

Appendix A – Government Camp Trails Project Biological Evaluation of Proposed, Endangered, Threatened, and Sensitive Botanical Species and Noxious Weed Analysis

BIOLOGICAL EVALUATION FOR Proposed, Endangered, Threatened, and Sensitive Plants, Lichens, Bryophytes and Fungi Government Camp Trails Project Zigzag Ranger District Mt. Hood National Forest

This project was evaluated for potential effects the proposed action, and alternatives to the Proposed Action, could have on Proposed, Endangered, Threatened, and Sensitive (PETS) plant species in accordance with The National Environmental Policy Act (42 USC 4321 et seq.) the federal Endangered Species Act (16 USC 1531 et seq.), and the National Forest Management Act (16 USC 1604 et seq.). To comply with the above, the Forest Service has set forth guidance in FSM 2670 that is designed to ensure Forest Service actions (1) do not contribute to the loss of viability of any native or desired non-native species or cause a trend toward federal listing for any species, (2) comply with the requirements of the Endangered Species Act; and (3) provide a process and standard which ensures that PETS species receive full consideration in the decision making process.

To achieve these objectives, all Forest Service projects, programs and activities are reviewed for possible effects on PETS species and the findings documented in the Decision Notice (FSM 2672.4). On the Mt. Hood National Forest there are no federally listed (proposed, endangered, threatened) plant species known to occur, however one federally threatened species (*Howellia aquatilis*) is suspected.

The Region 6 Regional Forester's Sensitive Species List (April, 2004) was used to determine species of vascular plants, fungi, bryophytes and lichens that are documented from or suspected to occur on the Mt. Hood National Forest.

PROJECT LOCATION & DESCRIPTION

Three alternatives have been proposed for this project: the No Action Alternative, the Proposed Action Alternative, and the Multorpor Mountain Alternative. See the Environmental Assessment for a full description and maps of the three alternatives.

RECOMMENDED PROJECT DESIGN CRITERIA

The following design criteria would be implemented as part of the proposed action (Alternative 2) and Alternative 3 – Multorpor Mountain to ensure sensitive plant species are protected.

1. Trail Segment 2.19, West Summit Fen Trail

The trail would be placed at least 50' away from the known population of the Sensitive moss, *Schistostega pennata*. A botanist trained in the identification of this species would work with those identifying the final trail location, so as to avoid any additional populations for this species by no less than 50'. In addition, the trail design would not alter the wetland hydrology.

2. Trail Segment 2.4, Camp Creek Trail

The trail would be placed at least 50' away from the known population of the Sensitive moss, *Rhizomnium nudum*. A botanist trained in the identification of this species would work with those identifying the final trail location, so as to avoid any additional populations for this species by no less than 50'. In addition, the trail design would not alter the riparian hydrologic conditions in any of the four areas where the trail would cross streams because such locations are potential habitat for this species.

3. Trail Segment 2.26, Timberline to Town Trail

The felling of live trees and ground disturbance would be the minimum necessary to meet project objectives to protect host trees and habitat for the Sensitive fungi, *Ramaria aurantiisiccescens*.

METHODOLOGY

Pre-field Analysis: Prior to any site visits, the following pertinent information was reviewed: Aerial photography, Regional Forester's list of Proposed, Endangered, Threatened, and Sensitive (PETS) species (revised April, 2004), Mt. Hood PETS plant database, and the Interagency Species Management System (ISMS) with information on the project area. No PETS species are known to occur within or adjacent to the proposed project area. Based on habitat and range information, (herbarium records, technical manuals, plant atlases, etc.), PETS species that are known or suspected to occur on the Mt. Hood National Forest and have potential habitat within the proposed project area are shown in Table 1.

Table 1. Proposed, Endangered, Threatened and Sensitive Species Known or Suspected to Occur on the Mt. Hood National Forest and with Potential Habitat Within the Proposed Project Area.

PETS Species Known Or Suspected Within The Vicinity Of The Proposed Project Area				
Species	Common Name	General Habitat	Survey Period	Potential Habitat?
Vascular Plants				
<i>Agoseris elata</i>	tall agoseris	Moist-dry meadow	June-Aug	No
<i>Arabis sparsiflora</i> var. <i>atrorubens</i>	sicklepod rockcress	Dry meadow, shrub-steppe	May-Aug	No
<i>Aster gormanii</i>	Gorman's aster	Dry cliffs, talus, rock slopes above 3500'	June-Sept	Yes
<i>Astragalus tyghensis</i>	Tygh Valley milkvetch	Shrub-steppe grassland	May-Aug	No
<i>Botrychium lanceolatum</i>	lance-leaved grape fern	Sub-alpine meadow, glacial till	July-Sept	No
<i>Botrychium minganense</i>	Mingan moonwort	Forested wetlands	June-Sept	Yes
<i>Botrychium montanum</i>	mountain grape-fern	Forested wetlands	June-Sept	Yes
<i>Botrychium pinnatum</i>	pinnate grape fern	Forested wetlands	June-Sept	Yes
<i>Calamagrostis breweri</i>	Brewer's reedgrass	Sub-alpine, moist – dry meadows	June- Sept	No
<i>Carex livida</i>	pale sedge	Wet-dry meadow, fen	June-Sept	Yes
<i>Castilleja thompsonii</i>	Thompson's paintbrush	Rock outcrops east of the Cascade Crest	July-Aug	No
<i>Cimicifuga elata</i>	tall bugbane	Mesic mixed hardwood/ conifer forest	June-Sept	No
<i>Coptis trifolia</i>	3-leaflet goldthread	Edge of forested fens	June-July	Yes
<i>Corydalis aquae-gelidae</i>	cold water corydalis	Forested seeps and streams	June-Sept	Yes
<i>Diphasiastrum complanatum</i>	ground cedar	Open conifer forest	Apr-Nov	Yes
<i>Erigeron howellii</i>	Howell's daisy	Moist-dry cliffs, talus, rocky slopes	June-Sept	No
<i>Fritillaria camschatcensis</i>	Indian rice	Moist-dry meadow	June-Aug	No
<i>Howellia aquatilis</i> var. <i>howellia</i>	Howellia	Low elevation lakes and ponds	June- Sept	No
<i>Lewisia columbiana</i> var. <i>columbiana</i>	Columbia lewisia	Dry cliffs, talus, rocky slopes	June-Sept	No
<i>Lycopodiella inundata</i>	bog club-moss	Wet meadows and bogs	July-Sept	Yes

PETS Species Known Or Suspected Within The Vicinity Of The Proposed Project Area

Species	Common Name	General Habitat	Survey Period	Potential Habitat?
<i>Montia howellii</i>	Howell's montia	Moist-dry open lowland forest	April-July	No
<i>Ophioglossum pusillum</i>	adder's tongue	Wet-moist meadow	June-Sept	Yes
<i>Phlox hendersonii</i>	Henderson's phlox	Sub-alpine, dry, rocky, scree	July-Sept	No
<i>Potentilla villosa</i>	villous cinquefoil	Sub-alpine, dry, rocky, scree	July-Sept	No
<i>Ranunculus reconditus</i>	obscure buttercup	Shrub-steppe grasslands	April-June	No
<i>Romanzoffia thompsonii</i>	Mistmaiden	Vernally wet cliffs	April-June	No
<i>Scheuchzeria palustris var. americana</i>	Scheuchzeria	Wet meadow, bog, fen	June-Sept	Yes
<i>Sisyrinchium sarmentosum</i>	Pale blue-eyed grass	Moist-dry meadow	June-Aug	Yes
<i>Suksdorfia violacea</i>	Violet suksdorfia	Moist cliffs, talus, rocky slopes	May-July	No
<i>Taushia stricklandii</i>	Strickland's taushia	Moist-dry meadow	June-Sept	No
<i>Wolffia borealis</i>	Dotted water-meal	Pond, lake, gently flowing water	May-Sept	No
<i>Wolffia columbiana</i>	water-meal	Pond, lake, gently flowing water	May-Sept	No
Bryophytes				
<i>Rhizomnium nudum</i>	Moss	Moist mineral soil in forest, 3000 – 5000 ft.	June - Oct	Yes
<i>Schistostega pennata</i>	green goblin moss	Moist mineral soil on rootwads	June- Oct	Yes
<i>Scouleria marginata</i>	Moss	Rock and boulders in streams	May - Nov	No
<i>Tetraphis geniculata</i>	bent-awn moss	Large down wood in old growth forest	May- Oct	Yes
Lichen				
<i>Chaenotheca subroscida</i>	pin lichen	Boles of live trees and snags in moist forest	May-Nov	Yes
<i>Dermatocarpon luridum</i>	Brook lichen	Rock submerged in streams	May-Nov	No
<i>Hypogymnia duplicata</i>	Ticker-Tape lichen	Conifer boles where > 90" inches of precipitation	May - Oct	Yes
<i>Leptogium burnetiae var. hirsutum</i>	Jellyskin lichen	Bark of deciduous trees, down rotted logs and moss on rock	May-Nov	Yes
<i>Leptogium cyanescens</i>	Blue jellyskin lichen	Moss and bark of deciduous trees	May-Nov	No
<i>Lobaria linita</i>	Cabbage lungwort	Lower bole of conifers /often mossy boulders	May-Nov	Yes
<i>Nephroma occultum</i>	Cryptic kidney lichen	Tree boles and branches in older forest habitat	May-Nov	Yes
<i>Pannaria rubiginosa</i>	Brown-eyed shingle lichen	conifer/deciduous tree bark in moist forest habitat	May-Nov	Yes
<i>Peltigera neckeri</i>	Black saddle lichen	Many substrates in moist forest	May-Nov	Yes

PETS Species Known Or Suspected Within The Vicinity Of The Proposed Project Area				
Species	Common Name	General Habitat	Survey Period	Potential Habitat?
<i>Peltigera pacifica</i>	Fringed pelt lichen	On moss in moist forest habitats	May-Nov	Yes
<i>Pilophorus nigricaulis</i>	Matchstick lichen	Rock on cool, north-facing slopes	May-Nov	No
<i>Pseudocyphellaria rainierensis</i>	specklebelly	boles of hardwoods and conifers in older forests..	May-Nov	No
<i>Ramalina pollinaria</i>	Chalky ramalina	Bark in moist, low-elevation habitats	May-Nov	No
<i>Tholurna dissimilis</i>	Urn lichen	Branches of krummolz at moderate to high elev.	Jun-Oct	No
<i>Usnea longissima</i>	Methuselah's beard lichen	Branches of conifers and hardwoods in moist forest	Apr-Nov	No
Fungi				
<i>Bridgeoporus nobilissimus</i>	noble polypore	Large true fir snags	May-Nov	Yes
<i>Cordyceps capitata</i>	earthtongue	Parasitic on truffles (<i>Elaphomyces</i> spp.)	Sept-Oct	Yes
<i>Cortinarius barlowensis</i>	mushroom	Montane coniferous forest to 4000 ft.	Sept-Nov	Yes
<i>Cudonia monticola</i>	earthtongue	Spruce needles and coniferous debris	Aug-Nov	No
<i>Gomphus kauffmanii</i>	mushroom	Terrestrial in deep humus under pine and true fir	Sep-Nov	Yes
<i>Gyromitra californica</i>	mushroom	On/adjacent to-rotted conifer stumps/ logs	June	Yes
<i>Leucogaster citrinus</i>	truffle	With the roots of conifers to 6600 feet	Aug-Nov	Yes
<i>Mycena monticola</i>	mushroom	Terrestrial in conifer forest above 3300 feet	Aug-Nov	Yes
<i>Otidea smithii</i>	cup fungi	Under cottonwood, D.-fir and w. hemlock	Aug-Dec	Yes
<i>Phaeocollybia attenuata</i>	mushroom	Terrestrial in conifer forest	Oct-Nov	Yes
<i>Phaeocollybia californica</i>	mushroom	With silver fir, Doug.-fir and w. hemlock	May, Oct-Nov	Yes
<i>Phaeocollybia dissiliens</i>	Mushroom	With silver fir, Doug-fir, w. hemlock, Sitka spruce	Oct-Nov	Yes
<i>Phaeocollybia olivacea</i>	mushroom	Terrestrial in low-elevation conifer forest	Oct-Nov	Yes
<i>Phaeocollybia oregonensis</i>	mushroom	Terrestrial with Doug fir, silver fir, w. hemlock	Oct-Nov	Yes
<i>Phaeocollybia piceae</i>	mushroom	Terrestrial with true & Doug.-fir /w. hemlock	Oct-Nov	Yes
<i>Phaeocollybia pseudofestiva</i>	mushroom	under mixed conifers and hardwoods	Oct-Dec	Yes

PETS Species Known Or Suspected Within The Vicinity Of The Proposed Project Area				
Species	Common Name	General Habitat	Survey Period	Potential Habitat?
<i>Phaeocollybia scatesiae</i>	mushroom	With true fir and <i>Vaccinium</i> spp.	May, Oct-Nov	Yes
<i>Ramaria amaloides</i>	Coral mushroom	Terrestrial with true & Doug fir, w. hemlock	Sept-Oct	Yes
<i>Ramaria aurantiiscescens</i>	Coral mushroom	Terrestrial with true & Doug fir, w. hemlock	Oct	Yes
<i>Ramaria gelatiniaurantia</i>	Coral mushroom	Terrestrial with true & Doug fir, w. hemlock	Oct	Yes
<i>Sowerbyella rhenana</i>	Cup fungi	Moist, undisturbed, older conifer forests	Oct-Dec	Yes

Field Surveys: Field surveys were conducted within the project area between September 14 and November 15, 2004. All vascular plant, lichen and moss species with potential habitat within the project area were determined to be “surveyable.” With the exception of the perennial conk, *Bridgeoporus nobilissimus*, surveys are not considered practical to detect the presence of PETS fungi species identified as having habitat within the proposed project area (FEIS 2004). It is assumed that these species are present in the project area where there is suitable habitat. Although there was an incidental find of one Sensitive fungi species within the project area, the surveys were not designed to survey for Sensitive fungi.

