affect recreation visitation and spending. As a result, local employment and income may change. Additionally, visitor spending contributes to county and municipal revenue from lodging and sales taxes. Tax revenues are used to fund essential public services, such as emergency management. The environmental consequences analysis addresses potential changes in employment, income, and public finances in the context of local economic characteristics.

Table 135. Economic characteristics by county

Location	Median Household Income (ACS 2013 5-year Estimate)	Unemployment Rate (ACS 2013 5-year Estimate)	Share of Tourism-related Employment (County Business Patterns 2013, accessed via EPS)
Butte County	\$43,752	14.1%	18.6%
Lassen County	\$53,107	13.6%	20.4%
Plumas County	\$45,794	17.2%	15.4%
Shasta County	\$44,651	13.4%	17.8%
Tehama County	\$41,924	15.8%	19.2%
California	\$61,094	11.5%	16.3%

Source: U.S. Census Bureau 2015a and U.S. Census Bureau 2015b

Much of the Lassen National Forest recreation visitor spending contributes to economic activity in travel and tourism-related sectors. These sectors include retail trade; passenger transportation; accommodation and food; and arts, entertainment, and recreation. Travel and tourism sectors account for a larger share of employment in the analysis area counties than in California overall. This suggests that the analysis area economy is reliant on tourism (including outdoor recreation).

Recreation Visitors

NVUM data were last collected on the Lassen National Forest in fiscal year 2010. Approximately 300,000 visits to the Lassen National Forest occur each year (USFS 2015b). Nearly 10 percent of survey respondents indicate that they participate in snowmobiling during their trip, with 8.4 percent reporting that snowmobiling is the primary purpose of their trip (USFS 2015b). That makes snowmobile use the third most common recreation activity on the forest, behind only viewing natural features and fishing, which account for 19.4 percent and 22.0 percent of main activities, respectively (USFS 2015b). The majority of forest visitors (60.2 percent) traveled fewer than 100 miles to reach the site. Nearly one-fifth of visits originated from a single zip code (96130), which covers the city of Susanville, California (USFS 2015b). The NVUM data do not break out visitor origin by activity type. Therefore, the analysis assumes that OSV and non-motorized winter recreation visitors reside in the same areas as forest visitors overall.

Economic Contributions

Visitors to national forests spend money on lodging, restaurants, gasoline, entry fees, and souvenirs. These purchases support employment and labor income in communities that surround National Forest

System lands. Visitor spending is influenced by both the type of trip (local or non-local; day or overnight) and the type of recreation activities. Snowmobilers spend more than most other recreation visitors (White and Stynes 2010). The NVUM survey collects data on “previous and planned spending of the entire recreation party within 50 miles of the interview site during the trip to the area” (White and Stynes 2010). These data indicate that a snowmobiler spends an average of \$642 (\$2007) on a non-local overnight trip and \$74 (\$2007) on a local day trip, compared to \$366 (\$2007) and \$34 (\$2007) for the same types of trips among participants of all recreation activities (White and Stynes 2010). Therefore, snowmobilers spend nearly twice what an average recreation user spends on their trip.

Recreation visitation (all activities and trip types) on the Lassen National Forest supports approximately 79 jobs³⁹ and \$2.6 million in labor income on an average annual basis (USFS 2015a). The largest contributions are to the retail trade and accommodation and food services sectors (USFS 2015a). Due to the high spending of snowmobilers, changes to over-snow vehicle opportunities on the Lassen National Forest have the potential to measurably affect economic contributions associated with national forest recreation. The environmental consequences analysis addresses the economic impact of over-snow vehicle route and area designations.

Values, Beliefs, and Attitudes

Values are “relatively general, yet enduring, conceptions of what is good or bad, right or wrong, desirable or undesirable.”

Beliefs are “judgments about what is true or false – judgments about what attributes are linked to a given object. Beliefs can also link actions to effects.”

Attitudes are “tendencies to react favorably or unfavorably to a situation, individual, object, or concept. They arise in part from a person’s values and beliefs regarding the attitude object” (Allen et al. 2009).

OSV trail and area designation may affect nearby residents and visitors to the Lassen National Forest. Public comments received during the scoping process provide insight into the values, beliefs, and attitudes of stakeholders in the OSV designation process. These comments reflect diverse opinions on the costs and benefits of various types of winter recreation on the Lassen National Forest.

Snow depth restrictions were controversial among some commenters with one noting that “Snow depth restrictions have always been difficult for the Forest Service to enforce, and have often resulted in Law Enforcement closing down an entire area based solely on snow depths at trailheads” (Sierra Access Coalition). However, other snowmobile users found the snow depth restriction reasonable, stating their “support [for] the implementation of the 6-inch minimum for OSV usage on roads and trails...parking or trailhead facilities are located in areas where there may be minimal snowfall but exceptional recreational opportunities remain for the snowmobile community in areas that are higher and colder and may have numerous feet of snow” (Off-road Business Association (ORBA)).

Some commenters believe that elevation restrictions are at best, redundant and perhaps arbitrary, given the snowpack restriction (ORBA, George Van Eperen). Furthermore, another commenter noted that “snowmobiling cross-country is self-limiting. A snowmobiler quickly pays the high price for riding his

³⁹ The economic modeling software (IMPLAN) reports jobs as average annual full-time and part-time jobs. No distinction is made between full-time and part-time employment, so the job calculations in this report are not full-time equivalents (FTEs). However, the duration of employment is used to calculate the number of jobs. Therefore, 1 full-time or part-time job lasting 1 year is equivalent to 2 full-time or part-time jobs lasting 6 months each. Both of these examples will be reported as 1 job in this analysis.

snowmobile with inadequate snow” (Sierra Access Coalition). Beliefs that OSV users self-regulate may contribute to negative attitudes about Forest Service restrictions on OSV access and use.

The contribution of OSV use to local economic activity, and the potential for restrictions to decrease these economic contributions, was noted by a commenter: “It is critical that an economic analysis be completed as part of the environmental analysis...If the restrictions that are currently proposed in the NOI were implemented this year, there would be a great impact to local businesses and loss of jobs” (Sierra Access Coalition).

Some commenters noted that motorized and non-motorized recreationists face asymmetrical user conflict: “Quiet non-motorized recreationists can have the quality of their experience dramatically altered by snowmobiles, while motorized users often don’t even notice skiers using the same landscape” (Switalski 2014). In particular, some commenters identified the following effects that reduce the quality of the recreation experience for non-motorized users: “OSV impacts on other recreational users include noise, toxic exhaust, consumption of powder snow, and rutting of trails and routes. Because non-motorized users wish to avoid such impacts, non-motorized use becomes concentrated at the areas where motorized use is prohibited. Where snowmobile use is heavy, non-motorized users are displaced to the extent that the area becomes effectively motorized use-only” (Snowlands Network).

A number of non-motorized winter recreationists expressed concerns that shared motorized and non-motorized spaces pose health (from snowmobile emissions) and safety (potential for collision or triggering an avalanche) risks to non-motorized users (Switalski 2014).

Additionally, some commenters believe that motorized and non-motorized winter recreation users have inequitable opportunities on the Lassen National Forest. For example, one commenter argued that “the motorized community has more than enough open space to use compared to areas that are exclusive to human powered backcountry use” (Snowlands Network). Additionally, other commenters expressed concern that the modified proposed action would leave over 82 percent of the forest open to cross-county OSV use (Wild Earth Guardians, Winter Wildlands Alliance). As a result of asymmetrical user conflict and few restrictions on OSV use, these commenters argue that “with fewer or smaller areas available, there will be a concentration of use which may lead to increased crowding, recreational conflict and resource damage. For example, it is becoming more commonplace for snowmobilers to travel on dry roadbeds or snow-free trails to access receding snowline” (Switalski 2014).

These views led some commenters to suggest that the forest dedicate some terrain to non-motorized snow sports only, to reduce conflict: “Motorists with OSVs now travel, per visit, faster, farther, higher and longer than in the past. This turbocharged magnification of demand for terrain has increased impacts to forest resources, to air and water quality, to modest (bipedal) forest visitors, and likely to resident wildlife” (Jeff Erdoes). Snowlands Network identifies the following areas as particularly important for non-motorized recreational users: Eagle Lake, Butte Lake, McGowen, Colby Mountain, Lake Almanor, and Fredonyer-Goumaz.

The relationship between OSV users and Pacific Crest Trail users was highlighted in several comments. For some, “the prohibition of snowmobiles on the PCT trail tread only is inadequate in protecting the trail and experience afforded PCT winter users” (Pacific Coast Trail Association). Other commenters, however, argued that OSVs should be allowed to cross the PCT at any location (Recreation Outdoors Coalition).

Environmental Justice

As noted above, residents of the analysis area counties experience a higher degree of economic insecurity than California residents overall. This is borne out in the poverty data, which reveal that four of the five

analysis area counties have a higher poverty rate than the state of California. In particular, residents of Butte and Tehama Counties experience particularly high rates of poverty.

However, the analysis area counties have lower shares of minority residents than the state. In California, 60 percent of the population identifies other than non-Hispanic white. In the analysis area counties, the shares of minority residents are much lower, accounting for between 15 and 34 percent of the population.

Table 136. Environmental justice characteristics by county

Location	Poverty Rate ⁴⁰ (ACS 2013 5-year Estimate)	Share Other than White Alone, Non-Hispanic (ACS 2013 5-year Estimate)
Butte County	20.4%	25%
Lassen County	16.9%	34%
Plumas County	15.2%	15%
Shasta County	17.5%	18%
Tehama County	19.7%	29%
California	15.9%	60%

Source: U.S. Census Bureau 2015a

Given the high rates of poverty in the analysis area, the environmental consequences analysis will address the potential for management actions to disproportionately and adversely affect low-income individuals. Low-income individuals may be less able to adapt to changes in employment, income, and recreation opportunities on the Lassen National Forest.

Environmental Consequences

Alternative 1

The National Environmental Policy Act requires a no-action alternative, which serves as a baseline to compare effects of action alternatives. This alternative would continue current management and would not affect public OSV use in the project area.

Table 137. Resource indicators and measures for alternative 1

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	(Alternative 1)
Economic activity	Employment, income, tax revenue	Number of jobs, amount of labor income, tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
Quality of life	Recreation visitation	Number of recreation visits	No change due to management; visitor use expected to increase over time
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes	User conflict may increase due to population growth and increased visitor use

⁴⁰ “Following the Office of Management and Budget’s (OMB) Statistical Policy Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family’s total income is less than the family’s threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps)” (U.S. Census Bureau 2015a).

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	(Alternative 1)
Environmental Justice	Low-income and minority populations	Change in cost of participating in recreation activities	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth

Economic Activity

The no-action alternative would not affect forest recreation use or visitor spending. Therefore, this alternative would not affect the number of jobs, amount of labor income, or tax revenue in the local economy. Visitor use is expected to increase over time due to factors outside the control of the Forest Service (e.g., population growth), which would increase employment, labor income, and tax revenue. However, these increases in visitor use would not be affected by the selection of any of the alternatives.

Quality of Life

The values, beliefs, and attitudes discussion above identified several key issues related to OSV use on the Lassen National Forest and quality of life for visitors and area residents. In particular, commenters discussed recreation opportunities and user conflict. The no-action alternative would not implement management activities that affect recreation opportunities or user conflict. As noted in the recreation section, conflicts between motorized and non-motorized winter experiences on the Lassen National Forest are currently minor and infrequent. However, conflict may increase as population and visitor use increase. As a number of commenters noted, user conflict is often asymmetrical (motorized use inhibits non-motorized use, but not the reverse). Therefore, the potential for increased user conflict may particularly affect quality of life for non-motorized winter recreation users.

Environmental Justice

The no-action alternative would not affect the cost of participating in recreation activities on the forest. Therefore, this alternative would not disproportionately and adversely affect the low-income individuals and households in the analysis area. However, climate change may reduce the areas on the forest that are suitable for winter recreation due to reduced precipitation and warmer winters. This could increase the travel costs (in terms of time and fuel) for accessing winter recreation opportunities on the forest. Low-income individuals and households have fewer financial resources and, thus, may be disproportionately affected by increased recreational travel costs.

Alternative 2

Alternative 2 is the modified proposed action. Alternative 2 would designate trails and areas for public OSV use on the Lassen National Forest.

Direct and Indirect Effects - Alternative 2

Economic Activity

The modified proposed action would decrease the acres open to OSV use to 921,130 acres, a 4 percent reduction from existing conditions. The modified proposed action would designate 323 miles of snow trails on National Forest System lands and groom 349 miles of snow trails on National Forest System lands and adjacent non-National Forest System lands. This represents no change in trail grooming relative to current conditions. As stated in the assumptions, based on observational evidence, OSV visitor use is driven by the miles of groomed trails. Therefore, the modified proposed action is not expected to change recreational visitor use compared to the no-action alternative. As a result, recreation-related employment, labor income, and tax revenue would not change relative to the no-action alternative.

Quality of Life

The values, beliefs, and attitudes discussion above identified several key issues related to public OSV use on the Lassen National Forest and quality of life for visitors and area residents. In particular, commenters discussed recreation opportunities and user conflict. The modified proposed action would close 228,890 acres to OSV use (186,000 acres are closed to OSVs under current management), which is a 23 percent increase in areas closed to public OSV use relative to existing conditions. Therefore, the modified proposed action would improve quality of life for non-motorized winter recreation users on the Lassen National Forest who prefer to have areas separated from OSV users. The increase in acres closed to OSV use may alleviate some concerns expressed by non-motorized winter recreation users related to vehicle exhaust fumes, disparities in speed, noise, and competition for fresh powder. Although the miles of groomed OSV trails would not change relative to current conditions, some OSV users may feel that the reduction in open acres adversely affects their quality of life by reducing the acreage available for cross-county OSV travel relative to existing conditions.

The modified proposed action would continue to groom OSV trails in close proximity to the Caribou Wilderness boundary and to the boundary of Lassen Volcanic National Park. Additionally, non-motorized and motorized users would continue to share trailheads for access. Therefore, the potential for user conflict to adversely affect quality of life would continue under the modified proposed action.

Environmental Justice

The reduction in acres open to public OSV use may require some OSV users to travel farther to recreate on the forest. However, miles of groomed trails would not change, so the effect of the closures on travel costs is expected to be minor. Like the no-action alternative, climate change may affect travel costs due to reduced precipitation and warmer winters. Low-income individuals would be disproportionately affected by changes in the cost of participating in winter recreation on the forest. Overall, the modified proposed action is expected to have a minor effect on recreation travel costs.

