

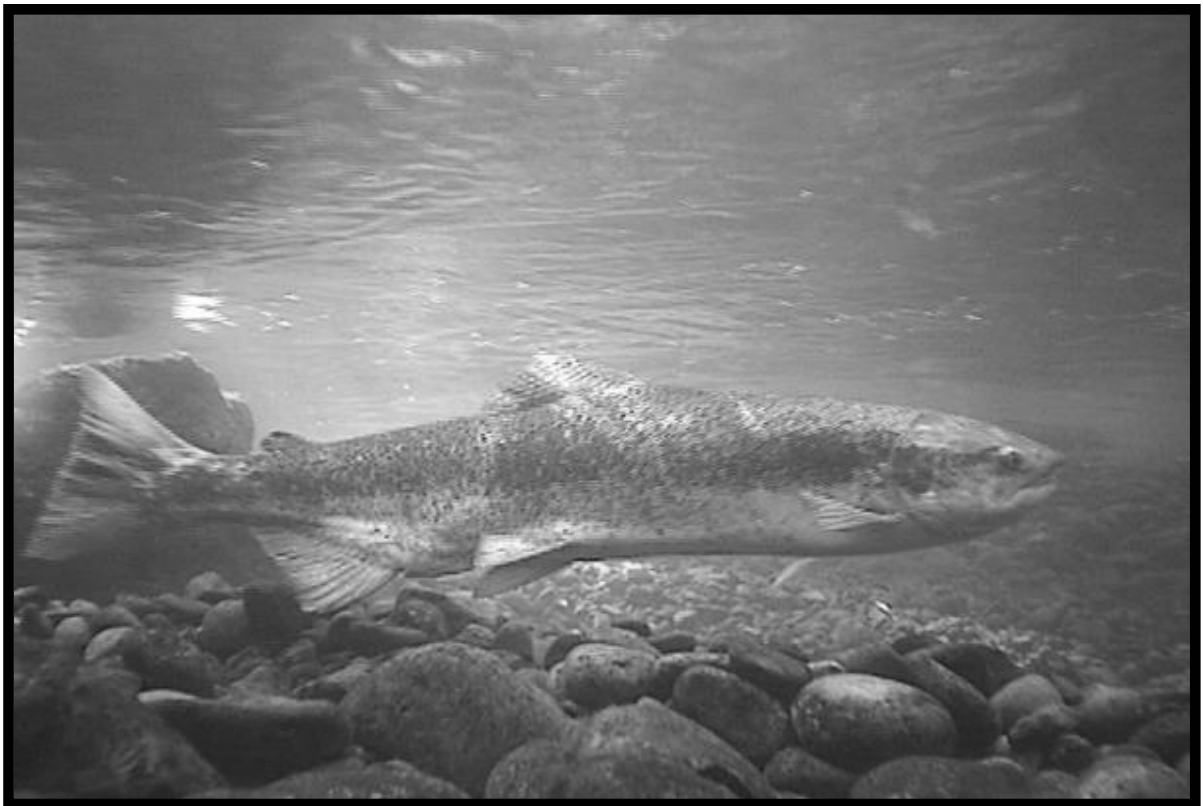
APPENDIX C

BRIEF LIFE HISTORY NARRATIVES FOR BOTANICAL, WILDLIFE, AND FISH

SPECIES OF LOCAL INTEREST

**Gifford Pinchot National Forest
Columbia River Gorge National Scenic Area,
Washington side
Invasive Plant Treatment FEIS**

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Prepared by: Cecile Shohet, Botanist
Shawna Bautista, Wildlife Biologist
Diana Perez, Fisheries Biologist

Brief Life History Descriptions for Botanical, Wildlife and Fish Species of Local Interest on the Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area (Washington side)

Appendix C provides life history and habitat information for the many botanical, wildlife and fish Species of Local Interest (SOLI) on the Gifford Pinchot National Forest (Forest) and the Washington side of the Columbia River Gorge National Scenic Area (Scenic Area). SOLI are: federally listed and Forest Service sensitive species (including species proposed for listing); Management Indicator Species (MIS); Survey and Manage species (S&M); and Washington State endangered, threatened, sensitive or candidate species.

This appendix, together with the effects analysis in Chapter 3 of the EIS, meets the requirements for Biological Evaluation of impacts on sensitive species. A Biological Assessment has also been prepared to discuss effects on federally listed species from the Preferred Alternative B.

This appendix was updated between the Draft and Final EIS.

Botanical Species

Fungi

Albatrellus ellisii

Albatrellus ellisii is a mycorrhizal fungi which forms a symbiotic or mutually beneficial relationship with the rootlets of plants through its hyphae. The roots provide the fungus with moisture and organic compounds (e.g., carbohydrates), while the fungus aids the roots in the absorption of phosphorus, inorganic nitrogen, and other minerals. In general, mycorrhizal fungi cannot grow without their hosts. This species grows solitary, scattered, gregarious, or in fused clusters on the ground in forests. It fruits in late summer and fall. Invasive plants have the potential to disrupt and/or displace the mycorrhizal association between this fungi and its host organism, which could lead to mortality.

A 2005 ISMS query resulted in 15 sites reported from California, Oregon and Washington State. One site occurs on the Gifford-Pinchot National Forest, south of Mount Adams. This site is approximately 90 feet (30 meters) from known invasives, far enough away to avoid the effects of encroachment. However, over time, the spread of invasives may threaten this population. Invasive species are currently growing in *Albatrellus* habitat, reducing the potential for this species to colonize suitable habitats.

Albatrellus flettii

Albatrellus flettii is found scattered to gregarious or in fused clusters on the ground in conifer or mixed woods. It is known from western North America. A 2006 GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query resulted in 82 sites in the Pacific Northwest, of which 5 sites on the Gifford Pinchot National Forest are in proximity to invasive treatment sites. It is unknown if invasives are impacting *Albatrellus flettii* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Cantharellus subalbidus

Cantharellus subalbidus, is a chanterelle, that grows solitary, scattered or gregarious on the ground in the forest. It is more common under second growth conifers, and is found solely in the Pacific Northwest (California, Oregon, and Washington).

A 2006 GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query resulted in 214 sites located with the Northwest Forest Plan, seven of these sites are on the Gifford Pinchot National Forest in proximity to treatment areas. It is unknown if invasives are impacting *Cantharellus subalbidus* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Chrysomphalina grossula

Chrysomphalina grossula is a saprophytic fungus dependent upon appropriate weather and microclimate regimes and the presence of suitable substrate: water-soaked coniferous wood, bark chips, and debris. All sites occur within the *Tsuga heterophylla/ Pseudotsuga menziesii* zone. The number of viable occurrences cannot be predicted for this saprophyte because it is dependent upon a substrate that rapidly decomposes, and then disappears with the loss of the substrate. Observations of a population in Oregon over a 5 year period concluded that as the substrate (bark chips) decomposed and dispersed, the population spread. Once the bark chips were no longer replaced, the population disappeared.

Chrysomphalina grossula is found in Washington, Idaho, Oregon, and northern California, as well as Great Britain, Europe, and Japan. In the range of the northern spotted owl in the Pacific Northwest, *Chrysomphalina grossula* occurrences are rare in wild habitats but occasionally found in gardens or landscapes where there is wood mulch. Reproduction occurs through spore dispersal and mycelial interactions. Longevity of individuals and populations is thought to depend upon the presence of an appropriate substrate.