All but one of the trails, Multorpor Mountain, was flagged prior to surveys being conducted. For these trails, the entire length was surveyed. For Multorpor Mountain, the existing trail was surveyed as well as an intuitive controlled survey of different habitats within the portion of the mountain where the new trail is proposed. General habitat and Sensitive species found during surveys are noted in Table 2 below.

FINDINGS

Table 2 General habitat and species found during surveys

Trail #	Trail Name	Habitats/ Sensitive Species found
2.19	West Summit Fen	Riparian, Conifer forest in silver fir climax zone, wetland. <i>Schistostega pennata</i> found in wetland area.
2.22	Multorpor Mt.	Conifer forest in silver fir climax zone, rock outcrop. No Sensitive Species found
2.28	East summit Trail Extension	Conifer forest in silver fir climax zone. No Sensitive Species found
2.6	Barlow Tie	Conifer forest in silver fir climax zone. No Sensitive Species found
2.3	Crosstown Thunderhead Tie	Conifer forest in silver fir climax zone, wetland. No Sensitive Species found
2.2	West Blossom Connector	Conifer forest in silver fir climax zone, wetland. No Sensitive Species found
2.4	Camp Creek Trail	Conifer forest in silver fir climax zone, riparian. <i>Rhizomnium nudum</i> (RHNU) found in riparian area and more RHNU habitat found in other riparian areas.
2.26	Timberline to Town	Conifer forest in Mountain hemlock and silver fir climax zones, crossing riparian areas, <i>Ramaria aurantiisiccescens</i> found.
2.23	Trillium Bike	Conifer forest in silver fir climax zone, riparian area, wetland. No Sensitive Species found
2.29	Optimator Multorpor	Conifer forest in silver fir climax zone. No Sensitive Species found

Table 3 - PETS Species Found by Surveys or Suspected to Occur on the Mt. Hood National Forest and with Potential Habitat Within the Proposed Project Area.

Sensitive Mosses Found in Survey Area	Sensitive Fungi Found in Survey Area
<i>Schistostega pennata</i>	<i>Ramaria aurantiisiccescens</i>
<i>Rhizomnium nudum</i>	
Sensitive Species Assumed Present Due to Existence of Potential Habitat in Project Area	
<i>Cordyceps capitata</i>	<i>Cortinarius barlowensis</i>
<i>Gomphus kaufmannii</i>	<i>Gyromitra californica</i>
<i>Leucogaster citrinus</i>	<i>Mycena monticola</i>
<i>Otidea smithii</i>	<i>Phaeocollybia attenuata</i>
<i>Phaeocollybia californica</i>	<i>Phaeocollybia dissiliens</i>
<i>Phaeocollybia olivacea</i>	<i>Phaeocollybia oregonensis</i>
<i>Phaeocollybia piceae</i>	<i>Phaeocollybia pseudofestiva</i>
<i>Phaeocollybia scatesiae</i>	<i>Ramaria amaloidea</i>
<i>Ramaria aurantiisiccescens</i>	<i>Ramaria gelatiniaurantia</i>
<i>Sowerbyella rhenana</i>	

DETERMINATION OF EFFECT

Alternative 1 – No Action Effects on PETS Plant Species

The No Action Alternative would not implement any trail construction projects, trailhead parking or implement existing trail upgrades. Therefore there is a finding of “No Impact” to all proposed threatened, endangered, and sensitive species.

Alternative 2 - Proposed Action and Alternative 3 – Multorpor Mountain Effects on PETS Plant Species

Alternative 2 – Proposed Action would construct 9.6 miles of new trail and Alternative 3 would construct 11.3 miles of new trail. Following are the effects to individual species from these proposed projects. The upgrades to existing trails, trailhead parking and trail signing would have no impact to PETS plant species.

Proposed, Threatened and Endangered Species

Howellia aquatilis is generally confined to palustrine wetlands. No habitat of this type exists within the project area, thus the proposed action would have **NO EFFECT** on this threatened species.

Sensitive Species

Table 4 displays the impact of the proposed action on species that were targeted by the field survey. For the following Sensitive fungi species, presence is assumed, because surveys are not practical and potential habitat is present. In addition, there was an incidental find of *Ramaria aurantiiscescens* within one of the proposed trails.

Cordyceps capitata is a widespread but locally rare species documented from 38 sites in the western Cascade and Coast Ranges in Washington, Oregon and northern California. Three sites are known from Mt. Hood NF on Zigzag and Clackamas River Districts. The species is parasitic on the fruiting body of *Elaphomyces* spp., a genus of underground-fruiting fungi in the truffle group. *Elaphomyces* are associated with the roots of conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*.

Cortinarius barlowensis is widely distributed, known from 16 sites in the western Cascades, Coast Range and Olympic Mountains of Washington and Oregon. There are three known sites from the Mt. Hood NF on the Zigzag District. Habitat is soil under conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*.

Gomphus kaufmannii is endemic to western North America and is found in California, Oregon, and Washington states. It is located either along the Pacific coast or in the Cascade-Sierran Range. There are 6 known sites for this species on the Mt. Hood National Forest. Host trees for *G. kaufmannii* include true firs and pines. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*.

Gyromitra californica is distributed from British Columbia to northern California and east to

Colorado, Montana and Nevada. It is known in Washington, Oregon and northern California from 35 sites, one of which is on the Mt. Hood NF, Hood River District. This wood and litter saprobe is found on well-rotted stumps and logs of conifers or in soil with rotted wood.

Removal of some potential future downed wood in the form of live trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Leucogaster citrinus is endemic to the Pacific Northwest, known from western Washington, western Oregon and northern California and known from 45 sites. There are four sites from the Mt. Hood NF, Zigzag District. This truffle species is associated with the roots of conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Mycena monticola is endemic to the Pacific Northwest where it is known from 153 sites, one of which is on the Mt. Hood National Forest. It is restricted to forests above 3000' in elevation, particularly those with Pinus species. *Mycena monticola* is saprophytic on litter and may form fine root associations with plants. Removal of some vegetation and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Otidea smithii is known from 10 scattered sites in the western Washington, Western Oregon and northern California. On the Mt. Hood NF, there is one known location on Clackamas River District. This litter saprobe is found on soil under Douglas-fir, western hemlock and cottonwood. Removal of some vegetation and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there

is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia attenuata is endemic to the Pacific Northwest from western Washington and western Oregon to northern California where it is known from 131 sites. One site is known from the Mt. Hood NF on Zigzag Ranger District. This mycorrhizal species is found on soil under conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia californica is endemic to the Pacific Northwest, known from 34 sites in western Washington, western Oregon, and northern California. No sites are known to occur on the Mt. Hood NF, however, there is a site on the adjacent Columbia River Gorge National Scenic Area. This mycorrhizal species is terrestrial and associated with the roots of Douglas-fir, western hemlock and Pacific silver fir. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails, within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia dissiliens is endemic to Oregon where it is known from 22 sites. It is not yet known from the Mt. Hood NF but it has been found in the West Cascades on the forest to the immediate south of the Mt. Hood and it is reasonable to assume that habitat may be present. This mycorrhizal species is terrestrial under conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia olivacea is endemic to the Pacific Northwest, known from 92 sites in western Washington, western Oregon, and northern California. There is one known site on the Mt. Hood NF on Zigzag District. This mycorrhizal species is terrestrial under conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia oregonensis is endemic to Oregon where it is known from 11 sites, three of which are on the Mt. Hood National Forest, and one is known from the Clackamas River Ranger District. This mycorrhizal species is terrestrial and associated with the roots of Douglas fir, western hemlock and Pacific silver fir. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia piceae is endemic to the Pacific Northwest, known from 49 sites in western Washington, western Oregon and northern California. There is one known site on the Mt. Hood NF on Zigzag District. This mycorrhizal species is terrestrial and associated with the roots of Douglas-fir, western hemlock and Pacific silver fir. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia pseudofestiva is endemic to the Pacific Northwest, known from British Columbia south through western Washington, western Oregon to California. There are 36 known sites in Washington, Oregon and California, four of which are on the Mt. Hood NF, Zigzag District. This mycorrhizal species grows on soil under conifers. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a

reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Phaeocollybia scatesiae is endemic to western Oregon and northwestern California where it is currently known from 16 sites. Three of these sites are on the Zigzag Ranger District of the Mt. Hood National Forest. This mycorrhizal species is associated with the roots of true firs, Sitka spruce, and huckleberry species, from sea level to 3750' elevation. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Ramaria amaloidea is endemic to the Pacific Northwest where one site has been documented on the Mt. Hood National Forest. This mycorrhizal species is terrestrial and associated with the roots of Douglas fir, western hemlock, and true firs. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Ramaria aurantiisiccescens is a Pacific Northwest endemic and is known from 29 sites within the range of the northern spotted owl. The 29th site for this mycorrhizal species was found within this project area and is the first confirmed site from the Mt. Hood NF. It was found within the lower elevation portion of the Timberline to Town trail segment. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although this species is present within one trail segment and there is a reasonable likelihood this species occurs within other project area trails, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both alternatives 2 and 3 is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Ramaria gelatiniaurantia is another Pacific Northwest endemic species. This mycorrhizal species is currently known from a total of 24 sites, two of which are on the Mt. Hood National Forest. This species fruits in humus or soil and is associated with true firs, Douglas fir, and western hemlock. Removal of some potential host trees and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Sowerbyella rhenana, a litter saprobe, is known from the range of the northern spotted owl. There area currently a total of 69 confirmed sites, 3 of which are on the Mt. Hood NF. This species is terrestrial in older conifer forests. Removal of some vegetation and some soil compaction would occur in connection with trail building and resultant trail usage, both of which could have a small localized negative impact on individuals. Alternative 2 - Proposed Action would build a total of 9.6 miles and Alternative 3 would construct 11.3 miles of trails within much larger undisturbed areas with the same potential habitat. Although there is a reasonable likelihood this species occurs within the project area, there is a low risk to local populations or species viability, and a low likelihood of a trend toward listing caused by the project. Therefore, the impact to this species for both action alternatives is *May Impact Individuals or Habitat but is not likely to lead to a trend toward federal listing*

Sensitive Species found during surveys

Schistostega pennata is a rare moss found in Oregon, Washington, Montana, and from British Columbia through Alaska. In Oregon there are 31 known sites, 15 of which are on the Mt. Hood National Forest. Most Mt. Hood NF sites are located in the silver fir climax zone. Typically this species is found growing on mineral soil over the root wads of downed trees, often with shallow pools of standing water at the base of the root wad. Within the Government Camp trails project areas this species was found on a root wad in the wetlands associated with the proposed West Lake trail. Although a concern for this species is direct impact by trail building activities or alteration of microclimatic conditions, the project design criteria would adequately protect this species. The trail would not come any closer than 50' to the known site, the wetland hydrology would not be altered as the result of trail building activities, and a botanist would be involved in the final trail location so as to place any newly found sites a minimum of 50' from the trail. No impacts are anticipated from recreationists. The project effect for both action alternatives is *no impact*.

Rhizomnium nudum is also another rare moss and is known from both Washington and Oregon where it is associated with moist or wet sites in the silver fir and mountain hemlock plant climax zones. It is adjacent to a tributary of Camp Creek and the proposed Camp Creek trail within the Government Camp trails project area. Although a concern for this species is direct impact by trail building activities or alteration of microclimatic conditions, the project design criteria would

adequately protect this species from impacts. The proposed trail would be placed a minimum of 50' away from the known *R. nudum* site. The riparian hydrology would not be altered from the trail building and a botanist would be involved with trail layout, to assure that any additional sites discovered in the area are also 50' away from the trail. No impacts are anticipated from recreationists. The project effect for both action alternatives is *no impact*.

Table-4. Findings of Effect of Alternatives on Sensitive Plant Species

Species Name	Common Name	Species Likely Present in Project Area?	Alternative 1 No Action	Alternatives 2 & 3
Vascular Plants				
<i>Aster gormanii</i>	Gorman's aster	No	NI	NI
<i>Botrychium minganense</i>	mingan moonwort	No	NI	NI
<i>Botrychium montanum</i>	Mountain grape-fern	No	NI	NI
<i>Botrychium pinnatum</i>	pinnate moonwort	No	NI	NI
<i>Carex livida</i>	Pale sedge	No	NI	NI
<i>Coptis trifolia</i>	3-leaflet goldthread	No	NI	NI
<i>Corydalis aquae-gelidae</i>	cold water corydalis	No	NI	NI
<i>Diphasiastrum complanatum</i>	Ground cedar	No	NI	NI
<i>Lycopodiella inundata</i>	Bog club-moss	No	NI	NI
<i>Ophioglossum pusillum</i>	Adder's tongue	No	NI	NI
<i>Scheuchzeria palustris</i>	Scheuchzeria	No	NI	NI
<i>Sisyrinchium sarmentosum</i>	Pale blue-eyed grass	No	NI	NI
Bryophytes				
<i>Rhizomnium nudum</i>	Moss	Yes	NI	NI
<i>Schistostega pennata</i>	Green goblin moss	No	NI	NI
<i>Tetraphis geniculata</i>	Bent-awn moss	Yes	NI	NI
Lichens				
<i>Chaenotheca subroscida</i>	pin lichen	No	NI	NI
<i>Hypogymnia duplicata</i>	Ticker-tape lichen	No	NI	NI
<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	jellyskin lichen	No	NI	NI
<i>Lobaria linita</i>	lungwort	No	NI	NI
<i>Nephroma occultum</i>	Cryptic kidney lichen	No	NI	NI
<i>Pannaria rubiginosa</i>	brown-eyed shingle lichen	No	NI	NI
<i>Peltigera neckeri</i>	black saddle lichen	No	NI	NI
<i>Peltigera pacifica</i>	fringed pelt lichen	No	NI	NI
Fungi				
<i>Bridgeoporus nobilissimus</i>	Noble polypore	No	NI	NI
<i>Cordyceps capitata</i>	earthtongue	Yes	NI	MIH
<i>Cortinarius barlowensis</i>	mushroom	Yes	NI	MIH
<i>Gomphus kaufmannii</i>	Mushroom	Yes	NI	MIH
<i>Gyromitra californica</i>	mushroom	Yes	NI	MIH
<i>Leucogaster citrinus</i>	truffle	Yes	NI	MIH
<i>Mycena monticola</i>	Mushroom	Yes	NI	MIH
<i>Otidea smithii</i>	cup fungi	Yes	NI	MIH
<i>Phaeocollybia attenuata</i>	mushroom	Yes	NI	MIH
<i>Phaeocollybia californica</i>	mushroom	Yes	NI	MIH
<i>Phaeocollybia dissiliens</i>	Mushroom	Yes	NI	MIH
<i>Phaeocollybia olivacea</i>	mushroom	Yes	NI	MIH

Species Name	Common Name	Species Likely Present in Project Area?	Alternative 1 No Action	Alternatives 2 & 3
<i>Phaeocollybia oregonensis</i>	Mushroom	Yes	NI	MIIH
<i>Phaeocollybia piceae</i>	mushroom	Yes	NI	MIIH
<i>Phaeocollybia pseudofestiva</i>	mushroom	Yes	NI	MIIH
<i>Phaeocollybia scatesiae</i>	Mushroom	Yes	NI	MIIH
<i>Ramaria amaloides</i>	Coral mushroom	Yes	NI	MIIH
<i>Ramaria aurantiisiccescens</i>	Coral mushroom	Yes	NI	MIIH
<i>Ramaria gelatinaurantia</i>	Coral mushroom	Yes	NI	MIIH
<i>Sowerbyella rhenana</i>	Cup fungi	Yes	NI	MIIH

MIIH = May Impact Individuals or Habitat but not likely to lead to a trend toward federal listing.
NI = A project or activity would have No environmental impacts on habitat, individuals, a population, or a species.