Table 138. Resource indicators and measures for alternative 2 direct and indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2 Direct and Indirect Effects
Economic activity	Employment, income, tax revenue	Number of jobs, amount of labor income, tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
Quality of life	Recreation visitation	Number of recreation visits	No change due to management; visitor use expected to increase over time
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes	23% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users and may adversely affect OSV users; potential for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads
Environmental Justice	Low-income and minority populations	Change in cost of participating in recreation activities	Minor change in travel costs due to fewer open areas; climate change may increase distances winter recreation users must travel for adequate snow depth

*Cumulative Effects – Alternative 2***Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis**

Past, present, and reasonably foreseeable projects in the planning area include vegetation management, livestock grazing, and prescribed burns. These actions have the potential to temporarily restrict or displace recreation use. However, none of the actions are expected to measurably affect annual recreation use, visitor spending, and associated employment, labor income, and tax revenue. Therefore, no cumulative effects related to economic activity are anticipated. The temporary displacement of recreation use may affect quality of life if preferred sites are temporarily unavailable. However, such effects are expected to be infrequent and minor. Temporary displacement is not expected to increase conflict between motorized and non-motorized recreation users. Finally, these past, present, and reasonably foreseeable actions may affect travel costs if visitors must travel farther because preferred recreation sites are temporarily unavailable. However, since displacement would be infrequent and minor, effects to travel costs are not expected to meaningfully add to the potential environmental justice effects described in the direct and indirect effects analysis.

Table 139. Resource indicators and measures for alternative 2 cumulative effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2 Cumulative Effects
Economic activity	Employment, income, tax revenue	Number of jobs, amount of labor income, tax revenue	No effects to employment, labor income, and tax revenue are expected
Quality of life	Recreation visitation	Number of recreation visits	Infrequent and minor displacement not expected to change number of recreation visits
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes	Infrequent and minor displacement not expected to change user conflict or quality of life
Environmental Justice	Low-income and minority populations	Change in cost of participating in recreation activities	No measurable change in travel costs

Alternative 3

Alternative 3 is described in detail in chapter 2 of the EIS. Alternative 3 was developed to address the non-motorized recreational experience issue.

*Direct and Indirect Effects - Alternative 3***Economic Activity**

Alternative 3 would decrease the acres open to public OSV use to 834,660 acres, a 13 percent reduction from existing conditions. Alternative 3 would designate 316 miles of snow trails on National Forest System lands and groom 349 miles of snow trails on National Forest System lands and adjacent non-National Forest System lands. This is a reduction in designated trails of 7 miles compared to the modified proposed action, but the miles of groomed trails are consistent with both the no-action and modified proposed action alternatives. As stated in the assumptions, based on observational evidence, OSV visitor use is driven by the miles of groomed trails. Therefore, alternative 3 is not expected to change recreational visitor use compared to the no-action and modified proposed action alternatives. As a result, recreation-related employment, labor income, and tax revenue would not change relative to the no-action and modified proposed action alternatives.

Quality of Life

The values, beliefs, and attitudes discussion above identified several key issues related to OSV use on the Lassen National Forest and quality of life for visitors and area residents. In particular, commenters discussed recreation opportunities and user conflict. Alternative 3 would close 315,360 acres to OSV use (186,000 acres are closed to OSVs under current management), which is a 70 percent increase from existing conditions. Therefore, alternative 3 would improve quality of life for non-motorized winter recreation users relative to both the no-action alternative and the modified proposed action. The increase in acres closed to public OSV use may alleviate some concerns expressed by non-motorized winter recreation users related to vehicle exhaust fumes, disparities in speed, noise, and competition for fresh powder. Although the miles of groomed snow trails would not change relative to current conditions, some OSV users may feel that the reduction in open acres adversely affects their quality of life by reducing the acreage available for cross-county OSV travel relative to existing conditions.

Alternative 3 would continue to groom OSV trails in close proximity to the Caribou Wilderness boundary and to the boundary of Lassen Volcanic National Park. Additionally, non-motorized and motorized users would continue to share trailheads for access. Therefore, the potential for user conflict to adversely affect quality of life would continue under alternative 3.

Environmental Justice

Alternative 3 would prohibit public OSV use below 3,500 feet in elevation and would reduce acres open to public OSV use relative to both the no-action and modified proposed action alternatives. These changes may require some OSV users to travel farther to recreate on the forest. However, miles of groomed trails will not change, so the effect of the closures on travel costs is expected to be minor. Like the no-action and modified proposed action alternatives, climate change may affect travel costs due to reduced precipitation and warmer winters. Low-income individuals would be disproportionately affected by changes in the cost of participating in winter recreation on the forest. Overall, alternative 3 is expected to have a minor effect on recreation travel costs.

Table 140. Resource indicators and measures for alternative 3 direct and indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 3 Direct and Indirect Effects
Economic activity	Employment, income, tax revenue	Number of jobs, amount of labor income, tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
Quality of life	Recreation visitation	Number of recreation visits	No change due to management; visitor use expected to increase over time
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes	70% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users and may adversely affect OSV users; potential for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads
Environmental Justice	Low-income and minority populations	Change in cost of participating in recreation activities	Minor change due to prohibition on OSV use below 3,500 feet in elevation and reduced open acres; climate change may increase distances winter recreation users must travel for adequate snow depth

Cumulative Effects – Alternative 3

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

The cumulative effects under alternative 3 would be similar to the cumulative effects described under alternative 2.

Alternative 4

Alternative 4 is described in detail in chapter 2 of the EIS. Alternative 4 was developed to address the motorized recreational experience issue.

Direct and Indirect Effects - Alternative 4

Economic Activity

Alternative 4 would decrease the acres open to OSV use to 958,930 acres, a less than 1 percent reduction from existing conditions. Alternative 4 would designate 398 miles of snow trails on National Forest System lands and groom 349 miles of snow trails on National Forest System lands and adjacent non-National Forest System lands. This is an increase in designated trails of 75 miles compared to the modified proposed action, but the miles of groomed trails are consistent with all other alternatives. As stated in the assumptions, based on observational evidence, OSV visitor use is driven by the miles of groomed trails. Therefore, alternative 4 is not expected to change recreational visitor use compared to the other alternatives analyzed in this EIS. As a result, recreation-related employment, labor income, and tax revenue would not change relative to the no-action alternative.

Quality of Life

The values, beliefs, and attitudes discussion above identified several key issues related to public OSV use on the Lassen National Forest and quality of life for visitors and area residents. In particular, commenters discussed recreation opportunities and user conflict. Alternative 4 would close 191,090 acres to OSV use (186,000 acres are closed to OSVs under current management), which a 3 percent increase from existing conditions. Alternative 4 would close fewer acres to OSV use than the other action alternatives (modified proposed action and alternative 3). In addition, alternative 4 would allow OSV use below 3,500 feet in elevation where snow depths are adequate. The net effect on motorized and non-motorized quality of life is expected to be consistent with current conditions and the no-action alternative.

Alternative 4 would continue to groom OSV trails in close proximity to the Caribou Wilderness boundary and to the boundary of Lassen Volcanic National Park. Additionally, non-motorized and motorized users would continue to share trailheads for access. Therefore, the potential for user conflict to adversely affect quality of life would continue under the modified proposed action.

Environmental Justice

Alternative 4 would allow public OSV use below 3,500 feet in elevation where snow depths are adequate and it would decrease acres open to public OSV use by less than 1 percent. Therefore, management actions are not expected to affect the travel costs of motorized winter recreation users relative to current conditions. The environmental justice consequences are the same as described under the no-action alternative.

Table 141. Resource indicators and measures for alternative 4 direct/indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 4 Direct and Indirect Effects
Economic activity	Employment, income, tax revenue	Number of jobs, amount of labor income, tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
Quality of life	Recreation visitation	Number of recreation visits	No change due to management; visitor use expected to increase over time
Quality of life	Values, beliefs, and attitudes	Qualitative evaluation of public values, beliefs, and attitudes	No net change in quality of life relative to current conditions; user conflict may increase due to population growth and increased visitor use
Environmental Justice	Low-income and minority populations	Change in cost of participating in recreation activities	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth

Cumulative Effects – Alternative 4

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

The cumulative effects under alternative 4 would be similar to the cumulative effects described under alternative 2.

Summary

Table 142 displays a comparison of each alternative’s socioeconomic consequences.

Table 142. Summary comparison of environmental effects to socioeconomic resources

Resource Element	Indicator/ Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Economic activity	Employment, income, tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue	No change due to management; increased visitor use over time would increase number of jobs, labor income, and tax revenue
Quality of life	Recreation visitation	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time	No change due to management; visitor use expected to increase over time
Quality of life	Values, beliefs, and attitudes	No net change in quality of life relative to current conditions; user conflict may increase due to population growth and increased visitor use	23% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users; potential for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads	70% increase in acres closed to OSV use would benefit quality of life of non-motorized winter recreation users; potential for continued user conflict due to trails in proximity to wilderness, national park, and shared trailheads	No net change in quality of life relative to current conditions; user conflict may increase due to population growth and increased visitor use
Environmental Justice	Low-income and minority populations	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth	Minor change in travel costs due to reduction in acres open to public OSV use; climate change may increase distances winter recreation users must travel for adequate snow depth	Minor change in travel costs due to prohibition on OSV use below 3,500 feet in elevation and reduction in acres open to public OSV use; climate change may increase distances winter recreation users must travel for adequate snow depth	No change due to management; climate change may increase distances winter recreation users must travel for adequate snow depth

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

The no-action alternative would not be in compliance with Subpart C of the Travel Management Regulation, which requires designation of roads, trails, and areas on National Forest System lands to provide for OSV use.

The modified proposed action, alternative 3, and alternative 4 would be in compliance with Subpart C of the Travel Management Regulation. These alternatives would also be in compliance with the Forest Plan direction to provide diverse off-highway and winter recreation opportunities.

This section of the EIS satisfies requirements for socioeconomic analysis, as identified in the “Relevant Laws, Regulations, and Policy” section (page 406).

Noise Impacts

This analysis considers and discloses the potential acoustic impacts of sound related to the following proposed actions:

- Designating roads, trails and areas for over-snow vehicle (OSV) use
- Identifying snow trails for grooming for OSV use

This analysis compares alternatives that would result in varying levels of snowmobile use on the Lassen National Forest.

Relevant Laws, Regulations, and Policy

Regulatory Framework

National Forest Management Act

Specifically for Off-Highway Vehicle management, the National Forest Management Act (NFMA) requires that this use be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System (NFS) lands. NFMA also requires that a broad spectrum of forest and rangeland-related outdoor recreation opportunities be provided that respond to current and anticipated user demands.

Sierra Nevada Forest Plan Amendment

The Sierra Nevada Forest Plan Amendment established standards and guidelines specific to wheeled motor vehicle travel off of designated routes, trails, and limited off-highway vehicle (OHV) use areas. Unless otherwise restricted by current Forest Plans or other specific area standards and guidelines or Forest Orders, cross-country travel by OSVs would continue (Forest-wide Standard and Guideline number 69 (USDA Forest Service 2009b)).

Land and Resource Management Plan

The Lassen National Forest Land and Resource Management Plan (LRMP or Forest Plan) provides standards and guidelines for areas that are relevant to this noise analysis as follows:

Forest Goals:

Wilderness and Further Planning Areas

- a. Protect Wilderness character in designated and recommended wilderness

Standards and Guidelines:

15. Recreation

(a)(3). Manage recreation according to the Recreation Opportunity Spectrum (ROS) classes described in the ROS User's Guide, as specified in Appendix J [of the Forest Plan], and the Management Prescriptions. Refer to the separate ROS Map for the distribution of ROS classes throughout the forest.

(b)(6) Minimize user conflicts by specifying allowable winter use on certain roads and trails (for example cross-country ski trails, snowmobile-only trails or winter 4-wheel drive only).

Desired Condition

The desired outcome of this OSV use designation process is a manageable, designated OSV system of trails and areas within the Lassen National Forest, which is consistent with and achieves the purposes of the Forest Service Travel Management Rule at 36 CFR Part 212, Subpart C. The system of trails and areas would provide access, ensure that OSV use occurs when there is adequate snow, promote the safety of all users, enhance public enjoyment, minimize impacts to natural and cultural resources, and minimize conflicts among the various uses.

Management Area

The following management areas are relevant to providing both motorized recreation opportunities, and quiet non-motorized recreation opportunities.

M – Semi-Primitive Motorized Recreation

This prescription is derived from the ROS class of semi-primitive motorized (SPM) (see Appendix J of the LRMP for the definition of this class). It is intended to facilitate dispersed, motorized recreation, such as snowmobiling, four-wheel driving, and motorcycling, in areas essentially undisturbed except for the presence of four-wheel drive roads and trails. Non-motorized activities such as hiking, fishing, hunting, picnicking, and cross-country skiing are also possible. Motorized travel may be seasonally prohibited or restricted to designated routes to protect other resources. (LRMP 4-60)

N – Semi-Primitive Non-Motorized Recreation:

This prescription is derived from the ROS class of semi-primitive non-motorized (SPNM) (See Appendix J of the LRMP for the definition of this class). It is intended to facilitate dispersed recreation such as hiking, mountain bicycling, horseback riding, hunting, and cross-country skiing in unroaded, essentially undisturbed areas outside of existing and proposed wilderness areas. Motorized recreation is prohibited (LRMP 4-63).

Prohibit motorized recreation, including four wheel driving, motorcycling, and snowmobiling (LRMP 4-64)

S – Special Areas

Recreation: 2. Prohibit motorized vehicles within Research Natural Areas (LRMP 4-68)

Wild and Scenic Rivers: 1. Allow public recreation and other resource use activity based on the recommended category of each river segment. (LRMP 4-69)

W – Wilderness Prescription

The prescription specifies management direction in accordance with the Wilderness Act of 1964, assuming no permanent or long-lasting evidence of human use. Motorized and mechanized equipment is prohibited (LRMP 4-76).

Special Area Designations

Special Area Designations within the Lassen National Forest that are relevant to the noise analysis include Wilderness, proposed wilderness, Inventoried Roadless Areas, and National Trails.

