Wildlife

This section includes a summary of the Wildlife specialist's report and Biological Evaluation; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

General Effects to Wildlife

With all management activities, there are negative effects to some species and benefits to others that must be considered and balanced along with the need for those human activities. Negative effects of recreational OHV use on wildlife may include wildlife mortality, direct and indirect loss of habitat, displacement, and reduced connectivity. Factors that influence the vulnerability of different wildlife species include behavior and ecology. For example, animals that tend to stay closer to shelter, such as gray squirrel and woodchuck, can tolerate closer encounters with humans because they can quickly escape (Frid and Dill 2002; Gill et al. 1996). Other species tend to forage less and spend less time in quality habitat near human activity (Gill et al. 1996). Still other species may respond positively to human development and use of OHV trails and roads; potential benefits are related to habitat, mobility, and food resources. Openings, shrubs and grasses may develop alongside roads, providing additional foraging habitats. Cleared roads and trails are utilized as travel corridors for some species.

No road construction is proposed for the Ochoco Summit project; however, there are ongoing effects of existing roads, and the effects of existing roads and proposed OHV trails are similar.

Road widths vary from 14 to 35 feet depending on single or double lane and maintenance of right of way. For trails, effects are less than roads regarding direct alteration of habitat as the width of the footprint for motorcycle trails would be 24 inches wide; ATV trails would be 50 inches wide; and jeep trails would be 80 inches wide.

General effects to wildlife include altered reproductive success, mortality, loss of habitat or habitat quality due to:

- Access for predators and people
- Fragmentation of habitat patches
- Behavioral changes in response to human use
- Impacts due to noise
- Physical alteration of habitat

Access for predators and people

Roads may act as barriers for some species but may aid in the dispersal of other native and non-native species. Pocket gophers have extended their ranges by traveling on roads and canals (Hey 1941 in Ouren et al. 2007). Brown-headed cowbirds are attracted to trails giving them easier access to parasitize nests near the trail or roads (Hickman 1990). Studies have found predation rates increase with decreasing distance to trails by raven, domestic dogs, mice, squirrels, skunks, and coyotes (Miller and Hubbs 2000; Miller et al. 1998).

Roads and trails provide greater human access to habitats previously not accessed (Forman et al. 2003). There is increased human access to and contact with animals resulting in intentional or accidental harm or mortality. Roads and trails also increase access for falconers to remove young raptors from nests (Erdman et al. 1998 in Gaines et al. 2003). Increased contact can result in increased intentional or accidental killing of wildlife, resulting in increased vulnerability of species like mink, marten, deer and elk (Cole et al. 1997; pers. comm. ODFW; Gaines et al. 2003).

Edge effect from roads and trails may also increase predation access to songbird nests. Studies found an increase in predators attracted to the corridors and the adjacent forest interior on trails and roads 7

to 26 feet (Rich et al. 1994 in Ouren et al. 2007; Hickman 1990). In addition, open areas such as junctions, play areas, campgrounds, and staging areas have perches and a clear view of surrounding areas can be a factor in higher nest predation (Ratti & Reese 1988 in Paton 1994).

Adjacent roads and trails provide travel corridors into forested habitat from nearby areas (Small and Hunter 1988; Askins 1994 in Montana TWS 1999). Predators such as great gray owls and red-tail hawks take advantage of forest edge. Roads and 4 wheel drive trails provide additional nesting habitat for these species. Indirect effects would include competition with other predators, such as Goshawk and Coopers hawk.

In recent years there have been few restrictions to cross country travel across the Forest except in designated areas (e.g. wilderness, research natural areas, Travel Management Areas, Roadless Areas). Closed roads have administrative use allowed. This use is highly variable in any given year from short-term daily use for a vegetation management project to years of inactivity. Because of the variability and high degree of inactivity these roads are not included in the disturbed habitat analysis. Outside of closed areas cross country travel has been permitted on Ochoco National Forest, and many miles of user-created trails, closed roads, non-motorized trails and other unauthorized routes are receiving motorized use. Within the project area there are 659 miles of roads that are legal for mixed use by OHVs. In addition there are 140 miles of open road that are not legal for OHV use, and 669 miles of closed roads, many of which are receiving OHV use. Given the traditional pattern of “open unless designated closed” on this forest, there are currently large areas with high levels of human disturbance and predator access.

The Ochoco Summit project does not propose to construct any new roads. Proposed trail construction would utilize roads, user-created trails, fire lines, snowmobile trails, and other areas disturbed from management activities wherever possible. Through the action alternatives, OHV use would only be allowed on designated trails, routes, shared use roads and/ or play areas, and would no longer be permitted on user-created trails. Within each action alternative, there is a proposal to decrease habitat disturbance by closing and rehabilitating user-created trails, physically closing roads that are not managed as open roads, and converting roads into trails. Table 89 displays the length of trail by existing disturbance type. “Miles of trail not on roads” includes new routes, as well as routes on existing disturbance that are not recognized in GIS as Forest System Roads (ie. temporary roads, skid roads, user created trails, or old roads that have been removed from the transportation database). A combination of rehabilitation of unwanted user created or unauthorized routes and reinforcement of existing road closures would be implemented, which should ameliorate effects of human access across the project area. However, closed roads, converted trails and rehabilitated routes may still provide access for predators. Given the relatively open travel conditions present across much of the project area for hunters and predators alike, it is assumed that animal mortality rates would be similar to what currently exists.

Table 89. Comparison of Alternative Actions.

Alternative	Miles of mixed use (OHV legal) road	Miles of trail route on open roads	Miles of trails on closed roads	Miles of trails on decommissioned roads	Miles of trails not on roads
Alternative 1	659	0	0	0	0
Alternative 2	659	46	44	11	69
Alternative 3	659	13	30	7	50
Alternative 4	659	53	62	14	81

Fragmentation of habitat patches

Roads contribute to forest fragmentation by dissecting large patches into smaller patches. Forest fragmentation results in decreased interior forest habitat and increased edge habitat (Askins et al. 1987; Small and Hunter 1988; Schonewald-Cox and Buechner 1992; Askins 1994 in Montana TWS 1999; Reed et al. 1996). Patch size and distribution can determine the probability that a patch may be occupied (Laan and Verboom 1990; Fahrig 1998 in Montana TWS 1999). Habitat fragmentation from roads and 4-wheel-drive trails may reduce a species capacity by disrupting continuous forest cover and reducing space needed by interior species (Hickman 1990 in Montana TWS 1999, Hutto 1996). However, some species such as flycatching birds and accipiters may respond favorably to canopy gaps and corridors, which they utilize as foraging sites or flyways.

Riparian areas are usually areas of high diversity. Fragmentation of riparian habitats by roads may create greater impacts on the landscape. Patch size is reduced and roads may separate important habitat associations between the uplands and riparian areas. Songbirds, such as the brown creeper and dark-eyed junco, utilizing both the riparian and upslope forested habitat (McGarigal and McComb 1992) used habitats more effectively when they were connected (Hutto 1995).

Road and trail edges may serve as ecological traps for some species (Andrews 1990 in Ouren et al. 2007; Kokko and Sutherland 2001). These areas may have the necessary resources for species to live and potentially reproduce but impose high mortality rates. For example, some bird species are attracted to roadsides due to the lush vegetation for nesting and foraging; although the road and trail sides contains suitable habitat, these individuals are at greater risk of mortality of being hit by vehicles or predation (Clark and Karr 1979 in Ouren et al. 2007, Brooks and Lair 2005; Mumme et al. 2000 in Ouren et al. 2007; Yahner et al. 1979 in Ouren et al. 2007; Kokko and Sutherland 2001). In the Ochoco Summit project area, the more likely potential effect would be increased predation, as risk of animals being hit by an OHV on trails designed for slow speed is low.

Forman (2000) described a “road effect distance” of 200 meters (660 feet) for secondary roads to calculate the indirect loss of habitat and the displacement of many species. Forman also mentions the road effect zone is highly variable and is dependent on the species affected, adjacent habitat, road type, and traffic volume. Noss and Cooperrider (1994) report edge effects are not linear and the zone varies in width depending on what is being measured. They report edge effects seen as far as 240 meters. Therefore, the 200 meter road effect distance would be used to assess edge effects as well. This distance may over-estimate effects for some species and would under-estimate effects for others. However, this distance captures known effects for many species and provides a relevant measure of change between the existing condition and the alternatives. The analysis would also assume a 200 meter affected distance for all motorized trails proposed as part of the Ochoco Summit OHV system. It is assumed that the 200 meter road effect distance would also include those effects for motorized access for dispersed camping. Vehicles accessing dispersed campsites are usually traveling at a very low rate of speed for short distance (no more than 300 feet). Engines are only on for short periods of time and therefore, effects realized for the 200 meter road effect zone would include those for motorized access for dispersed camping as well. This 200 meter road effect distance would be referred to as disturbed habitat in the analysis.

For an estimate of acres affected due to fragmentation of habitat by the network of existing open roads and by the proposed activities refer to the column labeled “Acres within 660’ (200m)” in Table 90.

Table 90. Comparison of Alternatives, Acres within distance bands of motorized routes.

Alternative	Acres within 660' (200m)	Acres 660' to ¼ mile	Acres ¼ mile to ½ mile	Acres ½ mile to ¾ mile	Acres ¾ mile to 1 mile
Alternative 1 (existing condition)	115,127	70,793	66,473	26,794	11,614
Alternative 2	125,745	70,192	61,299	23,450	10,484
Alternative 3	123,036	70,652	62,775	24,142	10,565
Alternative 4	129,390	70,155	58,977	22,224	10,423

Behavioral changes in response to human use

A major short-term or immediate response of wildlife to recreation is a change in behavior. Behavioral changes include stopping foraging until the disturbances ceases, fleeing, flushing, nest abandonment, and stopping mating calls (Knight and Cole 1995; Taylor and Knight 2003). Frid and Dill (2002) suggested human-caused disturbance (e.g. walking, motorized vehicles, wildlife viewing) is a form of predation risk, in that animals respond to human activities in the same way they might respond to their predators. A human approaching straight towards an animal may trigger a flight response (Bennett and Zuelke 1999; Klein et al. 1995). In addition, if the human is off-trail, the animal may have a much stronger tendency to flee (Knight and Cole 1995; Taylor and Knight 2003).

The stress of a flight response in any animal can cause physiological changes, including increased heart rate, oxygen consumption, metabolism, respiratory rate, blood flow, body temperature and blood sugar, and decreased blood flow to skin and digestive organs (Gabrielsen and Smith in Knight 1995). These types of energy expenditures can reduce vigor and decrease energy.

Long-term disturbances can reduce overall vigor and energy. Wildlife may change their habits, including reproductive behaviors, foraging habitats, food consumption, food sources, foraging areas and home ranges (Giest 1978; Klien 1971; Knight and Cole 1995). Elk have been found to avoid open roads, while deer avoid areas occupied by elk. Thus the presence of open roads can result in spatial partitioning in response to distance from motorized routes (Wisdom, et. al 2005). Some species become habituated to human presence; habituation can result in reduced sensitivity to disturbance, but may increase vulnerability to hunting or poaching.

Impacts due to noise

For the purposes of this analysis, noise is defined as any "human made sound that alters the behavior of animals or interferes with their normal functioning" (Bowles in Knight and Gutzwoulder 1995). The potential effects of noise on wildlife (AMEC 2005, Forman and Alexander 1998) include:

Altered behaviors
Hearing loss and decreased sound sensitivity
Communication confusion
Habitat loss
Habituation

The impacts of these effects may include reduced reproductive success, mortality, and/or reduced habitat quality or habitat loss (AMEC 2005). An animal's sensitivity to sound varies with the frequency band to which it is most sensitive to (AMEC 2005). Sound is usually measured in decibels (dB) and can vary with distance from the source due to a variety of factors like topography, weather, features that act as barriers (trees), volume, and the source (AMEC 2005). Noise emitted from many OHVs today can reach 101.1 dBs and higher (http://www.fs.fed.us/r6/centraloregon/recreation/cohvops/sound.shtml). In Oregon there is a state

law of 99 dBs maximum (at 20 inches from the muffler) on all OHVs (http://www.nohvcc.org/IMAGES/ohvregs.htm).

Altered Behaviors: Behavioral responses to noise can be mild, (wariness, walking slowly away, freezing, or crouching), moderate (running away, hiding in dens or burrows, flying short distances) to intense (panic flight, urinating or defecating and running at high speeds). These behaviors interrupt foraging, nurturing young, and in the case of panic responses can lead to injury or death (Bowles in Knight 1995). Burger and Gochfeld (1991) found shorebirds' foraging time decreased and avoidance of disturbance increased within 100 m (328 ft). Various mammal studies have shown mammals may leave an area where noise is, but return at some point once the noise is gone (Bowles in Knight 1995).

Hearing loss and decrease in sound sensitivity: Although sounds from OHVs are not the loudest sounds, they are emitted more frequently in wildlife habitats than other high intensity sounds (Brattstrom and Bondello 1983 in Ouren et al. 2007). Effects on animals can vary from partial deafness to hormonal stress responses, depending on loudness and proximity.

Marler et al. (1973) used sound pressure of 95-100 decibels (dB), which represents many OHV sound levels (two stroke engines: 70-101 dB; four stroke engines: 60 dB; ATVs: 78 dB; snowmobiles: 75 dB). The noise level of 99 dB (highest allowed in Oregon) would be loud enough to create partial deafness in canaries and songbirds (Marler et al. 1973; Konishi 1969). Wildlife within the project area would not experience this noise level at a constant rate, nor would they receive this sound level 20 cm away. It is more probable wildlife would be intermittently exposed to vehicles producing sound levels of 99 dB, with a rare occasion of illegal engine reaching above 99 dB, and much farther away than 20 cm. So, while deafness is unlikely there could be a decreased sensitivity. For example, sand lizards and kangaroo rats exposed to playback recordings of dune buggies at lower decibels than they would have been actually exposed to experienced hearing loss for weeks after and were unresponsive to predator sounds (Brattstrom and Bondello 1983 in Ouren et al. 2007).

Communication Confusion: Human-made noise has the potential of interfering with animal communication signals, sounds animals listen to for orientation, and for predator-prey detection (Erbe et al. 1999 in AMEC 2005). Noisy environments can cause problems with intra-species communication and can interfere with detection, discrimination, and localization of appropriate signals (Wollerman 1998 in AMEC 2005). Klump et al. (1984) showed how the great tit can hear the sparrow hawk coming and gives one of three alarm calls to warn others of the presence of sparrow hawks. Communication between the species fails if noise masks either the noise produced from the sparrow hawk or the alarm call. Reijen and Foppen (1994) stated that where primary song was affected by vehicle disturbance, birds appeared reluctant to establish nesting territories. This could affect populations whose numbers are already low (AMEC 2005). Konish (1970) found all birds could hear frequencies below 1kHz, which may be used to detect low broad-band noises by predators. Vehicle noise may indirectly cause mortality by eliminating a species' ability to detect and capture necessary food items or detect and avoid predators (Montana TWS 1999). In addition, ambient (background) noise affects the distance at which vocalizations, human-made noises, and other sounds can be detected (AMEC 2005). Ambient noise in terrestrial environments includes sound like animal calls and songs (e.g. birds, frogs, and insects), water, and wind (AMEC 2005). At times, OHV noise may simulate natural sounds (e.g. thunder) to which animals are adapted and result in inappropriate responses. In a study conducted by Brattstrom and Bondello (1983 in Ouren et al. 2007), spadefoot toads subjected to taped motorcycle sounds emerged prematurely from their burrows during the wrong season (absence of rain).

Habitat Loss: Habitat loss is a potential impact of noise disturbance on wildlife. Studies on ungulates and carnivores have shown heavily traveled roads are avoided or used little in comparison to lightly traveled roads (Forman et al. 2003; Rowland et al. 2005). Large mammals tend to have lower population densities within 100-200 meters of roads and other animals seem to avoid roads (i.e.

arthropods, small mammals, birds) (Forman and Alexander 1998; Barton and Holmes 2007; Eigenbrod et al. 2007; Fletcher et al. 1999; Montana TWS 1999; Gaines et al. 2003; and Ouren et al. 2007).

Many studies show breeding birds near highways and OHV trails have reduced densities, population decline and/or are more likely to abandon their nest (Forman et al. 2003; Barton and Holmes 2007; Montana TWS 1999; Kaseloo 2006; Van der Zande et al.1980; Reijnen et al. 1995; Reijnen and Foppen 1995). Depending on the species the amount of habitat lost due to noise varies.

Habituation: Some animals do show the ability to adapt to noise. Flushing distance may decrease, avoidance distances may decrease, and individual wildlife may learn to ignore the sound (Bennett and Zurlke 1999; Burter 1981; Zande et al. 1980; Dorrance et al. 1975; Richins and Lavigne 1978; Moen at al. 1982 in Zielinski et al. 2007). Additionally, some songbirds can become habituated to certain people visiting their nest sites and may become aggressive to others they have not become accustomed to (Knight 1995). Mule deer were found to use areas closer to roads at Starkey Experimental Forest and Range (Johnson, 2000), but this pattern of use was attributed to avoidance of elk rather than selection of habitat near roads. Preisler (2006) noted that the response of elk to human disturbance lessened after a few days of disturbance and suggested that the elk had either habituated or found refugia close to roads, rather than fleeing to the far corners of experimental pastures at Starkey Experimental Forest and Range.

Whittaker and Knight (1999) stated that animals may become habituated to trail recreation because the movement is always occurring on a certain line of travel continually. Their study illustrated an animal's probability of flushing due to recreation increased when the activity was off-trail versus on-trail. Other studies have shown animals are also more prone to habituate to trail activities versus those activities that are unpredictable (MacAurthur et al. 1982; Miller et al. 2001). The energetic cost for wildlife of responding to disturbances from recreation can also affect the carrying capacity of wildlife habitat (Stalmaster 1983). In some cases, wildlife may habituate to predictable disturbance from recreation, but in other cases they may not (Taylor and Knight 2003). However, habituation may lead to attraction, which could have wildlife consequences. For example, habituated wildlife may be more susceptible to mortality from poaching and hunting (Singer 1975).

Disturbance associated with noise is assumed to be greatest within the road effect zone (200 meters each side of roads) as well as along unauthorized routes and via cross country travel. Disturbance would decrease beyond the road or motorized trail effect zone for each of the action alternatives and as a result, habitat quality would increase as distance from road or trail increases. Acreage within five potential disturbance bands is displayed in Table 90. At 1 mile or more from a motorized route noise and disturbance impacts are assumed to drop to the ambient level (zero impact from motorized use of the route); Table 91 displays the acreage in the project area that is within one mile of an existing or proposed route, and the acreage that is more than one mile from existing or proposed routes.

Table 91. Acreage within and more than one mile from motorized routes in the Ochoco Summit project area.

Alternative	Total Acres (% of area) less than 1 mile from motorized route	Total Acres (% of area) more than 1 mile from motorized route
Alternative 1	290,802 (96.4%)	10,779 (3.6%)
Alternative 2	291,170 (96.5%)	10,411 (3.5%)
Alternative 3	291,170 (96.5%)	10,411 (3.5%)
Alternative 4	291,170 (96.5%)	10,411 (3.5%)

Physical Alteration of Habitat

Effects of direct habitat alteration depend on the scale at which they occur and the tolerance of the species in question. Reducing one acre of habitat for a species that has a large home range and large

quantities of habitat available would have very little impact, if any, on that species. Reducing one acre of habitat on a species that is not mobile and has a three acre home range may affect that individual's ability to successfully reproduce or survive. Affecting one or a few such individuals may have little or no effect on the population or species across the landscape.

This project would not remove substantial amounts of dead and down wood, would have limited landscape level impacts to various plant associations, and would avoid springs, bogs and other unique habitat. Thus, this project is not expected to result in changes to habitat for species that use dead and down logs (including bears, American marten and other species); a wide range of species that use various plant communities; and species that use springs, bogs and other unique habitat (including shorebirds, waterfowl, gastropods, amphibians and a variety of other species).

Alternative 1: Physical effects to special habitats (SHAB) such as meadows, riparian woodlands, shrublands and rocky sites would continue within the affected zone along open roads. No physical closure of unauthorized routes would be implemented. Direct and indirect effects of existing open roads are related to road maintenance activities, dust, run-off and vehicles being driven off the road surface for various reasons such as campsite access, firewood cutting, parking, etc. There would be no effects from a designated trail system.

Action Alternatives: Direct and indirect effects would continue within the road effect zone on roads that remain open and for any additional length of motorized route included in the OHV trail system described in each alternative. Direct and indirect effects include those described above for Alternative 1, as well as for soil disturbance associated with new trail construction, maintenance and conversion of old road beds to motorized trails.

Alternative 2: Within the designated trail system approximately 36 miles of designated route impact 18 acres of special habitat. Of the designated route miles on SHAB, 11 miles are on open roads. The designated system would include 126 miles in forested plant association groups (PAGs) and 44 miles in PAGs other than forested (juniper woodland, juniper steppe, non-forested). Of the designated route miles in forested PAGs: 11miles of class I routes are on open roads; 16 miles of class II routes are on open roads; and 3 miles of class III routes are on open roads. If an average width of 10' of impact to vegetation is assumed on routes not on existing roads, then approximately 1.2 acres per mile could be affected by direct habitat alteration of forested PAGs, a total of 115 acres. Of the route miles in PAGs that are not forest land, 3 miles of class I routes are on open roads; 13 miles of class II routes are on open roads; and 1 mile of class III routes are on open roads. If the same average width of habitat alteration is assumed as in forested PAGs, then non-forested habitat alteration could potentially affect 32 acres. The area impacted by clearing could be reduced in the long-run on routes where roads are converted to trails (up to 55 miles), as well as where unauthorized routes are closed. Such closures are proposed on a total of 209 sites.

Alternative 3: Within the designated trail system approximately 17 miles of designated route impact 7 acres of special habitat. Of the designated route miles on SHAB, 5 miles are on open roads. The designated system would include 82 miles in forested plant association groups (PAGs) and 19 miles in PAGs other than forested (juniper woodland, juniper steppe, non-forested). Of the designated route miles in forested PAGs 4 miles of class I routes are on open roads, and 6 miles of class III routes are on open roads. If an average width of 10' of impact to vegetation is assumed on routes not on existing roads, then the area potentially affected by direct habitat alteration of forested PAGs would be a total of 86 acres. Of the route miles in PAGs that are not forest land, 1 mile of class I route is on open roads, and 4 miles of class III routes are on open roads. There are no class II routes proposed under this alternative. If the same average width of habitat alteration is assumed as in forested PAGs, then non-forested habitat alteration could potentially affect 17 acres. The area impacted by clearing could be reduced in the long-run on routes where roads are converted to trails (up to 37 miles), as well as where unauthorized routes are closed. Such closures are proposed on a total of 145 sites.

Alternative 4: Within the designated trail system approximately 40 miles of designated route impact 22 acres of special habitat. Of the designated route miles on SHAB, 14 miles are on open roads. The designated system would include 164 miles in forested plant association groups (PAGs) and 48 miles in PAGs other than forested (juniper woodland, juniper steppe, non-forested). Of the designated route miles in forested PAGs: 24 miles of class I routes are on open roads; 6 miles of class II routes are on open roads; and 7 miles of class III routes are on open roads. If an average width of 10' of impact to vegetation is assumed on routes not on existing roads, then the area potentially affected by direct habitat alteration of forested PAGs would be a total of 152 acres. Of the route miles in PAGs that are not forest land, 10 miles of class I routes are on open roads; 5 miles of class II routes are on open roads; and 1 mile of class III routes are on open roads. If the same average width of habitat alteration is assumed as in forested PAGs, then non-forested habitat alteration could potentially affect 38 acres. The area impacted by clearing could be reduced in the long-run on routes where roads are converted to trails (up to 76 miles), as well as where unauthorized routes are closed. Such closures are proposed on a total of 277 sites.

Threatened, Endangered and Sensitive Species

Greater Sage Grouse and California wolverine, both candidate species, are the only terrestrial wildlife species federally listed or under review for listing under the Endangered Species Act that are likely to occupy any portion of this project area based on the 2011 R6 Regional Forester's Threatened, Endangered and Sensitive Species List (R6 TES List).

Sensitive species were analyzed using the 2011 update to the R6 TES List. Table 81 includes all terrestrial animal species documented or suspected to occur on the Ochoco National Forest and their status.

Species classified as sensitive by the Forest Service are to be considered by conducting biological evaluations (BE) to determine potential effects of all programs and activities on these species (FSM 2670.32). The BE is a documented review of Forest Service activities in sufficient detail to determine how a proposed action may affect sensitive wildlife species. Columbia spotted frog, western ridged mussel (bivalve mollusk), Columbia clubtail (dragonfly), *Namamyia plutonis* (caddisfly), Harney Basin duskysnail, Indian Ford juga and Crater Lake tightcoil (snails) occupy aquatic or semi-aquatic environments and are discussed in the aquatic species section.

Table 92. Regional TES Terrestrial Animal Species for the Ochoco National Forest.

Species	Listing Status	Habitat	Presence Within Ochoco Summit Area
Bald Eagle (*Haliaeetus leucocephalus*)	Regional Forester Sensitive	Lakes, Reservoirs, Large Trees for Nesting	Habitat Present - Known Nests
Upland Sandpiper (*Bartramia longicauda)*	Regional Forester Sensitive	Large Wetlands	Habitat Present – historic occurrence
Bufflehead (*Bucephala albeola*)	Regional Forester Sensitive	Mountain Lakes and Ponds	Habitat Present - Migratory
American Peregrine Falcon (*Falco pergrinus anatum*)	Regional Forester Sensitive	Lakes, Rivers, Snags	Habitat Present - Unknown
Tricolor Blackbird (*Agelaius tricolor*)	Regional Forester Sensitive	Marshes and Bogs with Emergent Plants	No Habitat
Lewis' Woodpecker (*Melanerpes lewis*)	Regional Forester Sensitive	Open Forests, Burned Forest or Cottonwood Galleries	Habitat Present – Documented occurrence

Table 92. Regional TES Terrestrial Animal Species for the Ochoco National Forest.

Species	Listing Status	Habitat	Presence Within Ochoco Summit Area
White-Headed Woodpecker (*Picoides albolarvatus*)	Regional Forester Sensitive	Ponderosa Pine or Mixed Conifer Forests Dominated by Ponderosa Pine	Habitat Present – Documented occurrence
Greater Sage Grouse (*Centrocercus urophasianus phaeios*)	Federal Candidate	Sagebrush Without Tree Cover	Habitat Present – Documented occurrence
California Wolverine (*Gulo gulo*)	Federal Candidate	Mixed Forest Mosaic, High Elevations	Habitat Present – Historic occurrence
Pygmy Rabbit (*Brachylagus idahoensis*)	Regional Forester Sensitive	Sagebrush with Friable Soils	No Habitat
Townsend's Big-Eared Bat (*Plecotus townsendii*)	Regional Forester Sensitive	Roost Sites in Buildings, Caves and Bridges	Habitat Present – Documented occurrence
Silver-Bordered Fritillary (*Boloria selene*)	Regional Forester Sensitive	Wet meadows, marshes, bogs and more open parts of shrubbier wetlands	Habitat Present – Documented occurrence
Johnson's Hairstreak (C*allophrys johnsoni*)	Regional Forester Sensitive	Mostly in old growth coniferous forests with mistletoe presence	Unknown

After a review of existing records, habitat requirements, and existing habitat components, it was determined that the following sensitive species have habitat present in the project area or are known to occur and would be included in this analysis: Greater Sage Grouse (*Centrocercus urophasianus phaeios*), Northern bald eagle (*Halaieetus leucocephalus*), Upland Sandpiper (*Bartramia longicauda*), Bufflehead (*Bucephala albeola*), American Peregrine Falcon (*Falco pergrinus anatum*), Lewis' woodpecker (*Melanerpes lewis*), White-headed woodpecker (*Picoides albolarvatus*), California wolverine (*Gulo gulo*), Townsend's Big-Eared Bat (*Plecotus townsendii*), Silver-bordered fritillary (*Boloria selene)* and Johnson's hairstreak (*Callophrys johnsoni*).

The following species were determined not to occur in the project area based on a review of habitat requirements, and habitat types present in the project area and a lack of existing sighting information: tricolored blackbird (*Agelaius tricolor)* and pygmy rabbit (*Brachylagus idahoensis).* These species will not be included in any further analysis for this project.

American Peregrine Falcon (Falco pergrinus anatum), R6 Sensitive

In Oregon peregrine falcons occur as resident and migratory populations. They nest on cliffs greater than 75 feet in height and within one mile of some form of water (Pagel 1992). Nesting occurs in xeric areas of eastern Oregon, marine habitats of western Oregon, montane habitats to 6,000 feet elevation, small riparian corridors statewide, and more recently urban habitats of the lower Willamette and Columbia Rivers. Riparian corridors are used for travel and as hunting areas (90-95 percent of all prey items are birds that may come from these systems, Pagel 1992).

Existing Condition: There are no known peregrine falcon eyries on Ochoco National Forest. Within the Ochoco Summit project area there is a limited amount of suitable cliff habitat that could function as nesting habitat. Cliffs in the area are considered to have low potential to support nesting peregrine falcons. In the project area general observations of peregrine falcons were recorded near Duncan Butte in May of 1978, near Buck Point in July of 2002 and at Deep Creek in 2003. Additional records

occurred on private land between 1986 and 1995 approximately 3 miles south of the project area's southeast corner, one in July and three in January.

Effects Common to All Alternatives: Cliff habitat and potential foraging areas would not be modified by any alternative proposed by this project. There are no proposed trails or staging areas within 1 mile of any know nest area.

Determination: Implementation of any alternative would have "**No Impact**" on the peregrine falcon. Because no effects are anticipated, there are no cumulative effects.

Greater Sage-Grouse (Centrocercus urophasianus phaeios), Federal Candidate

Greater sage grouse are found in foothills, plains, and mountain slopes where sagebrush is present and the habitat contains a mixture of sagebrush and meadows in close proximity. Winter habitat containing palatable sagebrush probably is the most limited seasonal habitat in some areas (NatureServe 2008). In Oregon sage-grouse occur in Central and Southeastern Oregon in the Western and Northern portions of the Great Basin (USFWS, 2012).

Existing Condition: While this habitat type and sage grouse are known to occur on the Ochoco National Forest, this habitat type does not occur in large enough patches to provide high quality nesting and brood rearing habitat within the project area. Numerous records exist for sage-grouse sightings within 1 to 6 miles of the southeast boundary of the project area. These were all general sightings and most occurred between July and October. However, two springtime records occurred, both outside the project area by at least 3 miles. Core area has been mapped along the southeast corner of the project area (ODFW 2012).

Effects Common to All Alternatives: Some relatively small patches of potentially suitable nesting or brood rearing habitat occur in proximity to proposed trails. However, these sagebrush habitat patches are not likely to be utilized by nesting sage-grouse hens due to the presence of raptor perches (small patches or intermixed scab/stringer habitat) and distance from known leks (breeding sites). There are no proposed trails or staging areas within 4 miles of sighting locations, within the core area or within four miles of any known lek.

Determination: The Deschutes and Ochoco National Forests completed a Joint Aquatic and Terrestrial Programmatic Biological Assessment for Federal Lands within the Deschutes and John Day River Basin's Administered by the Deschutes and Ochoco National Forests in August 2006. At the time of document completion, the greater sage grouse was under review for federal listing. Current direction is to continue to incorporate the Project Design Criteria (PDCs) to limit effects to sage-grouse. The PDCs for the sage grouse were reviewed in relation to the Ochoco Summit OHV project as proposed and were determined to be consistent. A new programmatic BA for 2010-2013 does not include the greater sage-grouse since it is not currently federally listed or proposed for listing under ESA. Implementation of any alternative would have "**No Impact"** on the greater sage-grouse. Because no effects are anticipated, there are no cumulative effects.

Townsend's Big-Eared Bat (Plecotus townsendii), R6 Sensitive

Townsend big-eared bat maternity and hibernation colonies are typically in caves and mine tunnels. They roost almost exclusively in cavity roosts, both in human-made structures (that is, buildings, bridges, and mines) and caves (Christy and West 1993). They are extremely sensitive to disturbance while roosting, because they hang directly from the ceiling of the roost and do not go into torpor (temporary hibernation) during the day in summer colonies (Barbour and Davis 1969 and Dalquist 1948 cited in Christy and West 1993). Perkins and Levesque (1987) estimated the Oregon population at 2,300-2,600 bats and Gaines (1997 cited in NatureServe 2008) estimated 3,000-5,000 individuals in Oregon. The species range extends from southwestern British Columbia, western Washington, western and central Oregon, and northwestern and west-central California. NatureServe (2009) gives

them a status of S2, Imperiled in the state of Oregon. The greatest threat to the species is vandalism and disturbance by humans. Disturbance of a nursery colony or of a hibernating group is likely to cause the bats to abandon the site and move to an alternate roost. An additional threat is blockage of cave/mine entrances through collapse or human activities (NatureServe 2009).

Existing Condition: Though there are mines on Lookout Mountain Ranger District and there are documented reports of Townsend's big-eared bats occurring on the district, these are not located in proximity to any proposed trail or staging area. There is one known location for Townsend's big-eared bat in the project area. This location was first recorded in 1998 and is known to have continued occupancy by bats, though species determinations have not been confirmed in recent years. Another record, about 1 ½ miles west of the project area, came from a bat survey conducted in June of 1997.

Effects Common To All Alternatives: Cave, mine and existing wooden structures (potential roost sites) and potential foraging areas would not be modified by any alternative proposed by this project. There are no proposed trails or staging areas within 5 miles of the roost location.

Determination: The selection and implementation of any alternative would have "**No Impact**" on the Townsend's big-eared bat. Because no effects are anticipated, there are no cumulative effects.

Northern Bald Eagle (Haliaeetus luecocephalus), R6 Sensitive

The northern bald eagle was officially de-listed as a federal threatened species on August 8, 2007; however, they are still protected under the Bald and Golden Eagle Protection Act of 1940. This law provides for the protection of bald and golden eagles by prohibiting the take, possession, sale, purchase, barter, offer to sell, transport, export or import, of any bald or golden eagle, dead or alive, including any part, nest, or egg, unless allowed by permit (16 U.S.C. 668(a); 50 CFR 22). The U.S. Fish and Wildlife Service (2007) has prepared Bald Eagle Management Guidelines to help landowners, land managers, and others to meet the intent of this Act. In addition, monitoring of selected bald eagle nest sites would continue to occur including sites on national forest system lands. The Land and Resource Management Plan (LRMP) also provides direction for the management of habitat through the protection of known nest and roost sites. The designation of Bald Eagle Management Areas (BEMAs) has occurred at known nest sites subsequent to publication of the LRMP.

A detailed account of bald eagle habitat requirements can be found in the Pacific Bald Eagle Recovery Plan (USDI 1986). Bald eagle nesting territories are normally associated with lakes, reservoirs, or rivers. Nests are usually located in large conifers in uneven-aged, multi-storied stands with old-growth components (Anthony et al. 1982). Nest trees usually provide an unobstructed view of the associated body of water. Live, mature trees with deformed tops are often selected for nesting. East of the Cascade Mountains in Oregon, bald eagles prefer nesting in ponderosa pine trees that average 46 inches in diameter (range 21-76 inches) and tend to be larger than the surrounding trees (Anthony et al 1982).

Existing Condition: Within the Ochoco Summit project area there are three designated BEMAs and two mapped bald eagle winter roost areas. The bald eagle observations that have been documented in the project area are associated with established nesting territories or roost sites.

Table 93 displays the results of nesting surveys conducted in the project area by Frank Isaacs (Isaacs and Anthony 2007) and by district personnel over a period of 10 years. Nesting surveys that contribute to post de-listing monitoring data were conducted through 2012.

Table 93. Bald eagle territories and historical nesting status 2002-2012 within Ochoco Summit project area.

Territory Name	Status 2012	Status 2011	Status 2010	Status 2009	Status 2008	Status 2007	Status 2006	Status 2005	Status 2004	Status 2003	Status 2002
Shady Creek	1	1	1	oF	1	oF	O?	1	2	oF	O?
Yellowjacket	1	O?	1	_ (new)							
Rock Creek	NS	O?	_	NS	NS	NS	NS	1	2	2	oF
Wolf Creek	2	2	2	O?	2	NS	2d	1	2	2d	2
Total Young	4	3	4	0	3	0	2	3	6	4	2

compilation from Isaacs and Anthony 2002 to 2006 and survey results from 2007 to 2012

Effects Common to All Alternatives: All action alternatives exclude roads in proximity to known nests and roosts from the designated OHV system of routes. None of the proposed trail system would occur within ½ mile of any known eagle nest or within any BEMA or mapped roost area.

Determination: The Deschutes and Ochoco National Forests completed a *Joint Aquatic and Terrestrial Programmatic Biological Assessment for Federal Lands* within the Deschutes and John Day River Basin Administered by the Deschutes and Ochoco National Forests in August 2006. At the time of document completion, the northern bald eagle was still federally listed as a threatened species. A new programmatic BA for 2010-2013 does not include the bald eagle since it is no longer a federally listed species. Current emphasis is to continue to incorporate the Project Design Criteria (PDCs) to limit effects to bald eagles where possible. Guidance on legal protection for bald eagles is provided in the National Bald Eagle Management Guidelines (USFWS 2007). The PDCs for the northern bald eagle were reviewed in relation to the Ochoco Summit OHV project as proposed and were determined to be consistent. The project is also consistent with the National Bald Eagle Management Guidelines (USFWS 2007). Because there would be no removal of nest trees or potential nest trees, that all motorized routes are greater than ½ mile from the known nests, and that BEMAs would not be entered with new trail construction, the determination is "**No Impact"** to the bald eagle or their habitat. Because no effects are anticipated, there are no cumulative effects.

Bufflehead (Bucephala albeola), R6 Sensitive

The bufflehead is North America's smallest diving duck. It winters throughout Oregon but is an uncommon breeder in the central and southern Cascades (Marshall 2003). The bufflehead would use tree cavities or artificial nest boxes in trees close to water. Marshall (1996) stated that human disturbance from high recreation use at Cascade Lakes and a shortage of suitable nesting cavities due to forestry practices may be having an impact on their population status. The Oregon breeding population is considered sensitive by the ODFW because of small size and limited nesting habitat (Marshall et al 2003). The Montana Chapter of the Wildlife Society conducted a review of effects of recreation on Rocky Mountain wildlife species including waterfowl. Korschgen and Dahlgren (1992) reviewed 21 journal articles on human disturbance of waterfowl and compiled and reported that waterfowl are wary, seeking refuge from all forms of disturbance, particularly those associated with loud noise and rapid movement. Activities along shorelines such as fishing, bird watching, hiking, and traffic were noted as disturbances to waterfowl although to a lesser degree compared to rapid overwater movement and loud noise; sailing, windsurfing, rowing, or canoeing, wading, and swimming. Disturbance effects can include increased rate of nest desertion and/or reduced hatching rate, both of which can lead to a declining population.

Existing Condition: On the Lookout Mountain Ranger District buffleheads are not commonly seen. Older forested stands adjacent to the lakes may provide snag habitat for this cavity nester, but most lakes of substantial size in the project area have developed or dispersed campsites used during the summer months and fall hunting seasons. Thus, there is limited potential for lakes and ponds in this

project area to provide suitable habitat for nesting bufflehead ducks. One bufflehead sighting was recorded in June of 1999 about 1 ½ miles east of the southeast corner of the project area, and a migrating bufflehead was observed on a borrow pit pond in the project areas in November of 2007.

Effects - Alternative 1: This alternative would result in no direct effects to the bufflehead because no new OHV trails or closed roads would be opened or developed within the riparian zone of lakes or ponds in the project area. Because of the known recreational use of closed or unauthorized routes to otherwise protected lakes and ponds during the breeding season, it is assumed the selection of this alternative may result in some level of disturbance to nesting buffleheads, if present, along the riparian zones of these small lakes. The determination is "**May Impact Individuals Or Habitat, But Would Not Likely Contribute To A Trend Toward Federal Listing Or Cause A Loss Of Viability To The Population Or Species"** of bufflehead**.**

Effects Common to All Action Alternatives: All action alternatives propose to reinforce existing closures on routes that access riparian zones of several small lakes or ponds. Overall, this would result in a reduction of motorized use within the riparian zone of these water bodies. However, all action alternatives also propose staging areas in locations with borrow pit ponds. These sites are accessed by open roads, are devoid of snags and subject to heavy recreational use and thus are not likely to provide nesting habitat for buffleheads. However, they may provide resting areas during migration. Motorized access to these ponds is generally snowed in during spring migration and seasonal restriction on the trail would also reduce disturbance during spring migration. However, the increase in use of these sites due to designation of a new trail system may reduce the capability of these ponds to provide secure stop-over sites during fall migration.

Determination: All action alternatives would reduce motorized use of several small ponds and reservoirs compared to the existing condition. However, the action alternatives may compound disturbance effects at Cottonwood Pit and Walton Sno-Park ponds. Therefore, implementation of any action alternative "**May Impact Individuals or Habitat, But Would Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species"** of bufflehead**.**

Lewis' Woodpecker (Melanerpes lewis), R6 Sensitive

This woodpecker is a medium-sized bird that relies on flycatching during the spring and summer and stored mast and fruits in the fall. They breed in low numbers in open habitats along Eastern Oregon river and stream valleys. The species is most common in open habitats (e.g. burns) and uses cottonwood galleries in the Blue Mountains (Marshall et al. 2003). Wisdom (2000) reported that burned ponderosa pine forest created by stand-replacing fires provide highly productive habitats as compared to unburned pine. They are not considered strong cavity excavators but require large snags in an advanced stage of decay that are easier to excavate. Lewis' woodpeckers would also use old cavities created by other woodpeckers. Forty-two percent of the nest trees on the eastern edge of the Mt. Hood National Forest were in ponderosa pine (typically snags) and 43 percent were in living and declining Oregon white oak. The mean diameter of nest trees was 26 inches and mean nest tree height was 41 feet (Marshall et al. 2003). Haggard and Gaines (2001) determined that the Lewis' woodpecker was most abundant in low snag density stands within a stand replacement fire study conducted on the Wenatchee National Forest in Washington. Marshall et al. (2003) reports the species is declining throughout its range possibly due to loss of suitable habitat, competition for nest holes, and the effects of pesticides.

Existing Condition: Existing district wildlife sighting records show a few observations of Lewis's woodpeckers in or near the project area. Woodpecker surveys conducted between 1992 and 1995 (targeting pileated, white-headed, black-backed and three-toed) did not produce any records for Lewis' woodpecker. Surveys conducted in 2008 (targeting white-headed and Lewis' woodpeckers) produced records for six other species of woodpeckers and sapsuckers, but no Lewis' woodpeckers.

Records (2003 to 2007) from the local chapter of the Audubon Society (formerly East Cascade Bird Conservancy) had the majority of its Lewis' woodpecker records at lower elevations (off the Forest), during migration. However, one record included four woodpeckers in late August within the project area. Of the three records of Lewis's woodpeckers in the project area, two are more than 5 miles from any proposed trail or staging area, while the other is within 1 mile of a class III trail and about 1 mile from a class III staging area in an active gravel pit.

Effects Common To All Alternatives: Hamann et al. (1999) and Gaines et al.(2003) conducted literature reviews of recreational associated effects on wildlife including studies on woodpeckers and other cavity nesting birds. Their reviews of existing published literature showed that recreational trail-associated disturbances did not present a problem to woodpeckers and cavity nesters as a group. Hamann et al. (1999) also stated that recreational activity is unlikely to be focused around nest sites of these species and by design woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds. Therefore at the present, recreational disturbance is not known to be a major limiting factor.

Altman in the Landbird Conservation Strategies for the Northern Rocky Mountains (2000) lists the Lewis' woodpecker as the Focal Species for both 1) the Burned Old Forest conservation focus in the Dry Forest habitat type and 2) the Large Snags in Riparian Woodland conservation focus in the Riparian habitat type. He also lists them as a species to benefit from the presence of large patches of old dry forests. Recommendations include road closures or fuel wood restrictions to minimize the loss of large ponderosa pine snags. No snags would be intentionally targeted for felling with the exception of hazard trees or snags near trails or staging areas. Project design and layout would minimize the loss of existing large snags and this would be consistent with the recommendations by Altman (2000).

Determination: Current literature reviews state that the woodpecker guild is not known to be disturbed from recreational trail users and Project Design Features have been incorporated to minimize the intentional removal of large diameter trees and snags. The selection of any alternative would lead to a determination of "**No Impact**" on the Lewis' woodpecker. Because effects are limited to incidental loss of snag habitat on a very small proportion of the landscape in a scattered arrangement, proposed activities are not likely to substantially reduce habitat within individual home ranges or at the landscape scale. Refer to the discussion on effects to snag habitat in the section on Primary Cavity Excavators, under Management Indicator Species.

White-Headed Woodpecker (Picoides albolarvatus), R6 Sensitive

The white-headed woodpecker is a resident of montane forests from southern interior British Columbia south through Central Washington, Northern Idaho, Eastern Oregon and Southwest Oregon, Northern and Central California, and the eastern edge of Central Nevada to the mountains of Southern California (Marshall et al. 2003). The presence of old growth pine is thought to be important to white-headed woodpeckers. Large diameter pines provide bark crevices for the invertebrate prey of white-headed woodpeckers and are good cone producers; white-headed woodpeckers rely on pine seeds for food during the winter months. Old-growth stands have greater densities of the large-diameter snags that white-headed woodpeckers appear to select for nesting (Frenzel 2002). White-headed woodpeckers usually excavate nest cavities in snags, but other recorded substrates include stumps, leaning logs, and the dead tops of live trees. Frenzel (2002) studied white-headed woodpecker nesting areas on the Deschutes and Winema National Forests; he found that nest trees ranged from 23.6 to 118.1 cm (9-46 inches) with an average diameter of 27 inches, 89 percent of the nest trees were in ponderosa pine, and canopy closure at the nest tree ranged from 0 percent to 57 percent with a mean of 13 percent.

Frenzel (2002) concluded population recruitment for this woodpecker was insufficient to offset mortality in his study areas on the Deschutes and Winema National Forests. He also reported that shrub growth, increased understory tree densities from fire suppression, may be factors affecting

levels of mammalian nest predation and vulnerability of adults to avian predation. Marshall et al. (2003) stated that the long-term stability of this woodpecker in Oregon and Washington appears to rest with reversing the declining health of ponderosa pine forest.

Existing Condition: Existing district wildlife sighting records show numerous observations of white-headed woodpeckers in or near the project area between 1989 and 2010. Woodpecker surveys conducted between 1992 and 1995 (targeting pileated, white-headed, black-backed and three-toed) produced many records for white-headed woodpecker, including multiple records within the project area. Surveys conducted in 2008 (targeting white-headed and Lewis' woodpeckers) produced records for six species of woodpeckers and sapsuckers, including white-headed woodpeckers within the project area (Polie Creek, Marks Creek, Ochoco Creek, Rush Creek). Survey efforts in spring/summer 2010 have recorded white-headed woodpecker responses near Polie Creek and Little Summit Prairie (both within the project area). In addition, records from local Audubon Society members (formerly East Cascade Bird Conservancy) from 2003 to 2007 described numerous sightings of white-headed woodpeckers, including nine in the project area from June to October in 2004 through 2006.

Effects Common To All Alternatives: Hamann et al. (1999) and Gaines et al. (2003) conducted literature reviews of recreational associated effects on wildlife including studies on woodpeckers and other cavity nesting birds. Their reviews of existing published literature showed that recreational trail-associated disturbances did not present a problem to woodpeckers and cavity nesters as a group. Hamann et al. (1999) also stated that recreational activity is unlikely to be focused around nest sites of these species and by design woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds. Therefore at the present, recreational disturbance is not known to be a major limiting factor.

Altman in the Landbird Conservation Strategies for the Northern Rocky Mountains (2000) lists the white-headed woodpecker as the Focal Species for the Large Patches of Old Forest conservation focus in the Dry Forest habitat type. He also lists them as a species to benefit from the presence of grassy edges and openings in dry forest. Recommendations include various measures to minimize the loss of snags, particularly soft snags, and high cut stumps for hazard tree removal. No snags would be intentionally targeted for felling with the exception of hazard trees or snags near trails or staging areas. Project design and layout would minimize the loss of existing large snags and high stumping in suitable white-headed woodpecker habitat types will be included in the design elements for this project, consistent with the recommendations by Altman (2000).

Determination: Current literature reviews state that the woodpecker guild is not known to be disturbed from recreational trail users and Project Design Features have been incorporated to minimize the intentional removal of large diameter trees and snags. These measures incorporated into any alternative would have "**No Impact**" on the white-headed woodpecker. Because effects are limited to incidental loss of snag habitat on a very small proportion of the landscape in a scattered arrangement, proposed activities are not likely to substantially reduce habitat within individual home ranges or at the landscape scale. Refer to the discussion on effects to snag habitat in the section on Primary Cavity Excavators, under Management Indicator Species.

California Wolverine (Gulo gulo), Federal Candidate

The wolverine is the largest terrestrial member of the mustelid family with males weighing 26 to 40 pounds and females 17 to 26 pounds. Wolverines are opportunistic feeders consuming a variety of foods depending on availability. There is no evidence hunting by wolverines is limited by habitat structure. Primarily a scavenger rather than a hunter, the wolverine forages where carrion can be found (Ruggiero 1994). In addition to carrion they would also prey on small animals and birds and eat fruits, berries, and insects. Copeland et al. (2007) reported little seasonal movement (400 meter elevational band) among collared wolverines in Idaho and the modest shift was likely due to prey

availability in the form of ungulate carrion at lower elevation and upslope movement to locate rodents at higher elevations in the summer.

Wolverines occupy a wide variety of habitats from the arctic tundra to coniferous forest. The most common habitats are those that contain a high diversity of microhabitats and high prey populations. Copeland (2007) described wolverine habitat in the contiguous United States as consisting of small, isolated "islands" of high-elevation, alpine habitats containing sufficient depth of snow during the denning period, separated from each other by low valleys of unsuitable habitats. Wolverines occupy habitat in a high elevation band from 6,888 feet to 8,528 feet in the mountains of the lower 48 states (Federal Register/ Vol. 73, No. 48/ Tuesday, March 11, 2008). The intervening valleys in this area range from 3,198 feet to 4,920 feet and are unsuitable for long-term wolverine habitat because they do not have the snow conditions or other habitat features required by wolverines (Aubry et al. 2007 in Federal Register/ Vol. 73, No. 48/ Tuesday, March 11, 2008). High elevation alpine wilderness areas appear to be preferred in summer, which tends to effectively separate most wolverine and human interactions. Aubry et al. (2007) reported that virtually all of the wolverine records located in the Pacific states were within or near alpine areas. Copeland et al. (2007) reported that adult males tend to travel more widely than females and as such, they are more likely found in lower, coniferous-dominated habitats simply by chance. The essential component of wolverine habitat may be isolation and the total absence of disturbance by humans (Ruggiero 1994). However, Copeland et al. (2007) reported that unmaintained winter roads used for snowmobile access to trapping sites in the study area were frequently used for travel by wolverines.

The most critical and limiting habitat for wolverines seems to be acceptable natal denning habitat. Magoun and Copeland (1998) described two types of dens used by wolverines: natal and maternal. Natal dens are used during parturition and occur more commonly in subalpine cirque basins associated with boulder talus slopes. Maternal dens are used subsequent to natal dens and before weaning occurs. They consist of a complex of dens associated with boulders or fallen trees. Magoun and Copeland (1998) believe that a critical feature of wolverine denning habitat is the dependability of deep snow to persist through the denning period of February through May with at least one meter of snow depth. Ruggiero (1994) described natal dens having been found in snow tunnels, hollow trees and even caves in the ground. Ruggierro (1994) also reported that in forested habitats the structural diversity provided by large snags, fallen logs, and stumps would likely provide natal den sites. Aubry et al. (2007) reported that virtually all of the wolverine records located in the Pacific states were within or near alpine areas. They also reported that spring snow cover was the only habitat layer in their study that fully accounted for the distribution of historical wolverine records in the western mountains.

Home ranges for adult wolverines tend to be large ranging from 38.5 square miles to 348 square miles (Banci 1994 in Federal Register Doc. 03-26475). Copeland (1996) radio collared wolverines in Idaho and reported annual home ranges of resident adult females averaged 148 square miles and an average of 588 square miles for resident adult males. Aubry et al. (2007) compiled verifiable and documented records of wolverine occurrences and suggest that the historical distribution of wolverines in the Cascade Mountain and Sierra Nevada was disjunct, contradicting previous interpretations. Current records (1995-2005) are limited to north-central Washington, northern and central Idaho, western Montana, and northwestern Wyoming (Aubry et al. 2007). A recent observation with photographs indicates wolverines are still present in California (Zielinski, pers. comm. 2008). Aubrey et al. (2007) found no current records in Oregon despite concerted efforts to obtain verifiable evidence of wolverine occurrence using remote cameras, bait stations, and helicopter surveys in many areas of the Pacific states. However, five verifiable records of wolverine presence in Oregon were documented from 1961 to 1994 (Aubry et al. 2007). Recently confirmed sightings were recorded in the Eagle Cap Wilderness.

Wolverine may be impacted by management practices that influence subalpine and alpine communities, particularly those that reduce the presence and opportunity for carrion availability (Copeland et al. 2007). Resource extraction (including timber harvesting), backcountry skiing and snowmobiling, roads and other forms of human disturbance merit careful consideration by those concerned about wolverine conservation (Ruggiero et al. 2007) Researchers in British Columbia found a consistent negative association between wolverine occurrence and areas where helicopter and backcountry skiing occur. However, the causal factors associated with these patterns are not well understood (Copeland et al. 2007). Squires et al. (2007) found that trapping was the primary factor explaining decreased survival in western Montana. He also determined that harvest pressure was capable of reducing isolated populations beyond sustainable levels despite a regulated harvest within a state-wide quota system.

Existing Conditions: District records list multiple wolverine sightings near the west end of the project area between 1969 and 1992. There are also multiple records near the northeast corner of the project area between 1975 and 1997. Between these clusters of sighting were two records along the North Fork of the Crooked River in the 1980s. Potentially suitable natal denning habitat may be found in the Bridge Creek Wilderness Area, Lookout Mountain Recreation Area and Rock Creek/Cottonwood Creek area, as well as on the talus areas on north to northeast facing slopes below Mt Pisgah, Peterson Point, the rim above Keeton and Fry Creeks, Buck Point and the rim between Buck Point and Rock Creek . It is unlikely that denning habitat would be found in remainder of the project area because of open roads, moderately high recreational use, and the lack of persistent snow cover in subalpine areas where denning might occur.

Effects – Alternative 1: This alternative would result in no direct effects to the wolverine because no new OHV trails or closed roads would be opened or developed which access potential denning habitat in the project area. However, because of the known recreational use of closed or unauthorized routes to otherwise protected talus slopes, remote high elevation areas and northeast facing basins, it is assumed the selection of this alternative may result in some level of disturbance to wolverine, if they are present, in these areas. The determination is "**May Impact Individuals or Habitat, but Would Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species."**

Effects Common to All Action Alternatives: The selection of any action alternative would have no effect on potential wolverine denning in the project area. The most suitable potential denning habitat is found in wilderness, roadless or unroaded areas, none of which are in proximity to any proposed trails or areas. High road densities, and year-round recreational use, including the designated snowmobile and Nordic ski trails, across the project area would likely preclude wolverine use of the Ochoco Summit project area as denning habitat. However, there are occasional reports of wolverine in the project area, so it is possible that increased motorized route density (action alternatives) could result in disturbance to individual wolverine passing through the area. The additional impact from proposed trails would likely be negligible compared to the existing impacts from open roads and designated over-the-snow routes.

Determination: Although at the present time there are no recent confirmed records of wolverine presence in the project area there are numerous unconfirmed historic records for this species. As this animal is known to be affected by motorized use, particularly over the snow, and this project would not prohibit use of proposed routes by over the snow vehicles, the action alternatives "**May Impact Individuals or Habitat, but Would Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species."**

Silver-Bordered Fritillary (Boloria selene), R6 Sensitive

The silver-bordered fritillary butterfly has a holarctic range extending from northern Canada southward into the United States and as far south as New Mexico (NatureServe 2008). While the

species is common and widespread in northeastern Washington and northern Idaho, colonies are extremely local and isolated southward, and are particularly vulnerable to local extinctions. Only two primary colonies are found in Oregon, one at Big Summit Prairie on the Ochoco National Forest and one in the Strawberry Mountains Wilderness on the Malheur National Forest (Miller and Hammond 2007). NatureServe (2008) lists this species as G5, demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery. In Oregon its ranking is listed as S2, Imperiled. Suitable habitat for this species is described as mostly wet meadows, marshes, bogs, and more open parts of shrubbier wetlands (NatureServe 2008, Miller and Hammond 2007). This species is dependent on the maintenance of open and wet meadow habitats (Miller and Hammond 2007). Food sources for the adults include nectar sources such as composite flowers, including goldenrod and black-eyed susans (Opler et al. 2006). Eggs are laid singly near host plants and caterpillar hosts are violets including *Viola glabella* and *Viola nephrophylla* (Opler et al. 2006).

Existing Conditions: Surveys for this fritillary species were conducted on the Lookout Mountain Ranger District (now part of Paulina Ranger District) in suitable habitat surrounding Big Summit Prairie between 1995 and 1998. Several sub-populations of this species were confirmed and mapped. Within the project area suitable habitat for this species may occur in the wet meadow complexes where tributary streams enter wet meadow or marsh areas. Riparian habitat is also present in the project area on private lands along Little Summit Creek and North Fork of the Crooked River. However, it is currently unknown if suitable habitat conditions exist for this species on private lands.

Effects Common to All Alternatives: There are no proposals to develop new motorized trails or include user-created trails that access wet meadow habitat that may be providing habitat for this species of butterfly. Crossings of any meadow areas would have a hardened surface or crossing structure to prevent impacts to wetland vegetation in accordance with design criteria outlined in Chapter 2 of this document. Mitigations for botanical resources should also provide protection to reproductive habitat for this species. There are no proposed trails or staging areas within 1 mile of documented populations of this species.

Determination: The selection of any alternative would have **"No Impact"** on the Silver-bordered Fritillary butterfly. This determination is based on the premise that no suitable habitat would be negatively impacted by project activities.

Johnson's Hairstreak (Callophrys johnsoni), R6 Sensitive

The Johnson hairstreak butterfly is found from southwest British Columbia southward into the Coast Ranges to San Francisco in California; south in the Cascades and Sierra Nevada to Yosemite and also in the Blue Mountains of eastern Oregon. In Oregon its ranking is listed as S2, Imperiled, while globally its status is G3, very rare or local throughout its range or found locally in a restricted range (NatureServe 2008).

Suitable habitat for this species is described as coniferous forests, especially old growth (Opler et al. 2006) and old growth coniferous forests with red firs, western hemlocks, or gray pines on which its parasitic (mistletoe) hosts grows (NatureServe 2008). Johnson's hairstreak is believed to feed generally on all dwarf mistletoe species throughout its range, and to perhaps specialize on locally available dwarf mistletoes in specific localities (Miller per comm. 2008 cited by Schmitt and Spiegel 2008). Miller and Hammond (2007) describe suitable habitat as almost identical to that of the northern spotted owl except that the butterfly does not occur south of central California. The caterpillar food plant is western dwarf mistletoe. Adults find nectar on low growing plants such as Oregon grape, ceanothus and pussypaws (NatureServe 2008; Pyle, 1981; and USDA, NRCS 2008). Miller and Hammond (2007) indicated that to benefit this species management practices need to promote the maintenance of mature and old-growth conifers at middle to low elevations on the west slope of the Cascade Mountains and Coast Range.

Existing Conditions: Opler et al. (2006) shows Johnson hairstreak documentation for western and central Oregon plus the Blue Mountains in northeastern Oregon. The species is suspected to occur on the Ochoco National Forest, but currently there is no confirmed documentation for this species anywhere on Ochoco National Forest. Formal surveys have not been conducted. The species is closely associated with dwarf mistletoe which is present in the project area. However, an association of Johnson's hairstreak with the species of mistletoe present on this Forest has not been confirmed. Schmitt and Spiegel (2008) state that in the absence of recent large scale disturbance, dwarf mistletoe infestation levels can occur in early, mid, and late successional stands. Though the project area includes several small to moderately sized recent fire events, the project area has not experienced a large scale stand replacement event associated with an uncharacteristic wildfire. Therefore, mistletoe infection is assumed to be present in all stand age classes which could serve as a host for the caterpillar, if it occurs in association with the mistletoe present on this Forest. In 2010 the Interagency Special Status/Sensitive Species Program (ISSSSP) funded widespread field surveys in Oregon and Washington to document presence of Johnson's Hairstreak butterfly (Callophrys johnsoni) at locations where species presence was currently unknown, but likely based on habitat modeling and specific survey site selection criteria. The resulting report (Davis and Weaver, 2010) discloses that no historic record for this species back to 1891 has been found in Crook or Wheeler County and that the entire Ochoco Summit Trail System project area has a low probability of occurrence for this species.

Direct and Indirect Effects - Alternative 1: The selection of this alternative would not result in any change in vegetative conditions of conifer stands in the project area because no new trail construction would be completed. The species may occur in the area, but no management action is planned that would impact the species. Thus, the determination is **"No Impact"** to the Johnson's hairstreak butterfly and their habitat.

Effects Common to All Action Alternatives: The selection of any action alternative would result in the designation of user created trails, roads converted to trails and inclusion of new trail construction. Trail widths needed for new construction would be approximately 50 inches wide for Class I machines (ATVs), approximately 80 inches wide for Class II machines (jeeps and buggies), and approximately 24 inches for Class III (motorcycles). New trails would be designed to minimize tree removal but may require trees up to six to eight inches in diameter to be cut some of which may be infected with mistletoe. Mistletoe infection, however, is considered to be widespread throughout all plant associations and size classes over much of the 301,580-acre project area. Mistletoe infection would remain widespread throughout the project area if any of the action alternatives were selected for implementation. The incidental removal of mistletoe-infected trees during construction or maintenance would have a negligible effect on mistletoe in the project area, and thus would have very little effect on reproductive habitat for this species. Likewise, due to the relatively small proportion of the area physically impacted during construction, maintenance and use of the trail system (refer to the Botany section), the abundance of flowering plants to serve as foraging sites for adults would not be substantially changed by the alternatives.

Determination: This species has not been documented to occur on Ochoco National Forest and formal surveys have not been conducted in the Ochoco Summit project area. Because the host species are present, this butterfly may also be present. Due to the minimal scale of mistletoe removal relative to the extensive scale of mistletoe infection, the abundance and distribution of mistletoe host brooms (reproductive habitat for this butterfly) will not be substantially changed at the landscape scale under any action alternative. Likewise, the abundance of flowering plants that could serve as foraging sites for adults would be subject to a negligible reduction. Implementation of any action alternative "**May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species"** for the Johnson's hairstreak. This conclusion is based on the limited scope of this project and the narrow trail width needed for trail construction compared to the size of the project area and the current magnitude of mistletoe infection.

Upland Sandpiper (Bartramia longicauda), R6 Sensitive

Upland sandpipers breed in prairie-grassland habitats from Alaska and Canada to N. Dakota and adjacent states. A small, disjunct relict population occurs in Oregon and Idaho. The species winters in papas of South America. Habitat for upland sandpiper is present in this project area due to the inclusion of Big Summit and Little Summit Prairies and their extensive open wetland areas. According to Marshall et al. 2003, Oregon's upland sandpiper population, probably the largest west of the Rocky Mountains, is close to extirpation, and that remnant breeding populations are limited to Bear and Logan Valleys in Grant County. However, some field guides show isolated or rare occurrences in South Central Oregon and northern California (Kaufman 2000, Sibley 2000). Breeding by this species at Big Summit Prairie was reported in 1919 and a single bird was observed in that area in 1987. Continental range has been decreasing over the last two centuries due to hunting in the late 1800's, and conversion of prairie habitat to farming and grazing (White 1983). Though populations east of the Rocky Mountains are stable or increasing, populations west of the Rockies are declining and its continued existence in the Northwest is precarious (Marshall et al. 2003). Marshall et al offered as possible reasons for the western population declines the following: encroachment of pine into meadows, use of herbicides to control or eliminate forbs in nesting meadows, overgrazing in meadows especially during incubation and brood rearing, down-cutting of streams which impacts the water table and meadow systems and management practices on wintering grounds. The species currently holds rankings in Oregon as Sensitive and by the Oregon Natural Heritage Information Center as G5 globally secure, S1 critically imperiled in Oregon.

Existing Condition: Upland sandpipers have been recorded historically at Big Summit Prairie, but no records are known from the area since 1987. The expansive wetland complex of Big Summit Prairie is largely under private ownership, with only small amounts under management by the Bureau of Land Management. The majority of the prairie habitat in Big Summit Prairie is grazed seasonally by cattle. The majority of Little Summit Prairie is also under private ownership and is grazed seasonally by cattle. It is suspected that the historic breeding population reported in the area early in the 1900s is no longer present on the prairies of the Ochoco Mountains. Surveys conducted in 1993 did not result in any sightings and there are no records of upland sandpipers in the sighting record database forest-wide.