The Biological Evaluation is complete.

Carol Horvath, Botanist

January 18, 2005

Date

REFERENCES

- Castellano, MA, Jane E. Smith, Thom O'Dell, Efren Cazares, Susan Nugent. Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan, USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-476-1999. Portland, OR.
- Castellano, MA, Efren Cazares, Bryan Fondrick, Tina Dreisbach. Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan, USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-572-2003. Portland, OR.
- Castellano, MA, Thom O'Dell. Management Recommendations for Survey and Manage Fungi Version 2.0, September 1997. USDA Forest Service.
- Halverson, N.M., C. Topik and R. Van Vickle. Plant Association and Management Guide for the Western Hemlock Zone. Mt. Hood National Forest. USDA Forest Service, Pacific Northwest Region. R6-ECOL-232A-1986. Portland, OR.
- Lilleskov, Erik A. and T. Bruns. Nitrogen and ectomycorrhizal fungal communities: what we know, what we need to know, Dept of Plant and Microbial Biology, U of Cal, Berkeley, CA from the New Phytologist (2001) 149:154-158

Tresder, Kathleen. A meta-analysis of mycorrhizal responses to nitrogen, phosphorus, and atmospheric CO₂ in field studies by Kathleen K, Dept of Ecology and Evolutionary Biology and Dept. of Earth Systems Science, U of CA, Irvine, CA , New Phytologist (2004)

USDA Forest Service and USDI Bureau of Land Management. 2004. Record of Decision to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. Portland, OR.

**Risk Assessment and Recommendations to Minimize the Introduction and Spread of Invasive Plants
Government Camp Trails Project
Zigzag Ranger District
Mt. Hood National Forest**

What Are Invasive Plants?

Management Direction for Invasive Weed Species

Invasive Plants are any plant species not native to a particular ecosystem that are likely to cause environmental harm, or harm to human health. They include, but are not limited to, the Oregon Department of Agriculture (ODA) Noxious Weed list. Invasive Plants may disrupt natural ecosystems by displacing native species and reducing natural diversity through the replacement of native communities with invasive monotypic weed stands. They reduce productivity of forest systems by displacing desirable species and capturing and utilizing valuable resources (Oregon Weed Control Program 2002). The Invasive Weeds Report in the Analysis File contains a complete listing of both ODA Noxious Weeds (Table A) and the Supplemental List of Invasive Plants for Zigzag and Clackamas River Ranger Districts (Table B).

In addition to the above-mentioned lists, it should be noted that new invasive plant species are continually being introduced and are spreading to new areas. These new invaders may not always be included on the present lists. However, if they are not native to the particular ecosystem and are likely to cause environmental harm, or harm to human health, they should be added to the supplemental list and evaluated for this report.

Table A. ODA Noxious Weed List

Rating*	Common Name	Scientific Name
B	velvetleaf	<i>Abutilon theophrasti</i>
B	bidy-bidy	<i>Acaena novae-zelandiae</i>
B	Russian knapweed	<i>Acroptilon repens</i>
B	jointed goatgrass	<i>Aegiops cylindrica</i>
A	ovate goatgrass	<i>Aegilops ovata</i>
A	barbed goatgrass	<i>Aegilops triuncialis</i>
B	quackgrass	<i>Agropyron repens</i>
A	camelthorn	<i>Alhagi pseudalhagi</i>
B	ragweed	<i>Ambrosia artemisiifolia</i>
A	skeletonleaf bursage	<i>Ambrosia tomentosa</i>
B	common bugloss	<i>Anchusa officinalis</i>
B	lens podded white top	<i>Cardaria chalapensis</i>

Rating*	Common Name	Scientific Name
B	white top (Hoary cress)	<i>Cardaria draba</i>
B	hairy white top	<i>Cardaria pubescens</i>
B	musk thistle	<i>Carduus nutans</i>
A	plumeless thistle	<i>Carduus alanthoides</i>
B	Italian thistle	<i>Carduus phycnocephalus</i>
B	slender flowered thistle	<i>Carduus tenuiflorus</i>
A	smooth distaff thistle	<i>Carthamus baeticus</i>
A,T	wooly distaff thistle	<i>Carthamus lanatus</i>
A,T	purple starthistle	<i>Centaurea calcitrapa</i>
B	diffuse knapweed	<i>Centaurea diffusa</i>
A,T	Iberian starthistle	<i>Centaurea iberica</i>
B,T	spotted knapweed	<i>Centaurea maculosa</i>
B	short fringed knapweed	<i>Centaurea nigrescens</i>
B	meadow knapweed	<i>Centaurea pratensis</i>
B,T	yellow starthistle	<i>Centaurea solstitialis</i>
A,T	squarrose knapweed	<i>Centaurea virgata</i>
B,T	rush skeletonweed	<i>Chondrilla juncea</i>
A	western waterhemlock	<i>Cicuta douglasii</i>
B	Canada thistle	<i>Cirsium arvense</i>
B	bull thistle	<i>Cirsium vulgare</i>
B	clematis	<i>Clematis vitalba</i>
B	poison hemlock	<i>Conium maculatum</i>
B	field bindweed	<i>Convolvulus arvensis</i>
B	common crupina	<i>Crupina vulgaris</i>
B	houndstongue	<i>Cynoglossum officinale</i>
B	yellow nutsedge	<i>Cyperus esulentus</i>
A	purple nutsedge	<i>Cyperus rotundus</i>
B	french broom	<i>Cytisus monspessulanas</i>
B	scotch broom	<i>Cytisus scoparius</i>
B	Portugese broom	<i>Cytisus striatus</i>
B	cutleaf teasel	<i>Dipsacus laciniatus</i>
B	South American waterweed (elodea)	<i>Elodea (=egeria) densa</i>
B	giant horsetail	<i>Equisetum telmateia</i>
B,T	leafy spurge	<i>Euphorbia esula</i>
B	halogeton	<i>Halogeton glomeratus</i>
B	English ivy	<i>Hedera helix</i>
A	Texas blueweed	<i>Helianthus ciliaris</i>
B	spikeweed	<i>Hemizonia pungens</i>
A,T	giant hogweed	<i>Heracleum mantegazzianum</i>
A	orange hawkweed	<i>Hieracium aurantiacum</i>
A,T	yellow hawkweed	<i>Hieracium floribundum</i>
A	mouse ear hawkweed	<i>Hieracium pilosella</i>
A	king devil hawkweed	<i>Hieracium piloselloides</i>
A	meadow hawkweed	<i>Hieracium pratense</i>

Rating*	Common Name	Scientific Name
A	hydrilla	Hydrilla verticillata
B	St. Johnswort (Klamath weed)	Hypericum perforatum
B	dyers woad	Isatis tinctoria
B	kochia	Kochia scoparia
B	perennial pepperweed	Lepidium latifolium
B	dalmatian toadflax	Linaria dalmatica
B	yellow toadflax	Linaria vulgaris
B,T	purple loosestrife	Lythrum salicaria
B	Eurasian watermilfoil	Myriophyllum spicatum
A	matgrass	Nardus stricta
B	Scotch thistle	Onopordum acanthium
B	small broomrape	Orobanche minor
B	wild proso millet	Panicum miliaceum
A	African rue	Peganum harmala
B	Japanese knotweed	Polygonum cuspidatum
B	Himalayan knotweed	Polygonum polystachyum
B	giant knotweed	Polygonum sachalinense
B	sulfur cinquefoil	Potentilla recta
A,T	kudzu	Pueraria lobata
B	creeping yellow cress	Rorippa sylvestris
B	Himalayan blackberry	Rubus discolor
B	Mediterranean sage	Salvia aethiopis
B,T	tansy ragwort	Senecio jacobaea
B	milk thistle	Silyburn marianum
A	silverleaf nightshade	Solanum elaeagnifolium
B	buffaloburr	Solanum rostratum
B	Johnsongrass	Sorghum halepense
A	smooth cordgrass	Spartina alterniflora
A	spartina	Spartina anglica
A	spartina	Spartina densiflora
B	spartina	Spartina patens
B	Spanish broom	Spartium junceum
B	Austrian peaweed	Sphaerophysa salsula
B	dodder	Suscuta spp.
B	medusahead rye	Taeniatherum canput-medusae
B	tamarix	Tamarix ramossissima
B	puncturevine	Tribulus terrestris
A	coltsfoot	Tussilago farara
B,T	gorse	Ulex europaeus
B	spiny cocklebur	Xanthium spinosum
A	Syrian bean caper	Zygophyllum fabago

*Noxious Weed Control Rating System

Noxious weeds, for the purpose of this system, shall be designated “A”, “B”, and/or “T”, according to the ODA Noxious Weed Rating System.

1. **“A” Designated weed** – a weed of known economic importance which occurs in the state in small enough infestations to make eradication /containment possible; or is not known to occur, but its’ presence in neighboring states make future occurrence in Oregon seem imminent. Recommended action: Infestations are subject to intensive control when and where found.
2. **“B” designated weed** - a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties. Where implementation of a fully integrated statewide management plan is infeasible, biological control shall be the main control approach.
3. **“T” designated weed** – a priority noxious weed designated by the State Weed Board as a target weed species on which the Department will implement a statewide management plan.

Table B. Supplemental List of Invasive Plants for Zigzag and Clackamas River Ranger Districts

Common Name	Scientific Name
Norway maple	<i>Acer platanoides</i>
tree-of-heaven	<i>Ailanthus altissima</i>
European beachgrass	<i>Ammophila arenaria</i>
false-brome	<i>Brachypodium sylvaticum</i>
fountain butterfly bush	<i>Buddleia alternifolia</i>
butterfly bush	<i>Buddleia davidii</i>
cotoneaster	<i>Cotoneaster</i> spp.
pampas grass	<i>Cortaderia jubata</i>
pampas grass	<i>Cortaderia selloana</i>
English hawthorn	<i>Crataegus monogyna</i>
spurge laurel	<i>Daphne laureola</i>
foxglove	<i>Digitalis purpurea</i>
water hyacinth	<i>Eichhornia crassipes</i>
broom	<i>Genista monspessulana</i>
shining crane’s-bill	<i>Geranium lucidum</i>
herb Robert	<i>Geranium robertianum</i>
English holly	<i>Ilex aquifolium</i>
policeman’s helmet	<i>Impatiens glandulifera</i>
yellow flag iris	<i>Iris pseudacorus</i>
eastern redcedar	<i>Juniperus virginiana</i>
Perennial peavine	<i>Lathyrus latifolius</i>

Common Name	Scientific Name
privet	Ligustrum spp.
birdsfoot trefoil	Lotus corniculatus
lemon balm	Melissa officinalis
common forget-me-not	Myosotis scorpioides
water lily	Nymphaea polysepela
fountain grass	Pennisetum spp.
reed canarygrass	Phalaris aquatica
reed canarygrass	Phalaris arundinacea
English laurel	Prunus laurocerasus
Portugal laurel	Prunus lusitanica
sweet cherry	Prunus avium
thundercloud cherry	Prunus cerasifera
firethorn	Pyracantha spp.
creeping buttercup	Ranunculus repens
black locust	Robinia pseudoacacia
sweet-briar	Rosa eglanteria
multiflowered rose	Rosa multiflora
European mountain ash	Sorbus aucuparia
periwinkle;vinca	Vinca major
periwinkle;vinca	Vinca minor

Supporting Direction

Development of weed prevention practices is supported by Forest Service noxious weed policy and strategy. Forest Service policy is to prevent the introduction and establishment of noxious weed infestations. This policy directs the Forest Service to: (1) determine the factors that favor establishment and spread of noxious weeds, (2) analyze weed risks in resource management projects, and (3) design management practices to reduce these risks. The Forest Service Noxious Weed Strategy identifies development of practices for prevention and mitigation during ground-disturbing activities as a long-term emphasis item. The February 1999 Executive Order 13112 on Invasive Species requires Federal agencies to use relevant programs and authorities to prevent the introduction of invasive species and not authorize or carry out actions that are likely to cause the introduction or spread of invasive species unless the agency has determined, and made public, documentation that shows that the benefits of such actions clearly outweigh the potential harm. All feasible and prudent measures to minimize risk of harm will need to be taken in conjunction with the actions. An additional authority for coordinated efforts to prevent and control the spread of Invasive Plants in Region 6 is the 1988 *Final EIS for Managing Competing and Unwanted Vegetation*.