Federal Law

The proposed OSV designations will be reviewed to determine their consistency with the following applicable laws, regulations and policies:

- Wilderness Act of 1964 and applicable Wilderness Implementation Plans
- National Trails System Act of 1968 (P.L. 90-543) and the Pacific Crest National Scenic Trail Comprehensive Plan
- 2001 Roadless Area Final Rule (36 CFR Part 294)
- 2005 Travel Management Rule – Subpart C (36 CFR Parts 212 and 261) as amended in 2015 - Use by Over Snow Vehicles (Travel Management Rule)

Executive Orders

Executive Order 11644 of February 8, 1972, as amended by Executive Order 11989 of May 24, 1977 and by Executive Order 12608 of September 9, 1987, requires certain federal agencies, including the Forest Service, to “ensure that the use of off-road vehicles on public lands [is] controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.”

State and Local Law

California Vehicle Code (CVC) Section 27200 – regulates noise emitted by vehicles.

CVC Section 27203 limits noise at 82 dBA for snowmobiles manufactured after 1972. Noise levels generated by OSVs are further limited through manufacturer restrictions. Snowmobiles produced since February 1, 1975 and certified by the Snowmobile Safety and Certification Committee’s independent testing company emit no more than 78 dBA from a distance of 50 feet while traveling at full throttle when tested under the Society of Automotive Engineers (SAE) J192 procedures. Additionally, those produced after June 30, 1976 and certified by the Snowmobile Safety and Certification Committee’s independent testing company emit no more than 73 dBA at 50 feet while traveling at 15 mph when tested under SAE J1161 procedures (California Department of Parks and Recreation 2010).

OSV use on county roads and National Forest System lands are subject to the state standards described above. The Lassen LRMP does not identify standards and guidelines regulating noise emissions of forest activities (California Department of Parks and Recreation 2010).

Issues Addressed in This Analysis

OSV Designations

The existing system of public OSV snow trails and areas on the Lassen National Forest is the culmination of multiple agency decisions over recent decades. Public OSV use of the majority of this available system continues to be manageable and consistent with the Travel Management Regulations.

Exceptions have been identified, based on internal and public input and the criteria listed at 36 CFR §212.55. These include needs to provide improved access for public OSV users and to formalize prohibitions required by Forest Plan and other existing management direction. These exceptions represent additional needs for changes in how public OSV use is managed on the Lassen National Forest, and in these cases, changes are proposed to meet the overall objectives.

Improve Public OSV Access

Currently, the Forest Service requires 12 or more inches of snow on the ground for the public to operate an OSV on the Lassen National Forest. Although 12 inches of snow may exist at a given time in many higher elevation areas, there may be less than 12 inches of snow at trailheads, which under current regulations, would leave areas with 12 or more inches of snow inaccessible to public OSV use. To improve public OSV access to designated areas open to OSV use, the modified proposed action would allow public OSV use on snow trails designated for OSV use that are located over existing roads, as long as there are at least 6 inches of snow on the ground.

Ensure OSVs are Operated on Adequate Snow to Minimize Impacts to Natural and Cultural Resources

The Forest Service has also identified areas in which public OSV use should not be designated (i.e., not be allowed), but there are no existing orders or directives that have formally prohibited public OSV use within them. These areas total 42,890 acres in addition to the 186,000 acres of National Forest System land where OSV use is currently prohibited.

These areas are either in lower elevations that do not typically receive sufficient snow for OSV use; are interspersed among areas where OSV use is currently prohibited, such as Wilderness, proposed wilderness, and areas classified as semi-primitive non-motorized in the recreation opportunity spectrum; have limited access, except from adjacent private land; are not managed consistent with the Forest Plan, which would prohibit motorized use in the area; or are small areas adjacent to pedestrian trails upon which motorized use is currently prohibited. The modified proposed action would not designate these types of areas for public OSV use.

There are also approximately 12 miles of ungroomed OSV trails located within areas where OSV use is currently prohibited. These trails typically extend a short distance into non-motorized areas and reach a dead end. These non-motorized areas are designated as semi-primitive non-motorized in the Forest Plan. The non-motorized areas where these motorized trails are located are designated as semi-primitive non-motorized in the Forest Plan. The Forest Plan prohibits motorized recreation, including four-wheel driving, motorcycling, and snowmobiling in semi-primitive non-motorized areas. These semi-primitive non-motorized areas are designated in the Forest Plan as management prescription “N” (Forest Plan, page 4-63). The proposed action would not designate these 12 miles of ungroomed trail for OSV use.

Identification of Snow Trails for Grooming

For more than 30 years, the Forest Service, Pacific Southwest Region, in cooperation with the California Department of Parks and Recreation (California State Parks) Off-highway Motor Vehicle Division has enhanced winter recreation, and more specifically, snowmobiling recreation by grooming snow trails for snowmobile use. On the Lassen National Forest, all groomed trails are co-located on underlying roads. Some of the Forest Service’s grooming occurs on county roads and closed snow-covered highways not under Forest Service jurisdiction. Grooming activities are funded by the State off-highway vehicle trust fund.

In addition to complying with the settlement agreement with Snowlands Network et al., the snow trail grooming analysis would also address the need to provide a high-quality OSV trail system on the Lassen National Forest that is smooth and stable for the rider. Groomed snow trails are designed so that the novice OSV rider can use them without difficulty.

Considering potential impacts of the sounds associated with OSV use and the ancillary activities of operating plowing and grooming equipment associated with the winter OSV activities is important to minimizing impacts on recreational and wildlife resources.

Non-significant Issues

Noise Impacts

Designating snow trails and areas for public OSV use and grooming snow trails for public OSV use have the potential to generate anthropogenic noise and increase noise levels above ambient levels in the short term. This has the potential to adversely impact wildlife species that are sensitive to this sort of disturbance as well as the experience of the recreational user who values solitude and quiet recreational opportunities.

Measurement Indicators

Potential effects from noise are analyzed using the following indicator measures:

- Opportunities for motorized winter uses – Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management;
- OSV designations – Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use.

The GIS noise model will consider:

- Proximity of predicted noise increases above ambient levels in sensitive areas to include:
 - Points along the Pacific Crest Trail
 - OSV trails near Wilderness areas;
 - OSV trails near communities;
 - OSV trails brought forward by the public as concern areas during scoping (Butte Lake area);
 - Plowed OSV trailheads

Table 143. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure (Quantify if possible)	Used to address: Purpose and Need (P/N), or Issue?	Source (LRMP S&G ⁴¹ ; law or policy, BMPs ⁴² , etc.)?
Noise	Opportunities for motorized winter uses	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management;	Yes	Minimization Criteria: 36 CFR §212.55(b)(3): Consider effects on the following with the objective of minimizing: Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands; and (4) Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands. In addition, the responsible official shall consider: (5) Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.
	OSV designations	Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use.	Yes	

Methodology

This analysis uses SPreAD-GIS (Version 2.0), an ArcGIS toolbox for modeling the propagation of engine noise in a wildland setting. SPreAD-GIS is based on the System for the Prediction of Acoustic Detection, a model developed by the Forest Service and Environmental Protection Agency to predict and plan for recreation opportunities in national forests. Input data includes commonly available datasets including:

- Digital elevation model (DEM)
- Land cover
- Local weather conditions (average air temperature, relative humidity, wind speed and direction for given season)
- Sound source characteristics (from a table of built in source types)
- Ambient sound conditions (a tool is available to estimate this based on land cover and a table of background sound for various environmental conditions.)

Spatial Context:

- Forest Boundary

⁴¹ Standard and Guideline

⁴² Best Management Practices

Effects Timeframe:

- Short-term effects occur within one year.
- Long-term effects occur up to 20 years.

Affected Environment

Existing Condition

The Forest Service has a well-developed winter recreation program on the Lassen National Forest which emphasizes snowmobile use and includes 323 miles of snowmobile trails that connect to six well-placed developed staging areas. It also includes over 2,400 miles of ungroomed and unmarked trails located over existing roads that are not maintained in winter for wheeled vehicle use, but are located in areas open to cross-country OSV use.

For over 30 years, the Forest Service, Pacific Southwest Region, in cooperation with the California Department of Parks and Recreation (California State Parks) Off-highway Motor Vehicle Division has enhanced winter recreation, and more specifically, snowmobiling recreation by maintaining National Forest System trails (snow trails) by grooming snow for snowmobile use. Plowing of local access roads and trailhead parking lots, grooming trails for snowmobile use, and light maintenance of facilities (e.g., restroom cleaning, garbage collection) are the essential elements of the OSV program that keep the national forests open for winter recreation use.

The groomed OSV trail systems on the Hat Creek, Eagle Lake, and Almanor Ranger Districts are described in detail in the Recreation section of this analysis.

Noise

The sounds associated with OSV use and the ancillary activities of operating plowing and grooming equipment associated with the winter OSV activities may be interpreted as noise with potential impacts to other recreational uses, and wildlife resources. These effects are specifically addressed in the Recreation and Wildlife sections of this analysis.

Sound is a physical phenomenon, a vibration in the air that can be measured. Noise is an interpretation of sound, or a sound that has characteristics that may irritate or annoy a listener, interfere with a listener's activity, or in some other way be distinguished as unwanted (Harrison et al 1980).

The acoustic impact of sound can be determined by measuring the inherent characteristics of the sound and considering that in conjunction with the setting in which the sound is heard and the individual attributes of the listener. Whether sounds are determined to be acceptable, or are interpreted as noise depends on the values and desires of the person making the judgement (Harrison et al 1980).

As noted in the Recreation section of this analysis, conflict between motorized and non-motorized winter users arise due to differing desired recreation experiences, public safety concerns, noise, air quality, and access issues. Public comments received during the scoping period for this analysis describe conflicts related to the creation of noise and air quality impacts that lead to the displacement of non-motorized users.

Areas of specific concern to non-motorized users who are typically seeking a quiet recreation setting that is not influenced by the sight, sound, or exhaust smell of motorized vehicles include cross-country ski trails, the Pacific Crest Trail, the Butte Lake area, Wilderness, proposed wilderness and semi-primitive non-motorized ROS classes.

Generally, human related sounds are more appropriate toward the rural and roaded end of the ROS spectrum and less toward the semi-primitive non-motorized and primitive end of the ROS spectrum (Harrison et al 2008). ROS classes are described in the Recreation section of this analysis.

Sound Propagation

Sound is measured by amplitude (decibels, dB) that determine loudness, frequency (Hertz, Hz) that determine pitch, and duration of the sound.

As sound waves travel away from the source, they lose energy (amplitude decreases). Several factors influence how far the sound will travel. Spherical spreading loss refers to the fact that a sound's loudness decreases as the distance between the source and the listener increases. Atmospheric absorption loss refers to sound waves being transferred to, or absorbed by the atmosphere. This varies with air temperature, elevation, relative humidity, vegetation and ground cover. Long distance loss refers to refraction of sound due to varying air temperatures or wind directions and diffraction or scattering of sound waves around a barrier (Harrison et al 1980).

Background or ambient sound levels influence how noticeable a given sound may be, and the setting in which it is heard influences how appropriate that sound may be.

Table 144. Resource indicators and measures for the existing conditions and Alternative 1

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Existing Condition
Noise	Opportunities for motorized winter uses	Size of areas (acres) open to public, cross-country OSV use	964,020 acres open to public, cross-country OSV use
	OSV designations	Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use.	2,760 miles of groomed and ungroomed trails identified for OSV use/349 miles groomed for OSV use

Environmental Consequences

Alternative 1 – No Action

Under alternative 1, there would be no changes to the existing system of OSV use on roads, trails, and areas within the Lassen National Forest except as prohibited by Forest Order. In addition, only those seasonal restrictions as specified in the Lassen Forest Plan and contained in existing forest orders would be continued. The 2005 Travel Management Rule, subpart C, would not be implemented, and no OSV use map would be produced. 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.

Noise

Under the no-action alternative, 964,020 acres would remain open to OSV use and the associated influence of OSV noise. Noise sources of multiple OSVs and vehicles would be concentrated at plowed OSV trailheads, and more dispersed along groomed trails. Of the 964,020 acres open to OSV use, only approximately 304,820 acres are anticipated to have high to moderate OSV use levels (see maps in the recreation section of this analysis) and the associated potential noise impacts.

Conflicts between motorized and non-motorized winter experiences on the Lassen are currently minor and infrequent, existing conflicts would continue and may increase as population and visitor use increase.

Occasional incursions into adjacent Wilderness areas and non-motorized areas on other Federal lands would continue to occur, and possibly increase as population and visitor use increase. Ongoing OSV use near designated non-motorized areas could result in short-term impacts to solitude. OSV use across, and adjacent to the PCT would continue, with the potential for ongoing noise related impacts to non-motorized trail users, when OSVs are present near the trail.

Alternative 2 – Proposed Action

The modified proposed action is described in detail in chapter 2. Alternative 2 would designate 921,130 acres of National Forest System lands within the Lassen National Forest for public, cross-country OSV use when snow depth is adequate for that use to occur. Trails designated for public OSV use when snow depth is adequate for that use to occur would total 323 miles. All existing OSV prohibitions applying to areas or trails would continue. Alternative 2 would identify approximately 349 miles of snow trails that would be groomed for public OSV use by the Forest Service's Lassen National Forest Grooming Program. The California State Parks' snow grooming standards would be formally adopted, requiring a minimum of 12 inches of snow depth before grooming can occur.

Alternative 2 would implement a forest-wide snow depth requirement for OSV use that would provide for public safety and natural and cultural resource protection by allowing public, cross-country OSV use in designated areas when there is a minimum of 12 inches of snow covering the landscape; and allowing public OSV use on designated snow trails when there are six or more inches of snow covering the trail. Except for approximately 0.1-mile of OSV trail (which would require 12 or more inches of snow for OSV use), all snow trails to be designated for public OSV use or identified for OSV grooming in all alternatives would overlay an existing paved, gravel, or native surface travel route. These travel routes are trails and roads used by wheeled, motorized vehicles, when allowed, and non-motorized recreation.

Alternative 2 would designate 28 public OSV crossing points of the Pacific Crest Trail on roads designated for wheeled, motorized vehicle use. Two of the Pacific Crest Trail crossing points that would be designated are adjacent to private land. This alternative would also establish a corridor for the Pacific Crest Trail, within which public OSV use would not be designated (public OSV use would be prohibited), except on 26 designated public OSV trails across this corridor.

Public OSV use would not be designated (would be prohibited) on approximately 228,890 acres, including all of the approximately 186,000 acres of the Lassen National Forest where public OSV use is currently prohibited, and 42,890 acres of areas currently open to OSV use that would not be designated for OSV use in this alternative

Public OSV use that is inconsistent with the designations and snow depth requirements made under this decision would be prohibited under 36 CFR Part 261.