A 2006 GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query listed 15 known sites for *Chrysomphalina grossula* within the range of the Northwest Forest Plan, and 1 site on the Gifford Pinchot National Forest within 100 feet of a treatment area. It is unknown if invasives are impacting *Chrysomphalina grossula* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Clavariadelphus ligula

Clavariadelphus ligula, is a club-shaped fungi, that is found in humus under conifers scattered to densely gregarious. It is common throughout much of Europe and the West, but is absent or rare in the Pacific Northwest.

A 2006 GeoBob (Geographic Biotic Observations, United States Department of the Interior) query resulted in two known locations of *Clavariadelphus ligula* in the region of the Northwest Forest Plan. One of the two sites is located within 100 feet of a treatment area. Currently, it is unknown if invasives are impacting *Clavariadelphus ligula* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Cortinarius boulderensis

Cortinarius boulderensis is a ground dwelling fungi found in the woods. An endemic to the Pacific Northwest, *Cortinarius boulderensis* ranges from the Olympic Peninsula south to Mt Rainier National Park, and extends west of the Cascade Range crest south to the area near Castle Crags State Park in California.

A 2006 GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query resulted in ten sites for *Cortinarius boulderensis* within the range of the Northwest Forest Plan. Two of these sites are on the Gifford Pinchot National Forest within 100 feet from treatment areas.

Currently, it is unknown if invasives are impacting *Cortinarius boulderensis* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Gastroboletus ruber

Gastroboletus ruber is a mycorrhizal species which is dependent on a host tree for carbohydrates. Without the host tree, the mycorrhizal fungi will shortly die. It is found in forests with a shrubby understory.

According to 2006 GeoBob (Geographic Biotic Observations, United States Department of the Interior) records, there are 33 sites of *Gastroboletus ruber* located from CVS plots within the Northwest Forest Plan region. As of 2002, there were seven known sites for this species within the range of the Northwest Forest Plan. Currently, it is unknown if invasives are impacting *Gastroboletus ruber* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Helvella elastica

Helvella elastica can be found solitary to widely scattered to gregarious in woods or at their edges, particularly near streams and paths.

As of 2006, there were 52 known sites of *Helvella elastica* within the range of the Northwest Forest Plan. Two of these sites are from the Gifford-Pinchot National Forest within 100 feet of treatment areas. It is unknown if invasives are impacting *Helvella elastica* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Hypomyces luteovirens

Hypomyces luteovirens is found solitary, scattered or gregarious in the woods, often partially buried in the duff, usually on the fruiting bodies of *Lactarius* and/or *Russula* species.

As of 2006, there were 12 sites located within the region of the Northwest Forest Plan, with one of these sites 100 feet from a treatment area on the Gifford Pinchot National Forest. It is unknown if invasives are impacting *Hypomyces luteovirens* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Leucogaster microsporus

Leucogaster microsporus is found in soil or duff under conifers, in association with the roots of *Pseudotsuga menziesii* and *Tsuga heterophylla* at mid-elevations.

Leucogaster microsporus is known from the western Cascade Mountains in southern Washington south along the western flank of the Cascade Mountains in Oregon and also in southwest Oregon in the Coast Ranges. As of 2006, there were 9 sites located within the region of the Northwest Forest Plan, with one of these sites 100 feet from a treatment area on the Gifford Pinchot National Forest. Currently, it is unknown if invasives are impacting *Leucogaster microsporus* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Mycena monticola

The ISMS database lists 143 sites for this species within the range of the Northwest Forest Plan (ISMS query 2005). On the Gifford-Pinchot National Forest, it has been found from at least six sites. There is one *Mycena* site within a treatment area. There are several other populations of *Mycena monticola* on the Gifford-Pinchot National Forest.

Mycena is a fall fruiting, saprobe, subsisting on dead or decaying matter (generally, wood or litter) and is generally restricted to conifer forests (especially with *Pinus* sp. present) above 1000 m in elevation. Currently, no known instances of invasive species are encroaching or displacing *Mycena* sites. The spread of invasives over time could displace this species via competition for habitat. Invasive plants may also disrupt the future production of downed wood on which this species feeds.

Otidea smithii

Otidea smithii is saprophytic on wood and litter, and grows solitary to gregarious, often under black cottonwood, Douglas Fir, and western hemlock. This species fruits in the late summer and fall. A 2005 ISMS query records 10 sites of this species in California, Oregon, and Washington; 3 are from the Gifford-Pinchot National Forest. There are no known occurrences of *Otidea smithii* within 100 feet of any treatment area. However, surveys for fungi are not generally conducted on the Gifford-Pinchot National Forest, and there is potential for this species near the Camp Creek Falls trailhead, which is within a treatment area (Andrea Ruchty, personal communication, 2005). Potential impacts include habitat encroachment and disruption of the future production of downed wood, as tree and shrub seedlings are out-competed by invasives.

Ramaria celerivirescens

Ramaria celerivirescens grows on the ground in the woods often partially buried in the humus.

As of 2006, there were 82 sites located within the region of the Northwest Forest Plan, with one of these sites 100 feet from a treatment area on the Gifford Pinchot National Forest. Currently, it is unknown if invasives are impacting *Ramaria celerivirescens* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Ramaria rubrievanescens

Ramaria rubrievanescens is found under conifers.

As of 2006, there were 51 sites located within the region of the Northwest Forest Plan, with one of these sites 100 feet from a treatment area on the Gifford Pinchot National Forest. The site on the Gifford Pinchot National Forest is in association with lodgepole pine. Currently, it is unknown if invasives are impacting *Ramaria rubrievanescens* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Rhizopogon evadens var. subalpinus

Rhizopogon evadens var. *subalpinus* is found in the soil or duff under conifers.

As of 2006, there were 19 sites located within the region of the Northwest Forest Plan, with two of these sites 100 feet from a treatment area on the Gifford Pinchot National Forest. The site on the Gifford Pinchot National Forest is in association with lodgepole pine. Currently, it is unknown if invasives are impacting *Rhizopogon evadens* var. *subalpinus* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Spathularia flavida

Spathularia flavida is saprophytic on litter, and grows in clusters or fairy rings on woody debris on the forest floor. It fruits in the late summer to early fall. A 2005 ISMS query reports this species from 38 sites across the Northwest Forest Plan. There are two sites of this species within 100 feet of treatment areas.

There currently are no direct or indirect effects to *Spathularia flavida* from invasive encroachment. Potential impacts include habitat encroachment and disruption of the future production of downed wood, as tree and shrub seedlings are out-competed by invasives.

Non-Vascular Species, Lichens

Cetrelia cetrarioides

Cetrelia is an epiphytic foliose (leafy) lichen that grows on the limbs of alders (*Alnus rubra*) in riparian zones. A 2005 ISMS query resulted in 85 sites for this species recorded from across the range of the Northwest Forest Plan; four of these are from the Gifford-Pinchot National Forest. One recorded site is in proximity to mapped invasive plants. It is unclear if this site actually exists, as database records exist but hard copy records have not been located.

No direct threats from invasives have been observed, although some invasives thrive in a riparian environment (e.g., knotweeds, reed canary grass, meadow knapweed, etc.) and have the potential to out-compete alders, which could eventually threaten habitat for *Cetrelia*.

Dendriscoaulon intricatum

Dendriscoaulon intricatum is a fruticose lichen typically found on mossy tree trunks in the company of species of *Sticta*, *Pseudocyphellaria*, and *Nephroma*.

There are 584 known sites of *Dendriscoaulon intricatum* within the region of the Northwest Forest Plan, and 7 sites known from the Gifford-Pinchot National Forest that are within 100 feet of invasive weed treatment areas. As *Dendriscoaulon* is found growing on tree trunks, it is unlikely that invasives are currently impacting this species directly. In time, competition for habitat between the host tree and the invasive species may occur.