The Forest Service, as part of the NEPA document, must analyze and discuss the need for measures to prevent the establishment or spread of invasive plants based upon a survey of project areas proposed for ground disturbance. These may include locations of proposed temporary roads and new specified roads, reconstruction of existing roads, and likely transportation routes, to establish the presence or absence of Invasive Plants, and to identify equipment cleaning and other potential requirements. Weed risks must be analyzed in the planning stage to identify the

likelihood of weeds spreading to the project area and determining the consequence of weed establishment in the project area. A finding of risk is the basis for identifying the appropriate weed prevention practices from the Guide, which are likely to be effective in a particular project situation.

The excerpts from the Forest Service Guide to Noxious Weed Prevention Practices, USDA July 2001 (GUIDE) below provide a comprehensive directory of weed prevention practices for use in planning and wildland resource management activities and operations. The Guide supports implementation of Executive Order 13112. Federal agencies are expected to follow the direction in this order. In addition, Best Management Practices, or other credible methods may be used in establishing equipment cleaning needs and requirements.

Risk Ranking

The Factors and Vectors considered in determining the risk level for the introduction or spread of noxious weeds are:

Factors

- A. Known noxious weeds in close proximity to project that may foreseeably invade project.
- B. Project operation within noxious weed population.
- C. Any of vectors 1-8 in project area.

Vectors

- 1. Heavy equipment (implied ground disturbance including compaction or loss of soil “A” horizon.)
- 2. Importing soil/cinders/gravel/straw or hay mulch.
- 3. ORVs or ATVs.
- 4. Grazing.
- 5. Pack animals (short term disturbance).
- 6. Plant restoration.
- 7. Recreationists (hikers, mountain bikers, etc...).
- 8. Forest Service or other project vehicles.

High, moderate, or low risk rankings are possible. For the high ranking the project must contain either a combination of factors A+C or B+C above. The moderate ranking contains any of vectors #1-5 in the project area. The low ranking contains any of vectors #6-8 in the project area or known weeds within or adjacent to the project area, without vector presence.

Table C Weed Risk Ranking Results Without Project Design Criteria

Factors	Vectors	Risk Ranking for Alternative 1	Risk Ranking for Alternatives 2 and 3
A	1, 2, 3 (Bicycles), 5, 7	Low	High

Table D Weeds Currently Existing Adjacent to or Within the Project Area

Species Name	Common Name	Areas where present
<i>Centaurea maculosa</i>	Spotted knapweed	Hwy 26 shoulders, Timberline lodge
<i>Centaurea diffusa</i>	Diffuse knapweed	Hwy 26 shoulders

Findings

This project has a low risk ranking for alternative 1 and a high risk ranking for Alternatives 2 and 3 without incorporating the recommended design criteria below. However, with the implementation of the following design criteria, the risk ranking is low for Alternatives 2 and 3.

Recommended Design Criteria Incorporated into Design Narratives of Action Alternatives for Prevention of the Introduction and Spread of Invasive Plants

Following are the specific design criteria that would be implemented to meet the noxious weed objectives below.

Objective: Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

- Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict to those periods when spread of seed or propagules are least likely. Prior to project implementation a botanist would survey the proposed staging areas and determine they are weed free. If not weed free, new uninfested project staging areas would be selected.
- Clean equipment before entering National Forest System lands, including undercarriages, radiators, wheels, and tires. This practice does not apply to service vehicles traveling frequently in and out of the project area that would remain on the roadway. Seeds and plant parts need to be collected when practical and incinerated. Remove mud, dirt, and plant parts from project equipment before moving it into a project area.
- If trail projects are not implemented within 3 years of weed survey dates (summer 2004), weed surveys would be redone and the weed risk analysis with recommendations would

be updated prior to project implementation.

Objective: Prevent the introduction and spread of weeds caused by moving infested sand, gravel, borrow, and fill material in Forest Service, contractor and cooperators operations.

- Inspect material sources on site, and ensure that they are weed-free before use and transport. Treat weed-infested sources for eradication, and strip and stockpile contaminated material before any use of pit material.
- Inspect and document the area where material from treated weed-infested sources is used, annually for at least three years after project completion, to ensure that any weeds transported to the site are promptly detected and controlled.
- Maintain stockpiled, uninfested material in a weed-free condition.

Objective: In those vegetation types with relatively closed canopies, retain shade to the extent possible to suppress weeds and prevent their establishment and growth.

- Retain native vegetation in and around project activity to the maximum extent possible consistent with project objectives.

Objective: Avoid creating soil conditions that promote weed germination and establishment.

- Minimize soil disturbance to the extent practical, consistent with project objectives.

Objective: Where project disturbance creates bare ground, consistent with project objectives, re-establish vegetation to prevent conditions to establish weeds.

- Revegetate disturbed soil (except travelways on surfaced projects) in a manner that optimizes plant establishment for that specific site.
- Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching as necessary. Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g. road embankments or landings)
- Use local seeding guidelines to determine detailed procedures and appropriate mixes. To avoid weed-contamination, have a certified seed laboratory test each lot against the all-State noxious weed list to Association of Seed Technologists and Analysts (AOSTA) standards, and provide documentation of the seed inspection test. There are plant species not on State and Federal noxious weed lists that the Forest Service would consider non-native invasive weeds. Check State and Federal lists to see if local weeds should be added prior to testing. Seed lots labeled as certified weed free at time of sale may still contain some weed seed contamination. Non-certified seed should be tested before use.

Objective: To prevent new weed infestations and the spread of existing weeds, avoid or

remove sources of weed seed and propagules.

- Encourage backcountry pack and saddle stock users to feed stock only weed-free feed for several days before travel on National Forest System lands.
- Inspect, brush, and clean animals, especially hooves and legs before entering public land. Inspect and clean tack and equipment.
- Tie or hold stock in ways that minimize soil disturbance and avoid loss of desirable native vegetation.

Objective: Improve effectiveness of prevention practices through weed awareness and education.

- Post weed awareness messages and prevention practices referring to preceding objective's messages at project trailheads and/or parking areas.

Carol Horvath, Botanist

January 18, 2005

Date

**Appendix B – Government Camp Trails Project Biological Evaluations of
Listed and Proposed Endangered, Threatened, and Sensitive Wildlife Species**

**GOVERNMENT TRAILS ENVIRONMENTAL ASSESSMENT
BIOLOGICAL EVALUATION**

**FOR THOSE WILDLIFE SPECIES LISTED AS THREATENED, ENDANGERED, OR PROPOSED
UNDER SECTION 4 OF THE ENDANGERED SPECIES ACT & SENSITIVE SPECIES UNDER THE
REGIONAL FORESTER'S LIST**

DATE: February 2005

**Zigzag Ranger District
Mt. Hood National Forest**

Written by: /s/ Alan Dyck Date: February 23, 2005
Alan Dyck, Forest Wildlife Biologist

EXECUTIVE SUMMARY

The 4-step Biological Evaluation process for those TESP (threatened, Endangered, Sensitive, Proposed) animal species that are documented or suspected to occur within the Mt Hood National Forest and considered in the Government Camp Trails EA (Environmental Assessment) is summarized below.

Species (T=Threatened E=Endangered S=Sensitive P=Proposed)	Step #1 Pre-field	Step #2 Field Recon.	Step #3 Preferred Alt. Effects / Impacts Call	Step #4 Biological Investigation or Consultation
	Suitable habitat present?	Potential of Species Presence		
Northern Spotted Owl (T)	<i>Yes</i>	<i>Low</i>	<i>MA-NLAA</i>	<i>Consultation Required</i>
Northern Bald Eagle (T)	<i>Yes</i>	<i>Moderate</i>	MA-NLAA	Consultation Required
Canada Lynx (T)	<i>No</i>			
Oregon Slender Salamander (S)	<i>Yes</i>	<i>Moderate</i>	<i>MII-NLFL</i>	<i>None Required</i>
Larch Mountain Salamander (S)	<i>Yes</i>	<i>Low</i>	<i>MII-NLFL</i>	<i>None Required</i>
Cope's Giant Salamander (S)	<i>Yes</i>	<i>Low</i>	MII-NLFL	<i>None Required</i>
Cascade Torrent Salamander (S)	Yes	<i>Low</i>	MII-NLFL	<i>None Required</i>
Oregon Spotted Frog (S)	<i>No</i>			
Painted Turtle (S)	<i>Yes</i>	<i>Low</i>	<i>NI</i>	<i>None Required</i>
Northwestern Pond Turtle (S)	<i>Yes</i>	<i>Low</i>	<i>NI</i>	<i>None Required</i>
Horned Grebe (S)	<i>Yes</i>	<i>Low</i>	<i>NI</i>	<i>None Required</i>
Bufflehead (S)	<i>Yes</i>	<i>Low</i>	<i>MII-NLFL</i>	<i>None Required</i>
Harlequin Duck (S)	<i>No</i>			
American Peregrine Falcon (S)	<i>No</i>			
Gray Flycatcher (sensitive)	<i>No</i>			
Baird's Shrew (S)	<i>Yes</i>	<i>Low</i>	<i>MII-NLFL</i>	<i>None Required</i>
Pacific Fringe-tailed Bat (S)	<i>Yes</i>	<i>Low</i>	<i>NI</i>	<i>None Required</i>

California Wolverine (S)	<i>Yes</i>	<i>Low</i>	<i>MII-NLFL</i>	<i>None Required</i>
Pacific Fisher (S)	<i>Yes</i>	<i>Low</i>	<i>MII-NLFL</i>	<i>None Required</i>
<i>Pristiloma arcticum crateris-</i> Crater Lake Tightcoil (S)	<i>Yes</i>	<i>Low</i>	<i>MII-NLFL</i>	<i>None Required</i>
<i>Monadenia fidelis minor-</i> Dalles Sideband (S)	<i>No</i>			
<i>Cryptomastix devia-</i> Puget Oregonian (S)	<i>No</i>			
<i>Cryptomastix hendersoni-</i> Columbia Oregonian (S)	<i>No</i>			

EFFECTS / GOVERNMENT CAMP TRAILS CALL:

“NI” denotes a No Impact

“MII-NLFL” denotes a May Impact Individuals but not likely to cause a trend to federal listing or loss of viability

“LFL” denotes likely to cause a trend to federal listing or loss of viability

“NE” denotes a No Effect

“MA-NLAA” denotes a May Affect, Not Likely to Adversely Affect

“MA-LAA” denotes a May Affect, Likely to Adversely Affect

BIOLOGICAL EVALUATION PROCESS

A. Purpose

Forest management activities that may alter the habitat for Threatened, Endangered, Sensitive or Proposed (T,E,S&P) species are required to undergo review in a Biological Evaluation (FSM 2671.44 and FSM 2670.32) as part of the National Environmental Policy Act process. The Biological Evaluation process (FSM 2672.43) is intended to document that proposed management actions will not jeopardize the continued existence or cause adverse modification of habitat for listed or proposed species, or (for sensitive species) lead towards the likelihood of Federal listing.

B. Process

The Biological Evaluation is a 4-step process as follows:

Step 1) **Pre-field review** to determine if habitat for the species is present

Step 2) **Field reconnaissance** to determine if the species is present

Step 3) **Risk assessment/Analysis of Effects** for species by alternative. Risk assessment is based on evaluation of impacts to habitat (even if the habitat is not known to be occupied), individuals (risk from disturbance, actual physical harm to an individual or direct loss of habitat in known occupied territories), and population (based on available regional information).

Step 4) A **biological investigation** if the risk assessment reveals a trend towards federal listing (sensitive species only) or **consultation** with the USFWS if a may effect call is made for T, E, or P species under the preferred alternative.

Each TESP species associated with the proposed project area is evaluated based on these steps. Evaluation of impacts on a given species may be complete at the end of Step #1 (e.g. if no habitat is present, the risk is automatically determined to be none) or may extend through Step #4. If field reconnaissance is not undertaken and habitat is available, species occurrence is assumed.

The USFWS may modify a project based upon consultation. In addition, the Forest Service provides for modification to any project based on a contract provision that is included in all project contracts. This provision provides for the protection of any threatened or endangered species and their habitat, located after a sale has been sold.

The following chart describes the differing levels of field reconnaissance and presence potentials required under Step #2:

Level of Survey	Intensity of Survey	Survey Description
<p><i>Level A:</i> Aerial photo interpretation and review of existing site records. Determination of the potential for a listed species to occur within the proposed project area. No field surveys are done.</p>	Low Potential	Less than 40% potential for a listed species inhabiting the proposed project area.
	Moderate Potential	40-60% potential for a listed species inhabiting the proposed project area.
	High Potential	Greater than 60% potential for a listed species inhabiting the proposed project area.
<p><i>Level B:</i> Single-entry survey of probable habitats. Areas are identified by photos and existing field knowledge. Field surveys are conducted during the season most favorable for species identification.</p>	Low Intensity	Selected habitat surveys (approx. 5-10% of area) are conducted with a single entry for listed species inhabiting the proposed project area.
	Moderate Intensity	Selected habitat surveys (approx. 10-40% of area) are conducted with a single entry for listed species inhabiting the proposed project area.
	High Intensity	Selected habitat surveys (approx. 40-60% of area) are conducted with a single entry for listed species inhabiting the proposed project area.
<p><i>Level C:</i> Multiple-entry surveys are conducted for listed species likely to inhabit the project area.</p>	Low Intensity	Selected habitat surveys (approx. 5-10% of the area) are conducted with repeated entries for listed species inhabiting the proposed project area.
	Moderate Intensity	Selected habitat surveys (approx. 10-60% of the area) are conducted with repeated entries for listed species inhabiting the proposed project area.
	High Intensity	Selected habitat surveys (approx. 60-80% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

PROJECT BACKGROUND AND ALTERNATIVE SUMMARY

This trails project is located within the Zigzag Ranger District of the Mt. Hood National Forest. The trails occur within two watersheds: Zigzag River and Salmon River watersheds. The proposed action (Alternative 2) is to construct or improve 0.7 miles of hiker only trails, 6.3 miles of hike/bike trails, 2.6 miles of hike, bike/nordic ski trail (9.6 miles of trail).