Minimization Measures

Minimizing Conflicts between Motor Vehicle Use and Existing or Proposed Recreational Uses of National Forest System Lands or Neighboring Federal Lands (36 CFR §212.55(b)(3))

All Public OSV Use:

1. In alternative 2, only, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by identifying a non-motorized corridor in which public, cross-country OSV use would not be designated, along both sides of the Pacific Crest Trail. The width of this corridor zone would be based on the Recreational Opportunity Spectrum classification of the land in which the Pacific Crest Trail is located.

2. In alternative 2, only, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by designating OSV crossing points at intervals within limits specified by the Pacific Crest Trail Comprehensive Plan (USDA Forest Service 1982, pp. 18-19).
3. In alternative 2, only, the objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by designating OSV trails through the PCT corridor with the objective of minimizing the distance an OSV would travel to cross the corridor to the designated Pacific Crest Trail crossing point. These corridor crossings would, with the exception of 0.1 mile, exist as designated OSV trails located on roads and trails already designated for wheeled, motorized vehicles under subpart B of the Travel Management Regulations, where possible.
4. The objective of minimizing conflicts between OSV recreationists and non-motorized recreation enthusiasts on the Pacific Crest Trail would be addressed by installing additional signage along the Pacific Crest Trail as staffing and funding allow, to enhance wayfinding of winter OSV users. Agency signage procedures would be followed. As a guideline, trail markers would be at eye level, approximately 40 inches above the average snow depth.
5. The objective of minimizing conflicts between OSV use and other existing or proposed recreational use would be addressed by identifying the Pacific Crest Trail as non-motorized on the Over-snow Vehicle Use Map.
6. The objective of minimizing conflicts between OSV use and other existing or proposed recreational use would be addressed by encouraging public awareness and education regarding locations of non-motorized trails or areas where public OSV use is prohibited; considering additional signage; or applying other methods to minimize OSV encroachment in these areas.

Groomed Snow Trails:

1. The objective of minimizing conflicts between OSV trail groomers and other existing or proposed recreation uses would be addressed by coordinating the timing of trail grooming to minimize impact on recreation experiences.

Public, Cross-Country OSV Use:

1. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by encouraging public awareness and education regarding locations of non-motorized trails or areas where public OSV use would be prohibited. We would install additional signage or other methods to minimize OSV encroachment in these areas where necessary.
2. In alternative 2, only, the objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by not designating the area along Lake Almanor's south shoreline. Skiers use the bike trail in this area in the winter.
3. In alternative 2, only, the objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by not designating areas around the south end of Eagle Lake for OSV use in the modified proposed action. Skiers and fishermen use the lake in the winter. This would also buffer and protect the lake from potential OSV incursions on Eagle Lake trout (an important forest natural resource).
4. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by not designating specific areas around the perimeter of Lassen Volcanic National Park for public OSV use. These undesignated areas vary by alternative.

Monitoring to Minimize Conflicts:

1. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by monitoring Wilderness boundaries and other closed areas near groomed snow trails and areas open to OSV use for OSV incursions. We would coordinate and implement increased education or enforcement actions as needed.

2. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by monitoring trailheads and groomed trail areas for user conflicts and public safety concerns, coordinating and implementing site-specific controls as necessary (such as speed limits, segregated access points for motorized and non-motorized use, increased visitor information, or increased on-site management presence).
3. In alternative 3, only, the objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by monitoring to ensure that, where restricted, public OSV use is restricted to designated routes and is not encroaching outside the trail corridor in areas where such use is not allowed.

Minimizing Conflicts among Different Classes of Motor Vehicle Uses of National Forest System Lands or Neighboring Federal Lands (36 CFR §212.55(b)(4))

Groomed Snow Trails

1. The objective of minimizing conflicts between public OSV use and other existing or proposed recreational use would be addressed by prohibiting wheeled vehicle use of groomed snow trails from December 26 through March 31.

Direct and Indirect Effects - Alternative 2

Under alternative 2, 921,130 acres would remain open (designated) for OSV use and the associated influence of OSV noise. Noise sources of multiple OSVs and vehicles would be concentrated at plowed OSV trailheads, and more dispersed along groomed trails and in open areas. Of the 921,130 acres that would be designated for OSV use, only 304,820 acres are anticipated to have high to moderate OSV use levels (see maps in the recreation section of this analysis) and the associated potential noise impacts.

Using average environmental factors for the winter season on the Lassen National Forest and the SPreAD-GIS model, Map 1 in the noise specialist report shows the anticipated sound propagation away from point source sound locations along OSV trails. The trail points represent a snapshot in time, and were selected based on their proximity to important non-motorized trails and areas. OSV sound source points shown on Map 1 include the plowed OSV trailheads, points where OSV trails are near cross-country ski trails, designated Wilderness areas, and Lassen Volcanic National Park, and points where OSV trails cross the Pacific Crest Trail. The noise propagation contour lines on the map show how the OSV sound is expected to spread out from the source location given unique environmental, vegetation, and terrain conditions. The map also shows excess noise levels where the introduced OSV noise would be in excess of ambient sound conditions.

As shown in Map 2 in the noise specialist report: Sound Propagation near Caribou Wilderness Area, OSV noise along the groomed OSV trails near the Wilderness boundary may be heard from within the Wilderness area. This represents a short term disturbance to opportunities for solitude. This impact would be temporary and short-term as the OSV passes by on the trail.

Map 3 in the noise specialist report: Sound Propagation near the PCT and Cross Country Ski Trails shows the extent of potential noise impacts from OSV trails crossing the PCT, and near several non-motorized cross-country ski trails. The experience of non-motorized users along the PCT in the vicinity of OSV crossings would be temporarily impacted by noise from OSVs. Since 28 PCT crossings would be designated in this alternative, the potential for noise impacts is confined to the area near the designated crossings. Quiet recreation opportunities would be maintained on the rest of the trail by the proposed 10,460-acre Pacific Crest Trail non-motorized corridor. This would reduce the influence of noise that may be experienced under existing conditions, since there are currently no designated PCT crossings, and no restrictions on OSV use up to and adjacent to the trail. Potential noise impacts to cross-country ski trails

are generally concentrated near the plowed trailheads and less as both motorized and non-motorized users move away from the trailhead.

Map 4 in the noise specialist report: Sound Propagation near Lassen Volcanic National Park shows the extent of potential noise impacts at several points, near popular non-motorized recreation areas.

Additionally, in alternative 2, OSV use would be prohibited, and opportunities for solitude and quiet, non-motorized experiences would be enhanced in the following areas: the 27,400 acres in the southwest corner of Lassen National Forest that are not designated because there is limited access for OSVs due to the proximity to other non-motorized areas including the Ishi Wilderness, Mill Creek Proposed Wilderness, and semi-primitive non-motorized areas within the Ishi and Polk Springs Inventoried Roadless Areas. The 1,520 acre Deer Creek Anadromous Fish Closure that would run along the northwestern boundary of the Cub Creek Inventoried Roadless Area, the 1,840 acres along the southwest shore of Lake Almanor, and the 1,150 acres along the South Shore of Eagle Lake.

Ongoing monitoring for user conflicts would consider the influence of noise on recreational experiences. Site-specific sound modeling with the SPreAD-GIS program may be useful to analyze individual areas if future conflicts are identified through monitoring. The sound propagation model would help determine appropriate actions to help mitigate the conflicts related to noise.

Table 145. Resource indicators and measures for alternative 2 direct/indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 2 Direct/Indirect Effects
Noise	Opportunities for motorized winter uses	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management;	921,130 acres open to OSV use, a 4.5 percent decrease from existing conditions.
	OSV designations	Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use	323 miles of designated OSV trails/349miles groomed OSV trails

Cumulative Effects – Alternative 2

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present, and reasonably foreseeable projects in the project area include vegetation management (including timber sales, fire salvage, and restoration projects), livestock grazing, prescribed burns, and recreation. There are many on-going and scheduled projects identified on the Lassen National Forest which may increase the management presence across the forest.

Noise

The trailhead and parking lot plowing activities and OSV trail grooming activities would increase the noise associated with motorized vehicles in the forest setting; however, this would not be a change from existing conditions. Parking lot plowing would continue to occur during the day when OSV use also typically occurs, so the sounds generated by each activity could be cumulative. OSV trail grooming generally occurs at night when very few or no OSVs are operating, therefore the noise impacts from trail grooming would be less likely to be cumulative with other motor vehicle sounds, but may be more noticeable since the ambient sound conditions are typically quieter during the night.

Non-motorized winter visitors to the Lassen National Forest could experience noise from OSVs, in addition to other noise such as snow plows, vehicles on roads, and aircraft that may be in the same area at the same time, cumulatively impacting the quiet recreation experience in the short term.

Alternative 3

Alternative 3 is described in detail in chapter 2. Alternative 3 was developed to address the non-motorized recreational opportunities significant issue. It includes components of the modified proposed action with several additions. OSV use would be prohibited in additional areas that are important for non-motorized recreation, including the Butte Lake Closure (OSV use prohibited except where restricted to the trail only) north of LVNP; areas below 3,500 feet on the Lassen National Forest; Fredonyer-Goumaz Closure (OSV prohibited except where restricted to trail only) between highways 36 and 44; McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17); Colby Mountain Closure; Southwest Shore Lake Almanor; South Shore Eagle Lake; and the Willard Hill Closure.

Alternative 3 would allow public OSV use on designated snow trails generally when there are 12 or more inches of snow covering the trail. This use would be allowed when there are as few as 6 inches of snow only where site review determines there would be no damage to underlying resources.

Grooming of OSV snow trails would be allowed, consistent with historical grooming practices, when there are 18 or more inches of snow. This alternative would groom the same snow trails for OSV use as the modified proposed action.

No PCT crossing points or corridor would be designated. OSV use would be allowed adjacent to, and across the PCT. The trail itself would remain non-motorized.

Project Design Features and Mitigation Measures

The project design features and mitigation measures listed for alternative 2 would apply, in addition to the following:

- Education on responsible practices, trail restrictions, or separations to reduce conflicts.

Direct and Indirect Effects - Alternative 3

Noise impacts associated with the groomed and ungroomed OSV trail system in alternative 3 would be the same as alternative 2.

Alternative 3 would prohibit OSV use on more acres than alternative 2, and would designate areas where motorized OSVs are restricted to designated trails. With additional areas closed or restricted to OSVs, the opportunities for non-motorized use (in areas not influenced by the sights, sounds and exhaust smells of OSV use) would be enhanced.

In addition to the areas described in alternative 2, OSV use would be prohibited, and opportunities for solitude and quiet, non-motorized experiences would be enhanced in the following areas: areas below 3,500 feet, the McGowen Lake, Colby Mountain, Southwest shore Lake Almanor, South shore Eagle Lake, and Willard Hill prohibitions, and the restriction to trails in the Butte Lake and Fredonyer-Goumaz areas. OSV closures in the area north of Caribou Wilderness (Butte Lake) and south of the Heart Lake and Wild Cattle Mountain Proposed Wilderness Areas (McGowen) would also help to minimize potential impacts from the sights and sounds of OSVs to solitude and quiet, non-motorized areas and to Lassen Volcanic National Park.

Potential impacts from OSV noise would continue along the PCT, as described in alternative 1.

Table 146. Resource indicators and measures for alternative 3 direct/indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 3 Direct/Indirect Effects
Noise	Opportunities for motorized winter uses	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management	834,660 acres open to OSV use, a 13.4 percent reduction from existing conditions.
	OSV designations	Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use	316 miles of designated OSV trails/349 miles of groomed OSV trails

Alternative 4

Alternative 4 is described in detail in chapter 2. Alternative 4 was developed to address the motorized recreational opportunities significant issue.

Alternative 4 would designate 398 miles of groomed and marked, but ungroomed snow trails. This would represent a reduction in the number of miles of trail where OSV use is currently allowed. However, approximately 99 percent of the OSV trails in the current trail system would be either designated for public OSV use or would be located in areas that would be designated for public, cross-country OSV use in this alternative. Alternative 4 would identify 349 miles of snow trails for grooming, as in the existing conditions.

In addition to areas where OSV use is already prohibited on the Lassen National Forest, alternative 4 proposes OSV prohibitions in the Blacks Mountain RNA, and the McGowen Lake Non-Motorized Area (North of Mineral, East of Rd. 17).

Public, cross-country OSV use would be allowed in designated areas as long as there are 12 or more inches of snow; and public OSV use on designated snow trails would be allowed when there are 6 or more inches of snow. The minimum snow depth for trail grooming to occur would be 12 inches.

OSV use would be allowed below 3,500 feet when there is adequate snow depth to prevent damage to underlying surface resources.

This alternative would groom the same snow trails for OSV use as the modified proposed action.

No PCT crossing points or corridor would be designated. OSV use would be allowed adjacent to, and across the PCT. The trail itself would remain non-motorized.

Direct and Indirect Effects - Alternative 4

Alternative 4 would allow OSV use on more acres than alternative 3, and slightly fewer acres than alternative 2. Allowing use of OSVs below 3,500 feet would enhance OSV opportunities when snow depths are adequate for use in that area, and with this use, additional acres would be subject to potential noise impacts from OSV use.

Potential impacts from OSV noise would continue along the PCT, as described in alternative 1.

Otherwise, noise impacts associated with the groomed and ungroomed OSV trail system in alternative 4 would be the same as alternative 2.

Table 147. Resource indicators and measures for alternative 4 direct and indirect effects

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Alternative 4 Direct/Indirect Effects
Noise	Opportunities for motorized winter uses	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management	958,930 acres open to OSV use, a 0.5 percent reduction from existing conditions.
	OSV designations	Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use	398 miles of designated OSV trails/349 miles of groomed OSV trails

Summary

Degree to Which the Purpose and Need for Action is Met

All of the action alternatives (alternatives 2, 3, and 4) would equally meet the purpose and need to effectively manage OSV use by identifying a manageable system of OSV trails and areas per Subpart C of the Travel Management Rule and to identify OSV trails for grooming to provide a high-quality OSV trail system.

Degree to Which the Alternatives Address the Issues

Table 148 provides a comparison of the alternatives and the degree to which the alternatives address the noise related issues.