Dermatocarpon luridum

Dermatocarpon is an aquatic lichen that grows submerged or partially submerged in cold perennial streams. An ISMS (Interagency Species Management System) query in 2005 showed that there are 22 sites for this species recorded from across the range of the Northwest Forest Plan; six of these sites are reported from the Gifford-Pinchot National Forest. Three of these sites are in proximity to invasive species, the closest growing approximately 13 meters from invasives. No effects of encroachment from invasives can be observed currently; however, over time, if invasives continue to spread, they may occupy these sites and out-compete the *Dermatocarpon*.

Leptogium rivale

Leptogium rivale is an aquatic lichen that attaches to submerged rocks. A GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query in 2006 showed that there are 170 sites for this species recorded from across the range of the Northwest Forest Plan; ten of these sites are reported from the Gifford-Pinchot National Forest. It is unknown if invasives are impacting *Leptogium rivale* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Nephroma bellum

Nephroma bellum is an epiphytic cyanolichen that grows on the boles, lower limbs, or lower twigs of conifers. At times, it is found on understory shrubs, such as *Acer circinatum*. A 2005 ISMS query reported 164 sites for *Nephroma bellum* from the Pacific Northwest, with 16 of these sites from the Gifford-Pinchot National Forest. Of these 16 sites, one is in proximity to a treatment area.

No effects of encroachment from invasives can be observed currently; however, over time, if invasives continue to spread, they may occupy these sites and out-compete the substrates on which *Nephroma* depends.

Nephroma occultum

Nephroma occultum is an epiphytic cyanolichen that is old-growth associated and probably dispersal limited, and tends to grow on horizontal limbs high up in the canopy of old conifers, though sometimes also found on understory shrubs, such as *Acer circinatum* (maple) (Andrea Ruchty, personal communication, 2005).

The ISMS database lists 202 sites for this species within the range of the Northwest Forest Plan (ISMS query, June 2005); seven of these are located on the Gifford-Pinchot National Forest. Invasive plants have been detected near two of these sites.

No effects of encroachment from invasives can be observed currently; however, over time, if invasives continue to spread, they may occupy these sites and out-compete the substrates on which *Nephroma* depends.

Peltigera pacifica

Peltigera pacifica is a foliose lichen species that often grows on soil, duff or woody debris, and occasionally on tree bases in low elevation, moist forests. Gifford-Pinchot National Forest surveys have located this species in abundance throughout stands that have regenerated after fire. *Peltigera* grows on mineral soil and woody debris and seems to be fairly well distributed across the forest.

The ISMS database lists 114 sites for this species within the range of the Northwest Forest Plan (ISMS query, June 2005); at least 23 of these are located on the Gifford-Pinchot National Forest. Two of these 23 sites are of concern for this project as they overlap within 100' of invasives or are at least 100' of a treatment area.

No effects of encroachment from invasives can be observed currently; however, over time, if invasives continue to spread, they may occupy *Peltigera* sites.

Pseudocyphellaria rainierensis

Pseudocyphellaria rainierensis is a foliose (leafy) lichen that grows on the bark and wood of conifers in moist old growth forest at low to mid-elevations. As of June 2005, there were 248 sites for this species in the Interagency Species Management System (ISMS) database; 44 of these sites are from the Gifford-Pinchot National Forest. Five of the 44 sites are either within 100 feet of an invasive species detection or treatment area. No direct threats from the invasives have been observed or are anticipated (the nearby invasives do not occupy the same habitat niche). Over time, however, encroachment of invasives could impact the trees and shrubs on which *Pseudocyphellaria* depends.

Usnea longissima

Usnea longissima is an epiphytic lichen, usually found in riparian areas in the Pacific Northwest (Oregon and Washington), both on conifers and hardwoods, at low elevations. It is most commonly found in the transitional band between the mountains and foothills.

A GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query in 2006 showed that there are 278 sites for this species recorded from across the range of the Northwest Forest Plan; eight of these sites are reported from the Gifford-Pinchot National Forest within 100 feet from treatment areas. It is unknown if invasives are impacting *Usnea longissima* habitat, as original sighting reports of this species did not include invasive weed observations.

Non Vascular Species, Bryophytes (Moss)

Racomitrium aquaticum

Racomitrium aquaticum is a moss which forms mats on shaded, moist rocks and cliffs along shady streams or in forests, often in splash zones, but never in aquatic habitat.

A GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query in 2006 showed that there are 31 sites for this species recorded from across the range of the Northwest Forest Plan; one of these sites are reported from the Gifford-Pinchot National Forest within 100 feet from a treatment area. It is unknown if invasives are impacting *Racomitrium aquaticum* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Scouleria marginata, Margined Streamside Moss

Scouleria marginata is an aquatic species of moss found in running water. The Washington Natural Heritage Program reports 2 large populations of *Scouleria marginata* on the Columbia River Gorge National Scenic Area along the Klickitat River. Both are within 100' of a treatment area. Each of these populations is large. Currently, the only aquatic invasive known from the treatment area is reed canary grass which is very limited in number and size, and likely has not impacted *Scouleria marginata* individuals or habitat.

Schistostega pennata

Schistostega pennata is a moss that grows on upturned root wads adjacent to standing water (small streams, generally). A 2005 ISMS query resulted in 102 sites for this species recorded from across the range of the Northwest Forest Plan; 23 of these sites are reported from the Gifford-Pinchot National Forest. Four of the 23 sites on the Gifford-Pinchot National Forest are within 100 feet of an invasive species or an invasive plant treatment area. This species has a highly selective habitat, one whose niche would not easily be occupied by invasive species.

Tetraphis geniculata

Tetraphis geniculata is a moss that grows on rotten stumps and logs in shady, humid forests at low to mid-elevations. This species ranges from northern California to Alaska. According to a 2005 ISMS query, 103 sites for this species are from Washington and Oregon; 60 are from the Gifford-Pinchot National Forest. Fifteen of the 60 sites are within 100 feet of an invasive species or a treatment area. This species has a highly selective habitat, one whose niche would not easily be occupied by invasive species.

Vascular Plant Species

Artemisia campestris var. *wormskioldii*

Artemisia campestris var. *wormskioldii* is an herbaceous species that grows along the shores of the Columbia River. Two populations of this species have been recorded world-wide – one in the National Scenic Area and one further upstream. The population in the National Scenic Area is of very limited numbers (personal communication, Robin Dobson, May, 2005). Currently, knapweed is potentially threatening this population and careful monitoring is on-going. Both impacts and mortality to this species is thought to have occurred in the past, due to alterations in plant communities.

Botrychium lanceolatum

Botrychium lanceolatum is found in well-drained meadows, wet, mossy benches in mature red cedar forests, mossy talus slopes near creek drainages, mixed mature coniferous forests, alpine meadows, roadbeds, and disturbed areas. It can be found from 700 – 6000 feet in elevation. This species is able to utilize a wide ecological amplitude of habitats, and can also tolerate some level of disturbance, in many western states. Within Washington, *Botrychium lanceolatum* is scattered, mostly west of the Cascades, in the Olympics, and in several northeastern counties. In Washington, there are over 80 occurrences, the majority of which each have less than 20 plants (Washington Natural Heritage, 2003). There are many sites for this species on the Gifford-Pinchot National Forest (personal communication, Andrea Ruchty, January, 2006).

There is one site on the Gifford-Pinchot National Forest, in Midway Meadow (treatment area, 35-14m1), where *Botrychium* is growing along roads adjacent to the meadow. Tansy ragwort, oxeye daisy, hairy catsear, and scotchbroom are also known from the road-systems adjacent to these meadows. Habitat has been impacted, but there has been no impacts to individuals. Future mortality is to be expected.