Effects Common to All Alternatives: This alternative would result in no direct effects to the upland sandpipers or potential habitat for them because no new OHV trails, trailheads or staging areas would be developed within expansive prairie-grassland habitats in the project area. Crossings of any meadow areas would have a hardened surface or crossing structure to prevent impacts to wetland vegetation in accordance with design criteria outlined in Chapter 2 of this EIS. Mitigations for botanical resources should also provide protection to reproductive habitat for this species. There are no proposed trails or staging areas within 1 mile of documented populations of this species.

Determination: The selection of any alternative would have "No Impact" on the upland sandpipers. This determination is based on the absence of this species within the project area, and because no suitable habitat would be impacted by project activities. Because no effects are anticipated, there are no cumulative effects.

Cumulative Effects to TES Species with Habitat Present in the Project Area

Past, present and reasonably foreseeable projects which have effects that overlap in time and space with effects of this project are listed in Table 6.

As described above, due to the fact that this project does not include large scale vegetation management, there are no cumulative impacts to habitat components based on vegetative composition and structure when considered in combination with thinning and prescribed burning treatments. However, this project's effect of increased access could combine with effects of increased

accessibility due to development of routes used to implement commercial thinning projects, and with the more open forest conditions created through vegetation and fuels management projects. If this occurred in proximity to occupied habitat for TES species there could be an increase in the potential for disturbance. However, there is no overlap of proposed trails or staging areas with Bald Eagle Management Areas or bald eagle roosts or nest buffers. There is no mapped critical or essential habitat, or occupied habitat for the other TES species within the zone of influence of any proposed route or staging area, with the exception of white-headed woodpecker. As noted in the section on Primary Cavity Excavators, white-headed woodpeckers prefer open forest conditions, and woodpeckers are not considered to be sensitive to disturbance from recreational activity. On the other hand, woodpecker habitat is vulnerable to illegal woodcutting. No new routes would be constructed of sufficient width to accommodate full size trucks and trailers typically used by woodcutters. Some full width roads would have their width reduced to trail standards, or would be closed under the action alternatives and thus, woodcutter access reduced. In addition, effects of project implementation on snag habitat are limited to incidental loss of snag habitat on a very small proportion of the landscape, in a scattered arrangement that is not likely to substantially reduce habitat within individual home ranges or at the landscape scale. Therefore, cumulative effects to white-headed woodpeckers are not expected to result in loss of occupied habitat and the cumulative effect on snag abundance would be negligible at the landscape scale.

The Forest-level Travel Management Plan closes the Forest to cross country travel except on designated routes or in designated areas. Following full implementation of the forest-level Travel Management Plan, acres of disturbed habitat would be limited to only those roads and motorized trails that are designated as open to the public for motorized use. Thus, the physical road closure reinforcements, rehabilitation of user created trails and additional road closures proposed in the action alternatives would combine with the rules for motorized travel in the Travel Management Plan, so that disturbance would be reduced in areas distant from open roads and trails, but would be increased in proximity to the routes that are designated open.

Summary of Conclusions for Sensitive Species

There is no habitat present and/or the following species are not expected to occur within the project area and therefore the determination is **"No Impact"** for pygmy rabbit and tricolored blackbird.

The selection of any alternative (1, 2, 3 or 4) is expected to have **"No Impact"** on the bald eagle, peregrine falcon, Lewis' woodpecker, white-headed woodpecker, greater sage-grouse, Townsend's big-eared bat and the silver-border fritillary.

The No Action alternative would result in a determination of "**May Impact Individuals or Habitat, but Would Not Contribute to a Trend toward Federal Listing or Loss of Viability to the Population or Species"** to the bufflehead and California wolverine.

The No Action alternative would have **"No Impact"** on the Johnson hairstreak.

The action alternatives (2, 3 and 4) "**May Impact Individuals or Habitat, but Would Not Contribute to a Trend toward Federal Listing or Loss of Viability to the Population or Species"** for the bufflehead, California wolverine and Johnson's hairstreak.

Table 94. Summary of Conclusion of Effects to Region 6 Sensitive Animal Species.

Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Bald Eagle	NI	NI	NI	NI
Upland Sandpiper	NI	NI	NI	NI
Bufflehead	MIIH	MIIH	MIIH	MIIH
American Peregrine Falcon	NI	NI	NI	NI
Tricolored Blackbird	NI	NI	NI	NI
Lewis' Woodpecker	NI	NI	NI	NI

Table 94. Summary of Conclusion of Effects to Region 6 Sensitive Animal Species.

Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4
White-Headed Woodpecker	NI	NI	NI	NI
Greater Sage-Grouse	NI	NI	NI	NI
California Wolverine	MIIH	MIIH	MIIH	MIIH
Pygmy Rabbit	NI	NI	NI	NI
Townsend's Big-Eared Bat	NI	NI	NI	NI
Silver-Bordered Fritillary	NI	NI	NI	NI
Johnson's Hairstreak	NI	MIIH	MIIH	MIIH

NI = No Impact
MIIH = May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or loss of viability to the population or species
BI = Beneficial Impact

Management Indicator Species (LRMP)

During the preparation of the Ochoco National Forest Land and Resource Management Plan (USDA 1989), a group of wildlife species were identified as Management Indicator Species (MIS). These species were selected because their well-being could be used as an indicator of other species dependent upon similar habitat conditions. Indicator species can be used to assess the impacts of management actions on a wide range of other wildlife with similar habitat requirements. The species listed in Table 95 were selected for the Ochoco National Forest.

Table 95. Ochoco National Forest Management Indicator Species.

Ochoco National Forest Management Indicator Species	Habitat	Species Present Within Analysis Area	Habitat Present Within Analysis Area
Primary Cavity Excavators	Dead wood habitat	Yes	Yes
Pileated Woodpecker	Old-growth mixed conifer forests	Yes	Yes
Northern Flicker	Old Growth Juniper	Yes	Yes
Golden Eagle and Prairie Falcon	Cliffs, talus, caves	Yes	Yes
Northern Bald Eagle	Lakeside/Reservoir, Large Trees	Yes	Yes
Rocky Mountain Elk and Mule Deer	Mosaic of early, forage-producing stages and later, cover-forming stages of forests, in close proximity	Yes	Yes

Effects to the northern bald eagle and American peregrine falcon were discussed in the Proposed, Endangered, Threatened, and Sensitive Species section, previously in this Chapter. Golden eagles and prairie falcons are discussed in the section on raptors, later in this chapter in the section titled "Other Species (LRMP)." Potential effects to the remaining MIS species are discussed in this section.

Primary Cavity Excavators (woodpeckers, chickadees and nuthatches)

Primary Cavity Excavators (PCE) include the Pileated Woodpecker and Northern Flicker (LRMP MIS), white-headed woodpecker and Lewis' woodpecker (TES and focal species), red-naped sapsucker (focal species) and other avian species that excavate their own cavities.

Primary cavity excavators are listed as a group, as Management Indicator Species (MIS) in the Ochoco National Forest Land and Resource Management Plan (LRMP). The primary cavity excavator MIS group includes birds that feed primarily on dead wood insects and that excavate their own nest cavities. Primary cavity excavators were selected to represent the species that require snag

habitat, or that utilize dead or defective wood habitat that is often reduced by forest management activities. The primary cavity nesters serve as ecological indicators for a large number of species and for secondary cavity users, like swallow, blue birds and bats (FEIS pp 3-22).

The PCE species associated with the project area are listed below (Thomas et al., 1979). The species with an asterisk (*) are also dead wood insect users.

Pileated Woodpecker*
White-headed Woodpecker
Northern Flicker
Lewis' Woodpecker*
Williamson's Sapsucker*
Black-backed Woodpecker*
White-breasted Nuthatch*
Pygmy Nuthatch*
Red-naped Sapsucker*
Hairy Woodpecker*
Three-toed Woodpecker*
Red-breasted Nuthatch*
Downy Woodpecker*

Effects to the white-headed and Lewis' woodpeckers have been disclosed in the Threatened, Endangered, and Sensitive section of this Chapter. Effects to the black-backed, three-toed, pileated, hairy and downy woodpeckers and the red-naped and Williamson's sapsuckers, common flicker, chickadees and nuthatches are discussed here. These species have been grouped together into the PCE. Direct, indirect, and cumulative effects are discussed for this group below.

Habitat use by woodpeckers that depend on the presence of bark beetles shows some similarities and some differences in stands selected for nesting, roosting, and foraging. Habitats for these species include lodgepole pine forests, mixed conifer, and mountain hemlock, although forest type may not be as important as the presence of bark beetles (Marshall et al. 2003). Stand-replacing fires produce habitats that briefly contain abundant food resources for woodpeckers (McCullough et al. 1998 cited in Marshall et al. 2003). After three to five years, the majority of the insects inhabiting the dead wood emerge as adults and do not re-colonize the dead trees, resulting in a decrease in food availability and hence habitat suitability for woodpeckers.

Wisdom et al. (2000) stated there are several factors affecting these species. Silvicultural practices (tree harvest before susceptibility to beetle attack) and fire management policies (salvage logging) have altered natural patterns of beetle outbreaks. Also, increasing road densities have allowed greater human access into forested regions for snag removal as firewood.

Some PCE species are dependent upon snags and/or live trees with internal rot for nesting or roosting cavities and as a forage substrate. Many of the PCE species listed above fall into this group. However, there are differences in their selection of preferred habitats. For example, the common flicker is generally most abundant in open forests and forest edges while the pileated woodpecker occurs primarily in dense mixed conifer forests in late seral stages or in deciduous trees stands in valley bottoms (Marshall et al. 2003).

The pileated woodpecker holds a ranking in Oregon as Sensitive; all of these species are ranked by the Oregon Natural Heritage Information Center as G5 globally secure. NatureServe (2009) listed the following as the top five major threats afflicting pileated woodpeckers (1) conversion of forest habitats to non-forest habitats, (2) short rotation, even-age forestry, (3) monoculture forestry, (4) forest fragmentation, and (5) removal of logging residue, downed wood, and pine straw that would ultimately put nutrients back into the ecosystem and provide foraging substrate. The northern flicker is ranked as S5: demonstrably widespread, abundant and secure (NatureServe 2009, Csuti 1998). Other PCE species depend upon dead or defective woody materials that allow access for use of natural cavities or for excavation of cavities using existing cracks to gain entrance to hollow or decaying wood. These species will also utilize cavities left by other primary cavity excavators (sapsuckers and woodpeckers) and thus they can be used as an indicator for many other species of secondary cavity nesters. There are differences in their selection of preferred habitats. Some are more common in the mountainous areas of Central Oregon, while others tend to be restricted to riparian

woodlands and lower elevation areas in eastern Oregon. Some prefer dense moist forests in comparison to others which prefer open ponderosa pine forests. For some the presence of large hollow trees and snags is important. For example to survive cold winter nights, the pygmy nuthatch goes into a state of torpor when roosting communally inside tree cavities (Marshall et al. 2003).

Existing Condition: Events affecting bark beetle abundance have occurred in the past. In 1967 to 1968 three fires burned approximately 6,100 in the Ochoco Creek and Marks Creek Watersheds, which were subsequently salvaged. The Hash Rock Fire of 2000 burned about 4,600 acres in the Marks Creek Watershed; the Maxwell Fire of 2006 burned about 6,965 acres in Upper North Fork Crooked River Watershed; the Bridge Creek fire of 2008 burned about 5,300 acres in the Bridge Creek Watershed; and the 747 Fire of 2002 burned 15,091 acre on national forest system land in Rock Creek Watershed. These are examples of wildland fires that have occurred irregularly across the project area and provided short-term foraging areas in the past. Potential nesting habitat is distributed in patches across the planning area as well.

Pileated woodpecker habitat in the Ochoco National Forest is defined as ponderosa pine stands with Douglas-fir and grand fir understories, or mixed conifer stands with greater than 15-20 inch in diameter trees and a dense canopy condition. Northern flickers are habitat generalists and occur throughout the project area, especially in open stands.

The Land and Resource Management Plan (LRMP) allocated a network of Old-growth Management Areas (OGMA) including approximately 19,570 acres across the Forest (outside of Wilderness and Research Natural Areas). The OGMAs are in mixed conifer or ponderosa pine stands and average 300 acres in size. The emphasis for these areas is to provide habitat for wildlife species dependent on old growth stands, with pileated woodpecker as the major indicator species. Adjacent or in proximity to each of these OGMAs is an additional 300 acres (average size) of mapped pileated woodpecker feeding habitat (pfh). The mapped feeding habitat is not identified as a management allocation in the LRMP, but recommendations for this habitat are included along with the standards and guidelines for OGMAs. Generally the OGMAs are intended to provide reproductive habitat for pileated woodpeckers, while the mapped feeding habitat is intended to provide supplemental foraging habitat no further than ½ mile from reproductive areas.

Several of these species were detected and recorded in surveys conducted between 1992 and 1995, and in 2008 and 2010.

Direct and Indirect Effects

Alternative 1- No Action

Alternative 1 is most likely to result in retention of the current pattern of disturbance from unregulated cross country motorized vehicle access, user-created trails, as closure of unauthorized routes would not be done. Since typical user-created trails develop without felling of trees, and since woodpeckers are relatively protected from increases in predation, effects associated with this alternative would be the result of disturbance associated with motorized travel on user created or unauthorized trails rather than through habitat loss or increased predation. As stated below for the action alternatives, recreational trail-associated disturbance does not affect the PCEs, so there would be no direct or indirect effects to primary cavity excavators from implementation of this alternative.

This alternative would not designate any motorized routes, or modify the current patterns of human use in OGMAs or mapped feeding habitat for pileated woodpeckers. Existing user created or unauthorized routes within these habitats would not be closed or rehabilitated.

Action Alternatives (2,3,4)

By design (nesting in tree cavities), woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds because they nest in tree cavities. For the

woodpeckers and other cavity nesters, Hamann et al. (1999) and Gaines et al. (2003) have conducted literature reviews of recreational effects, including OHV use. Their reviews showed that recreational trail-associated disturbances did not present a problem to woodpeckers and cavity nesters as a group. Hamann et al. (1999) also stated that recreational activity is unlikely to be focused around nest sites of these species. Gaines et al. (2003) also concluded recreational trail-associated disturbance does not affect the guild. Therefore, recreational disturbance and increased nest predation are not known to be a limiting factor to primary cavity excavators along motorized trails.

Refer to Chapter 2 for a full description of each alternative. Alternatives 2, 3, and 4 propose new trail construction ranging from 50-81 miles (dependent upon alternative) where trees potentially could be felled and thus habitat directly altered. A Project Design Feature (Chapter 2) would limit tree felling during trail construction unless the trail design cannot be modified. This circumstance would be considered infrequent, as most trails would be routed along previously disturbed areas (also a Project Design Feature). Generally dead trees along trail systems are not felled unless the lean over the trail, or lean toward the trail and are within striking distance of the trail. During initial construction and maintenance on designated routes on closed or decommissioned roads, hazard tree felling may occur. Action alternatives propose trail placement on existing closed and decommissioned roads ranging from 37 to 76 miles (dependent on the alternative). Felled hazard trees would remain on site either as large wood habitat or as strategically placed obstacles to control trail width, to add complexity or difficulty (trail features), or to augment road and trail closures or restoration sites. These actions would be short-term events with project completion taking from a few hours to a few days to implement for each segment. Rehabilitation is not projected to result in any impact to PCEs. Staging areas are also proposed for OHV users including using existing campgrounds, Sno-Parks or mineral sources (rock pits). Alternatives 2 and 4 also propose new staging areas to provide OHV parking and may include amenities like toilets, picnic tables, and fire rings. Larger staging areas maybe three to five acres in size and the small staging areas with fewer facilities would range from one to two acres in size. Danger tree felling would focus on staging areas where the greatest hazard exists. Since these staging areas involve open roads, mineral sources and existing campsites, some level of hazard abatement will occur in these areas regardless of whether they are established as staging areas or not, see Cumulative Effects below.

Because of the very limited circumstances in which snags or live trees would be removed during construction or maintenance activities, effects would be limited to individual woodpeckers from habitat alteration, alternatives would have a negligible effect on snag distribution and abundance at the landscape scale and no effect to local populations is expected to result from implementation of this project.

The action alternatives would each designate motorized routes within OGMA and mapped feeding habitat for pileated woodpeckers (pfh). Alternative 2 proposes 2.6 miles; Alternative 3 proposes 1.4 miles; and Alternative 4 proposes 2.9 miles of designated route in OGMAs. Each of the action alternatives also proposes to designate motorized routes within mapped feeding habitat as follows: Alternative 2 has 2.8 miles; Alternative 3 has 0.7 miles; and Alternative 4 has 2.5 miles of designated routes in pfh. The majority of these route miles (both in OGMA and pfh) are on, or connect existing roads or are near the exterior boundary of the OGMA or pfh. Existing unwanted user created or unauthorized routes within these habitats would be closed, concealed and rehabilitated. No habitat would be removed within the Ochoco Summit OHV project area, other than minimal hazardous snags. Because the Ochoco Summit project area is over 300,000 acres and there are likely tens of thousands of existing snags present, the impact of removing incidental hazard trees during trail maintenance would not result in a measurable change in available habitat. New trail layout would also avoid placing trails where snags currently exist. Hamann et al. (1999) and Gaines et al. (2003) studies show woodpeckers are not disturbed by OHV traffic. Therefore, Ochoco Summit OHV project will

not contribute to a negative trend in viability on the Ochoco National Forest for any primary cavity excavator, including the pileated woodpecker and northern flicker.

Cumulative Effects

With implementation of the Travel Management Rule, motorized travel is restricted to designated routes and existing Maintenance Level 2 (and higher) roads. Hazard tree abatement would continue to occur along 674 miles of open maintenance level 2 roads, 125 miles of maintenance level 3 to 5 roads, at numerous industrial work areas (such as gravel pits, corrals, and industrial camps) and at administrative sites and high recreational use areas (such as campgrounds and trailheads). At the same time continued tree mortality due to inherent levels of insects and disease would result in snag recruitment overtime which would partially offset loss of snags to hazard abatement and firewood cutting. In addition, many acres of ponderosa pine forests and mixed conifer stands would be treated to maintain open pine-dominated forests with large trees to the benefit of the subset of the woodpecker guild dependent on such habitat. Treatments to improve forest health in all forest types would occur which would alter the rate of tree mortality and thus snag recruitment. Dead and defective tree and log habitat would continue to be well distributed at the landscape scale, though the area along open roads would likely experience reduced snag abundance over time. Table 6 was reviewed for projects that overlap in time and space with the Ochoco Summit OHV project. Several recent large-scale vegetation management decisions have been implemented or are in the process of implementation (Spears, Canyon, Howard Elliot Johnson, Zane, Jackson) or are being planned (Wolf) that partially overlap the Ochoco Summit OHV project area. The hazard trees potentially removed during implementation of these projects added to the very minimal numbers projected for OHV trail maintenance and staging areas, and combined they are not expected to result in measurable changes in existing snag numbers across the project area. The primary effect of these vegetation management projects on snag habitat is related to rate, size and density of snag recruitment due to improved forest health. These effects are disclosed in the NEPA documents for those projects and this OHV trail project would result in negligible changes to the rate, size or density of snag recruitment over time. Therefore, no additive cumulative effects to the woodpeckers and other primary cavity nesters are projected due to implementation of this project. In summary, there would be no aggregated effects for the PCEs in general beyond those discussed under direct and indirect effects because this trail system project would not appreciably change snag habitat at a landscape scale.

Snag densities on private land in the project area are assumed to be low because most landowners want to reduce wildfire potential and utilize wood products on their land. Consequently, snag habitat is likely limited and may not be available to woodpeckers for very long and would not contribute to nesting populations.

Viability Assessment for Pileated Woodpecker

Background (Ecology): The pileated woodpecker was chosen as a terrestrial management indicator species (MIS) for mature and old-growth forest (LRMP 1989, p. 243 and 251). The pileated woodpecker is also an indicator of late-successional habitat on all forests across the region. It is assumed that if good habitat is provided for pileated woodpeckers and their population is maintained at some desired level, that adequate habitat is also being provided for other species that share similar habitat requirements (LRMP FEIS p. 3-21). The pileated woodpecker plays an important ecological role by excavating nest cavities that are later used by other birds and small mammals (Thomas 1979) and by feeding on forest insect pests.

The pileated woodpecker occurs primarily in dense mixed conifer forests in late seral stages or in deciduous stands in valley bottoms (Marshall et al. 2003). Pileated woodpeckers nest in large diameter (> 21”d.b.h.) and tall snags, and depend heavily on carpenter ants for food. They commonly feed on dead grand fir trees and downed logs. They also roost in large hollow trees and tend to select relatively dense stands with grand fir common. They typically select for multi-strata mixed conifer

LOS. The pileated woodpecker's habitat associates prefer dense forest conditions, and they include Townsend's warbler, hermit thrush and red-breasted nuthatch among others. Some of these are discussed further in the Landbirds section of this document. As dense mixed coniferous stands often contain a high density of dead or dying trees, habitat for this species also represents habitat for the black-backed and three-toed woodpeckers, which are attracted to stands with abundant snags and activity by bark beetles and wood boring beetles.

Pileated woodpecker habitat is managed through guidelines in the Ochoco Forest Plan and recommendations of best available science. The BBS indicate that the population trend of the pileated woodpecker is increasing in both Oregon and the Northern Rockies BCR during all time intervals. The trend represents the yearly percentage change. During the period of the 1966 to 2006, there was an estimated 2 percent population increase per year in Oregon and a 4.6 percent population increase per year in the Northern Rockies BCR. The Oregon Natural Heritage Information Center 2009 list states the pileated woodpecker species ranking as S4, Apparently Secure. NatureServe (2009) listed the following as the top five major threats affecting pileated woodpeckers (1) conversion of forest habitats to non-forest habitats, (2) short rotation, even-age forestry, (3) monoculture forestry, (4) forest fragmentation, and (5) removal of logging residue, downed wood, and pine straw that would ultimately put nutrients back into the ecosystem and provide foraging substrate.

Recommendations for management of the Pileated woodpecker ("Habitat Use and Management of Pileated Woodpeckers in Northeastern Oregon," Bull et al. 1992), includes management of 900 acres of habitat for each territory. It is also recommended that the 900 acres contain 75% grand fir types; 25% would be old growth and the remainder in mature stands. At least 50% would have 60% canopy closure or greater. Dense stands in these relatively moist PAGs, dominated by large tree structure would have provided the best primary nesting habitat for pileated woodpeckers.

Existing Condition: The pileated woodpecker is considered to be an uncommon species in Oregon, limited attitudinally by habitat availability, and they are an uncommon permanent resident in the Blue Mountains (Marshall et al. 2003). Pileated woodpecker habitat for the Ochoco National Forest is defined as ponderosa pine stands with Douglas-fir and grand fir understories, or mixed conifer stands with greater than 15-20 inch in diameter trees and a dense canopy condition. The Ochoco National Forest Land and Resource Management Plan allocated Old Growth Management areas (OGMA) across the Forest to serve as reproductive habitat for the pileated woodpeckers. An additional 300 ac. of supplemental feeding habitat has been designated adjacent to each OGMA reproductive habitat area. Currently there are twenty-five allocated old growth areas within the project area totaling 7,693 acres. Satellite imagery from 2004 was used to characterize vegetation, which was subsequently used to estimate pileated woodpecker reproductive habitat within the watersheds potentially affected by this project. Currently pileated woodpecker primary reproductive habitat (based on GNN data) includes approximately 7,931 acres across the project area. The satellite imagery only provides a broad scale look at the live-tree component and does not provide information on stand specific snag or down log levels. In general, multistoried large tree structure with a significant fir component with abundant snags is the preferred habitat for the pileated woodpecker. The large blocks of preferred habitat with primary nesting habitat are currently distributed west of Big Summit Prairie and along the northern 1/2 of the project area. The OGMAs were surveyed in the 1990s for the presence of pileated woodpeckers. The surveys confirmed the presence of nesting pileated woodpeckers at Polie Creek OGMA. Numerous pileated woodpecker sightings were also recorded within and adjacent OGMAs across the project area including: Long Prairie OGMA D1-01; Lytle Prairie OGMA D1-02; Fox Canyon OGMA D1-03; Kemp Spring OGMA D1-04; Davis Spring OGMA D1-06; Lost Lake OGMA D1-07; Indian Butte OGMA D1-08; Peterson Creek OGMA D1-09; Scotts Camp OGMA D1-10; Deep Creek OGMA D1-11; East Porter Creek OGMA D1-12; Rush Creek OGMA D1-13; South Lookout OGMA D1-14; Polie Creek OGMA D1-15; Bridge Creek OGMA D1-17; Nature Creek OGMA D1-18; East Wolf Creek OGMA D2-05 and Chamberlin Spring OGMA D2-11.

Pileated woodpeckers have been recorded elsewhere in the project area including multiple general sightings at: Snowshoe Point; Marks Lake; Carrol Glade; South Fork Howard Creek; West Fork Howard Creek; east flanks of Round and Lookout Mountains; north and west flanks of Mt. Pisgah; headwaters of Peterson, Porter and Keeton Creeks; Little Summit Creek and north flanks of Paulina Butte; and upper Wolf and Rock Creeks.

Effects Common to All Alternatives: The alternatives would not treat LOS stands or forest stands within pfh or designated OGMAs. All alternatives would maintain the existing acres of fir-dominated understory and canopy closure, at least in the short term. In all alternatives, all existing snags would be left that are not deemed to be a safety hazards. Because the Ochoco Summit project area is over 300,000 acres and there are likely tens of thousands of existing snags present, the impact of removing of incidental hazard trees during trail maintenance would not result in a measurable change in available habitat. New trail layout would also avoid placing trails where snags currently exist when not in conflict with other Project Design Criteria (see Chapter 2). Since the action alternatives do not propose harvest of snags, the amount of existing snags present within the project area should not be substantially altered by implementation of any alternative. All alternatives would maintain the suitability of all existing habitat for pileated woodpeckers in the short term.

Conclusion: The pileated woodpecker is widely distributed in North America. It occurs primarily in dense, late seral stages of mixed conifer or deciduous tree stands. Its conservation status globally and nationally is secure and it is apparently secure in the State of Oregon (NatureServe). The pileated woodpecker does not have any special federal listing status as Candidate, Threatened or Endangered but it is listed as Vulnerable in the Blue Mountains on the State of Oregon Sensitive Species list. The State Vulnerable status indicates that the pileated woodpecker is facing one or more threats to their populations but is not currently imperiled with extirpation. The pileated woodpecker is not considered a focal species in the Partners in Flight *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* and is not a priority species on the USFWS *Birds of Conservation Concern*. Population trend data from the North American Breeding Bird Surveys indicate that the pileated woodpecker has an increasing population trend in Oregon and in the Northern Rockies Bird Conservation Region. While the interpretation of this data should be done with caution, a steady population increase is indicated. The Partners in Flight species assessment database also indicates a large population increase in the Northern Rockies Bird Conservation Region. The Partners in Flight population assessment database indicates that in the portion of the Northern Rockies Bird Conservation Region that is in Oregon (Blue Mountains, including the WWNF) the average number of pileated woodpeckers seen per breeding bird survey route was 1.02.

The broad-scale source habitat analysis conducted by Wisdom et al. (2000) indicated that there have been basin-wide declines of source habitat of the pileated woodpecker in the interior Columbia Basin, however, habitat of the pileated woodpecker is strongly increasing in the Blue Mountains Ecological Reporting Unit. In the Blue Mountains ERU there was more than a 100% increase in the amount of source habitat from historical conditions. This analysis was a coarse-scale analysis and based on a large pixel size (100 hectares or 247 acres), and included both private and public lands. Priority nesting habitat of the pileated woodpecker is still available in adequate amounts and distribution to maintain pileated viability on Ochoco National Forest. Currently, there are approximately 14,508 acres of priority nesting habitat on Ochoco National Forest, within 23 of the 34 watersheds (68%) on the Forest (including Crooked River National Grassland). Of the watersheds that historically provided priority nesting habitat (Ochoco National Forest excluding Crooked River National Grassland), 23 of 24 watersheds (96%) currently provide priority nesting habitat.

This viability assessment indicates the pileated woodpecker is well distributed across the Ochoco National Forest and there are adequate amounts, quality, and distribution of habitat to provide for pileated woodpecker population viability. Given the relatively wide range of this species, increasing population and habitat trends, and the amount and distribution of habitat remaining, within the project

area, at the forest level and across the eco-region, viability for this species is expected to be provided for on Ochoco National Forest. Given that this project impacts less than 1% of the suitable priority nesting habitat across the Forest, the overall direct, indirect and cumulative effects may result in a very small negative trend of habitat in the short term. However, this reduction in nesting habitat is insignificant at the Forest scale and is not expected to reduce the viability of this species at the Forest level. For these reasons this project is expected to result in continued viability of pileated woodpeckers on Ochoco National Forest.

Viability Assessment for Northern Flicker

Background (Ecology): The northern flicker was chosen as a terrestrial management indicator species (MIS) for old growth juniper (LRMP FEIS 3-21 and 4-96). Many researchers have reported on aspects of behavior and nest use by flickers as part of general studies of cavity nesting birds. Recently such interest has intensified as flickers have been recognized as "keystone" excavators which may influence the abundance of secondary cavity nesters in forest systems (Martin et al. 2004).

Existing Condition: A variety of forest types do exist in abundance and well distributed across the Forest and in this project area, including but not limited to dry site pine and juniper woodlands where large or old juniper and other potential nesting sites are available.

Effects Common to All Alternatives: The proposed action alternatives do not include removal of trees in dry site ponderosa pine PAGs with size class 5. No tree removal within size class 5 juniper PAGs is prescribed. The alternatives are not likely to remove old-growth juniper or other juniper trees with sufficient size and defect to serve as potential nest sites for northern flickers.

Conclusion: Even though the flicker was selected as an indicator for old growth juniper, they do nest in a wide variety of forest types. A variety of forest types do exist in abundance and well distributed across the Forest and in this project area, and this species is widespread and common. None of the alternatives would substantially alter habitat for this species. For these reasons this project will not contribute to a negative trend in viability for northern flickers on Ochoco National Forest.

Big Game - Deer and Elk

The 301,580-acre project area provides both summer and winter range habitat for mule deer and Rocky Mountain elk, including 17,828 acres in Winter Range, 25,183 acres in General Forest Winter Range, and 195,735 acres in General Forest (summer range) allocations. Deer and elk are popular big game species, and are associated with thousands of recreational visitor days to the Ochoco forest each year during hunting seasons, and for general wildlife viewing and photographic opportunities during other times of the year. The Oregon Department of Fish and Wildlife and Travel Oregon contracted with Dean Runyan and Associates in 2008 to conduct an economic analysis by county of fishing, hunting, and wildlife viewing (ODFW 2009). Table 96 and Table 97 display the results that survey participants spent on hunting and wildlife viewing in Crook and Wheeler Counties (based on Oregon Travel Impact 1991-2008). The selected counties in the table show an estimated dollar value placed on consumptive and non-consumptive recreational activities associated with terrestrial wildlife in this part of Oregon.

Table 96. Annual Travel-generated estimated expenditures toward hunting and wildlife viewing in Crook and Wheeler Counties, Oregon (overnight or day trips 50+ miles one way, or non-residents).

County	Hunting Expenditures	Wildlife Viewing
Crook	$2,584,000	$6,769,000
Wheeler	$1,168,000	Sample size too small to report data reliably
Total	$3,752,000	$6,769,000
State Total Percent	3.6%	1.4%
State Total	$104,458,000.	$495,260,000.

Table 97. Annual Local estimated expenditures toward hunting and wildlife viewing in Crook and Wheeler Counties, Oregon (residents and day trips less than 50 miles one way).

County	Hunting Expenditures	Wildlife Viewing
Crook	$683,000	$218,000
Wheeler	$103,000	Sample size too small to report data reliably
Total	$786,000	$218,000
State Total Percent	2.5%	1.0%
State Total	$31,574,000.	$33,173,000.

Table 98 displays mule deer hunting data for the wildlife management unit potentially affected by the project (ODFW 5/2009).

Table 98. Numbers of deer hunters, hunter days and hunter success in the Ochoco Wildlife Management Unit (Years 2008-2009).

Mgmt. Unit Number	# of RifleTags 2008 – 2009	# Deer Population Estimate (April 08-09)*	% Success Rifle 2008 - 2009
Ochoco WMU # 237	3,200 - 2,800	15,700 – 15,500	27 - 25
*Population estimate April 2010 was 16,000 deer			

ODFW's interpretation of telemetry data collected from mule deer on Deschutes National Forest between 2005 and 2010 indicated that some collared animals return to the same summer range area each year suggesting strong site fidelity. On Deschutes National Forest, depending on weather conditions, the animals usually return to summer range beginning in April although the spring migration period can last into June. Data also suggest some does drop their fawns before reaching their desired summering area and then continue their migration with their fawns. The fall deer migration to winter ranges usually begins in October and the majority of the deer are out to winter range by mid-November. Some collared deer utilize the same migration route as during the spring and some individuals also appear to follow the same routes in consecutive years (Ardt, pers. comm 2009). Though telemetry data is lacking for deer on Ochoco National Forest, mule deer may not engage in the long distance high density migrations observed with some of the deer of South Central Oregon. Nonetheless, the higher elevations in the Ochoco Summit project area do become snowbound in the winter and deer are known to concentrate in foothills and valley bottoms along the Crooked and John Day Rivers and their tributaries during the winter. Thus, it is likely that during their seasonal movements, some deer migrate across the mid-elevation areas where proposed trails are located.

Spring deer counts are conducted by ODFW to determine population levels as compared to the management objective for each unit. Table 99 shows the April deer counts conducted by ODFW for 2007 - 2012 within the management unit potentially impacted by the Ochoco Summit OHV project.

Table 99. April mule deer populations expressed as a percentage of the management objective (20,500) in the Ochoco Management Unit.

Year	Population Size	Percentage of Management Objective
2007	16,500	80
2008	15,700	77
2009	15,500	76
2010	16,000	78
2011	15,400	75
2012	15,400	75

Mule deer populations in most of the western United States began experiencing a decline in the mid-1990s. The Western Association of Fish and Wildlife Agencies (2004) reported there were a multitude of factors adversely impacting mule deer populations including habitat loss to development,

deterioration of forage quality and quantity, droughts, severe winter weather, competition with other ungulates, predation, disease, poaching and increased hunting mortality. As displayed in Table 99, deer populations are currently reaching 75 percent of the management objectives for the Ochoco Wildlife Management Unit (WMU) and showing a relatively stable population over the years displayed. Elsewhere in Central Oregon and across the West, steady declines in deer populations have been noted. Such population declines for big game in Central Oregon may attributable to a combination of factors, such as residential development, disturbance from increased motorized and non-motorized recreation, poaching, predation and hunting-season mortality. The enforcement of road closures and hunting regulations have not kept up with the increase in the human population in Central Oregon. Table 100 displays elk hunting data for the wildlife management unit potentially affected by the project (ODFW 5/2009).

Table 100. Numbers of elk hunters, estimated population and hunter success in the Ochoco Wildlife Management Unit (Years 2008-2009).

# of Rifle Tags 2008 – 2009	# of Archery Tags 2008 – 2009	# Elk Population Estimate (08-09)	% Success Rifle 2008 - 2009
1,275 - 1,075	850 - 750	4,300 – 4,000	29 - 25

Table 101. Winter elk populations expressed as a percentage of the management objective (4,600) in the Ochoco Management Unit.

Year	Population Size	Percentage of Management Objective
2006	4,600	100
2007	4,700	102
2008	4,300	93
2009	4,000	87
2010	4,300	93
2011	3,900	85

Mule deer and elk are listed as Management Indicator Species for the Ochoco National Forest and elk in particular can act as a barometer for species sensitive to human disturbance. The Land and Resource Management Plan (LRMP, 1989) provides habitat management direction for big game animals. This project would not substantially impact the amount or arrangement of forage and cover. Thus, the analysis for this project is focused on road density, disturbance and security habitat. For this analysis, road densities and motorized impacts are analyzed by subwatersheds. Target open road densities are 3.0 miles per square mile or less, to achieve deer summer range habitat effectiveness targets. The open road density in this analysis is displayed within the 3 allocations with standards and guidelines for road density related to elk management (Winter Range, General Forest Winter Range and General Forest). Road density is also displayed by watershed to distinguish which areas have the highest open road densities. Disturbance was evaluated using distance banding from motorized routes. Bands close to motorized routes have high potential for disturbance to big game, while areas distant from any motorized route have low probability for disturbance to big game from use of the route. Elk security habitat is based on distance from any motorized route of more than ½ mile. High value elk security habitat meets that criteria and occurs in blocks at least 250 acres in size.

Key Indicators for Big Game Habitat

Effects to big game will be displayed at several scales including 5th field watersheds and 6th field subwatersheds and the entire project area. The following indicators will be used to compare the effects of alternatives to big game:

- Open road and trail miles available for motorized use within 5th field watersheds expressed in miles of route per square mile of National Forest System roads and trails.
- Number of 5th-field watersheds and 6th-field subwatersheds with an open route density of greater than 3.0 miles of National Forest System roads and trails open for motorized use.
- Acres of National Forest land greater than 1 mile from an open motorized route in the project area.
- Acres of National Forest land within 4 distance bands within 1 mile from an open motorized route and percent of the project area.
- Acres providing elk security habitat (>1/2 mile from an open motorized route).
- Acres providing elk security habitat (>1/2 mile from an open motorized route) in patches at least 250 acres in size.
- Potential for displacement of big game onto private land as expressed by acres of secure cover within 2 miles of private land.

Of the indices included in the Habitat Effectiveness Index analysis (HEI), motorized route density is the only one that may be affected under the proposed alternatives. This is because change in cover under the proposed alternatives is negligible at the landscape scale. Refer to the section on Physical Alteration of Habitat under General Effects to Wildlife. If the maximum direct physical impact to forested habitat from trail construction is 190 acres (Alternative 4), and the total acres in General Forest in the project area is 195,735 acres, then the largest potential change in cover would be less than 1/10th of one percent at the landscape scale. Since the cover quantity index is derived from tables based on ranges of 4 percentage points, and the cover quality index is based on 10% increments of relative percentages in canopy closure which are not likely to be moved by a change of less than 1/10 of one percent, these indices are not sensitive enough to detect a change of such a small magnitude. Thus, measures based on findings in research from the Starkey Project (Wisdom, et al. 2005), were used as the key indicators for big game effects and serve as the primary basis for comparison of potential alternative impacts on big game. These measures are focused on distance from motorized routes and availability of security habitat.

Effects of Motorized Vehicle Access to Big Game

Effects to deer and elk habitat from motor vehicle access can be discussed in terms of direct and indirect impacts from disturbance, impacts to habitat, and increased legal and illegal harvest. The LRMP approved in 1989 recognized a need to limit motor vehicle access, and set guidelines on target road densities for elk winter range and elk summer range. Of the indices included in the Habitat Effectiveness Index analysis (HEI), motorized route density is the only one that may be affected under the proposed alternatives. Therefore the road density index will be addressed under the effects below. At the time the LRMP was written no guidelines were drafted to account for off-highway vehicle use, consequently motorized densities were based on passenger cars, two wheel and four-wheel drive trucks on open system roads. Off-highway vehicle use has increased greatly since 1990 and is contributing to the amount of motorized vehicle use across the Forest including this project area. Public scoping letters and participation in public meetings conducted for this project indicate many users may prefer trails over driving on roads because of the reduced traffic levels and for the recreational experience provided by trails with complexity, technical difficulty and interesting features.

***Disturbance*:** Stankowich (2008) conducted a comprehensive review and meta-analysis of research on ungulate escape responses from human and vehicle disturbances. His review found evidence that ungulates pay attention to approacher behavior, have greater perceptions of risk when disturbed in open habitats, and that females or groups with young offspring show greater flight responses than adult groups. He also found that humans on foot were more likely to evoke a response than other

stimuli (vehicles, noises) and that hunted populations showed significantly greater flight responses than non-hunted populations.

A key element of elk habitat management is providing hiding cover and security areas especially during the fall hunting seasons. Some studies have shown that elk when disturbed by motor vehicles will leave an area that lacks sufficient hiding cover (Hillis et al. 1991 and Wisdom et al. 2004). Hillis et al. (1991) defined elk security cover as forested habitat at least 250 acres in size and at least ½ mile from a road open to motorized travel. Recent studies at the Starkey Project in northeast Oregon (Wisdom et al. 2005) have disclosed even more information on the effects of roads and road densities on deer and elk. Rowland et al. (2000) summarized the direct impacts of roads and associated traffic on elk, in addition to outright mortality from vehicular collisions as follows: (1) Elk avoid areas near open roads but avoidance varies in response to traffic rates; (2) Elk vulnerability to mortality from hunter harvest, both legal and illegal, increases as open road density increases; and (3) In areas of higher road density, elk exhibit higher levels of stress and increased movement rates. Rowland et al. (2005) also noted that elk use increased as distance from open roads increased and suggested that judicious closing of certain road segments, particularly road spurs, may retain or create blocks of habitat that serve as security areas for elk while allowing sufficient road access for other management needs.

An important finding from the Starkey Experimental Forest and Range studies is that road (or route) density is not the best predictor of habitat effectiveness for elk. Instead a model based on distance bands proved to be a more spatially explicit and biologically meaningful tool for assessing effects from roads. Road densities do not provide a spatial depiction of how roads are distributed on the landscape (Rowland 2005). Consequently, a distance banding analysis was conducted on the 301,580-acre project area. Using geographical information systems (GIS), open motorized routes (roads and trails) were buffered at five scales to display the amount of National Forest acreage within the buffers. The distance bands included: a) acres and percent of the project area within ¼ mile, b) acres and percent of the project area ¼ to ½ mile from an open motorized route, c) acres and percent of the project area ½ to ¾ mile from an open motorized route, d) acres and percent of the project area ¾ to 1 mile from an open motorized route and e) acres and percent of the project area greater than one mile from an open motorized route. Hillis et al. (1991) defined elk security habitat for forested stands greater than 250 acres in size and greater than ½ mile from an open route. Acreage in cover greater than ½ mile from an open motorized route is assumed to provide greater security for elk than cover within ½ mile of a motorized route. Thus, the amount of cover more than ½ mile from motorized routes and within 1 mile of private land was used as a measure of potential to avoid displacement of elk from federal onto private land.

Disturbance impacts to mule deer from off-road use, including motorized use, are more difficult to quantify. Mule deer studies from the Starkey Project in northeastern Oregon showed little measureable response to off-road treatments (ATV riding, mountain biking, hiking and horseback use) as compared to control periods of no activity reported by Wisdom et al. (2004). Mule deer movement rates increased only slightly however, during periods of all four off-road activities except ATV riding. Estimated probabilities of mule deer flight response were similar among all four activities versus control periods. This suggested that deer were not exhibiting the same tendency for flight as shown by elk in relation to off-road activities. However, Wisdom et al. (2004) also reported that deer may be responding to fine-scale changes in habitat use, rather than substantial increases in movement rates and flight responses. For example, it is possible that deer may respond to an off-road activity by seeking dense cover rather than running from the activity. This could lead to animals spending more time in dense cover and less time foraging, resulting in less fat reserves for winter survival.

Studies by Stankowich (2008) showed that humans on foot have more impact on mule deer than other stimuli studied (vehicles, noise, and horseback). Ferris and Kutilek (1989 in Montana TWS 1999)

found black-tailed deer avoided OHV areas during high peak use but returned to established home ranges after traffic levels subsided.

In another study Yarmoloy (1988 in Ouren et al. 2007) studied mule deer does equipped with radio collars and several were intentionally followed by ATVs for nine minutes a day for 15 days. The harassed does shifted their feeding patterns into darkness, used cover more frequently, and increased their flight distance from ATVs. The harassed does also showed reduced reproduction success the following year as compared to the control does that were not harassed. These effects would not be expected to occur in most of the project area because off-route travel would not be permitted under any action alternative (see Project Design Features, Chapter 2).

Hayden et al (2008) stated that disturbance factors in and of themselves have generally not been implicated in lower mule deer population performance. However, given the nutritional and energy requirements of deer, it seems reasonable to assume such factors could combine with a number of other factors to negatively impact deer. Habitat Guidelines for Mule Deer in the Northern Forest Ecoregion (Hayden et al. 2008) provided a list of recommendations to minimize negative effects of human encroachment. Those applicable to the project include:

- Develop consistent regulations for OHV use.
- Develop and maintain interagency coordination in enforcement of OHV regulations.
- Designate specific areas and times (seasonal use restrictions) for activities such as OHV use that disturb habitat or deer.
- Cluster recreational activities to maintain or create large blocks of undisturbed habitat. Direct new development toward previously disturbed areas (clumped rather than dispersed distribution).
- Seasonally separate humans and mule deer at critical periods.
- Through education, modify human behaviors to reduce recreational effects to mule deer.
- Monitor activities that may unduly stress deer at important times of the year. Reduce or regulate disturbance if deemed detrimental. When applicable, encourage enforcement of regulations regarding dogs running at large or chasing wildlife and wildlife harassment by snowmobiles and OHVs.

At the present time, motorized road use in the project area could be described as low to moderate during most of the year. Typically, most roads begin to melt out from winter snow in April and motorized use is available until November depending on snowfall timing and depth. During the spring and summer, road use is generally light, except near dispersed campsites along the main roads and where personal use firewood cutting is permitted. The general exceptions are roads and user-created OHV trails near population centers such as Prineville, which see substantial use during all periods that roads and trails are snow-free. However, motorized use in the entire project area changes dramatically beginning in late August with the onset of archery hunting season. The rifle deer season starts in late September or early October and is followed by rifle elk season in mid-October. Usually in early November the legal personal use firewood permittees shut down because of the end of the season and/or snowfall closes access roads.

***Off-Road Recreation Effects*:** The amount of habitat impacted by OHVs and 4-wheel drives and random cross-country travel is difficult to quantify. It is unlikely all motorized trails have been located; consequently, the amount of habitat currently being disturbed by motorized travel is only estimated. As noted in the Recreation section, based on estimates from the 2008 National Visitor Use Monitoring (NVUM) survey on the Ochoco National Forest, more than 14,000 forest visitors participated in OHV or Motorized Trail Activities on the Forest in that year. For the purpose of this analysis, it is assumed that there are approximately 5000 visitors participating in OHV use within the project area (slightly more than 1/3 of the estimated total forest OHV participation). Most of this use occurs seasonally as the higher elevations become inaccessible due to snow. Based on observational

data from Forest Service staff, the heaviest use within the Ochoco Summit project area occurs on summer weekends, and holidays from approximately May 1 – Sept. 30, with less recreational use occurring weekdays, and during the shoulder seasons. An exception to this is during hunting season. Starting with bow hunting in August and continuing through November, there are hunting camps scattered across the area. During this time, there is increased use of OHVs primarily for hunting purposes, not recreational riding. Most of the ongoing recreational OHV use in the project area occurs in the Marks Creek and Ochoco Creek subwatersheds, especially in the spring when the higher elevation areas are still snowed in. Later in the season OHV use increases in the central and eastern portions of the project area as the snow free season progresses. Known routes in use identified previously by the Central Oregon Motorcycle and ATV Club (COMAC) included routes in eight of the nine watersheds in the project area. However many of the miles identified by COMAC are on open roads. Therefore the length of routes identified by COMAC cannot be used to estimate off-road impacts to big game. Also there is an important distinction between recreational ATV use and use by hunters to access hunting areas or to retrieve game. Recreational users are more likely to use narrow, winding or difficult routes, while hunters on ATVs are more likely to use wider and straighter routes such as roads, whether open or closed (personal communication, Ramming, 2010).

Studies have examined deer and elk response to modes of off-road recreation at Starkey in northeastern Oregon (Wisdom et al. 2005; Naylor et al. 2009). Wisdom et al. (2005) measured responses by mule deer and elk to four off-road recreation activities including hiking, mountain biking, horse riding, and ATV riding. The distance deer and elk moved and movement rates were measured in response to the activity and during control periods where no recreational activity was permitted. Mule deer responses contrasted sharply with elk. Mule deer showed little measureable response to the off-road treatments. However, movement rates increased slightly, during periods of all four off-road activities except ATV riding. Wisdom hypothesized that deer may well be responding to the treatments with fine-scale changes in habitat use (such as seeking cover), rather than substantial increases in movement rates and flight responses. The response by deer to human disturbance can also be complicated in areas with elk due to interspecific avoidance. Johnson (2000) found that while elk selected gentle slopes farther from roads and on westerly aspects, deer selected steeper slopes, closer to roads and on easterly aspects. Johnson concluded that elk and mule deer select resources in opposite ways on shared ranges during the spring in the Blue Mountains Province, and that mule deer selection appears to be explained in large part as a result of avoidance of areas used by elk.

However, Wisdom et al. (2004) cautioned against inferring their study results to other areas where mule deer are common and elk are absent or sparse. In the absence of moderate or high densities of elk, mule deer may exhibit different distribution and selection patterns in relation to roads and traffic. Within the Ochoco Summit project area elk densities are moderate to high. Spatial separation of elk and deer on spring and summer range may occur in the Ochoco Summit area, such as has been observed in numerous studies: Collins and Urness (1983), Wallace and Krausman (1987), Wickstrom et.al. (1984), Latham et.al (1996, 1997), Wisdom et al. (2005) and Johnson (2000). Therefore, if elk patterns of movement or use are altered as a result of human activity, then mule deer use may increase in areas avoided by elk.

Movement rates by elk increased substantially during off-road activities as compared to the control periods (Wisdom et al. 2005 and Naylor et al. 2009). ATV use showed the greatest response by elk resulting in the greatest increase in movement, distance moved, and probability of flight response. The study suggests that elk were displaced from preferred security and foraging areas as a result of flight behavior during the daytime off-road activities. ATV riding and mountain biking caused the largest reductions in elk feeding time and increases in elk travel time and elk showed no habituation to mountain biking (Naylor et al. (2009). Preisler et al. (2006), in a study of elk and ATV use at Starkey, showed that elk appeared to respond at long distances (greater than 1,000 meters) to ATVs and that the estimated probability of flight appeared to be higher when elk were closer to ATV routes,

even when the distance to the ATV was large. His study noted that a significant number of elk appear to 'freeze' while the ATVs pass very close (50-100 meters) that seem to suggest the possibility that elk are using topography and vegetation to escape detection at close distances to roads. Preisler et al. (2006) also concluded that over successive days of treatments (exposure to ATV riders) elk appear to adjust their distribution so that they are located closer to areas that are not visible from routes and during the nine days of rest in-between treatments, the animals appeared to return to their pretreatment distributions. Naylor (2008) found that elk behavior patterns were similar to controls each morning before treatments (ATV exposure) commenced, and then returned to pre-disturbance level 1 to 2 hours after each treatment ended. He also found that behavior patterns outside of the treatment times appeared to be unaffected by the treatment activity. Preisler (2006) also noted that during days 4 and 5 of treatment elk appeared to have either habituated to the activity or found close refugia, rather than fleeing to the far corners of the study pasture. He concluded that over successive days of treatment, that elk appear to adjust their distributions so that they are located in or closer to areas that are not visible from the motorized route.

To assess the amount of big game habitat impacted from motorized disturbance a distance banding analysis was completed showing acreage within four distance bands within 1 mile of open roads or motorized trails, and acres in two distance bands greater than 1 mile from an open road or motorized trail. This analysis does not separate the on-road and off-road effects, but considers them in combination with equal impacts. The distance bands were selected based on several references, including: ODFW (2009); Mason, Bruce and Girard, Inc for ODFW (2008); Preisler (2006); Rowland (2000, 2005), Roloff (1998) and Gaines (2003).

***Effects from Legal and Illegal Harvest*:** Roads open for motorized use provide the predominant hunter access into the Ochoco WMU. As shown in Table 102, current overall open road densities in the watersheds range from 1.17 mi/mi^2 to 2.34 mi/mi^2. The greater the open motorized route density the greater the potential for game violations. Road hunting in itself is not considered illegal by the State of Oregon as long as the driver steps away from the road surface to fire the weapon. High open road and/or motorized trail densities may provide additional access for poaching of big game animals. Poaching is considered one of the factors contributing to the general decline in mule deer numbers in Central Oregon. However, as stated above, trails proposed under this project would be designed for slow speed and increased technical difficulty so would not necessarily provide easy access for poachers.

In addition to big game mortality from motorized access, there are other impacts to deer and elk. Johnson et al. (2004 in Wisdom et al. 2005) stated that elk trying to elude hunters can deplete fat reserves needed for over-winter survival and that elk responded to hunters by fleeing, whereas deer appear to elude hunters by hiding. Cook et al. (1996, 2005) reported that forage intake and nutritional quality during August and September can be determinants of winter survival of elk calves. Cook et al. (2005) also reported that the effects of the summer-autumn nutrition on fat accretion of cows and growth of calves significantly influenced their survival probability under harsh winter conditions. These months coincide with archery elk seasons and also when other recreationists such as late season campers, photographers and other forest visitors take to the woods to enjoy the fall colors. Time spent hiding from people takes away from foraging. While Rowland et al. (2000, 2004) found elk showed increasingly strong selection toward areas with increasing distance from roads open to motorized traffic, some recreationists would travel on foot that distance to pursue their activity. The research at Starkey also indicated that mule deer moved closer to roads with the assumption that they changed their distribution within the study area in relation to opposite changes in distribution by elk. This could lead to higher levels of deer harvest where road densities are also high.

The distributional pattern of open roads and motorized trails is important in determining the security an area can provide for elk during hunting seasons. Where possible, clumping road/trail closures can maintain security areas, which Hillis et al. (1991) have described as a non-linear patch greater than

250 acres in size and greater than ½ mile from an open motorized route. Other authors have also referred to the ½ mile distance as a threshold for security (Rowland, 2005) though smaller patches may also be of benefit. Other authors have suggested that the highest impacts occur within the first ¼ mile (ODFW, 2008; Gaines, 2003). Some references imply that the level of the impact decreases on a continuum as distance from motorized increases (ODFW, 2008; Rowland, 2000, 2005). In their report to ODFW, Mason et al (2008) stated that the anticipated effect of a roadway on deer and elk drops to zero one mile (1600 m) away from the road. Naylor (2000) states that a distance greater than 1,290 m was beyond the distance where roads would greatly affect elk distribution. Gains (2003) provides tables displaying suggested zones of influence for a variety human uses, including motorized routes. He suggests a zone of influence on deer and elk of 300 m for motorized trails and up to 1300 m for open roads. The effects discussion on alternatives provide analysis conducted at several distance banding scales to determine and display various zones of influence and the amount of security habitat for big game under each alternative.

Table 102 displays open road and motorized trail densities in the project area expressed as miles of route per square mile of land base on National Forest System land within each 5th field watershed. All acres within any subwatershed that overlapped with any project alternative have been included in the analysis; the actual area within 1 mile of any proposed motorized trail system is about 100,000 to 110,000 acres.

Table 102. Total combined open motorized density of roads and trails expressed in miles per square mile, by alternative and watershed (National Forest System lands only) without mitigation.

5th Field Watershed	5th Field square miles NFS Lands Only	Alt. 1 Total Motorized Density(Roads + Trails) mi/mi2	Alt. 2 Total Motorized Density (Roads + Trails) mi/mi2	Alt. 3 Total Motorized Density (Roads + Trails) mi/mi2	Alt. 4 Total Motorized Density (Roads + Trails) mi/mi2
Bridge Creek	24.37	1.31	1.31	1.31	1.33
Deep Creek	82.25	1.90	2.57	2.34	2.68
Lower Beaver Creek	36.86	1.60	1.85	1.85	1.90
Lower North Fork Crooked River	33.52	1.27	1.27	1.27	1.27
Mountain Creek	30.06	1.17	1.20	1.17	1.20
Paulina Creek	25.15	1.89	1.93	1.93	1.93
Rock Creek	22.16	1.52	1.56	1.56	1.56
Upper North Fork Crooked River	139.07	2.34	2.65	2.46	2.66
Upper Ochoco Creek	74.70	1.66	1.81	1.95	2.10
Total	471.14	1.83	2.09	2.01	2.17

Direct and Indirect Effects

Alternative 1 – No Action

***Disturbance*:** Alternative 1 would be most likely to retain the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because no closure of unauthorized routes would be implemented under this alternative. Though this alternative would provide the highest amount of security habitat based on open roads, it would offer the poorest assurance of security for deer and elk due to the current configuration of the existing network of roads and the current pattern of use. There would be limited opportunity to close roads, reinforce existing closures, designate a defined OHV trail system or rehabilitate user-created trails. Open road densities on National Forest system lands would remain at the current level (refer to Table 102). Open road densities would exceed Forest Plan guidelines of 3.0 mi/mi2 in General Forest

allocation in 2 of the 31 subwatersheds in the project area (Lower Big Summit Prairie and Lower Marks Creek; see Table 103). Mixed use by passenger cars, industrial traffic and OHVs would occur on 659 miles of operational maintenance level 2 roads. Motorized use other than by OHVs would continue to occur on 140 miles of highway legal only (maintenance level 2 to 5) roads

Table 103. Subwatersheds with Open Road Density at or above 3 miles/sq. mile in General Forest, Alternative 1 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Upper North Fork Crooked River	Lower Big Summit Prairie	3.31 GF
Upper Ochoco Creek	Lower Marks Creek	3.15 GF

Distance banding analysis of existing open roads (based on operational maintenance level) shows there are a total of 50,177 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 17% of the project area. Of these, 47,969 acres occur in patches greater than 250 acres in size, or 96% of the total area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 28 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek) and Lower Big Summit Prairie (in Upper North Fork Crooked River). In contrast, 115,127 acres (38 percent) of the project area are within 200 m (660 feet) of an existing open road. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas at least during daylight hours when motorized traffic is more likely to occur.

***Off-road Motor Vehicle Access*:** Unregulated motorized access from all user groups would likely continue to degrade big game habitats because no closure of unauthorized routes would be implemented under this alternative. This would result from unregulated access into deer hiding cover patches, elk security cover blocks, and into calving and fawning grounds during critical time periods of May and June. In the absence of a designated system of OHV routes, it is reasonable to assume user-created trails may continue to increase in mileage and further expand across the project area until the Travel Management Plan is fully implemented. Legal and illegal harvest of deer and elk would be expected to continue at the same rate or slightly increasing as human population increases and more user-created motorized routes are established.

Negative impacts including disturbance during calving seasons would be expected to continue at the current trend. Security areas in patches greater than 250 acres in size would be available to elk across nine 5th field watersheds in the project area as displayed in Table 104. This alternative would provide a total of 47,969 acres of security habitat in blocks greater than 250 acres in size. Security areas (greater than ½ mile from open roads) in patches less than 250 acres in size would occur on a total of 2,208 acres distributed across eight watersheds. There would also be limited opportunity to obtain grant funding to reduce road densities or increase security habitat acreage.

Table 104. Acres of Elk Security Area Greater than ½ mile from any open motorized routes.

5th Field Watershed	Watershed Acres (ONF)	Alt. 1 Elk Security Area	Alt. 2 Elk Security Area	Alt. 3 Elk Security Area	Alt. 4 Elk Security Area
Bridge Creek	15,595	4,385 (4,274)	4,373 (4,263)	4,373 (4,263)	4,373 (4,263)
Deep Creek	54,561	4,551 (3,745)	1191 (378)	2,114 (1,024)	794 (1)
Lower Beaver Creek	23,611	4,364 (4,176)	3,559 (3,421)	3,559 (3,421)	3,559 (3,421)
Lower North Fork Crooked River	21,458	4,920 (4,868)	4,644 (4,593)	4,644 (4,593)	4,644 (4,593)

Table 104. Acres of Elk Security Area Greater than ½ mile from any open motorized routes.

5th Field Watershed	Watershed Acres (ONF)	Alt. 1 Elk Security Area	Alt. 2 Elk Security Area	Alt. 3 Elk Security Area	Alt. 4 Elk Security Area
Mountain Creek	19,244	6,986 (6,986)	6,959 (6959)	6,986 (6,986)	6,959 (6,959)
Paulina Creek	16,094	1,704 (1,609)	1,697 (1,602)	1,697 (1,602)	1,697 (1,602)
Rock Creek	14,181	3,567 (3,466)	3,510 (3,409)	3,510 (3,409)	3,510 (3,409)
Upper North Fork Crooked River	89,005	9,907 (9,433)	9,362 (9,104)	9,778 (9,108)	9,352 (9,067)
Upper Ochoco Creek	47,832	9,793 (9,412)	9,078 (8,734)	8,486 (8,108)	8,197 (7,819)
Total	301,580	50,177 (47,969)	44,374 (42,460)	45,148 (42,514)	43,085 (41,132)

Acres in ( ) are in blocks greater than 250 acres in size.
Shaded cells represent more than 10% reduction in total elk security area.
Bold print acres represent more than 50% reduction in 250+ acre security areas.

Alternative 2

***Disturbance and Off-road Motor Vehicle Access*:** Alternative 2 would reduce the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because of the rehabilitation and concealment proposed at 89 sites on user created routes, 11 sites on decommissioned roads and 109 sites on closed roads. Alternative 2 would reinforce existing closures. However, this alternative would also increase the length of motorized route network by 69 miles. This alternative would provide a system of designated routes intended to provide a legal, planned, designed, engineered and maintained series of routes for motorized use. This should reduce the level of traffic on existing unauthorized or unwanted user-created routes. A regulated trail network would be established, providing approximately 69 miles of new motorized trails and up to 55 miles of roads converted to trails for a total of 124 miles in the designated trail system. The trail systems would be linked with shared use roads, including 46 miles which would be designated as connecting routes for the trail network.

Refer to Chapter 2 for a detailed description of each alternative.

Legally open road and trail densities on National Forest system lands would increase in some watersheds as shown in Table 102. Open road densities would exceed Forest Plan guidelines of 3.0 mi/mi2 in General Forest allocation on 4 of the 31 subwatersheds in the project area (Elliot Creek, Lower Big Summit Prairie, Porter Creek and Lower Marks Creek; see Table 105). Mixed use by passenger cars, industrial traffic and OHVs would occur on 659 miles of operational maintenance level 2 roads. It is projected that motorized use would increase approximately 2 to 5 percent per year as the OHV trail system develops and becomes more widely known to users. Motorized use other than by OHVs would continue to occur on 140 miles of highway legal only (maintenance level 2 to 5) roads.

Table 105. Subwatersheds with Open Road and Trail Density at or above 3 miles/sq. mile in General Forest, Alternative 2 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Deep Creek	Jackson Creek	2.95 GF
Upper North Fork Crooked River	Elliot Creek	3.06 GF
	Lower Big Summit Prairie	3.31 GF
	Porter Creek	3.26 GF
Upper Ochoco Creek	Lower Marks Creek	3.15 GF

Distance banding analysis of existing open roads (based on operational maintenance level) shows there are a total of 50,177 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 17% of the project area. Of these,

47,969 acres occur in patches greater than 250 acres in size, or 96% of the total area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 28 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek) and Lower Big Summit Prairie (in Upper North Fork Crooked River). In contrast, 115,127 acres (38 percent) of the project area are within 200 m (660 feet) of an existing open road. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas at least during daylight hours when motorized traffic is more likely to occur.

Rocky Mountain Elk Foundation (RMEF) has mapped elk habitat at a State by State scale. This habitat map may be too coarse of a scale to predict high use areas at the local level. However, the alternative was compared to the RMEF map, particularly areas identified as "crucial." Under this alternative, 31 miles of designated routes occur within RMEF's Crucial Winter Habitat including routes both on and off of existing open roads. This represents 18% of the total designated route miles under this alternative. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), this would translate to a potential reduction of 4,960 acres, or approximately 9 percent of the 53,435 acres of winter crucial habitat mapped within the project area. However, the mapped habitat is coded as summer, winter crucial and winter habitat on the RMEF map, and includes elevations ranging from 3800 feet to over 6,200 feet including all available aspects and slopes (including north facing cliffs and talus slopes). It is also entirely within the Rager Travel Management area where motorized access is limited as described above. The proposed season of OHV use for the trail network is outside of the critical winter period both inside and outside of the Rager TMA under all action alternatives. Therefore, although these routes are within the polygon shown on the RMEF habitat map as crucial winter habitat, the proposed trails would not be open for use by OHVs during the critical winter period. The impact of these trails on elk habitat would be during the summer use period. The entire 301,580 acre project area is coded as summer habitat on the RMEF map regardless of slope, elevation, aspect or terrain features. Using the same assumptions as described above, the 170 miles of trail system (including 46 miles of open roads) could increase impacts to summer habitat on 9 percent of the RMEF mapped summer habitat within the project area.

Potential elk calving and deer fawning areas were mapped based on areas in proximity (within ¼ mile) to meadows, aspen and other riparian shrub habitats, where such areas occur on terrain with less than 25% slope. Under this alternative 84 miles of designated routes occur within potential elk calving habitat. Of those 30 miles are on open roads and 54 miles are not on open roads. There is potential for increased traffic on open roads included as part of the OHV trail system as well as on proposed routes that are not on open roads. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), proposed system routes would impact habitat in potential elk calving areas on 13,440 acres or 12 percent of the 115,540 acres available within the project area. Areas with high concentrations of elk during the calving period based on telemetry data collected by Oregon Department of Fisheries and Wildlife between 1989 and 1994 were avoided when planning for trail placement (ODFW 1998).