Table 148. Summary comparison of how the alternatives address the issues

Issue	Indicator/Measure	Alt 1	Alt 2	Alt 3	Alt 4
Noise	Opportunities for motorized winter uses	964,020 acres open to OSV use and potentially affected by noise	921,130 acres open to OSV use and potentially affected by noise, a 4.5 percent decrease from existing conditions	834,660 acres open to OSV use and potentially affected by noise, a 13.4 percent decrease from existing conditions	958,930 acres open to OSV use and potentially affected by noise, a 0.5 percent decrease from existing conditions
	Size of areas (acres) open to public, cross-country OSV use; percentage change compared to current management	186,000 acres closed to OSV use and available for quiet recreation	228,890 acres closed to OSV use and available for quiet recreation, a 23 percent increase from existing conditions	315,360 acres closed to OSV use and available for quiet recreation, a 69.5 percent increase from existing conditions	191,090 acres closed to OSV use and available for quiet recreation, a 2.7 percent increase from existing conditions
	OSV designations Length of snow trails (miles), groomed and ungroomed, designated and identified for public OSV use	2,760 miles designated /349 miles groomed	323 miles designated /349 miles groomed	316 miles designated /349 miles groomed	398 miles designated /349 miles groomed

Summary of Environmental Effects

All action alternatives would provide the same level of groomed motorized OSV trail opportunities, and therefore the same degree of potential noise impacts associated with trail use. Cross-country travel, and use of OSV trails would be limited by minimum snow depth requirements for all action alternatives; however, alternative 4 would provide the least restrictive snow depth, 6 inches with no restrictions, for

use of OSV trails. Alternative 3 would also provide some flexibility in the snow depth requirements on specific trails where site review determines there would be no damage to underlying resources. This flexibility would allow OSV access to higher elevations and adequate snow depths. Alternative 4 would provide the most access for motorized OSV use forest wide, compared to alternatives 2 and 3, and therefore the greatest potential for noise impacts across the forest.

Alternative 3 would enhance opportunities for quiet, non-motorized recreation with the designation of areas where OSVs would be prohibited, or restricted to designated OSV trails, while maintaining the existing level of groomed OSV trail opportunities. Alternative 3 would minimize the potential impacts from noise associated with OSV use to a greater extent than alternatives 2 and 4.

Alternative 2 would maintain OSV opportunities, and associated potential for impacts from noise, most similar to the existing conditions on the Lassen National Forest.

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

Alternative 1, No Action, would not comply with Subpart C of the Travel Management rule that requires designation of roads, trails, and areas on NFS lands to provide for over-snow vehicle use. Alternative 1 would not implement the management area direction from the Lassen Forest Plan to prohibit motorized use in the Blacks Mountain Research Natural Area.

Alternatives 2, 3, and 4 would comply with Subpart C of the Travel Management rule and the Lassen Forest Plan.

Unavoidable Adverse Effects

Allowing motorized OSV use, which is an acceptable use of National Forest System lands would unavoidably affect non-motorized or quiet opportunities in some areas, as discussed in the analysis related to conflicts between motorized and non-motorized winter experiences.

Impacts on Air Quality

Air quality is a key resource and a valued element of the forest experience. Air quality is protected under several provisions of the Clean Air Act (CAA), including the Prevention of Significant Deterioration (PSD) program, the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). Potential impacts to air quality from winter use on the Lassen National Forest relate to OSV⁴³ emissions. This analysis describes the existing condition of air quality on the Lassen National Forest and evaluates the potential changes and effects of the alternatives on air quality.

Relevant Laws, Regulations, and Policy

Regulatory Framework

Land and Resource Management Plan

The Lassen National Forest Land and Resource Management Plan (LRMP) (USDA Forest Service 1992) provides standards and guidelines for Air Quality. The LRMP states Forest Standards and Guidelines call for compliance with State and local air quality requirements, and minimizing of smoke encroachment from prescribed burning (pg. 2-1).

The Forest Standards and Guidelines, with regard to OSV use, apply to the entire Forest.

- a. Maintain air quality to meet or exceed legal requirements of appropriate levels of Government.
 - (1) Comply with the Federal Clean Act, as amended, and State and local air quality regulations.

Federal Clean Air Act

In 1963, Congress passed the Federal Clean Air Act and amended the act in 1970, 1977, and 1990. The purpose of the act is to protect and enhance air quality while ensuring the protection of public health and welfare. The 1970 amendments established National Ambient Air Quality Standards, which must be met by most state and Federal agencies, including the Forest Service.

States are given the primary responsibility for air quality management. Section 110 of the Clean Air Act requires states to develop state implementation plans that identify how the State will attain and maintain National Ambient Air Quality Standards (NAAQS). The Clean Air Act also allows states, and some counties, to adopt unique permitting procedures and to apply more stringent standards. California has set standards for certain pollutants, such as particulate matter and ozone, which are more protective of public health than respective Federal standards. California has also set standards for some pollutants that are not addressed by Federal standards including sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles.

The Clean Air Act requires that Forest Service actions have “no adverse effect” on air resources by meeting the National Ambient Air Quality Standards and non-degradation standards for Class 1 areas. Managers are further directed to improve existing substandard conditions and reverse negative trends where practicable. The NAAQS and California Ambient Air Quality Standards (CAAQS) for particle

⁴³ An OSV is defined in the Forest Service’s Travel Management Rule as “a motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow” (36 CFR 212.1) (DEIS 2015).

pollution as set by the Clean Air Act and California Air Resources Board can be viewed online at the California Air Resources Board webpage.⁴⁴

National Ambient Air Quality Standards (NAAQS)

NAAQS requirements were established to protect human health and the environment and acceptable maximum air quality concentrations. The NAAQS consist of numerical standards for air pollution, which are broken into “primary” and “secondary” standards for six major air pollutants described below. Primary standards protect public health (including sensitive populations such as asthmatics, children, and the elderly) and represent levels at which there are no known major effects on human health. Secondary standards are intended to protect the nation’s welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. These standards are detailed in table 149 and its corresponding footnotes.

California Air Resources Board

California law authorizes the California Air Resources Board to set ambient (outdoor) air pollution standards (California Health & Safety Code section 39606) in consideration of public health, safety, and welfare. The Air Resources Board has established State Ambient Air Quality Standards (CAAQS) to identify outdoor pollutant levels considered safe for the public. After State standards are established, State law requires the Air Resources Board to designate each area as attainment, nonattainment, or unclassified for each State standard. The area designations, which are based on the most recent available data, indicate the healthfulness of air quality throughout the State (ARB 2015). The State and National Ambient Air Quality Standards are displayed in table 149 and its corresponding footnotes. (Further information can be found at: <http://www.arb.ca.gov/desig/statedesig.htm>.)

The California Air Resources Board (ARB) is responsible for meeting the Clean Air Act requirements. The Air Resources Board has further delegated the authority to local Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMDs) for stationary sources, while retaining the authority for mobile sources. Air quality rules and regulations for California can be found at <http://www.arb.ca.gov/homepage.htm>. The APCD/AQMD has the primary responsibility for meeting the requirements of the Clean Air Act. This responsibility is carried out through the development and execution of State Implementation Plans (SIPs), which must provide for the attainment and maintenance of air quality standards.

State Implementation Plans are comprehensive plans that describe how an area will attain national ambient air quality standards (NAAQS). The 1990 amendments to the Federal Clean Air Act set deadlines for attainment based on the severity of an area's air pollution problem.

State Implementation Plans are a compilation of new and previously submitted plans, programs, district rules, state regulations and federal controls. State law makes the Air Resources Board the lead agency for all purposes related to the State Implementation Plan. Local air districts and other agencies prepare state implementation plan elements and submit them to the Air Resources Board for review and approval. The Air Resources Board forwards state implementation plan revisions to the U.S. Environmental Protection Agency (U.S. EPA) for approval and publication in the Federal Register. The Code of Federal Regulations Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP (<http://www.arb.ca.gov/planning/sip/background.htm>). The Forest Service is required to comply with all requirements of the California State Implementation Plan.

⁴⁴ <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>

Table 149. State and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards ¹		National Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone (O ₃) ⁸	1 hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	---	Same as Primary Standard	Ultraviolet Photometry
	8 hour	0.070 ppm (137 µg/m ³)		0.070 ppm (137 µg/m ³)		
Respirable Particulate Matter (PM ₁₀) ⁹	24 hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m ³		---		
Fine Particulate Matter (PM _{2.5}) ⁹	24 hour	---	---	35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	12.0 µg/m ³		
Carbon Monoxide (CO)	1 hour	20 ppm (23 mg/m ³)	Non-dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m ³)	---	Non-dispersive Infrared Photometry (NDIR)
	8 hour	9.0 ppm (10 mg/m ³)		9 ppm (10 mg/m ³)	---	
	8 hour (Lake Tahoe)	6 ppm (7 mg/m ³)		---	---	
Nitrogen Dioxide (NO ₂) ¹⁰	1 hour	0.18 ppm (339 µg/m ³)	Gas Phase	100 ppb (188 µg/m ³)	---	Gas Phase
	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	Chemiluminescence	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Chemiluminescence
Sulfur Dioxide (SO ₂) ¹¹	1 hour	0.25 ppm (655 µg/m ³)	Ultraviolet Fluorescence	75 ppb (196 µg/m ³)	---	Ultraviolet Fluorescence Spectrophotometry (Pararosaniline Method)
	3 hour	---		---	0.5 ppm (1300 µg/m ³)	
	24 hour	0.04 ppm (105 µg/m ³)		0.14 ppm (for certain areas) ¹⁰	---	
	Annual Arithmetic Mean	---		0.030 ppm (for certain areas) ¹⁰	---	
Lead ^{12,13}	30 Day Average	1.5 µg/m ³	---	---	---	---
	Calendar Quarter	---	Atomic Absorption	1.5 µg/m ³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average	---	---	0.15 µg/m ³		
Visibility Reducing Particles ¹⁴	8 hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 hour	25 µg/m ³	Ion Chromatography			
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence			
Vinyl Chloride ¹²	24 hour	0.01 ppm (26 µg/m ³)	Gas Chromatography			

Source: California Air Resources Board (5/4/16) (See footnotes on next page.)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above $150 \mu\text{g}/\text{m}^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from $15 \mu\text{g}/\text{m}^3$ to $12.0 \mu\text{g}/\text{m}^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at $35 \mu\text{g}/\text{m}^3$, as was the annual secondary standard of $15 \mu\text{g}/\text{m}^3$. The existing 24-hour PM10 standards (primary and secondary) of $150 \mu\text{g}/\text{m}^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO₂ standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO₂ national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard ($1.5 \mu\text{g}/\text{m}^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Regional Haze Rule (1990 Clean Air Act Amendments, 40 CFR Part 5)

The Federal Clean Air Act of 1977 declared a national goal to remedy existing visibility impairment and prevent future haze caused by man-made air pollution at selected national parks and wilderness areas of the United States, known as Class 1 Areas. California has 29 mandatory Class 1 Areas managed by either the National Parks Service or the U.S. Forest Service (more than any other state). In 1999, the U.S. Environmental Protection Agency (U.S. EPA) promulgated a regional haze regulation (40 CFR 51.308-309) that calls for states to establish goals and emission reduction strategies to make initial improvements in visibility at their respective Class 1 Areas. Visibility variation occurs as a result of the scattering and

absorption of light by particles and gases in the atmosphere. It also mandates each state to develop a Regional Haze State Implementation Plan to incorporate measures necessary to make reasonable progress towards national visibility goals. In 2009, the Air Resources Board (ARB) prepared a Regional Haze Plan (RH Plan) for California demonstrating reasonable progress in reducing haze by 2018, the first benchmark year on the path to improved visibility. U.S. EPA funded five Regional Planning Organizations throughout the country to coordinate regional haze rule-related activities between states in each region. California belongs to the Western Regional Air Partnership (WRAP), the consensus organization of western states, tribes, and federal agencies, which oversees analyses of monitoring data and preparation of technical reports regarding regional haze in the western United States.

Criteria Pollutants Regulated by EPA

Ozone (O₃) is the most widespread air quality problem in the state. It is a colorless gas with a pungent, irritating odor. Ozone, an important ingredient of smog, is a highly reactive and unstable gas capable of damaging the linings of the respiratory tract. This pollutant forms in the atmosphere through complex reactions between chemicals directly emitted from vehicles, industrial plants, and many other sources. Exposure to levels of ozone above the current ambient air quality standard can lead to human health effects such as lung inflammation and tissue damage and impaired lung functioning. The ozone that ARB regulates as an air pollutant is produced close to the ground level, where people live, exercise and breathe. The California Air Resources Board (ARB) is concerned about ozone pollution because of its effects on the health of Californians and the environment (ARB 2015).

In April 2005, the Air Resources Board approved a new 9-hour standard of 0.070 ppm and retained the one-hour ozone standard of 0.09 after an extensive review of the scientific literature. (ARB 2015)

Particulate Matter 2.5 (PM 2.5) is the term for particles found in the air, including dust, dirt, soot, smoke and liquid droplets. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. Particles less than 10 micrometers pose a health concern because they can be inhaled into and accumulate in the respiratory system. PM 2.5 are referred to as “fine” particles and believed to pose the greatest health risks. Sources include motor vehicles, power plants, wood burning. (source: EPA.gov)

Particulate Matter 10 (PM 10) are the larger particles between 2.5 and 10 micrometers found in the air including smoke and dust from factories, farming, roads, mold, spores and pollen. Major concerns for human health from exposure to PM-10 include: effects on breathing and respiratory systems, damage to lung tissue, cancer, and premature death. Acidic PM-10 can also damage human-made materials and is a major cause of reduced visibility in many parts of the U.S. (source: EPA.gov)

Lead (Pb) is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been from fuels in on-road motor vehicles (such as cars and trucks) and industrial sources. As a result of EPA's regulatory efforts to remove lead from on-road motor vehicle gasoline, emissions of lead from the transportation sector dramatically declined by 95 percent between 1980 and 1999, and levels of lead in the air decreased by 94 percent between 1980 and 1999. Today, the highest levels of lead in air are usually found near lead smelters. The major sources of lead emissions to the air today are ore and metals processing and piston-engine aircraft operating on leaded aviation gasoline. (source: EPA.gov)

Nitrogen Dioxide (NO₂) is a reddish-brown gas with an irritating odor. It is emitted from motor vehicles, industrial facilities, and power plants. Indoors, home heaters and gas stoves also produce substantial amounts of NO₂. Nitrogen dioxide and nitric oxide are products of all types of combustion. Nitric oxide reacts with hydrocarbons in the presence of sunlight to form nitrogen dioxide. In the summer months

NO₂ is a major component of photochemical smog and an essential ingredient in the formation of ground-level ozone pollution. Exposure to NO₂ along with other traffic-related pollutants, is associated with respiratory symptoms, episodes of respiratory illness and impaired lung functioning. In February 2007, the Air Resources Board established a new annual average NO₂ standard of 0.030 ppm and lowered the one-hour NO₂ standard to 0.18 ppm, after an extensive review of the scientific literature (source: ARB 2015).