On areas proposed for trail construction there would be some individual tree removal and soil disturbance to create a useable path or the intended use. Hazard trees- trees that because of lean, disease, or decay could fall on people using the trail, would be removed. Down logs would have sections cut out or moved to facilitate ease of movement. Chainsaws and earth moving equipment would create some noise levels above ambient.

The following gives a brief description of the alternatives:

ALTERNATIVE 1: Under the no-action alternative, current management plans would continue to guide management of the project area. No new trails would be constructed under this proposal.

ALTERNATIVE 2: The proposed action as described above. A full description of Alternative 2 and 3 is contained in the Environmental Assessment.

ALTERNATIVE 3: This alternative is similar to Alternative 2 except it would construct an additional 2.1 miles of additional hike/bike/nordic ski trail.

SPECIES SPECIFIC DISCUSSIONS

Northern Spotted Owl (*Strix occidentalis caurina* – threatened)

A. HABITAT:

Old growth coniferous forest is the preferred nesting, roosting and foraging habitat of spotted owls in Oregon. Old growth habitat components that are typical for spotted owls are: Multilayered canopies, closed canopies, large diameter trees, abundance of dead or defective standing trees, and abundance of dead and down woody material. The following describes spotted owl habitat as defined in the Programmatic Biological Assessment for Projects with the Potential to Modify the Habitats of Northern Spotted Owls and/or Bald Eagles or Modify Critical Habitat of the Northern Spotted Owl
--Willamette Province - FY 2005-2006

Suitable habitat for the **northern spotted owl** consists of habitat used by owls for nesting, roosting *and* foraging (NRF). Generally this habitat is 80 years of age or older, multi-storied and

has sufficient snags and down wood to provide opportunities for nesting, roosting and foraging. The canopy closure generally exceeds 60 percent. The unit wildlife biologist makes site-specific determinations and delineations of suitable habitat.

Dispersal habitat for the **northern spotted owl** generally consists of mid-seral stage stands between 40 and 80 years of age with canopy closures of 40 percent or greater and an average dbh of 11". Spotted owls use dispersal habitat to move between blocks of suitable habitat; juveniles use it to disperse from natal territories. Dispersal habitat may have roosting and foraging components, enabling spotted owls to survive, but lack structure suitable for nesting. The unit wildlife biologist makes site-specific determinations and delineations of dispersal habitat.

Critical Habitat Units: Designation of critical habitat serves to identify lands that are considered essential for the conservation and recovery of listed species. The functional value of critical habitat is to preserve options for the species eventual recovery. The Service's primary objective in designating critical habitat was to identify existing spotted owl habitat and highlight specific areas where management considerations or protections should be given highest priority. Critical Habitat Units (**CHUs**) were distributed in a manner that would facilitate demographic interchange.

Since the designation of spotted owl critical habitat in 1992, the Northwest Forest Plan (USDA & USDI 1994a) was developed as a conservation strategy for all late-successional forest species, including the spotted owl. Like critical habitat, the Northwest Forest Plan was based upon the work of the Interagency Science Committee, but incorporated recommendations from the spotted owl recovery team, and was strengthened to address the needs of other late-successional forest-associated species.

B. PRE-FIELD REVIEW:

Habitat available within the project area

Yes. Approximately 75 percent of the project falls within dispersal habitat for spotted owls, five percent or less is in potential suitable habitat (although there are no historic known sites located within the project area) and 20 percent or more of the area is non-habitat. The lack of historic known sites within two miles of this area is a result of poor quality habitat for spotted owls possibly due to the higher elevation and high amount of snowfall that would make finding prey more difficult during the winter. The lack of historic nest sites in the project vicinity may also indicate that the habitat in the area is not optimal for spotted owl nesting.

C. FIELD RECONNAISSANCE:

A level A survey was conducted within the project area in addition to some daytime calling during field reconnaissance. There is a low potential for species presence based on current field reconnaissance and based on historic data.

D. ANALYSIS OF EFFECTS /CUMULATIVE EFFECTS:

Alternative 1 (No action)

No effects to the owl would be predicted with this alternative. The habitat would continue to function as spotted owl suitable or dispersal habitat for the short term. The predicted long-term effects to the currently suitable stands would be that they would remain suitable habitat for a long time.

Alternative 2 (Proposed Action) & 3

General Considerations:

The proposed action will not occur within an LSR or Critical Habitat. The proposed trails will go through a very small amount of suitable spotted owl habitat. The largest impact to spotted owl habitat would be trails that go through dispersal habitat. This habitat would be affected in a minor way by trail construction. The impact of noise and disturbance would be minor to nonexistent due to the very small amount of suitable habitat in the project area. Implementation of this project will have no impact to the functional interim connectivity cells.

Historic Owl Activity Centers:

The Programmatic Biological Opinion for Projects with the Potential to Modify the Habitats of Northern Spotted Owls and/or Bald Eagles or Modify Critical Habitat of the Northern Spotted Owl (USDI 2003) associated with this project included a term and condition that stated for activities within the disruption zone (depending on activity) of any current or historic spotted owl activity center, a seasonal restriction would be in place between March 1 and July 15th (or later if deemed necessary by an agency wildlife biologist) for all activities associated with habitat modification that disturb nesting spotted owls and/or their habitat.

There are no trails within 2 miles of a known spotted owl activity center. All trail construction activities, involving chainsaws associated with these trails will have the seasonal restriction in place for any operation that would have the potential to disturb the northern spotted owl. This includes any trail within 65 yards of suitable spotted owl habitat.

Effects to NRF and Dispersal Habitat on a Local and Watershed Scale

The proposed action will have an effect on dispersal habitat as well as NRF (nesting, roosting, and foraging) habitat. The proposed action will degrade both suitable and dispersal habitat in the project area. The Government Camp Trails Environmental Assessment occurs within Zigzag River and Salmon River Watersheds and contains dispersal habitat (11/40 rule - average 11 inch DBH with an average canopy cover of 40%) within approximately 90% of its area. Three sections of trail totaling less than one mile of trail go through suitable spotted owl habitat (*West Blossom Connection, Cross Town Thunderhead, and West Summit Fen*).

The proposed action will have very little effect on the quality of the dispersal habitat in the two watersheds. Although the dispersal habitat characteristics of the units will be reduced in quality, they will still function as dispersal habitat for the owl. No loss of dispersal habitat will occur. This reduction in quality in dispersal habitat is considered minimal at the watershed scale. The resultant effects to spotted owls and the population within the watershed is predicted to be negligible.

NRF or suitable habitat is considered to be the limiting factor for spotted owls. The proposed action will degrade a small amount of spotted owl NRF (nesting, roosting, and foraging) habitat within these watersheds. The two trails on the west end of the project area are the only two trails that travel through a small amount of suitable spotted owl habitat. The individual tree removal or moderate thinning required to creating trails will not significantly alter the NRF habitat. In effect, this trails project sale will not reduce the percentage of NRF habitat within these watersheds. There are no known spotted owl nests within the Government Camp Trails project area. Therefore, in the context of the local and watershed scale, the proposed action is determined to may affect, but not adversely affect the northern spotted owl and its habitat.

Effects to Critical Habitat

This project occurs near Critical Habitat Unit OR-1. No trail construction is planned through critical habitat. There is **no affect** to northern spotted owl critical habitat.

Effects to spotted owl on a province scale (Willamette Province)

The USFWS issued an opinion on the effects of the Government Camp Trails commercial thinning project as well as many other projects within the document titled “Willamette Province Fiscal Year 2005-2006 Habitat Modification Biological Opinion for Listed Species.” The conclusion they reached is the following: “After reviewing the current status of the bald eagle and spotted owl, including critical habitat, the environmental baseline for both species, the effects of the proposed action, and the cumulative effects, it is the Service’s biological opinion that the FY 2005-2006 Habitat Modification Projects in the Willamette Province are not likely to jeopardize the continued existence of the bald eagle or spotted owl and is not likely to destroy or adversely modify designated critical habitat for the spotted owl” (USDI 2005).

Effects to spotted owl on the entire range of the species (Washington, Oregon, and California)

The Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Project Documents within the Range of the Northern Spotted Owl established a system of land allocations and a rate of timber harvest (probable sale quantity) that is considered to be consistent with maintaining viability for the northern spotted owl across its range (USDA 1994). The Government Camp Trails Environmental Assessment meets all the Standards and Guidelines set forth within this decision document.

Cumulative Effects

The current condition of the habitat for spotted owls within the Zigzag River and Salmon River watersheds take into consideration recently created or soon to be created trails.

The landscape pattern of vegetation has also been affected by historic and recent recreation and urbanization activities as well as wildfire thus moderately impacting the habitat for spotted owls. Some ecologically important features of landscape pattern are: amount of edge habitat, degree of fragmentation of late-successional forest, and amount of interior forest. As fragmentation of a landscape pattern increases, the amount of interior forest habitat decreases and the amount of edge habitat increases. As fragmentation increases, the amount of interior forest habitat decreases, impacting organisms that prefer large patches of interior habitat, such as the spotted

owl in its western cascades range (USDA 1996). Mostly because of past fires, Zigzag River and Salmon River watersheds are very young stands watersheds within a moderately modified sub-basin.

A combination of the loss of suitable habitat due to fire and increase in fragmentation has moderately reduced the amount of suitable habitat for spotted owls currently present within this watershed. Currently, there are no foreseeable future actions other than the projects previously mentioned on Forest Service lands within the watersheds that are predicted to adversely impact spotted owl habitat. There will continue to be management activity within these watersheds that have the potential to adversely impact spotted owl individuals due to disturbance. These types of projects will continue to be consulted on with the United States Fish and Wildlife Service.

Effects Determination

The effect determination for Government Camp Trails Project is, “**may affect, but is not likely to adversely affect**, the spotted owl or its habitat. But the effect will be minor to non-existent for the project area due to the low amount of suitable habitat the trails would impact and the small magnitude of the habitat alteration. The Government Camp Trails Project will have little effect on of suitable habitat. The current proposal will not further add to the fragmentation of late-seral stands within these watersheds. The effects determination for disturbance related issues determined at the time of the biological assessment is, “may affect, but is not likely to adversely affect,” *but the effect determination will be reduced to “no affect” due to implementation of seasonal restrictions for chainsaws and heavy equipment within 65 yards of small stands of suitable habitat. The seasonal restriction will be from March 1 through July 15th in areas of suitable habitat. This seasonal restriction is only necessary for the small amount of trail on the west side of the project area in Sections 13 and 24 (West Blossom Connection, Cross Town Thunderhead, and West Summit Fen).*

Alternative 3

Effects same as in alternative 2 except that it would add 2.1 miles of trail in dispersal-only habitat. The effects determination would still be “**may affect, but is not likely to adversely affect**” to the northern spotted owl or and/or its habitat and “**no affect**” from disturbance with this alternative. The effects call determinations have the same contingency on the seasonal restrictions and the effects call for disturbance can be considered no affect if the seasonal restriction applies to the dispersal habitat within 65 yards of the habitat and the suitable habitat.

E. MITIGATION MEASURES:

The Programmatic Biological Opinion for Projects with the Potential to Modify the Habitats of Northern Spotted Owls and/or Bald Eagles or Modify Critical Habitat of the Northern Spotted Owl (USDI 2005) associated with this project included a term and condition that stated for activities within the disruption distance (depending on activity type) of any current or historic spotted owl activity center, a seasonal restriction would be in place between March 1 and July 15th (or later if deemed necessary by an agency wildlife biologist) for all activities associated with habitat modification that have the potential to disturb nesting spotted owls and/or their habitat. This restriction would only apply in areas where trails were adjacent (within 65 yards)

or go through suitable spotted owl habitat. The effects determinations would be reduced if hand methods are used for trail construction during the critical breeding season.

F. COMMUNICATION WITH U.S. FISH AND WILDLIFE SERVICE:

The northern spotted owl is listed as threatened throughout its range under the endangered species act (55 CFR 26114) on June 22, 1990. Any action that would result in a beneficial effect or could result in an adverse impact to the spotted owl would result in a may effect determination and would require consultation with the U.S. Fish and Wildlife Service.

Consultation with the U.S. Fish and Wildlife Service was initiated on the Government Camp Trails project in December of 2004 through the document titled “The Willamette Province Fiscal Year 2005-2006 Habitat Modification Biological Assessment for Listed Species.” The Fish and Wildlife Service issued the Biological Opinion in March 2005. The conclusion reached in this Biological Opinion for the Government Camp Trails project as well as all others included in the document is as follows: “After reviewing the current status of the bald eagle and spotted owl, including critical habitat, the environmental baseline for both species, the effects of the proposed action, and the cumulative effects, it is the Service’s biological opinion that the FY 2005-2006 Habitat Modification Projects in the Willamette Province are not likely to jeopardize the continued existence of the bald eagle or spotted owl and is not likely to destroy or adversely modify designated critical habitat for the spotted owl” (USDI, 2005). A letter has been sent to the U.S. Fish and Wildlife Service amending the Biological Assessment to reflect effects determinations based on better information on project alternatives.

Northern Bald Eagle *(Haliaeetus leucocephalus – threatened)*

A. HABITAT

The bald eagle is a permanent resident in Oregon. Their nests are usually located in multi-storied stands with old-growth components, and are near water bodies that support an adequate food supply. Nests, which usually consist of a bulky platform of sticks, are usually located in the super-canopy of trees, or even on a cliff. Nest sites are usually within ¼ mile of water in the Cascades.

Adequate forage sources are possibly the most critical component of bald eagle breeding and wintering habitat. Fish, waterfowl, rabbits, and various types of carrion comprise the most common food sources for eagles in the Pacific Recovery Plan area. Wintering bald eagles perch on a variety of substrates, proximity to a food source being the most important factor influencing perch selection. Eagles tend to use the highest perch sites available that provides a good view of the surrounding area. Communal roosts are invariably near a rich food source and in forest stands that are multi-storied and have at least a remnant old growth component.