This alternative would have a moderate impact to elk compared to Alternatives 3 and 4 because of the amount of road closures, medium trail extent and density. As shown in Table 104, Alternative 2 would result in a reduction in amount and distribution of undisturbed security habitat for deer and elk compared to Alternatives 1 and 3. Designation of new motorized routes would result in the decrease in lands greater than ½ mile from a route. This alternative would provide a total of 42,460 acres of security habitat in blocks greater than 250 acres in size. Security habitat less than 250 acres in size do

not provide the same security cover advantages present in larger security area blocks, but they would occur on USFS managed land on 1,914 acres.

Alternative 3

Distance banding analysis of existing open roads (based on operational maintenance level) shows there are a total of 50,177 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 17% of the project area. Of these, 47,969 acres occur in patches greater than 250 acres in size, or 96% of the total area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 28 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek) and Lower Big Summit Prairie (in Upper North Fork Crooked River). In contrast, 115,127 acres (38 percent) of the project area are within 200 m (660 feet) of an existing open road. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas at least during daylight hours when motorized traffic is more likely to occur.

Table 106. Subwatersheds with Open Road and Trail Density at or above 3 mi/sq. mi in General Forest, Alternative 3 combined with closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Upper North Fork Crooked River	Lower Big Summit Prairie	3.01 GF
Upper Ochoco Creek	Lower Marks Creek	2.40 GF

Distance banding analysis of the combination of existing open roads (based on operational maintenance level) and proposed trails indicates that there would be a total of 45,147 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 15% of the project area (a 2% reduction compared to existing condition). Of these, 42,514 acres occur in patches greater than 250 acres in size, or 94% of the total security area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 27 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security in patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek), Lower Big Summit Prairie and Porter Creek (in Upper North Fork Crooked River). In contrast, 123,032 acres (41 percent) of the project area would be within 200 m (660 feet) of an open road or motorized trail. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas during daylight hours when motorized traffic is more likely to occur.

Rocky Mountain Elk Foundation (RMEF) has mapped elk habitat at a State by State scale. This habitat map may be too coarse of a scale to predict high use areas at the local level. However, the alternative was compared to the RMEF map, particularly areas identified as “crucial.” Under this alternative, 15 miles of designated routes occur within RMEF’s Crucial Winter Habitat including routes both on and off of existing open roads. This represents 15% of the total designated route miles under this alternative. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), this would translate to a potential reduction of 2,400 acres, or approximately 4 percent of the 53,435 acres of winter crucial habitat mapped within the project area. However, this mapped habitat is coded as summer, winter crucial and winter habitat on the RMEF map, and includes elevations ranging from 3800 feet to over 6,200 feet including all available aspects

and slopes (including north facing cliffs and talus slopes). It is also entirely within the Rager Travel Management area where motorized access is limited as described above. The proposed season of OHV use for the trail network is outside of the critical winter period both inside and outside of the Rager TMA under all action alternatives. Therefore, although these routes are within the polygon shown on the RMEF habitat map as crucial winter habitat, the proposed trails would not be open for use by OHVs during the critical winter period. The impact of these trails on elk habitat would be during the summer use period. The entire 301,580 acre project area is coded as summer habitat on the RMEF map regardless of slope, elevation, aspect or terrain features. Using the same assumptions as described above, the 101 miles of trail system (including 13 miles of open roads) could increase impacts to summer habitat on 5 percent of the RMEF mapped summer habitat within the project area.

Potential elk calving and deer fawning areas were mapped based on areas in proximity (within ¼ mile) to meadows, aspen and other riparian shrub habitats, where such areas occur on terrain with less than 25% slope. Under this alternative 54 miles of designated routes occur within potential elk calving habitat. Of those 9 miles are on open roads and 45 miles are not on open roads. There is potential for increased traffic on open roads included as part of the OHV trail system as well as on proposed routes that are not on open roads. Assuming a reduction in effective habitat of 200 meters on each side of the route (160 acres per mile), proposed system routes would impact habitat in potential elk calving areas by 8,640 acres or 7 percent of the 115,540 acres available within the project area. Areas with high concentrations of elk during the calving period based on telemetry data collected by Oregon Department of Fisheries and Wildlife between 1989 and 1994 were avoided when planning for trail placement (ODFW 1998).

This alternative would have an impact to elk that falls between that of Alternatives 1 and 2 because of the amount of road closures, compact trail extent and density. Designation of new motorized routes would result in a decrease in lands greater than ½ mile from a route. As shown in **Table 104**, Alternative 3 would result in a reduction in amount and distribution of undisturbed security habitat for deer and elk compared to Alternative 1. This alternative would provide a total of 42,514 acres of security habitat in blocks greater than 250 acres in size. Security habitat less than 250 acres in size do not provide the same security cover advantages present in larger security area blocks, but they would occur on USFS managed land on 2,634 acres.

Alternative 4

Disturbance and Off-road Motor Vehicle Access: Alternative 4 would alter the current pattern of disturbance from unregulated cross-country motor vehicle access, user-created trails, and use of closed roads because of the rehabilitation and concealment proposed at 106 sites on user created routes, 8 sites on decommissioned roads and 163 sites on closed roads. This treatment would reinforce existing closures. However, this alternative would also increase the length of legally open motorized routes by 81 miles. This alternative would provide a system of designated routes intended to provide a legal, planned, designed, engineered and maintained series of routes for motorized use. This should reduce the level of traffic on existing unauthorized or unwanted user-created routes. A regulated trail network providing approximately 81 miles of new motorized trails and up to 76 miles of roads converted to trails for a total of 158 miles in the designated trail system would be established. The trail systems would be linked with shared use roads, including 53 miles which would be designated as connecting routes for the trail network. Refer to Chapter 2 for a detailed description of each alternative.

Open road and trail densities on National Forest system lands would increase in some watersheds as shown in Table 102. Open road densities would exceed Forest Plan guidelines of 3.0 mi/mi2 in General Forest allocation on 6 of the 31 subwatersheds in the project area (Jackson Creek, Elliot Creek, Lower Big Summit Prairie, Porter Creek, Lower Marks Creek and Upper Marks Creek). Road density in one subwatershed would be brought to the 3.0 mi/mi2 level (Howard Creek; see Table

107). Mixed use by passenger cars, industrial traffic and OHVs would occur on 659 miles of operational maintenance level 2 roads. It is projected that motorized use would increase approximately 2 to 5 percent per year as the OHV trail system develops and becomes more widely known to users. Motorized use other than by OHVs would continue to occur on 140 miles of highway legal only (maintenance level 2 to 5) roads.

This alternative would likely impact elk to a greater degree than Alternatives 1, 2 or 3. While more road closure reinforcements are proposed than the other action alternatives, the design of the trail system impacts more acreage and results in less undisturbed habitat greater than ½ mile from an open road. There would be fewer acres of security habitat compared to the other action alternatives. One benefit however, is a designated OHV system more capable of reducing unauthorized use in other areas due to its more extensive and varied recreational opportunities. This alternative may also be more likely to be of sufficient size to handle expected increases in future use, and thus may have a higher probability of preventing future proliferation of unauthorized or user-created trails.

Table 107. Subwatersheds with Open Road and Trail Density at or above 3 miles/sq. mile in General Forest, Alternative 4 combined with road closures proposed in other projects.

Watershed	Subwatershed	Management Area – miles/sq. miles
Deep Creek	Jackson Creek	3.0 GF
Upper North Fork Crooked River	Elliot Creek	3.01 GF
	Howard Creek	3.0 GF
	Lower Big Summit Prairie	3.31 GF
	Porter Creek	3.27 GF
Upper Ochoco Creek	Lower Marks Creek	3.22 GF
	Upper Marks Creek	3.27 GF

Distance banding analysis of the combination of existing open roads (based on operational maintenance level) and proposed trails indicates that there would be a total of 43,085 acres of National Forest lands greater than 800 m (1/2 mile) from an existing road (elk security habitat). This represents approximately 14% of the project area (a 3% reduction compared to existing condition). Of these, 41,132 acres occur in patches greater than 250 acres in size, or 95% of the total security area more than ½ mile from an open road. Security areas in patches greater than 250 acres are distributed across all nine watersheds (and 24 of 31 subwatersheds) within the project area. The subwatersheds that did not contain elk security in patches greater than 250 acres are Drift Canyon (in Lower Beaver Creek), Middle Rock Creek (in Rock Creek), Lower Big Summit Prairie and Porter Creek (in Upper North Fork Crooked River), Jackson Creek and Little Summit Prairie Creek (in Deep Creek), Lower Marks Creek (in Upper Ochoco Creek). In contrast, 129,385 acres (43 percent) of the project area would be within 200 m (660 feet) of an open road or motorized trail. These high-disturbance zone acres are distributed across all nine watersheds (and 30 of 31 subwatersheds) in the project area. Within these areas elk would continue to experience high levels of disturbance from motorized use. It is assumed that lands within the 200 m (660 foot) zone are unavailable for consistent elk use as cover or foraging areas during daylight hours when motorized traffic is more likely to occur.

Rocky Mountain Elk Foundation (RMEF) has mapped elk habitat at a State by State scale. This habitat map may be too coarse of a scale to predict high use areas at the local level. However, the alternative was compared to the RMEF map, particularly areas identified as “crucial.” Under this alternative, 38 miles of designated routes occur within RMEF’s Crucial Winter Habitat including routes both on and off of existing open roads. This represents 18% of the total designated route miles under this alternative. Assuming a reduction in habitat availability of 200 meters on each side of the route (160 acres per mile), this would translate to a potential reduction of 6,080 acres, or approximately 11 percent of the 53,435 acres of winter crucial habitat mapped within the project area. However, this mapped habitat is coded as summer, winter crucial and winter habitat on the RMEF

map, and includes elevations ranging from 3800 feet to over 6,200 feet including all available aspects and slopes (including north facing cliffs and talus slopes). It is also entirely within the Rager Travel Management area where motorized access is limited as described above. The proposed season of OHV use for the trail network is outside of the critical winter period both inside and outside of the Rager TMA under all action alternatives. Therefore, although these routes are within the polygon shown on the RMEF habitat map as crucial winter habitat, the proposed trails would not be open for use by OHVs during the critical winter period. The impact of these trails on elk habitat would be during the summer use period. The entire 301,580 acre project area is coded as summer habitat on the RMEF map regardless of slope, elevation, aspect or terrain features. Using the same assumptions as described above, the 212 miles of trail system (including 53 miles of open roads) could increase impacts to summer habitat on 11 percent of the RMEF mapped summer habitat within the project area.

Potential elk calving and deer fawning areas were mapped based on areas in proximity (within ¼ mile) to meadows, aspen and other riparian shrub habitats, where such areas occur on terrain with less than 25% slope. Under this alternative 102 miles of designated routes occur within potential elk calving habitat. Of those 31 miles are on open roads and 70 miles are not on open roads. There is potential for increased traffic on open roads included as part of the OHV trail system as well as on proposed routes that are not on open roads. Assuming a reduction in effective habitat of 200 meters on each side of the route (160 acres per mile), proposed system routes would impact habitat in potential elk calving areas by 16,320 acres or 14 percent of the 115,540 acres available within the project area. Areas with high concentrations of elk during the calving period based on telemetry data collected by Oregon Department of Fisheries and Wildlife between 1989 and 1994 were avoided when planning for trail placement (ODFW 1998).

This alternative would have the highest impact to elk compared to Alternatives 1, 2 and 3 because of the extensive trail system it proposes. The designation of new motorized routes would result in a decrease in lands greater than ½ mile from a motorized route. As shown in Table 104, Alternative 4 would result in a reduction in amount and distribution of undisturbed security habitat for elk compared to Alternatives 1, 2 and 3. This alternative would provide a total of 41,132 acres of security habitat in blocks greater than 250 acres in size. Security habitat less than 250 acres in size do not provide the same security cover advantages present in larger security area blocks, but they would occur on USFS managed lands on 1,953 acres.

Effects Common to All Action Alternatives

***Off-road Motor Vehicle Access*:** Unregulated cross-country motorized travel including user created trails across the project area is expected to be reduced as a result of provision of a designated system of trails and rehabilitation and concealment work at intersections of the proposed trail system with user created, decommissioned and closed roads. The extent of this relief from unauthorized travel likely depends to some extent on the amount and diversity of opportunities provided. In other words, a small-sized trail system may not be as effective in providing alternative riding areas compared to a more extensive system. On the other hand, some unauthorized use may continue in some areas of the Forest regardless of the provision of a designated system. In addition to the provision of alternate riding areas, the action alternatives are expected to result in less motorized disturbance to big game animals in specific locations where existing road closures are reinforced and where unwanted user-created trails are rehabilitated. The increase in law enforcement presence that comes with a designated trail system, may reduce violation of unauthorized routes in proximity to the trail system, but is not likely to affect the level of compliance elsewhere in the project area.

Cumulative Effects

Under the Deschutes and Ochoco Travel Management Plan, motorized use is restricted to designated routes, and OHV use is allowed only on designated OHV trail systems and those Maintenance Level

2 roads open for mixed use and selected rock pits designated as open for cross country travel as shown on the MVUM maps. Law enforcement actions will likely encourage compliance through education in the first couple years although it is unknown what level of non-compliance may occur initially. In the long-term, there will be reduced disturbance due to anticipated restriction of motorized use cross-country and on closed roads.

Projects that may have effects that would combine with proposed alternative effects are displayed in Table 6.

Alternative 1

The discussion of cumulative effects for Alternative 1 is the result of effects from past and present actions that have contributed to the current condition of motorized use and hiding cover in the project area, and how they combine with effects of the No Action alternative. Land management actions include commercial timber harvest entries, small tree thinning, prescribed fire, wildfires, wildlife habitat enhancements such as riparian restoration, water developments, and commercial and personal use firewood removal. Fuel and vegetation management actions have left some areas with improved forage conditions and reduced cover. Timber management has left behind a footprint of road systems built to extract wood products. Implementation of Alternative 1 would leave existing routes that are open on the ground in their current condition and enforcement of the new Travel Management Plan would be based largely on user compliance with the Motor Vehicle Use Map (MVUM). Legal use by OHVs would be confined to open mixed-use roads and rock pits designated as open for cross country travel within the project area.

All Action Alternatives

The Canyon and Spears Vegetation Management EISs have recently been implemented, while Howard Elliot Johnson and Jackson are currently in the implementation phase. These projects include management in areas that overlap the Ochoco Summit OHV project area. Approximately 70,000 acres of vegetation and fuels management have been proposed for treatments including commercial thinning, small diameter thinning and prescribed burning. The primary effect of these vegetation management projects on big game is related to roads used for access to treatment areas, roads closed as part of these projects, and changes in cover as a result of proposed vegetative treatments. Vegetative treatments may require the construction of temporary roads to access units and extract wood products. Temporary roads are typically in place for several years and then closed at the completion of all harvest associated activities. Currently closed roads may also have to be used for haul routes during timber harvest operations and are generally returned to closed status following timber sale operations. Collectively, these actions would have a temporary short-term impact on road densities. In addition, the vegetation treatments would likely result in a reduction in the amount of big game hiding cover and potentially increased human access due to removal of small trees and woody debris. The effects of vegetative treatments on hiding and thermal cover are disclosed in the NEPA documents for those projects and this OHV trail project would result in minimal changes to canopy closure, and therefore acres meeting the criteria for these cover classes. However, this project may affect the availability of these cover areas due to the impact of human disturbance within cover. There is a potential cumulative impact of disturbance to big game animals that may be utilizing hiding cover adjacent to active logging operations, from additional disturbance related to use of OHV trails in those areas. Over the short term, increased motorized route densities as compared to the existing condition may result in an increase in legal and illegal harvest of deer and elk because of more vehicular access. In addition, effects of human activity and reduction of cover associated with implementation of the vegetation and fuels management projects may combine with effects from proposed establishment of new motorized routes in limiting the amount or effectiveness of security habitat in the short term. In the long-term however, road closures included in some of these vegetation and fuels management projects would reduce the network of open motorized routes within

those project areas, potentially reducing the negative impacts from construction of the proposed trails within the project areas where road closures are implemented.

Deschutes and Ochoco Travel Management Plan now has a signed decision and implementation of the plan will occur over the next few years. The Travel Management Plan has done the following:

- Designate specific conditions, if any, under which existing routes or areas will continue to provide for sustainable motorized use considering a variety of societal and resource factors
- Identify existing roads, trails, and areas that will continue to support sustainable motorized use
- Identify potential motorized routes and/or areas that could be added to the forests and grasslands transportation system for motorized use.

After implementation of the forest-level Travel Management Plan, in the long-term, there would be reduced disturbance due to anticipated restriction of motorized use cross-country and on closed roads.

All action alternatives would develop a designated OHV trail system to replace the unregulated use that occurred prior to the Travel Management project Record of Decision. Under implementation of the 2005 Travel Management Rule and the forest-level Travel Management EIS, on-the-ground motorized route densities would decline from the current levels as a result of closing user created trails not included in the designated OHV system, enforcement of existing road closures and prohibiting cross-country travel. Roads Analysis has been conducted for all subwatersheds that overlap the proposed alternatives. The Roads Analysis process helps to prioritize roads for closure, reinforcement of existing closures or decommissioning. Implementation of the forest-level Travel Management Plan, in combination with closures and restoration proposed under this project would benefit mule deer and elk in the project area, because portions of this project area are heavily roaded with many closed or decommissioned roads that are still receiving motorized use, with relatively small percentages of elk security habitat. Refer to Table 102 and Table 104.

Private land ownership in the project area includes rural ranch and timberland. These lands do provide quality big game habitat because of restricted human access, and slope position which provides productive soils and water availability. While the industrial timberland acreage has been managed for timber harvest, big game hiding cover and secure habitat acreage is available. Consequently, the potential for development of an OHV system on National Forest lands to displace elk to private land has been considered in this analysis. Table 108 shows the amount of secure cover available to deer and elk on USFS managed land within 2 miles of private land. This measure was used as an estimate of capability to retain elk on federal land and not cause displacement to private land. This analysis assumes that elk would be more likely to find secure cover and not be displaced to private land where forested stands exceeding 40% crown closure occur at a distance of more than ½ mile from a motorized route and where this occurs within 2 miles of private land. As can be seen in Table 108 the difference between alternatives detected by this measure is very small (up to a 4 percent reduction between Alternatives 1 and 4). This is because of the relatively large network of existing open motorized routes and the abundance of open vegetation such as meadows and scabland that affect the distribution of forested cover within two miles of private land. Alternative 2 shows slightly more (up to 2% more) forested cover in proximity to private land compared to the other action alternatives due to the lack of interconnected loops on the west end in that alternative. These west end loops in Alternatives 3 and 4 are in a forested setting within 2 miles of private land, and thus they affect the amount of undisturbed forested cover in proximity to private land.

Table 108. Comparison of Alternatives for Hiding and Thermal Cover (more than ½ mile from open motorized route and within 2 miles of private land).

Cover Type	Alt 1	Alt 2	Alt 3	Alt 4
Hiding cover (40 to 70% cc)	11,847	11,558	11,465	11,285
Thermal cover (70+ % cc)	9,197	9,089	8,978	8,915
Total cover (40 - 100% cc)	21,044	20,647	20,443	20,200

Table 109 displays a summary of the predicted effects of the proposed alternatives on big game key indicators. No trails or areas are proposed in Winter Range or General Forest Winter Range, so there are not differences in these areas between the alternatives.

Table 109. Summary Comparison of Key Indicators for Big Game by Alternative.

Key Indicators	1	2	3	4
National Forest road and motorized trail density in mi/mi2 averaged for 31 subwatersheds in GF, GFWR and WR combined	1.83	2.09	2.01	2.17
National Forest road and motorized trail density in mi/mi2 in General Forest averaged across 31 subwatersheds	1.91	2.23	2.13	2.31
National Forest road and motorized trail density in mi/mi2 in Winter Range + GFWR averaged across 31 subwatersheds (without credit for gate closure mitigations)	1.41	1.41	1.41	1.41
National Forest road and motorized trail density in mi/mi2 in Winter Range + GFWR averaged across 31 subwatersheds (with credit for seasonal closure, MVUM)	0.9	0.9	0.9	0.9
Number of 6th-field subwatersheds with 3.0 miles or more of roads and trails open for motorized use in General Forest	2	4	2	6
Acres of National Forest land > than 1 mile from an open motorized route in the project area and percent of project area	10,779 (3.6%)	10,411 (3.5%)	10,411 (3.5%)	10,411 (3.5%)
Acres of National Forest land > than 1/2 mile from an open motorized route and percent of project area	49,187 (16.3%)	44,345 (14.7%)	45,118 (15.0%)	43,059 (14.6%)
Acres of National Forest land < than 660 feet (200 m) from an open motorized route and percent of project area	115,127 (38.2%)	125,745 (41.7%)	123,036 (40.8%)	129,390 (42.9%)
Acres elk security habitat (>1/2 mile from open motorized route) in blocks at least 250 acres in size and percent of project area	47,969 (15.9%)	42,460 (14.1%)	42,514 (14.1%)	41,132 (13.6%)
Acres elk security habitat (>1/2 mile from open motorized route) in patches less than 250 acres in size and percent of project area	2,208 (0.7%)	1,914 (0.6%)	2,634 (0.9%)	1,953 (0.6%)
Total Elk Security areas regardless of patch size and percent of project area	50,177 (16.6%)	44,374 (14.7)	45,148 (15.0%)	43,085 (14.3%)
Miles of trail in RMEF Crucial Winter Range (MAPS)	0	30.8	15.5	37.7
Miles of trail in calving/fawning habitat not on open roads	0	54.1	44.5	70.4
Acres of secure cover within 2 miles of private land	21,044	20,647	20,443	20,200

Viability Assessment for Rocky Mountain Elk and Mule Deer

Background: Mule deer and Rocky Mountain elk were chosen as terrestrial management indicator species (MIS) for populations of big game and their habitat (LRMP 4-245). A great deal of research and scientific literature on the Rocky Mountain elk was generated from studies conducted in the Blue Mountains. Research conducted at the Starkey Experimental Forest beginning in the 1980's on the Rocky Mountain elk has defined much of the science and current understanding of elk in the Blue Mountains of Oregon.

Existing Condition: Rocky Mountain elk and mule deer occur in populations across the State of Oregon, and across Ochoco National Forest. Deer and elk may utilize the watershed throughout the year during below normal snow years, but generally use the high elevation areas primarily as summer range, wintering on the lower elevation USFS managed lands and on private lands. Within the Forest boundary, the Ochoco Summit project area contains 14,442 acres within the General Forest (GF), 11,083 acres within General Forest Winter Range (GFWR) and 14,442 acres within the Winter Range (WR) LRMP allocations.

The project area lies within one Oregon Department of Fish and Wildlife (ODFW) management zone, the Ochoco Wildlife Management Unit (WMU). The Ochoco WMU contains 47% private lands and 53% public lands. The estimated 2011 population for elk and deer was 3900 elk and 15,400 deer. The management objective (MO) is the number of elk and deer that ODFW manages for to prevent depletion of big game animals and to provide optimum recreational and aesthetic benefits for the public (quality hunting and wildlife viewing opportunities in the present and in the future). In the Ochoco WMU the MOs are 4,600 elk and 20,500 deer. Mule deer populations have been generally declining across the Western States. This decline is evident in the Ochoco WMU as well. The mule deer MO was met in 1988, but has not been met since. Population estimates within the WMU have decreased from 18,500 in the late 1990s to 15,400 in 2011, but was estimated at 16,000 in 2010. The elk population steadily increased from the 1970s through the early 2000s, exceeded the 4,300 elk target starting in 1999, and has been holding fairly steady in recent years (between 3,900 and 4,700 between 2006 and 2012) with a slight downward trend.

Effects Common to All Alternatives: The potential effects are described in detail above. This project would increase motorized route density and would reduce the effectiveness of security cover within the project area. For these reasons the project may result in localized redistribution of big game, particularly of elk, from less secure locations into more secure locations (at least in the short term). The project does not increase motorized route density in winter range, and does propose reinforcement of closures on unwanted trails and closed roads to ensure consistency with the Ochoco National Forest Plan standards and guidelines for deer and elk.

Conclusion: Both species have a demonstrated harvestable surplus across the State of Oregon and within the Ochoco WMU. Oregon Department of Fish and Wildlife monitors these populations annually and sets harvest levels based on the results of annual monitoring. Given the widespread distribution of these species and their habitat across the Forest and WMU, and the potential effects described above (this project would increase motorized road and trail density, and reduce security habitat) the project's overall direct, indirect and cumulative effects may result in a small negative trend particularly in proximity to routes that are more than ½ mile from existing open roads. However this impact becomes unmeasurable beyond the one mile distance band from any proposed trails. Given the existing motorized route density, the relatively small change in motorized route density and the presence of demonstrated harvestable surplus populations of elk and mule deer, the continued viability of these species is expected to occur on Ochoco National Forest.

Bald Eagle

The bald eagle was selected as a management indicator species because it was a Threatened species. The bald eagle was previously discussed in the Threatened Endangered and Sensitive Species section. Please refer to the TES section for details on the northern bald eagle and the effects determination.

Golden Eagle

The golden eagle was chosen as a terrestrial management indicator species (MIS) for cliff, talus or cave habitat (LRMP 4-245).

Gilligan et al. (1994) describes the golden eagle as an uncommon to fairly common summer resident in open country east of the Cascade Mountains and a very uncommon summer resident high in the Cascades. Marshall et al. (2003) lists them as common to uncommon year round resident of all counties east of the Cascade Range, with the highest nesting densities in Lake, Harney and Malheur Counties. The golden eagle nests in open large (greater than 30 inches in diameter) live ponderosa pine or cliff ledges that support its 3-10 foot tall nest (Marshall et al. 2003). The Oregon Natural Heritage Information Center ranks golden eagles as S4, Apparently Secure (NatureServe 2009). NatureServe (2009) listed the following as the major threats golden eagles experience: (1) powerline electrocution because wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989), (2) poison intended for coyotes, (3) occasional shootings, and (4) habitat loss to agriculture and suburban land uses.

Existing Condition

Wildlife observation records list 48 golden eagle sightings across the project area, including 2 nests. The majority of the district records are from wintering birds (October through February). However, a number of sightings on the Forest occurred between March and August and these may be associated with nesting territories that have not been discovered. The State database (ODFW, 2007) lists 1 site record within the project area, the area was checked in 2002, 2005, 2006, 2007 and 2013, no golden eagle nests were located. Two additional nest locations in the district records have been monitored, one was checked in 2006, 2007, 2011 and 2012 and no nest was confirmed. The other nest has been confirmed and was found to successfully fledge young in 2004 and 2005. This nest was checked in 2012 and no sign of occupancy was found. Two nesting territories are being monitored just outside of the project area; they are each four miles or more from any proposed trail under any action alternative.

Viability Assessment for Golden Eagle:

Background: Golden eagles inhabit shrub-steppe, grassland, juniper, and open ponderosa pine, and mixed conifer/deciduous habitats. They forage in a variety of habitat types and successional stages, preferring areas with an open shrub component that provides food and cover for prey. Suitable nesting and foraging habitat can be found in mountains, canyons, and rolling hills. Of 506 occupied nests in Oregon in 1982, 35% were in mature trees and 65% on ledges along rims and cliffs (Isaacs and Opp 1991). Nest trees are typically large live ponderosa pine with sturdy open branching and a trunk dbh >30 in. Golden Eagles have large breeding territories ranging 10-40 sq.mi. Nest territories may contain several alternate nests. They forage on a variety of prey species including: jackrabbit, cottontail, California and Belding's ground squirrels, marmots, woodrats, small mammals, fresh carrion, and a variety of birds species (Marshall 2003). This species has a holarctic distribution. In the North America this species breeds from Alaska and Canada south to Central Mexico. In the U. S. it occurs primarily west of the east slope of the Rocky Mountains. In Oregon, golden eagles are common to uncommon year round residents in all counties east of the Cascade Range (Marshall, 2003).

The population trend in Oregon is unknown. In 2011 a state-wide effort was initiated to determine the status of historic nesting territories across the State of Oregon. All known historic golden eagle territories within, or in proximity to, the project area are being surveyed under the state-wide golden eagle inventory and survey program (Isaacs, 2014). Golden Eagles counted during the mid-winter Bald Eagle survey in Oregon for 1992-2001 have varied from 79 to 128 and averaged 97 (Isaacs 2001). The populations of resident golden eagles in the northern part of the Great Basin, particularly in Idaho and Northern Utah, have shown indications of a decline (Marshall, 2003). The Natural Heritage program rank golden eagles as S4, Apparently Secure (NatureServe 2009). NatureServe (2009) listed the following as the major threats golden eagles experience: (1) powerline electrocution because wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989), (2) poison intended for coyotes, (3) occasional shootings, and (4) habitat loss to agriculture and suburban land uses.

Existing Condition: On the Ochoco National Forest, including Crooked River National Grassland, there are records for 147 historic nesting sites. The majority of the nests are associated with extensive rimrock habitat present in Jefferson County, as noted below. Of 147 historic sites forest-wide, only 12 occur in Crook County. Sightings within the project area are described above.

Of the occupied nests studied by Isaacs and Opp in 1982, 65% were on rock ledges. A forest-level analysis was conducted in 2011 using updated GIS data on rock features. The output from this analysis reflects the majority of rock features with potential nesting habitat. Rock features identified in the GIS data are those that are of sufficient size to be detected from aerial photographs. The rock categories included in estimating potential nesting habitat for this species included the following: rimrock, rock, rock/limestone, rocky knob, talus, talus/rocky knob, talus/rimrock. The GIS data layer is estimated to be 80% accurate in detecting rock features with cliff faces that have any potential as nesting sites. Some small cliffs may have been overlooked in the aerial photo interpretation, and some rock features identified as potentially having cliff habitat, may not be suitable for nesting sites. However, this data is expected to be representative of the majority of suitable nesting substrate and of sufficient accuracy for a comparison of potential rock habitat within the project area and across the landscape at a forest-wide scale. From this analysis it was estimated that at the forest level there are approximately 18,838 acres of rock habitat with potential cliff nesting habitat (2,149 acres within the project area). There are a total of 34 watersheds (5th field HUC) on Ochoco National Forest. Potential cliff nesting habitat is distributed within all 34 of these watersheds, though some watersheds (Crooked River Grassland, Headwaters Deschutes River, Lake Billy Chinook, Lower Metolius River and Willow Creek) have substantially more cliff habitat than other watersheds across the Forest.

Golden eagle nests that are not on cliffs are typically on large ponderosa pine trees or snags in open stands, or on scattered individual large pine trees in otherwise open habitat such as rocky canyons, shrub/steppe or grassland settings. These individual scattered pines may occur in a variety of plant associations including juniper woodland, juniper steppe or xeric ponderosa pine.

Effects Common to All Alternatives: All action alternatives exclude roads in proximity to known nests and roosts from the designated OHV system of routes. None of the proposed trail system would occur within ½ mile of any known eagle nest.

Conclusion: This project area is likely to have a relatively minor influence on potential nesting and foraging habitat for golden eagles due to a general lack of extensive low to mid elevation cliff features and limited habitat for primary prey species within proximity to any proposed routes or facilities. For these reasons implementation of any alternative proposed in the Ochoco Summit Project will not contribute to a negative trend in viability on the Ochoco National Forest for the golden eagle.

Prairie Falcon

The prairie falcon was chosen as a terrestrial management indicator species (MIS) for cliff, talus or cave habitat (LRMP 4-245). The prairie falcon is also discussed in the section on Raptors under Other Species. Please refer to that section for further details on this species.

Prairie falcons breed throughout the open country east of the Cascades wherever cliffs and outcrops provide opportunities for nesting (Marshall 2003). Prairie Falcons are most common in rimrock country, where they nest, but may travel great distances in search of prey (Marshall 2003, Birds of Oregon). A combination of rimrock or other outcrops and adjacent open country provides ideal breeding habitat. They winter over much of the breeding range south to Mexico (Marshall 2003).

Existing Condition

District wildlife sighting records list 2 observations within the project area. Private forest and rangeland in the project area are likely to provide suitable habitat for prairie falcons, where cliff or rimrock faces provide nest sites situated within or near open shrub and grassland habitat. Multiple records for this species are associated with privately owned meadowlands within 1 mile of the Forest boundary, more than 2 miles from the project area boundary.

Viability Assessment for Prairie Falcon

This species breeds from c. British Columbia east to N. Dakota, south to Baja California and Texas. It winters over much of its breeding range south to Mexico (Marshall 2003). They breed throughout the open country east of the Cascades wherever cliffs and outcrops provide opportunities for nesting (Marshall 2003). Prairie Falcons are most common in rimrock country, where they nest, but may travel great distances in search of prey (Marshall 2003). A combination of rimrock or other outcrops and adjacent open country provides ideal breeding habitat. Cliffs need not be large. Denton (1979) found 59% of nest on cliffs less than 100 ft, some as low as 15 ft. The principal requirement is that the nest site be sheltered from above (Bent 1938, Webster 1976). This appears to reflect a need for shade and possibly protection from predators (Marshall 2003).

Grasslands are the preferred habitat although they also occur in less-productive areas dominated by sagebrush. The principal requirement for foraging appears to be low and sparse vegetation that accommodates their foraging style. Prey most often consists of small mammals, usually ground squirrels (Denton 1976, Haak 1982b).

This species occurs in low density and exhibits wide-ranging habits (Marshall, 2003). Densities of 3.9-8.0 breeding pairs/100square miles were found in Wasco and Wheeler counties (Janes 1975). Lardy (1980) found higher average densities in Malheur Co. (9.8-14.0/100sq.mi.). Populations, including those in Oregon, appear to be stable (White 1994).

Existing Condition: District wildlife sighting records list 2 observations within the project area. Private forest and rangeland in the project area are likely to provide suitable habitat for prairie falcons, where cliff or rimrock faces provide nest sites situated within or near open shrub and grassland habitat. Multiple records for this species are associated with privately owned meadowlands within 1 mile of the Forest boundary, more than 2 miles from the project area boundary. Prairie falcon nests have been confirmed at other locations on Ochoco National Forest at low elevation, near the Forest boundary.

A forest-level analysis was conducted in 2011 using updated GIS data on rock features. The output from this analysis reflects the majority of rock features with potential nesting habitat. Rock features identified in the GIS data are those that are of sufficient size to be detected from aerial photographs. The rock categories included in estimating potential nesting habitat for this species included the following: rimrock, rock, rock/limestone, rocky knob, talus, talus/rocky knob, talus/rimrock. The GIS data layer is estimated to be 80% accurate in detecting rock features with cliff faces that have any

potential as nesting sites. Some small cliffs may have been overlooked in the aerial photo interpretation, and some rock features identified as potentially having cliff habitat, may not be suitable for nesting sites. However, this data is expected to be representative of the majority of suitable nesting substrate and of sufficient accuracy for a comparison of potential rock habitat within the project area and across the landscape at a forest-wide scale. From this analysis it was estimated that at the forest level there are approximately 18,838 acres of potential cliff nesting habitat (2,149 acres within the project area). There are a total of 34 watersheds (5th field HUC) on Ochoco National Forest. Potential cliff nesting habitat for is distributed within all 34 of these watersheds, though some watersheds (Crooked River Grassland, Headwaters Deschutes River, Lake Billy Chinook, Lower Metolius River and Willow Creek) have substantially more cliff habitat than other watersheds across the Forest. Rock habitat with potential for cliff nesting species occurs within nine watersheds in the project area, with the majority occurring in Upper Ochoco Creek (578 acres), Rock Creek (388 acres) and Deep Creek (329 acres). Proposed alternatives increase the amount of area within ½ mile of a motorized route within these watersheds as follows: Upper Ochoco Creek Alt. 2 by 18%, Alt. 3 by 20%, Alt. 4 by 21%; Rock Creek 12% all action alternatives; Deep Creek Alt.2 by 38%, Alt. 3 by 36%, Alt. 4 by 39%. However, rock habitat is not uniformly distributed across each watershed, so increases in acreage in proximity to motorized routes at a watershed scale does not necessarily reflect a direct increase in potential for disturbance.

Effects Common to All Alternatives: No alternative would modify potential cliff nesting habitat. There is potential for effects from human disturbance as described above.

Conclusion: This project area is likely to have a relatively minor influence on potential nesting and foraging habitat for prairie falcons due to a general lack of extensive low to mid elevations sheer cliff features within proximity to any proposed routes or facilities. For these reasons implementation of any alternative proposed in the Ochoco Summit Project will not contribute to a negative trend in viability on the Ochoco National Forest for the prairie falcon.

Other Wildlife Species (LRMP)

During the preparation of the Ochoco National Forest Land and Resource Management Plan (USDA 1989), a group of wildlife species were identified as Other Species. These species were selected because their well-being was of interest and therefore specific standards were provided. The species listed in Table 110 were listed in the Ochoco National Forest LRMP.

Table 110. Ochoco National Forest Other Species (LRMP).

Ochoco National Forest Other Species (LRMP)	Habitat	Presence Within The Analysis Area
Antelope	Open country, sagebrush flats	Yes
Raptor Habitat (eagles, hawks, owls, falcons, osprey)	Nest sites/nesting habitat	Yes
Species that use dead and down logs	Snags and logs	Yes
Species that use plant communities	Diversity of PAGs and SS stages	Yes
Species that use springs, bogs and other unique habitat	Seeps, springs, bogs, wetlands,	Yes

Antelope

The LRMP specifies that habitat for antelope (pronghorn) is to be managed in accordance with ODFW Management Objectives. For the Ochoco WMU the population trend measured as an index using the number of animals per mile, and it was estimated at 3.1 in 2009 and 2.6 in 2010. This trend index was not surveyed in 2011 or 2012. The kid ratio was estimated at 34 kids per 100 does in 2008, at 43 in 2009, at 36 in 2010 and at 34 in 2011. The buck ratio was estimated at 25 bucks per 100 does in 2008, at 35 in 2009, at 36 in 2010 and at 34 in 2011. Percent rifle success was reported at 67% in

2009, at 73% in 2010 and at 76% in 2011. This project does not substantially alter vegetation that would provide primary pronghorn (antelope) habitat. However, as with other hunted big game species, pronghorn are likely to respond to traffic whether on an open road or a trail, and to human presence, whether motorized or not. This species has evolved with running swiftly as a primary means of escaping from predators. Thus, disturbances which are perceived as threatening in the eyes of a pronghorn may generate a fleeing response when such disturbances occur in suitable and occupied pronghorn habitat. Refer to Big Game – Deer and Elk in the section on Management Indicator Species for disclosure of potential impacts to big game from motor vehicle access. These animals select relatively dry and open sagebrush and upland shrub habitat on gentle slopes. To estimate the relative impact of alternatives on potential pronghorn habitat the length of trail on suitable plant association groups (PAGs) was measured in GIS. The total length of trail proposed under each alternative within juniper steppe, juniper woodland and non-forested areas combined is displayed in Table 111. This represents the relative potential for disturbance to pronghorn in their preferred habitat. As can be seen in this table, Alternative 3 has the lowest potential impact to pronghorn of the three action alternatives based on trail system miles within preferred habitat.

Table 111. Comparison of Alternatives for Length of Trail in Potential Pronghorn Antelope Habitat.

Type of Route	Alt 1	Alt 2	Alt 3	Alt 4
Open Road	No OHV System	16.2	4.9	15.8
Closed Road	No OHV System	8.1	4.8	9.9
Decommissioned Road	No OHV System	2.9	1.3	3.4
“New” Construction	No OHV System	16.3	7.6	19.1
Total OHV Designated Route Miles	No OHV System	43.5 miles	18.6 miles	48.2 miles

Raptors

The term raptors refer to birds of prey, those that kill other animals for meat, and which generally have talons and hooked beaks. Existing condition and potential effects to the northern goshawk, Cooper’s hawk, sharp-shinned hawk, red-tailed hawk, prairie falcon and golden eagle are discussed in this section along with other hawks and owls. Refer to the TES Species section for further information on bald eagles. Refer to the MIS Species section for further information on golden eagle and prairie falcon.

Existing Conditions of Raptors

Northern Goshawk

The northern goshawk is the largest member of the accipiter family and is distributed across most of Canada, the northern and western United States, and into Mexico. Reynolds et al. (1978) located goshawk nests in Oregon from 580 meters elevation on the west slopes of the Cascades to 1,860 meters nest site. Reynolds et al. (1992) stated preferred nest stands have a minimum of 40 percent canopy cover and the nest sites within these stands have greater than 60 percent canopy cover. Greenwald et al. (2005) reviewed goshawk nesting data and found that a majority of studies found a selection for stands with greater than 40 percent canopy as suitable goshawk nesting habitat. Vegetation plot data collected from Deschutes National Forest goshawk nest sites showed canopy cover ranging from 49-94 percent (USDA 1993). Foraging areas are typically 4,900-5,900 acres; comprised of a forest mosaic that must support a wide range of suitable prey including ground dwellers or those occurring near the forest floor (Marshall et al. 2003).

Sauer et al. (1996 cited in Wisdom et al. 2000) determined that breeding bird survey data for goshawk was insufficient to determine population trends for any state or physiographic region within the Interior Columbia River Basin because of low detection rates. However, sufficient data was available to indicate a stable trend in numbers between the years 1966-1995 for western North America.

Breeding bird surveys provided insufficient data to determine population trends within any state or physiographic province in the Interior Columbia Basin. However, it is anticipated that goshawk populations on the Deschutes National Forest would decline in response to the loss of habitat due to wildfires over the last 6-8 years. The Oregon Natural Heritage Information Center maintains a list of the most current information available on the distribution and abundance of animals native to Oregon. They rank the northern goshawk population as demonstrably wide-spread, abundant, and secure.

The wildlife sighting database has numerous documented observations of goshawks in the project area, including 36 nesting territories (22 on Lookout Mtn R.D. and 14 on Paulina R.D.). Goshawk surveys using broadcasts of recorded calls have occurred in portions of the project area in conjunction with vegetation management projects over the course of four decades. Most of the systematic survey records were initiated following implementation of the Regional Forester's Plan Amendment #2 (Eastside Screens) in 1995. However, there are records for goshawks in the project area dating back into the 1970s and up to 2010. The level of past survey work conducted to date is dependent on the location and timing of various vegetation management projects within the project area over time. Table 112 displays the survey and reproductive history of each known goshawk nesting territory within the project area.

Table 112. Reproductive History of Goshawks within the Ochoco Summit Analysis Area.

Post Fledgling Area	Year of last confirmed nesting	Year of first nesting record	Number of documented nest trees	Number of documented nest cores	Number of nest attempts with young, years surveyed
LOM 2497	2007	1997	2	1	Active nest 5 of 7 years checked
LOM 1169	2011	1992	4	2	Active nest 5 of 7 years checked
LOM 9902	1999	1999	1	1	Active nest 1 of 4 years checked
LOM 0265	2009	1981	2	1	Active nest 2 of 2 years checked
LOM 1168	2003	1995	3	2	Active nest 2 of 4 years checked
LOM 5108	2009	2004	3	1	Active nest 3 of 3 years checked
LOM 2494	2010	1996	2	1	Active nest 3 of 4 years checked
LOM 0242	1992	1992	1	1	Active nest 1 of 3 years checked
LOM 9603	2003	1996	4	1	Active nest 2 of 2 years checked
LOM 2496	2003	1999	2	1	Active nest 2 of 2 years checked
LOM 0089	2007	2007	1	1	Active nest 1 of 1 years checked
LOM 0253	1992	1922	1	1	Active nest 1 of 1 years checked
LOM 1262	1995	1995	2	1	Active nest 1 of 1 years checked
LOM 1256	1995	1995	2	1	Active nest 1 of 3 years checked
LOM 1286	2011	1995	2	1	Active nest 2 of 5 years checked
LOM 1271	1995	1955	1	1	Active nest 1 of 2

Table 112. Reproductive History of Goshawks within the Ochoco Summit Analysis Area.

Post Fledgling Area	Year of last confirmed nesting	Year of first nesting record	Number of documented nest trees	Number of documented nest cores	Number of nest attempts with young, years surveyed
					years checked
LOM 1222	2009	1995	2	1	Active nest 3 of 3 years checked
LOM 1285	1995	1995	2	1	Active nest 1 of 2 years checked
LOM 1219	2009	1995	2	1	Active nest 3 of 4 years checked
LOM 0249	1998	1981	2	2	Active nest 2 of 6 years checked
LOM 5113	2009	2009	1	1	Active nest 1 of 1 years checked
LOM 1172	2009	2009	1	1	Active nest 1 of 1 years checked
LOM 0244	2012	2010	3	1	Active nest 2 of 2 years checked
LOM 5114	2011	2011	2	1	Active nest 1 of 1 years checked
PAU 3263	2002	1997	2	1	Active nest 2 of 3 years checked
PAU 1846	1989	1989	1	1	Active nest 1of 2 years checked
PAU 3243	1999	1998	1	1	Active nest 1 of 6 years checked
PAU 3270/3271/3427	2004	2001	3	1	Active nest 3 of 3 years checked
PAU 3260/3261/3262	2002	1999	3	1	Active nest 2 of 5 years checked
PAU 3252	2002	1999	2	1	Active nest 2 of 5 years checked
PAU 3256	2002	1998	1	1	Active nest 2 of 3 years checked
PAU 2367/3247/3248	2002	1998	3	2	Active nest 5 of 5 years checked
PAU 3266/3431	2002	2000	2	1	Active nest 3 of 4 years checked
PAU 3259	2002	1998	1	1	Active nest 3 of 5 years checked
PAU 2370/3272/3428	2002	1996	4	2	Active nest 5 of 7 years checked
PAU 2368/3244	2005	1998	2	2	Active nest 4 of 6 years checked
PAU 3432/3433	2010	2000	3	1	Active nest 3 of 4 years checked
PAU 3251/3438	unknown	unknown	2	1	Active nest 0 of 4 years checked

Sharp-shinned and Cooper's Hawks

Sharp-shinned and Cooper's hawks are both ranked S4, Apparently Secure in the state of Oregon (NatureServe 2009). For sharp-shined hawks small declines may be attributed to loss of preferred

young dense forest stands in boreal forest due to logging, and pesticides (NatureServe 2009). The use of pesticides on farmlands and loss of habitat are the major threats for Cooper's hawks (NatureServe 2009).

Both species are closely associated with deciduous and mixed coniferous forests, open woodlands, and riparian woodlands. They can occur in large forests but are more likely to be found near forest edges and clearings near lakes or streams. In a study in eastern Oregon, Reynolds (1983) found nesting sharp-shinned hawks to use 25-50 year-old even-aged conifer stands while Cooper's hawks used 30-70 year old even-aged conifer stands with somewhat larger and more widely spaced trees than those stands used by sharp-shins. Reynolds also reported the mean distance between the nearest nesting neighbors was 4.1 km. (2.5 miles) for sharp-shins and 4.7 km (2.8 miles) for Cooper's hawks. Both species are adapted to catch avian prey but each would also capture small mammals, lizards and various large insects and amphibians (Johnsgard 1990). Home range estimates were 1,590 hectares (3,975 acres) for Cooper's hawks and 460 hectares (1,150 acres) for sharp-shin hawks in Oregon (Reynolds 1983). Reynolds et al. (1983) studied accipiter nest sites in eastern Oregon and determined the mean canopy cover for sharp-shinned nests was 68 percent and 64 percent for Cooper's hawks, although the range extends from 20-95 percent for sharp-shins and from 15-100 percent for Cooper's. Both species select nest placement well up in the tree canopy for nest concealment or shading during warm temperatures (Moore and Henny 1983; Reynolds et al. 1983). Dense vegetation provides screening cover and physical protection from predators and predation may account for the high foliage density in the immediate vicinity of the nests of sharp-shins and Cooper's hawks (Reynolds et al. 1982).

The wildlife sighting database lists 20 sightings and 11 nests for Cooper's hawks in the project area. While there are 8 recorded sharp-shinned sightings and 1 documented sharp-shinned nest within the project area. The sightings came from general observations during other forest management activities as well as during surveys for northern goshawks. There is considerable overlap of habitat for each species and habitat. Formal surveys have not been conducted specifically for either species and reported observations are the results of random observations and responses from conducting northern goshawk surveys.

Red-tail Hawk

Red-tail hawks are widely distributed across North America and winter from southern Canada south into the United States and Central America. Red-tail habitat consists of large snag or deformed trees on forest edges, open country interspersed with forests, and suitable perches (trees, utility poles, outcrops etc). They are known to use agriculture land, clearcut harvest units, grasslands, woodlands and alpine environments (Marshall et al. 2003). It uses any habitat that has perches to hunt from and open enough to capture its prey on the ground. Small mammals, such as rabbits, hares, and mice provide the bulk of their diet. They are also known to capture birds, reptiles, and amphibians. Red-tails use a wide variety of structures for nests, including trees, utility poles and cliffs (Marshall et al. 2003). They place their nests higher in trees than other raptors, and generally select larger trees or smaller deformed trees where branch structure supports this higher placement. The red-tail hawk has increased in numbers and expanded its range since Euro-American settlement (Marshall et al. 2003). Red-tailed hawks are ranked S5, Secure in Oregon (NatureServe 2009).

Red-tail hawks are common and widely scattered on the Forest. District wildlife sighting records list numerous red-tail hawk observations and 12 nests scattered across the project area. Private forestlands in the project area are likely to provide suitable habitat for red-tail hawks, where overstory trees provide nest sites situated within open forests and grasslands.

Golden Eagle

Refer to the MIS section for the discussion of golden eagles.

Osprey

Ospreys are good biological indicators of ecosystem health, because they are long-lived and are the top predator of aquatic food webs (USGS 2005). Various fish species comprise 99 percent of their diet. Ospreys dramatically declined in abundance through the mid-1970s, as a side effect of pesticide use, but have since recovered and become a common nesting species along the Columbia and Willamette waterways in western Oregon (USGS 2005). Osprey nesting habitat consists of forests that have large live or dead tree components for nesting near bodies of fish bearing water. They nest within two miles of fish bearing bodies of water and generally nest in larger broken top live trees or snags, but also utilize utility poles, man-made Canada goose nest boxes, channel markers and other manmade structures where natural structures are lacking (Marshall et al. 2003). The primary habitat requirements of osprey include a dependable source of fish that can be captured near the surface and an elevated nesting platform within a few kilometers of their food supply. Ospreys are migratory, typically arriving in the area in April and May and they stay into early autumn until fall migration. While the pair would mate for life, they migrate separately and re-unite at their nest site the following spring. The birds winter in central California south into Central and South America. They are currently ranked as S4 in Oregon, Apparently Secure (NatureServe 2009). NatureServe (2009) listed the following as major threats to ospreys: (1) pesticides, (2) gunshots, (3) steel traps, (4) impact with or electrocution by high-tension wires, and (5) being caught or drowned in nets (Wiemeyer et al. 1980, cited in Henny and Anthony 1989).

There are 7 known osprey nests located in the project area or adjacent to it. These are scattered across the project area in proximity to fish bearing streams, ponds and reservoirs. There is not a concentration of nests within the project area like there are along some of the more productive water bodies in Central Oregon.

Some of the nesting ospreys occupy territories that include high recreational use or residential areas, such as near Walton Lake Campground, Allen Creek Reservoir and Marks Lake. Other pairs have nests in more remote locations such as along the North Fork of the Crooked River and at various small ponds. It is assumed that where there is high recreational use in osprey territories, nests have either been abandoned or if in use, ospreys have become tolerant or habituated to the activity.

Prairie Falcon

Refer to the MIS section for the discussion of prairie falcons.

Other Hawks

Other species of hawks are found in the project area, particularly during migration. Some occupy habitat in the area during nesting season, while others may winter in the area or pass through during spring and fall migration.

District wildlife sighting records list 3 observations and 1 nest for American kestrel; 3 observations of northern harrier; 2 peregrine falcon sightings; 2 rough-legged hawks scattered within the project area. Private forestlands in the project area are likely to provide suitable habitat for these raptors that prefer open country dominated by open forest or shrub and grassland habitat.

Long-eared Owl

District wildlife sighting records list 2 records of long-eared owl within the project area. Private forestlands in the project area are not as likely to provide suitable habitat for long-eared owls, as this species tends to select very dense stands with an abundance of dwarf mistletoe in Douglas fir, where they are adjacent to open forests, shrublands and grasslands.

Great-horned Owl

District wildlife sighting records list 20 records of great horned owls, including 1 nest scattered across the project area. Private forestlands in the project area are likely to provide suitable habitat for this species where old hawk nests, hollow trees, caves or buildings provide nest sites situated within a mosaic of open forest or woodland mixed with open areas.

Great Gray Owl

District wildlife sighting records list 3 records of great gray owl observations in the project area, all in the vicinity of Lookout Mountain. This species finds suitable nesting habitat where dense stands of timber with broken-topped soft snags occur adjacent to open grassy areas with abundant small mammals (gophers and voles). These conditions are present in portions of the project area.

Other Owls

District wildlife sighting records list four observations and one nest for barred owl; two records of boreal owl; two records of flammulated owl; 14 northern pygmy owl records; and four northern saw-whet owl records scattered across the project area. These species select from a variety of habitat types from low elevation woodlands to high elevation subalpine forests. The project area does contain a variety of habitat types capable of supporting a variety of owl species. Private forestlands in the project area are likely to provide suitable habitat for flammulated, pygmy and saw-whet owls, but are less likely to have suitable habitat for boreal owls, which typically reside in high elevation stands where spruce and lodgepole pine area common.

Effects to Raptors

There is conflicting science when assessing the human disturbance effects on raptors. Gunnison National Forest Travel Management Plan, USDA (2001) and Hamann et al. (1999) suggested in both their literature reviews that sensitivity occurs near nest sites and mainly affects eggs or young. Direct activities, such as noise from vehicles, could disturb these species during nesting and foraging and may negatively affect them. These species may be sensitive to prolonged OHV use adjacent to their nest. USDA (2001) and Hamann (1999) also found prolonged disturbance during nesting season may result in nest and young abandonment and increased stress levels. Both findings suggest possible recreational disturbances affect raptors by causing parents to desert young or eggs, exposure of unprotected egg or nestling to weather, avian nest predation, or nestling leaving the nest prematurely; recreation on cliffs may cause accidental pushing of nests off cliffs (Hamann et al. 1999). Also, cross-country motorized travel could lead to disturbance that disrupts pair-bonding and increases adult energy expenditures.

Some studies have found that walking straight to a birds' nest (including raptors) is more disruptive than vehicle or OHV use (Lee 1981; Skagen 1980; Holmes et al. 1993; Burger and Gochfeld 1991; Gill et al. 1996). Specifically, in a northern goshawk and Cooper's hawk study conducted by Lee (1981), female goshawk did not show signs of agitation or flushing from snowmobiles until the riders stopped and got off their machines. In another observation, Lee (1981) found that female hawks did not flush from nests when motorcycles passed by; the author suggested that hawks may become habituated to moving machines, and may tolerate disturbances such as hikers, snowmobiles, motorcycles, and horseback riders so they can keep territories that meet resource needs.

Flecher et al. (1999) conducted a raptor study in Colorado riparian corridors that included some recreation trails. They found red-tailed hawk abundance was similar between the controlled sites to the trail sites. They concluded red-tailed hawks seem to tolerate human activity along the recreational trails. A study of red-tailed hawks in Wasco County, Oregon found that normal human activity did not affect red-tailed hawk reproductive success; additionally, the presence of dwellings or frequently travelled roads and the locations of nests near roads had no significant effects and compensation for normal human activities was not necessary for estimates of reproductive success (Janes 1984). Additionally, raptors have been known to use small two-track roads and trails that experience low use

and have existing canopy cover on the sides as foraging habitat (Flecher at al. 1999, St. Pierre 2008). Some avian scavengers prefer to use these types of open areas because vegetation may hide potential predators while they are feeding (Skagen et al. 1991).

Ospreys nest around lakes with high human activity (including fishing, boating, OHV use, snowmobile use, camping, hiking, biking, and bird viewing) but still can be sensitive to the recreational disturbances, especially in remote areas (Hamann 1999; Poole 1981). During recreation seasons, ospreys have been known to keep territories with low level of human activity (Levenson and Koplin 1984). The more remote the nest location is the higher probability of an osprey is to flush when disturbed; flushing can increase risk during hatching and raising young, causes adult ospreys to expel needed energy, and leaves the egg or nestling at risk of exposure to weather and predation (Reese 1991). User-created routes can decrease habitat by providing increased access to snags and other deadwood for firewood harvest (USDA 2001), which could affect osprey habitat.

Direct and Indirect Effects Common to All Alternatives

Existing and potential disturbance from vehicle use on roads and motorized trails and the associated fragmentation (edge effect) was modeled. The assumption was disturbance would continue within the road effect zone (660 feet or 200 meters each side of roads or motorized trails) for the OHV travel system described in each alternative. Decreased habitat quality, reduced reproductive potential, and avoidance of the road effect zone are potential effects as a result of habitat alteration physically or due to disturbance. The acres within the 660 foot disturbance band (200 m) displayed in **Table 113** are based on additional trail placement, but do not reflect improvements from mitigations. Disturbance would decrease beyond the road or motorized trail effect zone for each alternative and as a result, habitat quality and amount would increase in areas more distant from motorized routes. Disturbance would decrease in areas where existing road closures are reinforced, user-created trails are rehabilitated and new road closures are implemented under the action alternatives.

Table 113 illustrates the amount of potentially disturbed nesting habitat for the northern goshawk, osprey and other raptors. The increase in potential disturbed area is directly related to the change in roads and trails open for motorized use in proximity to known nest sites.

Alternative 1

The current level of disturbance to raptors, whether they are habituated or not, would be most likely to continue until the Travel Management Rule is fully implemented as no physical reinforcement of existing closures would be done under this alternative. Several studies have suggested that walking straight to a bird nest (including raptors) is more disruptive than vehicle or OHV use (Lee 1981; Skagen 1980; Holmes et al. 1993; Burger and Gochfeld 1991; Gill et al. 1996). The majority of the existing open road network in the project area has been in place for several years or more, and some level of habituation to motorized traffic has probably occurred for nesting red-tailed hawks since 8 nests are documented in the project area in proximity to open roads.

Off-road travel is unlikely to occur early in the nesting season in the majority of the project area due to elevation and snowpack, but is fairly common in much of the project area in the middle of the nesting season and later as snowpack recedes and firewood cutting season opens. Exceptions can occur during vegetation management actions that require snowplowing to access treatment units. Off-road foot travel increases substantially during the big game archery season, which starts after the critical period of raptor nesting season.

Action Alternatives

There are 0.25 miles of designated trail system within 660’ of hawk nests on existing open roads in Alternative 2. There are also designated trail segments within ¼ mile of osprey nests as follows: 0.6 miles in Alternative 2; 0.5 miles in Alternative 3; and 0.5 miles in Alternative 4. Within ¼ mile of goshawk nests there are 3.0 miles in Alternative 2; 1.5 miles in Alternative 3 and 2.8 miles in

Alternative 4. The lengths of trail system within proximity to raptor nests are displayed in **Table 113**. Some of these trail system miles within distance bands around raptor nests are on existing open roads.

Table 113. Raptor Nest Buffer Impacts within the Ochoco Summit Analysis Area.

Raptor Species	Buffer Radius	Alternative 1	Alternative 2	Alternative 3	Alternative 4
goshawk	¼ mile	0	3.0 miles	1.5 miles	2.8 miles
osprey	¼ mile	0	0.6 miles	0.5 miles	0.5 miles
Other raptor	660’	0	0.25 miles	0	0

For each of the action alternatives the amount of undisturbed habitat changes due to the opening up of trails on closed roads, construction of new trails, closing of roads and defining which roads and trails would become part of the trail system. Studies have shown that human activity near a nest site, e.g. walking around or stopping vehicles, has more of an effect than OHV use, riding by a nest (Lee 1981; Skagen 1980; Holmes et al 1993; Burger and Gochfeld 1991; Gill et al. 1996). For this reason stationary long duration activities such as construction and maintenance activities would be restricted seasonally where in proximity to active raptor nests as shown in Table 4.

Although new trail construction has potential to remove snags with potential for nesting, a very limited amount would be removed, compared to the snags available on a landscape basis. Only those that are within the tread of the trail, leaning toward the trail, or within striking distance of a staging area or trailhead would be felled. Due to the very limited circumstance and scope of snag felling operations, control of where motorized activity would occur, action alternatives would have a negligible effect to osprey and red-tailed hawk.

Cumulative Effects - Raptors

Once the Travel Management Rule is fully implemented, action alternatives should result in a decrease of disturbed habitat when compared to Alternative 1. This would be the result of the combined effect of existing road closure reinforcement and rehabilitation of user-created trails in combination with implementation of the forest-level Travel Management Plan. Motorized travel would then be limited to designated motorized routes and potential for users to forge new routes into existing known or unknown nest sites off of mixed use roads and designated trails would be reduced.

Recent and ongoing vegetation management projects that overlap the project area, (including Spears, Canyon, Howard Elliot Johnson, Zane, Jackson and Deep Restoration) are designed to return many forested stands back to sustainable conditions that can withstand appropriate disturbance processes. These projects would mostly reduce the density of understory trees and apply prescribed fire where appropriate, with the objective of maintaining large trees on the landscape. Implementation of these large scale projects include several years of activity involving multiple timber sales, stewardship projects, force account project work and service contracts. The planned projects would reduce the amount of dense structured forested stands the goshawk, Cooper’s hawk and sharp-shinned hawk prefer for nesting. However, ongoing and planned vegetation management projects include mitigation measures such as no harvest nest buffers and seasonal restrictions on disturbing activities, and portions of each planning area would remain unharvested, which could provide suitable nesting stands for these species.

Mitigation measures planned for active and proposed vegetation management projects include protection of active nest sites by application of a seasonal restriction for timber harvest and post-sale activities, as well as potentially disturbing non-commercial treatments. This should reduce potential for additive effects to occur during the nesting season. Because large diameter trees would be maintained in each project, nesting habitat would be provided for osprey, golden eagles and red-tailed hawks. Because prescribed burning tends to reduce soft snag abundance and reduce tree density, less nesting habitat would be available for great gray and other forest dwelling owls in treated areas. On the other hand, species that prefer to forage in open areas such as great-horned owl and red-tailed

hawk would benefit from commercial thinning. This project would have very little direct effect on existing or potential nesting habitat due to the small scale of impact to the vegetation and supporting land base compared to what is available at the landscape scale. It is not expected that implementation of the Ochoco Summit OHV project in conjunction with overlapping or adjacent vegetation management actions would lead to a change in populations of raptors across the project area because suitable habitat would be provided at the landscape scale with little change resulting from this project, and as shown in Table 90, the action alternatives result in less than a 5% increase in area within 200m (660 feet), and less than 2% increase in lands less than ½ mile from motorized routes. In addition, proposed closures offer better access management, including some existing routes in proximity to known raptor nests.

Land Birds

The Migratory Bird Treaty Act of 1918 (MBTA) implements various treaties and conventions between the U.S., Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. The U.S. Fish and Wildlife Service (FWS) is the lead federal agency for managing and conserving migratory birds in the United States. The BLM and USFS have implemented management guidelines that direct migratory birds to be addressed in the NEPA process. In January 2001, President Clinton issued an executive order (E. O. 13186 (66 Fed. Reg. 3853) on migratory birds, directing federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. A Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service and the Department of Agriculture, Forest Service was signed in late 2008 to conserve migratory birds including taking steps to restore and enhance habitat, prevent or abate pollution affecting birds, and incorporating migratory bird conservation into agency planning processes: 1) when developing, amending or revising management plans for national forests and grasslands, and 2) within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors. For this project analysis species of management concern are evaluated based on those species listed by USFWS as “Birds of Conservation Concern” and those species listed as “Focal Species” in the Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman, 2000).

Birds of Conservation Concern

The “Birds of Conservation Concern 2002” (BCC) revised in 2008 identifies species, subspecies, and populations of all migratory and resident birds not already listed under the Endangered Species Act of 1973 that represent the highest conservation priorities and are in need of additional conservation actions. While all of the bird species included in the BCC are priorities for conservation action, the list makes no finding with regard to whether they warrant consideration for ESA listing. The goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions.

Bird Conservations Regions (BCRs) were developed based on similar geographic parameters. The map below displays all the BCRs in North America. Only two BCRs overlap the Ochoco Summit OHV project project area: BCR 9 (Great Basin) and BCR 10 (Northern Rockies). The table below displays Birds of Conservation Concern species associated with BCR 9 and BCR 10 along with their preferred habitat and whether suitable habitat is present in the project area. A coastal species (yellow-billed loon) is not expected to occur within the project area is not included in the tables and will not be discussed further in this document.

The Great Basin (BCR 9) is a large and complex region that includes the Northern Basin and Range, Columbia Plateau, and the eastern slope of the Cascade Range. This area is dry due to its position in the rainshadow of the Cascade Range and the Sierra Nevada. Grasslands, sagebrush, and other xeric shrubs dominate the flats and lowlands, with piñon-juniper woodlands and open ponderosa pine

forests on higher slopes. Lodgepole pine/sub-alpine fir forests occur at higher elevations on north-facing slopes. Several substantial lowland wetlands are extremely important to shorebirds, including breeding American Avocet; Black-necked Stilt; and Willet, migrating Wilson's Phalarope, and other water birds, notably Eared Grebe. The region is also important for breeding Mountain Plover and Snowy Plover. Most of North American breeding White-faced Ibis and California Gulls nest in marshes and lakes scattered across the region. The Great Salt Lake and adjacent marshes host large numbers of American White Pelican, Cinnamon Teal, Northern Pintail, Redhead, Tundra Swan, and other waterfowl and many species of migrant shorebirds. Sage Grouse, Sage Sparrow, Sage Thrasher, and Brewer's Sparrow are priority land birds of lowlands, with White-headed Woodpecker, Flammulated Owl, and Cassin's Finch leading the list of characteristic birds of the region's pine forests.