Carbon Monoxide (CO) A colorless, odorless gas, carbon monoxide is a byproduct of incomplete combustion and is emitted directly into the atmosphere, primarily from motor vehicle exhaust. Carbon monoxide concentrations typically peak nearest a source, such as roadways, and decrease rapidly as distance from the source increases. Carbon monoxide is readily absorbed into the body from the lungs. It decreases the capacity of the blood to transport oxygen, leading to health risks for unborn children and people suffering from heart and lung disease. The symptoms of excessive exposure—headaches, fatigue, slow reflexes, and dizziness—also occur in healthy people (source: ARB 2015)

Sulfur Dioxide (SO₂) A colorless gas with a strong, suffocating odor, sulfur dioxide is primarily a combustion product of coal, fuel oil, and diesel fuel. Only small quantities of SO₂ come from gasoline fueled motor vehicle exhaust. Sulfur Dioxide is emitted directly into the atmosphere and can remain suspended for days allowing for wide distribution of the pollutant. Sulfur dioxide can trigger constriction of the airways, causing particular difficulties for asthmatics. Children can experience increased respiratory tract infections and healthy people may experience sore throats, coughing, and breathing difficulties. Long-term exposure has been associated with increased risk of mortality from respiratory or cardiovascular disease (source: ARB 2015).

The California Air Resources Board has monitored the gaseous criteria pollutants carbon monoxide, nitrogen dioxide, ozone, and sulfur dioxide since its inception in 1968. Monitoring is performed to demonstrate attainment or non-attainment of national and state ambient air quality standards.

Desired Condition

The Lassen LRMP states for the desired future condition that present air quality is maintained. Baseline conditions for all air quality related values are defined and limits of acceptable change are established for Class 1 wilderness areas. (LRMP pg 4-2)

Issues

Designating roads, trails, and areas for OSV use and grooming trails for OSV use have the potential to generate exhaust and emit pollutants into the air. This has the potential to degrade air quality, which can impact recreational users and sensitive areas.

Resource Indicators and Measures

The air quality analysis is a qualitative discussion comparing miles of trails open to OSV use and acres open to OSV use. The resource indicators are shown in Table 150 and will be used throughout the analysis to compare the alternatives and their potential effects to air quality.

Table 150. Resource indicators and measures for assessing effects

Resource Element	Resource Indicator	Measure	Used to address: P/N, or key issue?	Source (LRMP S/G; law or policy, BMPs, etc.)?
Air Quality	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Miles of snow trail open to OSV visitor use.	No	Forest Standards and Guidelines (pg 4-15) Air Quality a. Maintain air quality to meet or exceed legal requirements of appropriate levels of government. 1. Comply with the Federal Clean Air Act, as amended, and state and local air quality regulations.
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Acres open to OSV visitor use.	No	Forest Standards and Guidelines (pg 4-15) Air Quality a. Maintain air quality to meet or exceed legal requirements of appropriate levels of government. 1. Comply with the Federal Clean Air Act, as amended, and state and local air quality regulations.
	Potential effects of OSV emissions to create adverse impacts to air quality.	Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	No	Forest Standards and Guidelines (pg 4-15) Air Quality a. Maintain air quality to meet or exceed legal requirements of appropriate levels of government. 1. Comply with the Federal Clean Air Act, as amended, and state and local air quality regulations. LRMP (pg. 3-3) Caribou, Thousand Lakes and Lassen Volcanic Wilderness Areas are designated as Class I areas, allowing no degradation in air quality.

Methodology

Information Sources

Information sources used for this analysis are listed below and represent the best available information that was available at the time of report writing.

- ArcMap and relevant Geographic Information System (GIS) data layers from the Lassen National Forest, Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) including county boundaries, air basin boundaries, air district boundaries and class 1 and 2 areas.
- GIS layer of proposed OSV designations and groomed trails
- Lassen National Forest Plan (USDA Forest Service 1992).
- Scientific literature cited in the “References” section.
- The National Visitor Use Monitoring (NVUM) information from the years 2001, 2006, and 2010.

- OSV use from the 2009 OSV Winter Trailhead Survey conducted in support of the 2010 State OSV Program Environmental Impact Report (EIR) for Program Years 2010-2020.
- Information and correspondence obtained from the Air Resource Specialist at the California Air Resources Board (CARB).

Incomplete and Unavailable Information

No information was found on past monitoring of air quality or OSV emissions in the Lassen National Forest.

Assumptions used in the Analysis

For analysis purposes, snowmobile emission data used was obtained from the Environmental Protection Agency (EPA 2010). Analysis was based on emission estimates for a 2-stroke snowmobile (worst-case scenario). Snowmobile miles traveled per day was estimated at 50 miles per day and was averaged based on the responses received through a survey forum (snowest.com).

Approximate annual use was an estimated 10,020 OSV visitors forest-wide for the winter season based on previous use records.

Spatial and Temporal Context for Effects Analysis

The spatial context for effects analysis will be the forest boundary. The temporal context for effects analysis will be one year.

Affected Environment

Existing Condition

Air Quality Management

California is divided geographically into air basins for the purpose of managing the air resources of the State on a regional basis. An air basin generally has similar meteorological and geographic conditions throughout. The State is currently divided into 15 air basins, the Lassen National Forest lies mostly within the Sacramento Valley and Northwest Plateau with a small portion in the Mountain Counties Air Basin (Figure 7).



Figure 7. Designated air basins in California

Air Pollution Control District

Air Quality for the forest is managed and regulated by seven air management districts. Air management districts typically follow county boundaries. Most of the forest lies within the Shasta and Lassen air districts with the southern third of the forest in the Tehama, Northern Sierra (Nevada, Plumas and Sierra counties) and Butte Districts and the northern portion within the Siskiyou and Modoc Air Districts. See (Figure 8) for a map of air districts in relation to the Lassen National Forest. Air quality rules and regulations for each air pollution control district can be found at their website.

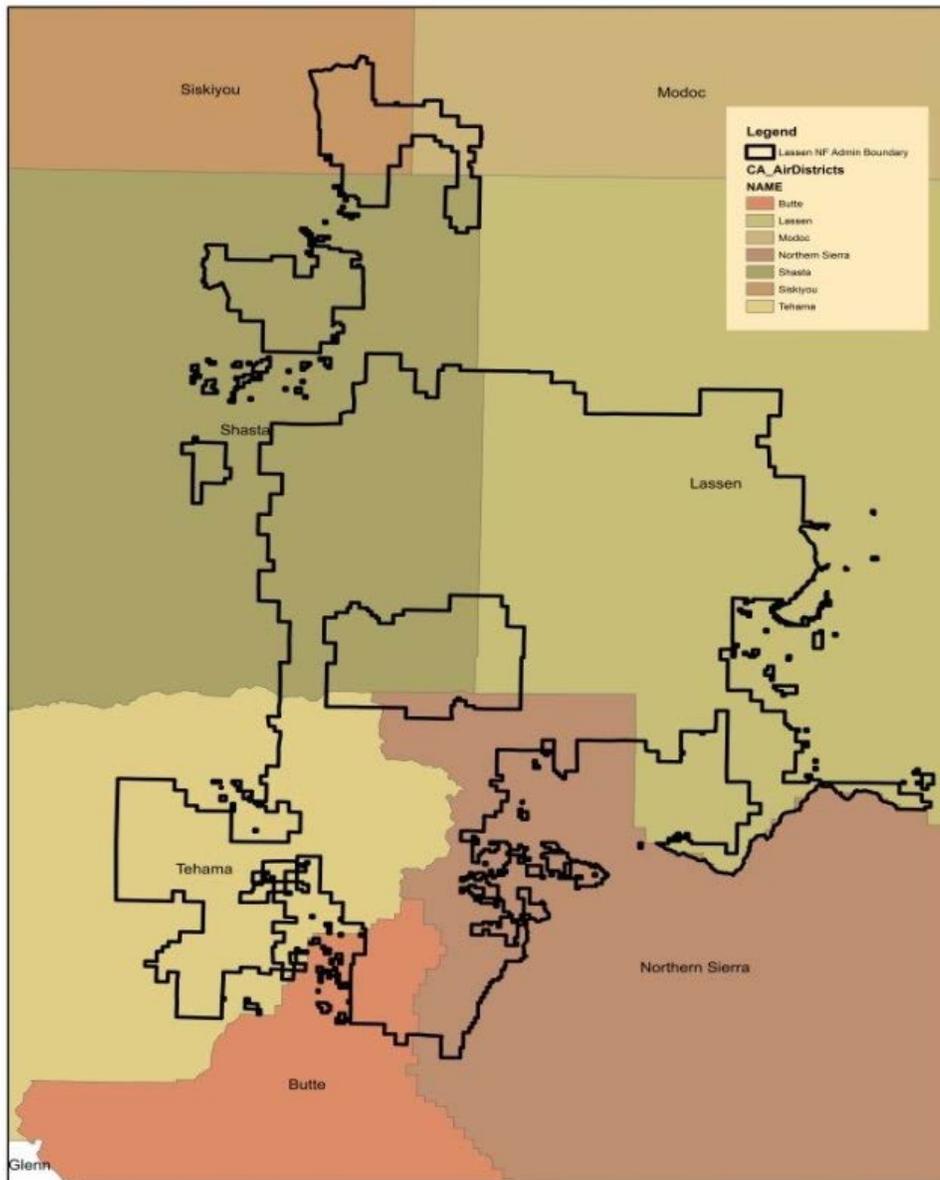


Figure 8. Air pollution control districts within the Lassen National Forest

Class 1 and II Areas

The Thousand Lakes and Caribou Wilderness are designated as Federal Class 1 Areas on the Lassen National Forest (figure 9). The Lassen Volcanic National Park, managed by the National Park Service, is also a designated Class 1 area that is surrounded by the Lassen National Forest. The Caribou Wilderness lies along the eastern boundary of Lassen Volcanic National Park and the Thousand Lakes Wilderness is located North West of Lassen National Park. The Ishi Wilderness lies in the southwest portion of the forest and is classified as a Class II area by EPA, which allows some reduction in air quality.

Visibility impairment is defined as any humanly perceptible change in visual air quality from that which would have existed under natural conditions (in other words, absent anthropogenic influence). This change is caused by air pollutants: particles and gases in the atmosphere which either scatter or absorb light. The net effect is the creation of a hazy condition. Sources for visibility impairment in these Class 1 areas

Air Quality Standards

The Lassen National Forest must comply with Federal and State ambient air quality standards as mandated by the Clean Air Act of 1963. These standards have been established for seven criteria air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), PM₁₀, PM_{2.5}, ozone (O₃), and sulfur dioxide (SO₂). California also has standards in place for sulfates, hydrogen sulfide, visibility-reducing particles and vinyl chloride (ARB 2015).

These pollutants can affect human health, reduce visibility, and lead to acidic deposition in sensitive, high-elevation lakes. Air quality within the Lassen National Forest is potentially affected by land management and development activities both on and off the forest. Sources of air pollutants include forest management activities such as wildland fires (both natural and management ignited), road dust, and vehicle emissions. These sources, as well as industrial sources and emissions from urban developments (gas stations, restaurants, railroads, and wood burning stoves) are also found outside Forest Service administered lands.

Currently, the Lassen National Forest complies with Federal and State standards and there are no known violations of the Clean Air Act. According to the Environmental Protection Agency, Butte County is in non-attainment for three criteria pollutants, 8-hour ozone, Carbon Monoxide and PM_{2.5}. The non-attainment boundary for 8-hour Ozone crosses the Lassen National Forest at the south central section on the Almanor Ranger District. The concern for Ozone is in the summer only according to the Air Pollution Specialist at the Air Resources Board (Lopina 2015). The city of Chico, California, within the Butte Air Pollution Control District is in non-attainment for carbon monoxide and PM_{2.5}. A portion of Tehama County is also in non-attainment for 8-hour ozone and Plumas County is classified as moderate non-attainment for PM_{2.5} (table 151).

Table 151. Federal non-attainment areas for criteria pollutants

County and/or Air District	8-hour Ozone	Carbon Monoxide (CO)	Lead (Pb)	Particulate Matter 2.5 (PM _{2.5})	Particulate Matter 10 (PM ₁₀)	Nitrogen Dioxide (NO ₂)	Sulfur Dioxide (SO ₂)
Butte	<i>Marginal</i>	<i>Moderate (Chico, CA)</i>	Unclassified /Attainment	(Chico, CA)	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Lassen	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Modoc	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Plumas (Within Northern Sierra Air District)	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	<i>Moderate</i>	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Nevada (Within Northern Sierra Air District)	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Sierra (Within Northern Sierra Air District)	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Shasta	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Siskiyou	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment	Unclassified /Attainment
Tehama	Tuscan Buttes. Marginal non-attainment (partial County)	Unclassified /Attainment N/A	Unclassified /Attainment N/A	Unclassified /Attainment N/A	Unclassified /Attainment N/A	Unclassified /Attainment N/A	Unclassified /Attainment N/A

Source: <http://www3.epa.gov/airquality/greenbook/>. Accessed: 10/01/2015:

Table 152 shows the California Ambient Air Quality Standards (CAAQS) state designations for all criteria pollutants in California. The Air Resources Board makes State area designations for 10 criteria pollutants: ozone, suspended particulate matter (PM₁₀), fine suspended particulate matter (PM_{2.5}), carbon monoxide, nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and visibility reducing particles (ARB 2015). The Air Resources Board lists eight counties in non-attainment for PM₁₀, four in non-attainment for Ozone and Butte County also in non-attainment for PM_{2.5}.