Botrychium montanum

Botrychium montanum generally occurs in dark coniferous forests, usually near swamps and streams from 1000-3000 m (3300-9800 feet) in elevation. Within the range of the northern spotted owl, the typical habitat for *Botrychium montanum* has been characterized as *Thuja plicata* (western redcedar) swamps in the Cascades of Oregon and Washington. On the west side of the Cascade Range, this species seems to require shady, relatively moist (but not flooded) sites, with a minimum of understory competition.

Botrychium montanum occurs in British Columbia, Washington, Oregon, California, and Montana, and is also documented in Idaho as of 1993. As of 1998, within the range of the northern spotted owl, all populations occurred on National Forest lands. It is reported from Chelan, Whatcom, Skagit, Snohomish, Pierce, and Okanogan counties in Washington State, and Wasco, Marion and Linn counties in Oregon. As of 1998, there is one known site of *Botrychium montanum* in California, located near the border of Butte County and Tehama County.

A GeoBOB (Geographic Biotic Observations, United States Department of the Interior) query in 2006 showed that there are 96 sites for this species recorded from across the range of the Northwest Forest Plan; five of these sites are reported from the Gifford-Pinchot National Forest within 100 feet from a treatment area. It is unknown if invasives are impacting *Botrychium montanum* individuals or habitat, as original sighting reports of this species did not include invasive weed observations.

Botrychium pinnatum

Botrychium pinnatum is found in moist coniferous forests, mossy talus slopes under mixed deciduous and coniferous cover, subalpine meadows, and disturbed areas. It is found at elevations between 1900 and 7300 feet. Like *Botrychium lanceolatum*, *Botrychium pinnatum* is found in a large ecological amplitude including some disturbance. There are over 130 sites for *Botrychium pinnatum* in Washington, with more than half of these sites having fewer than 10 plants, and many with a single individual. This species is found from Alaska to Colorado.

In the Pacific Northwest, *Botrychium pinnatum* is found throughout Washington, the Okanogan Highlands, Eastern Cascades, Western Cascades, and the Olympic Peninsula physiographic provinces. There are many sites for this species on the Gifford-Pinchot National Forest (personal communication, Andrea Ruchty, January, 2006).

There is one site on the Gifford-Pinchot National Forest, in Midway Meadow (35-14m1), where *Botrychium* is growing along roads adjacent to the meadow. Tansy ragwort, oxeye daisy, hairy catsear, and scotchbroom are also known from the road-systems adjacent to these meadows. *Botrychium* habitat has been impacted, but there have been no impacts to individuals. Future mortality is to be expected.

Chrysolepis chrysophylla

Chrysolepis chrysophylla (Golden Chinkquapin) is an evergreen member of the oak family, and reaches the northern edge of its range in Washington State. This species is shade intolerant, and can easily be overtopped by conifers, and die.

There are 11 sites of *Chrysolepis chrysophylla* on the Gifford-Pinchot National Forest. It can be locally abundant, but is not well distributed; certain areas have large patches. The biggest patch is on the south/southeast end of Big Lava Bed, on the Mt. Adams District. On the Gifford-Pinchot National Forest, there are six sites where this species and invasives are within 100 feet of a treatment area. Three of these sites are comprised of one individual tree. For the majority of these sites, invasives are currently too far away to threaten *Chrysolepis*. For several sites, there likely has been mortality (personal communication, Andrea Ruchty, January 2006). Over time, invasives could spread and compete for habitat with more *Chrysolepis* sites. Conversely, there may be a benefit to invasive encroachment, as invasives are unlikely to overtop *Chrysolepis chrysophylla* and out-compete it for shade, while native trees and shrubs could do just that. Any negative effects could be significant because of the limited numbers of *Chrysolepis chrysophylla* within these populations.

Cimicifuga elata

Cimicifuga elata site is an herbaceous plant that grows on forest edges. Data from the Washington Natural Heritage Program lists two known sites for this species from the Gifford-Pinchot National Forest. Within the state of Washington, three additional sites are reported on private land.

One *Cimicifuga elata* site is located very close to the Woods Creek Trailhead. The site is dry, although near a riparian zone and adjacent wet areas. This site is prone to trampling as it is adjacent to areas of heavy public usage, with an adjacent picnic and parking area. Monitoring results from a 1996 site visit, describe six stems of *Cimicifuga elata*, in an area of about 15 feet X 40 feet, with a scattered patchy distribution (2004 Washington Natural Heritage Element Occurrence Database). The site was described as a small, non-vigorous population. Himalayan blackberry is growing among the *Cimicifuga elata*, and Canada thistle adjacent to it. Other invasives in close proximity include: herb Robert, bull thistle, Scotch broom, and lesser burdock.

Currently, the Himalayan blackberry is directly competing with the *Cimicifuga elata* for space and resources, and probably has already caused mortality to this species. A number of other invasive species are also in close proximity, encroaching available habitat and competing for resources, thereby directly impacting the vigor and potentially the numbers of this population.

Without action, over time, the Woods Creek *Cimicifuga elata* population may be extirpated. The limited number of *Cimicifuga* populations coupled with the direct threat from invasives lead to an urgency to treat this site.

Corydalis aquae-gelidae

Corydalis aquae-gelidae is an herbaceous plant that grows in riparian zones. *Corydalis aquae-gelidae* habitat is along the edges of streams. The Washington Natural Heritage Program reports 40 sites for this species on the Gifford-Pinchot National Forest. Eight of the 40 sites are within 100 feet of invasive species. Invasive species occupying the same niche as *Corydalis aquae-gelidae* are currently present on the eight sites and threaten the viability of this native plant. These include: reed canary grass, meadow knapweed, and to a lesser extent, Canada thistle and Scotch broom.

One of the eight, the Springs Camp site, has 150-200 *Corydalis aquae-gelidae* scattered along small drainages downstream of the site. The site overlaps a dispersed recreation site threatened by meadow knapweed, scotch broom, tansy ragwort and Canada thistle. Meadow knapweed can grow in/adjacent to water, providing the greatest threat to *Corydalis aquae-gelidae*. Mortality can be expected, as well as potential extirpation of entire populations.

Cypripedium fasciculatum

Cypripedium fasciculatum is known from eight western states, and occurs in a variety of coniferous forests, with varying amounts of light infiltration. It is sometimes found along roads. A 2005 ISMS query reported 1,048 sites for this species from the Pacific Northwest with eight occurrences from the Gifford-Pinchot National Forest. All sites are found on mid-and upper-slope positions, four sites occur near open Douglas-fir forest edges. One of these eight sites, the Trail Peak site, is within the 33-05 treatment area. The *Cypripedium fasciculatum* at this site, is found in six small patches, adjacent to the road.

Currently, invasive species at this site are impacting *Cypripedium fasciculatum* habitat, but there has been no impacts to individuals. Within five years, impacts to individuals with possible mortality may occur.

Githopsis specularioides

Githopsis specularioides is an herbaceous species that grows on grass steppe habitats. Two populations of *Githopsis specularioides* are found on the Columbia River Gorge National Scenic Area within 100 feet of invasive species. One is the only known population of *Githopsis specularioides* on Miller Island, the other population is in Catherine Creek Natural Area. Invasive species at both sites (predominantly, yellow star thistle, spotted knapweed, blackberry and cheat grass) have likely impacted *Githopsis specularioides*, both displacing individuals causing mortality and their habitat. Impacts are continuing despite treatment.

Heuchera grossulariifolia

Heuchera grossulariifolia is an herbaceous species that grows on cliffs. Approximately 100 sites of *Heuchera grossulariifolia* are known along the Klickitat River.