The Northern Rockies (BCR 10) includes the Northern Rocky Mountains and outlying ranges in both the United States and Canada, and also the intermontane Wyoming Basin and Fraser Basin. The Rockies are dominated by a variety of coniferous forest habitats. Drier areas are dominated by ponderosa pine, with Douglas fir and lodgepole pine at higher elevations and Engelman spruce and subalpine fir even higher. More mesic forests to the north and west are dominated by western larch, grand fir, western red cedar, and western hemlock. High priority forest birds include the Flammulated Owl, Lewis' and Black-backed Woodpecker, Olive-sided Flycatcher, Townsend's Warbler, Rufous Hummingbird, Black Swift, and Blue Grouse. Barrow's Goldeneye, Harlequin Duck, and Trumpeter Swan breed in high-elevation lakes and streams. The Wyoming Basin and other lower-lying valleys are characterized by sagebrush shrubland and shrubsteppe habitat, much of which has been degraded by conversion to other uses or invasion of non-native plants. High priority birds include Sage Grouse, Ferruginous Hawk, Brewer's Sparrow, and Sage Thrasher.

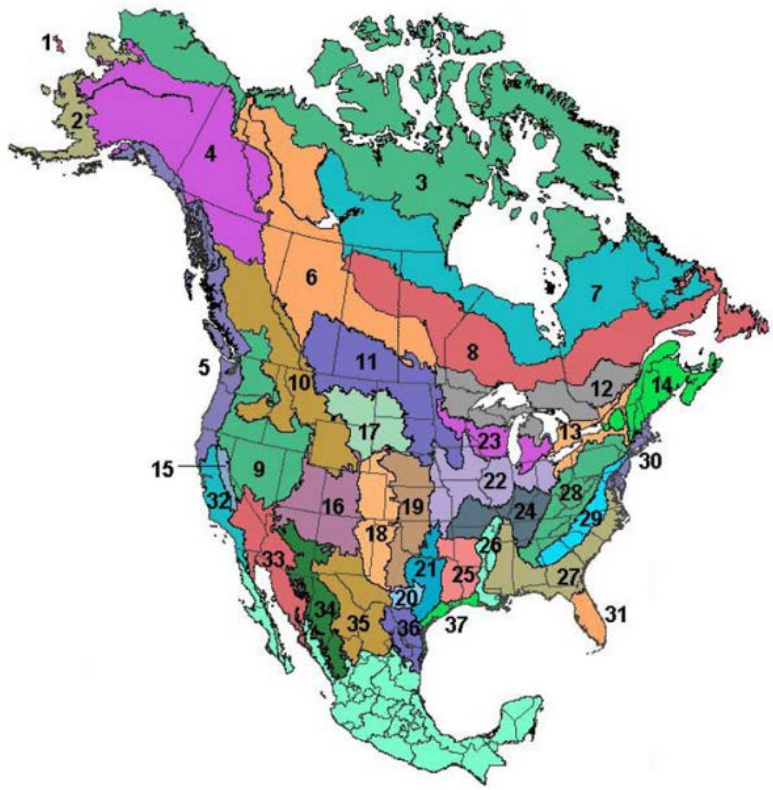

Figure 4. Bird Conservation Regions.

Table 114. Bird Conservation Regions 9 and 10 (combined) 2008 List.

Bird Species	Preferred Habitat	Habitat in Ochoco Summit OHV Project Area
Greater Sage Grouse (Columbia Basin DPS) (a)	Sagebrush dominated rangelands with bunchgrass/forb understory, and limited or no tree cover	Yes
Eared Grebe (nb)	Nests near shore on small freshwater lakes and reservoirs with emergent vegetation	Yes
Bald Eagle	Nests in large conifers usually near lakes, reservoirs or rivers	Yes
Ferruginous Hawk	Sagebrush-shrub steppe or bunchgrass prairie and low tree density	Yes
Swainson's Hawk	Open country, prairies and irrigated farmland	Yes
Golden Eagle	Elevated cliff or open grown tree nest sites in open country	Yes
Peregrine Falcon (b)	Cliffs or rock pinnacles with ledges or caves	Yes
Yellow Rail	Marshes with shallow water 4,100 to 5,000 ft elevation	No
Snowy Plover (c)	Dry, open, sandy beaches, alkali flats or salt ponds	No
Long-billed Curlew	Open grassland areas	Yes
Marbled Godwit (nb)	Grassy meadows near lakes and ponds, migrant (irregular E. OR)	No
Upland Sandpiper	Montane meadows 1,000 to 3,000 acres at 3,400 to 5060 ft. elevation surrounded by pine	Yes
Yellow-billed Cuckoo (w. U.S. DPS) (a)	Large expanses of dense riparian forest/cottonwoods	No
Flammulated Owl	Ponderosa pine forests with open understory and patches of saplings or shrubs	Yes
Black Swift	Cliffs associated with waterfalls	No
Calliope Hummingbird	Open mountain meadows, open young forests, meadow edges, and riparian areas	Yes
Lewis's Woodpecker	Open forests with brushy understory, dead and down wood	Yes
Williamson's Sapsucker	Open ponderosa pine and mixed forests with snags	Yes
White-headed Woodpecker	Mature, open ponderosa pine forests with snags	Yes
Willow Flycatcher (c)	Breeding habitat is dense shrubs and/or tall herbaceous vegetation especially riparian willow thickets	Yes
Olive-sided Flycatcher	Open conifer forests and edges with scattered tall trees and snags	Yes
Loggerhead Shrike	Open country with scattered juniper trees, tall shrubs	Yes
Pinyon Jay	Juniper, juniper-ponderosa pine transition, and ponderosa pine edge with sagebrush or juniper	Yes
Sage Thrasher	Big sagebrush, shrublands of greasewood, shadscale and rabbitbrush.	Yes
Virginia's Warbler	High elevation, steep shrublands, juniper or mountain mahogany woodlands, SE Oregon	No
Green-tailed Towhee	Vigorous shrub stands with high shrub species diversity on mountainsides and high plateaus	Yes
Brewer's Sparrow	Sagebrush shrublands, clearings with shrubs in coniferous forests	Yes
Black-chinned Sparrow	Dry slopes and rocky hillsides, sagebrush steppe,	

Table 114. Bird Conservation Regions 9 and 10 (combined) 2008 List.

Bird Species	Preferred Habitat	Habitat in Ochoco Summit OHV Project Area
	desert shrub	Yes
Sage Sparrow	Semi-open sagebrush up to 6,800 ft elevation	Yes
McCown's Longspur	Dry sparse prairies Great Plains, rare in Oregon and Washington	No
Tricolored Blackbird	Large expanses of cattails, bulrush, willow or tules	No
Black Rosy-Finch	Bare rock outcrops, cliffs and talus above timberline, rare in Oregon (SE Oregon)	No
Cassin's Finch	Open, mature forests and woodlands, coniferous or aspen	Yes
(a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR		

Landbird Strategic Plan

The Oregon and Washington Chapter of Partners in Flight (PIF) was formed in 1992 and has prepared a series of publications aimed at assisting private, state, tribal and federal agencies in managing for landbird populations. The Landbird Strategic Plan (January 2000) to maintain, restore, and protect habitats necessary to sustain healthy migratory and resident bird populations to achieve biological objectives. The primary purpose of the strategic plan is to provide guidance for the Landbird Conservation Program and to focus efforts in a common direction. On a more local level, individuals from multiple agencies and organizations within the Oregon-Washington Chapter of Partners in Flight participated in developing five publications for conserving landbirds in this region (Oregon and Washington). The strategy identifies conditions and habitat attributes important to landbird communities, describing the desired landscape based on habitat relationships of a select group of species (focal species). By describing habitat requirements and managing for the needs of focal species that are representative of important components in a functioning ecosystem, many other species and elements of biodiversity will also be conserved. A Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington was published in May 2000 (Altman, 2000) is one of five plans that cover all priority habitats for landbirds in Oregon and Washington. This strategy covers the geographic area of this project has been used since its development in planning and projects analysis on Ochoco National Forest.

General Effects to Land Birds

Literature is available that discusses vehicle and trail impacts to songbirds, also known as passerine species. Impacts known to affect songbirds are noise and distance from roads and trails. For example, noise can affect avian species by masking mating songs or communication calls (Konish 1970, Marler et al. 1973, Klump et al. 1984, Reynolds et al. 1992, Wollerman 1998 in AMEC 2005, and AMEC 2005). Species cannot hear territory calls, mating calls, or low frequency noise from predators with increased background noise from vehicles (Klump et al. 1984, Reijen and Foppen 1994, Montana TWS 1999, and Erbe et al. 1999 in AMEC 2005). Studies also found that the further away from the road or trail the more abundant the passerine species are (Sauvajot 1998, Miller et al. 1998, Forman 2000 and Barton and Holms 2006).

Romain-Bondi (2009) stated the common wildlife response to increased human activity is avoidance or displacement. The roads and trails may not provide enough protection/cover from predators and may not provide foraging and roosting areas for wildlife. Other variables that may impact wildlife include, but are not limited to noise, dust, speed, soil compaction, and possible harassment of wildlife (Romain-Bondi 2009, Ouren, 2007). The selection of Alternative 1 would result in no change in

motorized use in the project area. However, assuming some species displacement or individuals or pairs may occur, a disturbance buffer analysis was conducted as shown in Table 115. It was assumed all open roads are being used and a 200 m (660 feet) zone of disturbance was applied to each side of the motorized routes. This analysis showed 38 percent of the project area is within the disturbance zone although it is unknown if this level of disturbance is resulting in reduced nesting success in the project area. With Alternative 1 the existing open and closed roads and user created trails would be expected to continue having motorized use. Refer to the noise impacts discussion in the General Wildlife section of this Chapter. Based on a 200 meter (660 ft) distance band on each side of an open road, approximately 160 acres may be impacted by noise from open roads. However, this buffer may overestimate effects to these species based on the Ingerlfinger and Anderson (2004) study showing reduced species density within 100 meters (330 ft) from a roadside (80 acres per mile). On the other hand, the open road analysis does not include unauthorized use of closed, decommissioned or user created routes. In many cases traffic on these unauthorized routes may occur infrequently enough that the noise would not disrupt reproductive behavior or survival of passerine birds.

Among the open roads, there are multiple high speed paved or gravel roads with traffic volumes of ten or more motorized vehicles per day within the project area during nesting season. Nesting habitat 100 meters (330 feet) from these roads would likely experience similar disturbance levels Ingerlfinger and Anderson (2004) found in their study. While road volume does increase during the hunting seasons beginning in mid-August, the increase occurs after the nesting period for local passerine species.

A 200 meter (660 feet) each side road and trail disturbance zone was modeled to determine the area with potential noise disturbance for the entire project area. Due to the fact that the majority of motorized routes under any alternative are on or in proximity to existing open roads, there is only about a 5% difference in the amount of area within this disturbance zone between the action alternatives and a 6 to 11% difference between the action alternatives and the no action alternative. Results from the disturbance zone analysis across the project project area are displayed in Table 115. The addition of proposed trails to the existing network of open roads resulted in an increase in disturbance area of 3 to 5% across the project area. Under Alternatives 2, 3 and 4, the percentage of the project area within 200 m (660 feet) of an open motorized route is 42%, 41% and 43% respectively.

Table 115. Acres within 200 m (660’) of any open road or trail.

Alternative 1	Alternative 2	Alternative 3	Alternative 4
115,127	125,745	123,036	129,390

Alternatives 2, 3 and 4 would designate an official OHV trail system. Selected unauthorized roads and trails not designated as part of the system would be closed for motorized vehicle use. Improvement of existing road closures, and blockage of unauthorized and user created trails could result in improvement to local passerine species habitat by reduction of motorized disturbance along those routes that are closed. This potential improvement is not reflected in Table 115, as the disturbance band analysis was based on open system roads and did not include breached closures, user created routes and other unauthorized travel routes such as horse trails and non-system roads. OHV use is projected to increase 2 to 5 percent per year with the new system and open roads may also experience an increase in volume. The area within 200 m of a designated open road or trail should not increase as this level of use increases, but the intensity of disturbance on the designated network is expected to increase as the level of use increases.

Existing Condition of Individual Focal Species of Land Birds

Chipping sparrow: In Central Oregon, chipping sparrows can be found in open coniferous forests or stands of trees interspersed with grassy openings or low foliage and are found in good numbers in central Oregon in juniper, ponderosa pine, and lodgepole pine forests (Marshall et al. 2003). They are

associated with higher elevations are summer residents preferring open habitats with a shrub or regenerating pine component. Chipping sparrows occupy successional habitats after logging or burning because of an affinity for open, older stands of western mixed conifer forest (DeGraaf and Rappole 1995).

The current NatureServe Conservation Status Rank for chipping sparrows in Oregon is a S4, 'apparently secure,' and National 5, 'secure' and Global 5 'secure' (2009). Breeding bird surveys have shown that population declines of chipping sparrows have averaged 3.9 percent annually in Oregon due to a decrease in fire to maintained open woodlands but also due to cowbird brood parasitism and competition with house sparrows and house finches (Marshall et al. 2003). Chipping sparrows are known to occur on both Lookout Mountain and Paulina Ranger District, including locations within the project area for this project. Habitat for the chipping sparrow includes open canopied stands of lodgepole pine, ponderosa pine, Douglas-fir, or grand fir with tree diameters 10-15 inches or larger, especially where patches of regenerating pine seedlings and saplings are present. Such habitat is present in patches across the project area.

Vaux's swift: The Vaux's swift is associated with large snags in mesic mixed conifer forests. It is an aerial insectivore typically associated with late-successional forest and dependent on very large, hollow snags for nests and roosts. The best variables to predict Vaux's swift occurrence is the number of snags greater than 20 inches dbh and the number of tress with conks of Indian paint fungus (Bull and Beckwith, 1993). Conservation issues listed in the landbird plan include loss of large snags during intensive forest management and insufficient recruitment of large snags through harvest rotations. Habitat objectives include retention and development of snags greater than 27 inches dbh and 82 feet in height in different stages of decay, including hollow snags. Recommended conservation measures include retention of broken topped trees, especially those over 4' inches dbh, large snag retention and recruitment of replacement snags (large live trees with defect).

The current NatureServe Conservation Status Rank for Vaux's swift is Global G5 'secure', National N5B 'secure, breeding' and Oregon S5 'secure' (2009). Breeding bird surveys have shown state-wide population increases for Vaux's swift of 3.7 percent annually in Oregon (1966-1999), while Sharp (1992) estimated a 8.9% decrease on National Forests during the 1980's. The decline was attributed to harvest of late seral coniferous forests and conversion of stands of late seral grand fir dominated stands to early seral stands dominated by ponderosa pine which do not develop hollow tree structure as readily as grand fir does (Marshall et al. 2003). Vaux's swifts have been recorded on Paulina Ranger District, but not within the project area.

Townsend's warbler: The Townsend's warbler is associated with overstory canopy closure and understory structure in mesic mixed conifer forests. It foraged preferentially in grand fir and to a lesser extent larch and avoids ponderosa pine and Douglas-fir in northeastern Oregon. It has also shown a positive association with larger tracts of closed canopy forests than in stands with more perimeter (edge). Conservation issues listed in the landbird plan include loss of habitat where restoration of historic dry forest conditions return current stands of mixed forest to open pine dominated stands. Habitat objectives include where ecologically appropriate, retain patches of mixed conifer forest at least 100 acres in size, with greater than 50% crown closure and with late successional conditions (mature and old-growth forest) dominate by grand fir or Douglas-fir. Recommended conservation measures include designation of unmanaged or lightly managed areas where overstory canopy closure is emphasized.

The current NatureServe Conservation Status Rank for Townsend's warbler is Global G5, 'secure', National N5B 'secure, breeding' and NNRN 'not ranked, nesting' and Oregon S4 'apparently secure' (2009). The Townsend's warbler has greatly increased in abundance in the Blue Mountains as a result of fire suppression and subsequent increases in understory Douglas-fir and grand fir (Marshall et al.

2003). Townsend's warblers are known to occur on both Lookout Mountain and Paulina Ranger District, including locations within the project area for this project.

Varied thrush: The varied thrush is associated with structurally diverse, multi-layered canopy conditions in mesic mixed conifer forests. It is an omnivore that gleans understory debris in dense, older, mesic mixed conifer stands, especially in wet sites with closed canopy above 3000' elevation. Conservation issues listed in the landbird plan include loss of structural complexity, canopy layering and organic matter on the forest floor due to forest management practices. Several studies indicate that this species is area sensitive and avoids edges (McGarigal and McComb, 1995, Manuwal and Pearson, 1997). Habitat objectives include retaining blocks of late successional forest at least 75 acres in size; retention of patches with high canopy closure (greater than 60%), and with multiple tree layers with mixed species composition including at least 25% deciduous vegetative cover for dense leaf litter. Recommended conservation measures include maintaining large tracts of forested stands to reduce the amount of edge and fragmentation; conduct thinning from below to enhance diversity in forest structure, to enhance survival of suppressed and intermediate trees, and to promote growth; conduct thinning in conjunction with underplanting where necessary to increase tree layering and species diversity; and retaining or planting native berry and fruit producing shrubs in the understory.

The current NatureServe Conservation Status Rank for varied thrush is G5 globally 'secure', N5 nationally 'secure' and Oregon S4 'apparently secure' (2009). Breeding and wintering abundance varies cyclically every 2 to 5 years. Though the overall population trend is declining in Oregon, Washington and Northern California, its status east of the Cascades is unknown (Marshall et al. 2003). Varied thrushes are known to occur on both Lookout Mountain and Paulina Ranger District, including locations within the project area for this project.

MacGillivray's warbler: The MacGillivray's warbler is an indicator for dense shrub layer in forest openings or understory in mesic mixed conifer forests. This species is more common in open-canopy stands and regenerating forests than in closed canopy stands and are positively associated with wood shrubs up to 15 ft in height. In grand fir forests of the Blue Mountains they are associated with well-developed understories of shrubs, seedlings and saplings. Habitat objectives include where ecologically appropriate manage stands to tree canopy cover and herbaceous ground cover to less than 25% each, and dense understory shrub cover of greater than 40% and 270 stems/acre (including shrubs, seedlings and saplings). Recommended conservation measures include grazing management to achieve habitat objectives described above.

The current NatureServe Conservation Status Rank for MacGillivray's warbler is G5 globally 'secure,' N5B nationally 'secure, breeding' and Oregon S4 'apparently secure' (2009). According to Marshall et al. (2003) loss of riparian habitat and forest management practices that are intended to return stand conditions to open understory may have, or are likely to result in local population declines east of the Cascades. Breeding bird surveys have shown conflicting population trends between states and regions within the Oregon range depending on trends in forest practices that provide or remove shrubland habitat. Grazing, fire and herbicide treatments have also been identified as threats to this species (Marshall et al. 2003). MacGillivray's warblers have been recorded in every county in Oregon, and breeds throughout the Blue Mountains (Marshall et al. 2003). There are records for this species on Ochoco National Forest in the vicinity of Mt. Pisgah and along the Barnhouse Breeding Bird Survey route, part of which is in the project area.

Olive-sided flycatcher: The Olive-sided flycatcher inhabits montane and northern coniferous forests up to 3,000 meters in elevation, especially in burned-over forest areas with tall standing dead trees (DeGraaf and Rappole 1995). In Oregon this flycatcher is a summer resident that breeds in low densities throughout coniferous forests. The olive-sided flycatcher is an aerial insectivore that prefers forest openings or edge habitats where forest meets meadows, timber harvest units, rivers, bogs or marshes (Marshall et al. 2003). The current NatureServe Conservation Status Rank for the olive-sided

flycatcher in Oregon is a S3B, 'breeding vulnerable,' National 4B, 'breeding apparently secure' and Global G4 'apparently secure' (2009). NatureServe (2010) stated that fire suppression throughout the breeding range has limited the acreage of available habitat. It also reports that the species is "apparently secure" globally although at risk from deforestation on wintering grounds in Central and South America.

This flycatcher is considered a contrast species using old forests for nesting and either openings or gaps in old forests for foraging. Large trees and snags are preferred habitat elements for the olive-sided flycatcher (Romain-Bondi 2009). The species is positively associated with recent burns (Hejl 1994 cited by Wisdom et al. 2000).

Veery: The veery is associated with understory foliage and structure in riparian woodlands. In the Blue Mountains hawthorne, dogwood and willow are listed as important. Though black hawthorne is listed as encountered in the Blue and Ochoco Mountains (USFS, 1992), it is an uncommon species and generally limited in distribution on Ochoco National Forest. Dogwood and willow are widely distributed across riparian habitats within the project area.

The current NatureServe Conservation Status Rank for veery is Global G5 'secure', National N5B 'secure, breeding' and Oregon S4?B 'apparently secure, inexact numeric rank, breeding' (2009). According to Marshall et al. (2003) the Ochoco Mountain breeding colonies have remained relatively small and isolated for at least 30 years, and that population trends for breeding birds in Oregon remain relatively unknown. Breeding bird surveys have shown that this species is an uncommon breeder at low to middle elevations in the Blue Mountains, where sufficient riparian thickets exist, and that they are uncommon and local in Crook County (Marshall et al. 2003). Sightings of veery have been recorded on Lookout Mountain Ranger District in the vicinity of Ochoco Ranger Station, which is within the project area for this project.

Willow flycatcher: Marshall et al. (2003) describe the willow flycatcher as a relatively late-arriving migrant to Oregon that is associated with shrub-dominated habitats, especially riparian willow thickets. Breeding habitat is characterized by dense shrubs and/or tall herbaceous plants with scattered openings of shorter herbaceous vegetation. Marshall's et al. (2003) book *Birds of Oregon* displays a map showing locations of willow flycatchers by county. In the project area reproductive potential ranges from none to probable, with no confirmed nesting. Three requirements for willow flycatcher habitat are large meadow size, water and willows (Sanders and Flett 1989). Nest sites tend to be in shrubs or other shrub-level vegetation within a few feet of the ground. Territories tend to be small approximately one acre. Diets have not been studied in Oregon but the species is an aerial insectivore that feeds primarily on the wing and occasionally gleans (Sedgewick 2000 cited in Marshall et al. (2003). Factors indicated as a conservation concern include loss and degradation of the quality of riparian shrub habitats from altered hydrologic regimes, disturbance, and loss of habitat from overgrazing, and cowbird parasitism. Proposed conservation strategies are to increase width of riparian shrub zones through plantings, discourage aggregations of livestock near riparian areas, and eliminate willow cutting and herbicide use in the riparian zone. The current NatureServe Conservation Status Rank for willow flycatcher in Oregon is a S4, 'apparently secure', National NNR, 'unranked nationally' and Global G5T5 'secure' both at the species level and at the Oregon/Nevada subspecies level, (2009).

Nesting habitat consists of riparian areas with the presence of dense willow clumps, or other shrubbery, and uplands. Nesting uplands are low elevation valleys to high mountain areas in early seral stages of high conifer dominated stands (Marshall et al. 2003). The project area contains very limited acreage of dense willow thickets. However, there are a few pockets with well-established willows along meadow edges in or near Big Summit Prairie and Little Summit Prairie. Observations of willow flycatchers have not been reported within the Ochoco Summit OHV project area or elsewhere on Lookout Mountain or Paulina Ranger Districts.

Hermit thrush: The hermit thrush is a summer resident preferring mid to high elevation mature and old growth forests. It breeds in mature forests of all types especially those with a shaded understory of brush and small trees ranging from aspen groves to juniper woodlands to moderately open coniferous forests. Gilligan et al. (1994) described the Hermit thrush as a fairly common summer resident in the Cascade, Siskiyou and Blue Mountains and uncommon in the Coast Range of Oregon. Hermit thrushes nest on the ground, in brush or small trees. It is an opportunistic ground forager, feeding on insects and an occasional reptile or amphibian (Marshall et al. 2003). During the winter months they are rarely seen east of the Cascades and tend to winter in the west-side lowlands and foothills along the coast. There appear to be no serious conservation problems at this time (Marshall et al. 2003). The current NatureServe Conservation Status Rank for hermit thrushes in Oregon is a S4, 'apparently secure', National N5, 'secure' and Global G5 'secure' (2009).

Though hermit thrush was identified as a focal species for subalpine forest as a unique habitat, this species may include all forested PAGs with tree diameters exceeding 10-15 inches with a dense canopy within Ochoco National Forest. Virtually all of the suitable habitat for this species in the project area is on National Forest System lands within the grand fir (mixed conifer), Douglas-fir and ponderosa pine PAGs. Within the Ochoco Summit project area suitable habitat is present all along the Ochoco Mountains, with nesting habitat located on Coyle Butte, Round Mountain, Lookout Mountain, Slide Mountain, Indian Butte, Mt. Pisgah, East Point, Peterson Point, Buck Point, Bear Mountain and all the moderate to high elevation, north and east facing, forested slopes in between. Very limited surveys have occurred on the project area, though there are numerous records from Breeding Bird Surveys on Paulina Ranger District.

Vesper sparrow: The Vesper sparrow is associated with steppe-shrubland habitat. It can be found in a variety of habitat types including grassland, sagebrush, fallow fields, montane meadows, juniper steppe, cropland, open woodlands and openings in forest habitat such as clearcuts. Habitat objectives include where ecologically appropriate initiate actions in steppe-shrublands to maintain or provide a mosaic of steppe and shrubland habitat with less than 10% tree cover. Recommended conservation measures include eliminating or restricting human access and livestock grazing in steppe shrublands that have been degraded.

The current NatureServe Conservation Status Rank for vesper sparrows is a G5T3 Global 'secure,' but with the Oregon subspecies ranking as 'vulnerable,' National N5B, N5N 'secure, breeding and non-breeding' for the species, but NNR 'unranked' for the Oregon subspecies. The federal status US ESA ranking of SC, 'species of concern' applies to the Oregon subspecies. The conservation status ranking in Oregon is S4B 'apparently secure, breeding' for the species, but S2B, S2N for the Oregon subspecies 'imperiled, breeding and non-breeding' (2009). Breeding bird surveys have shown that population trends in Oregon have been relatively stable long-term (1966-1996), but declining in the short-term (1980-1996). Declines are attributed to a variety of factors including agricultural conversion of grasslands and shrub-steppe habitat, changes in agricultural practices and trampling of ground nests. (Marshall et al. 2003). Vesper sparrows have not been recorded on either Lookout Mountain or Paulina Ranger District. However, they are listed as common in spring, summer and fall in "Common Birds or the Ochoco Region."

Effects of the Action Alternatives to Individual Species of Land Birds

This project would have very little direct effect on existing or potential nesting habitat of any of these landbird species due to the small scale of impact to the vegetation and supporting land base compared to what is available at the landscape scale in the vegetation type where each species is most likely to be found. The potential reduction of habitat types under each action alternative was estimated by determining how many miles of new trail (not on an existing road) would be created in each habitat type, and how many acres would need to be cleared for trail creation. Also, acres that would need to

be cleared in association with staging areas were estimated (the assumption is up to 5 acres per staging area would need to be cleared). These acre estimates are summarized in Table 116.

Table 116. Estimate of acres that would need to be cleared by action alternative for the Ochoco Summit OHV Trail System project.

Land Bird	Habitat Type	Alternative 2			Alternative 3			Alternative 4		
		Acres Cleared for New Trail	Acres Cleared for Staging Area	Total Acres of Habitat Reduced	Acres Cleared for New Trail	Acres Cleared for Staging Area	Total Acres of Habitat Reduced	Acres Cleared for New Trail	Acres Cleared for Staging Area	Total Acres of Habitat Reduced
Chipping Sparrow	Ponderosa Pine	16	35	51	8	15	23	19	35	54
Vaux's Swift; Townsend's Warbler	Grand Fir	40	5	45	28	5	33	55	5	60
Varied Thrush; MacGillivray's Warbler	Riparian Hardwood	.4	0	.4	.2	0	.2	.4	0	.4
Olive-sided Flycatcher; Hermit Thrush	All Forested PAGs	68	40	108	46	20	66	90	40	130
Veery; Willow Flycatcher	Alder/ Willow	.22	0	.22	.15	0	.15	.22	0	.22
Vesper Sparrow	Grassland, Meadow, Steppe/ Shrubland	17	0	17	6	0	6	21	0	21

Cumulative Effects

All action alternatives would designate an OHV trail system available for use, while the reasonably forseeable forest-level travel management plan would prohibit cross country travel and/or use of closed roads. Some user created trails not used for the designated system would be closed and rehabilitated. This would result in an increase in the amount of undisturbed nesting habitat in selected areas under all action alternatives. While local landbirds may still be subjected to motorized disturbance during the nesting season (May – July) increased levels of undisturbed nesting habitat would be available as compared to the existing condition where closed roads and non-motorized trails are currently receiving motorized use, and where cross country travel is occurring. Thus proposed closures and rehabilitation of user created trails, in combination with implementation of the forest-level travel management plan should result in improved amounts of undisturbed nesting habitat in the long run.

This project alone would have very little direct effect on existing or potential nesting habitat of local land birds due to the small scale of impact to the vegetation and supporting land base compared to what is available at the landscape scale in the ponderosa pine PAGs, and in comparison to the much larger vegetation management projects that overlap the project area. The Spears, Canyon, HEJ and Deep Vegetation Management projects propose a variety of activities to increase the dominance of open forest conditions in ponderosa pine, and improve riparian hardwood, grassland, meadow and steppe shrubland habitat types; vegetation management associated with these projects would reduce the amount of grand fir in treated units. Species associated with open forest, riparian hardwood and shrub, grassland, meadow and steppe shrubland habitats, including chipping sparrow, varied thrush, MacGillivray's warbler, olive-sided flycatcher, veery, willow flycatcher, and vesper sparrow should benefit from improved habitat conditions in the long run as a result of these vegetation management projects. These vegetation management projects may reduce habitat for Vaux's swift, Townsend's warbler, and hermit thrush, at least in the short-term.

All vegetation management projects in the project area include prescribed burning. These actions would reduce the amount of shrub and sapling habitat in the treatment units in the short term.

Although Project Design Features in the NEPA documents and burn plan prescriptions usually call for the retention of untreated patches for the nesting birds, small mammal habitat, and big game forage, these actions would reduce the amount of land bird habitat as a result of burning. Short term reduction of understory shrub and pine regeneration is a trade-off for the benefit of long term resiliency of the stands as a whole, as well as for the reduction in fuel loading and subsequent risk of loss to high intensity wildfire. Depending on the prescribed fire return interval some of the shrubs would regenerate and provide nesting habitat until prescribed fire is applied again. While some nesting habitat would be removed, the application of fire would more closely mimic natural disturbance events that occurred in ponderosa pine plant associations. Nesting habitat would still be retained across the landscape (in some stands not selected for vegetative treatments in these NEPA documents) and within treatment units (although potentially in smaller patches depending on burn conditions and the resulting mosaic due to variable fire intensity). Within an project area of more than 300,000 acres and with multiple projects affecting potential habitat at a scale of hundreds or thousands of acres, the direct impact of this project on nesting habitat is relatively minute and the cumulative impact on habitat is negligible at the landscape scale.

Botany

This section includes a summary of the Botany specialist's report and Biological Evaluation; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

Introduction

This section describes expected effects of the Ochoco Summit Trail System project proposed action and alternatives upon botanical resources. Included is 1) the Biological Evaluation for proposed, endangered, threatened, and sensitive plant species, 2) analysis of effects of non-native invasive plants, and 3) effects to special plant habitats.

Threatened, Endangered and Sensitive Plants

Regulatory Framework

Direction for managing habitats for all existing native and desired non-native plants in order to maintain viable populations of species comes from Forest Service Manual 2600 (USFS 1995, WO Amendment 2600-95-7). Sensitive plants receive management emphasis to ensure viability and to preclude trends toward endangerment that would result in the need for federal listing (Forest Service Manual 2672.1). A biological evaluation is conducted to review Forest Service programs and activities for possible effects on endangered, threatened, proposed, or sensitive species, as required in Forest Service Manual 2672.4.

The desired future condition for sensitive species is to ultimately remove them from the U.S. Fish and Wildlife Service's Species of Concern list, and from the Regional Forester's Sensitive Species list. Ensuring that habitat is well distributed with viable, increasing populations within the Ochoco National Forest can contribute to this effort. The LRMP does not specifically identify a desired future condition for sensitive plant species. It does address riparian areas, which provide important habitat for many sensitive species within the Willow Pine Project Area. The LRMP states that most of the riparian areas will be in excellent condition within 50 years, characterized by vigorous stands of forbs, grasses, and grass-like species on stable stream banks.

Analysis Methods

There are no federally listed proposed, threatened or endangered plant species that occur on the Ochoco National Forest. There is no habitat recognized as essential for listed or proposed plant species recovery under the Endangered Species Act; this analysis is therefore limited to species

included on the Regional Forester's Sensitive Species List (hereafter referred to as sensitive species) for the Ochoco National Forest. Sensitive species will be grouped by habitat into riparian and scabland species. Design criteria that protect sensitive plants as described in Chapter 2 of the EIS will be taken into account when determining effects. The analysis area for sensitive plants includes the project area boundary as designated by the District Ranger (see maps in Chapter 2). Effects of the proposal will be measured by:

- Acres of sensitive plant populations impacted by proposed trails.
- Number of sensitive plant populations within ¼ mile of proposed trails.
- Acres of sensitive plant habitat impacted by proposed trails.

Information was integrated in part through GIS mapping to portray spatial relationships among sensitive plants and their habitat, and the proposed trail system. Spatial and tabular data for inventoried sites of sensitive plants were taken from the National Resource Inventory System (NRIS) database. To compare the alternatives for effects from motorized travel on trails, GIS was used to calculate the number of acres under each alternative.

Effects of new trail construction and re-construction of revegetated closed roads will be analyzed for short-term effects of 3-5 years. Use is expected to continue on all trails for the long term, >10 years.

Assumptions

Areas open to motorized recreation have a higher risk of impacting vegetation, including special habitats.

All forms of motorized vehicles are lumped together in the botany analysis, regardless of class of vehicle.

Areas that are seasonally closed were analyzed as open because there can be impacts to native plants and native plant habitats regardless of when the area is open. If the area is not 100% closed all year long then it is considered open.

A primary assumption related to cumulative effects is that the reduction of motorized access off designated routes and modification of motorized access for dispersed camping has a beneficial effect.

Existing Condition

Of the 39 sensitive plant species documented or suspected of occurring on the Ochoco National Forest and the Crooked River National Grassland, 15 have been documented in or near the analysis area, or have potential habitat that has not been surveyed. Species that occur in the project area are listed in Table 117 in bold type. Resources used to identify potential sensitive plant habitat were aerial photographs, vegetation maps, as well as personal knowledge of the analysis area.

The Regional Forester's sensitive species list was updated in 2011; however, the cover letter attached to the new list stated, *"Projects initiated prior to the date of this letter may use the updated list transmitted in this letter or the Regional Forester's Sensitive Species list that was in effect when the project was initiated"* (USFS 2011). The analysis included here is based on the 2008 list. However, the most current species list would be reviewed during project implementation planning; habitat would be evaluated, and surveys conducted according to project design criteria as needed.

Table 117. Summary of the prefield review for sensitive plants in the Ochoco Summit Project Area.

Species	Habitat	Probability of Occurrence	Rationale
Achnatherum hendersonii (Vasey) Bark. Henderson's needlegrass	Sagebrush scablands	High	Habitat Present
Achnatherum wallowaensis Maze & K.A. Robson Wallowa needlegrass	Sagebrush scablands	High	Habitat Present

Table 117. Summary of the prefield review for sensitive plants in the Ochoco Summit Project Area.

Species	Habitat	Probability of Occurrence	Rationale
Astragalus diaphanus var. *diurnus* Douglas ex Hook. S. Fk. John Day milkvetch	Western juniper woodland	Low	Outside documented range
Astragalus peckii Piper Peck's milkvetch	Sage/juniper/lodgepole pumice/coarse soils	Low	Outside documented range
Astragalus tegetarioides M.E. Jones bastard milkvetch	Sage steppe/ponderosa pine forest	Low	Outside documented range
Botrychium ascendens W.H. Wagner ascending moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium crenulatum W.H. Wagner crenulate moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium minganense Vict. Mingan's moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium montanum W.H. Wagner mountain moonwort	Wet meadows, springs, seeps	High	Habitat Present
Botrychium paradoxum W.H. Wagner twin-spike moonwort	Wet meadows, springs, seeps	High	Habitat Present
Calochortus longebarbatus Wats. var. *peckii* Ownbey Peck's mariposa lily	Vernally moist meadows, streambanks	High	Habitat Present
Camissonia pygmaea (Dougl. ex Lehm) Raven dwarf suncup	Low elev plains/washes w/ coarse soil or gravel	Low	No Habitat
Carex abrupta Mack. abrupt-beaked sedge	Montane, mid/high elev moist mdw/open forest	Moderate	Habitat Present
Carex diandra Schrank lesser panicled sedge	Sphagnum bog, lakeshores	Low	No Habitat
Carex lasiocarpa Ehrh. var. *americana* slender sedge	Very wet sedge mdws, along lakes/streams	Moderate	Habitat Present
Carex retrorsa Schwein. retrorse sedge	Swamps, marsh, meadows, along lakes, streams	Moderate	Habitat Present
Cheilanthes feei T. Moore Fee's lip fern	Basalt cliffs but occasionally limestone	Low	Outside documented range
Cyperus lupulinus (Spreng.) Marcks ssp. *lupulinus* Great Plains flatsedge	Riparian edge but dry hackberry, wheatgrass	Low	No Habitat
Elatine brachysperma A. Gray short-seeded waterwort	Muddy shores, shallow pools	Low	No Habitat
Eleocharis bolanderi A. Gray Bolander's spikerush	Seasonally wet; low sage/Sandberg in basalt	Moderate	Habitat Present
Eriogonum cusickii M.E. Jones Cusick's buckwheat	Juniper/big sage and low sage scabland	Moderate	Habitat Present
Heliotropium curassavicum L. salt heliotrope	Moist to dry, saline soils	Low	No Habitat
Lipocarpha aristulata (Coville) G. Tucker aristulate liptocarpa	Low elev, silty below high water along banks	Low	No Habitat
Lomatium ochocense Helliwell & Constance Ochoco lomatium	Sagebrush scablands	Low	Outside documented range
Mimulus evanescens R.J. Meinke disappearing monkeyflower	Sage/juniper vernally moist streambanks	Low	No Habitat

Table 117. Summary of the prefield review for sensitive plants in the Ochoco Summit Project Area.

Species	Habitat	Probability of Occurrence	Rationale
Muhlenbergia minutissima (Steud.) Swallen annual dropseed	Weathered lava soils in riparian	Low	No Habitat
Penstemon peckii Pennell Peck's penstemon	Stream banks Disturbed areas	Low	Outside documented range
Potamogeton diversifolius Raf. waterthread pondweed	Lakes, ponds, including created habitat	Low	Habitat Present
Rorippa columbiae (Suksd. ex B.L. Rob.) Suksd. ex Howell Columbia yellowcress	Wet meadows, moist plains, streams	Low	No Habitat
Rotala ramosior (L.) Koehne lowland toothcup	Sand and silt below high water, Low elevation	Low	No Habitat
Salix wolfii Bebb Wolf's willow	Riparian	Low	No Habitat
Talinum spinescens Torr. (*Phemeranthus spinescens*) spiny fameflower	Sagebrush scablands	Low	No Habitat
Thelypodium eucosmum B.L. Rob. arrow leaf thelypody	Dry slopes in vernal drainages	Low	Outside documented range
Utricularia minor L. lesser bladderwort	Lowland and montane fens, sedge meadows	Low	Outside documented range
Helodium blandowii (F. Weber & D. Mohr) Warnst. Blandow's bogmoss	Montane fens	Low	Specialized Habitat Present
Tomentypnum nitens (Hedw.) Loeske* tomentypnum moss	Montane fens	Low	Specialized Habitat Present
Tortula mucronifolia Schwägr. mucronleaf tortula moss	Riparian *Populus;* montane *Abies*	Moderate	Habitat Present
Dermatocarpon meiophyllizum Vain. silverskin lichen	Rocks inundated at least most of the year	Moderate	Habitat Present
Texosporium sancti-jacobi (Tuck.) Nadv. woven spore lichen	Often old root clumps, scat, or rocks	Low	Outside documented range

Management guidance for sensitive species comes from a variety of sources, including:

- *Calochortus longebarbatus var. peckii* is managed with guidance from a draft Conservation Strategy for the Ochoco National Forest (Dewey 2005).
- *Achnatherum hendersonii* and *A. wallowaensis* are managed with guidance from a draft Conservation Assessment for the Ochoco National Forest (Dewey 2007).
- *Botrychium ascendens*, *B. crenulatum*, and *B. paradoxum* are managed with guidance from a Conservation Strategy for the Wallowa-Whitman, Umatilla and Ochoco National Forests (Zika 1992).

Other species are not managed under Conservation Strategies developed specifically for Central Oregon, but guidance is used from Species Fact Sheets and Conservation Strategies from other parts of the State, such as "*Botrychium* on the Mount Hood National Forest" (Zika 1992).

Species that will not be carried through the analysis

Those species in Table 117 that are listed as "Low" do not have potential habitat, are geographically unlikely to occur within the project area, or only occur in specific habitats that would not be affected by the proposed activities. These species will not be carried further in the analysis. The *Astragalus tegetarioides* population in the southeastern part of the project area on Paulina Ranger District is the northernmost population in its range, and is not thought to extend any further; proposed activities are outside the documented range for the species. The same can be said for the *Lomatium ochocense* population on the Lookout Mountain District in the south part of the project area. Extensive surveys have been completed for both species. *Helodium blandowii* and *Tomentypnum nitens* occur in unique high elevation montane fens that are not within areas of proposed trails, and would be protected by design criteria as well.

Field surveys

Surveys for vascular sensitive plants in the project area have been conducted as early as 1980, continuing to the present. Populations of sensitive and rare plants are recorded in the NRIS database; surveys are done by the Limited Focus, and Intuitive Control survey methods. Surveys for sensitive nonvascular plant occurred in riparian areas thought to be high probability habitat from 2004 to 2009. Records containing information on survey routes, surveyor, and results are on file at the Lookout Mountain Ranger District and Paulina Ranger District offices. All routes on existing roadbeds, regardless of whether the road is open, closed, or decommissioned, is considered previously disturbed and covered with past NEPA analysis. No surveys would be necessary. Any trail proposed in this project that involves new construction will be surveyed for sensitive plants before disturbance takes place and the route is designated for use. This includes user-created trails, snowmobile routes, and other areas not previously surveyed.

The Ochoco Summit Trails project area comprises 266,738 acres within three watersheds. This boundary extends far beyond the actual area affected by the proposed trail system; it takes in the eastern portion of Lookout Mountain Ranger District and the western portion of the Paulina Ranger District. The area has a wide variety of suitable sensitive plant habitat throughout. Elevation ranges from 4,040 feet to 6,926 feet at Lookout Mountain, and corresponding precipitation from 13" to 31" annually (majority receives 21 inches). Human use has affected the project area. Impacts such as deep soil compaction and construction of roads are effectively permanent. Other effects such as erosion, dropping water tables due to stream entrenchment, livestock grazing, and activities such as fire suppression and recreational use are likely to continue, which may limit opportunities for achieving desired conditions. Sensitive plant species that may be affected by the Ochoco Summit Trail System project include those listed in Table 118.

Table 118. Populations of sensitive species that occur, or are likely to occur, within the Ochoco Summit project area.

Species	Known number of populations in the project area	Acres
Species associated with riparian habitat		
Ascending moonwort	1	11.0
Scalloped moonwort	16	26.6
Mingan's moonwort	8	7.7
Mountain moonwort	9	3.2
Peculiar moonwort	1	0.2
Peck's mariposa lily	201	2,744.8
Abrupt-beaked sedge	0	0
Slender sedge	0	0
Retrorse sedge	0	0
Mucronleaf tortula moss	0	0

Table 118. Populations of sensitive species that occur, or are likely to occur, within the Ochoco Summit project area.

Species	Known number of populations in the project area	Acres
Silverskin lichen	5	3.0
Species associated with scabland habitat		
Bolander's spikerush	0	0
Cusick's buckwheat	0	0
Henderson's/Wallowa needlegrass	21	126.5
Total	*262*	*2,923.0*

Quantity and diversity of documented sensitive species is high within the project area. Table 2 lists the known total acreage of sensitive species in the project area. Populations often are made up of separate occurrences called subpopulations that may be up to ¼ mile away from each other, usually connected by suitable habitat. Therefore spatially, the populations are spread out on the landscape.

Native vegetation in the project area has been influenced by human activities and associated changes within the last one hundred and fifty years. Most notable changes include eroded stream channels and loss of meadow and riparian habitats due to lowered water tables because of road construction, logging, livestock grazing, loss of beaver, and fire exclusion (USDA 1999). The density of fire intolerant conifers has increased, while the density of understory vegetation (grasses and shrubs) has decreased due to fire exclusion and grazing (Miller and Rose 1999, USDA 1999, Arno 2000, Agee 1993. Conditions in the analysis area generally reflect that described in the Interior Columbia Basin Draft Environmental Impact Statements (USDA/USDI 1997, 2000). As a result of human influences, conditions include a decline in species diversity and biomass of available forage, increased threats from non-native invasive plants (noxious weeds), and decline in overall landscape health.

General Effects of OHV Use on Vegetation Common to all Alternatives

Direct effects occur from physical damage to vegetation from crushing and breaking of plants as vehicles drive over them (Wilshire et. el. 1978). Plant foliage and stems can be damaged and plants uprooted by vehicles, so that actual plant damage may occur over an area much larger than the track width. Indirect effects of vehicles on vegetation include undercutting of root systems as vehicle paths are enlarged by erosion (Wilshire 1978). Other indirect effects from off-highway vehicle use include the proliferation of exotic plant species and a higher frequency of fire (Lovich and Bainbridge 1999). Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

The severity of damage to vegetation from vehicles is related to the amount of use that a given area is receiving from OHV use. As the number of vehicle passes increases, an increase in the impact to vegetation is also seen (Adams 1982, Payne et al. 1983, Bolling and Walker 2000). Such impacts have been shown to reduce the cover of native vegetation in OHV areas (Bolling and Walker 2000). When rare plants are present in OHV areas, motorized use can detrimentally impact plant populations by reducing the number and cover of individual plants (Groom et. al. 2005). Table 119 below lists the user-created trail system being used by Central Oregon Motorcycle and ATV Club (COMAC) and the associated sensitive plant locations within travel routes. Currently it is estimated that off road vehicles are affecting approximately 2.52 miles of sensitive plants (those listed as closed or trails in the table).

Table 119. COMAC routes within sensitive plant populations.

Species	Length	Vehicle Type	Maintenance Level
Peck's mariposa lily	6,724 feet	ATV & Shared use	Open road
Peck's mariposa lily	11,571 feet	ATV & Motorcycle	Closed road
Peck's mariposa lily	1,640 feet	ATV & Motorcycle	User-created trail
Silverskin lichen	353 feet	All	Open road
Tomentypnum moss	50 feet	ATV	User-created trail
Blandow's bugmoss	51 feet	ATV	User-created trail

This is a direct effect from tires crushing plant material, but also to soil properties. Even a few passes of a vehicle can compact soil, and repeated use leads to severely compacted and disturbed soils. Such soil compaction can lead to a considerable reduction in vegetation cover, with native plant establishment impaired (Web et al. 1978, Adams 1982, Lovich and Bainbridge 1999, Bolling and Walker 2000). Soil compaction can also increase the potential for non-native, invasive plants to displace native vegetation (Prose et al. 1987, Lovich and Bainbridge, 1999).

The dirt and dust associated with OHV roads and trails can also effect the trailside vegetation (Brooks and Lair 2005). Dust accumulation on plants can impair crucial plant functions such as photosynthesis and transpiration, which can lead to reduced plant growth, recruitment, cover, and survivorship (Walker and Everett 1987).

Direct and Indirect Effects– TES Plants –Alternative 1

Alternative 1 is the No Action Alternative; no trail system would be designated, and no staging or associated camping areas would be developed. Prior to 2011, the current management policy was that most areas within the project area were open to off-road travel by motorized vehicles. This policy changed with the signed Record of Decision for the Travel Access Management Project, which became effective December 2011. This decision prohibits all motorized access outside of designated roads, trails and areas. Dispersed camping is allowed within 300' of roads. Most vehicle use occurs on roads (personal observation), and the disturbance to native vegetation from the construction of the road is a past action. In the Ochoco Summit project area as a whole there is a low level of off-road use by antler hunters and some amount of willful "mud bogging" in sensitive areas such as meadows and riparian areas (personal observation). The amount of designated open road use is expected to continue as the popularity of OHV use continues to increase and the population of Prineville and the surrounding area continues to increase.

Riparian Habitat Sensitive Species

The No Action Alternative would result in a biological evaluation determination of "No Impact" for all riparian sensitive species.

OHV use in Oregon has increased 2.5 to 5.6% per year in the last decade (Skelton pers. comm.), and it would not be unreasonable to assume that parts of the Ochoco Summit project area has also received some increase in use. New rules regulating OHV use to designated roads would presumably decrease further off-road impacts to sensitive plant species. Some amount of illegal off-road use is expected to continue, especially on the Lookout Mountain Ranger District. The Paulina Ranger District, at present, does not exhibit evidence of sustained damage to vegetation from OHVs (personal observation). It is estimated that currently there is minor impacts to Peck's mariposa lily, sedges, moonworts, and silverskin lichen populations and habitat. Tortula moss is probably not being affected

presently due to the specific habitat requirements of rock outcrops and *Populus* species dominated riparian areas.

Of the riparian sensitive species, Peck's mariposa lily has the widest ecological amplitude, occurring on a wide variety of habitat types. The project area contains approximately 46% of the global population of Peck's mariposa lily. Direct impacts to the plants are from crushing of the basal leaf. Repeated damage or loss of the basal leaf each year can reduce the life of an individual by limiting the amount of photosynthate available for bulb renewal (Fiedler 1987). Indirect effects can occur as a result of changes in the microclimate of streams and meadows in the long-term due to streambank disturbance, soil compaction, and vegetation changes. Peck's mariposa lily appears to require a particular moisture regime. The requirements of this condition are not well known due to lack of study, however observations show that altering the hydrology of stream channels is one of the largest threats to the species (Fredricks 1989).

OHV effects to moonwort, sedges, riparian moss and lichen habitat is thought to be less frequent due to the more specific and unique habitats they require. Effects to these species occur from direct crushing of plants and through changes in microclimate. Some moonwort populations are directly adjacent to open roads, such as the crenulate moonwort sites along the 4270-252, 42-430 and 4270 roads, and do have some traffic within the wet spring areas; this vehicle use is expected to continue under Alternative 1. Repeated removal of the sporangia (by crushing from tires, or sediment wash from roadsides) before dispersal could reduce reproductive potential over time (Beatty et al 2003). Habitat modification from changed hydrology patterns is more likely to affect moonwort populations. These species occupy rare, ecologically diverse habitats, and rely on mycorrhizal fungi for water and nutrients. This mycorrhizal relationship is very sensitive to changes in soil moisture, changes in temperature and humidity, or light regime (Potash 1998).

Sensitive species that occur along perennial streams - retrorse, slender and wooley sedges, and silverskin lichen, are vulnerable to direct effects from crushing of plants from OHV traffic or camping activities. Again, effects to habitat are due to changes in stream hydrology and also to soil properties. Even a few passes of a vehicle can compact soil, and repeated use leads to severely compacted and disturbed soils. Such soil compaction can lead to a considerable reduction in vegetation cover, with native plant establishment impaired (Web et al. 1978, Adams 1982, Lovich and Bainbridge 1999, Bolling and Walker 2000). Soil compaction can also increase the potential for non-native, invasive plants to displace native vegetation (Prose et al. 1987, Lovich and Bainbridge, 1999).

The dirt and dust associated with OHV roads and trails can also effect the trailside vegetation (Brooks and Lair 2005). Dust accumulation on plants can impair crucial plant functions such as photosynthesis and transpiration, which can lead to reduced plant growth, recruitment, cover, and survivorship (Walker and Everett 1987).

The current amount of specific damage to riparian sensitive species populations and habitat by OHV use is unknown, and is expected to decline as new travel rules are enforced. Local OHV clubs (COMAC) have been using an un-authorized trail system that includes 254 miles of trail. The COMAC routes, which include all types of travel routes, from open roads and user created trails, are adjacent and within sensitive plant populations. Of the COMAC trails, 2.52 miles are directly within populations, see Table 3 above.

Scabland Sensitive Species

The No Action Alternative would result in a biological evaluation determination of "No Impact" for all scabland sensitive species.

Henderson's/Wallowa needlegrass is a small bunchgrass that occurs on shallow scablands with little vegetation; the greatest potential for impacts comes from soil disturbance. Roads and trails through

these clay soils can cause changes in microclimate surrounding individual ricegrass plants, interrupt moisture flow, and reduce infiltration through compaction. The successional status of Henderson's/Wallowa needlegrass is unknown. It is a deep-rooted perennial bunchgrass confined to a habitat that receives little disturbance. Therefore, it is likely this plant is an indicator of late seral condition. Poor soil productivity does not allow recovery on these sites, and mechanical impacts are long-term, basically permanent (LRMP 1989). Bolander's spikerush occurs in moist areas within habitat similar to the sensitive needlegrasses, as does Cusick's buckwheat, and effects to the plant and habitat would be similar from OHV impacts. There are no known sites of these two species on the Ochoco National Forest. Currently, there are no trails within needlegrass populations, however 40 miles of COMAC trails occur within scabland habitat. Use of these trails is expected to decrease as travel rules are enforced.

Direct and Indirect Effects– TES Plants –Alternative 2

Alternative 2 is the Proposed Action, which would designate a trail system, staging and play areas, and associated camping facilities for all classes of off-highway vehicles. Associated with this action, roads would also be closed and/or decommissioned with appropriate restoration activities to promote recovery of the closed road. Approximately 170 miles of trail would be designated open for travel; this includes 69 miles of new construction, 55 miles of reconstructing previously closed or decommissioned roads, and 46 miles of open road. The trails would include 142 stream crossings, 10 staging areas, and 6 trailheads.

This alternative adds 170 miles of trail to the open roads, trails, and gravel pits that are already designated for OHV use in the project area. In 2007 it was estimated that in Central Oregon as a whole, there were approximately 52,000 visitors using trail systems (Ramming, pers. comm.). The North Millican OHV area had 9,985 riders in 2008, which has similar weather and predicted period of use as the Ochoco Summit proposed trail system (Skelton 2010). In the long-term it is expected that the use would increase by 2.5-5.6 percent per year (Skelton 2010). Estimating on the low end of increase in the first half of the decade due to the current recession, and the high end on the second half of the decade, it is estimated there may be 15,000 riders using the Ochoco Summit trail system by 2020. This may likely be underestimated based on the 52,000 riders using Central Oregon trails.

Riparian Habitat Species

Alternative 2 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all riparian sensitive species.

This alternative proposes 31 crossings of perennial streams, totaling 13.8 miles within the RHCA, which is high-probability habitat for the sedges, tortula moss, silverskin lichen, and moonworts. Perennial streams are also moderate to high probability habitat for Peck's mariposa lily. Table 120 lists the sensitive plant populations that would be affected based on the current trail location proposal, which includes 1,645 feet of trail directly within Peck's mariposa lily populations. Project design criteria would prohibit designating trails within these populations (see Chapter 2 of the EIS); however moving the trail out of the known distribution of this particular plant may still be a risk, as the plant does not flower consistently and exact population perimeter is difficult to determine.

Stream crossings would be designed to reduce impacts to water quality (see project design features in Chapter 2 of the EIS) by development such as bridges, elevated puncheons, or culverts. This would help reduce impacts to sensitive plant habitat from repeated traffic.

Table 120. Length of trail proposed within sensitive plant populations.

Species	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Comments
Peck's mariposa lily	0 feet	200 feet	0 feet	200 feet	Crosses in two places
Peck's mariposa lily	0 feet	160 feet	0 feet	160 feet	Alternatives 2 & 4 include staging area
Peck's mariposa lily	0 feet	750 feet	750 feet	750 feet	
Peck's mariposa lily	0 feet	350 feet	350 feet	350 feet	
Peck's mariposa lily	0 feet	0 feet	0 feet	630 feet	Crosses in two places
Peck's mariposa lily	0 feet	185 feet	185 feet	185 feet	
Total	0 feet	1,645 feet	1,285 feet	2,275 feet	

Approximately 9.9 miles of proposed trail within perennial stream habitat either is a new route, or on a closed or decommissioned roadbed (see Table 121). This equates to 12 acres (at an average 10-foot disturbance width). In addition to trails within perennial streams, there are 76 proposed crossings within class 4 intermittent streams, which is Peck's mariposa lily habitat. The amount of trail within the class 4 RHCA is 2.3 miles, or approximately 2.8 acres of disturbance. These acreages are small when put in context of the overall amount of land in the project area due to the linear nature of trails. This is especially true considering the vast amount of the planning area where no trails are proposed - the southern half of the project area. Indirect effects from dust and carbon emissions to vegetation will be long-term, for however long the trail system is in existence. Dust raised by OHV traffic can disrupt photosynthetic processes, thereby suppressing plant growth and vigor, especially along OHV routes. In turn, reduced vegetation cover may permit invasive and/or non-native plants—particularly shallow-rooted annual grasses and early successional species capable of rapid establishment and growth—to spread and dominate the plant community, thus diminishing overall endemic biodiversity (USGS 2007).

Effects due to erosion and physical crushing of vegetation directly adjacent to the stream, is not expected because of project design criteria mitigations, which include hardened crossings, bridges and culverts.

There are 10 staging areas, 7 trailheads, and 2 play areas planned within ¼ mile of riparian sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. There is a staging area planned directly within a Peck's mariposa lily population along a tributary of Buck Hollow Creek. The greatest effect to sensitive plants in Alternative 2 would come from this staging area, which would likely destroy 0.75 acres of Peck's lily and habitat. The effect may be greater if disturbance increases beyond the currently designated area for staging.

The closest distance for the other staging and play areas is about 215 feet away from the stream. There may be impacts to this riparian area habitat from unauthorized riding from these points, where use can radiate out in many directions. Matchett and others (2004) point out that OHV use may be heaviest on slopes, along right-of-ways, in washes, and in the vicinity of camping facilities. Figure 3 was taken from a study by Webb (1982) on effects to desert soil by motorcycles, showing an area open to OHV use. The area was heavily impacted by trail convergence, passenger vehicles and camping. The study found that after 10 passes of a motorcycle on desert soil, crust and annual plants were destroyed. The terrain in the Ochoco Summit project area is more confined than in this example due to a mostly forested, mountainous setting; however, it is reasonable to conclude that OHV use would be heavier and more difficult to regulate around staging and camping areas.

Table 121. Proposed trails within riparian sensitive species habitat, perennial streams.

Trail Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Closed	0 miles 0 acres	5.57 miles 6.7 acres	1.1 miles 1.3 acres	5.9 miles 7.1 acres
Decommissioned	0 miles 0 acres	0.71 miles 0.9 acres	0.53 miles 0.64acres	0.93 miles 1.1 acres
New	0 miles 0 acres	3.62 miles 4.4 acres	2.9 miles 3.5 acres	3.9 miles 4.7 acres

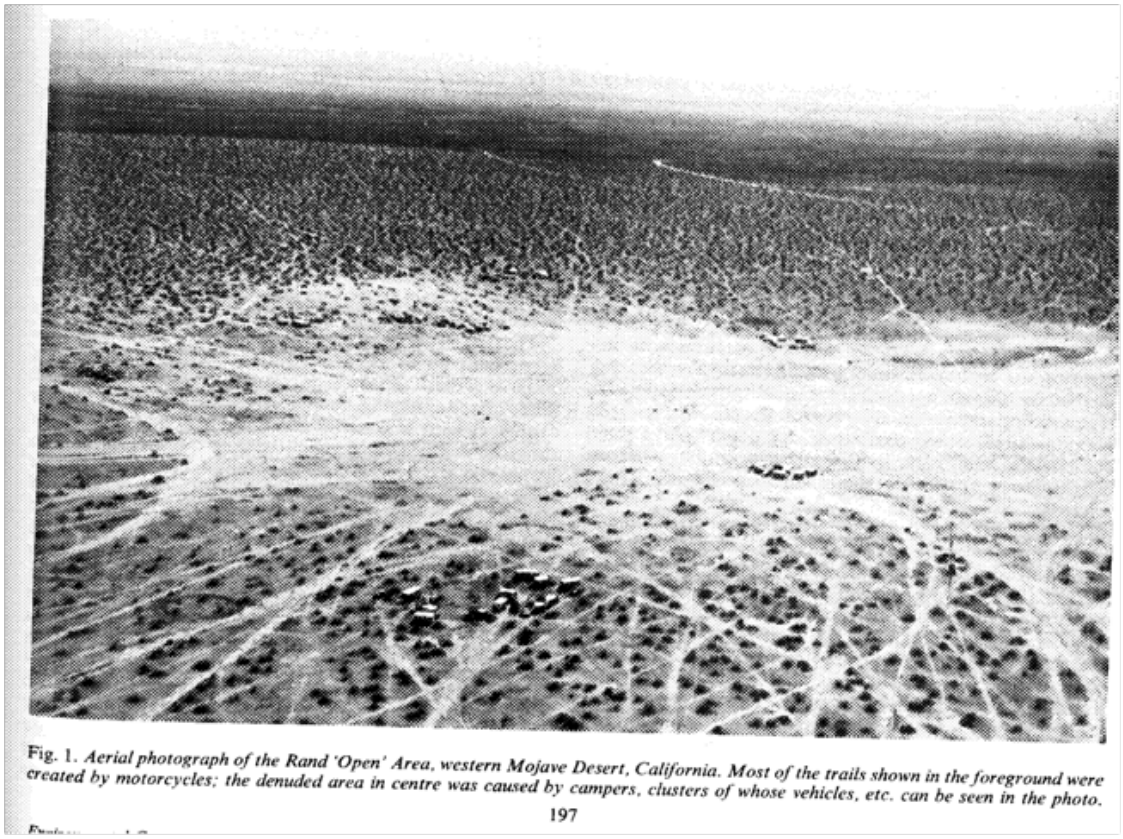
Fig. 1. *Aerial photograph of the Rand 'Open' Area, western Mojave Desert, California. Most of the trails shown in the foreground were created by motorcycles; the denuded area in centre was caused by campers, clusters of whose vehicles, etc. can be seen in the photo.*
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Figure 5. Trail Density and Denuded Camping Area in the Mojave Desert.

Scabland Habitat Species

Alternative 2 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all scabland sensitive species.

There are no trails proposed within needlegrass, Cusick's buckwheat, or Bolander's spikerush populations. These species all occupy roughly the same habitat types, primarily low and rigid sage, Sandberg's bluegrass on shallow soils. There are 72.3 miles of trail proposed in Alternative 2 within this type of habitat (see Table 122). Using an approximate distance of 10 feet for trail disturbance, this equals about 88 acres of the 64,609 acres of scabland sensitive species habitat in the planning area (less than 1%). Affected Bolander's spikerush habitat would be less than 88 acres because it occupies moist meadows within the scabland habitat. Habitat mapping at that level of detail has not been done, so the exact figure is unknown.

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest (USDA 1989). Damage to soil and vegetation is nearly impossible to mitigate due to shallow, unproductive soils. These soils also become heavily saturated and are susceptible to rutting (see Chapter 3 Soil Resource). Impacts of constructed trails and roads are very long-term, if not permanent. Although the effect to this habitat is less than 1%, trails are not easily restored or repaired if used when wet. A project design feature was developed to protect TES plant habitat, by closing the trail system when adverse conditions exist that may result in resource damage (rutting, runoff, etc), however in scabland habitat, once the damage is done, it is permanent.

There are 4 staging areas, 1 trailhead, and 2 play areas planned within scabland sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. There are impacts expected to this habitat both from the development of the recreation areas (the exact area is unknown because they are not designed yet, but are estimated at 18 acres), and from unauthorized riding from these points, where use can radiate out in many directions (see Figure 3 and discussion above). These gathering area sites were chosen because most of them have already been disturbed. There is a risk of spreading invasive plants to connected sensitive scabland species habitat that is not disturbed (see Invasive Plant discussion).

Table 122. Trails proposed within scabland sensitive species habitat.

Alternative	New construction	Closed/Decommissioned	Open roads
Alternative 2	30.6 miles	20.1 miles	21.6 miles
Alternative 3	19.2 miles	16.2 miles	7.9 miles
Alternative 4	38.6 miles	22.0 miles	22.7 miles

Direct and Indirect Effects– TES Plants –Alternative 3

Alternative 3 would designate a trail system, staging and play areas, and associated camping facilities for motorcycles and ATVs. The motorcycle loop would be concentrated on the west side of the project area (Paulina Ranger District), while the ATV area would be on the east side of the project area near Highway 26. No OHV trails for jeeps and small trucks (80 inch category) would be included in this alternative. Associated with this action, roads would also be closed and/or decommissioned with appropriate restoration activities that would promote the recovery of the closed road. Approximately 101 miles of trail would be designated open for travel; this includes 50 miles of new construction, 37 miles of reconstructing previously closed or decommissioned roads, and 14 miles of open roads. The trails would include 62 stream crossings, and 4 staging areas.