Table 152. State designated non-attainment areas for criteria pollutants

County and/or Air District	Ozone	Carbon Monoxide (CO)	Lead (Pb)	PM_{2.5}	PM₁₀	Nitrogen Dioxide (NO₂)	Sulfur Dioxide (SO₂)	Sulfates	Hydrogen Sulfide	Visibility Reducing Particles
Butte	<i>Non-Attainment</i>	Attainment	Attainment	<i>Non-Attainment</i>	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Lassen	Attainment	Unclassified	Attainment	Attainment	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Modoc	Attainment	Unclassified	Attainment	Attainment	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Nevada (within No Sierra Air Dist)	<i>Non-attainment</i>	Unclassified	Attainment	Unclassified	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Plumas	Unclassified	Attainment	Attainment	Unclassified *(Portola Valley in non-attainment)	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Sierra	Unclassified	Unclassified	Attainment	Unclassified	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Shasta	<i>Non-Attainment</i>	Unclassified	Attainment	Attainment	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified
Siskiyou	Attainment	Unclassified	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Unclassified	Unclassified
Tehama	<i>Non-Attainment</i>	Unclassified	Attainment	Unclassified	<i>Non-Attainment</i>	Attainment	Attainment	Attainment	Unclassified	Unclassified

Source: www.arb.ca.gov.desig/adm/adm.htm (ARB last review, August 22, 2014)

For ozone, PM_{2.5}, and PM₁₀, the required minimum number of monitors is based on the population of the Core-Based Statistical Area (CBSA) and the severity of the pollutant concentrations each CBSA. The table below includes the CBSAs, population of the CBSAs, the site in each CBSA that is currently measuring the highest concentration, and monitor information used to evaluate whether the minimum monitoring requirement is satisfied. In all cases, sufficient monitoring exists and no additional monitoring is required (ARB 2015).

Table 153. Minimum monitoring requirements for ozone

CBSA	County/ Counties	Population (2010 Census)	3-Year Average the 4th Highest Concentration (ppm)	Site with the Highest 3-Year Average of the 4th Highest Concentration	Number of Monitors Required	Number of Active Monitors	Number of Additional Monitors Needed
Bakersfield*	Kern	839,361	0.091	Bakersfield-Municipal	2	8	0
Chico	Butte	220,000	0.075	Paradise-Airport Road	1	2	0
El Centro	Imperial	174,528	0.080	El Centro	1	3	0
Los Angeles-Long Beach-Anaheim*	Los Angeles and Orange	12,828,837	0.098	Santa Clarita	4	16	0
Oxnard-Thousand Oaks-Ventura	Ventura	823,318	0.079	Simi Valley	2	5	0
Redding	Shasta	177,223	0.068	Anderson & Lassen Volcanic	1	4	0
Riverside-San Bernardino-Ontario*	Riverside and San Bernardino	4,224,851	0.103	Redlands-Dearborn	3	21	0
Sacramento-Arden Arcade-Roseville*	El Dorado, Placer, Sacramento, Nevada and Yolo	2,149,127	0.085	Folsom-Natoma Street	2	17	0
Santa Rosa*^	Sonoma	483,878	0.057	Healdsburg	1	2	0
Vallejo-Fairfield*	Solano	413,344	0.066	Vacaville-Ulatis Drive	2	3	0
Yuba City	Sutter and Yuba	166,892	0.074	Sutter Buttes^^	1	2	0

Source: ARB 2015

Table 154 displays the annual average emissions (tons per year) generated for the air districts within the Lassen National Forest (EPA 2013).

Table 154. Annual average emissions (tons/year) by air district

Air District	Emissions Estimates (Tons/Year)							
	TOG	ROG	CO	NOx	SOx	PM	PM ₁₀	PM _{2.5}
Butte	9380.5	6212.3	30389.9	6643	109.5	10793.05	6270.7	2171.75
Lassen	6288.95	2197.3	12884.5	1766.6	94.9	5880.15	3777.75	1153.4
Modoc	5715.9	1135.15	3157.25	1003.75	14.6	6303.55	3606.2	543.85
Northern Sierra	10577.7	5131.9	33572.7	4796.1	270.1	12380.8	7577.4	1941.8
Shasta	10829.55	5650.2	34525.35	8570.2	175.2	7548.2	4847.2	2014.8
Siskiyou	9084.85	3854.4	15173.05	3467.5	58.4	9698.05	6015.2	1573.15
Tehama	7971.6	2449.15	8913.3	4117.2	36.5	5208.55	3014.9	810.3
TOTAL Emissions for Air Districts (tons/year)	59849.05	26630.4	138616.1	30364.35	759.2	57812.35	35109.35	10209.05

Snowmobile Emission Standards

The effect of emissions from snowmobile activity on air quality and deposition in high elevation ecosystems has been studied primarily at Yellowstone National Park (YNP) in northwestern Wyoming. Snowmobiles emit hydrocarbons (HC), nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO), and non-combusted fuel vapors (USDI 2000). Combustion engine emissions contain carcinogens, including benzene, butadiene, and polycyclic aromatic hydrocarbons (USDI 2000). Combustion engines also emit large amounts of carbon dioxide.

In 2002, EPA issued a regulation that imposed stringent pollution regulations on snowmobiles, requiring that they fall under regulations of the Clean Air Act (Jehl 2002). In 2012, snowmobile manufacturers were required to meet one of two alternatives. One would require reductions in emissions of both hydrocarbons and carbon monoxide by 50 percent from current levels. The other is intended to encourage further reductions in hydrocarbons and would require a 70 percent reduction in hydrocarbons, the source of the more urgent health concerns, in return for a 30 percent reduction in carbon monoxide (Jehl 2002)

EPA also requires that manufacturers ensure each new engine, vehicle, or equipment meets the latest emission standards. Once manufacturers sell a certified product, no further effort is required to complete certification. If products were built before EPA emission standards started to apply, they are generally not affected by the standards or other regulatory requirements (EPA 2015(3)).

Table 155. Exhaust emission standards for snowmobiles

Phase	Model year	Phase-in (percent)	Emission standards		Maximum allowable family emission limits	
			HC	CO	HC	CO
Phase 1	2006	50	100	275		
Phase 1	2007–2009	100	100	275		
Phase 2	2010 and 2011	100	75	275		
Phase 3	2012 and later	100	(¹)	(¹)	150	400

Source: Code of Federal Regulations, Accessed November 2015

¹ See § 1051.103(a)(2):

(a) * * *

(1) Follow Table 1 of this section for exhaust emission standards. You may generate or use emission credits under the averaging, banking, and trading (ABT) program for HC and CO emissions, as described in subpart H of this part. This requires that you specify a family emission limit for each pollutant you include in the ABT program for each engine family. These family emission limits serve as the emission standards for the engine family with respect to all required testing instead of the standards specified in this section. An engine family meets emission standards even if its family emission limit is higher than the standard, as long as you show that the whole averaging set of applicable engine families meets the applicable emission standards using emission credits, and the vehicles within the family meet the family emission limit. The phase-in values specify the percentage of your U.S.-directed production that must comply with the emission standards for those model years. Calculate this compliance percentage based on a simple count of your U.S.-directed production units within each certified engine family compared with a simple count of your total U.S.-directed production units. Table 1 also shows the maximum value you may specify for a family emission limit, as follows:

(2) For Phase 3, the HC and CO standards are defined by a functional relationship. Choose your corporate average HC and CO standards for each year according to the following criteria:

<https://www.federalregister.gov/articles/2008/06/25/E8-14411/exhaust-emission-standards-for-2012-and-later-model-year-snowmobiles>

Best Available Technology (BAT)

Snowmobiles must be certified by the National Park Service to enter some National Parks (Yellowstone, Grand Teton). BAT certification is one of the most stringent standards for air and noise emissions in the world, requiring hydrocarbon emissions of less than 15 g/kW-hr, carbon monoxide emissions of less than 120 g/kW-hr, and sound level limited to 73 decibels (BRP 2011). The use of BAT snowmobiles, which result in lower carbon monoxide and hydrocarbon emissions, (USDI 2013) is not currently required on the Lassen National Forest.

Motorized Winter Recreation

The Lassen National Forest has a well-developed winter recreation program which emphasizes snowmobile use and includes 406 miles of snowmobile trails that connect to six well-placed developed staging areas. Details on the groomed OSV trail system on the Hat Creek, Eagle Lake, and Almanor Ranger Districts of the Lassen National Forest can be found in the R5 OSV Lassen Recreation Report (Valentine 2015).

Table 156 is derived from the OSV trailhead survey conducted for the State EIR, and based on data summarized in the State EIR (California Department of Park and Recreation 2010). The table shows the average number of vehicles at trailheads, and the average number of OSVs that would be expected on weekends and holidays versus weekdays. Based on this information, estimated use for the 2015/2016 winter season is 10,020 OSV users Forest wide (Valentine 2015).

Table 156. Lassen National Forest OSV visitor use

Location	Day Description	Number of Vehicles	Number of OSVs
Forest-wide	Weekend/Holiday (approx. 33 per season)	106	212
Forest-wide	Weekday (approx. 65 per season)	21	42
Individual Trailheads	Weekend/Holiday	15 (average)	30
Individual Trailheads	Weekday	3.5	7

Based on 2009 Data from CA State DEIR

*assumes an average of 2 OSV's per vehicle parked at a trailhead (Valentine 2015)

Grooming Activities

Currently there are 324 miles of National Forest System trails that are groomed for OSV use on the Lassen National Forest. Snow trail grooming for OSV use typically occurs mid-December and continues through March (December 26 through March 31). Grooming historically occurred several times per week with a maximum of 12 hours per day and a total of 1,743 hours for the season (USDA Forest Service 2015).

The California OHMVR Division's snowcat fleet is subject to emission regulation by the California Air Resources Board (CARB) as off-road equipment. The CARB sets an emission limit for the vehicle fleet as a whole rather than for individual pieces of equipment. Based on the total horsepower of the vehicle fleet, and the model and year of the individual equipment within the fleet, CARB determines how much horsepower per year must be repowered, retrofitted, or retired. The California OHMVR Division then determines what modifications to make to its fleet in order to satisfy CARB requirements (USDA Forest Service 2015).

Table 157. Resource indicators and measures for the existing condition and alternative 1

Resource Element	Resource Indicator	Measure	Alternative 1 Existing Condition
Air Quality	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Miles of trail open to OSV visitor use (including approx. 38 miles groomed by the Lassen program but under a different jurisdiction)	349 miles
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Acres open to OSV visitor use	964,020 acres
	Potential effects of OSV emissions to create adverse impacts to air quality.	Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	No known impacts to air quality or NAAQS/CAAQS violations exist.

Environmental Consequences

Alternative 1 – No Action

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.

Air quality on the Lassen National Forest is potentially affected by land management and development activities on and off the forest. Air pollution sources include emissions from mobile and stationary sources including industrial activity, highway vehicles, off-road vehicles (all-terrain vehicles, aircraft, locomotives, construction machinery). Dust and burning can also have significant impacts to air quality as they are occurring on and off the forest. These sources can emit a host of regulated pollutants in and around the forest. Currently, good dispersion and topographic influences on the forest have resulted in no violations of Federal and State Ambient Air Quality Standards and have not attained concentrations high enough to warrant measurement or to result in degradation of air quality in the Class 1 areas.

Three factors, largely beyond State control, can interfere with air quality in Class 1 Areas: wildfire smoke, offshore shipping emissions, and Asian dust. These factors are either from natural sources (wildfire smoke), uncontrollable sources (shipping emissions beyond California’s jurisdiction), or both (Asian dust, a combination of anthropogenic and natural sources beyond California’s control) (ARB 2014).

The table below displays the potential contribution of snowmobile emissions from the estimated 10,020 OSV visitors that recreate on the Lassen National Forest each year. All calculations were done using emission estimates from a 2-stroke snow mobile (EPA 2010). As shown in table 158, it is estimated emissions from OSV use on the Lassen contributes approximately 0.12 percent of carbon monoxide (CO) to the air districts under the no-action alternative and less than 0.01 percent of nitrogen oxide (NOx) and particulate matter (PM).

Table 158. Emission estimate (tons/year) for OSV use on the Lassen National Forest

Source	Number of OSVs	Miles*	CO	NOx	PM
Snowmobile (2-stroke)	10,020	50	163.47	.47	1.49
% Pollutant Contribution to Air Districts	-----	----	0.12%	Less than 0.01	Less than 0.01

*Assumes 10,020 OSVs recreate on the Lassen per year and travel an average of 50 miles.

Alternative 2 – Proposed Action

Direct and Indirect Effects - Alternative 2

Under alternative 2 there would be a 4 percent reduction in acres open to OSV use. The proposed areas where use would be prohibited would be located in the southwest corner of the Lassen National Forest (at elevations of 3,500 feet or less) and in the Black Mountain Research Natural Area. Proposed closures would minimize local impacts to air quality in these areas. The reduction of acres open to OSV use may cause a shift in OSV use to other areas. However, it is not likely this shift will result in increased accumulation or significant affects to air quality in other areas of the Lassen National Forest. With a proposed 4 percent reduction in acres open to OSV use, it is likely emissions generated as a result of OSVs would be similar to or less than what is currently estimated and displayed in table 154. Current emissions are estimated to contribute less than 1 percent (0.12 percent of carbon monoxide (CO), less than 0.01 percent of nitrogen oxide (NOx) and less than 0.01 percent of particulate matter (PM)) of pollutants to the seven air districts within the Lassen National Forest. These emissions are minor compared to other off forest sources of air pollution that can impact the forest. Impacts to air quality include vehicle emissions such as nitrogen oxides, particulate matter and carbon monoxide from all motorized vehicles including snowmobiles and Sno-Cats. Diesel engines also emit sulfur oxides and particulates. Air quality impacts from vehicle emissions are influenced by the effectiveness of the smog control devices on cars, amount of traffic,

and the duration of engine idling. As people recreate in the forest during the winter months the effects of vehicle exhaust on air quality may become a localized temporary issue where concentrated motorized use conflicts with non-motorized uses and nuisance smell occurs.

Although there can be localized air quality impacts where there are a large number of snowmobiles occupying a parking lot as studied at Yellowstone National Park, those conditions do not apply in this case. The number of anticipated users for this assessment would be considered low as compared to Yellowstone National Park, which records 75,000 snowmobile visitors each winter (Millner 2015). The estimated 10,020 OSV visitor's forest wide for the winter season would equate to approximately 104 OSV visitors on the forest per day utilizing 349 (311 miles on the Lassen National Forest) miles of snow trail and 921,130 acres open to OSV use. That is equivalent to approximately one OSV visitor per 8,857 acres. It is expected OSV emissions would dissipate and the possibility of accumulation would be eliminated based on topographic influences and wind dispersion. Non-motorized users' air quality concerns in parking lots, at trailheads and on trails would continue since non-motorized and motorized users would still share the same parking areas, trailheads and many of the same trails. The odor generated by emissions from combustion engines, particularly two-cycle engines, can diminish a non-motorized user's experience. However, this is likely a recreation (user satisfaction) issue rather than a general air quality issue (see recreation specialist's report for more discussion on the topic of visitor experience). Bishop et al. (2006) found emissions were greatest during initial startup and idling, especially when the engine is cold. They also observed reducing wait times at entrance stations would further lower emissions and exposure. Implementing similar measures or idling limits at parking lots and trailheads, may address public concerns regarding nuisance smell and potential impacts to air quality in those areas. It is anticipated any impacts to air quality from winter motorized recreation under alternative 2 would not result in any violations to National and State Ambient Air Quality Standards.