About 20 sites are in the Columbia River Gorge National Scenic Area, within three treatment areas: Major, Balfour and Klickitat “Rails to Trails”. These sites all have small population numbers, often 10 or less, in small patches on cliffs. However, they are not currently threatened by invasive plants and encroachment is not likely as cliff habitat is not conducive to these invasives.

Lomatium suksdorfia

Lomatium suksdorfia is an herbaceous species found on open dry slopes, usually with grass or herbaceous dominated vegetation. There are two sites of this species along the Klickitat “Rails to Trails” project, where several invasive species are found within 100 feet of the *Lomatium*. Twelve sites of this species are recorded on the Columbia River Gorge National Scenic Area and more that have not yet been located are considered likely. Mortality to individuals and habitat loss has resulted from impacts by invasive plants, such as cheat grass and yellow star thistle. Treatment of invasive plants near these populations is believed to help reduce potential impacts.

Lomatium columbianum

Lomatium columbianum is an herbaceous plant found on dry, rocky, talus slopes. *Lomatium columbianum* is widespread and common plant on the Columbia River Gorge National Scenic Area. There are approximately 10 sites of this species where invasive species are within 100 feet of the *Lomatium*. It is an endemic and has a restricted range, but is well represented on the Columbia River Gorge National Scenic Area with hundreds of sites recorded.

Lomatium columbianum habitat has been infested with invasive plants such as yellow star thistle, white top, and cheat grass; mortality from encroachment has been likely, and is expected to continue even with current treatment.

Microseris borealis

Microseris borealis is a perennial found in montane, wet meadows. There are 12 sites reported from public land in Washington State, and five sites from the Gifford-Pinchot National Forest. Populations of this species on the Gifford-Pinchot National Forest are in wet meadows directly adjacent to well used roads, where there is low invasive density and frequency. There are two *Microseris borealis* sites that are adjacent to treatment areas. The Takh Takh meadows site is less than 5 meters from the road system, which is the treatment area, and where invasives are present. The Babyshoe Pass site is also less than 5 meters from the road (treatment area). The invasive, birds-foot trefoil is in close proximity to the wet meadow and *Microseris borealis*, at this site.

Currently, invasives have not encroached habitat or directly impacted any *Microseris borealis* individuals. The invasives at both sites are roadside, and the meadows are wet. In time, some of the invasives that can tolerate a wet meadow habitat could begin to out-compete the *Microseris*. These include Canada thistle, scotch broom, yellow hawkweed, etc.

Montia diffusa

Montia diffusa is an early successional species that shares habitat with invasive species. This species often appears post-fire. The Washington Natural Heritage Program reports 5 sites of *Montia diffusa* from the Gifford-Pinchot National Forest and six additional sites from public land within the State of Washington. There are two sites where *Montia diffusa* grows within 100 feet of invasive treatment sites (one of the two sites is along a road cut).

A 1988 monitoring report from one of these two sites (element occurrence 18) lists Canada thistle as an associated species. Impacts to habitat, then, have already occurred. *Montia diffusa* is an early seral species, as are a majority of invasives. Both colonize early successional habitat, like disturbed areas, i.e., road cuts, eroded areas, etc. The spread of Canada thistle and other invasives, has likely already resulted in the mortality of *Montia diffusa*. Continued future mortality is to be expected.

Orthocarpus bracteosus

Orthocarpus bracteosus grows in low elevation meadows west and east of the Cascades. The Washington Natural Heritage Program ranks this species as endangered, with a state rank of S1, indicating that it is critically imperiled, with two occurrences within the state. A single population for this species is known from the Gifford-Pinchot National Forest, and that population is found in Peterson Prairie. There is one other population in Washington State (COSEWIC, 2004). The *Orthocarpus* is in the vicinity of the road, where many of the invasives (tansy ragwort, Canada thistle, scotch broom, spotted knapweed, etc.) are also located. Currently, there is impact to habitat, but *Orthocarpus* individuals have not been impacted.

Penstemon barrettiae

Penstemon barrettiae is an herbaceous species that grows along roadsides and on rock outcrops. The Washington Natural Heritage Program reports one site in Washington State for this species, and that site is found on the Gifford-Pinchot National Forest. This site consists of a single clump about 9 square feet, with 55 flower stems, growing in an old rock quarry. This species is more common on the Columbia River Gorge area, where it is a local endemic, restricted in the general area of the White Salmon and Klickitat Rivers. No impacts to this species from invasives are currently observed. However, this site is critical due to the scarcity of this species in Washington and its small size (both number and area). Competition from invasive plants in the future could eliminate this native species in Washington.

Sisyrinchium sarmentosum

Sisyrinchium sarmentosum is an herbaceous plant species that grows in meadows.

There are 21 populations of this species known world-wide; 13 of these occurrences are in the state of Washington; 9 of these are on the Gifford-Pinchot National Forest. Of the nine, one is no longer extant (Pine Tree Springs) and two (Little Mosquito Lake and Little White Salmon) appear to be in decline (Andrea Ruchty, personal communication, June, 2005). Two locations on the Mt. Hood National Forest are in extreme decline with five or fewer individuals.

Throughout the range, many populations are too small to be considered self-sustaining. Five, though, do likely have the potential to be self-sustaining: three on the Gifford-Pinchot National Forest (South Prairie, Cave Creek, and Peterson Prairie) and two on the Mt. Hood National Forest (Little Crater Meadow and Lower Lake) (Raven, 2003). Of these populations, three are comparatively large (several thousand individuals), all of which are located within the Ice Caves Grazing Allotment: South Prairie, Cave Creek, and Peterson Prairie. In July of 2003, the two populations at South Prairie and Cave Creek were estimated to comprise 85 percent of the known *Sisyrinchium* individuals in existence (Raven 2003). Since 2003, two “new” sites were found on the Gifford-Pinchot National Forest with large numbers of individuals (Lost Creek drainage, 2000+ individuals; and Falls Creek Horse Camp, 1000+ individuals)

Currently, invasive species grow closely with *Sisyrinchium sarmentosum* in two locations on the Gifford-Pinchot National Forest. Both locations are one of the five sites with the potential for *Sisyrinchium sarmentosum* to be self-sustaining. One of the locations is Cave Creek (one of 3 sites on the Gifford-Pinchot National Forest with a large enough population size to be considered self-sustaining), where houndstongue and Canada thistle, have already encroached habitat and probably have displaced *Sisyrinchium sarmentosum*. Within ten years, significant impact and mortality to *Sisyrinchium sarmentosum* is expected, including the loss of some of these smaller, satellite sites. The other is a satellite site about a quarter of a mile from the main *Sisyrinchium sarmentosum* site at South Prairie. Mortality to *Sisyrinchium sarmentosum* has occurred from invasive encroachment at both these sites. Over time, invasive plants in Cave Creek and South Prairie could further threaten the *Sisyrinchium*, resulting in a trend towards listing this species.

Wildlife Species

Federally Listed Wildlife Species (Endangered Species Act)

Grizzly Bear (*Ursus arctos horribilis*)

Listed grizzly bears occur in more isolated and remote areas of four states (Idaho, Montana, Wyoming and Washington) in the conterminous U.S. Grizzly bears in Canada and Alaska are not federally listed.

Life History

Grizzly bears are relatively long-lived and some individuals have been recorded to live 40 years or more. More typical life spans are around 25 years. They are normally solitary except when breeding or a female is caring for young. Mating occurs from late May through mid-July. Cubs are born in February and litter size varies from one to four cubs. Females typically give birth to young every three years.