This alternative adds 101 miles of trail designation (approximately 83 acres) in addition to current designated open roads and dispersed camping areas.

Riparian Habitat Species

Alternative 3 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all riparian sensitive species.

This alternative proposes 21 perennial stream crossings, for a total of 6 miles in the RHCA, which is high-probability habitat for the sedges, tortula moss, silverskin lichen, and moonworts. Perennial streams are also moderate to high probability habitat for Peck's mariposa lily. Table 121 lists the sensitive plant populations that would be affected based on the current trail location proposal, which includes 1,285 feet of trail directly within Peck's mariposa lily populations. A project design criteria would prohibit designating trails within these populations (see Chapter 2 of the EIS), however moving the trail out of the known distribution of this particular plant may still be a risk, as the plant does not flower consistently and exact population perimeter is difficult to determine.

Stream crossings would be designed to reduce impacts to water quality (see project design features in Chapter 2 of the EIS) by development such as bridges, elevated puncheons, or culverts. This would help reduce impacts to sensitive plant habitat.

There are also trails planned within riparian sensitive species habitat. Approximately 4.5 miles of proposed trail within perennial stream habitat either is a new route, or on a closed or decommissioned roadbed (see Table 121). This equates to 5.4 acres (at an average10-foot disturbance width). In addition to trails within perennial streams, there are 34 proposed crossings (1.2 miles equating to 1.4 acres) proposed within class 4 intermittent streams, which is Peck's mariposa lily habitat. These acreages are small when put in context of the overall amount of area in the project area due to the linear nature of trails. This is especially true considering the vast amount of the planning area where no trails are proposed - the southern half of the project area. Indirect effects from dust and carbon emissions to vegetation will be long-term, for however long the trail system is in existence. Effects due to erosion and physical crushing of vegetation are not expected because of project design criteria mitigations, which include hardened crossings, bridges and culverts.

Alternative 3 does not include the staging area near Buck Hollow Creek that lies within a Peck's mariposa lily population, eliminating the direct effect to this population. There are four staging areas planned within ¼ mile of riparian sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. The closest distance is about 230 feet away from the stream. There may be impacts to this riparian area habitat from unauthorized riding from these staging areas.

Scabland Habitat Species

Alternative 3 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all scabland sensitive species. However, this Alternative would have the least effect to scabland sensitive species of the action alternatives.

There are no trails proposed within needlegrass, Cusick's buckwheat, or Bolander's spikerush populations. These species all occupy roughly the same habitat types, primarily low and rigid sage, Sandberg's bluegrass on shallow soils. There are 43.3 miles of trail proposed in Alternative 3 within this habitat type (see Table 121). Using an approximate distance of 10 feet for trail disturbance this equals about 53 acres of the 64,609 acres of scabland sensitive species habitat in the planning area (less than 1%). Affected Bolander's spikerush habitat would be less than 53 acres because it occupies moist meadows within the scabland habitat. Habitat mapping at that level of detail has not been done, so the exact figure is unknown.

There are no staging areas, trailheads, or play areas planned within scabland sensitive plant habitat in Alternative 3. This, along with the least amount of proposed trails in scablands, results in the least impact of the action alternatives.

Direct and Indirect Effects– TES Plants –Alternative 4

This alternative proposes 212 miles for approximately 173 acres, and 170 stream crossings. New construction of trails would comprise 81 miles (38.4 acres). There are also 10 staging areas, 3 play areas, and 7 trailheads planned. There are 22 miles of OHV trails in Riparian Habitat Conservation Areas. Road closures and associated restoration activities would also take place.

Riparian Habitat Species

Alternative 4 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all riparian sensitive species.

This alternative proposes 38 crossings of perennial streams, totaling 17.6 miles in the RHCA, which is high-probability habitat for the sedges, tortula moss, silverskin lichen, and moonworts. Perennial streams are also moderate to high probability habitat for Peck's mariposa lily. Table 121 lists the sensitive plant populations that would be affected based on the current trail location proposal, which includes 2,275 feet of trail directly within Peck's mariposa lily populations. A project design criteria would prohibit designating trails within these populations (see Chapter 2 of the EIS), however moving the trail out of the known distribution of this particular plant may still be a risk, as the plant does not flower consistently and exact population perimeter is difficult to determine.

Stream crossings would be designed to reduce impacts to water quality (see project design features in Chapter 2 of the EIS) by development such as bridges, elevated puncheons, or culverts. This would help reduce impacts to sensitive plant habitat from repeated traffic.

Approximately 10.7 miles of proposed trail within perennial stream habitat either is a new route, or on a closed or decommissioned roadbed (Table 121). This equates to 12.9 acres (at an average10-foot disturbance width). In addition to trails within perennial streams, there are 2.75 miles, 3.3 acres (92 stream crossings) proposed within class 4 intermittent streams, which is Peck's mariposa lily habitat. These acreages are small when put in context of the overall amount of area in the project area due to the linear nature of trails. This is especially true considering the vast amount of the planning area where no trails are proposed - the southern half of the project area. Indirect effects from dust and carbon emissions to vegetation will be long-term, for however long the trail system is in existence. Dust raised by OHV traffic can disrupt photosynthetic processes, thereby suppressing plant growth and vigor, especially along OHV routes. In turn, reduced vegetation cover may permit invasive and/or non-native plants—particularly shallow-rooted annual grasses and early successional species capable of rapid establishment and growth—to spread and dominate the plant community, thus diminishing overall endemic biodiversity (USGS 2007).

Effects due to erosion and physical crushing of vegetation directly adjacent to the stream, is not expected because of project design criteria mitigations, which include hardened crossings, bridges and culverts.

There are 7 staging areas, 1 trailhead, and 1 play area planned within ¼ mile of riparian sensitive plant habitat. These are areas where vehicles, both off-road and passenger vehicles, will congregate. Like Alternative 2, there is a staging area planned directly within a Peck's mariposa lily population near Buck Hollow Creek. The greatest effect to sensitive plants in Alternative 4 would come from this staging area, which would likely destroy 0.75 acres of Peck's lily and habitat. The effect may be greater if disturbance increases beyond the currently designated area for staging.

The closest distance for the other staging and play areas is about 215 feet away from the stream. There may be impacts to this riparian area habitat from unauthorized riding from these staging and play areas from use radiating out in many directions (Matchett et al 2004).

Scabland Habitat Species

Alternative 4 would result in a biological evaluation determination of "May Impact Individuals or Habitat But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for all scabland sensitive species.

There are no trails proposed within needlegrass, Cusick's buckwheat, or Bolander's spikerush populations. These species all occupy roughly the same habitat types, primarily low and rigid sage, Sandberg's bluegrass on shallow soils. There are 83.3 miles of trail proposed in Alternative 4 within this type of habitat (see Table 121). Using an approximate distance of 10 feet for trail disturbance, this equals about 101 acres of the 64,609 acres of scabland sensitive species habitat in the planning area (less than 1%). Alternative 4 also proposes the most miles, 38.6, of new trail construction through scabland sensitive species habitat, impacting the most habitat of all the Alternatives. Affected

Bolander's spikerush habitat would be less than 101 acres because it occupies moist meadows within the scabland habitat. Habitat mapping at that level of detail has not been done, so the exact figure is unknown.

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest (USDA 1989). Damage to soil and vegetation is nearly impossible to mitigate due to shallow, unproductive soils. These soils also become heavily saturated and are susceptible to rutting (see Chapter 3 Soil Resource). Impacts of constructed trails and roads are very long-term, if not permanent. Although the effect to this habitat is less than 1%, trails are not easily restored or repaired if used when wet. A project design feature was developed to protect TES plant habitat, by closing the trail system when adverse conditions exist that may result in resource damage (rutting, runoff, etc), however in scabland habitat, once the damage is done, it is permanent.

There are 4 staging areas, and 1 play area planned within scabland sensitive plant habitat. This is fewer than Alternative 2. These are areas where vehicles, both off-road and passenger vehicles, will congregate. There are impacts expected to this habitat both from the development of the recreation areas (the exact area is unknown because they are not designed yet, but are estimated at 14 acres), and from unauthorized riding from these points, where use can radiate out in many directions (see discussion under Alternative 2).

Cumulative Effects – TES Plants

Within the last decade, past management in the project area has focused on thinning small diameter trees, and using prescribed fire to reduce fuel loadings, which has little cumulative effect to the proposed trail system. Harvest generally avoids riparian areas where sensitive plants and habitat occur. Harvest also does not occur on scablands. New roads associated with harvest have mostly been limited to temporary roads outside of scabs and riparian areas, and are closed after use. Some areas within the project area, such as Deep Watershed, have had extensive restoration activities in both the uplands and riparian areas. The upland scabland-juniper interface has had juniper encroachment removal, which is a benefit to scabland sensitive species. Riparian areas have also had restoration activities such as headcut repair, fencing, planting, and culvert replacement. While there are short-term effects to riparian sensitive species habitat, cumulatively these actions will be a benefit in the future.

The ground disturbing activities listed in the paragraph above have undoubtedly contributed to and will continue to contribute to the introduction and spread of invasive plant species. The present patterns of recreational use with dispersed campsites and OHV use contribute to the continued spread of invasive plant infestations. The spread of invasive plant species is second only to habitat destruction for endangering imperiled species (Flather et. al. 1994). Implementation of the proposed OHV project would increase the risk of introducing invasive plant infestations in off road areas.

A December 2011 Forest-wide Travel Management Plan decision, closes the Ochoco National Forest to cross country travel except on designated routes or in designated areas. Following implementation of the forest-level Travel Management Plan acres of disturbed habitat would be limited to only those roads and motorized trails that are designated as open to the public for motorized use. COMAC routes that do not overlap with the Ochoco Summit OHV Trails would also be closed. Additional road closures proposed in the action alternatives (see Chapter 2 of the EIS) would combine with the Travel Management Plan so that disturbance would be reduced overall. Prohibiting overland use of OHVs would also reduce the risk of introducing invasive plant infestations in off road areas not associated with designated trails.

Sensitive Species Determination

The Ochoco Summit OHV Environmental Impact Statement addresses the need to provide recreation opportunities for off-road motorized vehicle use. The proposed activities would have negative effects

on sensitive plants with suitable habitat within the project area. Table 123 contains the expected effects to sensitive plants for each of the alternatives. These determinations are based on the assumption that all design elements and proper coordination at implementation is in effect. The environmental effects section of the document provides the rationale for each determination.

Table 123. Alternative effects summary to sensitive plant populations and habitat for the Ochoco Summit OHV Trail System Project Area.

Species	Alt 1	Alt 2	Alt 3	Alt 4
Achnatherum hendersonii	NI	MIIH	MIIH	MIIH
Achnatherum wallowaensis	NI	MIIH	MIIH	MIIH
Astragalus diaphanus var. *diurnus*	NI	NI	NI	NI
Astragalus peckii	NI	NI	NI	NI
Astragalus tegetarioides	NI	NI	NI	NI
Botrychium ascendens	NI	MIIH	MIIH	MIIH
Botrychium crenulatum	NI	MIIH	MIIH	MIIH
Botrychium minganense	NI	MIIH	MIIH	MIIH
Botrychium montanum	NI	MIIH	MIIH	MIIH
Botrychium paradoxum	NI	MIIH	MIIH	MIIH
Calochortus longebarbatus var. *peckii*	NI	MIIH	MIIH	MIIH
Camissonia pygmaea	NI	NI	NI	NI
Carex abrupta	NI	MIIH	MIIH	MIIH
Carex diandra	NI	NI	NI	NI
Carex lasiocarpa var. *americana*	NI	MIIH	MIIH	MIIH
Carex retrorsa	NI	MIIH	MIIH	MIIH
Cheilanthes feei	NI	NI	NI	NI
Cyperus lupulinus ssp. lupulinus	NI	NI	NI	NI
Elatine brachysperma	NI	NI	NI	NI
Eleocharis bolanderi	NI	MIIH	MIIH	MIIH
Eriogonum cusickii	NI	MIIH	MIIH	MIIH
Heliotropium curassavicum	NI	NI	NI	NI
Lipocarpha aristulata	NI	NI	NI	NI
Lomatium ochocense	NI	NI	NI	NI
Mimulus evanescens	NI	NI	NI	NI
Muhlenbergia minutissima	NI	NI	NI	NI
Penstemon peckii	NI	NI	NI	NI
Potamogeton diversifolius	NI	NI	NI	NI
Rorippa columbiae	NI	NI	NI	NI
Rotala ramosior	NI	NI	NI	NI
Salix wolfii	NI	NI	NI	NI
Talinum spinescens (Phemeranthus spinescens)	NI	NI	NI	NI
Thelypodium eucosmum	NI	NI	NI	NI
Utricularia minor	NI	NI	NI	NI
Helodium blandowii	NI	NI	NI	NI
Tomentypnum nitens	NI	NI	NI	NI
Tortula mucronifolia	NI	MIIH	MIIH	MIIH
Dermatocarpon meiophyllizum	NI	MIIH	MIIH	MIIH
Texosporium santi-jacobi	NI	NI	NI	NI

NI - No Impact.
MIIH - May Impact Individuals or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing or Loss of Viability to The Population Or Species.
WIFV* - Will Impact Individuals or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population or Species.
BI - Beneficial Impact
N/A - No Habitat or Species Present
***Trigger For A Significant Action As Defined in NEPA**
****Note: Rationale For Conclusion of Effect Is Contained In The NEPA Document.**
Form 2 (R-1/4/6-2670-95)

Non-native Invasive Plants

Introduction

The term invasive plant broadly encompasses all invasive aggressive or harmful non-indigenous plant species, including those designated as noxious weeds. Noxious weeds are those species of foreign origin, which have been listed by the Secretary of Agriculture or responsible state official, which can directly injure crops, or other interests of agriculture, fish and wildlife resources, or the public health. Some noxious weeds are toxic to wildlife, while others are simply unpalatable. The terms invasive plant, noxious weed, and weed are used interchangeably in the text.

Regulatory Framework

Invasive plants are non-native, introduced plants that have the ability to spread into natural habitats where they alter plant communities by displacing native species. Noxious weed is a legal term designated by state and county weed control laws. Noxious weeds are introduced to the United States; there are no native biological agents to keep them in check, and in sufficient numbers they can reduce biological diversity, increase fire risk, poison livestock, and reduce the quality of wildlife forage. The term invasive plant, as used in this document includes all non-native, aggressive species, including noxious weeds. Management of invasive plants is regulated by:

- The Federal Noxious Weed Act of 1974, as amended (7 U.S.C 2801 et seq.) requires cooperation with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to management and control of noxious weeds.
- U.S. Forest Service Manual 2900 directs the Forest Service to use an integrated weed management approach to control and contain the spread of noxious weeds on National Forest System (NFS) lands and from NFS lands to adjacent lands.
- Executive Order 13112 (1999) directs federal agencies to reduce the spread of invasive plants. Invasive species have been identified by the current Chief of the Forest Service as one of the four threats to ecosystem health.

In October 2004, the Chief of the Forest Service released a National Strategy and Implementation Plan for Invasive Plant Species Management – part of the President's Healthy Forest Initiative. It focuses on four key elements: preventing invasive species before they arrive; finding new infestations before they spread and become established; containing and reducing existing infestations; and rehabilitating and restoring native habitats and ecosystems.

Invasive plant management direction contained in Land and Resource Management Plans of the Ochoco National Forest has been amended by the recently published *Pacific Northwest Region Invasive Plant Program – Preventing and Managing Invasive Plants* Record of Decision (USFS 2005). This site-specific FEIS follows new Standards and Guidelines as outlined in the regional document. The regional Record of Decision also releases the USDA Forest Service from direction provided by the 1988 Environmental Impact Statement and 1988 Record of Decision for Competing and Unwanted Vegetation, and the associated 1989 Mediated Agreement for invasive plant management. The R6 2005 ROD added goals, objectives, and standards for invasive plant management by amending the Ochoco National Forests' LRMP.

Treatment of noxious weeds is regulated by the 2012 Invasive Plant Treatments Final Environmental Impact Statement for the Deschutes and Ochoco National Forests, and various categorical exclusions for manual treatment.

Local prevention measures are outlined in the "Deschutes and Ochoco National Forests and Crooked River National Grassland Invasive Plant Prevention Practices" dated January 2006.

Analysis Methods

The existence, introduction, and spread of weeds are difficult to quantify and attribute specifically to any one vector on a landscape. As a result, this effects analysis will provide a mostly qualitative assessment of the alternatives on the risk potential for weed spread as a function of off-road vehicles, and adjacency of known invasive plant populations. Off-road vehicles are a physical vector of weed introduction and spread, and cause disturbance that creates a weed-susceptible environment.

Invasive plant population, as used here, describes a weed occurrence that can be as small as one plant, to as large as thousands of plants but are spatially separated from other occurrences. Most noxious weed infestations begin on disturbed areas, such as road shoulders, harvest landings, and recreation sites. The level of potential risk of invasive plants among the four alternatives is measured by:

- total mileage of motorized routes designated for this project
- route adjacency to areas infested with weeds

Assumptions used in the analysis:

- Project Design Criteria (PDCs) for invasive plants listed in Chapter 2 of the EIS would be implemented and enforced.
- Vehicles are a vector for the establishment and spread of invasive plants. The more miles that are open to motorized use, the greater the potential for invasive plant spread.
- All highways and open Forest Service roads would continue to receive motorized use by all types of vehicles, which is the same for all alternatives. The differences between alternatives are based on the number of trail miles proposed.
- All forms of motorized vehicles are lumped together in the botany analysis, regardless of class of vehicle. Trails are considered to be 10-feet wide, regardless of class of vehicle, to account for effects from microclimate changes, dust, vehicles passing, etc.
- As determined by the Travel Access Management decision, cross-country travel would not be permitted within the project area.
- A 2.5 to 5.6 percent yearly increase in the number of riders would occur for each of the action alternatives.

Existing Condition

Currently there are 524 noxious weed populations encompassing 2,090 acres within the project area. See Table 124 for a list of weeds present. These weed sites range from a handful of plants, acres of scattered individuals, to areas with complete noxious weed cover. Systematic weed inventories have been completed in some areas through project botanical surveys; other informal inventories occur as Crook County Weed Control and Forest Service personnel travel throughout the project area.

Table 124. Noxious Weed Occurrence within the Ochoco Summit Analysis Area.

Species	Common Name	Morphology	Number of Populations	Acres
Acroptilon repens	Russian knapweed	Perennial with adventitious shoots	3	0.9
Cardaria draba	Whitetop	Rhizomatous perennial	18	5.8
Carduus nutans	Musk thistle	Biennial / winter annual	1	0.1
Centaurea biebersteinii	Spotted knapweed	Short-lived perennial	73	149.8
Centaurea diffusa	Diffuse knapweed	Herbaceous annual to perennial	26	41.3
Centaurea solstitialis	Yellow starthistle	Herbaceous annual	3	18.4
Cirsium arvense	Canada thistle	Perennial with adventitious root buds	83	21.3

Table 124. Noxious Weed Occurrence within the Ochoco Summit Analysis Area.

Species	Common Name	Morphology	Number of Populations	Acres
Convulvulis arvensis	Field bindweed	Herbaceous perennial	5	0.8
Cynoglossum officinale	Houndstongue	Herbaceous biennial or short-lived perennial	204	1,787.7
Cytisus scoparius	Scotch broom	Woody perennial shrub	1	0.1
Dipsacus fullonum	Teasel	Herbaceous biennial	10	3.0
Euphorbia esula	Leafy spurge	Herbaceous perennial	1	0.25
Hypericum perforatum	St. John's-wort	Rhizomatous perennial	10	4.6
Leucanthimum vulgare	Oxeye daisy	Rhizomatous perennial	3	0.2
Linaria dalmatica	Dalmatian toadflax	Perennial with adventitious root buds	4	0.78
Linaria vulgaris	Yellow toadflax	Perennial with adventitious root buds	3	0.6
Onopordum acanthium	Scotch thistle	Herbaceous biennial	8	3.7
Potentilla recta	Sulfur cinquefoil	Herbaceous perennial	10	3.8
Salvia aethiopis	Mediterranean sage	Herbaceous biennial	11	5.9
Taeniatherum caput-medusae	Medusahead	Annual grass	47	40.7
Total			**524**	**2,089.8**

Table 124 does not include low priority species such as bull thistle, mullein, cheatgrass, North Africa grass, or other species that are not tracked in databases kept by the Forest due to abundance. Canada thistle is also under-represented in Table 124 because the Forest stopped keeping records on small populations due to abundance.

Few noxious weed populations present in the project area can be treated with herbicides under the current authority of the Noxious Weed EA. Weed populations discovered or introduced outside the treatment units designated in 1998 cannot be controlled with herbicides due to lack of environmental analysis. An environmental impact statement is currently being prepared that would allow control of most populations of invasive plants using herbicides; the decision is expected in 2012.

The morphology of noxious weeds determines how a plant reacts to other control methods. Hand-pulling rhizomatous perennials such as whitetop and toadflax, is not effective, they are species that usually increase in density using manual control because new plants form from any root segments left in the soil after pulling the mature plant. Biennial plants can be reduced in density with diligent, twice-yearly manual pulling. Very small patches of medusahead can be controlled by diligent hand pulling throughout the growing season, however most infestations are too large to effectively pull the vast numbers of this annual grass. Species such as spotted and diffuse knapweed are perennial plants that have deep root structures and do not respond to manual control.

Most of the noxious weed sites within the project area are found along road corridors. From these points of initial infestation, weed species become opportunistic in invading suitable microhabitats adjacent to the initial infestation site. Exceptions to this include the Snowshoe area in the northwest corner of the project area, and Roba, which is located in the southeast. These two areas contain large infestations of houndstongue that has invaded riparian and forest habitats rather than roadsides. Most of the noxious weed species within the project area thrive in open full sunlight on disturbed soils in which native species have been diminished or displaced (conditions commonly associated with roads). Most of the noxious weed species listed in Table 124 are spread by vehicle traffic making

road corridor weed sites of high concern. Medusahead and houndstongue are primarily spread by other means. These weeds are extremely competitive, have rapid spread rates and are moved around by wind, and animals in addition to vehicles. Low priority weed species, such as Canada thistle and bull thistle, also readily establish where soil and plant associations have been disturbed. These species, however, are not highly persistent and populations usually decline as the tree canopy closes and/or with competition from seeded/native species.

Direct and Indirect Effects – Alternative 1

All-terrain vehicles can affect the project area in two ways, the new introduction of invasive plants by bringing seed in from elsewhere, and the spread of established infestations in the planning area by creating disturbance. Travel Management rules allow vehicle use and camping on most gravel and native surface roads. Exceptions include individual roads signed as closed to vehicle traffic, and areas such as Lookout Mountain Roadless Area. There are also seasonal closures of spur roads in the southern portion of the project area during fall and winter. OHV use in the east part of the project area is low, mostly local riders, with an increase during hunting season (personal observation). The western part of the project area receives more OHV use, presumably because it is closer to Prineville. There are no designated OHV trails within the area to draw riders specifically for recreational trail riding, and no designated trails are proposed in this alternative. Therefore, the probability of increase in establishment and spread of noxious weeds is equal to the current condition; vehicles would continue to be a vector of weed spread. No new trails that would provide susceptible environment for noxious weed establishment, and there would be fewer OHVs to act as vectors of weed spread.

The effects of the project on noxious weed introduction, establishment, and spread is indicated by the area of potential disturbance as measured in miles of designated roads and trails to be used for OHV routes within the project area. Table 125 indicates miles of potential disturbance by alternative and a description of effects in the sections following.

Table 125. Miles of designated trail, and number of gathering areas by alternative.

Alternative	1	2	3	4
Existing routes	0	46.4	13.8	53.2
Closed routes	0	43.2	29.4	61.1
Decommissioned routes	0	11.4	7.5	13.4
New routes	0	69.1	50.3	84.5
Total miles	**0**	***170.1***	***101***	***212.2***
Staging areas	0	10	4	10
Play areas	0	3	0	1
Parking areas	0	1	0	0
Trailheads	0	6	0	0
Total number of areas	***0***	***20***	***4***	***11***

OHV use would continue to occur under the No Action alternative. The resulting risk of weed introduction is moderate in the planning area. OHVs brought to the project area that are not clean may harbor weed seed and plant parts that can introduce new infestations. OHVs can also run through existing weed infestations, further spreading the population by creating additional disturbance for a seed bed, or picking up seed and carrying it to another portion of the area. There are several areas open to cross country travel (such as rock pits) within the Ochoco Summit project area that have noxious weed populations. These sites include Walton Lake Sno-Park, Crystal, Scotts Camp, Podo and Six Corners. OHV users that recreate in these areas are likely to cause new weed infestations in the project area.

No new trails would be designated or constructed within or adjacent to the Snowshoe or Roba areas. These areas have large populations of noxious weeds, primarily houndstongue, across the landscape. Less soil disturbance and fewer vehicles results in less risk of weed introduction and spread in this alternative.

Direct and Indirect Effects - Alternatives 2, 3, and 4

There has been a dramatic increase in OHV use in Oregon over the last 20 years. A publication by Lindberg (2009) for Oregon State Parks reports that there were nearly 139,000 in-state permits given out in 2008 for OHVs. Central Oregon is the 4th most used region for recreational riding in the state, with 382,218 trip days (including riders from out-of-state it is 449,668 trip days). Designating a trail system within the Ochoco Summit project area would increase the OHV use. The increased use of OHVs within the project area would increase the introduction and spread of noxious weeds for Alternatives 2, 3, and 4.

Seeds from many species of noxious weeds can be carried within the tread of tires or in cracks and crevices of motor vehicles and then become dislodged in other areas. A study done by Montana State University (Tayor 2011) determined that there is little difference in the number of seeds picked up by different vehicles. OHVs and passenger vehicles all collect the same number of seeds, and these seeds can remain attached to the vehicle after travelling 160 miles. It is then reasonable to assume that unwashed vehicles coming from other areas can bring new weed species to the project area. When tires of motor vehicles displace topsoil and damage vegetation, the resulting bare soil becomes potential sites for weed establishment. A Montana State University Extension Service Bulletin (1992) explains that rapid dispersal of weeds is characteristic of motorized routes where “ORVs can quickly spread 2,000 knapweed seeds over a ten mile area,” and a 1998 bulletin states, “Protecting and conserving the surface soil are critical to the long-term sustainability of healthy, functioning ecosystems. In one study, runoff was 1.5 times higher and sediment yield was 3 times higher on spotted knapweed-dominated plots than on plots dominated by the native bluebunch wheatgrass. Loss of soil because of noxious weeds may have very serious consequences in the future” (Sheley et al. 1998). Healthy, functioning plant communities are critical for deterring the establishment of invasive plants.

Alternatives that propose more area open to motor vehicle travel and that have higher densities of designated routes pose a higher risk of noxious weed spread, introduction into new sites, and create greater challenges for detecting and controlling new weed sites. Table 9 displays the planned miles of designated trails for the action alternatives. Alternative 3 proposes the fewest miles of trail and the fewest number of gathering areas, somewhat lowering the risk of weed introduction compared to Alternatives 2 and 4. Alternative 3 also splits the use into two areas, without a designated connection between the two. In one of the two areas, the east side of the project area on the Paulina Ranger District, a motorcycle trail system would be designated where OHV use is currently low. This will increase the risk of weed introduction substantially for that area. Also, while Alternative 3 has the least amount of miles overall, it has the highest percentage (86%) of trails that will either open closed and decommissioned roads, or create new disturbance through trail construction. The density of trails on the west end of the project area is also the highest for Alternative 3. The above combination of factors gives Alternative 3 a high risk level for invasive plant establishment even though the Alternative proposes the least amount of trail miles.

Table 126 shows that Alternatives 2 and 4 would designate 170 miles and 212 miles of trail from Highway 26 across the Forest to Deep Creek Watershed on the Paulina Ranger District. Along with mileage differences for the two alternatives, there are also differences in the number of gathering areas. These are areas where use would be concentrated, and activities such as camping and play-riding for kids would take place. Anywhere that use is concentrated and various vehicle types are gathered, will increase the risk of weed introduction. Alternative 4 proposes 11 different gathering areas compared to the 20 proposed for Alternative 2, which has fewer miles of trail designated. This is in response to one faction of public comments about the project, saying more miles of trail are needed, and fewer trailheads, parking, and playing areas. Alternatives 2 and 4 are similar in the percentage of closed, decommissioned, and new routes, 73%, and 75% respectively. These two

alternatives would expose new bare ground and also recovered vegetation on closed and decommissioned roads resulting in a high risk for invasive plant establishment.

Project design criteria require that trail construction and maintenance equipment be cleaned of all dirt and plant parts before entering Forest Service lands. This requirement would reduce the risk of introducing a new invasive plant population. Another possible form of weed introduction is through materials brought in to build trails (dirt, gravel, rock), or enhance trail difficulty. Enhancement often includes narrowing the trail or placing obstacles such as logs and boulders. A project design criteria requires materials to be weed free. This criterion is thought to be only moderately effective because some materials clean better than others. For example, boulders can be cleaned, while logs and fill material is much more difficult to guarantee to be weed free.

As stated above, the type of activity, intensity and location of associated disturbance, and proximity to a seed source will affect the probability or risk of introducing noxious weeds. When ground and soil disturbance are likely to result in a measurable change from the existing condition, there is a high associated risk of introducing noxious weeds. Location of the proposed trail system is also important to the risk potential and associated effects. OHV use on the east end of the project area on Paulina Ranger District is currently low (personal observation). All alternatives propose trails circling the area surrounding Little Summit Prairie that was designated as a sensitive resource area by the Paulina District Ranger, and who recommended to prohibit off-road OHV use. This area contains important resource attributes including a major population center for Peck's mariposa lily, a Regional Forester's sensitive plant species; a high density of prehistoric archaeological sites; soils that have a high-risk for erosion; and one of the most interconnected habitats for redband trout, another Regional Forester's sensitive species. Although no trails are proposed directly within the Little Summit Prairie area, trail designation in close proximity, and increased use on all open roads would result in increased potential for invasive plant establishment and spread in an important resource area. This area, and others within the project boundary, is scab-stringer habitat, dominated by non-forested plant communities that have shallow clay soils. These areas have seen a dramatic increase in invasive winter annual grasses over the last six years (personal observation). *Ventenata dubia* (North Africa grass) in particular has spread, along with cheatgrass and medusahead rye. Theories on reasons for the increase include distance to infested roads and trails and the nature of soil properties. These heavier textured soils do not support vegetation that provides shade, soil temperatures are higher and the high clay content provides ample winter moisture for early growth of invasive grasses, while native grasses are still dormant (Riegel 2010). Increases in trail miles within or adjacent to scabland habitat is likely to increase the potential for spread of annual grasses.

Directly south of the Little Summit area is a very large infestation of houndstongue scattered throughout 19,000 acres (Roba). This species is spread through "Velcro"-like hooks on the seed, and is readily transported by clothing, vehicles, and animals. It germinates readily anywhere a seed is dropped on bare soil, and OHV trails would be vulnerable to houndstongue establishment. There is also a large infestation of houndstongue on the west end of the project area adjacent to the trail system proposed near Ochoco Divide Research Natural Area (Snowshoe). There is a high risk that houndstongue would be spread in this area as well.

Another element of risk that would have an effect on the potential for weed spread is the proximity to existing weed seed sources. Table 126 displays the trails and gathering areas directly within noxious weed infestations. Overall overlap within noxious weed locations is low. There are three weed infestations being crossed by trails, and 5 gathering areas within weed sites. Weed sites within the concentrated use areas (staging, etc) have the most potential for spread throughout the trail system. The gathering areas would receive intense use and seed would be carried down the trails radiating out of the area. Alternative 2 has the highest risk of spreading existing infestations as it has the highest number of trail/gathering/weed overlap.

Table 126. Summary of proposed trails and gathering areas within noxious weed infestations.

Infestation	Alternative 2	Alternative 3	Alternative 4
Diffuse knapweed #453	2 trail intersections, and Scotts Camp Trailhead	2 trail intersections	2 trail intersections
Spotted knapweed #828	1 trail intersection		2 trail intersections
Spotted knapweed #785	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Canada thistle #691	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Canada thistle #692	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Russian knapweed #922	Walton Lake staging area	Walton Lake staging area	Walton Lake staging area
Spotted knapweed #197	Cottonwood Pit staging area	Cottonwood Pit staging area	Cottonwood Pit staging area
Canada thistle #198	Cottonwood Pit staging area	Cottonwood Pit staging area	Cottonwood Pit staging area
St. John's-wort #167	Staging area on FS road 42		Staging area on FS road 42
Diffuse knapweed #206	Play area on FS road 30		

All action alternatives would result in an increase of noxious weeds and other invasive plants across the project area. This in turn would result in additional expense for controlling invasive plants on the Forest. The nature of the proposal involves a constantly disturbed environment due to continued use of the trail system by vehicles coming from different parts of the state or country with a high probability of bringing in weed seed and plant parts. In 2007 it was estimated that in Central Oregon as a whole, there were approximately 52,000 visitors using trail systems (Ramming, pers. comm.). The North Millican OHV area had 9,985 riders in 2008, which has similar weather and predicted period of use as the Ochoco Summit proposed trail system (Skelton 2010). In the long-term, trail use is expected to increase by 2.5-5.6 percent per year (Skelton 2010). Using the low end of estimated increase in the first half of the decade (due to the current recession), and using the high end on the second half of the decade, it is estimated there may be 15,000 riders using the Ochoco Summit trail system by 2020. Concentrated and increased of use of the area will result in a constant need to monitor the trail system for noxious weed presence, and an increased need for treatment. As the Forest does not currently have the ability to use herbicides as a treatment method for new sites, manual control would be used which is more labor intensive and more expensive. As costs increase, the ability to inventory and monitor the trail system decreases, which limits the ability to catch the infestations while small. Controlling small infestations of most species is less expensive and more effective. Current budgets are not sufficient for the Ochoco National Forest to control all known infestations; due to the high risk potential of noxious weed establishment on an OHV trail system, it is not unreasonable to expect that the proposed trail system would further jeopardize the Forest's ability to detect and control weeds in the long-term.

Summary

Alternative 1 (no trail system) would not increase the potential for invasive plant establishment. Alternatives 2, 3, and 4 would increase the potential for invasive plant establishment. When ground and soil disturbance are likely, there is a high associated risk of introducing noxious weeds and other invasive plants. All action alternatives result in a high risk, with differences due to magnitude. The two measures used to differentiate between alternatives (miles of trail/number of gathering areas, and adjacency to existing seed source) show that Alternative 3 has a somewhat reduced potential for weed spread due to fewer miles of trail, fewer areas of concentrated vehicles in staging and parking, and

less disturbance adjacent to existing weed infestations. Alternative 4, although proposes more miles of trail, has less risk and potential for weed spread than Alternative 2. This is due to fewer gathering areas, 11 staging/parking/play areas versus 20. These concentrated areas of use and collection of vehicles pose a greater potential for weed spread. Alternative 4 also proposes slightly less disturbance adjacent to existing weed infestations than Alternative 2. Alternative 2 has the highest potential for weed introduction and spread and associated expense of treatment.

Cumulative Effects

Alternative 1 does not propose a trail network or disturbance, and as a result there are no cumulative effects. This alternative will not be carried further in the cumulative effects discussion. Cumulative effects are the same under Alternatives 2, 3, and 4 with only the variance in the direct and indirect effects.

Past road construction and maintenance, grazing, timber harvest and other soil disturbance have provided environments for noxious weed species establishment, vectors for noxious weed dispersal, and infestations of noxious weeds as seed sources for spread. Past activities within the analysis area have resulted in moderate amounts of weed infestations occupying 2,090 acres. Over 1,400 acres of this is houndstongue, which is difficult to control and easily spread by a number of vectors, including vehicles.

The potential for noxious weed establishment and spread from passenger vehicles not associated with the project along open road corridors (including seasonally open roads) would continue. The potential for other vectors of spread within the project area including people, wind, or animals would also continue.

Specific on-going activities in the project area are similar to past actions including timber harvest, precommercial thinning, prescribed burning, grazing, OHV use, and other forms of recreation such as hiking, horseback riding, and camping, all of which introduce and spread noxious weeds. Known sites are treated based on priority; effectiveness of the treatment depends on the species and control method – pulling or herbicide (if approved for herbicide treatment).

In addition to the current activities within the project area, adding 101 to 212 miles of designated OHV trail would result in cumulative impacts to native vegetation from invasive plants. OHV travel is allowed on designated routes within most areas of the Ochoco Summit Trail project area, and use is increasing. The proposed designated trail system is adjacent to several large houndstongue infestations. Based on the phenology and mechanism of spread of this particular weed, there is a high risk that the trail system would cause additional disturbance that would provide an optimal seed bed for germination. Designating a trail system would increase the intensity and extent of use in an area susceptible to weed invasion faster than use is occurring at present. The Forest does not currently have the ability to control noxious weeds using the most effective method, herbicide; this increases costs and limits the amount of treatment possible. These factors would cumulatively result in expanding noxious weed populations.

Future actions that have the potential to incrementally increase the risk of weed introduction are the Canyon and Jackson Vegetation Management EISs are currently in the NEPA process and include projected management acreage that overlaps with the Ochoco Summit OHV project area. Approximately 20,000 to 30,000 acres of vegetation and fuels management may be proposed for treatments including commercial thinning, small diameter thinning and prescribed burning. Of these activities, commercial harvest and fuels management (either burning or piling) would produce bare ground that is susceptible to invasive plant establishment, including species such as North Africa grass, medusahead and cheatgrass. Timber harvest may also require the construction of temporary roads to access units, and currently closed roads may be used for haul routes during timber harvest

operations. Collectively, these actions would have a short-term (3-5 years) increase in susceptible area until bare ground is revegetated.

Implementation of the Travel Management Rule of 2005 became effective December 30, 2011. The Deschutes and Ochoco Travel Management Plan is currently in the enforcement stage; and under this forest-level travel management plan, motorized use will be restricted to designated OHV trail systems and those Level II roads open for passenger vehicle travel. Cross-county OHV travel is no longer be allowed within the project area. This will lessen the cumulative impacts of the Ochoco Summit trail system in two ways. It will make it illegal to create new trails modifying those proposed for Ochoco Summit. For example there would be less potential for riders to cut across the loop around Little Summit Prairie, a sensitive resource area, in order to shorten the ride. Prohibiting the ability for users to create their own trails will reduce disturbance to native vegetation, and reduce the amount of exposed soil, thus lowering the risk of creating a susceptible seed bed for weed establishment. Implementing the Travel Rule will also concentrate OHVs as a vector of spread to areas designated in Alternatives 2, 3, and 4. This will help limit the scale of risk to a known location, facilitating surveys and weed control. It may however increase the intensity of use, more vehicles means more risk of weed introduction and spread.

The Ochoco/Deschutes NFs Invasive Plant Treatment is a proposal currently in the NEPA process that would increase the ability to effectively control invasive plants with herbicides. The ability to use herbicides would increase efficiency, thus lowering costs, which results in the ability to treat more acres for the same costs. This proposal does not synergistically interact with the proposed trail system, but does help reduce the extent and duration of effects of noxious weeds on native vegetation. Herbicide is more effective on difficult to control species such as annual grasses and rhizomatous species, resulting in smaller infestations and lower plant densities.

Special Plant Habitats

Introduction

Special plant habitats are areas which sustain unusual and/or particularly rich biological diversity. These habitats have a high probability of supporting rare species. All non-forest and riparian habitats are often treated as special habitats because they encompass such a small percentage of the land base in forested regions but have a disproportionate value in the conservation of biological diversity (USDA Forest Service 1996). For example, riparian areas where hardwood species are found usually constitute about 1-2% of the landbase on the Forest, yet riparian habitats are abundantly used for recreation such as camping, fishing and hiking. For this analysis, Hardwoods, meadow, rock outcrops, shrub-scablands, and grasslands will be considered special habitats.

Regulatory Framework

The Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by NFMA of 1976 requires National Forests to provide for the diversity of plant and animal communities. Forest Service direction for managing habitats for all existing native and desired non-native plants in order to maintain viable populations of species comes from Forest Service Manual 2600 (USFS 1995, WO Amendment 2600-95-7. Direction for Research Natural Areas is found in Forest Service Manual 4063.04b, which gives direction to manage and protect all RNAs and allow natural processes to occur for research and education.

The Ochoco NF Land and Resource Management Plan addresses some facets of special habitats and biological diversity, such as riparian areas, connective habitat, snags, old growth, RNAs, non-forest plant communities including scablands, and sensitive plant and animal species. This analysis will look at a subset of these as described in the introduction. The LRMP does not specifically identify a desired future condition for the biological diversity of plant species. It does address riparian areas, which provide important habitat for many sensitive species within the Project Area. The LRMP states

that most of the riparian areas will be in excellent condition within 50 years, characterized by vigorous stands of forbs, grasses, and grass-like species on stable stream banks. It also addresses scablands, and recognizes them as fragile areas adversely affected by management activities.

Analysis Methods

Hardwoods will include cottonwood, aspen, alder, and willow communities. Meadows include dry, moist and wet meadows that have saturated soils for some of time during the year. Rock outcrops are exposed rocks that are large enough to be mapped in GIS. Shrub-scablands include non-forested areas dominated by low and rigid sagebrush and Sandberg's bluegrass. Unique grassland areas include those dominated by Sandberg's bluegrass and one-spike oatgrass. The Ochoco Divide Research Natural Area will be included in the discussion due to its special status and proximity to proposed trails. Effects of the proposal will be measured by:

- Acres/miles of special plant habitat impacted by proposed trails and gathering areas.

Effects of new trail construction and re-construction of revegetated closed roads will be analyzed for short-term effects of 3-5 years. Use is expected to continue on all trails for the long term, >10 years.

Assumptions:

- Areas open to motorized recreation have a higher risk of impacting vegetation, including special plant habitats.
- All forms of motorized vehicles are lumped together in the analysis, regardless of class of vehicle.
- Areas that are seasonally closed were analyzed as open because there can be impacts to native plants and native plant habitats regardless of when the area is open. If the area is not 100% closed all year long, it is considered open.
- All forms of motorized vehicles are lumped together in the analysis, regardless of class of vehicle. Trails are considered to be 10-feet wide, regardless of class of vehicle, to account for effects from microclimate changes, dust, vehicles passing, etc.
- Calculated acres of hardwood communities are based on potential, and stands are not necessarily currently fully occupied by hardwood species.

Existing Condition – Special Plant Habitats

The texture and pattern of biodiversity can be examined at many different scales, ranging from global to microscopic. At the landscape scale, the coarse scale of Plant Association Groups was used to calculate the amount of special habitat within the project area (see Table 127). This course scale using GIS can miss unusual small scale habitats such as an individual dead tree or root wad, which can provide habitat for rare species of fungi, bryophytes, and lichens. That fine scale of biological diversity will not be analyzed.

Hardwoods – This type is dominated mostly by quaking aspen (*Populus tremuloides*) stands. Black cottonwood (*Populus trichocarpa)*, mountain alder (*Alnus incana*), and willow (*Salix* species) make up a small amount of the acreage listed in Table 11. These deciduous hardwood trees and shrubs provide a variety of important ecological functions, diversification of landscape patterns, and habitat for many other species (USDA Forest Service 1997). Riparian communities made up of these species are extremely diverse in plant life since they initiate forest succession, and thus provide great structural diversity. Hydrologically, hardwoods provide excellent stability to stream banks and soil surfaces. Their deep and spreading root systems can resist flood pressures and slow water velocity. They provide shade to help maintain stream temperatures, and abundant leaf shedding in the fall increases soil fertility.

Aspen and cottonwood are short-lived, early seral species that rely on disturbance for establishment. Black cottonwood has been declining due to conversion of floodplain vegetation to agricultural uses,

changes in stream systems (confining streams into a single channel), over browsing by livestock, elk and deer, and conifer encroachment (USDA Forest Service 1997). Quaking aspen, alder and willow are declining as the result of conifer encroachment and increasing density, over browsing by livestock, deer and elk, and loss of habitat where the water table as dropped due to stream downcutting.

Meadows (wet, moist and dry) – Meadow communities are found in areas where ground water is higher than that found on the surrounding upland sites, such as a spring. They can also include perched water table areas within stream communities. Meadows communities include moist meadows, where moisture is available in the rooting-zone during the growing season, but drops 1-3 feet in the fall, and wet meadows, where available water is at or near the surface all season long (Hall 1989). Dry meadows have no standing water and dry out completely in the summer.

Rock – these are areas of exposed surface rock (pavement), outcrops, or boulders. Dry rock habitats occur when plants establish themselves in soil deposited between rocks. Many plants found here are also found in dry forest and even moist forest habitats; however, some plants occur only when a dry rock habitat receives ample moisture in the spring before drying up in summer. Lichen, mosses, ferns, scarlet gilia, wild rose, ninebark, oceanspray, and smooth sumac, are often found here. This plant habitat is unique, including ephemeral meadows formed by filling of rock pools, and "hanging" clumps of vegetation developed in soil that accumulates in stepped, pocket-like depressions along outcrops and boulder fields.

Shrub-scabland – These non-forested habitats have rocky, shallow soils and are commonly found on topographically high sites such as ridges. Dominated by scattered sagebrush, bunchgrasses, and forbs, these sites are particularly exposed to summer heat and dryness, winter cold, and spring frost-heaving. Occasional species include mountain mahogany and juniper. Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. Revegetation is nearly impossible due to water saturation and frost heaving (LRMP 1989).

Grassland – These are also scabland habitats, but are even drier and have shallower soils than shrub-scabland described above, and have the highest combined surface rock, pavement, bareground percentage (63%) of any grassland in the Blue and Ochoco Mountains (Johnson and Clausnitzer 1992). This habitat is dominated by Sandberg's bluegrass and one-spike oatgrass. Forbs include low pussytoes, yarrow and bisquitroots.

Table 127. Acres of special habitat within the Ochoco Summit project area.

Special Habitats	Acres	Percent of total area
Hardwood	2,046	0.7
Meadows	8,705	3
Rock	1,668	0.6
Shrub-scabland	41,296	14
Grassland	5,897	2

Biological soil crust is present in scabland and grassland habitat where there are significant areas of open space between vegetative clumps that are exposed to the elements. Erosion in these areas is controlled by pebbles and communities of nonvascular or cryptogamic plants that grow upon or immediately beneath the solid surface. Where established and undisturbed, the cryptogams form a recognizable crust. These plants, made up of algae, lichens and mosses play an important role in soil stabilization (Anderson et al 1982). This crust is a unique feature to semi-arid conditions within scabland habitat.

Research Natural Areas - (RNAs) are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands (Forest Service Manual 4063). RNAs are managed such that natural physical or

biological processes are allowed to prevail without human intervention. According to FSM 4063.3, standards, management of an RNA must support and promote the basic objectives and purposes of establishing the area.

Overall objectives for RNAs are to maintain a wide spectrum of high quality representative areas of the major forms of variability found in forest, shrublands, grasslands, alpine, and natural situations, to preserve and maintain genetic diversity, and to protect against human-caused environmental disruptions. Each RNA contains representative or unique natural features in a relatively undisturbed condition. The designation of these areas provides long-term protection and recognition of their natural values for research and baseline ecological study, observation, and conservation of biological diversity. The Ochoco Divide RNA is present within the project area and was chosen to represent the ponderosa pine-Douglas fir and grand fir-western larch-Douglas fir plant associations.

There would be no change to the management of RNAs, regardless of the chosen alternative. These areas are not open for motorized travel off of designated routes nor motorized access to dispersed camping. It is included in the analysis due to the proximity of the proposed trail system and invasive plant populations.

Direct and Indirect Effects – Special Plant Habitats – Alternative 1

Alternative 1 is the No Action Alternative; no trail system would be designated, and no staging or associated camping areas would be developed. The current management policy is that many roads within the project area are open to travel by motorized vehicles, and cross-country travel is prohibited. This policy would remain in effect in this alternative. Areas not open to off-road use includes Ochoco Divide RNA, Bridge Creek Wilderness, and Lookout Mountain Roadless Area. Most of the OHV use in the project area occurs on roads (personal observation), where the disturbance to native vegetation from the construction of the road is a past action. There are some areas where user-created trails are increasing, especially on the west side of the planning area closest to Prineville. The amount of both on and off road use is expected to continue as the popularity of OHV use continues to increase and the population of Prineville and the surrounding area continues to increase. Even though OHV use is expected to increase, the effects under Alternative 1 are minor, because the roads open for travel are already established, and no new disturbance would take place. Minor effects from dust would affect plants along the roadsides (see the effects section below for more detail)

General Effects Common to all Action Alternatives

Direct impacts on vegetation caused by vehicles include crushing of foliage, root systems, and seedlings (Wilshire et al. 1978b). Plant foliage and stems can be damaged and plants uprooted by vehicles, so that actual plant damage may occur over an area much larger than the track width. Indirect effects of vehicles on vegetation include undercutting of root systems as vehicle paths are enlarged by erosion (Wilshire 1978a). Secondary effects from disturbance include the proliferation of exotic plant species and a higher frequency of fire (Lovich and Bainbridge 1999). Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Indirect effects can be invasion by invasive plants into disturbed areas which then compete with native plants. In general, grasslands, riparian areas, and relatively dry, open forests are more susceptible to invasion than are dense moist forests and high montane areas (USDA Forest Service 2005a, p. 3-40). The former have frequent gaps in plant cover, which favor invasive plant establishment, whereas the latter have relatively closed plant cover or have extreme climate or soils, which are tolerated by fewer invasive plant species. Invasive plants tend to colonize disturbed ground along roads, highways, along trails, and in campgrounds and quarries. Once established, invasive

plants begin to spread, displacing native vegetation. Eastside forests are more susceptible to invasive plants for the above reasons.

Motorized use, especially concentrated and repeated use, can degrade native plant habitats by denuding areas of understory vegetation and compacting soils. Of particular concern are special habitats, those which sustain unusual and/or particularly rich biological diversity. People are drawn to unique places such as aspen stands, meadows, and rock outcrops; scablands often provide vistas due to their ridgetop location. Visiting these areas by motor vehicle can have a lasting impact to areas of fragile soils, including damage to biological soil crust. When soils are severely disturbed, vegetation cover can be reduced significantly and plant growth can be impaired (reviewed in Ouren et al. 2007). Davidson and Fox (1974) reported significant loss of herbaceous vegetation from motorcycle activity. Bolling and Walker (2000) reported that track roads had significantly lower total vegetative cover than control areas. Total plant density and cover were significantly lower in roads than in controls in the Mojave Desert, and long-lived plant species were greatly reduced in disturbed areas compared to controls (Prose et al. 1987).

Several special habitats are particularly susceptible to invasion of non-native annual grasses (medusahead, cheatgrass, and North Africa grass) including the dry meadows, shrub-scabland and grassland habitats.

Direct and Indirect Effects – Special Plant Habitats – Alternatives 2, 3, and 4

The Ochoco Summit project proposes a designated trail system, and accompanying trailheads, campgrounds, staging areas, parking areas and play areas (herein called gathering areas). Alternatives differ in the number of miles, trail location, and number of gathering areas. Effects to sensitive areas are similar between alternatives, varying by magnitude of interaction.

The action alternatives are expected to increase off road vehicle use, increase number of riders, and provide associated facilities that would impact special habitats.

Relatively low recreational traffic intensities cause a significant drop in plant cover, plant height, species richness and species diversity, leading to an increase in soil compaction and a decrease in soil organic matter and moisture content (reviewed in Kutiel et al. 2000). Kutiel et al. (2000) studied the response of soil and annual plants to various intensities of short-duration pedestrian and motorcycle traffic, and found that motorcycle passage had an immediate detrimental impact on annual plants at all traffic intensities.

Secondary effects from disturbances, such as off-highway vehicle use, include the proliferation of exotic plant species and a higher frequency of fire (Lovich and Bainbridge 1999). Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Table 128 displays the number of trail miles and converted acres (at 10’ width of disturbance) within special habitats. The effect of trails on hardwood communities appears low, 0.6 acres for alternatives 2, 3 and 4; however the pattern and location of the trails may have an effect beyond direct overlap with hardwoods. There are ten black cottonwood stands within the 300,000+ acre project area. This project proposes trails within or directly adjacent to three of them, including one that would have new trail built through it. Hardwood communities provide aesthetic enjoyment to humans, and aspen and cottonwood stands are particularly important to biological diversity. They provide important foraging, nesting, breeding, and resting sites for a wide variety of birds and mammals. In addition to the effects on vegetation within hardwood stands, noise may be a factor effecting wildlife (see the EIS Chapter 3 wildlife section). The network of trails shown in Figure 4 shows the adjacency to the many aspen stands in the west end of the planning area.

Table 128. Acres and miles of proposed trails located within special habitat.

Alternative	1	2	3	4
Hardwood	0 acres 0 miles	0.6 acres 0.5 miles	0.6 acres 0.5 miles	0.6 acres 0.5 miles
Meadows	0 acres 0 miles	2.4 acres 2.02 miles	2.5 acres 2.1miles	4.1 acres 3.35 miles
Rock	0 acres 0 miles	1.3 acres 1.1 miles	0.7 acres 0.6 miles	1.6 acres 1.3 miles
Shrub-scabland	0 acres 0 miles	29.1 acres 24.0 miles	10.8 acres 8.9 miles	33.2 acres 27.4 miles
Grassland	0 acres 0 miles	10.3 acres 8.51 miles	5.6 acres 4.75 miles	9.3 acres 7.7 miles
Total	*0 acres* *0 miles*	*43.7 acres* *36.1 miles*	*20.2 acres* *16.8 miles*	*48.8 acres* *40.25 miles*

In addition to the planned trails, the facilities to support the trail network would also occur within special habitats. Table 129 shows the number of gathering areas (staging, playing, trailheads, etc) planned for each alternative. Most of the planned facilities fall within special habitat:

Alternative 2 - 17 out of 20 areas within special habitat
Alternative 3 - 3 of 4 areas within special habitat
Alternative 4 - 10 of 11 areas within special habitat

Some of these locations are on large, already-disturbed sites, such as Marks Creek and Walton Lake Sno-parks, and Six Corners material source, where direct effects to vegetation would be negligible. Other sites would have impacts as developed recreation facilities are added. Impacts to special habitat may come from unauthorized riding from these points, where use can radiate out in many directions (see Figure 3). Matchett and others (2004) point out that OHV use may be heaviest on slopes, along right-of-ways, in washes, and in the vicinity of camping facilities.

Table 129. Number of gathering areas within special habitat.

Alternative	1	2	3	4
Staging areas	0	10	3	9
Play areas	0	3	0	1
Parking areas	0	1	0	0
Trailheads	0	3	0	0
Total number of areas	*0*	*17*	*3*	*10*

Effects to rock habitat would be low; regardless of the Alternative, less than two acres would be impacted by trails or gathering areas (0.1% of the rock in the project area). New trail proposed through rock habitat include 0.5 miles, 0.25 miles, 0.5 miles for Alternatives 2, 3, and 4 respectively. The fractured basalt in the project area does not provide the large boulders desired by jeeps for “rock crawls”. Trails would however, be designed to go through rock habitat to provide roughness and difficulty. Many of the rock areas in the project area are cliffs and rimrock, which have stepped, “hanging” vegetation would not be impacted.

Meadow and scabland soil and vegetation are vulnerable to disturbance by vehicles. Driving through these areas, especially when wet leads to rutting and soil compaction. Natural recovery rates following disturbance depend on the nature and severity of the impact but are generally very slow. Recovery to pre-disturbance plant cover and biomass may take 50-300 years, while complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). Table 12 shows that Alternatives 2 and 3 impact about 2.5 acres of the 8,705 acres present in the project area; and roughly 4 acres are impacted in Alternative 4. Within meadows, most of the trail miles would occur on previously closed or decommissioned roads, where the impact to soils and vegetation have already

occurred, especially soil compaction; however recovered vegetation would be impacted. Meadows are also open areas, where keeping traffic on the trail may be more difficult to enforce. Approximately one-half mile of new trails would be built through meadows in Alternative 2, and one mile each in Alternatives 3 and 4. Effects to meadows would be long-term, but small in magnitude.

Scabland soils (both shrub-scabland and grassland special habitats) are fragile ecosystems where damage is nearly impossible to mitigate (USDA 1989). The Ochoco National Forest LRMP states that the transportation system in scablands will be limited to long-term roads because of the inability to restore the impact of the road. Once a trail is constructed through the scabland or grassland, the effect is permanent. Design criteria (see EIS Chapter 2) meant to limit resource damage, such as closing trails if erosion or soil displacement is occurring, have little effect in this situation due to length of recovery period for scabland soil and vegetation. Belnap (1995) discuss how desert soils may recover slowly from surface disturbances, resulting in increased vulnerability to desertification. As a result, recovery from compaction and decreased soil stability is estimated to take several hundred years. The nitrogen fixation capability of soil requires at least 50 years to recover (Belnap 1995).

Combining shrub-scabland and grassland special habitats as having similar vegetation and soils, Table 128 shows that there are 32.5 miles of trail proposed in Alternative 2, 16.6 miles in Alternative 3, and 35 miles in Alternative 4. Off-road vehicle activity has been shown to greatly increase soil compaction in areas of intense traffic (Adams et al. 1982). Soil characteristics, particularly soil compaction, play important roles in the distribution, abundance, growth rate, reproduction, and size of plants. Even a few passes by vehicles can cause significant changes in soil properties (Ouren et al. 2007). Adams et al. (1982) found reduced cover of desert annuals in tracks created by as few as one (on wet loamy sand) to 20 (on dry loamy sand) vehicle passes; the reduction in cover, however, was not due to fewer plants, but to smaller plant sizes. With tracks made by 1, 3, 10, and 20 vehicle passes, Adams et al. (1982) found that annuals with large taproots decreased, whereas there was significantly greater cover of a non-native, fibrous-rooted grass. The fibrous root system allows for easier germination and root growth than large-taprooted species. Overall, the extent of immediate effects increases with the frequency of OHV passes. For example, Webb (1982; reviewed in Ouren et al. 2007) found that after a single pass, annual plants on an OHV route remained intact, but most were destroyed after 10 passes.

In addition to effects to soil and herbaceous vegetation, biological soil crust is impacted by OHV use. Maintaining soil stability and normal water and nutrient cycles in desert systems is critical to avoiding desertification (Belnap 1995). Soil compaction and disruption of biological soil crusts can result in decreased water availability to vascular plants through decreased water infiltration (Belnap 1995). Biological soil crusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. In rangelands, they function as living mulch by retaining soil moisture and discouraging annual weed growth (Belnap et al. 2001). Biological crusts are an important component of desert ecosystems, as they influence soil stability and fertility (Belnap 2002).

Once disturbed, natural recovery rates were found to be very slow (Belnap 1993). Recovery of biological soil crusts can be hampered by large amounts of moving sediment, and re-establishment can be extremely difficult in some areas. The rate of recovery for some components of biological soil crusts were significantly hastened on areas inoculated with surrounding biological crust material, however, lichen and moss recovery was minimal.

Belnap et al. (2001) also discuss how invasive plants affect biological soil crusts by reducing the diversity of native vascular plants. The risk of invasive plants spread by the project is high (see the Invasive Plants section of this document). The vertical and horizontal vascular plant structure of many arid and semi-arid vegetation communities optimizes growth of biological soil crusts. Vascular plants create windbreaks and shade, influencing how much moisture and light reach the soil surface. They also trap leaf litter, keeping the interspaces free of substantial or persistent litter cover. Invasive exotic

plants generally decrease the structural diversity of native vascular plant communities by creating monocultures of densely spaced plants and by homogenizing litter distribution. They also lead to decreased biological crust cover and species richness in most ecosystems.

Invasion of exotic annual plants into perennial plant communities can pose a long-term threat to biological soil crusts, as the crust-dominated interspace between perennial plants is often heavily invaded. Because biological crusts stabilize soils, germination of seeds of exotic species can be inhibited in sites with well-developed crusts and low plant litter, as was recently demonstrated for the annual exotic grass, cheatgrass (*Bromus tectorum*) (Belnap 2001). Kaltnecker et al. (1999) found that areas with intact biological soil crust cover maintain low cheatgrass densities despite abundant seed sources nearby. In contrast, native species that have evolved with biological soil crusts may have mechanisms, such as a geniculate awn that drills the seed into the soil. Shrub-scabland and grasslands within the project area are experiencing a recent increase in the density of invasive grasses, including cheatgrass, North Africa grass, and medusahead rye.

Effects to shrub-scabland and grassland habitat, including biological soil crust, would be long-term to permanent, but small in magnitude, with the most potential impact occurring near gathering areas. Acreage-wise there would be little scabland area affected, 39 acres, 16.4 acres and 42.5 acres for Alternatives 2, 3, and 4 respectively, out of 47,193 acres present within the project area.

Research Natural Area

The Ochoco Divide RNA is within the project boundary; no trails are proposed with the RNA itself. Direct effects to vegetation within the RNA are not expected. The risk of indirect effects from invasive plants is expected to increase as a result of the project. Alternative 3 proposes ¾ mile of new trail along the south RNA boundary, which is also directly adjacent to a houndstongue population. There are already houndstongue infestations within the RNA in the southeast corner, and all along the northern boundary. For all alternatives, OHV traffic out of the Marks Creek Snopark staging area may increase the risk of spreading the northern populations into the RNA from use of the 26-600 road system.

Cumulative Effects – Special Plant Habitats

Alternative 1 does not propose building and designating trails within special plant habitats, or other disturbance, and as a result there are no cumulative effects. This alternative will not be carried further in the cumulative effects discussion. Cumulative effects are the same under Alternatives 2, 3, and 4 with only the variance in the direct and indirect effects.

Past road construction and maintenance, grazing, timber harvest and other disturbance have impacted special habitats. Hardwood communities have decreased in stand size and health, and have become fragmented, due to lowered water tables. Moisture regimes in meadows have been altered by grazing and road construction. Dry meadows are becoming smaller due to conifer encroachment as a result of fire suppression. Shrub-scabland and grassland plant communities have been altered by invasive plants.

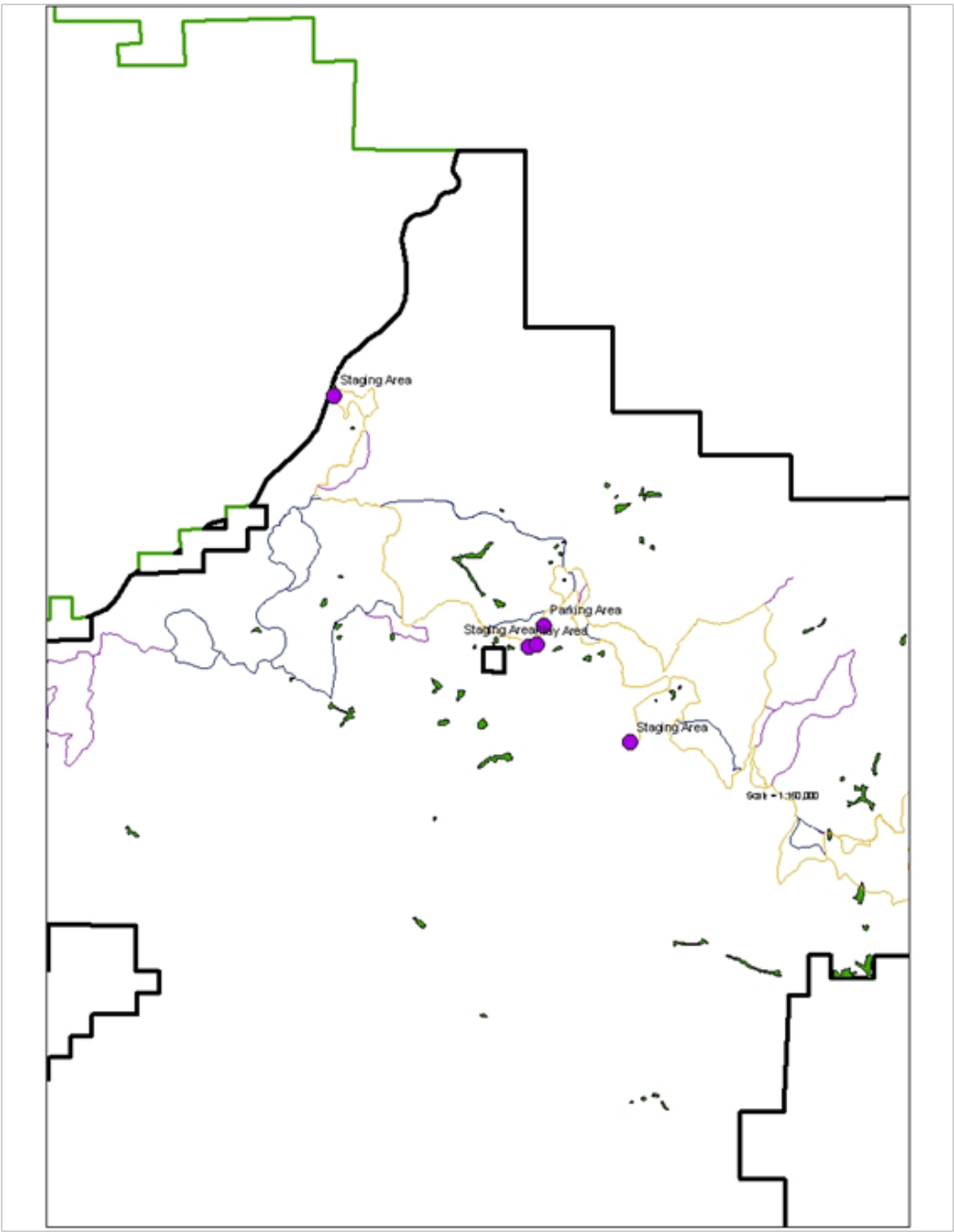
On-going activities will continue across the project. Specific on-going activities in the project area are similar to past actions including timber harvest, precommercial thinning, prescribed burning, grazing, recreation such as hiking, horseback riding, and camping, all of which impact special plant habitat. Some of these actions have positive impacts, such as conifer removal within aspen stands, and juniper encroachment removal in shrub-scablands. Personal observations of current OHV use in the project area see that some OHVs are damaging special habitat. Observations such as ruts in meadows, and hill-climbs on scabland habitat are not uncommon. OHV use in the spring is especially damaging to the soft soil in meadows and scablands. This damage is not limited to OHVs; passenger vehicles also engage in “mud bogging” as a form of recreation.