B. PRE-FIELD REVIEW

Habitat available within the project area

Yes, but marginal. The area around Trillium Lake has the potential to be utilized as nesting, roosting, or perching habitat for the bald eagle.

C. FIELD RECONNAISSANCE

A level A survey was conducted. There is a low potential for this species to inhabit the project area. Birds are observed occasionally on the District, especially in late summer through late winter. Due to low numbers and sporadic use, no communal roost areas are known for the District. There has been consistent use by adults in two areas of the Zigzag Ranger District and nesting approximately 5.5 miles from the trail project area.

D. ANALYSIS OF EFFECTS /CUMULATIVE EFFECTS:

Alternative 1 (No Action)

No effect to the bald eagle or its habitat would occur with implementation of this alternative. The one unit within this project area would continue to provide poor quality habitat for the species.

Alternative 2 (Proposed Action), & 3

Effects to Habitat

Bald eagles usually nest within ¼ mile of a water body in the Cascades. There is one Government Camp Trails project trail with potential nesting and roosting habitat that is tied into a trail at Trillium Lake. This habitat could conceivably serve as nesting trees for bald eagles. The rest of the units within the Government Camp Trails Project are either beyond ¼ mile of a water body or do not have the structural characteristics to serve as potential nesting/roosting/perching habitat for the bald eagle.

However, the likelihood is low that this unit would be utilized as nesting/roosting/perching habitat for the following reasons: 1) The area is highly utilized for recreation throughout the nesting season. 2) There are no recent records to indicate the area adjacent Trillium Lake has produced sightings of Bald Eagles.

Effects to Individuals

It is unlikely that individuals of a bald eagle population would be affected by the proposed action. In the rare instance that a bald eagle would be present in this unit during project implementation, they would have the ability to quickly move to adjacent acceptable habitat.

Effects to Population

None expected since no effects to individuals and minor effects to habitat occurring with project implementation.

Cumulative Effects

None predicted. There are no other projects (except for the occasional hazard tree removal) within the Oak Grove watershed that have the potential to affect potential nest/roost/perch trees.

Effects Determination

The effect determination for Government Camp Trails Project for both Alternative 2 & 3 is, “**May affect, but is not likely to adversely affect,**” the Bald Eagle or its habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration.

E. MITIGATION MEASURES

None.

F. COMMUNICATION WITH U.S. FISH AND WILDLIFE SERVICE

The northern bald eagle is listed as threatened throughout its range under the endangered species act (55 CFR 26114) on June 22, 1990. Any action that would result in a beneficial effect or could result in an adverse impact to the bald eagle would result in a may effect determination and would require consultation with the U.S. Fish and Wildlife Service.

Consultation with the U.S. Fish and Wildlife Service was initiated on the Government Camp Trails project in December of 2004 through the document titled “The Willamette Province Fiscal Year 2005-2006 Habitat Modification Biological Assessment for Listed Species.” The Fish and Wildlife Service issued the Biological Opinion in March 2005. The conclusion reached in this Biological Opinion for the Government Camp Trails project as well as all others included in the document is that the proposed projects within the Biological Assessment may affect, but are not likely to adversely affect the bald eagle.

Canada Lynx

(Lynx Canadensis – threatened)

A. HABITAT

In the Pacific Northwest, lynx are associated with high elevation, boreal forests that typify northern latitudes. They are found primarily above 1220m (4000 ft.) in Washington. Although scarce in Oregon, lynx range and habitat in Oregon and Washington is unclear. High quality lynx habitat is comprised of a mosaic of early successional forests with high prey densities (especially snowshoe hare) for foraging and of late-successional forests with an accumulation of down logs used for denning, thermal and security cover. Intermediate successional stages are used mainly for travel and landscape connectivity but may also provide foraging opportunities.

B. PRE-FIELD REVIEW

Habitat available within the project area

No. In a letter dated August 2 of 2001 (USDA 2001) and updated on December 3 of 2003 (USDA 2003), the Mt. Hood National Forest has made a determination, based on the best available scientific and commercial data, that the Canada lynx and its habitat are currently not present on the Forest. This letter follows the March 2004 Record of Decision: To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDI Bureau of

Land Management, USDA Forest Service 2004) and is consistent with the Lynx Conservation Assessment and Strategy (Ruediger 2000) as specified in this Record of Decision.

The Lynx Nationwide Survey protocol was implemented and resulted in no lynx being located on the Mt. Hood National Forest. Forest-wide winter tracking surveys have been conducted during the winters of 1994-1995, 1995-1996, 2000-2001, 2001-2002, 2002-2003, 2003-2004. No lynx were detected during these surveys.

No further analysis needed due to lack of habitat.

Larch Mountain Salamander (*Plethodon larseli* – Sensitive)

A. HABITAT

Habitat is mainly restricted to the talus slopes of the Columbia River Gorge, although the species is now known to occur at several locations in the Cascade Mountains of Washington. This salamander can be found near the surface under rocks during wet weather, but it retreats to considerable depths in the talus during cold and dry weather. Individuals can occur far from streams and seepages and seem to be less common in perpetually wet talus than in talus that varies from wet to dry with seasonal rainfall.

B. PRE-FIELD REVIEW

Habitat available within the project area

Yes. The Government Camp Trails project occurs within the identified Larch Mountain salamander distribution range as defined in the Northwest Forest Plan. Some of the trails do occur within or directly adjacent to talus slopes. Two field reconnaissance, one in the spring and one in the fall did not locate any individuals in the project area. The only larch mountain salamanders ever found on the Mt. Hood National Forest have occurred at Larch Mountain despite numerous survey efforts for this species.

C. FIELD RECONNAISSANCE

Level A and low intensity B surveys were conducted. No individuals were found. There is a low potential for this species to inhabit the project area.

D. ANALYSIS OF EFFECTS /CUMULATIVE EFFECTS:

Alternative 1 (No Action)

No short-term or long-term effects to the Larch Mountain salamander would be predicted with this alternative. The forested stands would continue to function as potential Oregon Slender salamander habitat.

Alternative 2 (Proposed Action) & 3

Effects to Habitat

The Larch Mountain salamander prefers moist environments and tends to avoid large openings areas. This alternative will not significantly alter the trees per acre and would retain existing logs that are currently in these stands. It is likely there would also be additional down woody debris generated by the creating the trails. The microclimate will likely change within the trail prism as a result of the individual tree removal, but probably not to the degree that would make the units unsuitable for the Larch Mountain salamander. Thus, this proposed action would degrade but not remove potential Larch Mountain salamander habitat from the area.

Effects to Individuals

Although limited surveys for this species have been completed in the Government Camp Trails project area, there appears to be potential habitat for the Larch Mountain salamander within the project area stands. For this reason, species presence is assumed in these areas. There is also the potential that any individuals currently residing in these units would be able to survive and reproduce in the units after project implementation. The proposed trail construction has the potential to extirpate individuals that are present in the trail prism. The loss of individuals may occur indirectly through the degradation of the habitat but could also occur directly by the presence of man and machine in the units.

Effects to Population

Although detrimental effects could occur to individuals of the population, adverse effects are not expected to the population as a whole. The Hood River and Barlow Ranger Districts on the Mt. Hood National Forest have recently conducted extensive surveys for the Larch Mountain Salamander but have found no populations or individuals outside of the Larch Mountain vicinity. In addition, although the range of the species is small, there is abundant potential habitat for the species in protected lands on the Mt. Hood, the Columbia River National Scenic Area and the Gifford Pinchot National Forest. Predominantly these protected lands are Wilderness areas, Congressional Reserves, Late-Successional Reserves and National Scenic Area lands.

Cumulative Effects

The current condition of the habitat for the Larch Mountain salamander within the Zigzag River and Salmon River watersheds take into consideration recently harvested or soon to be harvested projects or projects that will remove or have removed suitable habitat from the area. There are very few projects in the vicinity of the project that would impact Larch Mountain salamanders that could potentially occur. The loss of mature moist forested stands due to historic fires and the possible expansion of the Timberline Ski Lifts could have minor impacts on potential habitat for this species.

The Government Camp Trails project adds to the effects of the above by degrading an additional 9.1 lineal miles of potential habitat. Currently, there are no foreseeable future actions other than the impacts previously mentioned on Forest Service lands within the watersheds that are predicted to impact the Larch Mountain salamander or its habitat.

Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for Larch Mountain Salamander or its habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration.

Oregon Slender Salamander
(Batrachoseps wrighti)
(Sensitive)

A. HABITAT

The only amphibian endemic to Oregon, this species is found predominantly on the west slope of the Cascade Range from the Columbia River south to southern Lane County. Sites have been found in Lane, Linn, Clackamas, and Multnomah counties as well as a few sites on the eastern slopes of the Cascades in Hood River and Wasco counties. Sites are generally scarce, occurring in scattered and often widely separated colonies, but sometimes locally common. It is known to occur at only a few dozen localities.

The Oregon Slender salamander is found in moist woods consisting of Douglas fir, maple, hemlock, and red cedar. It is most common in mature Douglas-fir forests and appears to be dependent on mature and old growth stands. Individuals are found under rocks, wood, or bark and wood chips at the base of stumps as well as under the bark and moss of logs. They are also found in rotting logs, in holes and crevices in the ground, and in termite burrows. Nests that have been located were found under bark and in rotten logs.

B. PRE-FIELD REVIEW

Habitat available within the project area

Yes. All the older stands have potential Oregon Slender salamander habitat.

C. FIELD RECONNAISSANCE

A level A and low intensity level B surveys were conducted. No individuals were found. There is a low potential for this species to inhabit the project area.

D. ANALYSIS OF EFFECTS /CUMULATIVE EFFECTS:

Alternative 1 (No Action)

No short-term or long-term effects to the Oregon Slender salamander would be predicted with this alternative. The forested stands would continue to function as potential Oregon Slender salamander habitat. The predicted long-term effects to the stands currently providing potential habitat for the Oregon Slender Salamander would be that they would remain suitable habitat for a long time.

Alternative 2 (Proposed Action) & 3

Effects to Habitat

Approximately 9-11 miles of trail would be created in the project area. The Oregon slender salamander prefers down logs and bark and may not be present at the elevation of the project. This alternative will retain existing logs that are currently in these stands. It is likely there would also be additional down woody debris generated by the trail construction. The microclimate will likely change slightly along the trail corridor as a result of creating the pathway but probably not to the degree that would make the units unsuitable for the Oregon Slender salamander. Thus, this proposed action would degrade but not remove approximately 9-11 lineal miles of potential Oregon Slender salamander habitat from the area.

Effects to Individuals

Although limited surveys for this species have been completed in the Government Camp Trails project area, there appears to be potential habitat for the Oregon Slender salamander within older stands. For this reason, species presence is assumed in these areas. Several of these stands with potential habitat are adjacent to more suitable habitat that individuals could migrate into after project implementation. There is also the potential that any individuals currently residing in these units would be able to survive and reproduce in the units after project implementation. The proposed trail construction has the potential to extirpate individuals that are present in the trail prism. The loss of individuals would not likely occur indirectly through the degradation of the habitat but could occur directly by the presence of man and machine in the units.

Effects to Population

Although detrimental effects could occur to individuals of the population, adverse effects are not expected to the population as a whole. The Hood River and Barlow Ranger Districts on the Mt. Hood National Forest have recently found approximately 300 individuals of this species while conducting surveys for the Larch Mountain Salamander. In addition, although the range of the species is small, there is abundant potential habitat for the species in protected lands on the Mt. Hood and Willamette National Forest as well as the Columbia Gorge National Scenic Area. Predominantly these protected lands are Wilderness areas, Congressional Reserves, Late-Successional Reserves and National Scenic Area lands.

Cumulative Effects

The current condition of the habitat for the Oregon slender salamander within the Zigzag River and Salmon River watersheds take into consideration recently projects that will remove or have removed suitable habitat from the area. These projects include the Timberline ski lift expansion project, fuels reduction project and historic fires in the watershed. The loss of mature moist forested stands due to past fires has substantially reduced the amount of suitable habitat for the Oregon slender salamander currently present within these watersheds.

The Government Camp Trails project adds to the effects of the above by degrading an additional 9-11 lineal miles of suitable habitat. Currently, there are no foreseeable future actions other than the ski lift expansion and fuels reduction projects previously mentioned on Forest Service lands within the watersheds that are predicted to impact the Oregon slender salamander or its habitat.

Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for Oregon Slender Salamander or its habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration.

Cope’s Giant Salamander (*Dicamptodon copei* - Sensitive) and **Cascade
Torrent Salamander** (*Rhyacotriton cascadae* – Sensitive)

A. HABITAT

Cope’s Giant Salamander: Cope’s Giant salamander prefers streams and seepages in moist coniferous forests. They limit their occurrence to waters with temperatures in the 8 to 14 degrees Celsius range. They will also inhabit cold clear mountain lakes and ponds. They occur in suitable areas from sea level up to 1,350 meters elevation. The Cope's salamander breed and rear its young within the cracks and crevices of the rocky substrates within the stream course. They sometimes leave streams on wet rainy nights but remain on wet rocks and vegetation near the stream. This salamander is most frequently found on pieces of wood in streams, under logs, bark, rocks or other objects near streams.

Cope's giant salamander has the potential to be negatively affected by increased sedimentation resulting from project activities adjacent to or intersecting streams and water sources. Sediment deposition within the substrate could impair preferred habitat characteristics. Also, sedimentation of streams can lead to asphyxiation of embryos and larvae as well as a degradation of over-wintering habitat that may result in local extinctions.

Cascade Torrent Salamander: The range of this species is from the coastal mountains on the Olympic Peninsula in Washington south to Mendocino County, California. It also has a known population in the Cascade Mountains of southern Washington and northern Oregon, with a local disjunct population in the southern Oregon Cascades.

The torrent salamander is most abundant in rocks bathed in a constant flow of cold water, but also occurs in cool rocky streams, lakes, and seeps. Individuals from this species require microclimatic and microhabitat conditions generally found only in older forests.