Grizzly bears hibernate in the winter and excavate dens in which to hibernate. Grizzlies are omnivorous and opportunistic feeders. They may eat carrion, grasses, riparian forbs, berries, bulbs, insects, whitebark pine nuts, fish, ungulates, ground squirrels, roots, bulbs, fungi, tree cambium, and even garbage (Cole, 1972; Hamer 1974; Hamer et al. 1977 as cited in U.S. Fish and Wildlife Service, 1993a; Martinka 1972; Murie 1944; Pearson 1975; and Singer 1978). In some areas grizzlies may be almost entirely herbivorous, and they rely on plants that have recently emerged, when crude protein levels are highest (U.S. Fish and Wildlife Service, 1993). Foods high in protein and carbohydrates that allow for significant fat deposition prior to hibernation are essential for the grizzly's survival.

The search for food has a prime influence on grizzly bear movements. Upon emergence from the den they seek the lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges where their food requirements can be met. From late spring to early summer they follow plant green-up back to the higher elevations. In late summer and fall, the bears will transition to fruits and nuts as a food source.

Habitat Description

The grizzly has a broad range of habitat tolerance. Currently occupied areas are characterized by contiguous, relatively undisturbed mountainous habitat with a high diversity of topographic and vegetative diversity (U.S. Fish and Wildlife Service, 1993). Grizzlies prefer dense cover with interspersed openings for feeding sites.

In a four-year study in the Yellowstone ecosystem, Blanchard (1978, as cited in U.S. Fish and Wildlife Service, 1993) found that 90 percent of relocations of radio tagged grizzlies were in forest cover too dense to observe the bear from a plane. Dens are usually located on steep slopes where deep snow is likely to accumulate and persist. Appropriate denning areas may be limiting in some areas and are important for the species survival.

Threats

Human-caused mortality, disturbance and habitat loss are the primary threats to grizzlies. Specific examples of threats to grizzly bear include road and trail construction in unroaded areas, human use of existing roads, logging, grazing, power line corridors, poaching, backcountry recreation, energy and mineral exploration and extraction, non-target mortality during black bear hunting season, and residential development.

Action Area Information

Grizzly bears are known as historic occurrences or occasional transient individuals on the Gifford Pinchot National Forest. There are no recent, documented records of grizzly bear on the Gifford Pinchot National Forest or the Columbia River Gorge National Scenic Area (Washington side). There are no known den sites. No grizzly bear Recovery Areas occur on the Forest or Scenic Area, nor are there any recovery goals for the area. Grizzly bears are not expected to occur in the project area for the duration of the project.

Gray Wolf (*Canis lupus*)

The gray wolf was extirpated from Washington in the 1930's. Wolves in Washington occur primarily near the border with Canada and Idaho, and are transient individuals. There have been some den and rendezvous sites detected in north-central Washington, but these have not persisted to form an established pack territory. It is expected that, as wolf populations in Idaho expand, wolves will disperse into Washington. Gray wolves are found as rare transient individuals on the Gifford Pinchot National Forest, based on present knowledge of this species status and distribution. Survey activity for gray wolves on the Forest has been infrequent and limited in scope.

In 2003, the FWS released a final rule to establish three distinct population segments (DPS) for gray wolves in the lower 48 states: Eastern, Western, and Southwestern (U.S. Fish and Wildlife Service, 2003). Wolves in Oregon and Washington are within the Western DPS and are listed as "endangered."

The gray wolf is native to most of North America, north of Mexico City. The drastic reduction in the distribution and abundance of wolves was directly related to extensive predator control, loss of habitat, and reduction or elimination of large herds of ungulates. An inadequate prey density and a high level of human persecution apparently are the factors that limit wolf distribution (Mech, 1995).

Life History

Wolves prey on a variety of large mammals, including elk, deer, bison, and livestock, and will eat carrion. Occasionally, small mammals, snowshoe hare, birds, large invertebrates, and even domestic pets may be taken. In 2002, a radio-collared female wolf wandered into northeastern Washington. While there she killed an elk, a deer, and fed on a moose carcass (Borysewicz, personal communication). Wolves are social animals and live in established packs. Packs are primarily family groups consisting of a breeding pair (i.e. "alpha male and alpha female"), their pups from current and previous years, and occasionally an unrelated wolf. Gray wolves give birth to pups in April or May.

Normally, only the alpha female in a pack will breed. Pups become very mobile by fall. Prior to pups becoming mobile, wolves are sensitive to disturbance in the vicinity of their den sites.

Gray wolves use very large ranges and may defend territories as large as 1,040 square kilometers (400 square miles) (U.S. Fish and Wildlife Service, 2003). Young wolves may disperse large distances from their natal pack's territory and dispersal movements of 800 km (500 miles) have been documented. Recently, solitary wolves from the Eastern DPS have been documented in Nebraska and Missouri (Missouri Department of Conservation, 2001).

Habitat Description

The gray wolf occupied almost any areas that supported sufficient populations of hoofed mammals (ungulates; like deer, elk, and moose). They were generally absent from arid deserts and high mountaintops. Virtually any area that has sufficient prey and adequate protection from human-caused mortality could be considered potential gray wolf habitat (U.S. Fish and Wildlife Service, 2003).

Threats

Some level of persecution continues today, as evidenced by the number of illegal shootings documented in the Western DPS. Sufficient regulatory mechanisms (primarily provided by ESA) have prevented the level of persecution from impacting wolf populations. Individual states are preparing to take over primary responsibility for wolf protection, through the development of wolf management plans, as wolf populations near recovery and removal from ESA protection.

It is anticipated that wolves will continue to prey on livestock and that removal or killing of problem wolves will occur in the future. Specific strategies for this action are contained in the various state wolf management plans. In the Western DPS, depredation control has resulted in the annual removal of less than six percent of the wolf population (Bangs, et al. 1995; U.S. Fish and Wildlife Service, et al., 2002). Since the status of the gray wolf has reverted back to "endangered," any killing of wolves in Oregon and Washington would be illegal and in violation of the ESA.

Action Area Information

There are no known den or rendezvous sites on the Gifford Pinchot National Forest. There are a few historic records of gray wolves on the Forest. Few surveys for wolves have been conducted in the most remote areas of the forest, like roadless areas and wilderness, so their absence on the forest cannot be definitively established. There is suitable habitat and ungulate prey on the forest, so naturally expanding populations of wolves from Idaho and Canada could inhabit more areas in Washington in the near future. It is expected that wolves would first colonize the northern and eastern portions of the State. For purposes of this analysis, it is assumed that some individual gray wolves could be present in remote areas on the northern part of the Gifford Pinchot National Forest. There are no records of wolves for the Columbia River Gorge National Scenic Area.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle ranges throughout much of North America, nesting on both coasts and north into Alaska, wintering as far south as Baja California. The largest breeding populations in the contiguous United States occur in the Pacific Northwest states, the Great Lake states, Chesapeake Bay and Florida. Oregon and Washington are important for wintering bald eagles in the conterminous United States. The Forest provides wintering habitat for migratory eagles as well as residents.

Life History and Habitat Description

Bald eagles are most common along coasts, major rivers, lakes and reservoirs (U.S. Fish and Wildlife Service, 1986), and require accessible prey and trees for suitable nesting and roosting habitat (Stalmaster, 1987). Food availability, such as aggregations of waterfowl or salmon runs, is a primary factor attracting bald eagles to wintering areas and influences the distribution of nests and territories (Stalmaster 1987). Bald eagles feed primarily on fish during the breeding season, and eat waterfowl, seabirds and carrion during the winter (U.S. Fish and Wildlife Service, 1995). On the Forest, salmon carcass placement of hatchery stock along river systems occurs within some drainages which attract foraging bald eagles.