In addition to the current activities within the project area, adding 101 to 212 miles of designated OHV trail would result in small scale cumulative impacts to some special habitats, including meadows, shrub-scabland, and grassland. Hardwood plant communities are not expected to be cumulatively impacted by the proposed trail project. Noise effects to the wide variety of wildlife using this habitat may be a cumulative effect (see the Wildlife section in Chapter 3 of the EIS). The effects of the project on rock habitat is ½ acre at most from Alternatives 2 and 4, this is not a cumulative impact as there are no other activities affecting rock habitat. Trails through meadows and shrub-scabland would increase soil compaction, damage biological soil crust, and affect native plants as described under the Alternatives. Due to the narrow linear nature of these trails, the amount of area affected is small. These habitats are very open, and there is a risk of OHVs leaving the designated trail, becoming an enforcement issue, and increasing the amount of special habitat affected.

A risk of cumulative impacts to special habitats comes from the increase and spread of invasive plants. The proposed designated trail system is adjacent to several large houndstongue infestations. Based on the phenology and mechanism of spread of this particular weed, there is a high risk that the trail system would cause additional disturbance that would provide an optimal seed bed for germination. Designating a trail system would increase the intensity and extent of use in an area susceptible to weed invasion faster than use is occurring at present. The Forest does not currently have the ability to control noxious weeds using the most effective method, herbicide; this increases costs and limits the amount of treatment possible. These factors would cumulatively result in expanding noxious weed populations.

In addition to the current activities within the project area, adding 101 to 212 miles of designated OHV trail would result in small scale cumulative impacts to some special habitats, including meadows, shrub-scabland, and grassland. Hardwood plant communities are not expected to be cumulatively impacted by the proposed trail project. Noise effects to the wide variety of wildlife using this habitat may be a cumulative effect (see the Wildlife section in Chapter 3 of the EIS). The effects of the project on rock habitat is ½ acre at most from Alternatives 2 and 4, this is not a cumulative impact as there are no other activities affecting rock habitat. Trails through meadows and shrub-scabland would increase soil compaction, damage biological soil crust, and affect native plants as described under the Alternatives. Due to the narrow linear nature of these trails, the amount of area affected is small. These habitats are very open, and there is a risk of OHVs leaving the designated trail, becoming an enforcement issue, and increasing the amount of special habitat affected.

Future actions that have the potential to incrementally increase the risk of weed introduction are the Canyon and Jackson Vegetation Management EISs are currently in the NEPA process and include projected management acreage that overlaps with the Ochoco Summit OHV project area. Approximately 20,000 to 30,000 acres of vegetation and fuels management may be proposed for treatments including commercial thinning, small diameter thinning and prescribed burning. It is unknown at this time what special habitat may be directly affected by these activities. Commercial harvest and fuels management (either burning or piling) would produce bare ground that is susceptible to invasive plant establishment, including species such as North Africa grass, medusahead and cheatgrass. Timber harvest may also require the construction of temporary roads to access units, and currently closed roads may be used for haul routes during timber harvest operations. Collectively, these actions would have a short-term (3-5 years) increase in susceptible area until bare ground is revegetated.



Yellow = proposed trails in Alternative 2
Purple = additional proposed trails in Alternative 3
Blue = additional proposed trails in Alternative 4

Figure 6. Aspen stands (dark green) on the west end of the Ochoco Summit Project Area in relation to proposed trail locations and gathering areas.

Cultural Resources

This section includes a summary of the Cultural Resources specalist's report; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon. Due to the sensitive nature of some information in the report, portions of the report are FOIA-exempt.

History

The Ochoco Mountains form the headwaters for the Crooked River. Drainages including tributaries join the North Fork of the Crooked River as it winds its way through Big Summit Prairie. Likewise tributaries join Little Summit as they feed the wetlands at Little Summit Prairie eventually joining in with Deep Creek drainages and making their way into the North Fork of the Crooked River. These waters, along with the Wolf Creek drainages, flow from the high ridges of the Ochocos through forested uplands to the main stem of the Crooked River in the Deschutes basin. Big Summit Prairie and Little Summit Prairie were especially important to both Indian People and early Anglo settlers for their abundant resources and water. The Ochoco Mountains offered high elevation country in contrast to the arid shrub-steppe lowlands common along the main stem of the Crooked River which makes the high desert country so unique.

Indian people have occupied these upland areas since time immemorial. Archaeological evidence documents the intensive use in and around Big Summit and Little Summit Prairies. The uplands extended seasonal hunting and gathering activities and provided valuable resources. Camas and a variety of other root crops could be dried and stored to sustain these groups through the long cold winters common to the high desert. The North and South Fork of the Crooked River provided north-south access routes between obsidian resources to the south and upland areas like the Ochoco Mountains and their mountain prairies. This area has primarily been occupied seasonally due to cold winters and snowfall. Indian occupation was subsistence based with the more recent. The dominant cultural theme in this area is represented by a long period of Indian occupation. A variety of site types represent a mobile hunting and gathering lifeway dependent on upland resources as part of their seasonal rounds. Site types vary from surface lithic scatters to more complex sites with formed tools and features like house pits, camas ovens and peeled trees. Traditional resources continue to available and gathered today. Traditional foods include root crops like camas, bitterroot, Indian celery, lomatium species, and other foods and resources like hanging black moss, yellow bells, wyethia, and chokecherry along with a host of other plants and faunal resources.

The influx of Anglo-settlement changed cultural patterns in the mid-1800s. Anglo-settlement occupation was based on stock grazing, agricultural practices and forest products. Stock grazing and agricultural practices were introduced to this area in the late 1800s with the influx of Anglo exploration and settlement. The high elevation meadows provided excellent stock grazing opportunities and attracted early homesteaders. By the 1930s for a variety of reasons the population shifted to larger trade centers and communities like Prineville and Mitchell. Changes in the economy and social patterns also led to larger ranches utilizing this area primarily in the summer months compared to year-round homestead parcels.

The timbered lands surrounding Big Summit Prairie were first visited during the exploration and mining periods in the 1860s. Gold was discovered along nearby Ochoco Creek in the 1870s and travel route was established across the Ochoco Mountains to Canyon City. This is mapped as the Canyon City Wagon Road on early maps. Cinnabar was discovered near the turn of the century and the production of mercury flourished until the 1940s when market conditions and the economy changed.

Public domain lands and Forest Reserves were established in the early 1900s. Stock grazing was at its peak and the Forest Service mission was set up to manage grazing and settle range disputes. The mission included marking forest boundaries, coping with beetle infestations and establishing roads, trails, telephone lines and facilities like ranger stations and fire lookouts. Grazing allotments and stock driveways were soon established to better manage stock grazing. Logs were burned out to develop watering troughs for sheep, cattle and horses. Names and dates in many of the surviving aspen stands reflect herders moving stock across the forest. Magnetic telephone lines were soon constructed to provide better communication between local communities, ranger stations and fire lookout points. These administrative developments led the way to fire patrol, range management and access to the forest.

Management Direction

Management direction for cultural resources is found in the Ochoco National Forest Land and Resource Management Plan, in the Forest Service Manual section 2360, in Federal Regulations 36CR64 and 36CFR800 (amended December 2000), and in various federal laws including the National Historic Preservation Act (NHPA) of 1966 (as amended), the National Environmental Policy Act, and the National Forest Management Act.

In general, the existing management direction asks the Forest to consider the effects on cultural resources when considering projects that fall within the Forest's jurisdiction. Further direction indicates that the Forest would determine what cultural resources are present on the Forest, evaluate each resource for eligibility to the National Register of Historic Places (National Register), and protect or mitigate effects to resources that are eligible.

Additional surveys of potentially impacted areas would be done in accordance with the Ochoco Inventory Strategy.

Desired Condition

The desired condition is not clearly stated in the Forest Plan but can be derived from the implied goals of the Standards and Guideliness and the Monitoring Plan. It would be desired to know the location and extent of all cultural resources, to have evaluated each one for eligibility to the National Register, and to have developed management plans for all eligible properties that would provide protection or mitigate effects that may occur to the resources.

It is desired that the current trend of unmanaged recreation activities, such as those occurring on known sites, would in the future have such use directed to areas more appropriate and sustainable in consideration of cultural resources. Existing use patterns have likely affected historic properties and individual site integrity. This project provides an opportunity to direct some of the motorized recreational use to areas away from historic sites and cultural resources.

Existing Condition

It is assumed there has been loss of site integrity from actions that occurred before the implementation of regulations for the National Historic Preservation Act (NHPA). This means that the active protection of cultural resources has a relatively short history, approximately 40 years. Historic use of places beginning in the historic period of discovery, settlement, and subsequent development of forest roads, trails, and other facilities that overlap known and unknown sites has likely caused loss of site integrity.

In addition to pre-field investigations utilizing Geographical Information System layers and existing records, site specific surveys have been conducted on seven percent of the entire analysis area. The area of potential effects (APE) occurs approximately 100 ft on each side of proposed trails and an

area of up to 5 acres at each staging area. The majority of the high probability areas within the APE for the Preferred Alternative (Alternative 3) have been surveyed.

Numerous cultural resource sites are present in the project area. Many of these are linear features such as historic roads and trails, stock driveways and telephone lines. One of the historic linear sites, the Historic Summit Trail, has been evaluated and has been found to be eligible to the National Register of Historic Places (NRHP). A small percentage of the remaining linear features have been recommended for eligibility but have not been fully evaluated. Any on these sites that have been recommended for eligibility would have to be fully evaluated if they were to be found adversely affected by the proposed project. The remaining are prehistoric in age (inferred from the presence of stone tool technologies), or contain evidence of occupation during both time periods.

Sites from the historic period include the Historic Summit Trail, Cold Springs Guard Station, stock driveways and corrals, historic structure remains, utility corridors, fire lookouts, historic trails (many of which are now roads) and the remains of historic sheep camps. Prehistoric site types represented include lithic scatters, lithic scatters with flaked stone tools and sacred sites.

Spatial data review for all known sites in the APE indicated that the majority of the prehistoric sites are not located near any of the proposed routes of the designated trail system. Many of the remaining prehistoric and historic sites in the APE are crossed by or are situated on or adjacent to existing Maintenance Level 1 (closed roads) or Level 2 (roads for high clearance vehicles) that would become part of the designated trail system. Since an effort was made to locate proposed trails on existing disturbance such as roads or trails, some of the designated routes are on top of roads or trails that have been identified as historic sites. Of the sites that are crossed by proposed trail segments, each alternative is described based on the total number of sites crossed and the number of sites that are linear features such as roads, trails or telephone lines.

- Alternative 1 does not propose any designated trails and therefore does not add any designated routes or remove any unauthorized routes across cultural sites. The existing transportation system (roads and trails) would remain as currently in place regardless of the presence or absence of heritage sites.
- Alternative 2 (APE = 4,088 acres): Routes cross or closely approach a total of 26 recorded sites and one traditional food area. Of the recorded sites: four are linear features located on system roads; nine are sites alongside system roads where the proposed route is on the road prism, four are proposed route crossings on linear features that are not system roads; five can be mitigated by implementing minor rerouting to avoid sites; and four are on segments of FS road 2630 which would be mitigated by designing these segments in accordance to the Historic Summit Trail Management Plan. One site is located at a viewpoint, where heritage values would be maintained by coordinating placement of the trail and any associated improvements with the District or Forest Archeologist, and the historic significance would be interpreted for the benefit of the public.
- Alternative 3 (APE = 2,432 acres): Routes cross or closely approach a total of 23 recorded sites and one traditional food area. Of the recorded sites: three are linear features located on system roads; six are sites alongside system roads where the proposed route is on the road prism, six are proposed route crossings on linear features that are not system roads; five can be mitigated by implementing minor rerouting to avoid sites; and two are on segments of FS road 2630 which would be mitigated by designing these segments in accordance to the Historic Summit Trail Management Plan.
- Alternative 4 (APE = 5,087 acres): Routes cross or closely approach a total of 39 recorded sites and one traditional food area. Of the recorded sites: five are linear features located on system roads; eleven are sites alongside system roads where the proposed route is on the road

prism, ten are proposed route crossings on linear features that are not system roads; nine can be mitigated by implementing minor rerouting to avoid sites; and 4 are on segments of FS road 2630 which would be mitigated by designing these segments in accordance to the Historic Summit Trail Management Plan. One site is located at a viewpoint, where heritage values would be maintained by coordinating placement of the trail and any associated improvements with the District or Forest Archeologist, and the historic significance would be interpreted for the benefit of the public.

Historically significant structures exist in the analysis area at the Ochoco Ranger Station, Cold Springs Guard Station, and Salters Cabin. None of these structures are within the APE. Also included within the analysis area are the Blue Ridge, Mother Lode, Amity, Independent, Mayflower and Scissorsville mines. Some of these mines have associated structures. However, none of these mines are within the APE. The Summit Trail was found eligible for nomination to the National Register of Historic Places in 1987. Within the analysis area, the Summit Trail corridor includes approximately 3,036 acres allocated for partial visual retention, 2,780 acres allocated for visual retention and 86 acres allocated for preservation. Within all of these allocations the desired condition is to maintain the existing historic integrity of the Summit Trail and to enhance and interpret significant segment for public enjoyment and education (LRMP 4-61). The LRMP also states that pristine segments will be managed to protect, interpret and preserve their historic qualities.

Direct and Indirect Effects

Alternative 1

In general, this alternative would continue the existing situation of uncontrolled recreation and use of user-created trails through the forest until the Travel Management Rule is implemented. Where new routes are developed through cultural resource sites, there is displacement, crushing, breakage, and general loss of site context and integrity. Where OHV use persists on existing roads that traverse eligible or unevaluated cultural resource sites, integrity would continue to degrade as unrestricted travel allows vehicles to forge into new sites. Lack of maintenance on user-created trails can compound effects on eligible or unevaluated sites by development of deep ruts causing erosion plus breakage, displacement, and loss of artifacts and site integrity.

Action Alternatives

Following guidelines in a 2003 Regional Programmatic Agreement (PA) among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Office (SHPO), a finding of “No Adverse Effect” (No Historic Properties Affected) was determined under Stipulation III(B)5 of the Programmatic Agreement. The Forest finds that there are historic properties but the undertaking would have no effect on them as defined by 36 CFR 800.16(i). Any potential information that would otherwise be lost would be documented and reported to the SHPO. This finding is based on Project Design Elements and Mitigation Measures (see Chapter 2 of this document) that have been incorporated to determine the eligibility of unevaluated sites prior to trail construction. This would be accomplished through a series of treatment, data collection, and trail rehabilitation measures to document potential character defining features of the site. For those sites that may be eligible and are already being traversed from user-created trails through or adjacent to the site, Mitigation Measures would include site protection of the remaining portion adjacent to the route, data recovery, and/or avoidance. Protection is not required for those sites that are evaluated and found not eligible.

The Ochoco Land and Resource Management plan provides direction for the historic Summit Trail, which includes maintaining the existing historic integrity. Thus for the proposed trail segments along the Summit Trail further development, including construction, maintenance, signs, information

boards, etc. should be consistent with the emphasis and desired conditions for the Historic Summit Trail (MA-F7, LRMP page 4-61 to 4-62).

A mitigation/site protection table is incorporated in the cultural resource compliance report. Because of its sensitive nature, it is not included here. Coordination between project implementation personnel and the District and/or Forest archaeologist(s) would occur during layout of the trails in the sensitive areas to best adjust designated routes, design mitigating structures or surfacing, or identify site boundaries where avoidance is required.

Trail construction may involve widening or narrowing of the trail clearance to the appropriate width for the class of vehicle to be used for the trail system. On some trails, this would be 50 inches for ATVs (class I), which also accommodates motorcycles. Other trails would be 24 inches to accommodate motorcycles (class III) only. Still other trails would be 80 inches wide for jeeps and buggies (class II), which would also accommodate class 1 and III vehicles. Also, routine ground disturbing activities would occur such as blading of trails for leveling and maintenance, as well as creating and maintaining appropriate drainage features and width limiting obstacles.

There are circumstances where past motorized access for dispersed recreation activities has occurred within known sites. It is unknown if these activities in the area have altered character defining site features and how much site integrity has been compromised. Where a user-created trail is proposed for the designated trail system and it overlaps a known site, rutting and periodic maintenance activities have the potential to bury, crush, displace and/or lose context for artifacts that may be within the footprint of the trail. Prior to trail construction and designation, all known sites would be mitigated or evaluated for eligibility to NRHP. If the site is found to be eligible, the next step would be to determine whether the portion that overlaps the trail would contribute to that eligibility. If it does, then the following may take place: 1) trail relocation; 2) data recovery efforts sufficient to recover available information and the trail system would continue to be used; and/or 3) site protection through tread armoring and/or barriers to off-trail travel.

Trail grooming equipment includes a narrow tracked machine with a blade mounted in the back. Such equipment might eventually expose otherwise unknown cultural material on an unidentified site by removing obscuring deposits. Due to the patchy distribution of ash and clay deposits in the project area, artifacts are likely to be near the surface on tight clay soils, while they may migrate up and down in the ash soil strata. Agents of movement are artificial, as noted above, as well as natural, such as wind and flood events, erosion, tree roots, tree tip ups, burrowing insects, rodents, birds, and especially freeze-thaw cycles. Where ash soils are present, artifacts are not always visible on the surface and may be exposed following disturbance. Where clay soils are present and surface erosion has occurred, artifacts may be transported from their original location.

On proposed trail segments that are on top of existing roads, the trail would be built on ground that is already disturbed. In those instances when the road or existing trail traverses a known cultural resource site, loss of potential site information has been assumed to have already occurred within the depth of the road material and would not increase as a result of changing the use of the road. In some cases, the road would have shared use between regular (passenger cars, pickups, etc.) and trail vehicles. In others, the road would be closed to all but trail system users. Neither of these instances would directly affect a known site that is already traversed by the road. Design elements include the staying within the existing road prism when converting old roads into trails.

Another potential loss of site integrity would occur if an existing road is being converted to a narrower width for a trail segment. The method of ripping the road bed with heavy equipment, especially on a native surface, could directly affect a cultural resource site that may be traversed by the road. Although loss of integrity may have occurred during road formation and continued use, deposits below the surface of the road bed could disturb a buried archaeological site, its artifacts, and their context within the site. Project Design Features in this circumstance would maintain the integrity

of the site by avoiding ripping of the soil on known cultural sites and using trail narrowing methods such as surface impediments in lieu of subsurface ripping during road-to-trail conversion.

Outside of known sites there is potential for disturbance to sites that are yet to be discovered. During ripping or cross drainage installation during conversion of old roads to trails, and during decommissioning of unwanted existing roads or user trails, additional sites may be exposed or disturbed. Monitoring and/or mitigation would be coordinated with the District or Forest archeologist for any newly discovered site. All rehabilitation ground disturbing activities would occur where there would be no effect to eligible historic properties or other known cultural sites. Other rehabilitation activities would use appropriate non-ground disturbing methods such as above ground barriers and shallow scarification and rooting of vegetation especially on native surface project locations.

There is a potential from the sound generated by OHVs to be heard where American Indians potentially hold ceremonies or harvest traditional cultural foods. There may be other unknown sites that would typically remain unidentified because of their sacred nature. The purpose of the sites is of religious importance and is meant to occur in the absence of artificial/outside intrusions. The sound from OHV engines, or other activities unrelated to OHV use could be considered such an intrusion. The Scoping Letter and maps were sent to representatives of Confederated Tribes of Warm Springs, Klamath Tribes, Burns Paiute Tribe and Confederated Tribes of Umatilla. Communication with these tribes will continue throughout the planning and Section 106 (cultural resource management) process. Any information on cultural resources or traditional cultural properties will be addressed following the Project Design Elements in Chapter 2 of this DEIS.

Cumulative Effects

Cumulative effects on cultural resources were determined by focusing on the current aggregate effects of past, present, and reasonably foreseeable future actions. For cultural resources, in general, past actions have avoided effects to eligible or unevaluated cultural resource sites, because of the Forest Service responsibility to protect their values. This has largely been accomplished through avoiding the pertinent cultural resource sites for those activities that are closely monitored. For example, overlapping vegetation management projects (Spears, Canyon, Ochoco Valley Fuels, Howard Elliot Johnson, Zane, Deep Restoration) determination of effect to cultural resources found: “Following guidelines in a 2004 Regional Programmatic Agreement among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Office, a finding of “No Historic Properties Adversely Affected” was determined.

In the past, the strategies of site protection or mitigation have been successful because of efforts to inventory, identify, evaluate, and manage cultural resources. Therefore, any overlapping past, present, or reasonably foreseeable action on this project would not result in cumulative effects.

Monitoring

Site monitoring would occur during any phase of soil disturbance when it overlaps a known site. Site monitoring would also occur when excavating for toilet vaults to examine buried deposits for potential artifacts and features that would indicate a buried site not previously identified.

Range Resources

This section includes a summary of the Range specialist's report; the entire report is in the Ochoco Summit Trail System project record, located at the Ochoco National Forest, Prineville, Oregon.

Introduction

The Ochoco Summit Trail System project area is approximately 301,574 acres and is located on the Ochoco National Forest in Crook and Wheeler Counties. The project area has been grazed since the late 1800s and early 1900s by sheep, cattle, and horses with the main objective of providing forage for livestock. The project area is located within portions of twenty-eight allotments and a Wild Horse Management Area. Table 130 describes the 28 allotments adjacent to and intersecting the project area. Twenty-five of the allotments are active allotments, one of which is a sheep allotment. Remaining active allotments are currently grazed by cattle. The Little Summit Allotment is comprised of both private and National Forest System lands. The other allotments are composed solely of National Forest System lands. To facilitate the management of these allotments, water developments and fences have been constructed over the years. A majority of the water developments are associated with spring sources or stock ponds. Water developments benefit both wildlife and livestock.

For the purpose of discussing livestock grazing, all of the area located within the allotments will be included in discussion.

Table 130. Allotment Information.

Allotment	Total Acres	Acres In Project Area	Kind/Class	Permitted Number	Season of Use	AUMs
Antler	661	661	Cattle-cow/calf	114	06/16-09/30	537
Badger	29,942	29,942	Cattle-cow/calf	496	06/21-09/30	2,248
Bearskull/Cottonwood	43,226	6,365			Closed	0
Big Summit	24,750	24,750	Cattle-cow/calf	400	06/16-09/30	1,883
Brush Creek	10,521	10,521	Cattle-cow/calf	110	07/01-09/30	445
Buck	451	451	Cattle-cow/calf	16	07/11-09/25	54
Burn	4,671	3,174	Cattle-cow/calf	130	04/15-08/14	698
Crystal Springs	7,190	7,190	Cattle-cow/calf	185	05/17-08/31	871
Deep Creek	17,577	17,577	Cattle-cow/calf	200	06/16-09/30	929
Derr	12,474	12,474	Cattle-cow/calf	150	07/01-09/30	599
Elkhorn	15,020	15,020	Cattle-cow/calf	290	06-15-09/30	1,340
Fox Canyon	13,007	13,007	Cattle-cow/calf	217	06/15-09/30	1,031
Gray Prairie	10,935	10,935	Cattle-cow/calf	325	06/15-09/30	1,544
Happy	18,624	18,624	Cattle-cow/calf	230	06/21-09/30	1,018
Indian Creek	525	525	Cattle-	30	07/15-	103

Table 130. Allotment Information.

Allotment	Total Acres	Acres In Project Area	Kind/Class	Permitted Number	Season of Use	AUMs
			cow/calf		09/30	
Little Summit	15,704	15,704	Cattle-cow/calf	200	06/21-09/30	886
Lookout	2,625	2,345			Closed	0
Lost Horse	6,848	460	Cattle-cow/calf	100	06/16-09/30	471
Marks Creek	10,542	10,542	Cattle-cow/calf	366	07/01-09/30	1,449
North Fork	6,034	6,034	Cattle-cow/calf	150	06/15-09/30	713
Pisgah	5,079	5,079	Cattle-cow/calf	156	06/16-08/11	391
Prairie Parcels (Shady Cr.)	78	78	Cattle-cow/calf	22	05/01-06/15	45
Prairie Parcels (Brush)	353	353	Cattle-cow/calf	22	07/15-10/15	89
Pringle	7,203	21	Cattle-cow/calf	225	06/21-09/24	950
Reservoir	34,173	34,173	Sheep-ewe/lamb	2,200	06/16-09/30	2,354
Roba	18,266	18,266	Cattle-cow/calf	236	06/16-10/15	1,250
Rock Creek	6,428	6,428			Vacant	0
Snowshoe	2,710	2,710	Cattle-cow/calf	156	08/12-09/30	343
Wolf Creek	42,231	23,901	Cattle-cow/calf	781	06/16-10/15	4,135

Information for pasture turn on dates, turn off dates and numbers were taken from the Grazing Permits at Lookout Mountain Ranger District and Paulina Ranger District.

Cattle Allotments

All cattle allotments in the project area range in size from one pasture to eight pastures. Most allotments containing more than one pasture are on a deferred rotation grazing system. Grazing season varies from April 15th to October 15th. A combination of cow/calf pairs, yearlings, and bulls graze the landscape, within an authorized Animal Unit Months (AUMs) stocking limit per allotment.

Sheep Allotment- Reservoir

The Reservoir allotment is not split into pastures, but is managed by the trailing of two bands of sheep. The permit authorizes 2,200 ewe/lamb pairs from June 16th through September 30th, for a total of 2,354 AUMs. There are two bands of sheep (each 1,100 pairs) that trail through the allotment, the Canyon Creek Band and the Reservoir Band. Herders are with the sheep for the entire grazing season. Sheep are permitted to water and bed at specifically authorized locations only once per season. Actual turn-out dates and permitted numbers have been consistent with the permit. Range readiness criteria have always been met prior to turn-out (2210 Range File, Reservoir Allotment, Inspection Notes).

Wild Horses

The Wild Horse Management Area falls within the same area as the Reservoir allotment and is managed for 55 to 65 animals.

A wild horse is any untamed horse that resides in or has temporarily strayed from a recognized Wild Horse Territory. In 1975 a Wild Horse Management Plan and Environmental Assessment was developed for the Ochoco National Forest. The objective is "to provide protection, management and control of wild, free roaming horses in order that we might perpetuate a sound biological unit consistent with the Wild Free Roaming Horse and Burro Act of 1971" (2260 Range File, Ochoco Wild Horse Management). The plan states that the wild horse herd should be managed for 55 to 65 animals. If population numbers rise above 65 animals, methods of capture and control are utilized to keep a stable population. The Wild Horse Herd Management Area does not fall within the Burn and Crystal Springs Allotments; however, wild horses are commonly found in both. Wild horses have often resided in Hohn Springs pasture of the Burn Allotment and in the Coyle Creek pasture of the Crystal Springs Allotment.

There are several factors that possibly contribute to the migration of wild horses out of the Herd Management Area (HMA). Key factors are fence maintenance (particularly winter damage to fences), lack of winter range and off-road vehicles. Wild horses have been able to move out of the HMA by the means of damaged fence. Currently the HMA does not contain enough winter range to accommodate the herd and horses naturally move to lower elevations where winter forage is more accessible. These areas are typically outside of the HMA. There is some speculation that horses may also be moving to escape harassment from off-road vehicles, which are commonly used within the HMA.

Information on wild horse data was taken from the Wild Horse File for the Herd Management Area, which is located on the Lookout Mountain Ranger District, Ochoco National Forest.

Range Improvements - Cattle and Sheep Allotments

Throughout the project area there are several range improvements including fences and water developments and exclosures. All range improvements help in keeping livestock distributed throughout the allotment. Permittees are responsible for pasture fenceline, allotment boundary fenceline and water developments. Permittees maintain these fences prior to turn-out every year. Most exclosure maintenance is the responsibility of the Forest Service. Several water developments have been recorded as needing maintenance or relocation.

Environmental Effects

Under any alternative, livestock grazing would continue to occur within the Ochoco Summit Trail System project area. Current stocking rates and management practices would remain the same. Wild horse occupancy would continue to occur within the analysis area, and management would target a population size of 55 to 65 horses.

Alternative 1

Under this alternative there would be no dedicated trail system for off-road motorized recreation. Current management plans would guide management of the project area, and OHV use off of designated roads and trails would be expected to decline with implementation of the Travel Management Plan (2011).

Range vegetation trend and livestock distribution would not be altered by trail development or use. Range improvements including troughs, ponds, exclosures and pasture fences would remain at the current level of risk of damage by people. Likelihood for livestock-OHV interactions would not be changed from what is expected to occur under implementation of the current Travel Management Plan. Additional cattle guards would not be needed.

Effects Common to all Action Alternatives

Under these alternatives a system of trails and areas would be designated by class of vehicle and season of use. Trails would be designated in 15 active allotments. Rehabilitation or restoration activities would take place in previously damaged areas and interconnecting unauthorized or user-created routes to promote recovery, and to prevent confusion about which routes are open and which are not. Non-motorized use would not be prohibited on proposed motorized trails.

Alternatives 2, 3 and 4 would decrease available forage for livestock. The implementation of new routes would remove suitable range, which can be a source of forage (see Table 131 and Table 132 for Loss of Forage in Acres). Livestock may be displaced during high use times on the trail system and distribution throughout the project area could also be negatively affected with the increase of OHV use in a localized area. If livestock distribution is negatively impacted, localized areas in uplands and riparian areas may receive greater grazing utilization. The proximity of the trail to several livestock water developments may cause livestock to avoid those areas when approached by OHV users, making those developments ineffective. This would change the distribution of livestock and utilization patterns, which would lead to a need for additional monitoring of livestock and potentially require a change in existing Allotment Management Plans (AMPs). Trail system routes would not go through the Wild Horse Herd Management Area (HMA), resulting in no decrease of available forage in the HMA for wild horses.

Range improvements such as troughs, fences, water tanks, and cattle guards not only help manage livestock, but wildlife as well. Table 133 identifies range improvements that are adjacent to or intersecting a proposed trail segment under each alternative. A major concern with increased use on the trail system adjacent to range improvements is vandalism or user group conflicts. Improvements are used to disperse domestic livestock throughout the allotment. All action alternatives include design elements intended to avoid or reduce the likelihood of damage to improvements. Livestock may avoid trail users entirely, or be harassed by OHVs, which could potentially lead to the destruction of fences or injury to livestock.

Direct and indirect effects to grazing operations should be minimal. Permittees that operate in the project area should continue to be able to access range improvements for maintenance, spread salt, and check the herd for distribution. By restricting travel to designated routes only, permittees may have an increase in labor under this alternative due to the need to pack salt and access improvement by foot or horseback. Permitted off road travel to access range improvements may be administratively authorized under the Term Grazing Permit, but would have to be planned in advance and authorized by a Line Officer.

Direct and indirect effects under action alternatives may affect the introduction and spread of noxious weeds. The type of activity, intensity and location of associated disturbance, and proximity to a seed source will affect the probability or risk of introducing noxious weeds or contributing to their spread. Potential for noxious weed infestations due to cross-country travel across the analysis area will decrease with vehicle access restricted to designated areas. However, there will continue to be unauthorized use, which can potentially create in an increase in the spread of noxious weeds in rangelands if vehicles are not clean. The increase in weed infestations can decrease native vegetation, which provides forage for livestock. As noted in the Invasive Plant section, all action alternatives could result in an increase of noxious weeds and other invasive plants across the project area. Overall overlap of proposed routes within noxious weed locations is low. There are up to three weed infestations crossed by proposed trails, and up to 5 gathering areas within or adjacent to weed sites (varies between alternatives). Weed sites within the concentrated use areas (staging, etc) have the most potential for spread of weeds. Refer to Table 126 in the Botany section for further details on weed sites intersected by proposed routes or areas.

Mitigations that Address Livestock Safety/Harassment Effects are as follows:

- Place cattle guards in place of gates where OHV trails cross existing pasture fences.
- Increase distance of trail from water developments if trail is within 100 ft. of development. This will reduce the potential of collisions between livestock and off-road vehicles and the potential of vandalism to water developments and livestock.
- Provide education literature about livestock management at staging areas.
- If rangeland conditions change due to OHV pressure on livestock movement, DMAs (designated monitoring areas) should be moved to more representative areas if needed.

OHV use for maintaining grazing allotment improvements off the trail system will be by prior authorization as part of AOI (Annual Operating Instructions). This will be reviewed by the Line Officer.

Table 131. Loss of Suitable Rangeland on New Routes (Acres of Forage lost by Alternative).

	Alternative 2			**Alternative 3**			**Alternative 4**		
Vehicle Class	I	II	III	I	II	III	I	II	III
Miles of New Routes	31	12	26	22	0	28	48	11	22
Acres of Suitable Range Lost	15.7	9.7	6.3	11.1	0	6.8	24.2	8.9	5.3
Total Acres	**15.7**	**9.7**	**6.3**	**11.1**	**0**	**6.8**	**24.2**	**8.9**	**5.3**
Total	**31.7**			**17.9**			**38.4**		

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
Badger Allotment	Miles of New Routes	5.45	7.06	0	0	0	2.51	6.62	7	0
	Acres of Suitable Range Lost	2.75	5.7	0	0	0	.61	3.34	5.66	0
	Total Ac. Lost	**8.45**			**.61**			**9**		
Big Summit Allotment	Miles of New Routes	.17	5	.06	0	0	.48	.17	4.24	0
	Acres of Suitable Range Lost	.09	4.04	.01	0	0	.12	.09	3.43	0
	Total Ac. Lost	**4.14**			**.12**			**3.52**		
Crystal Springs Allotment	Miles of New Routes	1.23	0	0	3.05	0	0	3.9	0	0

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
	Acres of Suitable Range Lost	.62	0	0	1.54	0	0	1.97	0	0
	Total Ac. Lost	**.62**			**1.54**			**1.97**		
Deep Creek Allotment	Miles of New Routes	6.5	0	5.78	0	0	11.17	8.54	0	5.06
	Acres of Suitable Range Lost	3.28	0	1.40	0	0	2.71	4.31	0	1.23
	Total Ac. Lost	**4.68**			**2.71**			**5.54**		
Derr Allotment	Miles of New Routes	0	0	1.17	0	0	.45	0	0	2.94
	Acres of Suitable Range Lost	0	0	.28	0	0	.11	0	0	.71
	Total Ac. Lost	**.28**			**.11**			**.71**		
Elkhorn Allotment	Miles of New Routes	1.79	0	3.1	2.64	0	0	6.07	0	0
	Acres of Suitable Range Lost	.90	0	.75	1.33	0	0	3.07	0	0
	Total Ac. Lost	**1.65**			**1.33**			**3.07**		
Happy Allotment	Miles of New Routes	4.46	.32	1.55	0	0	1.99	6.41	0	0
	Acres of Suitable Range Lost	2.25	.26	.38	0	0	.48	3.24	0	0
	Total Ac. Lost	**2.89**			**.48**			**3.24**		
Little Summit Allotment	Miles of New Routes	0	0	5.4	0	0	5.4	1.09	0	6.56

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
	Acres of Suitable Range Lost	0	0	1.31	0	0	1.31	.55	0	1.59
	Total Ac. Lost	**1.31**			**1.31**			**2.14**		
Marks Creek Allotment	Miles of New Routes	1.27	0	0	4.11	0	0	5.49	0	0
	Acres of Suitable Range Lost	.64	0	0	2.08	0	0	2.77	0	0
	Total Ac. Lost	**.64**			**2.08**			**2.77**		
Pisgah Allotment	Miles of New Routes	2.05	0	2.09	2.41	0	0	3.56	0	0
	Acres of Suitable Range Lost	1.04	0	.51	1.22	0	0	1.8	0	0
	Total Ac. Lost	**1.55**			**1.22**			**1.8**		
Reservoir Allotment	Miles of New Routes	6.74	0	.12	7.33	0	0	6.87	0	0
	Acres of Suitable Range Lost	3.4	0	.03	3.7	0	0	3.47	0	0
	Total Ac. Lost	**3.43**			**3.7**			**3.47**		
Roba Allotment	Miles of New Routes	0	0	.65	0	0	.65	0	0	.65
	Acres of Suitable Range Lost	0	0	.16	0	0	.16	0	0	.16
	Total Ac. Lost	**.16**			**.16**			**.16**		
Rock Creek Alltoment	Miles of New Routes	0	0	.39	0	0	.39	0	0	.87

Table 132. Loss of Suitable Rangeland on New Routes for Forage by Alternative & Allotment.

		Alternative 2			Alternative 3			Alternative 4		
	Vehicle Class	I	II	III	I	II	III	I	II	III
	Acres of Suitable Range Lost	0	0	.09	0	0	.09	0	0	.21
	Total Ac. Lost	**.09**			**.09**			**.21**		
Snowshoe Allotment	Miles of New Routes	1.24	0	0	1.24	0	0	1.24	0	0
	Acres of Suitable Range Lost	.63	0	0	.63	0	0	.63	0	0
	Total Ac. Lost	**.63**			**.63**			**.63**		
Wolf Creek Allotment	Miles of New Routes	0	0	5.35	0	0	5.35	0	0	6.06
	Acres of Suitable Range Lost	0	0	1.3	0	0	1.3	0	0	1.47
	Total Ac. Lost	**1.3**			**1.3**			**1.47**		

Table 133. Range Improvements in the Ochoco Summit Trail System Project Area that are Adjacent to or Intersect Proposed Trail Segments.

Improvements	No Action	Proposed Action	Alternative 3	Alternative 4
Troughs or Ponds	0	23	24	39
Fence Crossings/Adjacencies	0	58	50	81
Corrals	0	2	1	2
Cattle guards	0	Est. 50	Est. 50	Est. 65
Troughs indicated are at least within ¼ mile of trail. Fences indicated include fence crossings and/or fence-lines that run adjacent to trail. New cattle guards for trail crossings through range fences would require excavation in the road prism for installation.				

Cumulative Effects

Cumulative effects result from the potential effects of an increase in recreational use by OHVs on designated routes in the Ochoco Summit project area combined with the effects of past, present or ongoing activities. For Alternatives 2, 3, and 4: The proximity of trail users to existing water developments may be expected to cause avoidance of these areas by livestock. Combining OHV use and livestock grazing on allotments may lead to increased livestock use in areas that are generally utilized less or not at all. Travel patterns of cattle may be altered and new cattle trails may be created, which may lead to new areas of soil compaction. Vegetation and forage species composition can be expected to change over time in response to changes in livestock distribution. This effect may be off-set to some degree in areas where implementation of the Travel Management Rule limits motorized

access, thereby reducing effects of human interaction with livestock in areas not associated with designated routes. Past road construction and maintenance, grazing, timber harvest and other soil disturbance have provided environments for noxious weed species establishment. Past activities within the analysis area have resulted in moderate amounts of weed infestations occupying 2,090 acres. The potential for noxious weed establishment and spread from passenger vehicles not associated with the project alternatives along open road corridors (including seasonally open roads) would continue. The potential for other vectors of spread within the project area including people, wind, or animals would also continue.

In addition to the past and current activities within the project area, adding 88 to 158 miles of designated OHV trail on routes that are not otherwise open to motorized travel could result in cumulative impacts to forage production due to establishment or spread of invasive plants. At the same time, implementation of the Travel Management Rule, prohibits overland use of OHVs and all motorized travel on routes that are not designated as open, which would reduce the risk of introducing invasive plants into areas not associated with designated trails.

The Ochoco/Deschutes NFs Invasive Plant Treatment Record of Decision has been recently signed. This decision increases the ability to effectively control invasive plants with herbicides. The ability to use herbicides will increase efficiency, thus lowering costs, which results in the ability to treat more acres for the same costs. This proposal does not synergistically interact with the proposed trail system, but does help reduce the extent and duration of effects of noxious weeds on native vegetation.

Wilderness, Inventoried Roadless and Unroaded Areas

This section contains the entire Wilderness, Inventoried Roadless and Unroaded Areas analysis.

Wilderness and Inventoried Roadless Areas

Existing Condition

One Wilderness Area, two Inventoried Roadless Areas (IRAs) and one Wilderness Study Area are within the Ochoco Summit Trail System project boundary.

The 5,355-acre Bridge Creek Wilderness is within the project area. Emphasis in the Bridge Creek Wilderness Area is to protect the wilderness ecosystems and manage use to maintain a natural setting and preserve solitude. Bridge Creek Wilderness is to be managed as a nontrailed wilderness (Forest Plan, p. 4-51). Generally, no motorized or mechanized use is allowed on trails in Wilderness Areas (Forest Plan, p. 4-188).

Within the 15,660-acre Lookout Mountain Recreation Area, of which 14,365 acres are within the project area, the management emphasis is to maintain a natural setting, provide continued opportunities for high quality semiprimitive recreational activities and wildlife habitat, and maintain healthy forests (Forest Plan, p. 4-68). Year-round trails to facilitate the use of the area by horseback riders, mountain bikers, hikers, snowmobilers and cross-country skiers will be developed (Forest Plan, p. 4-188). Emphasis in the Rock/Cottonwood Roadless Area (5,098 ac in the project area) is to provide opportunities for nonmotorized recreational use while protecting the anadromous fishery, sensitive soils on steep slopes and big game habitat (Forest Plan, p. 4-63).

The management emphasis in The North Fork Crooked River Wilderness Study Area (WSA) as discussed in the Forest Plan (p. 4-54) is to maintain existing conditions of the area for potential wilderness designation or until it's either designated as wilderness or released from further consideration. The North Fork Crooked River WSA was evaluated and recommended as non-suitable for Wilderness designation by the Prineville District BLM in the mid-1980s. This recommendation was approved by the BLM Oregon State Office, the Secretary of the Interior and the President of the United States. The final status of the WSA is to be determined by Congressional legislation. In the

meantime it is being managed for its wilderness potential under Interim Management Policy (BLM Manual H-8550-1) and by guidance under the North Fork Crooked River Management Plan (USDI/USDA 1993).

Environmental Effects

The following values often characterize unroaded values (Federal Register, January 12, 2001):

- High quality soil, water, and air.
- Sources of public drinking water (the Ochoco Summit Trail System project area is not a source 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.
- Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of recreation opportunities (refer to LRMP GL-19).
- Reference landscapes
- Landscape character and scenic integrity.
- Traditional cultural properties and sacred sites.
- Other locally identified unique characteristics.

Alternative 1

Under Alternative 1, characteristics that are used to define unroaded values such as high quality soil and water, and recreational opportunities would remain at current levels. Opportunity to hear and see motorized vehicles would not change. Due to the basic unregulated nature of travel and the expanse of the riding area, law enforcement for incursions of motorized vehicles into unroaded areas would remain problematic. Implementation of the Travel Management Rule generally limits motorized travel to designated routes, and OHV travel to designated mixed-use roads; some mixed-use roads are adjacent to unroaded areas. There are 1.3 miles of road currently open to non-highway legal OHV use adjacent to or within the Lookout Mountain Recreation Area.

Alternatives 2, 3 and 4

Bridge Creek Wilderness would not be affected by the action because the closest point to any proposed motorized OHV trail is over one mile. No portion of the wilderness area is within the noiseband >45 db for designated trail system routes. Management emphasis for the Bridge Creek Wilderness is to maintain a natural setting and preserve solitude. Effects to this resource are discussed in the Recreation section of this EIS.

Activities proposed under any alternative in the Ochoco Summit project do not overlap any IRA; therefore effects to soil, water and air quality are as disclosed in those sections of the EIS.

There would be no effect from any of the action alternatives on any area within the Lookout Mountain Recreation Area. The closest proposed motorized trails are > 4 miles from the boundary of this area. OHV use would be allowed on any road open to non-highway legal vehicles that are within or adjacent to the Recreation area as described for Alternative 1. Management emphasis for Lookout Mountain Recreation Area includes opportunities for high quality semiprimitive recreational activity and wildlife habitat; potential impacts to these resources are disclosed in the Recreation and Wildlife sections of this EIS.

Rock Creek/Cottonwood Creek Area is an unroaded area with a management emphasis on protecting soil, water and fisheries while providing opportunities for nonmotorized recreational use. Activities proposed by this project do not overlap the Rock Creek/Cottonwood Creek Area and therefore do not affect unroaded characteristics within that management area. Potential impacts to nonmotorized

recreation and to Keeton Trail based on areas where sounds may be heard at greater than 45db when OHVs are riding on the designated OHV trail system are discussed in the Recreation Section.

No trails or areas are proposed within the North Fork Crooked River Wild and Scenic River Corridor and no portion of the corridor is within the noiseband for >45db.

How the Action Alternatives Respond to Identified Unroaded Values

High quality soil, water and air: Impacts to the soil resource are limited to the area of activity and are described in the Soils section in Chapter 3 of this FEIS. Soil productivity is maintained through Project Design Criteria and rehabilitation of user-created trails within the identified implementation and OHV management areas. Project Design Criteria were included that would minimize sediment potential and it has been determined that there would be a net maintenance and restorative process overall by meeting Forest Plan standards and guidelines; many user-created trails within riparian areas would be closed or redesigned to meet standards (see discussion in the Hydrology and Aquatic Species section, Chapter 3 of this document). Air quality is also addressed in this chapter. Any localized impairment would be diluted to a scale that would be impractical to measure. A projected 2.5 to 5.6 percent yearly increase in riders would not change this condition because the primary use would be during daylight hours and within a season of use (June 1 to September 30 in Alternative 3) when dispersion is likely to occur.

In summary, there would be no measureable effect to air quality since the net emissions from vehicles, vehicle travel, forest management activities, and wildfires are unlikely to appreciably change under the action alternatives. There may be some temporary air quality impairment from localized vehicle emissions and fugitive dust, but it would be well away from Wilderness, the Wilderness Study Area and Inventoried Roadless Areas.

Sources of public drinking water: The Ochoco Summit project area does not contain any municipal watersheds. The proposed trail system would not affect ground water; therefore there would be no change to ground water wells and spring developments at some Forest Service facilities and developed campgrounds.

Diversity of plant and animal communities: The diversity of plant and animal communities within the Wilderness, Wilderness Study Area, and Inventoried Roadless Areas, and within the greater Ochoco Summit project area, is not unique for the area. Effects to wildlife and botany are disclosed in Chapter 3; in summary, effects of the proposed trail system would be limited in scale to the zone of influence for the designated trail system itself, as described in the effects to wildlife and botanical resources, and no effects to the overall diversity of plant and animal communities are anticipated.

Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land: Please see discussions in the "Hydrology and Aquatic Species," "Wildlife," and "Botany" sections in Chapter 3 of this FEIS for effects to threatened, endangered, proposed, candidate and sensitive species. In all action alternatives the proposed trail system is designed on top of, adjacent to, or in proximity to existing disturbed areas (for instance, mixed-use roads, closed/decommissioned roads, and user-created trails). The proposed trail system design avoids large, undisturbed areas of land and therefore would have no effect on species that are dependent upon such habitat.

Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of recreation opportunities: The Ochoco Summit Trail System project does not change the Recreational Opportunity Spectrum (ROS) for these areas. The project area boundary defines where motorized trail use might be designated; this is further refined by the identified trail implementation areas (see Chapter 2 in this FEIS). OHV trail may be designated in the vicinity of primitive and semi-primitive ROS areas, and in some cases sound may carry into these areas (see Table 45 in the "Recreation"

section of this FEIS); however, non-motorized opportunities would continue to operate unchanged from the current condition.

Landscape character and scenic integrity: The landscape character would be similar following trail construction. Disturbance associated with unregulated motorized use has already occurred; closure and rehabilitation of user-created trails that are located in undesirable locations or in areas that are valued for riparian, cultural or wildlife habitat would offset new trail construction and route designation. Trails would essentially be designed to not dominate the landscape, thus maintaining the current scenery and landscape character. For more information, see the "Visual Quality" section in Chapter 3 of this FEIS.

Traditional cultural properties and sacred sites: There are no effects to known traditional cultural resources or sacred sites in Wilderness areas, IRAs or the WSA, including potential linkage from a historic trail from the project area. Appropriate consultation with affected parties has occurred ("Cultural Resources" section, Chapter 3).

Potential Wilderness Consistency

Forest Service Handbook 1909.12 Chapter 70 section 71.1 outlines the criteria to be applied to meet the statutory definition of wilderness. Essentially, these criteria are limited to size requirements and presence of roads; however the Forest Service also looked at trail construction for (2.a) areas that can be preserved due to physical terrain and natural conditions, (2.b) Areas that are self-contained ecosystems, such as an island, and (2.c) Areas that are contiguous to existing wilderness, primitive areas, or potential wilderness in other Federal ownership, regardless of size.

Within the Ochoco Summit Trail System project area, there are no unroaded areas with potential to meet or exceed the threshold of 5,000 acres besides the IRAs and wilderness discussed above.

Because of active forest and range management and ongoing recreation both within and adjacent to the project area, the project area is generally well-roaded except in areas already identified and established to preclude roads and motorized access.

Generally, the implementation areas within the Ochoco Summit Trail System project area cannot be preserved due to physical terrain and natural conditions (subpart a), are not a self-contained ecosystem (subpart b), and are not contiguous to existing wilderness, primitive areas, administratively endorsed wilderness, potential wilderness in other federal ownership (subpart c). See the Recreation section in Chapter 3 for more details. Essentially, all proposed routes are closely associated with existing roads and user-created trails; where new trails are proposed, they are intended to connect areas of existing disturbance and would not create incursions into unroaded areas.

Unroaded Areas Identified by Commenters

In the early 2000s, the interest group Oregon Wild conducted an inventory across Oregon, including the Ochoco National Forest, to determine areas that are unroaded, using inventory criteria that they developed for their purposes. A map of Oregon Wild's unroaded areas was provided to the Ochoco National Forest during the comment period on the draft EIS for the Ochoco Summit project (see Figure 5).

The proposed action alternatives were evaluated against Oregon Wild's map, as follows:

Alternative 3

The northern side of the loop at Indian Butte skirts the edge of the southwestern most tip of the polygon that is shown across both sides of the county line near the top center of Oregon Wild's map. The majority of this route is on existing old road beds; however there is a proposed trail crossing the peripheral extension of this polygon that connects between roads 2200-306, 307 and 309 in the

vicinity of Indian Creek. All three of these roads are open year-round under the 2011 Travel Management Plan and are displayed as open on the MVUM map. Therefore the character of this finger of Oregon Wild's polygon is not unroaded. The area in which this trail system loop is proposed is identified as a Recreation Opportunity Spectrum (ROS) of Roaded Modified (Forest Plan page 4-179).

The largest polygons on Oregon Wild's map at Lookout Mountain and Rock/Cottonwood are entirely avoided by all proposed system trails.

The two smaller polygons south of Deep Creek (one along the North Fork of the Crooked River and the one south of Roba Butte sandwiched between private land and the 4260 road) are entirely avoided by all proposed system trails.

All polygons south of Big Summit Prairie are entirely avoided by all proposed system trails.

Alternatives 2 and 4

For Alternatives 2 and 4, the overlap on the southwest finger of the mapped polygon that crosses the county line (north central part of the map provided) is the same as described for Alternative 3. However these alternatives include routes that continue eastward from Indian Butte across the south facing flank of Mt. Pisgah. Under both of these alternatives proposed routes are approximately along the southern exterior edge of the central lobe of this polygon. Alternative 4 continues along the eastern exterior edge of this same central lobe, while Alternative 2 pulls away from it. Continuing eastward, both of these alternatives travel along the edge of this polygon on open road 2630. Both alternatives then travel into the southeastern lobe of this polygon primarily on road 2630 and adjacent spurs, with two short connector trails between roads 2630-555 and 556 and between 2630-600 and 606. All of these roads are open year-round and approved for mixed use (OHV legal) under the 2011 Travel Management Plan as displayed as such on the Motor Vehicle Use Maps (MVUM).

Alternatives 2 and 4 both propose class II trails in the peripheral tip of the finger at the southeast corner of this same northern polygon. These proposed trails are along ridges on and adjacent to road 3000-550 and connecting between roads 3000-550 and 3000-500. These routes are partially on existing road beds and partially on proposed new trails between existing road beds. Road 3000-550 and part of 500 are open year round and approved for mixed use.

No routes are proposed within any other polygon on the map provided under any action alternative.

A map was also provided by Wildlands CPR. Wildlands CPR used their own data and Geographical Information System analysis to estimate areas that are greater than one mile from a motorized travel route (see the green polygons in Figure 6).

The proposed action alternatives were evaluated against Wildlands CPR's map, as follows:

Of the areas shown on Wildlands CPR's map as being more than 1 mile from an open road, only the small polygon in the area of Big Spring Creek (west of Little Summit Prairie) is directly involved with any proposed designated route. Alternatives 2, 3 and 4 all had a single proposed route on an existing closed road within close proximity to that polygon. Under Alternative 3 that route has been relocated to another closed road bed that is to the west of the polygon, yet in proximity to it. Though the route is not within the polygon under this alternative, it does affect it because at least a portion of the polygon is within 1 mile of the proposed route. It would therefore no longer be more than a mile from any motorized route. For a detailed analysis of impacts to areas more than 1 mile from open motorized routes, refer to EIS sections on General Effects to Wildlife (Table 91), and Big Game – Deer and Elk (Table 108).

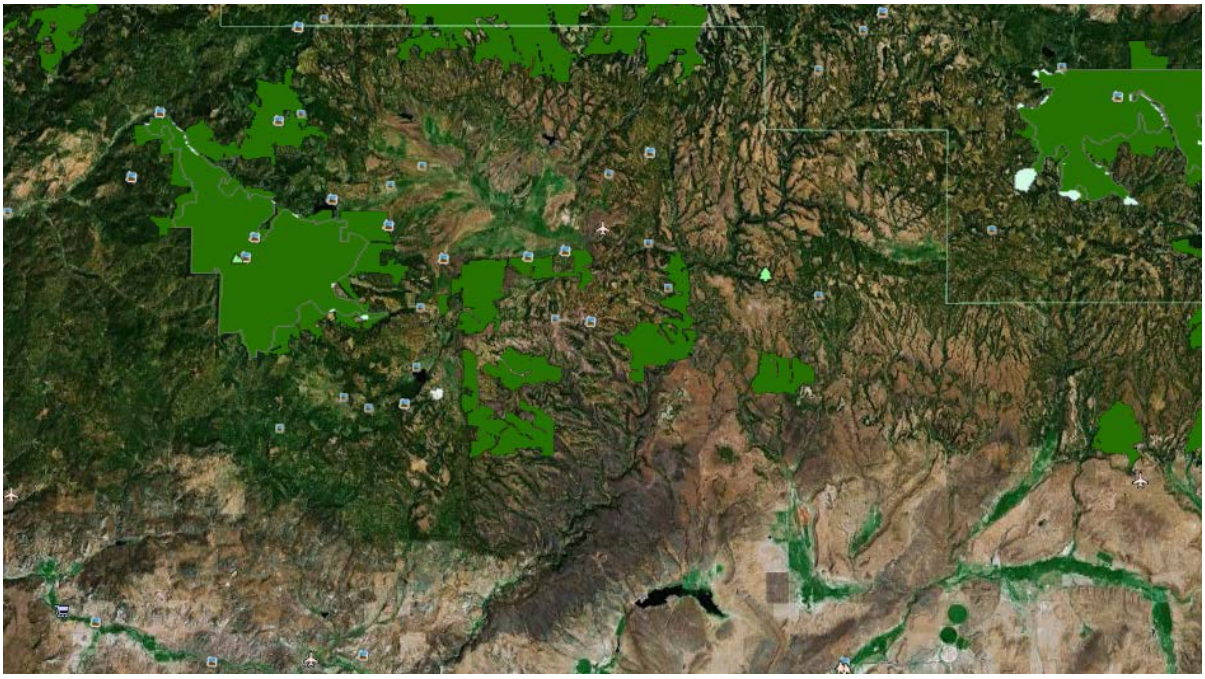


Figure 7. Map of "unroaded areas" provided by Oregon Wild during the comment period on the DEIS.

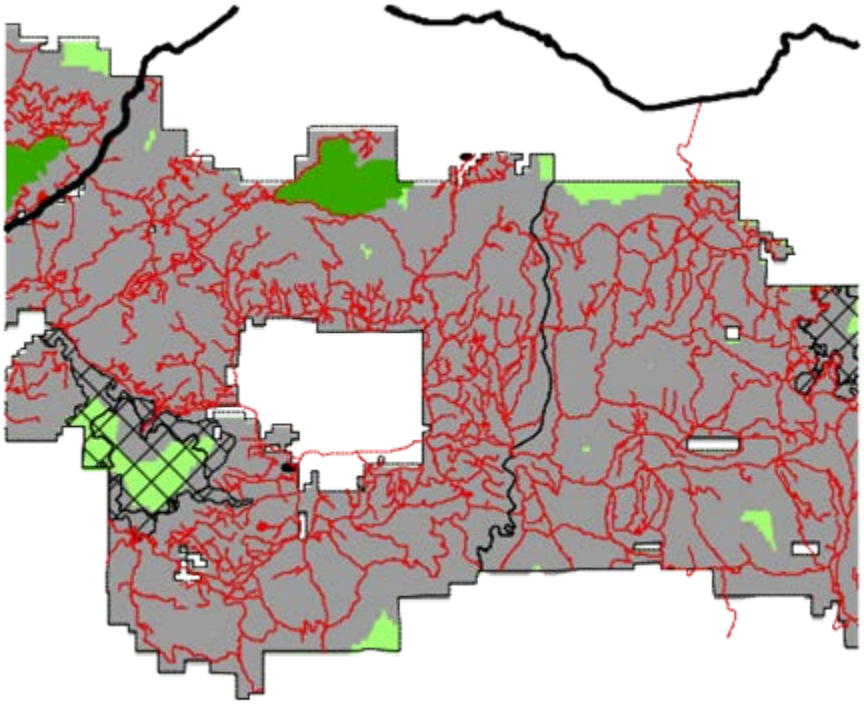


Figure 8. Map of "areas greater than 1 mile from a road" provided by Wildlands CPR.

Visual Quality

This section includes the entire Visual Quality analysis.

The existing scenery has a variety of disturbed and undisturbed areas. Human-caused activities and natural disturbances have altered the appearance of the landscape. Diverse vegetative composition and structure across the project area provide textural and color patterns that vary seasonally. Depth-of-field views vary between restricted to immediate foreground in high density stands, to filtered middleground views in moderate density to open timbered stands, to wide-open spaces offering long distance background views (vistas). This project would have a very limited amount of clearing of vegetation. Clearing would be the minimum width necessary to meet trail clearing standards along proposed routes, and clearing at staging areas or trail heads would be focused on safety and providing adequate room for turning-around, parking and in some cases campsites. Impacts to vegetative scenery would be evident, but would be of a relatively small scale in comparison to more expansive activities associated with vegetation and fuel management projects that have occurred, are being planned, or are ongoing within the project area.

There are specific Project Design Criteria (PDC) listed in Chapter 2 for visual emphasis areas including the Historic Summit Trail and visual corridors. Visually attractive areas such as aspen stands, cottonwood groves, meadows, seeps and springs would also be avoided during trail lay-out and construction as described in the PDC. The trail designs and sign plan would be developed that consider Forest Plan Visual Quality Objectives. However, directional and traffic management signs would be installed at trail system intersections, at trail crossings over open roads, and at Staging areas and/or Trail Heads. These signs may be considered to be an impact to the natural appearance of the sites where these signs are installed. However, they would be comparable to other signs that are already present across the project area for traffic control, recreation sites, trail markers and visitor information. Where rehabilitation or concealment of unwanted routes is proposed, these sites should improve in natural appearance compared to their current condition once vegetation becomes established.

Air Quality

This section includes the entire Air Quality analysis.

Affected Environment

The 1970 Federal Clean Air Act, as amended in 1977 and 1990 (42 U.S.C. §7401 et seq.), is a legal mandate designed to protect human health and welfare. National Ambient Air Quality Standards are defined in the Clean Air Act as levels of “criteria” pollutants above which may result in detrimental effects on human health and welfare. These criteria pollutants include carbon monoxide, lead, nitrogen oxides, particulate matter (PM2.5 and PM10), ozone, and sulfur dioxide.

State Implementation Plans (SIPs) are adopted by each state to implement the provisions of the Clean Air Act. State Implementation Plans describe the state’s actions to achieve and maintain National Ambient Air Quality Standards. Oregon Department of Environmental Quality is responsible for assuring compliance with the Clean Air Act. In 1994, the Forest Service, in cooperation with Oregon Department of Forestry and the Bureau of Land Management signed a Memorandum of Understanding (MOU) to establish a framework for implementing an air quality program in Northeast Oregon. However the MOU is specific to smoke management associated with prescribed fire. Implementation of this project is not expected to alter smoke emissions from prescribed fire and would thus not affect compliance with the MOU.

Section 160 of the Federal Clean Air Act also requires measures to "preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other places of specific national or regional natural, scenic, or historic values." Class I airsheds include Forest Service and Fish and Wildlife Service Wilderness areas over 5,000 acres that were in existence before August 1977, and National Parks in excess of 6,000 acres as of August 1977. Designation of Class I airsheds allows only very small increments of new pollution above existing air pollution levels, Class I airsheds have high air quality protection standards, in part, because visibility was identified as an important value. The nearest Class 1 Wilderness Airshed is The Strawberry Mountain Wilderness. Due to the location of the project area, prevailing winds and low volume of emissions anticipated from construction, use and maintenance of this OHV trail system, this project is not likely to affect any Class I Airshed.

Class 2 airshed is an airshed classification representing National Forest System Land that is not within a Class I airshed. The Ochoco Summit project area is a Class 2 airshed. Class 2 airsheds may receive a greater amount of human-caused pollution than Class I airsheds. These areas include areas that are neither industrialized nor meet the specific requirements for classification as Class I areas. They are protected by the Prevention of Significant Deterioration (PSD) program. The Prevention of Significant Deterioration (PSD) permitting program is a Clean Air Act permitting program for new and modified major sources of air pollution such as power plants, manufacturing facilities, and other facilities that emit air pollution.

Background

The U.S. Environmental Protection Agency (EPA) set national air quality standards for six common pollutants (also referred to as "criteria" pollutants. These standards are known as National Ambient Air Quality Standards (NAAQS) and are listed at the following web site: http://www.deq.state.or.us/aq/planning/. PSD applies to all pollutants that do not exceed the National Ambient Air Quality Standards (NAAQS) in an area. PSD also applies to other pollutants that do not have a NAAQS. These non-criteria pollutants are listed in EPA's regulations. Maintenance Areas are those geographic areas that had a history of nonattainment, while Nonattainment Areas have not consistently met the clean air levels set by the U.S. Environmental Protection Agency in the National Ambient Air Quality Standards (NAAQS). There are no mapped Air Quality Maintenance or Non-attainment Areas in Crook, Wheeler or Grant Counties (Oregon DEQ 2009). The Oregon Smoke Management Report displays principal population centers that are smoke sensitive receptors. The cities of Bend, Redmond and John Day are the closest municipalities shown as smoke sensitive areas on the Oregon Smoke Management Plan map which can be viewed at the following web site: http://www.oregon.gov/odf/pages/fire/smp/smkmgtannualrpts.aspx. The City of Bend was previously classified as a "Designated Area" in an Oregon Smoke Management Report as potentially air quality impaired. The City of Prineville, which is closest to the project area, is not shown as smoke sensitive on the Smoke Management Plan map, but is tracked by DEQ with an Air Quality Index. The Air Quality Index (AQI) is a color-coded tool which shows air pollution levels. The AQI for particulate matter (both $PM_{2.5}$ and PM_{10}) is based on the average of the previous 24 hours of pollution levels and is coded as good, moderate and two classes of unhealthy.

Fugitive Dust

"Fugitive dust" is the term used when the soil crust is disturbed or broken and soil particles are released and raised into the air by air currents generated by vehicles (Ouren et al. 2007).

Soil disturbance and migration are items to be considered in any setting where motor vehicle travel is off hardened surface roads. These soil particles, created when the crust is disturbed, are considered particulate matter. Particulate matter is a mixture of small liquid droplets and microscopic solid particles that can be formed or emitted directly into the air (including dust, dirt, smoke and soot) The

haze associated with air pollution is caused when these tiny particles scatter or absorb visible light (McCarthy et al. 2006; EPA 2010). The EPA (2009) defines the following sizes of particulate matter:

Ultrafine particles generally defined as those less than 0.1 microns.