A study by Musselman and Korfmacher (2007) was conducted in Wyoming to evaluate the effects of winter recreation snowmobile activity on air quality at a high elevation site. They measured levels of nitrogen oxides (NO_x, NO), carbon monoxide (CO), ozone (O₃) and particulate matter (PM₁₀ mass). They found nitrogen oxides and carbon monoxide were significantly higher on weekends than weekdays due to higher snowmobile use on weekends. Ozone and particulate matter were not significantly different during the weekend compared to weekdays. Air quality data during the summer was also compared to the winter data and they found carbon monoxide levels at the site were significantly higher during the winter than during the summer. Nitrogen oxides and particulates were significantly higher during the summer compared to winter. Nevertheless, air pollutants were well dispersed and diluted by strong winds common at the site, and snowmobile emissions did not have a significant impact on air quality at the site (Musselman and Korfmacher 2007).

Class 1 Areas

In Yellowstone National Park, the implementation of best available technology (BAT) requirements and the reduction in the number of OSVs entering the park during the managed use era dramatically reduced CO, PM, and hydrocarbon emissions. The substantial CO and PM emissions reductions from implementing BAT requirements have come with one important tradeoff—an increase in NO_x emissions. OSVs that meet BAT requirements have higher NO_x emissions than snowmobiles that do not meet BAT requirements. They found overall, from 2003 to 2011, air quality stabilized at the monitoring stations in the park, with the exception of 2010. These positive trends in air quality are primarily the result of BAT requirements for OSVs, fewer OSVs entering the park in recent years, and carbureted snow coaches being replaced with modern fuel injected engines. Requiring the use of only BAT snowmobiles has improved emissions despite the increasing number of snow coaches now entering the park. Although these changes present an overall positive trend toward lower emissions

by OSVs, other local sources, such as uncontrolled wood stoves in warming huts and some facilities in the park, still contribute to winter CO and PM2.5 concentrations (USDI 2013).

Implementation of alternative 2 is expected to maintain the same air quality conditions as compared to the existing condition due to good dispersion characteristics across the forest, low inversion potential, low emissions generated from OSVs as compared to other potential sources, and the equivalent number of OSV route miles open. In addition, it is expected the proposed reduction in acres and areas open to OSV use may reduce air quality impacts in those areas and nearby Class 1 areas. Compliance with state and Federal air quality standards is expected to occur under alternative 2. Motorized recreation emission sources on the forest are localized, transient and not expected to result in any significant air quality impacts under alternative 2, and no violations of the Clean Air Act are expected to occur under alternative 2.

Table 159. Resource indicators and measures for alternative 2

Resource Element	Resource Indicator	Measure	Alternative 2
Air Quality	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Miles of trail open to OSV visitor use (including approx. 38 miles groomed by the Lassen program but under a different jurisdiction.	349 miles (no change from existing condition)
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Acres open to OSV visitor use.	921,130 acres (3% decrease from existing condition)
	Potential effects of OSV emissions to create adverse impacts to air quality.	Shifts in OSV use in relation to sensitive areas (Class 1 and II areas)	OSV trails within ¼ mile of sensitive areas (Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries, and to the boundary of Lassen Volcanic National Park). No known impacts to air quality or NAAQS/CAAQS violations exist.

Cumulative Effects – Alternative 2

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present, and reasonably foreseeable future actions have the potential to impact air quality and are summarized below. Air quality on the forest is potentially affected by land management and development activities on and off the forest. Air pollution sources include emissions from industrial activity, highway vehicles, off-road vehicles (all-terrain vehicles, aircraft, locomotives, construction machinery). Dust and burning can also have significant impacts to air quality as they are occurring on and off the forest. None of the on forest sources discussed in the existing condition are expected to increase or impact air quality when combined with alternative 2. In addition, emissions generated as a result of snowcats utilized for plowing and grooming of parking lots and trailheads could also contribute to localized air pollution on forest. However, it is estimated the contribution of administrative snowcats use, to the overall cumulative impacts on air quality would be minimal.

Air quality impacts are expected to grow with continued growth of population around the Lassen National Forest. Substantial impacts to air quality are not expected to occur during winter months on the Lassen National Forest due to regulations already in place by the EPA and the Clean Air Act. The past, present, and reasonably foreseeable future actions would be the primary contributors to air quality impacts on the forest. Due to the short term and localized impact of OSV use, the action alternative is not expected to result in a significant contribution to the cumulative impacts of other local and regional air pollution sources. However, it is impossible to predict future pollutant discharge from off-forest mobile and stationary sources and how those sources may contribute or impact air quality on forest. There are no known unavoidable adverse, irreversible or irretrievable effects to air quality as a result of implementing alternative 2.

Alternative 3

Direct and Indirect Effects - Alternative 3

Alternative 3 would prohibit OSV use on more acres than alternative 2, and would designate areas where motorized OSVs are restricted to designated trails. Designation of the Butte Lake Backcountry Solitude Area minimizes motorized impact on the Caribou Wilderness and Caribou extension proposed wilderness and Lassen Volcanic National Park, thereby minimizing potential impacts to air quality in those areas.

With additional areas closed or restricted to OSVs, the potential effects to air quality in sensitive areas would be less under alternative 3 and with a proposed 13 percent reduction in acres open to OSV use forest-wide, it is likely emissions generated as a result of OSVs would be similar or less than what is currently estimated and displayed in table 154. Current emissions generated as a result of OSV use on the Lassen are estimated to contribute less than 1 percent (0.12 percent of carbon dioxide (CO), less than 0.01 percent of nitrogen oxide (NO_x) and less than 0.01 percent of particulate matter (PM)) of pollutants to the seven air districts within the Lassen National Forest. These emissions are minor compared to other sources of air pollution impacting the forest.

Cumulative Effects- Alternative 3

The cumulative effects listed for alternative 2 would also apply for alternative 3.

Table 160. Resource indicators and measures for alternative 3

Resource Element	Resource Indicator	Measure	Alternative 3
Air Quality	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Miles of trail open to OSV visitor use (including approx. 38 miles groomed by the Lassen program but under a different jurisdiction.	349 miles of designated OSV trails (no change from existing conditions)
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Acres open to OSV visitor use.	834,660 acres open to OSV use (a 13 percent decrease from the existing conditions)
	Potential effects of OSV emissions to create adverse impacts to air quality.	Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	OSV trails in close proximity of sensitive areas (Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries, and to the boundary of Lassen Volcanic National Park.) No known impacts to air quality or NAAQS/CAAQS violations exist.

Alternative 4

Direct and Indirect Effects - Alternative 4

Alternative 4 would allow OSV use on more acres than alternative 3, and slightly fewer acres than alternative 2.

The McGowen area would be closed to OSV use like alternative 3. However, one designated OSV trail would remain open and OSVs would be restricted to the trail only. This would potentially minimize impacts from OSV encroachment into Lassen Volcanic National Park and subsequent effects to air quality in the park. Otherwise, alternative 4 effects would be similar as described for alternative 2. and with a proposed less 1 percent reduction in acres open to OSV use forest-wide as compared to the existing condition, it is likely emissions generated as a result of OSVs would be similar or less than what is currently estimated and displayed in table 154. Current emissions generated as a result of OSV use on the Lassen National Forest are estimated to contribute less than 1 percent (0.12 percent of carbon dioxide (CO), less than 0.01 percent of nitrogen oxide (NO_x) and less than 0.01 percent of particulate matter (PM)) of pollutants to the seven air districts within the Lassen National Forest. These emissions are minor compared to other sources of air pollution impacting the forest.

Cumulative Effects for Alternative 4

The cumulative effects listed for alternative 2 would also apply for alternative 4.

Table 161. Resource indicators and measures for alternative 4

Resource Element	Resource Indicator	Measure	Alternative 4
Air Quality	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Miles of trail open to OSV visitor use (including approx. 38 miles groomed by the Lassen program but under a different jurisdiction.	349 miles of designated OSV trails (no change from existing conditions)
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality.	Acres open to OSV visitor use.	958,930 acres open to OSV use (a <1 percent decrease from the existing conditions)
	Potential effects of OSV emissions to create adverse impacts to air quality.	Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	OSV trails in close proximity (approx. ¼ mile) of sensitive areas (Caribou Wilderness, Caribou extension proposed Wilderness, Mill Creek Proposed Wilderness and Thousand Lakes Wilderness boundaries, and to the boundary of Lassen Volcanic National Park.) No known impacts to air quality or NAAQS/CAAQS violations exist.

Summary

It is expected the levels of pollutants for the alternatives would fall within the ranges currently experienced and no violation of State or Federal ambient air quality standards would occur on the Lassen National Forest during the OSV season.

Degree to Which the Purpose and Need for Action is Met

Table 162 provides a comparison of the alternatives and the degree to which the alternatives address potential air quality issues.

Table 162. Summary comparison of alternatives

Resource Element	Resource Indicator/Measure	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action	Alternative 3	Alternative 4
Air Quality	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality/ Miles of trail open to OSV visitor use	964,020 acres open to OSV use. No known violations of the CAA as a result of OSV use under the existing condition	921,130 acres open to OSV use, a 4 percent reduction from existing conditions. No violations of the CAA are anticipated.	834,660 acres open to OSV use, a 13 percent reduction from existing conditions. No violations of the CAA are anticipated.	958,930 acres open to OSV use, a <1 percent reduction from existing conditions. No violations of the CAA are anticipated.
	Estimate of change (increase/decrease) in emissions and the potential to create adverse impacts to air quality. Acres open to OSV visitor use	349 miles designated for OSV use. No known violations of the CAA as a result of OSV use under the existing condition.	349 miles designated for OSV use. (No change from existing conditions). No violations of the CAA are anticipated.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.	349 miles designated for OSV use. No change from existing conditions. No violations of the CAA are anticipated.
	Potential effects of OSV emissions to create adverse impacts to air quality/ Shifts in OSV use in relation to sensitive areas (Class 1 and II areas).	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. No known violations of the CAA or impact to Class 1 areas as a result of OSV use under the existing condition.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. No violations of the CAA or impact to Class 1 areas are anticipated under this alternative.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness, and the boundary of Lassen Volcanic National Park. Designation of Butte Lake Backcountry Solitude area minimizes OSV impacts and reduces emissions near Caribou wilderness and Lassen NP No violations of the CAA or impact to Class 1 areas are anticipated under this alternative.	Groomed OSV trails are in close proximity to the Caribou Wilderness, Thousand Lakes Wilderness and the boundary of Lassen Volcanic National Park. No violations of the CAA are anticipated or impacts to Class 1 areas.

Summary of Environmental Effects

Potential impacts of OSV use on Class 1 and II areas would be fairly similar for all action alternatives. Alternatives 2 and 3 would provide slightly more protection due to additional OSV restrictions and closures in the vicinity of sensitive areas. In all action alternatives, Class 1 and II areas are closed to OSV use.

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

No known violations of ambient air quality standards have occurred on the forest, nor have any activities on the forest caused violations of these standards elsewhere. The alternatives comply with the Clean Air Act, the National Ambient Air Quality Standards and California Ambient Air Quality Standards for criteria pollutants.

Unavoidable Adverse Effects

Authorized OSV use on NFS lands, may unavoidably affect the short-term air quality in some areas, specifically at trailheads and parking lots. However, it is likely this is a nuisance smell issue rather than an air quality issue, as air quality standards will not be exceeded.

Chapter 4. List of Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and other organization and individuals during the development of this environmental impact statement:

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The following individuals, groups, agencies, and email addresses were either contacted directly in the scoping process, or made themselves known to the Forest Service by submitting comments during scoping for the Lassen OSV Designation analysis.

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Over-snow Vehicle Use Designation

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Distribution of the Environmental Impact Statement

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, federally recognized tribes, State and local governments, and organizations representing a wide range of views.

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Acronyms

CVC	California Vehicle Code
DEM	Digital Elevation Model
GIS	Geographic Information System
LRMP	Land and Resource Management Plan
MVUM	Motor vehicle use map
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NVUM	National Visitor Use Monitoring
OHV	Off-highway vehicle
OSV	Over-snow vehicle
PCT	Pacific Crest Trail
RFA	Recreation Facility Analysis
ROS	Recreation opportunity spectrum

Glossary

Administrative use	Motorized vehicle use vehicle use associated with management activities or projects on National Forest land administered by the Forest Service or under authorization of the Forest Service. Management activities include but are not limited to: law enforcement, timber harvest, reforestation, cultural treatments, prescribed fire, watershed restoration, wildlife and fish habitat improvement, private land access, allotment management activities, and mineral exploration and development that occur on National Forest land administered by the Forest Service or under authorization of the Forest Service.
Area	A discrete, specifically delineated space that is smaller, and, except for over-snow vehicle use, in most cases much smaller, than a Ranger District.
Cross-country over-snow vehicle use	Public over-snow vehicle use that occurs off of snow trails designated for over-snow vehicle use, and within areas designated for public over-snow vehicle use.
Designated road or trail or area	A National Forest System road, National Forest system trail, or an area on National Forest System lands that is designated for over-snow vehicle use pursuant to 36 CFR §212.51 on an over-snow vehicle use map (36 CFR §212.1).
Designation of over-snow vehicle use	Designation of a National Forest System road, a National Forest System trail, or an area on National Forest System lands where over-snow vehicle use is allowed pursuant to §212.81.
Forest road or trail	A road or trail wholly or partially within or adjacent to and serving the [National Forest System (NFS)] that is determined to be necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 CFR §212.1)
Non-motorized use	A term used in this document to refer to travel other than that defined as motorized. For example, hiking, riding horses, or mountain biking.

Over-snow vehicle (OSV)	A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow (36 CFR §212.1)
Over-snow vehicle use map	A map reflecting roads, trails, and areas designated for over-snow vehicle use on an administrative unit or a Ranger District of the National Forest System.
Trail	A route 50 inches wide or less or a route over 50 inches wide that is identified and managed as a trail (36 CFR §212.1).

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