Bald eagles usually nest in trees near water, but are known to nest on cliffs and (rarely) on the ground. Nest sites are usually in large trees along shorelines in relatively remote areas that are free of disturbance. The trees must be sturdy and open to support a nest that is often 5 feet wide and 3 feet deep. Adults tend to use the same breeding areas year after year, and often the same nest, though a breeding area may include one or more alternative nests (U.S. Fish and Wildlife Service, 1999).

Threats

Currently, mortality to bald eagles occurs from habitat loss, disturbance by humans, pesticide and mercury contamination, decreasing food supply, electrocution, impacts with wind turbines, and illegal shooting (U.S. Fish and Wildlife Service 1999, Welch, 1994). Human disturbance can flush eagles from a nest. Nesting can fail if disturbance is frequent (U.S. Fish and Wildlife Service, 1999).

A recent threat to bald eagles is mortality caused by a new disease, avian vacuolar myelinopathy (AVM) (U.S. Fish and Wildlife Service, 1999). AVM, first reported in 1994, has been the cause of death for at least 100 bald eagles (and 1,000's of American coots) at 11 sites from Texas to North Carolina.

A recent hypothesis implicates a type of cyanobacteria that grows on the invasive aquatic plant, *Hydrilla verticillata* (Wilde, 2005). The cyanobacteria are thought to produce a neurotoxin that is fatal to herbivorous birds and their avian predators. Mortalities caused by AVM can have localized impact on bald eagles but there is currently no evidence that the overall recovery of the population is affected (U.S. Fish and Wildlife Service, 1999).

Conservation Measures

Management guidelines published by the U.S. Fish and Wildlife Service (1981) recommend establishing primary and secondary zones around all known eagle nests and restricting activities that occur within those zones. The primary zone is, at a minimum, 330 feet around the nest site and should be managed to protect or maintain the nest site by prohibiting timber harvest, mining, road or residential development, drilling or other disturbances that might alter the habitat. The secondary zone includes the area 660 feet around the nest and is designed to protect or maintain the habitat within the primary zone and to reduce disturbance of eagles during the breeding season.

Wintering eagles can be found concentrated at as salmon spawning areas and waterfowl wintering areas. Wintering eagles can sometimes be found in large communal roosts during the winter. Isolation is an important feature of winter habitat and night roosts are usually in remote areas with less human disturbance. In Washington, 98 percent of wintering eagles tolerated human activity at a distance of 300 m (328 yards), but 50 percent tolerated activity within 150 m (164 yards) (Stalmaster and Newman 1978).

Action Area Information

The Gifford Pinchot National Forest and the Columbia River Gorge National Scenic Area (Washington side) provide wintering and nesting habitat to both resident and migratory eagles. Nesting eagles are sensitive to disturbance (U.S. Fish and Wildlife Service, 1986). The critical period in Washington when human activities could disturb occupied nest sites extends from January 1 until August 15 (U.S. Fish and Wildlife Service 2003, p. 9). Nest initiation, including courtship and nest building, occurs in January through March. Incubation occurs from March until late May, and young are in nests from early April through mid-August. Young usually remain in the nest area throughout August.

Wintering eagles on the Forest can be sensitive to disturbance from October 31 to March 31 (U.S. Fish and Wildlife Service 2003, p. 9). The Forest and Scenic Area utilize a winter limited operating periods near bald eagles from October 31 to March 15 (U.S. Fish and Wildlife Service, letter of concurrence dated Sept. 28, 2001).

Table 1 lists the disturbance distances for nesting and wintering eagles. If disturbance-causing activities occur farther away from nesting or roosting eagles than the distances specified in Table 1, then no adverse effect will occur.

Table 1. Disturbance distances for bald eagle within which adverse effects may occur, as specified by FWS office in Lacey, Washington.

Activity	Distance
Use of chainsaw and other motorized tools	0.25-mile no-line-of sight, or 0.50-mile line-of-sight
Use of heavy equipment	0.25-mile no-line-of sight, or 0.50-mile line-of-sight
Burning	1-mile

Two nests are known to occur on the GP; one at Swift Reservoir and one near Goose Lake (Wainwright, personal communication, 2005). There is one active nest outside of, but near, National Forest land on the Cowlitz Valley Ranger District. None of the nests or roosts on the GP are within 0.25 miles of any treatment sites. Five bald eagle locations are on the Washington side of the CRG. No known nest sites are within 0.25 mile of any treatment area. Future treatments could occur within 0.25 mile of eagle sites under the early detection / rapid response procedures.

Bald eagles are common winter residents along the main Cowlitz and Cispus Rivers, the Lewis River within two miles of the upper end of Swift Reservoir downstream to the Columbia River, and larger tributaries like Skate Creek, lower Lake Creek, and others on Cowlitz Valley Ranger District (Kogut, Wainwright, personal communication, 2005). Surveys conducted along the Lewis River during the winters of 1984-1985 and 1985-1986 by personnel from Pacific Power and Light and Washington Department of Fish and Wildlife documented a suspected winter roost site on the GP just west of Miller Creek (about 2 miles east of the upper end of Swift Reservoir). Within the CRG, bald eagle winter surveys of the lower 13 miles of the Klickitat River noted from 1 to 52 birds from 2003-2005.

Currently, there are no invasive plants on the Forest or Scenic Area adversely affecting bald eagles. If left untreated, Japanese knotweed and Himalayan blackberry have the potential to adversely affect fish habitat on the Forest, and could affect the quality of some foraging areas for bald eagles. There is no evidence to suggest this is happening at present.

Northern Spotted Owl (Strix occidentalis caurina)

The current range and distribution of the spotted owls extends from southern British Columbia through western Washington, Oregon, and California, as far south as Marin County (U.S. Fish and Wildlife Service, 1990b). More detailed descriptions of the spotted owl's status and conservation history, as well as the environmental baseline and critical habitat on the Forest can be found in the Programmatic Biological Assessment for the Gifford Pinchot National Forest's activities (U.S. Fish and Wildlife Service 2001), as well as the Biological Assessment and Opinion for the R6 2005 FEIS. This information is incorporated by reference.

Life History

The spotted owl is a relatively long-lived bird (average life span approximating 8 years) with a naturally low reproductive rate. Spotted owls do not reach sexual maturity until after 2 years; once an adult, females lay an average of 2 eggs per clutch (range 1-4 eggs). Nest sites are usually located within stands of old-growth and late-successional forest dominated by Douglas-fir, and consist of existing structures such as cavities, broken tree tops, or mistletoe (*Arceuthobium* spp.) brooms (Forsman et al. 1984, Blakesley et al., 1992, LaHaye and Gutierrez, 1999).

In general, courtship and nesting behavior begins in February to March with nesting occurring from March to June; however timing of nesting and fledging varies with latitude and elevation (Forsman et al., 1984). After the young fledge from the nest, they are still dependent on their parents until they are able to fly and hunt on their own. Parental care continues post-fledging into September (U.S. Fish and Wildlife Service, 1990b), and sometimes into October (Forsman et al., 1984). During this time the adults may not roost with the young during the day, but they will respond to begging vocalizations by bringing food to the young (Forsman et al., 1984).

The spotted owl's primary prey items vary geographically and by forest type. Generally, northern flying squirrels (*Glaucomys sabrinus*) and red tree voles (*Arborimus longicaudus*) are the more prominent prey in Douglas-fir and western hemlock forests (Forsman et al. 1984). Depending on location, other prey species (i.e., mice, birds, and insects) also comprise a small portion of the spotted owl diet (Forsman et al., 1984).