The diet of this salamander consists of aquatic and semi-aquatic invertebrates, including amphipods, springtails, fly larvae, worms, snails, and spiders. They search for prey under rocks and other objects in streams. Adults occasionally are found under surface objects a few meters from water after heavy rains, but they are the most aquatic of our metamorphosed salamanders and should be expected only in saturated stream-side talus and in streams. Experiments have shown that this species are among the most sensitive of all terrestrial northwestern salamanders to loss of body water and will die quickly in a desiccating environment.

The Cascade Torrent salamander has the potential to be negatively affected by increased sedimentation resulting from project activities adjacent to or intersecting streams and water sources. Sediment deposition within the substrate could impair preferred habitat characteristics.

Also, sedimentation of streams can lead to asphyxiation of embryos and larvae as well as a degradation of overwintering habitat that may result in local extinctions.

B. PRE-FIELD REVIEW

Habitat available within the project area

Yes. A few areas within the Government Camp Trails project include perennial or intermittent streams, wet areas, or seeps.

Cope's Giant Salamander: This species' range is predominantly west of the Cascade Range. Potential habitat for this species does exist within the Zigzag River and Salmon River Watershed. Although the species is not known to exist in the watershed, a portion of the planning area appears to have all the habitat characteristics essential to the species.

Additional Comments: The Cope's Giant Salamander is difficult to identify and can be easily confused with the Pacific Giant Salamander (*Dicamptodon tenebrosus*). Although numerous sightings have been reported from streams on the Zigzag Ranger District, none have been positively confirmed in the project area.

Cascade Torrent Salamander: Potential habitat for this species does exist within the project area. A portion of the project area appears to have all the habitat characteristics essential to the species.

C. FIELD RECONNAISSANCE

A level A survey was conducted based on a low potential for species occurrence. Field surveys have not been accomplished.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Alternative 1 (No Action)

No effects to the Cope's giant salamander or Cascade torrent salamander would occur with implementation of this alternative. The streams and wet areas within the stands would continue to provide potential habitat for the species for possibly far into the future.

Alternative 2 (Proposed Action), & 3

Effects to Habitat and Individuals

There are several streams and wet areas occurring within or adjacent to the Government Camp Trails project area. The potential for increased sedimentation to these water sources will be minimized by installation of waterbars on the trail. The water bars will provide an effective barrier to any sediment being transported by surface erosion or runoff. Although there is the potential that small micro-climate changes would occur with implementation of this project, the

change is not predicted to be substantial enough to affect habitation of the areas by Cope's Giant Salamander and Cascade torrent salamander.

Cumulative Effects

Minimal cumulative effects are predicted to occur with the proposed action. The small increase in sediment caused by soil exposed by the trail will be mitigated by the installation of water bars on the trail. There will be some increase in sediment but it is expected to be small and will travel a short distance within the stream. The current condition of the habitat for the Cope's giant salamander or Cascade torrent salamander within the Zigzag River and Salmon River watersheds take into consideration recently projects that will remove or have removed suitable habitat from the area. These projects include the Timberline ski lift expansion project, fuels reduction project and historic fires in the watershed.

The Government Camp Trails project adds to the effects of the above by exposing soil on an additional 9-11 lineal miles of habitat. Most of this sedimentation will be absorbed by the surrounding vegetation. Some sediment will be added to the stream systems where the trail crosses the stream or then the trail closely parallels the stream. Currently, there are no foreseeable future actions other than the ski lift expansion and fuels reduction projects previously mentioned on Forest Service lands within the watersheds that are predicted to impact the Cope's giant salamander or Cascade torrent salamander or their habitat.

Effects Determination

The effects determination for the Government Camp Trails project is, "**May Impact Individuals but not likely to cause a trend to federal listing**", for Cope's Giant and Cascade Torrent Salamanders or their habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration.

Oregon Spotted Frog (*Rana pretiosa*)

Sensitive

Oregon Spotted Frog: The range of this species is from Northern British Columbia and coastal southern Alaska south to the Rocky Mountains of Idaho, Montana, and Utah. Populations are also present in both the interior and coastal mountains of the Pacific Northwest.

The Oregon Spotted Frog is a highly aquatic species that is rarely found far from permanent water. This species frequents waters and associated vegetated shorelines of ponds, springs, marshes, and slow-flowing streams and appears to prefer waters with a bottom layer of dead and decaying vegetation. They are found in aquatic sites in a variety of vegetation types, from grasslands to forests. Individuals may disperse into adjacent non-aquatic areas during wet weather.

The Oregon Spotted frog has the potential to be negatively affected by increased sedimentation resulting from project activities adjacent to or intersecting streams and water sources. Sediment deposition within the substrate could impair preferred habitat characteristics. Also, sedimentation of streams can lead to asphyxiation of embryos and larvae as well as a degradation of overwintering habitat that may result in local extinctions.

Oregon Spotted Frog: This species is highly aquatic and needs a permanent water source to survive. Potential habitat for this species does not exist within the Government Camp Trails Project area.

American Peregrine Falcon (*Falco peregrinus anatum* – Sensitive) &
Gray Flycatcher (*Empidonax wrightii* – Sensitive)

A. HABITAT

Peregrine Falcon: The most critical habitat components for Peregrine Falcons are suitable nest sites, usually cliffs, and overlooking fairly open areas with an ample food supply. They nest along seacoasts, near marshes, and even in cities, but are not well suited to life in interior forests. They usually nest or roost near a marsh, lake, or coast where water birds are plentiful.

Gray Flycatcher: The Gray Flycatcher is a bird of the arid interior West. It prefers relatively treeless areas with tall sagebrush, bitterbrush, or mountain mahogany communities. It will also occupy these communities within open forests of ponderosa or lodgepole pine. It also lives in juniper woodland with a sagebrush understory.

B. PRE-FIELD REVIEW

Habitat available within the project area

Peregrine Falcon: None. There are no suitable cliffs within or adjacent to the project area.

Gray Flycatcher: None. There is no habitat for this species on the Zigzag Ranger District

No further analysis needed due to lack of habitat.

Northern Painted Turtle (*Chrysemys picta* -Sensitive), **Western Pond Turtle**
(*Clemmys marmorata marmorata*- Sensitive), **Horned Grebe** (*Podiceps auritus* –
Sensitive), & **Bufflehead** (*Bucephala albeola* – Sensitive)

A. HABITAT

Painted Turtle: An aquatic turtle that frequents ponds, marshes, small lakes, ditches and streams where the water is quiet or sluggish and the bottom is sandy or muddy, and there is considerable vegetation. Mudbanks, logs, partially submerged branches and rocks are preferred for sunning.

Western Pond Turtle: The western pond turtle inhabits ponds, marshes, and the slow-moving portions of creeks and rivers that have rocky or muddy bottoms. Partially submerged logs, vegetation mats, mudbanks, rocks and tree branches provide areas for sunning. Western pond turtles have been found to occur from sea level up to around 2000 feet. During the winter months these turtles usually hibernate in bottom mud.

Horned Grebe: The Horned Grebe breeds throughout most of Alaska and Canada and, locally, just south of the Canadian border. It also breeds in northern Eurasia. Its habitat consists of areas with much open water surrounded with emergent vegetation.

Bufflehead: The Bufflehead is a northern species that breeds from Alaska across Canada, and south to Oregon, northern California, and Wisconsin. This species nests near mountain lakes surrounded by open woodlands containing snags. In many areas, the preferred nest trees are aspen, but it will also nest in ponderosa pine or Douglas-fir.

B. PRE-FIELD REVIEW

Habitat available within the project area

Painted turtle and Western Pond turtle: Yes. The trail project enters the Trillium Lake area and therefore there is potential habitat. There are no known sightings of these species on the Mt. Hood National Forest. The Region 6 Regional Forester's Sensitive Species list only has them as suspected to occur on the Mt. Hood National Forest.

Horned Grebe and Bufflehead: Yes. The trail project enters the Trillium Lake area and therefore there is potential habitat. These species both occur on the Mt. Hood National Forest as winter residents and as migrants. No breeding has been observed or documented for this species on the Mt. Hood National Forest.

C. FIELD RECONNAISSANCE

A low intensity level B survey was conducted based on a low potential for species occurrence. No observations were made of any of the four species at Trillium Lake during the breeding season. There are minimal opportunities for the horned grebe or bufflehead to utilize Trillium Lake during the winter since this lake freezes over. It is the professional opinion of the Forest Wildlife biologist that none of these species occur in the project area as residents. There is the potential for bufflehead and horned grebes to occur at Trillium Lake during migration. The lack of sightings of the turtles indicates that the turtles do not use Trillium Lake and will not be considered as species being potentially present in the project area.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Alternative 1 (No Action)

No effects to the Painted turtle, Western Pond turtle, Horned Grebe and Bufflehead would occur with implementation of this alternative. The lake would continue to provide potential habitat for the species for possibly far into the future.

Alternative 2 (Proposed Action), & 3

Effects to Habitat and Individuals

There is a very small potential for disturbance and loss of potential bufflehead nest trees from the trail in the vicinity of Trillium Lake. There would be no effect to the turtles or horned grebe from the trails project.

Cumulative Effects

Minimal cumulative effects are predicted to occur with the proposed action. An increase in use of Trillium Lake could cause more disturbance of waterfowl (horned grebe and bufflehead) by encouraging more use of the area if or when these species are present.

Currently, there are no foreseeable future actions within the watersheds that are predicted to impact the Painted turtle, Western Pond turtle, Horned Grebe, and Bufflehead or their habitat.

Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for Bufflehead or its habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration but potential loss of potential nest trees near Trillium Lake.

The effects determination for the Government Camp Trails project is, “**No Impact**”, for horned grebe, painted and western pond turtle, or its habitat due to the low amount of suitable habitat near the trails, lack of breeding individuals within the project boundary, and the small magnitude of the habitat alteration.

Harlequin Duck (*Histrionicus histrionicus*) (Sensitive)

A. HABITAT

Harlequin Duck: This species occurs from Iceland and Greenland west to eastern Canada. It is absent from the central part of North America, and the “western” population ranges from eastern Siberia east through Alaska and south to the Sierra Nevada of California and the mountains of southwestern Colorado. In the Northwestern United States, the Harlequin duck breeds along relatively low-gradient, slower-flowing reaches of mountain streams in forested areas.

B. PRE-FIELD REVIEW

Harlequin Duck: None. There is no habitat for this species on the Zigzag Ranger District

No further analysis needed due to lack of habitat.

Wolverine (*Gulo gulo* – Sensitive)

A. HABITAT

Populations in the Cascade Mountains are small and scattered. Wolverines are usually found in high temperate coniferous forests, from mid-elevation (around 4000 feet) to moderately high elevation (above timberline), depending on the season. Common tree species are subalpine fir and lodgepole pine. They prefer to feed along rivers and streams and in wet meadows. The den is usually in a rock crevice, cave, or beneath a talus slope. Territories may encompass 10 to 80 square miles. Wolverines are believed to prefer areas of minimal people presence and high

levels of solitude and seclusion. They are usually associated with wilderness, chiefly because they are so vulnerable to the activities of humans.

B. PRE-FIELD REVIEW

Habitat available within the project area:

Yes. Wolverines have no real habitat preference but instead appear to seek high elevations for denning and solitude. Wolverines are dependant on carrion for a large part of their diet and key in on big game populations rather than on specific habitats. Historic sightings of wolverines both verified and unverified are within a few miles of the project area. Snow Bunny Snow Park had one verified track sighting in 1990. However, the proposed project area occurs in areas that lack solitude and seclusion qualities due to the open road densities, management activities, businesses, homes, and recreational opportunities in the area. It is unlikely but possible that a wolverine would be present in the project area.

Recent field surveys in the project area have not been accomplished. The last time broad based surveys were conducted over the watershed was during the winter of 1993-1994 and 1994-1995. Some survey efforts have been ongoing to the east at the Badger Creek Wilderness and on the east and north sides of Mt. Hood but at this point in time there have been no verifiable sightings of wolverine or sign of presence.

C. FIELD RECONNAISSANCE

A level A survey was conducted based on a low potential for detecting species occurrence. No observations were made of wolverine or their tracks during field reconnaissance. The lack of sightings of this species is not a reliable indicator of species presence or absence. The home range of wolverines is documented to be in the hundreds of miles. Therefore any wolverine that is present in the Cascades of Oregon may potentially travel or forage in the project area.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Alternative 1 (No Action)

No effects to the Wolverine would occur with implementation of this alternative. The existing human use of this area would continue to limit opportunities for wolverines to utilize the area. However the area would continue provide potential habitat for the species for possibly far into the future.

Alternative 2 (Proposed Action), & 3

Effects to Habitat and Individuals

There is a potential for disturbance and loss of utilization of some of the potential wolverine habitat by this implementing these two alternatives. Increasing human presence in currently unutilized areas will make degrade the habitat for this species if the species in fact still exist on the Mt. Hood National Forest.

Cumulative Effects

The primary cumulative effect predicted for this species is to increase both the number of visitors to this area and expand the area of human impact in the proposed action area. An increase in human use in this area could cause wolverines to discontinue utilizing the area. That is assuming that the current level of use has not already had that impact.

Currently, there are two foreseeable future actions within the watersheds that are predicted to impact wolverines and their habitat. The Timberline Lift Express project and Government Camp Fuels Treatment Project will both increase human activity in the area and will add to the effect of disturbance ongoing in the area. Because there is already a high amount of human activity in the area from ski areas, businesses, a major highway, recreational uses and homes the effect of this project is considered to be a minimal addition.

Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for wolverine or its habitat due to the low amount of suitable habitat near the trails due to high amount of human presence already within the project boundary.

Conflict Determination

The action alternatives of the Government Camp Trails project will have “may impact individuals but not likely to cause a trend to federal listing or loss of viability” on the wolverine or their habitat.

Baird’s Shrew

(*Sorex bairdii permiliensis* – Sensitive)

A. HABITAT

This species is endemic to Oregon. Its range is from northwestern Oregon from the Pacific coast east to the Cascades, and from the Columbia River south to Benton and Lane Counties.