$PM_{2.5}$, also known as fine fraction particles (generally defined as those particles with an aerodynamic diameter of 2.5 microns or less), are usually 1/30th the diameter of a hair.

PM_{10} (generally defined as all particles equal to and less than 10 microns in aerodynamic diameter; particles larger than this are not generally deposited in the lung).

The Clean Air Act directs the EPA to set standards for particulate matter in the form of primary and secondary standards. Primary standards set limits on the amount and size of particulate matter that could be injurious to human health, while secondary standards set public welfare limits (damage to crops, animals, visibility impairment). These pollutants and standards are displayed in Table 134.

McCarthy et al. (2006) describe the dust plume raised by passing vehicles as PM_{10} whereas the emissions created by engine combustion are usually $PM_{2.5}$. The smaller size of the $PM_{2.5}$ particles allows for easy ingestion into human lungs and has been linked to health issues, such as asthma and strokes (EPA 2003). Road surface type, speed, and vehicle type all play a part in how much dust is created (Goossens and Buck 2009).

Consistent dispersal patterns indicate that larger particles travel shorter distances and stay relatively close to the ground while smaller particles go higher into the air and travel further away from the source (Padgett 2006). Wind direction, velocity, and canopy cover are factors in dust dispersal patterns and distance. Riders may not ride at mid-day on hot summer days due to the hot, dry and dusty conditions. Optimum riding is typically in the slightly cooler morning and evening periods during mid to late summer and during the moister and cooler spring, early summer and fall months.

In one study, the more open the trail terrain with adequate air circulation the faster the dust particles dispersed, and conversely, if the riding area was under heavy canopy with poor air circulation dust particles hang in the air for longer amounts of time (Meadows et al. 2008). In the Ochoco Mountains air circulation is also effected by time of day, with afternoon and evening breeze common during the summer use period.

Emissions

Vehicle emissions, particularly those resulting from two-stroke engines (nitrogen oxides, sulfur dioxide, carbon monoxide, ozone, aldehydes, and extremely persistent polycyclic aromatic hydrocarbons) and lightweight soil particles or “dust” resulting from vehicle travel on unpaved surfaces (also known as fugitive dust) can contribute to localized air quality degradation, even though National Ambient Air Quality Standards in a larger area are being met (Ouren et al. 2007).

Emissions from OHVs, particularly two-stroke engines (engines that use a gas and oil mixture in the combustion chamber), can contribute to decreased air quality because two-stroke engines do not completely burn fuels resulting in increased emissions containing nitrogen oxides (NO_x), sulfur dioxide (SO_x), carbon monoxide (CO) and ozone (O_3). Research has shown that a small two-stroke engine (e.g. chainsaw, which is considerably smaller than a standard two-stroke OHV engine) running for two hours emits the same amount of hydrocarbons as driving 10 fuel-efficient cars for 250 miles each (http://www/arb/ca/gov/msprog/offroad/sm_en_fs.pdf). Pollutants emitted from exhaust can create varying impacts on vegetation.

The U.S. Environmental Protection Agency (EPA), as directed by the Clean Air Act, set national air quality standards for six common pollutants, also referred to as “criteria pollutants.” These pollutants, carbon monoxide (CO), lead (Pb), nitrogen dioxide (N_2), Ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2), can damage crops, reduce visibility, combine with other pollutants to form wet and dry acids (acid rain), and prevent heat from escaping into space. This latter effect

contributes to the increasing concentrations of greenhouse gases that are considered responsible for climate change. Weather plays a part in the formation of some pollutants like ozone. Hotter, drier weather means higher ozone levels (EPA 2008), but the reduction of nitrogen oxide (NO_x) emissions reduces ozone levels.

Table 134 shows the criteria pollutants and their current allowable limits. These limits have been reviewed by the EPA to determine if the levels set in the 1990s are still appropriate or if more stringent measures are needed to reduce the potential impacts on greenhouse gases and human health. Previously, just registered vehicle engines (passenger cars and trucks) were tested and had exhaust emissions criteria set. Historically nonroad engines (recreational vehicles, diesel marine engines, and snowmobiles, etc.) were not required to have emissions standards. The EPA started implementing emissions standard requirements for these type engines (off-highway motorcycles and ATVs) in 2006, with 100 percent phase-in in 2007 (see 40CFR 1051). As new engines are designed to meet these criteria, older and less clean OHVs would be gradually phased out.

Table 134. Pollutants and standards.

Pollutant	Average Time	National Ambient Air Quality Standard (NAAQS) Violation Determination[1]	Federal Primary Health Standard (NAAQS) Exceedance Level	State Standard Exceedance Level
Carbon monoxide	1-hour	Not to be exceeded more than once/year	35 ppm	35 ppm
	8-hour	Not to be exceeded more than once/year	9 ppm	9 ppm
Lead	Calendar Quarter	Quarterly arithmetic mean	0.15 µg/m^3	0.15 µg/m^3
Nitrogen dioxide	Annual	Annual arithmetic mean	53 ppb	53 ppb
	1-hour	3-year average of the maximum daily 98th percentile one hour average	100 ppb	NA
Ozone	8-hour	3-year average of the annual 4th highest daily maximum 8-hour average concentration	75 ppb	75 ppb
$PM_{2.5}$	24 hour	98th percentile of the 24-hour values determined for each year. 3-year average of the 98th percentile values.	35 µg/m^3	35 µg/m^3
	Annual Average	3-year average of the annual arithmetic mean	15 µg/m^3	15 µg/m^3
PM_{10}	24 hour	The expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1 over a 3-year period.	150 µg/m^3	150 µg/m^3
Sulfur dioxide	1 hour	3-year average of the maximum daily 99th percentile one hour average	75 ppb	NA
Units of measure are parts per million (ppm), parts per billion (ppb) or micrograms per cubic meter of air (µg/m^3). For more information about the standards, visit http://www.epa.gov/air/criteria.html (EPA 2011).				

Direct and Indirect Effects

Alternative 1

Under the No Action Alternative, fugitive dust is present and a result of cross-country travel along user-created trails and existing motorized travel on established roads. With implementation of the Travel Management Rule motorized travel on designated routes the dust would be localized close to

the open unpaved roads within the analysis area. Motor vehicle travel on unpaved or native surface roads would produce dust but most would settle back out quickly and close to the trail. Some of the lighter particles would travel higher in the air and farther from the trail, but given the open nature of the trail design and air circulation, these would settle out in relatively short distances.

Alternatives 2, 3, and 4

The action alternatives affect where motorized vehicles can be legally operated on National Forest lands, and thus could potentially affect the location and concentration of vehicle emissions and fugitive dust resulting from vehicle travel on non-paved surfaces. There may be some increased temporary localized air quality impairment from vehicle emissions and fugitive dust in areas where a high level of OHV use occurs. This increased effect on air quality is assumed to be minimal, except in localized areas, because none of the alternatives are likely to change the overall amount of motorized use across the Forest. Vehicle travel on unpaved surfaces in areas prone to dust will continue to occur on the system of native and aggregate surface open roads, with larger vehicles and at speeds much higher than what is anticipated to occur on the proposed OHV trails, and when dusty conditions are likely. Thus there would be an increase in fugitive dust in close proximity to the proposed trail network, but it would be relatively small in comparison to the effect of ongoing travel across the project area.

The alternatives could also indirectly affect the location of unplanned human-caused wildfire starts, which could then have an indirect effect on air quality. It is possible that fire starts could occur as a result of OHV equipment or associated human use along the trail system. Since under Alternatives 2 through 4 would designate a motorized trail system fire risk associated with use of the trail system would be more readily monitored and restricted as necessary during extreme fire conditions. This could lead to reduced ignitions, more rapid detection and suppression, thereby potentially reducing emissions. However, these effects on air quality from human-caused wildfire that could be attributed to fire starts from OHVs or other uses within the designated trail system are highly speculative and are therefore not measurable. The potential for any of the alternatives to affect air quality indirectly as related to wildfires is predicted to be negligible and is therefore not discussed in further detail in this analysis.

In Alternatives 2 and 4 the areas with trail segments and supporting areas at or near the Ahalt Mineral Source, Peterson Lava, Ross/Peterson Ridge, Road 600 and Happy Camp would have increased levels of dust and emissions at those locations compared to the other alternatives. Alternative 2 and 4 include a class II network that would be largely utilized by vehicles that run 4-cycle engines and that travel the trail at very low speeds. These factors would combine to produce less of the pollutants associated with 2-cycle engines as well as fugitive dust. On the other hand the trails would be slightly wider and thus could be exposed to slightly higher levels of wind erosion, except where the trails are on lava or constructed boulder trails which are resistant to wind erosion. Alternatives 3 and 4 have more concentrated loops at the west end of the proposed system and thus, the opportunity for riders to encounter fugitive dust and associated dust particles with potential to affect human health would be greater in that area, as well as compared to the other alternatives. Although riders tend to utilize the trail systems during the seasons when dust can be avoided[9], the potential for exposure to dust is the greatest during the core summer season.

For all alternatives there may be some localized temporary air quality impairments from vehicle emissions and areas prone to dust. This would be particularly evident in staging areas where engines are started and warming up and where warm up loops and youth riding areas are provided. However, from an airshed perspective, the Ochoco Summit project area is far from the nearest area designated as potentially air quality impaired (Bend, Oregon), as well as from the nearest non-attainment and

[9] 2009, communication with Vicki Ramming, COHVOPS Program Director

maintenance areas (Klamath Falls, Lakeview), and the DEQ smoke sensitive communities (Bend, Redmond and John Day). Any localized impairment would be diluted to a scale that would be impractical to measure and negligible at the scale of airsheds. A projected 2 to 5 percent yearly increase in riders would not change this condition.

Cumulative Effects

For all of the alternatives, smoke and smoke drift from prescribed burns would have the potential to impact the Ochoco Summit OHV area. There is the potential for portions of the trail system to be closed on burn days due to reduced visibility from smoke and any possible health concerns. The prevailing winds are out of the southwest and normally would push the smoke east away from the proposed OHV area. The alternatives would have no direct or indirect effect on smoke emissions from Forest management activities, which are managed by the Oregon Department of Forestry as delegated by the Oregon Department of Environmental Quality.

Implementation of the Travel Management Rule across the Forest will reduce fugitive dust by restricting motorized cross county travel. Ongoing forest thinning projects in the project area could potentially reduce the time the dust is in the air by opening stands, thus allowing for increased air circulation and settling the dust more quickly. Fugitive dust and its effects would remain localized and would not change the disclosures for human health or water quality.

Potential cumulative effects include the vegetation and fuels management program that overlaps the project area, with a foreseeable action of up to 20,000 acres of prescribed fire across the project area (Spears, Canyon, HEJ, Zane, Jackson). Although it is acknowledged that prescribed burning releases common criteria pollutants, such as CO, the overlap of effects cannot be expressed as an aggregate. Smoke from prescribed fire contains much more particulate matter and travels a greater distance, and dispersion is highly dependent on prevailing winds, terrain and weather conditions. Effects to air quality from OHV use of a trail system tends be localized, with dispersion in proximity to the trail network and staging areas, rather than moving at landscape scales across airsheds.

Climate Change and Carbon Cycling

This section includes the entire Climate Change and Carbon Cycling analysis.

On January 16, 2009, the Washington Office of the Forest Service released guidance to Forest Service to assess the effect of proposals on the climate into project-level NEPA documents. This guidance provides that units should consider two kinds of climate change effects. First, units may, where appropriate, consider the effect of a project on climate change. Second, units may, where appropriate, consider the effect of climate change on a proposal.

Assessing the Effect of the Ochoco Summit Trail System project on Climate Change

The Ochoco Summit project planning team considered relevant factors of how a designated trail system on a National Forest could potentially affect a change in global climate. It was determined that the relationship and contribution of exhaust emissions was likely a key factor to consider. In addition, how this project would affect forests and their role in the carbon cycle was also considered.

Given the very limited circumstances when vegetation would be removed for a segment of new trail, it was determined that those activities would not be analyzed as a potential effect on global climate change. Areas of user-created trails to be rehabilitated and returned to a vegetative state would offset any actions that remove vegetative cover on proposed new trails or at staging areas. In addition, closed roads that are not needed for future administrative use, as determined by roads analysis, may be converted to trails where designated as part of the proposed trail system. Road to trail conversions

would narrow the footprint of the route to the designated trail width, which would increase recovery of vegetation on the portions of the road bed that are not utilized for the trail. This would also offset the loss of vegetation associated with establishment of new trails and at staging areas.

Emissions from OHVs, particularly two-stroke engines (engines that use a gas and oil mixture in the combustion chamber) do not completely burn fuels. The result is an increase in emissions that contain nitrogen oxides (NOx), sulfur dioxide (SOx), carbon monoxide (CO) and ozone (O_3), which are also identified as "greenhouse gasses" (or GHG) that contribute to warming of the atmosphere. These emissions are also what the Environmental Protection Agency (EPA) identifies as criteria pollutants in which they set National Air Quality Standards. These commonly found air pollutants are found all over the United States and beyond.

Because the Ochoco Summit Trail System area is not as close to urban centers along the Highway 97 corridor as some of the other OHV systems in Central Oregon, it is not expected to get high levels of use during peak periods such as those predicted for locations closer to Bend, Redmond and La Pine. The use estimated for the project area (see Recreation section in Chapter 3 of this document) is expected to be spread out over the season of use on the designated system and across the proposed trail system, as well as through the year and across the project area on the network of existing mixed-use roads. This annual use estimate equates to up to 5000 motor vehicles emitting GHG over the period of one year, plus additional vehicles used for transport to the staging areas or trailheads. This represents a very small fraction of the total internal combustion engines globally emitting GHG, even with the anticipated 2.5 to 5.6 percent increase in riders annually over the next decade. Therefore, this incremental contribution to global climate change is negligible.

Agency direction states: "[b]ecause greenhouse gases mix readily into the global pool of greenhouse gases, it is not currently possible to ascertain the indirect effects of emissions from single or multiple sources (projects). Also, because the large majority of Forest Service projects are extremely small in the global atmospheric CO_2 context, it is not presently possible to conduct quantitative analysis of actual climate change effects based on individual projects."

Under this definition, there would be no measurable direct effect associated with any of the OHV action alternatives. The action alternatives do not authorize the emission of GHG; the action alternatives do not limit the emission of GHG; and, the action alternatives are unlikely to change the emission of GHG as compared to the no action alternative. Emissions of GHG from OHV use in the Ochoco Summit Trail System project area are not directly affected by the designation of routes in a project area with 659 miles of existing routes (mixed use roads), areas open to cross country travel (rock pits shown as open on MVUM), 140 miles of open road for highway legal vehicles, along with commercial equipment operation. In other words, OHV use will continue to occur in the project area with or without trail system designation, and designation of OHV routes is not expected to increase the level of OHV use by a magnitude that would affect overall emissions of GHG within the project area.

The EPA is now implementing emissions standard requirements for two stroke (among other types of) engines (40 CFR 1051). As new engines are designed to meet these criteria, older and less clean OHVs would be phased out, likely to offset the contribution from predicted increases in riders.

Because the designation of motorized routes has no quantifiable direct or indirect effect on climate change, it cannot have a cumulative effect.

Assessing the Effect of Climate Change on the Ochoco Summit Trail System Project

Although El Niño/Southern Oscillation and the Pacific Decadal Oscillation comprise the primary factors for climate variability in the Pacific Northwest, the influence from global climate change is a

growing concern. According to the Climate Impacts Group, based out of the University of Washington, climate modeling for the Pacific Northwest predicts a future rate of warming of approximately 0.5 degrees Fahrenheit per decade for the Pacific Northwest through at least 2050, relative to the 1970-1999 average temperature. Temperatures are projected to increase across all seasons, although most models project the largest temperature increases in summer (June-August), and the average temperatures could increase beyond the year-to-year variability observed in the Pacific Northwest during the 20th century as early as the 2020s. Warmer temperatures during the OHV season of use may increase the demand for recreational opportunities in a forested setting where the temperatures tend to be lower than in the surrounding low elevation areas.

Assessing the influence of these factors on impacts to soils and vegetation associated with trail construction, operation and maintenance activities within the project area: a warming and drying climate combined with less of a snowpack could potentially extend the season of access to the trail system. This could provide additional time for monitoring and maintenance activities prior to the season of use. Recreational OHV use would remain limited to an exact season use as described in Chapter 2. Dry soil conditions early in the year may reduce potential for impacts from OHV to sensitive resources that are vulnerable to damage under wet soil conditions (such as scabland habitat and seasonal drainages), thus potentially reducing maintenance needs. However, early access in the spring and later access in the fall/winter by non-motorized users and illegal motorized use could lead to subsequent associated effects.

Very little removal of vegetation would occur associated with trail construction and maintenance. Project design included a focus on, wherever possible, locating trails to overlay existing snowmobile trails, existing user-created trails, and/or areas where vegetation and soil may be previously disturbed. Chapter 2 in this analysis discloses a season of use generally from June 1 through September 30 (Alternative 3). Monitoring is also an important element described for many resources and summarized in Chapter 2. If undesired consequences associated with an extended season are encountered, then the Forest Service has the authority to immediate suspend operation of the trail system to protect resources. Designation of a trail system allows the Forest Service greater flexibility in monitoring and adapting the project to a changing environment.

Social and Economic Analysis

This section contains the entire Social and Economic Analysis.

Social and economic elements, which are interrelated and interdependent with ecological elements, comprise the human components of the ecosystem. The implications of resource management decisions for the Ochoco Summit OHV project to the social and economic values are of interest to the residents, business owners, and users of the area. For the purposes of describing socio-economic effects on the economy, this analysis focuses on the economy of central and southeastern Oregon. The effects to the local economies are based on the estimated number of jobs created. The bulk of the area and communities potentially influenced by actions on the Ochoco National Forest lie within Deschutes, Crook, and Jefferson, the southernmost part of Wheeler, eastern most part of Grant, and the northern most sections of Harney and Lake counties. This is referred to as the Zone of Influence.

General Information and Population Estimates

The following information was retrieved from the Oregon State Archives website[10] and from reports generated in October, 2012, from the "Economic Profile System-Human Dimensions Toolkit" (see project file, Ochoco National Forest, Prineville, Oregon, for the complete reports). Population estimates discussed in the following text are summarized in Table 135.

[10] http://arcweb.sos.state.or.us/pages/records/local/county/histories.html

Crook County

Crook County was established on October 24, 1882. It was created from the southern part of Wasco County and named after U.S. Army Major-General George Crook, a hero of the Snake Indian Wars.

Crook County is situated in the geographic center of Oregon. It has been reduced from its original size of 8,600 square miles to 2,991 square miles by the creation of Jefferson County in 1914 and Deschutes County in 1916. The current boundaries were established in 1927. Crook County is bounded by Jefferson and Wheeler Counties to the north, Grant and Harney Counties to the east, and Deschutes County to the south and west.

In 1882 the Legislative Assembly established Prineville as the county seat. The voters confirmed the choice of Prineville, the only incorporated town in the county, in the 1884 general election. Prineville was named in honor of the town's first merchant, Barney Prine.

The first census in 1890 showed a population of 3,244 excluding the Indians. The last several censuses have shown an increase in inhabitants with the 2010 population of 21,515 representing a 12.2% increase from 2000. The fast pace of growth in the nearby Bend-Redmond area has played a role in the rising population of Crook County.

While the economy of the county historically was based on agriculture and forestry, currently manufacturing, retail trade, and education, health care and social assistance support the greatest number of jobs in Crook County.

Deschutes County

Deschutes County was created from the western portion of Crook County on December 13, 1916. The county encompasses 3,055 square miles and is located in the central portion of the state. Geographically, the county includes portions of the Cascade Mountains and the central high desert plateau. It is bounded by Jefferson County to the north, Crook County to the east, Klamath and Lake Counties to the south, and Lane and Linn counties to the west. The county seat is located in the city of Bend which was incorporated in 1905.

Principal industries in the county are tourism, timber, and agriculture, chiefly cattle and potatoes. The destination resort, Inn of the Seventh Mountain, and the resort communities of Black Butte and Sunriver, were developed during the 1970s. The Mount Bachelor ski area and High Desert Museum add to the tourism-based economy in the county as well. Numerous golf courses have been added in recent years.

The first county census was taken in 1920 and counted a population of 9,622. The 2010 population of 154,568 represented an increase of 34.0% over 2000.

Grant County

Grant County was established on October 14, 1864, and named for General Ulysses S. Grant, commander of the Union Army during the Civil War. Earlier in his military career Grant had been stationed at Fort Vancouver and assigned to protect the increasing number of emigrants traveling the Oregon Trail. Grant County is located in eastern Oregon and was created out of Wasco and Umatilla Counties. At that time Grant County was the largest county in the state. Its size was later reduced by the transfer of land to Lake County and the creation of Harney and Wheeler Counties. Grant County shares boundaries with eight counties: Morrow, Umatilla, and Union to the north; Harney to the south; Malheur and Baker to the east; and Crook and Wheeler to the west. It has an area of 4,528 square miles.

Grant County contains the headwaters of the John Day River, which has more miles of wild and scenic designation than any other river in the United States. More than sixty percent of the county's

land area is under public ownership, and the county contains parts of four national forests. Principal industries are agriculture, livestock, forestry, and recreation.

The first census was taken in 1870 and counted 2,251 persons. The population of Grant County in 2010 was 7,349. This represented a 7.4% decrease from 2000.

Harney County

Harney County was created from the southern two-thirds of Grant County on February 25, 1889. It is located in the high desert country in the southeast portion of the state and is the largest county in Oregon, comprising 10,228 square miles. Counties with contiguous borders include Malheur to the east; Lake, Deschutes, and Crook to the west; Grant to the north; and the State of Nevada to the south. The county was named after the lake that lies within its territory, which was named in honor of General William S. Harney, commander of the Department of Oregon of the U.S. Army in 1858-1859.

Harney County's population is primarily concentrated in a small urbanized sector of Burns-Hines with the remainder mostly in the Harney Basin. The county's population was recorded as 2,559 during the 1890 census and rose steadily until the decade of 1930-40, and then resumed an upward curve until the 1980s. The county experienced a net out migration of nearly fifteen percent in the 1980s primarily due to the closure of the lumber mill in Burns. The 2010 population of 7,364 represented a 3.2% decrease from 2000.

Jefferson County

Jefferson County was created on December 12, 1914, out of territory that was once part of Crook County. The county was named after Mount Jefferson, the second highest peak in Oregon with an elevation of 10,497 feet, which marks the county's western skyline. The county is bounded on the north by Wasco County, on the east by Wheeler and Crook Counties, on the south by Deschutes County, and on the west by Linn and Marion Counties. The county encompasses 1791 square miles.

The county's population at its first federal census in 1920 was 3,211. The 2010 population of 21,652 represented a 13.9% increase from 2000.

Lake County

Lake County was established on October 24, 1874. It was created from the southern part of Wasco County and the eastern part of Jackson County. It was named because of the numerous large lakes that are entirely or partly within its borders.

Lake County is situated in south central Oregon. The western boundary was changed with the creation of Klamath County in 1882. It regained some area when the southwestern part of Grant County was annexed in 1885. It currently has 8,275 square miles. Lake County is bounded on the north by Deschutes County, on the east by Harney County, on the south by the State of California, and on the west by Klamath County.

The 1875 Lake County census showed a population of 944, which jumped to 2,804 by 1880. Since then there has been some fluctuation in population, but with a fairly steady growth to a population of 7,882 in 2010. This represented a 6.2% increase over the 2000 population.

Wheeler County

Wheeler County was established on February 17, 1899. Formed from parts of Grant, Gilliam, and Crook Counties, there have been no boundary changes since its creation. The county shares boundaries with Gilliam and Morrow Counties to the north, Wasco and Jefferson to the west, Crook to the south, and Grant to the east. The county was named for Henry Wheeler, who operated the first stage line through the county. The area of the county is 1,713 square miles, and the county seat is located in the city of Fossil.

Wheeler County's 2010 population was 1,443. This represented a decrease of 6.7% from 2000.

Table 135. Population data in the seven Zone of Influence counties for the Ochoco Summit OHV Trails project.

County	Population		Change	Percent Change
	2000 Census Data	2010 Estimate		
Crook	19,182	21,515	2,333	12.2
Deschutes	115,367	154,568	39,201	34.0
Grant	7,935	7,349	-568	-7.4
Harney	7,609	7,364	-245	-3.2
Jefferson	19,009	21,652	2,643	13.9
Lake	7,422	7,882	460	6.2
Wheeler	1,547	1,443	-104	-6.7
Total	**178,071**	**221,773**	**43,702**	**24.5**
Information obtained from reports generated in October, 2012, from the "Economic Profile System-Human Dimensions Toolkit."				

Future population projections are expected to mimic that of the past decade. Deschutes, Crook, and Jefferson Counties are expected to continue with growth, whereas the more rural counties, Wheeler, Grant, Harney, and Lake are projected to grow quite slowly, if at all.

Employment

Table 136 summarizes the changes in the civilian labor force in Central Oregon over the last decade.

Table 136. Changes in civilian labor force in the Zone of Influence for the Ochoco Summit OHV Trail System project.

County	Civilian Labor Force		Change	Percent Change
	2000 Census Data	2010		
Crook	8,764	9,252	488	5.5
Deschutes	58,836	72,837	14,001	23.8
Grant	3,792	3,135	-657	-17.3
Harney	3,765	3,313	-452	-12.0
Jefferson	8,918	8,571	-347	-3.9
Lake	3,371	3,373	2	0
Wheeler	662	614	-48	-7.2
Total	88,108	103,105	14,997	17.0
Information obtained from reports generated in October, 2012, from the "Economic Profile System-Human Dimensions Toolkit."				

The following information comes from a report generated by the "Economic Profile System-Human Dimensions Toolkit" in October, 2012. In Crook County, the three largest sectors were education, health care and social assistance, (1,494), manufacturing (1,400), and retail trade (1,355). In Deschutes County the three largest sectors were education, health care, and social assistance (13,364), retail trade (9,219) and construction (8,539). In Grant County the three largest sectors were education, health care and social assistance (695), agriculture, forestry, fishing, hunting, and mining (469), and retail trade (294). In Harney County, education, health care and social assistance was tied with agriculture, forestry, fishing, hunting and mining for largest sector (618), followed by arts, entertainment, recreation, accommodation, and food (430) and retail trade (363). In Jefferson County the three largest sectors were education, health care and social assistance (1,629), manufacturing (1,552), and retail trade (989). In Lake County the three largest sectors were agriculture, forestry, fishing, hunting and mining (710), education, health care and social assistance (520), and retail trade (376). In Wheeler County the three largest sectors were arts, entertainment, recreation, accommodation, and food (163), agriculture, forestry, fishing, hunting and mining (110), and

education, health care and social assistance (107). Overall, the number of jobs in most sectors has declined in recent years; in Deschutes County, however, jobs increased in all sectors.

As of August, 2012, the unemployment rate in Oregon as a whole was 8.2 percent; while unemployment rates in the individual counties were[11]:

- Crook, 12.9 percent;
- Deschutes, 10.4 percent;
- Grant, 10.6 percent;
- Harney, 10.9 percent;
- Jefferson, 11.2 percent;
- Lake, 10.7 percent; and
- Wheeler, 7.1 percent.

Population Characteristics of OHV Users

This section briefly describes the population characteristics of OHV users in the Pacific Region (Oregon, Washington, and California), Oregon, and the local Central Oregon area; the information is based on the 2008 report "Off-Highway Recreation in the United States and its Regions and States: An Updated National Report," which was produced by the National Survey on Recreation and Environment, Internet Research Information Series.

Population Characteristics of OHV Users in the Pacific Region

In the Pacific Region (Washington, Oregon, and California), the rate of OHV participation (18.7 percent) is nearly the same as the national rate. The 6.9 million OHV users living in the Pacific region are about 16 percent of the national total. Similar to other regions, participation declines with age. People under age 30 are about three times more likely to participate as those over 50. Males are also significantly more likely to be OHV users than females. American Indians have the highest participation rate (31 percent) among racial and ethnic groups, just as they do in every other region. Though the Hispanic rate (14 percent) is next to the lowest, the number of Pacific Hispanic OHV users (about 1.3 million) is second only to Whites. This is due to the large Hispanic population, especially in California.

People with family incomes over $50,000 all participated at similar rates (23 to 27 percent). Only 12 percent of the lowest income class participated. Similar to every other region, the highest educated strata participated at the lowest rates. Just 13 percent of people with post-graduate degrees were OHV users compared with 21 percent of high school graduates and those attending some college or technical school. Also similar to every other region, the participation rate for non-metropolitan residents (32 percent) was much higher than for metro-area dwellers (18 percent), however, since the population in the Pacific region is more than 90 percent metropolitan, this population group dominated the OHV users, accounting for about 89 percent of the 6.9 million participants.

Population Characteristics of OHV Users in Oregon

The data show that Oregon has a slightly higher percentage of OHV users than the Pacific region as a whole. The 2004 Oregon Statewide Motorized Trail User Survey was conducted over a four-month period from January to April 2004 by the University of Oregon's Survey Research Laboratory. The survey found that seven percent of Oregon households have a person reporting motorized trail use, amounting to 98,000 households in the state. ATV riding is the most popular activity, with 70 percent of motorized trail users having engaged in that activity during the past year followed by off-road motorcycling (44 percent). Most motorized respondents were male, and the median age was 40 – 49

[11] Retrieved on October 9, 2012, from http://www.qualityinfo.org/pubs/rolf/12/rolf-0912.pdf.

years old. More than half had some college (62 percent), although most were not college graduates (21 percent). Median income was $40,000 to $69,999.

Population Characteristics of OHV Users in Central Oregon

Based on the initial data of the Central Oregon Off-Highway Vehicle Use Study conducted by Virginia State University during 2008, 77 percent of the visitors are returning users to Central Oregon OHV trails. Seventy percent of the visits are overnight use and average a three day trip. Thirty percent make day use trips averaging a six hour day. In a typical year, 12 days were spent recreating in Central Oregon, 24 days at other OHV areas. The average miles from the primary residence to this area was 129 miles.

The composition of the various groups visiting the area was 42 percent friends, 30 percent family and friends, 24 percent family, three percent single and 1½ percent organized club or organization. Forty one percent of the visitors were 31-40 years old.

A 2006 study (Outdoor Industry Foundation) estimated that 72 percent of Americans aged 16 and older participated in an outdoor activity in 2005, with hiking, running and bicycling on trails being three of the most frequently reported activities. Non-motorized recreation continues to be one of the most popular categories of recreation throughout the state and within the local region. National Visitor Use Monitoring (NVUM) findings show that most visitors participate in non-motorized activities (English et al., 2003). A description of visitor activities was compiled from the survey. Visitor's top picks while visiting the Ochoco National Forest were viewing wildlife, natural features and scenery; primitive camping; fishing, hunting, and developed camping. Each visitor also picked one of these activities as their primary activity for the current recreation visit to the Forest; the top primary activities on the Ochoco were developed camping, viewing wildlife/nature, hunting, horseback riding, and general relaxing. Dispersed camping and day use picnicking on the Ochoco account for about 27 percent of visitors' primary or secondary activities.

National Visitor Use Monitoring data indicate that big game hunting is a popular activity on the Ochoco National Forest, which is a regionally and even nationally popular destination for big game hunting. Approximately 22.6 percent of visitors identified hunting as either a primary or secondary activity on the Ochoco. Hunting was also in the top five most popular activities for visitors to the Ochoco.

Although many of these activities are often classified as "non-motorized," the lines between motorized and non-motorized uses begin to blur for many of these activities. For instance, viewing natural features and hunting can be motorized or non-motorized activities. Primitive camping could be considered by some to be any camp outside of developed campgrounds that they may have accessed with motorized vehicles for generations, while other visitors taking the survey might consider primitive camping to be a campsite in a remote Wilderness area only accessible after many hours of hiking. Available survey data do not make any distinction for whether motorized use is associated with these activities, although there are data regarding OHV use specifically as both a primary and secondary activity.

Off-Highway Vehicle Uses

National Visitor Use Monitoring (NVUM) findings indicate that the Ochoco was not a major provider of OHV (Off-Highway Vehicle) recreation in the year surveyed. Nationally, about 2.5 percent of the 205 million annual recreation visits to National Forests identified OHV use as their primary activity, with a slightly higher percentage (3.1 percent) as a secondary activity. Data for the Ochoco National Forest indicate a secondary use of 3.1 percent. For the Ochoco National Forest, the survey found that there were no recreation visits that year that were primarily for OHV use; the Ochoco ranks in the bottom three out of twenty administrative units in the Pacific Northwest Region of the Forest Service (R6) for primary OHV uses.

A somewhat larger percentage of visitors indicated that they participated in OHV recreation even if it was not their primary reason for visiting the Forest. For the Ochoco National Forest, the total percentage of visitors that reported OHV use as a primary or secondary activity was 3.35 percent of all the visits, or roughly 19,900 visits. These data are considerably below the average percent participation for Oregon overall (22.2 percent participation) as reported in the National Survey on Recreation and the Environment (Cordell et al., 2008). Considering both primary and secondary percentages, the Deschutes ranks slightly lower than middle, while the Ochoco ranks near the middle.

These data do not necessarily reflect the apparent local and regional demand for motorized trail systems in the area. Central Oregon is a regional destination for OHV trails, with many hundreds of miles of trails that can be used throughout the year. Based on the initial data of the Central Oregon Off-Highway Vehicle Use Study conducted by Virginia State University during 2008, East Fort Rock is the most used area for OHV recreational purposes; second is Millican Valley.

Cost Estimates

As constructions costs can vary significantly, only rough cost estimates can be used to demonstrate the economic range between the alternatives. With each of the proposed trail systems, there will be rutting, surface concerns, design needs for steep slopes and stream adjacency design concerns which would add to the construction cost. As a way to compare the construction of the new routes proposed for each alternative, the following rough cost estimates, based on ground slope, were developed. Estimates were based on the use of a Sweco trail building machine, a generic mini-excavator, operators, several laborers and saws for clearing and construction of the Class I and Class 3 trails. These values are only for analysis purposes to show the economic comparison of the alternatives. The estimates were broken into three slope ranges and do not include design, layout, signage or any sort of special constructed features or techniques:

- 0 - 15% Ground slope: $1,760/Mile
- 16 - 25% Ground slope: $2,840/Mile
- 26% + Ground slope: $4,340/Mile.

For this project, the slope breaks in the slope erosion map are 0-20%, 21-35%, 36-50% and greater than 51%. Table 137 reflects a summary of the new routes length (miles) for each alternative, broken out by slope. In order to use the cost per mile, 0-20% equates to the 0-15% value, 21-35% = 16-25%, >36% = 26%+. It was recognized that the flatter slope cost of $1,760/mile might be low for the 20% slope but this is a very rough estimate. For the purposes of this analysis, a rough estimate at $45,000 for each fiberglass bridge is assumed. The price for culverts might range from $10,000 - $20,000. For comparison purposes, the estimated costs for each alternative displayed in Table 137.

These estimates do not include design, contract development, installation nor construction inspection costs. An estimate for the boardwalks or fords was not developed. These costs also do not reflect development of the proposed staging areas, play areas, parking area or trail heads.

Alternative 2

In Alternative 2, for the majority of the new route construction, the slopes range from 0-20%. Cost for construction of new routes will vary by the slopes they cross. Based on cost estimates, the rough cost for actual construction of the new segments would run around $166,500, and bridges would cost $720,000, not including design costs.

Alternative 3

In Alternative 3, for the majority of the new route construction, the slopes range from 0-20%. Cost for construction of new routes will vary by the slopes they cross. Based on cost estimates, the rough cost

for actual construction of the new segments would run around $101,960, and bridges would cost $630,000, not including design costs.

Alternative 4

In Alternative 4, for the majority of the new route construction, the slopes range from 0-20%. Cost for construction of new routes will vary by the slopes they cross. Based on cost estimates, the rough cost for actual construction of the new segments would run around $194,800, and bridges would cost $765,000.

Table 137. Comparative costs per alternative based on new route length, ground slope and proposed culverts and bridges.

	Alternative 2	Alternative 3	Alternative 4
Class 1 (ATV)	31.06 miles/$62,627	21.92 miles/$47,991	51.09 miles/$105,029
Class 2 (Jeep)	12.39 miles/$53,772		11.24 miles/$48,797
Class 3 (Motorcycle)	25.67 miles/$50,027	28.40 miles/$53,971	22.14 miles/$40,937
Trail Cost Estimate	$166,500	$101,961	$194,762
Culverts	92 cmps at $92,000	27 cmps at $27,000	111 cmps at $111,000
Bridges	16 at $720,000	14 at $630,000	17 at $765,000
Total Cost Estimate	**$978,500**	**$759,000**	**$1,071,000**

Effects of Forest Plan Amendments

This section includes the entire analysis of effects of Forest Plan amendments.

The description of the alternatives in Chapter 2 of this final EIS includes five Forest Plan amendments proposed for the implementation of Alternatives 2 and 4 and four Forest Plan amendments for Alternative 3. The amendments relate to Forest Plan standards and guidelines within Old Growth Management Areas and on scablands.

Old Growth Management Area Forest Plan Amendments

As described in Chapter 2 of this FEIS, Alternatives 2 and 4 include site-specific Forest Plan amendments to standards and guidelines that apply within Management Area F6, Old Growth Management Areas (OGMA). Alternative 3 includes the same proposed amendments, except for #3 (amendment in OGMA OG-D2-11)

The following amendments are proposed:

1. Amend standards and guidelines that apply to Old Growth Management Area (OG-D1-08) at Indian Butte to allow motorized recreation only on designated routes including one new trail segment to connect between roads 2200-306 and 2200-309.
2. Amend standards and guidelines that apply to Old Growth Management Area (OG-D1-12) at East Porter to allow motorized recreation only on designated routes including one new trail segment at Looney Creek to connect between roads 4200-430 and 4200-440.
3. Amend standards and guidelines that apply to Old Growth Management Area (OG-D2-11) near Chamberlin Spring to allow motorized recreation only on designated routes including one trail segment on existing disturbance (closed road 4250-700) to connect between roads 4250-610 and 1200-440.

4. Amend standards and guidelines that apply to Old Growth Management Area (OG-D2-02) near Deep Creek to allow motorized recreation only on designated routes including one new trail segment.

As described in the Ochoco Forest Plan (page 4-48), there are about 19,570 acres of old growth mixed conifer and ponderosa pine stands identified as Old Growth Management Areas located on the Ochoco National Forest.

Management Emphasis in OGMA: To provide habitat for wildlife species dependent upon old growth stands.

Desired Condition: The Forest Plan indicates that old growth stands in OGMAs are not expected to change significantly in the 10-50 years following publication of the Plan (1989), barring a natural catastrophe. The desired condition is for the OGMAs to continue to provide habitat for dependent wildlife species including pileated and white-headed woodpeckers and flying squirrels, and non-dependent species such as deer and elk. Management activities and roads will generally not be evident.

Standards and Guidelines and Reasons for Amending

Forest-wide and management area Standards and Guidelines relevant to this project include the following: LRMP 4 -178 describes MA-F6 Old Growth as within the Recreation Opportunity Spectrum of Semiprimitive Nonmotorized, except snowmobiles operating on adequate snow base between December 1 and May 1; LRMP 4-188-189 states "no motorized or mechanized use allowed on trails" in MA-F6; LRMP 4-232 states "Constant service roads will remain open. Use on all other roads across the management areas will be eliminated;" LRMP 4-234 states "Motorized use restricted to over-snow use only.

The amendments would allow the authorization of:

1. Class I and III (50" tread for ATV and motorcycles) to cross through OG-D1-08 (Indian Butte) on one designated route (all action alternatives; see Figure 7);
2. Class III (24" tread for motorcycles only) to cross through OG-D1-12 (East Porter) on one designated route (all action alternatives; see Figure 8);
3. Class III (24" tread for motorcycles only) to cross through OG-D2-11 (Chamberlin Spring) on one designated route (Alternatives 2 and 4 only; see Figure 9)
4. Class III (24" tread for motorcycles only) to cross through OG-D2-02 (Deep Creek) on one designated route (all action alternatives; see Figure 10).

The proposed amendments are site-specific and apply only to the proposed segments of connecter trail. They are proposed in order to allow orderly and logical trail system design by linking existing roads that are proposed to be part of the designated trail system in each action alternative.

Effects of the Action Alternatives

The proposed trail segments in OGMAs are all within habitat blocks that are bordered by well-travelled existing open roads and all each proposed trail segment is in proximity to existing open roads; therefore the change in area within the allocation that is in proximity to motorized routes would be negligible. Each proposed trail segment would cross a linear timbered feature, less than ½ mile in width and surrounded by open areas; no proposed segment would cross a large block of interior forest habitat. Each proposed trail segment is limited to a specific tread width (3 segments would be 24" and one would be 50"); therefore the anticipated change in interior forest habitat within the allocation would be negligible. Effects of the proposed alternatives to OGMAs are also discussed in the "Wildlife" section in Chapter 3 of this final EIS. The estimate for clearing for new trails would

range from 0.76 acres for Alternative 3 to 0.84 acres for Alternative 2. The remaining miles of proposed trails within OGMA are on existing road beds.

The Recreation Opportunity Spectrum (ROS) would be affected within these OGMAs in proximity to the proposed trails, as analyzed and disclosed in the Recreation section of this FEIS (Table 45). A change in non-motorized visitation in these areas as a result of the proposed trail segments is unlikely; however, the trails would be available for use for other types of recreation, including mountain biking, hiking or horseback riding.

Scabland Forest Plan Amendments

There are 41,296 acres within the project area identified as shrub-scabland habitat (see Table 127). As described in Chapter 2 of this FEIS, all action alternatives include project-specific Forest Plan amendments to standards and guidelines that apply to scabland habitats. One amendment of the Forest Plan is proposed to make it possible to allow crossing of scablands on designated routes primarily on existing disturbance (old road beds).

Standards and Guidelines and Reasons for Amending

Forest-wide Standard and Guidelines for Recreation state "ORV use on scablands will be limited to snowmobiles operating on an adequate snow base" (LRMP 4-177).

The proposed amendments are site-specific and apply only to proposed segments of connecter trail, most of which are located on existing disturbance. These trail segments are proposed in order to allow orderly and logical trail system design by linking existing roads that are proposed to be part of the designated trail system in each action alternative.

Effects of the Action Alternatives

Potential impacts to scablands are analyzed and disclosed in the "Special Plant Habitats" section of this FEIS. Project Design Criteria for trails crossing scablands are included in Chapter 2 of this document. The project also includes monitoring, education and enforcement, which will help to ensure that riders stay on designated routes when crossing scablands.

Effects to shrub-scabland, including biological soil crust, would be long-term to permanent, but small in magnitude, with the most potential impact occurring near gathering areas. Acreage-wise there would be little scabland area affected, 39 acres, 16.4 acres and 42.5 acres for Alternatives 2, 3, and 4 respectively, out of 47,193 acres present within the project area.

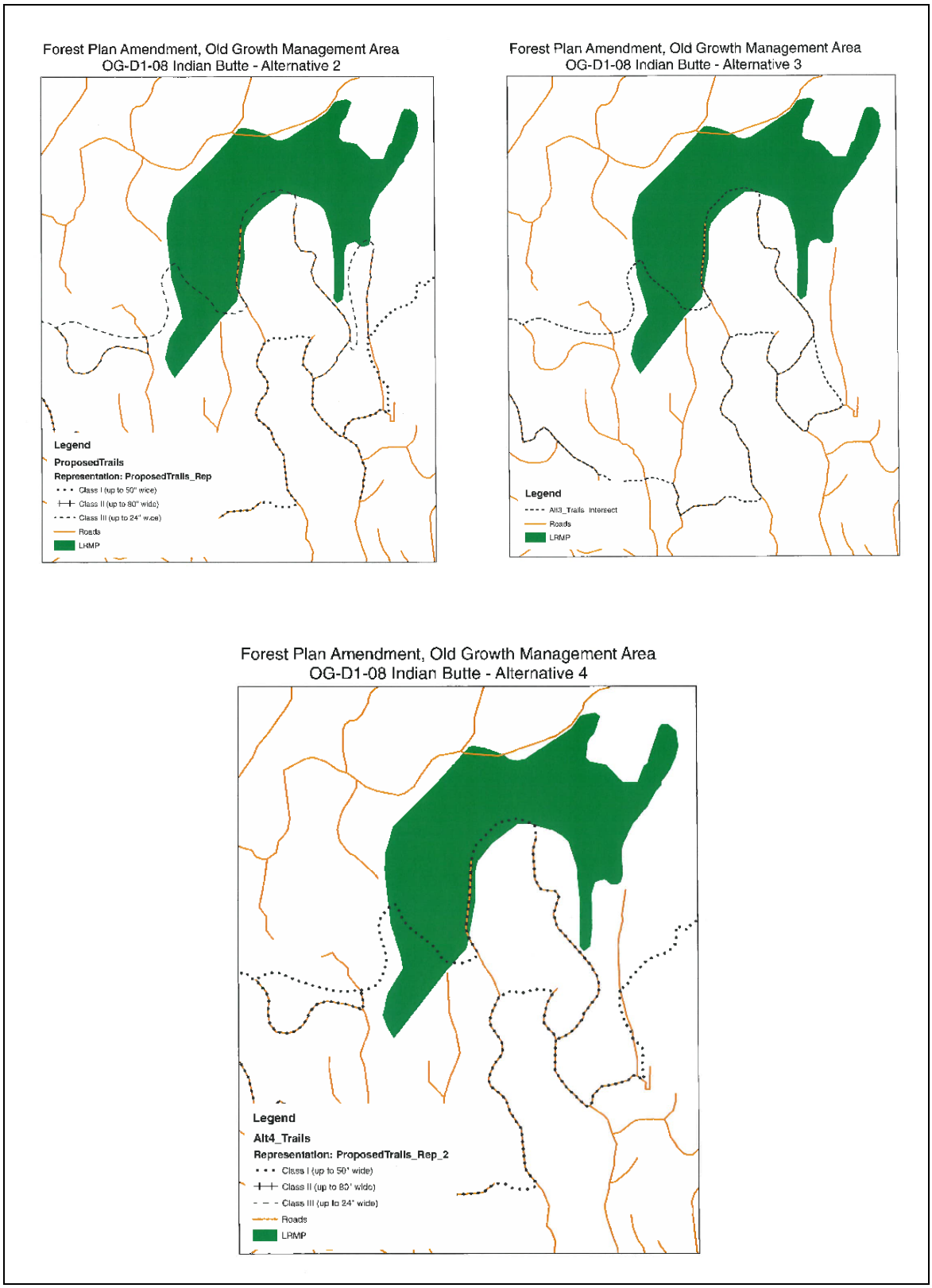


Figure 9. Proposed OHV trail in and in the vicinity of OG-D1-08, by alternative.

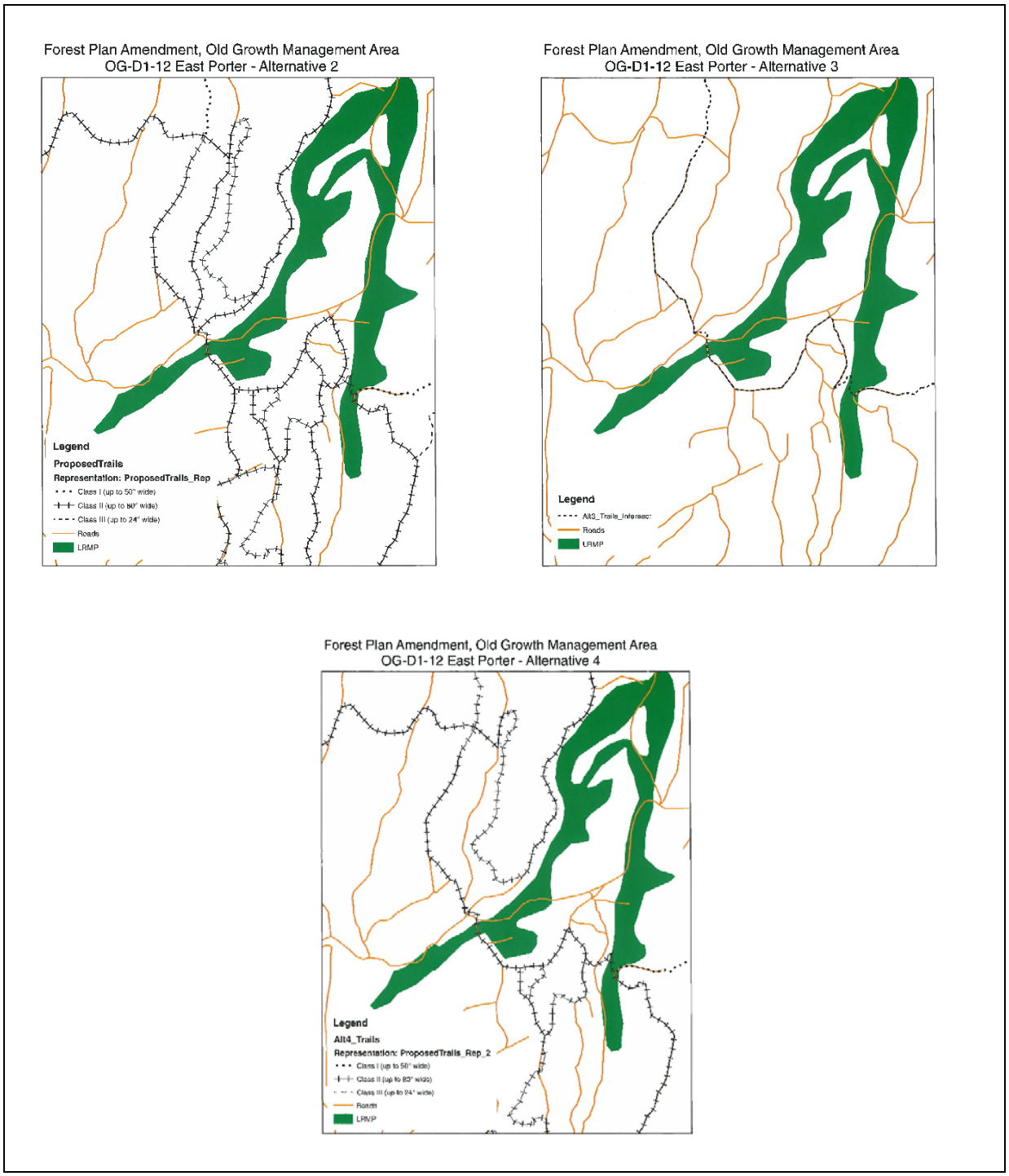


Figure 10. Proposed OHV trail in and in the vicinity of OG-D1-12, by alternative.

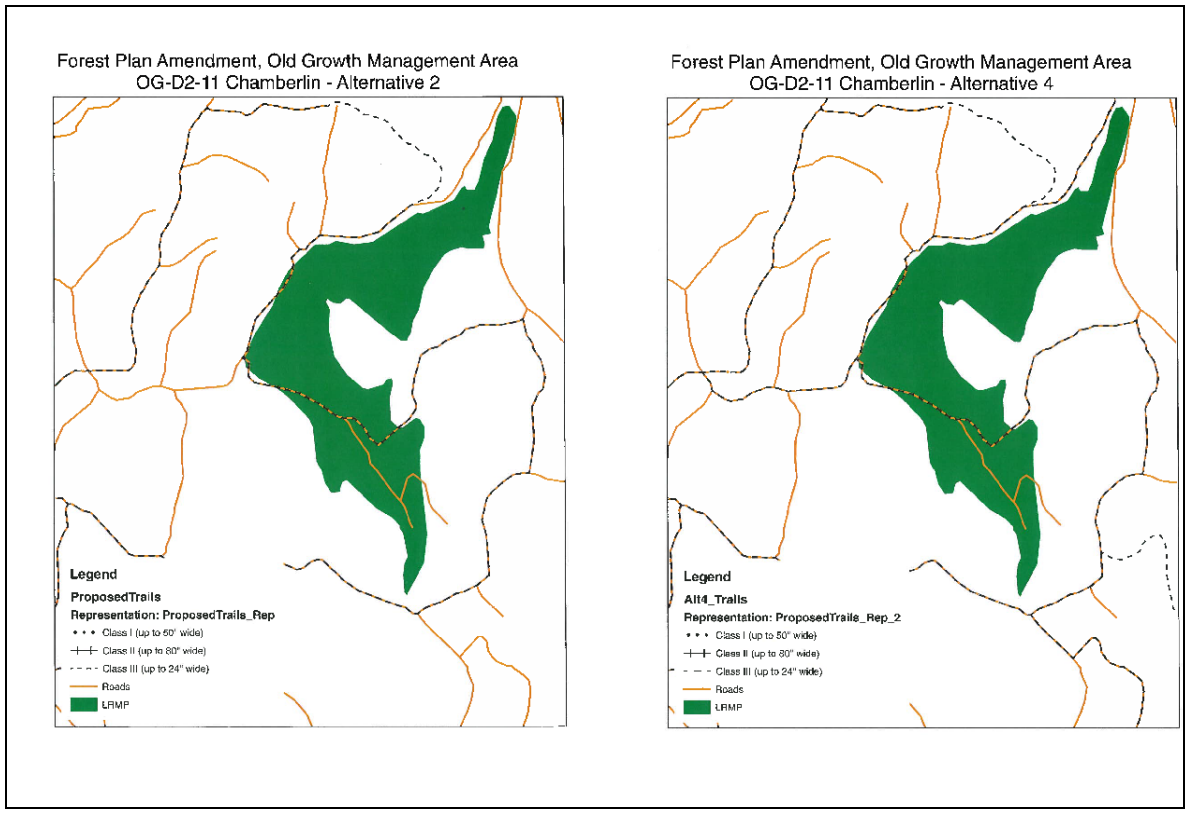


Figure 11. Proposed OHV trail in and in the vicinity of OG-D2-11, by alternative.

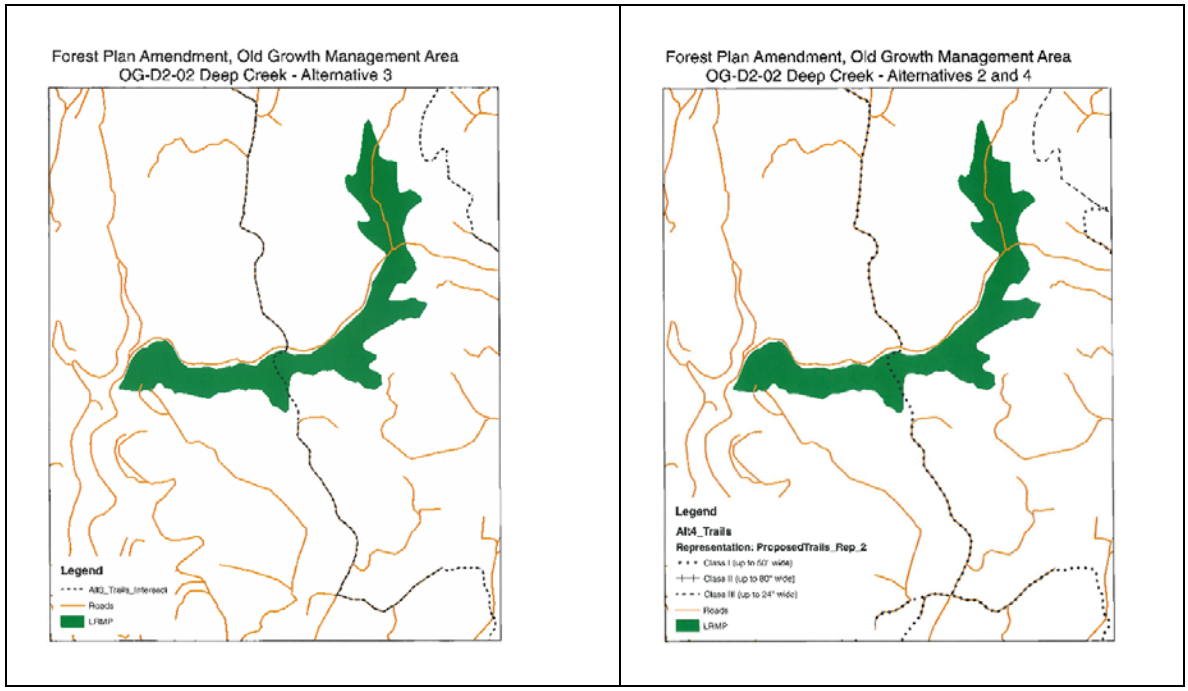


Figure 12. Proposed OHV trail in and in the vicinity of OG-D2-02, all action alternatives.

Civil Rights and Environmental Justice

Civil Rights legislations, especially the Civil Rights Act (CR) of 1964, Title VI, prohibit discrimination in Forest Service program delivery. The underlying principal behind the Civil Rights Act is that no activity shall negatively affect minorities, woman, or persons with disabilities by virtue of their race, color, sex, national origin, religion, age, disability, or material or familial status.

Environmental Justice, Executive Order 12898, demands the fair treatment and meaningful involvement of all people. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from the execution of our actions. Environmental Justice focuses on minority, low income groups, and subsistence lifestyles (including Native American Tribes). The purpose of involving these groups and analyzing the effects upon them is to determine whether adverse civil rights impacts are anticipated, or whether disparate or disproportionate impacts associated with the alternatives is anticipated on any of these groups.

With this project, there is no known potential for disparate or disproportionate effects, or to discriminate against or negatively impact any individual or subset of the population described above.

The reinforcement of existing road closures, given the nature of the project area and its extensive system of open roads, would not impede access throughout the project area. The actions proposed under Alternatives 2, 3 and 4 would not have any measurable impacts on Tribal rights (ceded lands) or Tribal traditional uses. The project is not located in a minority community nor would it affect residents of low or moderate income. Potential impacts would not affect any specific subset of the American population at a disproportionately higher rate than others.

The effects of this project on the social and economic context of these groups are within those described in the Forest Plan. The benefits and risks associated with implementation of the proposed action are provided to all members of the public. Therefore, the project would not pose disproportionately high or adverse effects to minority communities or to low income groups. As a result, no formal Civil Rights Impact or Environmental Justice Analysis was undertaken.

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

The action alternatives propose development and designation of a trail system for motorized recreation. Much of the proposed trail in each alternative is located on existing disturbance; however, there would be some degree of new trail construction associated with each alternative. Once completed, the trail system would be expected to exist as a long-term recreation opportunity.

Recent trends of uncontrolled motorized recreation may not be sustainable over the long term. Proposed alternatives are intended to move conditions toward a balance of managed motorized recreation and sustainable vegetative, soil and watershed conditions. Soil and Water are two key factors in ecosystem productivity and protection of these resources is provided by the design criteria discussed in Chapter 2. Sustainable wildlife habitat, water quality and other resources depend on maintaining the long-term soil productivity upon which vegetation relies. No long-term effects to water resources are anticipated as a result of developing and designating a motorized trail system. All

alternatives provide fish and wildlife habitat at levels necessary to maintain viable populations of the species within the project area.

Unavoidable Adverse Effects

NEPA requires disclosure of "… any adverse environmental effects which cannot be avoided should the project be implemented…" (40 CFR 1502.16).

All of the alternatives considered result in some adverse effects. Many of these adverse effects would be minimized through implementation of design criteria and resource protection measures identified in Chapter 2 or through mitigation measures. Even with implementing these measures, there would still be adverse effects that cannot be avoided.

Soils

Additional detrimental soil conditions are expected as a result of implementing Alterative 2, 3 or 4. The use of ground-based trail construction equipment would result in additional compaction and displacement. Use of OHV equipment and traffic by other users would keep the surface of the designated trail in a disturbed condition. Implementation of the design criteria and monitoring described in Chapter 2 would minimize these adverse effects. Proposed season of use is limited in order to reduce impacts to soils. The alternatives were designed to limit the amount of detrimental soil conditions consistent with R6 Supplement 2500-98-1 (Regional Guidelines), effective August 24, 1998 by focusing proposed trail location on existing disturbance where it is available. New trail construction is proposed on segments needed to connect between segments that are on existing disturbance.

Staging area and/or trail head construction would also result in adverse effects on soils. Parking area and road construction results in soil compaction and displacement. Development of campsites, toilets, picnic areas and signboards can also result in soil displacement, compaction and impacts to of vegetative cover. On closed and decommissioned roads and user created trails where reinforcement of existing closures, rehabilitation and/or concealment are proposed, the soil surface can be revegetated, but soil productivity may remain reduced due to compaction. See the Soils section for more details on potential impacts to soil resources.

Invasive Plants

The potential for introduction and spread of invasive plants exists under every alternative considered, including no action. A risk assessment concluded that the potential for introducing and spreading invasive plants cannot be completely avoided. All action alternatives create conditions that are conducive to the introduction and spread of invasive plants. Use of OHV equipment and traffic by other users would keep the designated trail surface in a non-vegetated condition, which would be vulnerable to introduction and spread of invasive plants. Implementation of design criteria and monitoring as described in Chapter 2 would minimize these adverse effects.

Proposed activities such as trail, staging area or trailhead construction, campsite and picnic area development, and reinforcement of closures on unwanted routes could result in conditions conducive to the introduction and spread of invasive plants. Under proposed action alternatives invasive plant spread would be monitored and new sites would be proposed for treatment with an early detection rapid response strategy under the 2012 Invasive Plant Treatments EIS. See the Botany section for more details on potential impacts from invasive plant species.

Sedimentation/Turbidity

All action alternatives propose new OHV routes, staging areas or trailheads, and public use areas such as campsites and picnic areas. Use of OHV equipment and traffic by other users would keep the

designated trail surface in a non-vegetated condition and would be a potential source of sediment. Most sediment delivered to streams would come from stream crossings, trail drainage close to streams and closure and rehabilitation of unwanted routes adjacent to Class IV streams and in ephemeral draws. Implementation of design criteria and monitoring as described in Chapter 2 would minimize these adverse effects.

Proposed activities such as trail, staging area or trailhead construction, campsite and picnic area development, and decommissioning of unwanted routes could result in conditions conducive to the release of sediment. Proposed season of use for OHVs on the trail system is limited in order to reduce potential for sediment release and transport. See the Hydrology section for more details on potential impacts to water quality.

Irreversible and Irretrievable Commitments of Resources

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

Irreversible commitments: Where over-sized materials (boulders) are removed from mineral sources and installed within the proposed trail network, they would be irreversibly committed to use for the purpose of development of this project, and they would no longer be available for other projects or for blasting and crushing to produce other aggregate materials such as riprap or gravel. Uses for such rock materials under this project would be as barriers to prevent travel on unwanted routes, width controlling devices to ensure trail use by appropriate vehicle class, obstacles to promote slow speed and improve technical challenge, constructed boulder crawls, trail surface hardening at selected locations, or as devices for defining campsites. Removing aggregate (gravel) from mineral material sources would result in an irreversible commitment of resources. Once aggregate is removed from material source sites and used in development of the proposed trail system, it cannot be renewed except over long periods of time. Use of materials such as gravel and riprap would occur at selected sites for the following purposes: selected hardening of the trail surface, construction of armored dips and fords, hardening of trailer parking areas or camp site parking, construction of bridge approaches, installation of culverts, installation of vault toilets, and hardening of areas with high foot traffic such as walkways at signboards, restrooms, and picnic sites.

Irretrievable commitments: Alternatives 2, 3 and 4 propose trail construction and development of supporting areas and facilities. Construction of trails and stream crossings is an irreversible action as it involves construction of features in portions of the landscape where they do not currently exist. This results in forgone opportunities to provide primitive access to the specific locations where the features are constructed and during the time in which the features are in use, and a commitment of land to a non-vegetative state (on trail surfaces and at staging areas, parking areas and campsites) until such time that the trail system is abandoned and the disturbed sites returned back to productive capacity. Though some of these trails and facilities are already in place, some of them would be changes from the existing condition and would thus represent an irretrievable commitment of the sites to use under a designated OHV trail system during the proposed season of use. The areas and routes would be available to other uses year round, but the time that they would not be utilized by OHVs would be limited to the season when use by OHVs is prohibited. Refer to Chapter 2 for proposed season of use under each of the action alternatives.

The action alternatives would designate some mineral material sources as staging areas and/or play areas, but some of these areas have already been committed to extractive use (rock material source) by past actions. Some of these mineral material sources are no longer in use for extraction. Refer to the Geology section for more details on mineral material sources. In some cases, such as with Six

Corners, the area proposed for development of the staging area is separate from the area currently in use for mineral material extraction. In the active material sources, use of the area is primarily for mineral material sources, and motorized used proposed by this project is secondary. Thus, when extraction is occurring at a specific proposed staging area, the portions of that staging area needed for extraction, processing, loading and hauling would be closed to OHV use during the active period.

Incomplete and Unavailable Information

The Council on Environmental Quality's implementing regulations for NEPA require that an agency disclose information that is incomplete or unavailable when analyzing effects of activities in an environmental impact statement (40 CFR 1502.22).

Current estimates of OHV users are reliable using anecdotal data from riders, and from agency and law enforcement personnel. Assumptions on number of riders over time on the Ochoco Summit trail system is based on the number of riders using the area now, State of Oregon data, and anecdotal information from a similar designated trail system on the Willamette National Forest.

What is unknown is how implementation of the Travel Management Rule will affect local and regional OHV use, and in particular, if local use will be reduced or will become concentrated into the smaller areas where such use will be permitted. Under the previous travel plan Ochoco National Forest was open to cross-country travel unless designated closed. This may have attracted riders from other areas. It is unknown whether implementation of the Travel Management Rule across all Forests in the Region will alter the destinations to which OHV users travel or the distribution of OHV use across the areas where OHV opportunities are being developed across the region.

Motorized recreation opportunities, uses and trends in the Ochoco Summit trail system project area that have been summarized and disclosed in this EIS provide sufficient information about both motorized and non-motorized future uses for the decision-maker to reasonably distinguish between the alternatives.

Energy Requirements

Motorized recreation in particular, as well as recreation in general, results in the consumption of energy. For environmental impact statements, NEPA requires a discussion of the energy requirements and conservation potential of proposed alternatives and mitigation measures [40 CFR 1502.18(e)].

Many people travel in and through the Ochoco National Forest every year, to access recreation opportunities, commute and/or work, transport goods and livestock, or on their way to other destinations. Almost all visitors to Ochoco National Forest utilize some type of motorized vehicle to access the Forest. While there is no quantifiable estimate, motor vehicle use in and through the Forest is increasing, and therefore associated energy use is also increasing.

Energy-consuming activities associated with recreation use in the Ochoco Summit OHV Trail project area include motor vehicle use to transport OHVs to staging areas, use of power generators at camp sites, driving for pleasure on Forest roads, and use of OHVs themselves on and off trail systems. Additional energy-consuming activities associated with any of the action alternatives would include use of vehicles, on and off-road, to transport Forest workers, volunteers and law enforcement officers, and motorized equipment used for trail construction, development of staging areas, installation of sign boards, and reinforcement of existing closures at crossings with unauthorized and unwanted routes.

The action alternatives include designating a trail system on which OHVs may be used in an area where they were previously permitted to be driven cross-country, and are currently allowed to drive on 659 miles of mixed use roads. This change is unlikely to affect the energy consumption within the

project area. There are no irregular energy requirements involved in implementation of any action alternatives.

Implementation of the Travel Management Rule prohibits motorized recreation from occurring anywhere but on designated routes. This may displace some motorized recreation to other areas, and may focus use onto existing mixed use roads and trails, as well as onto any trail system implemented through the action alternatives analyzed in this EIS. The effects on energy consumption from these possible changes in use patterns are not expected to be measurable.

Effects on Laws, Regulations, Plans, Policies, and Procedures

The National Environmental Policy Act at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders." This section includes a brief summary of those laws, policies, and executive orders that are relevant to the proposed actions considered in this EIS.

The National Environmental Policy Act (NEPA)

NEPA establishes the format and content requirements of environmental analysis and documentation as well as requirements for public involvement and disclosure. The entire process of preparing this environmental impact statement was undertaken to comply with NEPA.

National Forest Management Act

The National Forest Management Act (NFMA) directs all action taken on National Forests to be consistent with the Forest Land and Resource Management Plans prepared in accordance with the regulations of the NFMA. The regulations in this subpart set forth a process for developing, adopting, and revising land and resource management plans for the national Forest System as required by the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended. These regulations prescribe how land and resource management planning is conducted on National Forest System lands. The resulting plans shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes the long-term net public benefits in an environmentally sound manner. Guidelines for modification of management areas or prescriptions are provided in the LRMP (4-47 and Chapter 5).

Forest Plan Consistency- Ochoco National Forest

Federal regulations (36 CFR 219.10(e)) require that permits, contracts, cooperative agreements, and other activities carried out on the Ochoco National Forest be consistent with the Ochoco National Forest Land and Resource Management Plan, as amended (see FEIS page 260). Alternatives presented in this document are consistent with the long term objectives as discussed in the Forest Plan as amended except as discussed below in the section titled "Forest Plan Amendments."

The Ochoco National Forest Plan has a variety of Standards and Guidelines that restrict some or all motorized access within certain Management Areas. In the past, this guidance was translated into Travel Plan maps that were published for summer and winter. The Motor Vehicle Use Map (MVUM) published after the release of the Record of Decision for the Travel Management Rule functions as the new Travel Map for the Ochoco National Forest. Separate trail system maps would be published after the Record of Decision has been signed for the Ochoco Summit Trail System project.

Non-Significant Forest Plan Amendments

Old Growth Management Areas: There are three site specific amendments to the Ochoco Land and Resource Management Plan for Alternatives 2, 3, and 4 and one additional amendment that applies only to Alternatives 2 and 4. All of these are related to designation of motorized crossings in Old Growth Management Areas (MA-F6) allocated in the 1989 LRMP other than on constant service roads (4-232, 4-234):

- Old Growth Management Area (OG-D1-08) at Indian Butte to include motorized recreation only on designated routes including one new crossing to connect between roads 2200-306 and 2200-309. This amendment applies to Alternatives 2, 3 and 4.
- Old Growth Management Area (OG-D1-12) at East Porter to include motorized recreation only on designated routes including one new crossing at Looney Creek to connect between roads 4200-430 and 4200-440. This amendment applies to Alternatives 2, 3 and 4.
- Old Growth Management Area (OG-D2-11) near Chamberlin Spring to include motorized recreation only on designated routes including one crossing on closed road 4250-700 to connect between roads 4250-610 and 1200-440. This amendment applies to Alternatives 2 and 4.
- Old Growth Management Area (OG-D2-02) near Deep Creek to include motorized recreation only on designated routes including one new crossing. This amendment applies to Alternatives 2, 3 and 4.

Scablands: One additional amendment would apply to all action alternatives, and would amend Forest Plan standards and guidelines that preclude motorized vehicle use on scablands.

Determination of Significance

The Secretary of Agriculture's implementing regulation indicates the determination of significance is to be "[b]ased on an analysis of the objectives, guidelines, and other contents of the forest plan" (36 CFR 219.8). The Forest Service has issued guidance for Plan amendments when using planning regulations in effect before November 9, 2000. This guidance, in Forest Service Manual (FSM) 1926.51 describes non- significant amendments as:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management;
2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management;
3. Minor changes in standards and guidelines; and/or
4. Opportunities for additional projects or activities that will contribute to achievement of the management prescriptions.

Each of these proposed amendments represents a minor change in the Forest Plan standards and guidelines that preclude motorized recreation in Old Growth Management Areas or scablands. These amendments would not alter the multiple use goals and objectives for long term land and resource management. See the section titled "Effects of Forest Plan Amendments" in Chapter 3 of this FEIS for analysis and disclosure of the effects of these proposed amendments.

Four additional factors were considered in this analysis: timing; location and size; goals, objectives, and outputs; and management prescriptions. An analysis of these four factors is presented below.

***Timing*:** The Forest Service Planning Handbook (1909.12, 5.32) indicates that a change is less likely to result in a significant plan amendment if the change is likely to take place after the plan period (the first decade).

All five of these plan amendments would take place in or after the 25th year of the Forest Plan, would take place within the timeframe of project implementation, and are specific to this project.

***Location and size*:** This factor takes into account the location and size of the area involved in the change and the affected area's relationship to the overall planning area. Generally, the smaller the area affected, the less likely the change is to be a significant change in the Forest Plan.

All five amendments relate to new disturbance on short trail segments that would be constructed to connect existing roads. The acreage of new disturbance varies between alternatives but is extremely small, especially when compared to the project area as a whole; new disturbance in OGMAs would range from .76 to .84 acres, while disturbance in scablands would range from 16.4 acres to 42.5 acres, depending on alternative (see the section titled "Effects of Forest Plan Amendments" in Chapter 3 of this FEIS).

***Goals, Objectives and Outputs*:** This factor examines whether the change alters long-term relationships between the levels of goods and services projected by the Forest Plan. In most cases, changes in outputs are not likely to be a significant change in the Forest Plan unless the change would forego the opportunity to achieve an output in later years.

None of the proposed amendments would alter the multiple-use goals and objectives for long-term land and resource management.

***Management Prescriptions*:** This factor accounts for whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning. It evaluates how the change alters the desired condition of the land and resources or the anticipated goods and services to be produced.

These five amendments are being proposed to allow construction of short trail segments to connect existing roads, in order to develop a logical trail system to meet the purpose and need of this project. They would apply only to implementation of the Ochoco Summit project and would not allow similar actions in the future. These amendments to the Ochoco Land and Resource Management Plan standards and guidelines would not change the desired future condition for land and resources or anticipated goods and services from what is described in the existing management direction in the Land and Resource Management Plan.

Part 212-Travel Management

Subpart A- Administration of the Forest Transportation System

212.5(b) Identification of the Road System

The responsible official has identified the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest Lands. The interdiscplinary team and responsible official assessed roads within the project area on a route-by-route basis. A roads analysis for the Ochoco Summit OHV project area was compiled, utilizing information from other projects that overlap the analysis area to the extent there were available, and then completing the roads analysis process for potentially affected watersheds for which a roads analysis was not available. Through an interdisciplinary process, a minimum system was identified that meets applicable statutory and regulatory requirements and reflects long-term funding expectations. This system was analyzed at the appropriate scale and is reflected in the identified routes and road closure reinforcement sites proposed in each alternative. An appropriate discussion for each resource identifies the potential adverse and beneficial environmental effects associated each road segment and overall recommendations for route designation, closure, decommissioning or maintenance are included in the roads analysis.

Subpart B- Designation of Roads, Trails, and Areas for Motor Vehicle Use

212.55 (a) and (b)Criteria for Designation of Roads, Trails and Areas

(1)Damage to soil, watershed, vegetation, and other forest resources

Chapter 3 of this document displays the effects in detail to specific resources. In summary:

Soil: Activities associated with route designation (including new trail construction) and staging areas will have an effect on the soil resource by focusing soil disturbance on a designated network that will be designed, constructed, monitored and maintained in accordance to project design criteria intended to minimize adverse effects. This will cause negative effects at the location where new trails are constructed. However, the trail design also places the trail in more ecologically suitable locations and closes unauthorized and unwanted routes that intersect the designated system, allowing natural and management-induced processes to lower the overall footprint of detrimental soil conditions across the project area. Additional detrimental soil conditions as a result of creation of new trails is limited in scope from 50-81 miles dependent upon the alternative selected. The remainder of the routes is on existing disturbance so that utilizing them as trails would not result in additional disturbance. In some cases the width of area impacted by detrimental soil conditions may be reduced in the long-run where existing compacted roads are converted to narrower trails. All alternatives have potential impacts to soil resources which are described in detail in the Soils section of this EIS.

Watershed: Key Issue #3 specifically responds to the designation of a motorized trail system that could potentially impact water quality and fish habitat. In response to this key issue Alternative 3 was developed. The overall design of the trail system is to pull motorized access away from aquatic resources compared to the existing pattern of disturbance and unauthorized routes that often run parallel to streams or through sensitive riparian areas. All action alternatives would reinforce closures of unauthorized routes that intersect the trail system. Where these unauthorized routes impact riparian areas, action alternatives may facilitate improvement of impacted areas compared to the existing condition. However, all alternatives have potential negative impacts to water resources which are described in detail in the Hydrology section of this EIS.

Vegetation: The Botany section of this EIS discloses the effects of development and use of an OHV trail system on rare plants, invasive plants (weeds) and special plant habitats. The analysis concluded the trail system and reinforcement of road closures may have a negative effect to rare and sensitive vegetation and to the risk of introduction and spread of invasive plants in the project area. In addition, action alternatives would potentially increase costs of future timber management in some circumstances because of the possible need to reuse road beds that get closure reinforcement or road-to-trail conversion. Since the majority of the area where the designated trails system is proposed has been recently managed for vegetation and fuels (Spears, Canyon, HEJ, Zane and Jackson), it would likely be more than ten years before these areas are revisited as a timber sale project. Where these projects are ongoing, or where a new project is being planned (Wolf) any potential road-to-trail conversions involving roads accessing active or planned harvest treatment units would not be implemented until affected harvest activity is completed. Also, due to the Project Design Features and objective of designing trails that are narrow and winding, removal of trees would be the exception rather than the standard and development of any of the proposed action alternatives would have a negligible impact on forested cover at the landscape scale.

Cultural Resources: Following guidelines in a 2003 Regional Programmatic Agreement (PA) among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Office (SHPO), a finding of "*No Adverse Effect*" (No Historic Properties Affected) was recommended under Stipulation III (B) 5 of the Programmatic Agreement. The Forest finds that there are historic properties but the undertaking would have no adverse effect on them as defined by 36 CFR 800.16(i). Any potentially meaningful information that could contribute to the importance of a

site that might otherwise be lost would due to project implementation would be documented and reported to the SHPO. This finding is based on Project Design Features and mitigation measures that have been incorporated into the EIS to assure that no sites eligible to the National Register would be impacted by trail or staging area construction.

The Historic Summit trail (FS Road 2630 in the analysis area) has been evaluated and found to be eligible to the National Register of Historic Places (NRHP). The Ochoco Land and Resource Management Plan (LRMP) provides direction for the Historic Summit Trail, which includes maintaining the existing historic integrity. Segments of the proposed OHV trail system on or crossing over FS Road 2630 are on existing open road segments, but all development associated with alternatives would still be designed for consistency with emphasis and desired conditions for the Historic Summit Trail (LRMP 4-61, 4-125, 4-180, 4-182, 4-190, 4-192 and 4-193). Monitoring of this site is included in the EIS (Chapter 2) and in the SHPO report. For those cultural sites that were evaluated and not found eligible for NRHP, protection is not required.

Harassment of Wildlife and significant disruption of wildlife habitats: Chapter 3 discloses the effects of motorized use on a myriad of wildlife and their individual habitats. Key Issue #2 specifically responds to the designation of a motorized trail system that could potentially impact big game habitat. In response to this key issue Alternative 3 was developed. Development of additional motorized routes and effective closure of unauthorized and unwanted routes work in opposing ways, and may alter reproductive success, mortality, availability of habitat or habitat quality. The effects may stem from changes in access for predators and people, fragmentation of habitat, behavioral changes in response to human use, impacts due to noise, or physical alteration of habitat. Generally new routes that are in close proximity to existing open motorized routes have a less detrimental impact on wildlife than routes that are far away from existing open motorized routes. This is because the amount of habitat that has a low level of human disturbance (as measured by motorized access) is retained over more area if new routes are planned in areas that are already disturbed, rather than when they are built into areas that are currently undisturbed. Refer to the Wildlife section for a detailed discussion of disturbance bands and other effects analysis related to proposed alternatives and wildlife.

Conflicts between motor vehicle use and existing or proposed recreational uses of the National Forest System lands or neighboring Federal Lands: Key Issue #4 specifically responds to the designation of a motorized trail system that could potentially cause conflict between motorized and non-motorized recreation. Designation of a motorized trail system would contribute to the separation of uses and provide areas for quiet recreation away from the designated system, while reducing the quality of quiet recreation in proximity to the designated system. A noiseband analysis using projected noise levels of >45 bd as an indicator of where the sound of OHVs on the proposed trail system was conducted to determine if various recreational values would be affected. There would be no effect from any of the action alternatives on following developed recreation sites and trails: Walton Lake CG, Biggs Spring CG, Big Spring CG, Deep Creek CG, Cottonwood CG, Wolf Creek CG, Sugar Creek CG, Barnhouse CG, Wildwood CG, Walton Lake Trail, Lookout Mountain Recreation Area Trail Systems, Round Mountain National Recreation Trail, Ochoco Mt. Trail, Barnhouse Trail, Cold Springs Rental Cabin, Crystal Springs Organization Camp, Marks Creek Sledding Hill. There would also be no effect on Bridge Creek Wilderness, North Fork Wild and Scenic River corridor, Lookout Mountain Recreation Area, 50 miles of trails managed exclusively for non-motorized use within the project area (except for a maximum of 0.03 miles of Keeton Trail). There is also potential for competition for sites to camp or picnic. However, all action alternatives include some level of supporting areas associated with the trail system, which would help reduce conflict with existing dispersed recreation sites. Reference the Recreation section for a discussion on the types of uses that occur on the Ochoco National Forest and how they are affected by this project.

Conflict among different classes of motor vehicle uses on National Forest System lands or neighboring Federal lands: User conflict happens when a person's expectations for his or her

recreational experience are not met due to contact with another user or through disturbance from the sound or physical evidence left by another user. The potential for conflict exists among all user groups, and even within a user group. All three action alternatives were designed to provide some separation of the different classes of motor vehicles. However, all alternatives, including no action, incorporate use of OHVs on open mixed-use roads, so there is potential for conflict between OHV riders and standard motor vehicle drivers. Not all motorized conflicts on the National Forest are entirely recreation-based; the National Forest System provides a wide array of resource-based opportunities such as timber harvest, livestock grazing and mining all of which involve people traveling in motor vehicles. Reference the Recreation section for a discussion on the types of uses that occur on the Ochoco National Forest and how they are affected by this project.

*Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factor*s: The project area is not located near populated areas. Nonetheless, analysis included sound and air quality (see Recreation and Air Quality sections in Chapter 3 of this document).

Public Safety: The analysis disclosed fugitive dust as a potential to affect health, although it would be localized and temporary. Trail construction would be engineered for curvilinear design to abate driver speed. Barriers, signs, and other trail delineators would be employed to reduce rider confusion. Crossings at highway-legal roads, and shared segments of open mixed use roads would be posted to alert drivers on the road of crossing or merging OHV traffic. Such intersections would also be posted with “STOP” signs and approaches that allow visibility of the cross traffic in both directions on the road for riders entering the road from either direction on the trail. Increasing use of the mixed-use routes over time would require monitoring of those routes to identify and address issues related to user safety.

Provision of Recreational Opportunities: As a result of implementation of the Travel Management Rule, this project develops a trail system and staging areas specifically for OHV enthusiasts and to provide a riding experience they have requested. This proposal would provide between 101 and 212 miles of designated interlinking trails and roads that would vary in skill level and density to provide an opportunity for beginner through advanced riders. The analysis also discloses the balance of motorized and non-motorized recreational opportunities, including the potential effect of noise on quiet recreation such as hiking in wilderness or inventoried roadless area. Designation of a motorized trail system should benefit the non-motorized user in portions of the landscape distant from the proposed motorized routes as it separates uses and provides an area for motorized use that is concentrated and managed rather than scattered and uncontrolled.

Access Needs: Section 504 of the Rehabilitation Act of 1973 says that no qualified individual with a disability can be denied participation in a Federal program that is available to all other people solely because of his or her disability. In conformance with section 504, wheelchairs or mobility devices are welcome on all NFS lands that are open to foot travel and they are specifically exempted from definition as a motor vehicle in section 212.1 of Travel Management Rule (36CFR 212.1). There is no legal requirement to allow persons with disabilities use of motor vehicles on roads, trails, or other areas that are closed to motor vehicles. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. This concern has already been decided by law.

Conflicts among Uses of National Forest System Lands: Chapter 3 of the EIS as a whole has a robust display of the tradeoffs associated with designation of a motorized trail system. For each resource area, there are potential conflicts as it is the nature of multiple use in the National Forest System. Key Issues drove alternatives to address the most notable conflicts and concerns. These issues include motorized use and its effect on big game habitat, water quality and fish habitat, potential conflict between motorized and non-motorized recreation and quality and quantity of recreational opportunities for OHV riders. For other conflicts among uses such as potential incursion into adjacent

sensitive plant habitat or wet areas, impacts to cultural sites eligible for the National Register, project design criteria, mitigations and monitoring are included in the EIS (Chapter 2) to reduce adverse effects and to ensure that the trail system is properly designed, constructed, maintained and operated to reduce these potential conflicts.

The Need for Maintenance and Administration of Roads, Trails, and Areas that would arise if the Uses under Consideration are designated; and The Availability of Resources for that Maintenance and Administration: The project design criteria (PDC) in Chapter 2 include design, construction and maintenance guidelines. Safety played a key role in the development of the trail design and maintenance standards. Education and enforcement are also addressed in the OHV Trail Design PDCs. and in the Recreation section of the EIS. Enforcement will be led by COHVOPS in cooperation with local law enforcement officers and volunteer patrols. Maintenance and monitoring will be conducted in accordance with all of the PDCs and will be led by COHVOPS in cooperation with local resource specialists, OHV groups and/or other interested agencies, groups or individuals. The mission of COHVOPS is to provide consistent, quality off-highway vehicle recreation opportunities that are focused on customer service and resource protection. COHVOPS manages the central Oregon OHV trail systems for the Deschutes and Ochoco National Forests and the Prineville BLM. The team implements existing OHV management plans, identifies future needs, recommends actions to management, and assists in future OHV planning efforts. COHVOPS is funded through a combination of direct support from the Forest Service, the BLM, and grant funding from the State of Oregon derived from the ATV Allocation Funds derived from the ATV Permit program and a portion of gas tax revenue.

212.55(c) Specific Criteria for Designation of Roads

(1) Speed, volume and composition on roads; and (2) Compatibility of vehicle class with road geometry and road surfacing: As part of implementation of the Travel Management Rule on the Ochoco National Forest, motorized mixed use analysis has been performed to establish the suitability of allowing motorized mixed use on roads in the context of their current setting in terms of alignment, width, typical user speed, and presence or absence of traffic control devices. Supplemental analysis has been performed on certain designated motorized mixed-use roads in the Analysis Area that have been determined to be unsuitable for a mixture of non-highway legal and highway-legal vehicles because of either their current setting or their designation as roads maintained for passenger car use (on which non-highway-legal vehicle use is prohibited). In particular, this supplemental Engineering Analysis was done on Rd 2200-150, Rd 2630 (to Indian Prairie), Rd 2630 (Scott's Camp for 2 miles west), Rd 4250, Rd 4270, Rd 4200-740, Rd 38, Rd 3810 and Rd 4276 to determine what mitigations would be necessary to reduce the crash probability and severity on these motorized mixed use roads to an acceptable level. It was disclosed that these routes would not be appropriate for mixed use due to safety concerns without modifications to alleviate those hazards. For this analysis those road segments along with all of the Maintenance Level 3, 4 and 5 roads were considered to be not available for designation as OHV routes and are not included in the proposed alternatives except a crossings of the trail over highway-legal roads. A sign plan would be developed that would include posting of all shared use routes within the Ochoco Summit OHV Trail designated OHV system with confirmation signing for the presence of OHVs as well as signs alerting traffic on highway-legal roads to the presence of OHV crossings.

No valid existing right-of-ways would be affected by the action alternatives. There has been no change or designation of motorized use in wilderness or primitive areas per CFR 212.6(b).

The National Historic Preservation Act

A cultural resource inventory was conducted in the project area. The Ochoco National Forest completed the "Project Review for Heritage Resources under the Terms of the 2004 Programmatic Agreement" with the Oregon State Historic Preservation Office (SHPO). The activities in the

selected alternative have been designed to have no effect to cultural resource sites through both protection and avoidance (see "Cultural Resources," Chapter 3 in this document). A finding of No Historic Propoerties Adversely Affected has been made for this project and the SHPO concurred with this finding on January 24, 2013. The project is compliant with SHPO regulations.

Endangered Species Act

Effects to Threatened, Endangered species are evaluated in the Aquatic Species, Botanical Resources, and Wildlife sections of Chapter 3 of this EIS. The Endangered Species Act of 1973 requires that actions of federal agencies do not jeopardize or adversely modify critical habitat of federally-listed species. The purposes of this Act are to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered and threatened species, and to take such steps as may be appropriate to achieve the purpose of the treaties and conventions set forth in subsection (a) of this section." The Act also states "It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

There are no federally listed Threatened or Endangered fish, wildlife or native plant species on the Ochoco National Forest. There are two federal Candidates that have been found by USFWS to be "warranted but precluded" for listing as threatened under ESA. These are the greater sage-grouse and the California wolverine. These species are addressed in the Wildlife section.

Clean Water Act

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of all waters to protect the beneficial uses as documented according to Oregon Department of Environmental Quality (ODEQ) criteria. A beneficial use is a resource or activity that would be directly affected by a change in water quality or quantity and are defined on a basin Action alternatives follow State of Oregon requirements in accordance with the Clean Water Act for protection of waters. Application of Best Management Practices (BMPs) are selected and designed on site-specific conditions for waters potentially affected in the Ochoco Summit OHV project area. The interdisciplinary team has reviewed and incorporated applicable BMP water quality objectives in the design of alternatives and their mitigation measures. Standards and Guidelines for the Inland Native Fish Strategy where developed (in part) to maintain and restore aquatic ecosystems for dependent species (Chapter 3, Aquatic Species and Hydrology). These standards and guidelines afford the same or greater protection of stream courses as direction found in the 1988 USDA publication *General Water Quality – Best Management Practices.* Project design criteria for water quality and aquatic species are listed in Chapter 2.

Under Section 319 of the 1987 Clean Water Act Amendments, states are required to determine those waters that would not meet the goals of the Clean Water Act, determine those non-point source activities that are contributing pollution, and develop a process on how to reduce such pollution to the "maximum extent practicable." Section 303(d) of the Clean Water Act requires that a list be developed of all impaired or threatened waters within each state. The ODEQ is responsible for compiling the 303(d) list, assessing data, and submitting the 303(d) list to the Environmental Protection Agency (EPA) for federal approval.

Within the project area there are several streams with assessed water quality impairments related to summer water temperature. These include Double Corral Creek, Fox Creek, Happy Camp Creek, Howard Creek, Indian Creek, Jackson Creek, Little Summit Creek, Marks Creek, North Wolf Creek, Ochoco Creek, Peterson Creek, Porter Creek, and Toggle Creek. These streams are on Oregon's 2004/2006 Section 303(d) List of "Water Quality Limited Waterbodies." The Oregon State Water Quality Standards states that the seven-day-average maximum temperature of a stream identified as

having salmon and trout rearing and migration use, which describes some streams within the project area, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit). No measurable increase in water temperature from management practices is allowed in these streams.

All activities within the Ochoco Summit OHV project area would not change the 303(d) parameters for which Double Corral Creek, Fox Creek, Happy Camp Creek, Howard Creek, Indian Creek, Jackson Creek, Little Summit Creek, Marks Creek, North Wolf Creek, Ochoco Creek, Peterson Creek, Porter Creek, and Toggle Creek are listed. Reference the Hydrology section (Chapter 3 of this document) for more detail.

The Clean Air Act

All action alternatives comply with the Clean Air Act. The Act prescribes air quality to be regulated by each individual state. Effects to air quality are as described in the "Air Quality" section in Chapter 3 of this FEIS; while localized air impairments may occur, any localized impairment would be diluted to a scale that would be impractical to measure and negligible at the scale of airsheds. A projected 2 to 5 percent yearly increase in riders would not change this condition.

Executive Orders

11644 of February 8, 1972

Use of Off-road Vehicles on the Public Lands

Sec. 3. *Zones of Use*. (a) Each respective agency head shall develop and issue regulations and administrative instructions, within six months of the date of this order, to provide for administrative designation of the specific areas and trails on public lands on which the use of off-road vehicles may be permitted, and areas in which the use of off-road vehicles may not be permitted, and set a date by which such designation of all public lands shall be completed. Those regulations shall direct that the designation of such areas and trails will be based upon the protection of the resources of the public lands, promotion of the safety of all users of those lands, and minimization of conflicts among the various uses of those lands. The regulations shall further require that the designation of such areas and trails shall be in accordance with the following--

(1) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, or other resources of the public lands.

Chapter 3 of this document displays the effects in detail to these specific resources. Also, see response to the Travel Management Rule CFR 255(a) and (b) in this section.

(2) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats.

Chapter 3 discloses the effects of motorized use on wildlife and their individual habitats. Significant Issue #2 specifically responds to the designation of a motorized trail system that could potentially alter effectiveness big game habitat. Alternative 3 responds to this Significant Issue.

(3) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

All three action alternative provide for some degree of separation of use. Alternatives 2 and 4 would offer opportunities for all three classes of vehicles (ATVs, jeeps and 4-wheel drive vehicles, motorcycles). Alternative 3 would specifically provide opportunities for ATVs and motorcycles; jeeps and 4x4s would still have access to all mixed-use roads.

(4) Areas and trails shall not be located in officially designated Wilderness Areas or Primitive Areas. Areas and trails shall be located in areas of the National Park system, Natural Areas, or National Wildlife Refuges and Game Ranges only if the respective agency head determines that off-road vehicle use in such locations will not adversely affect their natural, aesthetic, or scenic values.

There are no trails located in Wilderness, Inventoried Roadless, or Potential Wilderness Areas. See the Recreation, the Visual Quality, and the Wilderness, Inventoried Roadless Area and Unroaded Area sections in Chapter 3 for more details.

(b) The respective agency head shall ensure adequate opportunity for public participation in the promulgation of such regulations and in the designation of areas and trails under this section.

The public participation process is outlined in Chapter 1 of this document.

(c) The limitations on off-road vehicle use imposed under this section shall not apply to official use.

Maintenance Level 1 roads would remain closed to the public; however administrative use is maintained.

11988 & 11990 of May 24, 1977

Protection of Floodplains and Wetlands

Executive Order 11988 requires the Forest Service to provide leadership and to take action to (1) minimize adverse impacts associated with occupancy and modification of floodplains and reduce risks of flood loss, (2) minimize impacts of floods on human safety, health, and welfare, and (3) restore and preserve the natural and beneficial values served by floodplains. Executive Order 11990 requires the Forest Service to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Hydrology: The Forest Service is proposing to designate where and what types of motorized access would be allowed within the riparian influence zone in every alternative except Alternative 1, in which motorized access would be allowed in areas currently authorized by the Travel Management Plan. All action alternatives include design criteria for trail construction and monitoring within riparian areas.

Aquatic Biota: All alternatives comply with the intent of Executive Order 11990 and USDA Departmental Regulation 9500-3 by either not designating trail in riparian areas (Alternative 1) or providing a properly constructed designated trail system within riparian areas (Alternatives 2-4). See discussions related to this topic in Hydrology, Aquatic Species, and Soils resource sections in Chapter 3 for more information.

13186 of January 10, 2001, and the Migratory Bird Treaty Act of 1918

The purpose of the Migratory Bird Treaty Act is to establish an international framework for the protection and conservation of migratory birds. The Act makes it illegal, unless permitted by regulations, to “pursue, hunt, take, capture, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, including in this Convention…for the protection of migratory birds…or any part, nest, or egg of any such bird” (16USC 703). The original 1918 statute implemented the 1916 Convention between the United States and Great Britain (for Canada). Later amendments implemented treaties between the Unites States and Mexico, Japan, and the Soviet Union (now Russia).

Executive Order 13186, signed January 10, 2001, directs federal agencies to protect migratory birds by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practical, adverse impacts on migratory birds’ resources when conducting agency actions. This order directs agencies to further comply with the Migratory Bird

Treaty Act, the Bald and Golden Eagle Protection Act, and other pertinent statutes. This analysis is compliant with the National Memorandum of Understanding between the USDA Forest Service and the U.S. FWS to promote the conservation of migratory birds (USDA 2008g).

For a more detailed analysis see the Wildlife section in Chapter 3.

13443 of August 16, 2007

Facilitation of Hunting Heritage and Wildlife Conservation

This order directs federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

This EIS has considered the management of wildlife habitats trends in and effects on hunting opportunities, and economic and recreational values of hunting. Resource specialists have considered the programs and plans of other state and federal wildlife agencies, have worked collaboratively with them in their professional roles, and have coordinated with them in development of Ochoco Summit OHV project. These other agencies have been kept abreast of these proposed actions. The Ochoco National Forest currently has in place various cooperative seasonal motorized use closures, including winter range motorized closure areas, a year-round Cooperative Travel Management area (South Boundary) and the "Green Dot" hunting season road closures (Rager Travel Management Area). Proposed alternatives were developed with consideration of these areas and seasons.

12898 of February 11, 1994

Environmental Justice in Minority Populations and Low-income Populations

Executive Order 12898 directs the agency to identify and address, "...as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations...." The intent of the order is to assure the fair treatment and meaningful involvement and consideration of all people. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from the execution of a federal actions. Outreach and public involvement for this project has been extensive and at various scales within various communities of interest.

In order to identify and address environmental justice concerns, the EO states that each agency shall analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and native Americans as part of the NEPA process.

Two distinct populations fall into the categories identified by EO 12898. One population is the harvesters, most of whom are members of the Asian minority. In Environmental Justice analyses, Census data is often used to illustrate the percentage of the population that belongs to an ethnic minority in the study area. Data usually come from sources similar to those presented in the Social and Economic section.

As a result of outreach and scoping (public involvement) processes, there were no potentially disproportionately high and adverse human-health, environmental, or social effects to minority or low-income populations identified. Based on the Social and Economic analysis presented in Chapter 3, there is no known potential for disparate or disproportionate effects on minority or low-income populations.

USDA Civil Rights Policy

The Civil Rights Policy for the USDA, Departmental Regulation 4300-4 dated May 30, 2003, states that the following are among the civil rights strategic goals; (1) managers, supervisors, and other

employees are held accountable for ensuring that USDA customers are treated fairly and equitably, with dignity and respect; and (2) equal access is assured and equal treatment is provided in the delivery of USDA programs and services for all customers. This is the standard for service to all customers regardless of race, sex, national origin, age, or disabilities.

The project alternatives, given the size of potential social and economic effects, are not likely to result in civil rights impacts to Forest Service employees or customers of its program.

Persons with Disabilities

Some comments received during the Ochoco Summit OHV planning process expressed concern that changes to motorized access would prevent future access to National Forest system lands for those with disabilities. In response to these comments, a review of the project alternatives has been conducted to ensure that they apply equally to all groups. Therefore, the Ochoco Summit OHV project is not discriminatory towards persons with disabilities, because it applies equally to all groups.

Under section 504 of the Rehabilitation Act of 1973, no person with a disability can be denied participation in a Federal program that is available to all other people solely because of his or her disability. There is no legal requirement to allow people with disabilities use of motor vehicles on roads, trails, or other areas that are closed to motor vehicles. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory.

Prime Farmland, Rangeland, and Forest Land

The Secretary of Agriculture issued memorandum 1827 which is intended to protect prime farm lands and rangelands. The Ochoco Summit OHV project area does not contain any prime farmlands or rangelands. Prime Forest Land, as defined in the memorandum, is not applicable to lands within the National Forest System.

CHAPTER 4. CONSULTATION AND COORDINATION

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this draft environmental assessment:

ID TEAM MEMBERS:

Barb Franano, Fisheries Biologist
Bret Friel, Archaeologist
Brian Kurtz, Engineering
Ron Gregory, Archaeologist
Carrie Gordon, Geologist
Deb Mafera, Botanist and Invasive Species Coordinator
Dede Steele, Team Leader and Wildlife Biologist
Diane Hopster, Hydrologist
Greg Hooper, COHVOPS
Holly Myers, Range Conservationist
Jennifer Mickelson, Fisheries Biologist
Jim David, Soil Scientist
Kent Koeller, Recreation Planner
Marcy Anderson, Environmental Coordinator
Mark Lesko, Botanist
Matt Able, COHVOPS
Ramon Alonso, Transportation Planner/Road Manager

EXTENDED ID TEAM MEMBERS:

Jim Grace, GIS Specialist
Ken Kittrell, Transportation Planner/Road Manager

FEDERAL, STATE, AND LOCAL AGENCIES:

Crook County
Environmental Protection Agency, Office of Federal Activities
Environmental Protection Agency, Region 10
Oregon Department of Fish and Wildlife
U.S. Fish and Wildlife Service

TRIBES:

Confederated Tribes of the Warm Springs Reservation
The Burns Paiute Tribe
The Klamath Tribes

INDIVIDUALS:

Dick Dufourd
Gary Ervin
Brian Ferry
Dennis Flaherty
Lonny W. Gallagher
Don Gore
Ethan Wilcox Green
Matt H
Joseph and Marcella Edmonds
Mike and Teresa Ervin
Jeff B. Fields
Bob Flint
Michael Gerdes
Bill Gowen
Noel Groshong
Ron Haas
Robert Ericsson
Jennifer Fairbrother
Dennis M. Fish
Bob Freimark
William W. Glenn
Ron Grace
Wendell Gump
Glenn Hanna

Rick Hansen
Hugh Heck
Josh Hicks
Bob and Kenna Hoyser
Wayne Jacox
Herbert and Virginia Jones
Dave Kimball
Chandra LeGue
Ethan Lodwig
Allen Mann
Kim McCarrel
Marilyn Miller
Richard Nelson
Aaron Palmquist
Anthony Peiffer
David Peterson
Scott Porfily
Holt Porfily
Jean Public
Caleb Puckett
Jon and Patti Pyland
Zac Ramey
Jared Richenbach
Stan Rodgers
Marvin Schenck
Gary Scott
Teri Scott
Ed Sink
Paul Smith
Darek Staab
Martin A. Stegman
John Taggart
Dennis and Linda Tribby
Larry Ulrich
Larry VanZyl
John Weber
Chuck Williams
Don Wood
Clay Woodward
Cade Woodward
Berta Youtie

Donna Harris
William J. Herrick
Brett Hodgson
Gayle Hunt
Don James
Rance Kastor
Mary Ann Kruse
Bob and Susan Lever
Keith A. Lund
Pat Marquis
Scott McCaulou
John Morgan
Linda Nolte
Rick and Danielle Paul
Eric Peterson
Wade Popham
Grant Porfily
Dan Portwood
Carrie Puckett
Layne Puckett
Daniel Quinn
Randy Rasmussen
Joe Ricker
Mr. & Mrs. R. A. Ross
Gordon Scott
Kenna Scott
Ray and Bonnie Sessler
Barbara Smith
James H. Smith
Janice Staats
Amy M. Stuart
Allen Teskey
Scott Turo
Roberta Vandehay
Tim and Denise Walker
Mr. Phil White
Rick Wobbe
Craig Woodward
Kim Woodward
Kenna Woodward
Randy Zustiak

Tyrrell Hart
Kurt P. Herzog
Jerry Honl
Cheryl Ingersoll
Chris Johnson
Greer Kelly
Brad Lasniewsky
Tim Lillebo
Mike Lunn
Peter Mayer
Barbara McKillip
Michael J. Morris
Dan Paige
Chris Paulson
James Peterson
Crista Porfily
Nash Porfily
Edd Price
Brett Puckett
Craig Puckett
Paul Quinn
Bill Richardson
Keith Riehl
Renee Roufs
Tom C. Scott
Kenton Scott
Isaac Shepherd
Trent Smith
Kathy Smith
Scott Staats
Ben Sunderland
Billy Toman
Tyler Groo
Tim VanDomelen
Art Waugh
Dave Wiling
Becky Wolf
Lucy Woodward
Clark Woodward
Ronald S. Yockim
Brian Cinelli

ORGANIZATIONS:

American Hiking Society
Blue Ribbon Coalition
Chamber of Commerce
Crook County Judge
Crooked River Watershed Council
Deschutes County 4-Wheelers
Emerald Trail Riders Association
Friends of McKay

Blue Mountains Biodiversity Project
Central Oregon Wild Horse Coalition
Cherry Family Trust
Crook County NRPC
Crooked River Weed Mgt. Area
Deschutes Resource Conservancy
Forest Service Employees for Environmental Ethics
Interfor Pacific

Klamath Basin OHV Club
Ochoco Lumber Company
Odell Lake Resort
Oregon Hunters Association, Bend Chapter
Oregon Hunters Assn, Redmond Chapter
Pacific NW 4 Wheel Drive Association
Prineville Sawmill Co., Inc.
The Wilderness Society
Wolfpack 4 x 4s
Lobos Motorcycle Club Inc.
Ochoco Trail Riders
Oregon Hunters Association
Oregon Hunters Association, Capitol Chapter
Oregon Wild!
Prineville Power Sports
Rocky Mtn. Elk Foundation
Trout Unlimited

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Glossary

A

Access Management- Management of the ingress and egress of people on National Forest System lands. Generally used to describe motorized use allowed.

Adaptive Management- A type of natural resource management that implies making decisions as part of an on-going process. Monitoring the results of actions would provide flow of information that may indicate the need to change a curse of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to the new information.

Administrative Use - Motorized use of a road, trail or area for 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 vehicles for national defense purposes; Law enforcement response to violations of the law, including pursuit; and, Permitted use and occupancy of National Forest System lands (USDA- Forest Service. 2004. 36 CFR part 212, 251, 261, and 295).

Advanced Regeneration - Small trees, usually less than one inch in diameter, that are growing under mature trees prior to planned harvest activities.

Affected Environment - The natural environment that exists at the present time in an area being analyzed.

Air Shed- A geographical area that, because of topography, meteorology and climate, shares the same air.

All-terrain Vehicle (ATV) - Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travels on three or more low-pressure tires with a seat designated to be straddled by the operator. Low-pressure tires are 6 inches or more in width and designed for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of 10 pounds per square inch (psi) or less as recommended by the vehicle manufacturer (FSH 2309.18). In this document ATV trail is often used to discuss a motorized trail that can be used for motorcycles also.

The Forest Service does not classify as ATVs the new ‘golf cart’ sized light off-road utility vehicles as they usually have a wider track and overall length than ATVs.

Alternative- One of several policies, plans or projects proposed for the decision-making.

Aquatic Ecosystem-The stream channel, lake or estuary bed, water, biotic communities and the habitat features that occur within.

Archaeological- A term used to describe any cultural resources deposited on or in soil strata from past human activities. However, these cultural deposits generally must be at least 50 years old to be considered archaeological.

Area- A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District.

Arterial Road- A forest road that provides service to large land areas and usually connects with other arterial roads or public highways. (FSH 7709.54 – Forest Transportation Terminology Handbook, no longer in print).

B

Best Management Practices (BMP)- Practices designed to prevent or reduce water pollution. Also referred to as Soil and Water Conservation Practices (SWCPs).

Big Game- Those species of large mammals normally managed for sport hunting.

Biological Diversity- The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems and ecological processes that connect everything in a common environment.

Borrow Source- An area from which sand, gravel or stone is taken for use in another area.

Bridge- A road or trail structure, including supports, erected over a depression or obstruction such as water, a road, trail or railway and having a deck for carrying traffic or other loads.

C

Canopy- the upper most spreading branchy layer of a forest.

Canopy Base Height- The height above the ground of the first canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire. Low canopy base heights have been shown to initiate crown fire behavior.

Capability- The potential of an area of land to produce resources, supply goods and services and to allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects and disease.

Chain- A standard measurement for rate of fire spread (approximately 66')

Classified Road- Road wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, national Forest System roads and other roads authorized for motor vehicle use pursuant to 36 CFR 212.51 on a Motor Vehicle Use Map (MVUM). (36 CFR 212.1, FSM 7705 - Transportation System). A road under Forest Service jurisdiction.

Clean Air Act -(42 U. S. C. 7609). Section 309 provides authority for the Environmental Protection Agency to review other agency environmental impact statements.

Closed Roads- Roads on the Forest Transportation system available for motorized administrative or emergency use, but not open to public motorized use. Also called long-term intermittent and is classified as a Maintenance Level I road.

Collector Road- A forest road that serves smaller land areas than an arterial road. Usually connects forest arterial roads to local forest roads or terminal (FSH 7709.54- Forest Transportation Terminology Handbook, no longer in print).

Concern- (Also management concern). An issue, problem or condition which constrains the range of management practices identified by the Forest Service in the planning process.

Concentrated Use – The Forest Plan page 4-135 under Intensive Recreation defines concentrated use as: "Generally, high concentrations of visitors will occur around developments."

Condition Classes- A function of the degree of departure from historical fire regimes. Condition Class I is within or near historical conditions; Class III is significantly altered from historical regimes.

Connectivity (of habitats)- The linkage of similar but separated vegetation stands by patches, corridors or 'stepping stone' of like vegetation. This term can also refer to the degree to which similar habitats are linked.

Corridor- Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows where wildlife feed.

Council of Environmental Quality (CEQ)- The Council issues regulations binding all federal agencies, to implement the procedural provisions of the national Environmental Quality Act (NEPA). The regulations address the administration of the NEPA process, including the preparation of Environmental Impact Statements (EIS) for major federal actions which significantly affect the quality of the human environment.

Cover- Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders or undercut streambanks. Animals use cover to escape from predators, rest or feed.

Cross-country Travel- Travel over terrain not on designated roads and/or trails.

Cultural Resource- An umbrella term used to describe a variety of resources, including archaeological or historic remains, folklore and oral traditions and geographic areas traditionally ascribed to have historical significance to a given culture.

Cumulative Effects or Impacts- The impact on the environment that results from incremental impact of an action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other action. Cumulative effects or impacts can result from individual minor but collectively significant actions taking place over a period of time.

D

Draft Environmental Impact Statement (DEIS) - The draft version of the Environmental Impact Statement that is released to the public and other agencies for review and comment.

Designated road, trail or area- A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to §212.51 on a motor vehicle use map.

Detrimental Soil Disturbance- Compacted, displaced, eroded or burned soil conditions incurred by management, recreational or natural activities that are capable of reducing the productivity of the soil resource.

Developed Recreation- Recreation that requires facilities that, in turn, result in concentrated use of the area. The Forest Plan on page G-4 defines developed recreation: “Recreation use that occurs within a site or facility specifically established and constructed for public recreation purposes. Activities commonly included are camping, picnicking, resort use, downhill skiing, but also include parking areas, trailheads, boat launching sites, etc.

Difficulty Level - The degree of challenge a trail presents to an average user's physical ability and skill, based on trail condition and route location factors such as alignment, steepness of grades, gain and loss of elevation, and amount and kind of natural barriers that must be crossed, and which may temporarily change due to weather. (FSM 2353.05):

a. Easiest. A trail requiring limited physical ability and skill to travel.

b. More Difficult. A trail requiring some physical ability and skill to travel.

c. Most Difficult. A trail requiring a high degree of physical ability and skill to travel.

Dispersed Recreation- Recreation with few developed amenities such as structures, developed campsites or toilets. Dispersed recreation is generally less directly constrained by management controls on movement or by enforcement activities, but must comply with posted orders or restrictions for areas under management. Dispersed campers for instance, can choose to camp in places that are underdeveloped, so long as they meet the general posted rules for site protection. The

term dispersed recreation usually implies lower visitor use densities. Dispersed recreation may be motorized or non-motorized and that is defined in the Forest Plan on page 4-4: "Activities which disperse recreation throughout the forest include Nordic skiing, river rafting, mountain bicycling, and off-highwau use." Page G-4 of the Forest Plan defines dispersed recreation as "Recreation use outside of developed recreation site, ranging from scenic driving to backpacking."

Disturbance- Events that such as a forest fire or insect infestation that alters stand structure composition or function of an ecosystem.

Dual Sport-Class III (motorcycle) ATV specificially designed to be street legal and used off road.

E

Early Seral- Plants which inhabit a disturbed site within the first few years subsequent to the disturbance.

Ecosystem- An arrangement of living and nonliving things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

Effects- Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate and related effects on air, water and other natural systems including ecosystems.

Emergency Need- An urgent maintenance need that may result in injury, illness, or loss of life, natural resource or property; and must be satisfied immediately. Emergency needs generally require a declaration of emergency or disaster, or a finding by a line office that an emergency exists.

Endangered Species-Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior and endangered in accordance with the 1973 Endangered Species Act.

Endangered Species Act- The Act which requires consultation with U.S. Fish and Wildlife Service if practices on National Forest System lands may impact a threatened or endangered plant or animal species.

Engineering Analysis- An analysis and evaluation conducted by a qualified engineer or under the supervision of a qualified engineer of a NFS road, road segment or road being considered for mixed motorized use. The analysis and evaluation may include recommended mitigation measures. The analysis may simply be simply documentation of engineering judgment or maybe a more complex engineering report that includes many factors related to mixed motorized use.

Environmental Analysis- An analysis of alternative actions and their predictable long and short-term effects. Environmental analysis include physical, biological, social and economic factors.

Environmental Impact Statement (EIS)- A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA) of 1969 and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council for Environmental Quality (CEQ) guidelines and directives of the agency responsible for the project proposal.

F

Facilities- Transportation planning, road management and operation, fleet equipment and engineering services (for example: administrative buildings, water and sanitation systems, sanitary landfills, dams, bridges and communication systems).

Fauna- The animal life of an area.

Fugitive Dust- Dust generated from open sources is termed 'fugitive' because it is not discharged to the atmosphere in a confined flow stream.

Fire Management- All activities required for the protection of resources from fire and the use of fire to meet land management goals and objectives.

Fire regime- A function of the historical frequency of fire and the degree of severity of those fires.

Flood Plain- A lowland adjoining a watercourse. At a minimum the area is subject to a 1% or greater chance of flooding in a given year.

Forage- All browse and non-woody plants that are eaten by wildlife or livestock.

Forb- A broadleaf plant that has little or no woody material in it.

Forest Road or Trail- A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

Forest Supervisor- The official responsible for administering National Forest lands on an administrative unit, usually consisting of one or more Ranger Districts which comprise the National Forest. The Forest Supervisor reports to the Regional Forester.

Fuels- Vegetative matter, dead or alive, that burns in a fire. It is broadly categorized by the following categories:

Surface or ground fuels are within a foot of the ground.
Ladder fuels exist when you have a continuous vertical arrangement of fuel that easily allows fire to go from ground level into the tree canopy.
Crown fuels are the tree limbs and leaves that can burn with enough heat and/or wind.
Live fuels are the green (live) herbs and shrubs.

Fuel Models- Fuel models are a tool used to standardize discussion of fuel conditions on a landscape.

Fuel conditions, defined by quantity and arrangement, have been categorized into 40 standard descriptive fuel models (Scott and Burgan 2005).

Fuel Treatment- Manipulation or removal of fuels to reduce the likelihood of ignition and/or lessen potential damage and resistance to control (e.g. lopping, pruning, chipping, crushing, mastication, piling and burning).

G

Game Species- Any species of wildlife or fish that is harvested according to prescribed limits and seasons.

Geographical Information Systems (GIS)- GIS is a computer technology that uses a geographic information system as an analytic framework for managing and integrating date, solving a problem or understanding a past, present or future situation.

H

Habitat- The area where a plant or animal lives and grows under natural conditions.

Habitat Capacity- The ability of a land area or plant community to support a given species of wildlife.

Hiding Cover- The vegetation that would hide ninety percent of an elk from the view of a human at a distance of 200 feet or less. The distance which the animal is essentially hidden is called sight distance.

High Clearance Vehicle- Generally a truck, pickup truck, SUV or ATV with a road clearance that allows travel on low standard roads without vehicle damage. Usually greater clearance than a standard passenger vehicle.

Highway Legal Vehicle- Any motor vehicle that is licensed or certified under state law for general operation on all public roads in the state. Operators of highway-legal vehicles are subject to state traffic law including requirements for operating licensing.

Historic Property- Any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register for Historic Places. This term includes artifacts, records and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register for Historic Places criteria.

Hydrology- The science of dealing with the study of water on the surface of the land, in the soil and underlying rocks and in the atmosphere.

I

Initial Attack- The fire suppression effort that takes place as soon as possible following a wildland fire report.

Interdisciplinary Team- A team of individuals with skills from different disciplines that focuses on the same task or project.

Intermittent Stream- A stream that goes dry at some point each year but flows continuously at least 30 days a year when it received water, usually from a seasonal groundwater, but may also include some surface source more persistent than a rainstorm, such as melting snow.

Invasive Species- A plant species moving into areas outside of its former range.

Inventoried Roadless Area- (West of the 100th meridian). An area which meets the statutory definition of wilderness, does not contain improved roads maintained for travel by standard passenger type vehicle and meets one or more of the following criteria:

Contains 5,000 acres or more

Contains less than 5,000 acres but:

Due to physiography or vegetation, is manageable in a natural condition

Is a self-contained ecosystem such as an island

Is contiguous to existing wilderness, primitive area, Administration-endorsed wilderness or roadless area in other Federal ownership, regardless of size.

Irretrievable- Applies to losses of production, harvest or commitment of renewable natural resources. For example, some of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use I changed, the timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible- Applies primarily to the use of non-renewable resources, such as minerals or cultural resources or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Issue- A point, matter or question of public discussion or interest to be addressed or decided through the planning process. *Preliminary issue* is an issue identified early in the scoping phase and is sometimes referred to as a tentative issue. *Significant issue* is an issue within the scope of the proposed action which is used to formulate alternatives in an Environmental Assessment (EA) or Environmental Impact Statement (EIS).

L

Ladder Fuels - Fuels that provide vertical continuity between the ground fuels and tree crowns, thus creating a pathway for the surface fire to move into the overstory tree crowns.

Legal Notice- A notice of a decision which can be appealed that is published in the Federal Register or in the legal notice section of a newspaper or general circulation.

Lek- An area used habitually by grouse species where the males display for the females each spring. Number of males are counted on the lek each spring to estimate general population trends.

M

Maintenance Level- Defines the level of service provided by and maintenance required for a specific road, consistent with road management objectives and maintenance criteria. (FSH 7709.58, Sec 12.3-Transportation System Maintenance Handbook).

Maintenance Level 1- Assigned to intermittent service roads during times they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic maintenance strategies are ‘prohibit’ and ‘eliminate’. Roads receiving level 1 maintenance may be of any type, class or construction standard and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but maybe open and suitable for non-motorized uses.

Maintenance Level 2- Assigned to roads open for se by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either: 1) discourage or prohibit passenger cars or 2) accept or discourage high clearance vehicles.

Maintenance Level 3- Assigned to roads open and maintained for travel by prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either ‘encourage’ or ‘accept’. ‘Discourage’ or ‘prohibit’ strategies maybe employed for certain class of vehicles or users.

Maintenance Level 4- Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surface. However, some roads maybe single lane. Some roads maybe paved and/or dust abated. The most appropriate traffic management strategy is ‘encourage’. However, ‘prohibit’ strategy may be apply to specific classes of vehicles or users at certain times.

Maintenance Level 5- Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double lane, paved facilities. Some maybe aggregate surfaced and dust abated. The most appropriate traffic management strategy is 'encourage'.

Mitigation Measures- Modifications of actions taken to:

Avoid impacts by not taking a certain action or parts of an action,

Minimize impacts by limiting the degree or magnitude of the action and its implementation;

Rectify impacts by repairing, rehabilitating or restoring the affected environment;

Reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or,

Compensate for impacts by replacing or providing substitute resources or environments.

Mixed Use – Roads on which both highway legal and non-highway legal vehicles are operating.

Monitoring- A process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Motor vehicle - Any vehicle which is self-propelled, other than: (1) a vehicle operated on rails; and (2) any wheelchair or mobility device, including one that is batter-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.

Motor vehicle use map (MVUM)- A map reflecting designated roads, trails, and areas on an administrative unit or a Ranger District of the National Forest System.

Motorized Mixed Use- Designation of a national Forest System (NFS) road for use by both highway-legal and non-highway legal motor vehicles (FSM Engineering 7700-30).

Motorized Trail-A route over 50 inches in width or a route over 50 inches wide that is identified and managed as a trail.

N

National Environmental Policy Act (NEPA)- An Act passed in 1969 to declare a national policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere, stimulates the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, establishes a Council on Environmental Quality.

National Forest Management Act- A law passed in 1976as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring preparation of Forest Plans and the preparation of regulations to guide that development.

National Forest System- All National Forest land reserved or withdrawn from the public domain of the U.S.; all National Forest lands acquired through purchase, exchange, donation or other means; the national Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act; and all other lands. Waters, interests therein that are administered by the Forest Service or are designated for administration though the Forest Service as part of the system (36 CFR 212.1).

National Forest System Road- A forest road other than a road which has been authorized by a legally documented right-of-way held by State, county or other local public road authority.

National Historic Preservation Act- Legislation intended to preserve historical and archaeological sites in the United States of America. Signed into law October 15, 1966.

National Survey on Recreation and the Environment (NSRE) - Part of the National Recreation Survey (NRS) program that was started in 1960

National Forest Visitor Use Monitoring (NUVM) - A permanent, ongoing sampling system which measures national forest visitor demographics, experiences, preferences and impressions. A stratified random sample is done for 25% of the national Forest system each year according to a national research protocol. NVUM responds to the need to better understand the use and importance, satisfaction with, national forest recreation opportunities.

National Register of Historic Places- A register of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology and culture. The register was established by the National Historic Preservation Act of 1966 and is maintained by the Secretary of the Interior.

Native Species- With respect to a particular ecosystem, a species that other than as a result of introduction, historically occurred or currently occurs in that ecosystem (Executive Order 13122, 2/3/99).

Non-Motorized Travel- Modes of travel include hiking, equestrian and mountain bikes and exclude all motorized use.

Noxious Weeds (Invasive species)- Non-native plants listed by the State that generally have either economic or ecosystem impacts, or are poisonous to wildlife and/or livestock. They aggressively invade disturbed areas such as fires, road slides, landslides and construction areas.

O

Off-highway vehicle (OHV) - Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain.

Off-road Vehicle (ORV) - Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice or other natural terrain.

Operation Permit - Sticker placed on an OHV that allows access to public lands in designated areas in the State of Oregon.

Over-snow vehicle - 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.

P

Perennial - A plant species having a life span of more than two years.

Percentile Weather- The weather conditions that can be expected of X% of days during the fire season. The standard percents are Low (0%-15%), Moderate (16%-89%), High (90%- 96%) and Extreme (97% +). So low percentile weather is the average suite of weather conditions that would occur less than 15% of the time.

Play Area – limited area allowing for cross-country travel.

Prescribed Fire - Fire which is planned and used as a tool to meet specific management objectives.

Problem Fire- problem fires are wildfires that, because of extreme fire behavior, present a high risk to human safety and loss of forest resources

Project Design Criteria (PDC)- A set of required, implementation design criteria applied to projects to ensure that the project is done according to environmental standards ad adverse effects are within the scope of those predicted in this environmental impact statement.

Proposed Species- Any plant or animal species that is proposed by the Fish and Wildlife Service or NOAA Fisheries in the *Federal Register* notice to be listed as threatened or endangered.

R

Ranger District- An administrative subdivision of a national forest, supervised by a district ranger who reports to the forest supervisor.

Reserved Rights- Rights tribes kept, or reserved during the treaty-making out of a greater number of rights they already owned.

Resolved Issue- Significant issues identified by the public that have been fully mitigated during the development of alternatives or project design criteria.

Restoration- Ecological restoration is the process of assisting the recovery and management of ecological integrity. Ecological integrity includes a critical range of variability in biodiversity ecological processes and structures, regional and historical context and sustainable cultural practices.

Revegetation- The re-establishment of plants on a site. The term does not imply native or nonnative; does not imply that the site can ever support any other types of plants or species and is not at all concerned with how the site 'functions' as an ecosystem.

Rill - A narrow and shallow incision into soil resulting from erosion by overland flow that has been focused into a thin thread by soil surface roughness.

Right-of-Way- An accurately located strip of land with defined width, beginning of point and point of ending. It is the area within which the user has the authority to conduct operations approved or granted by the landowner in an authorizing document, such as a permit, easement, lease, license or Memorandum of Understanding (MOU).

Riparian Area- A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affect it.

Road - A motor vehicle route over 50 inches wide, unless identified and managed as a trail.

Road Maintenance- Maintaining or keeping an existing constructed road in an acceptable condition so as to continue to provide acceptable service and achieve its expected life (FSM 7712.3).

Road Maintenance Objective- defines the intended purpose of an individual road based on management area direction and access management objectives, Road management objectives contain design criteria, operations criteria and maintenance criteria (FSH 7709.55 Sec 33- Transportation Planning Handbook).

Road-to-Trail Conversion – Previous road, modified and managed as a trail; this includes width controlling devices and installation of roughness and obstacles to increase technical challenge and provide a trail experience.

Rock Crawler – Class II ATV (jeeps, other 4-wheel drive vehicles) specifically designed to climb over rocks and boulders.

S

Saddle Time- Total time spend riding by an OHV recreationist- usually in one day.

Scenic- Of or relating to landscape scenery; pertaining to natural or natural-appearing scenery; constituting or affording pleasant views of natural landscape attributes or positive cultural elements.

Scenic Integrity- State of naturalness, or conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from existing landscape character in a National Forest.

Scenic Quality- the essential attributes of landscape that when viewed by people elicit psychological and physiological benefits to individuals and society as a whole.

Scenic River- A classification within the national Wild and Scenic River System. Scenic rivers are those rivers, or sections of rivers, that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible by roads.

Seasonal Closures- A route or area closed part of the year. The season of closure is defined by the reason for the closure (e.g. winter range, snow etc.).

Sediment- Any material carried in suspension by water that would ultimately settle to the bottom. Sediment has two main sources: from the channel area itself and from disturbed sites.

Sensitive Species- Species identified by the Regional Forester for which population variability is a concern, as evidenced by significant current or predicted downward trend in population numbers or density; or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Seral Stages- Seral stages describe the phase of development of a plant community. Early seral species are those species you would expect to find on a site soon after a major disturbance, like fire. These are species such as pines, Douglas-fir, snowbrush, fireweed etc. They are generally shade intolerant species. Late seral are the species under a fully developed vegetative canopy, such as true firs, prince's pine, lichens etc.

Shared use- Shared use roads are those roads on which both highway legal and non-highway legal vehicles are operating and have been specifically identified and designated in the Ochoco Summit OHV trail system.

Silviculture- The theory and practice of directing forest establishment, composition and growth for the production of forest resources to meet specific management objectives.

Site- A specific location where management activity is considered, planned or operating.

Site preparation- The removing or rearranging of vegetation or woody debris to meet specific management objectives. Most often it is used to describe the process(s) used to expose mineral soil areas suitable for planting or seeding desirable species of plants.

State Historic Preservation Office- Established in 1967 to manage and administer programs for the protection of the state's historic and cultural resources.

T

Trail - A route of specified width that is identified and managed as a trail.

Trail Definitions by Width –

Single track motorcycle trail- width of 6-24 inches

ATV Trail – width of 50 inches or less

Jeep Trail – width of 80 inches or less

Trail Difficulty Level- The degree of challenge a trail presents to an average user's physical ability and skill, based on trail condition and route location factors such as alignment, steepness of grades, gain and elevation, and amount and kind of natural barriers that must be crossed, and which may temporarily change due to weather.

Easiest: A trail requiring limited physical ability and skill to travel.

More Difficult: A trail requiring some physical ability and skill to travel.

Most Difficult: A trail requiring a high degree of physical ability and skill to travel.

Travel Management Rule of 11/2/2005 (36 CFR parts 212, 251, 261 and 295)- Regulations that directs each national forest in the country to designate roads, trails and areas that would be open to motor vehicle use by vehicle class. The result of this process would be a standardized map which designates roads and trails that are open to motorized use. After a map is produced all other areas are closed to motorized use. The map would be updated annually.

Tribe- term used to designate a federally-recognized group of American Indians and their governing body. Tribes may be comprised of one or more Band.

Tribal and Treaty Rights- Native American treaty or other rights or interests recognized by treaties, statutes, laws, executive orders, or other government action, or federal court decisions.

Treaty- A contract or compact between nations. It is an agreement that is binding upon nations that sign the treaty.

U

Unauthorized Road or Trail- A road or trail that is not a Forest System road or trail or a temporary road or trail and that is not included in a Forest Transportation Atlas (36 CFR 212.1). The term 'unclassified' was used in some of the earlier project file documentation that predated the Travel Management Rule.

Undesignated Road or Trail- Roads and trails that have not yet gone through site-specific travel planning to determine if they should be open, closed or restricted to motorized vehicle use, or roads and trails that have gone through travel planning and determined that motorized vehicle use is not appropriate and is not allowed.

U.S. Fish and Wildlife Service (USFWS)- The federal agency that is the listing authority for species other than marine mammals and anadromous fish under the ESA.

U.S. Forest Service (USDA FS or USFS)- The federal agency responsible for management of the nation's National Forest lands.

Underburn- Using prescribed fire under the canopy of an existing stand of trees.

V

Viability- Ability of a wildlife or plant population to maintain sufficient size to persist over time in spite of normal fluctuations in numbers**,** usually expressed as a probability of maintaining a specific population for a specified period.

Viable Population- A wildlife or plant population that contains an adequate number of reproductive individuals appropriately distributed on a planning area to ensure long-term existence of the species.

Viewshed- Total visible area from a single observer position, or total visible area from multiple observer positions. Viewsheds are accumulated seen-areas from highways, trails, campgrounds, towns, cities or other viewer locations. Examples are: corridor, feature or basin Viewsheds.

Visual Quality Objective- A desired level of excellence based on physical and sociological characteristics of an area. Refers to the degree of acceptable alteration of the characteristic landscape.

W

Watershed- A land area that contributes all its water to one drainage system, basin, stream or river. Watersheds can be described at multiple levels.

Wetland- An area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include: swamps, bogs, fens, marshes and estuaries.

Wild and Scenic River System- The Wild and Scenic Rivers Act of 1968 established a system of selected rivers in the United States, which possess outstanding remarkable values, to be preserved in a free-flowing condition. Within the national system of rivers, three classifications define the general character of designated rivers: Wild, Scenic and Recreational. Classifications reflect levels of development and natural conditions along a stretch of river. Classifications are used to help develop management goals for the river.

Wilderness- Areas designated by Congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; including at least 5,000 acres, or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecological and geologic interest.

Wildland Fire- Any non-structure fire that occurs in the wildland. There are three types of wildland fire: wildfire, wildland fire use and prescribed fire.

Wildfire- An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland ire where the objective is to put the fire out.

Winter Range- A range, usually at lower elevation, used by migratory deer and elk during the winter months; usually better defined and smaller than summer range.

Woody Debris- Dead pieces of woody vegetation such as stems, limbs or leaves which are on a site.

X

Xeric- A soil moisture regime in which soil is dry for 45 or more consecutive days in the 4 months following the summer solstice, and moist for 45 or more consecutive days in the 4 months following the winter solstice.

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