Little published information exists that assigns with certainty habitat characteristics to the Baird’s Shrew. In 1986 two specimens were collected in an open Douglas-fir forested area with numerous rotting logs in Polk County. The habitat of the Baird’s shrew can be described as moist coniferous forests with a shrubby understory. Individuals of the species tend to forage near logs and rocks.

B. PRE-FIELD REVIEW

Habitat available within the project area

Yes. As stated above little is known about this species. The location and habitat characteristics of the forested areas of the Government Camp Trails project does seem to fit with what little is known about the species.

C. FIELD RECONNAISSANCE

A level A survey was conducted. There is a low potential for this species to inhabit the project area.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Alternative 1 (No Action)

No short-term effects to the Baird's shrew would be predicted with this alternative. The forested stands would continue to function as potential Baird's shrew habitat for the short term.

Considering long-term effects, there is the potential that most of the units that are currently young managed plantations would eventually acquire enough of down wood component to become potential habitat for the Baird's shrew. The predicted long-term effects to the currently suitable stands would be that they would remain suitable habitat for a long time.

Alternative 2 (Proposed Action) & 3

Effects to Habitat

This alternative would retain existing logs that are currently in these stands. It is likely there would also be additional down woody debris generated by the trails project. The microclimate will possibly change within the immediate trail prism. Enough is not known about the species to determine whether this microclimate change and alteration of tree density will impact the habitation of the unit by the species. It is predicted that this proposed action would degrade but not remove potential Baird shrew habitat from the area.

Effects to Individuals

Although no surveys for this species have been completed in the Government Camp Trails project area, there appears to be potential habitat for the Baird shrew within the older forested stands. For this reason, species presence is assumed in these areas. Several of these stands with potential habitat are adjacent to more suitable habitat that individuals could migrate into after project implementation. There is also the potential that any individuals currently residing in these units would be able to survive and reproduce in the units after project implementation. The proposed trails project also has the potential to extirpate individuals that are present in the trail prism. The loss of individuals would likely occur indirectly through the degradation of the habitat but could also occur directly by the presence of man and machine in the units.

Effects to Population

Although detrimental effects could occur to individuals of the population, adverse effects are not expected to the population as a whole. In addition, there is abundant potential habitat for the species in protected lands on the Mt. Hood. Predominantly these protected lands are Wilderness areas, Congressional Reserves, Late-Successional Reserves and National Scenic Area lands.

Cumulative Effects

The current condition of the habitat for the Baird's shrew within the Zigzag River and Salmon River watersheds take into consideration proposed projects that will remove or have removed

suitable habitat from the area. These projects include the following: Timberline Ski Lift Express and Government Camp Fuels Reduction Project. There could be some loss of moist forested stands and down logs that will subsequently reduce the amount of suitable habitat for the Baird's shrew currently present within these watersheds.

The Government Camp Trails project adds to the effects of the above by degrading an 9-11 lineal miles of suitable habitat. Currently, there are no foreseeable future actions other than the projects previously mentioned on Forest Service lands within the watersheds that are predicted to impact the Baird's shrew or its habitat.

Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for Baird's Shrew or its habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration.

Pacific Fringe-tailed Bat (*Myotis thysanodes vespertinus*) (Sensitive)

A. HABITAT

Little to nothing is known about this subspecies of the Fringed Myotis (*Myotis thysanodes*). There appears to be only one source of information for the Pacific Fringe-tailed bat. The distribution of this species is in California, Oregon, and Washington. No habitat data could be found on the Pacific Fringe-tailed bat so habitat information and the following analysis are based on what is known for the Fringed Myotis.

Although the Fringed Myotis is found in a wide variety of habitats throughout its range, it seems to prefer forested or riparian areas. Most Oregon records are west of the Cascade Mountains. Its nursery colonies and roost sites are established in caves, mines, and buildings. The species is thought to forage by picking up food items from shrubs or the ground. It consumes beetles, moths, harvestmen, crickets, craneflies, and spiders.

B. PRE-FIELD REVIEW

Habitat available within the project area

Yes. No breeding or roosting sites available within the project area. There is the potential for the project area to contain foraging habitat, although foraging usually occurs near the species' breeding and roosting sites. Species would only occur in area during dispersal or possibly foraging. This species is considered suspected on the Mt. Hood National Forest. No verified records have been documented for this species on the Forest.

C. FIELD RECONNAISSANCE

A level A survey was conducted. There is a low potential for this species to inhabit the project area.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Effects Determination

The effects determination for the Government Camp Trails project is “**No Impact**” in any alternative due to lack of nesting or roosting habitat. In the event that individuals were dispersing or foraging through the area, they would likely be able to quickly disperse from the area during project implementation. Foraging habitat is not limiting and if individuals happened to be displaced, they could easily find other areas to forage within nearby.

Fisher

(Martes pennanti – Sensitive)

Note: The species analyzed here is the Fisher (*Martes pennanti*) and not the Pacific fisher (*Martes Pennanti pacifica*). It is assumed that the species meant to be on the Region 6 Regional Forester’s Sensitive Species List is *Martes Pennanti* since the USFWS concluded that it is unlikely that there are any valid subspecies of *M. pennanti*.

A. HABITAT

In the northwest part of its range, the fisher occupies a “wide variety of densely forested habitats at low to mid-elevations. The fisher is a moderate- to wide-ranging species and is considered rare in Oregon. West of the Cascade Range, all records for the species were for sites at elevations of 100-1,800 meters (328 – 5906 feet) and were located in the Subalpine fire, western hemlock, and Sitka spruce zones. The species tends to frequent riparian corridors. They are known to occasionally use cut-over areas, but this is not their optimal habitat.

Research has shown that the habitat for fishers would be enhanced by minimizing forest fragmentation, both in the remaining old-growth and in second-growth forests; maintaining a high degree of forest-floor structural diversity in intensively managed plantations; preserving large snags and live trees with dead tops; maintaining continuous canopies in riparian zones; and protecting wetland habitat.

B. PRE-FIELD REVIEW

Habitat available within project area

Yes. The older forested stands have the structural characteristics of fisher habitat. Although these watersheds have been fragmented through past management, there remains enough unfragmented stands of old-growth and second-growth forests, including some of the stands proposed for treatment, that potential low quality habitat exists for the fisher. Fishers were reduced to extremely low numbers in Oregon as recently as 1950. There was a transplant of fishers into south central Oregon and those populations remain viable. No recent verifiable records exist for fishers on the Mt. Hood. A few track sightings were recorded as potentially being fisher but these are unreliable due to the size overlap with American Marten. It is speculated that fishers have been extirpated from the Mt. Hood.

C. FIELD RECONNAISSANCE

A level A survey was conducted. There is a low potential for this species to inhabit the project area.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Alternative 1 (No action)

No short-term effects to the fisher would be predicted with this alternative. The older forested stands would continue to function as potential low quality fisher habitat for the short-term. The predicted long-term effects to the currently suitable stands would be that they would remain suitable habitat for a long time.

Alternative 2 (Proposed Action) & 3

Effects to Habitat

This alternative will leave not impact stand structure enough to alter fisher habitat. These alternatives would retain existing logs that are currently in these stands. It is likely there would also be additional down woody debris generated by the project. The microclimate will change within the harvest units, but possibly not to the degree that would make the units unsuitable for the fisher. Thus, this proposed action would degrade but not remove fisher habitat from the area. It is not expected that treatment in these stands would increase fragmentation of suitable habitat for the species.

Effects to Individuals

Although no surveys for this species have been completed in the Government Camp Trails project area, there appears to be potential low quality habitat for the fisher within the older forested stands. For this reason, species presence is assumed in these areas. There is the slight possibility that a fisher traveling through the area could be impacted by the disturbance associated with implementation of this project. This includes the disturbance created by the 9-11 lineal miles of trail construction. However, these stands with potential habitat are adjacent to more suitable habitat that individuals could easily migrate into during project implementation. The proposed trails project does not have the potential to extirpate individuals that are present in or adjacent to the units. Fishers are not believed to be highly sensitive to human activity. Any fishers currently utilizing the watershed could easily change their travel habitat to avoid the management activity.

Effects to Population

Effects are not expected to the population since there will be no adverse effects to any individuals.

Cumulative Effects

Past activities has to a substantial extent caused the fragmentation of habitat within the affected watersheds as well as the forest. This has reduced essential habitat characteristics associated with the fisher. Currently the majority of these watersheds are providing low quality habitat for the fisher. Continued forest openings could further reduce habitat quality for the fisher within these areas.

. Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for Fisher or its habitat due to the low amount of suitable habitat near the trails and the small magnitude of the habitat alteration.

- Crater Lake Tightcoil *Pristiloma arcticum crateris* (sensitive)

A. HABITAT

Above 610 meters elevation in moist conifer forests and among mosses and other vegetation near wetlands, springs, seeps, and riparian areas. This species may be found on logs, among sedges, attached to decaying leaf surfaces, in litter, or inside other shells (USDI, Bureau of Land Management, 1999).

B. PRE-FIELD REVIEW

Habitat available within project area

Yes. *Pristiloma arcticum crateris* has been found rarely on the Mt. Hood Nation Forest in the past. The habitat in the project area fits the habitat where this species has been found to occur. The project area does have mosses, wetlands, springs and seeps.

C. FIELD RECONNAISSANCE

A Level A survey was done and it was determined that habitat for this species was present in the project area. During field reconnaissance of the project area a low intensity Level B surveys were done in the spring and fall for mollusk and salamanders. No specimens were discovered during the low intensity surveys.

Habitat for this species is present in the project area and therefore presence is assumed.

D. ANALYSIS OF EFFECTS / CUMULATIVE EFFECTS

Alternative 1 (No action)

No short-term effects to the *P. arcticum crateris* would be predicted with this alternative. The suitable habitat would continue to function as habitat for the short-term. The predicted long-term effects to the currently suitable stands would be that they would remain suitable habitat for a long time.

Alternative 2 (Proposed Action) & 3

Effects to Habitat

It is anticipated that some habitat areas for this species will be disturbed by the construction of a trail through the habitat. Some trails may go through some portion or in rare cases all of the home

range for this small species. In some rare cases the amount of opening created by the trail could change the microclimate to the point that the habitat in that small area is no longer suitable.

During trail construction some additional habitat for *P. arcticum crateris* will be created by falling trees and creating more down logs. Down logs is a major component of habitat for this species because of their moisture holding capacity. Therefore there will be some loss and some increase in habitat.

Effects to Individuals

It is anticipated that some individuals may be removed from the population due to trail construction activities. The footprint of the trails themselves is small in terms of ecological scale and therefore the resulting loss of individuals is anticipated to be small relative to the overall population of these mollusks.

Effects to Population

Although there is anticipated that there is potentially some loss of individuals these mollusk are widely scattered over the landscape from Klamath County, Oregon to the Mt. Hood. *P. arcticum crateris* occurs throughout the Oregon Cascades in widely scattered populations. The effect of this project will be extremely local and should not severely impact the population.

Cumulative Effects

The current condition of the habitat for the *P. arcticum crateris* within the Zigzag River and Salmon River watersheds take into consideration proposed projects that will remove or have removed suitable habitat from the area. These projects include the following: Timberline Ski Lift Express and Government Camp Fuels Reduction Project. There could be some loss of moist forested stands and down logs that will subsequently reduce the amount of suitable habitat for the *P. arcticum crateris* currently present within these watersheds.

The Government Camp Trails project adds to the effects of the above by degrading an 9-11 lineal miles of suitable habitat. Currently, there are no foreseeable future actions other than the projects previously mentioned on Forest Service lands within the watersheds that are predicted to impact the *P. arcticum crateris* or its habitat.

Effects Determination

The effects determination for the Government Camp Trails project is, “**May Impact Individuals but not likely to cause a trend to federal listing**”, for *Pristiloma arcticum crateris* or its habitat due to small magnitude of the habitat alteration and large amount of unaltered potential habitat in the area.

***Monadenia fidelis minor*- Dalles Sideband , *Cryptomastix devia*- Puget
Oregonian, *Cryptomastix hendersoni*- Columbia Oregonian
(Sensitive)**

A. HABITAT

Monadenia fidelis minor- Dalles Sideband : This species is usually found in springs and seeps in steppe or dry forest plant communities more associated with the eastside of the Mt. Hood National Forest (USDI, Bureau of Land Management, 1999).

Cryptomastix devia- Puget Oregonian: This species is found in low to mid elevations. The project is above the elevation that this species is usually found (USDI, Bureau of Land Management, 1999).

Cryptomastix hendersoni- Columbia Oregonian: This species is found in low to mid elevations. The project is above the elevation that this species is usually found (USDI, Bureau of Land Management, 1999).

B. PRE-FIELD REVIEW

Habitat available within the project area

Monadenia fidelis minor- Dalles Sideband: None. There is not enough dry forest types in the project area.

Cryptomastix devia- Puget Oregonian: None: The elevation of the project area is higher than this species is normally found.

Cryptomastix hendersoni- Columbia Oregonian: None. The elevation of the project area is higher than this species is normally found.

No further analysis needed due to lack of habitat.

LITERATURE CITED

Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger, and Al Williamson. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

USDA Forest Service, USDI Bureau of Land Management. 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Project Documents within the Range of the Northern Spotted Owl; Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest related Species within the Range of the Northern Spotted Owl. Pacific Northwest Region.

USDA Forest Service, Pacific Northwest Region, USDI Bureau of Land Management, 1998. North Willamette LSR Assessment, Mt. Hood National Forest & Cascade Resource Area, Salem BLM. Portland, Oregon.

USDA Forest Service, Mt. Hood National Forest 2001. Lynx Effects Determination. Letter dated August 2, 2001.

USDA Forest Service, Mt. Hood National Forest 2003. Lynx Effects Determination. Letter dated December 3, 2003.

USDI, Fish and Wildlife Service, 2003. Biological Opinion for the Willamette Province Fiscal Year 2005 & 2006 Habitat Modification Biological Assessment for Effects to Listed Species.

USDI, Bureau of Land Management, 1999 (Mt. Hood consolidated version). Field Guide to Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan, June 1999 pgs 5,9,37, and 57.