Habitat Description

Spotted owls rely on older forested habitats because they contain the structures and characteristics required for nesting, roosting, foraging, and dispersal. These characteristics include the following: a multilayered, multi-species canopy dominated by large overstory trees; moderate to high canopy closure; a high incidence of trees with large cavities and other types of deformities; numerous large snags; an abundance of large, dead wood on the ground; and open space within and below the upper canopy for owls to fly (Thomas et al., 1990; U.S. Fish and Wildlife Service, 1990a). Forested stands with high canopy closure also provide thermal cover as well as protection from predation. In some ecotypes, recent landscape-level analyses suggest that a mosaic of late-successional habitat interspersed with other vegetation types may benefit spotted owls more than large, homogeneous expanses of older forests (Franklin et al., 2000, Meyer et al., 1998).

Threats

The northern spotted owl was listed as threatened throughout its range "due to loss and adverse modification of suitable habitat as a result of timber harvesting and exacerbated by catastrophic events such as fire, volcanic eruption, and wind storms" (U.S. Fish and Wildlife Service, 1990b).

The draft recovery plan for the northern spotted owl (U.S. Fish and Wildlife Service, 1992b) identified significant threats to the owl by physiographic province. These threats are summarized as follows: low populations, overall population decline, limited habitat, declining habitat, distribution of habitat or populations, isolation of provinces, predation and competition, lack of coordinated conservation measures, and vulnerability to natural disturbance.

Since listing of the northern spotted owl, new information suggests that hybridization with the barred owl (*Strix varia*) is less of a threat (Kelly and Forsman, 2004) and competition with the barred owl is a greater threat than previously anticipated (Courtney et al., 2004). Barred owls apparently compete with spotted owls through a variety of mechanisms: prey overlap (Hamer et al., 2001); habitat overlap (Hamer et al., 1989, Dunbar et al., 1991, Herter and Hicks, 2000, Pearson and Livezey, 2003); and agonistic encounters (Leskiw and Gutiérrez 1998, Pearson and Livezey, 2003).

West Nile virus (WNV) has been identified as a potential threat of unknown magnitude to the northern spotted owl (Courtney et al., 2004).

Critical Habitat

Critical habitat for the spotted owl was designated on January 15, 1992 (U.S. Fish and Wildlife Service, 1992a). Primary constituent elements for owl critical habitat consist of habitat features that support nesting, roosting, foraging, and dispersal.

The attributes of nesting and roosting habitat include moderate to high canopy closure (60 to 80 percent); a multi-layered, multi-species canopy with large (>30 inches dbh) overstory trees; a high incidence of large trees with various deformities; large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly (Thomas et al. 1990).

Foraging habitat varies across the range of the owl and contains attributes similar to nesting and roosting habitat, but may also include more open fragmented habitat. Dispersal habitat consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities.

Action Area Information

The early nesting season for the northern spotted owl on the National Forest and Scenic Area has been identified as the period from March 1 through July 15. The early nesting season is when egg-laying, incubation, hatching, feeding of nestlings, and fledging occurs, and active nest sites could be affected by disturbance.

Spotted owls are somewhat sensitive to disturbance caused noisy machinery during certain times of the year. If sound-generating activities occur within close proximity to a nest or unsurveyed suitable habitat during the early breeding season (March 1 to July 15), spotted owls may be disturbed by the sound, potentially causing missed feedings or the adults to flush, leaving young susceptible to predation and weather (U.S. Fish and Wildlife Service 2003, p. 129). After July 15, spotted owlets are no longer completely dependent upon the adults and are able to thermo-regulate, fly, and forage on their own, reducing their susceptibility to disturbance-related effects.

The Gifford Pinchot National Forest utilizes a Limited Operating Period restriction of no noise-producing activities above ambient levels between March 1 and June 30, near spotted owl nests or activity centers (U.S. Fish and Wildlife Service 2001). Table 2 lists the disturbance distances for nesting spotted owls. If disturbance-causing activities occur farther away from nesting spotted owls than the distances specified in Table 2, then no adverse effect will occur.

Table 2. Disturbance distances for spotted owls within which adverse effects may occur, as specified by FWS office in Lacey, Washington.

Activity	Distance ¹
Use of chainsaw and other motorized tools	65 yards
Use of heavy equipment	35 yards

¹ U.S. Fish and Wildlife Service. 2003. Estimates of distances at which incidental take of murrelets and spotted owls due to harassment are anticipated from sound-generating, forest-management activities in Olympic National Forest. Unpublished report prepared by Kent Livezey, Western Washington Fish and Wildlife Office, Lacey, WA. 20 pp.

Spotted owls may detect and become alerted by sounds without any adverse effects occurring. Louder sounds can cause a spotted owl to flush from a nest or miss feeding a chick, which would be considered an “injury” (U.S. Fish and Wildlife Service 2003). Sound-only injury distances for activities that would cause disturbance to the northern spotted owl are those at 92 decibels (dB) and above (U.S. Fish and Wildlife Service 2003). The estimated ambient noise levels for a forest setting are at 40 dB (U.S. Fish and Wildlife Service 2003). Hamer and Nelson (1998) measured mean decibel (dB) levels of some equipment in a forested environment at a distance of 25 m. They reported mean decibel levels of 58 dB for automobiles, 67 dB for trucks, and 72 dB for chainsaws. U.S. Fish and Wildlife Service (2003) reported higher dB levels for chainsaws used in timber harvest. The maximum 1-minute reading for the largest chainsaw (Stihl 38) was 90.8 dB, with a peak reading of 104.2 dB.

Some equipment used to treat invasive plants could create noise above ambient levels, depending upon site-specific conditions. Engines used to pump herbicide and other liquids through nozzles for roadside spraying operations, normally in the back of a pick up truck, may generate noise levels that could disturb spotted owls. Because noise levels of this type of equipment were not known, two diesel pump engines used for roadside spraying and mounted in the back of running pick-up trucks were evaluated for noise level. Two separate readings of different pump engines using different decibel meters produced readings of 72-75 decibels within 10 yards, dropping to 64-67 decibels at 35 yards (observations in the project file). The threshold for a noticeable noise is 70 decibels and the threshold for disturbance causing “injury” or “harassment” is 92 decibels (U.S. Fish and Wildlife Service 2003). No measurements exceeded 92 dB. County Weed Coordinators also reported that the noise of diesel pump engines measured for this analysis was greater than the noise of gasoline-powered pump engines used by some operators (D Sherwin, pers. comm. 2005, D. Durfey, pers. comm. 2005). The gasoline-powered pump engines will be quieter than the diesel pump engines that we measured.

There are 20,112 acres of spotted owl suitable habitat (nesting, roosting, and foraging) and dispersal habitat within 65 yards of proposed weed treatment sites on the Gifford Pinchot National Forest. All suitable habitat that does not have current surveys completed to protocol is considered occupied. Applicable project design features are therefore implemented for un-surveyed habitat. On the Columbia River Gorge National Scenic Area (Washington side), there are about 277 acres of suitable spotted owl habitat within 65 yards of proposed treatment areas.

Designated critical habitat for the northern spotted owl occurs on the Gifford Pinchot National Forest and a small amount occurs on the Washington side of the Columbia River Gorge National Scenic Area. Table 4 lists total designated critical habitat for the northern spotted owl on each unit, and the acres of critical habitat located within proposed treatment areas.

Table 3. Designated critical habitat for the northern spotted owl on the Gifford Pinchot National Forest and the Washington side of the Columbia River Gorge National Scenic Area.

Administrative Unit	Total Critical Habitat (acres)	Critical Habitat within Proposed Treatment Areas (acres)
Gifford Pinchot NF	581,025	16,655
Columbia River Gorge NSA	4,211	0

No invasive plant species on the Forest or Scenic Area currently adversely affect spotted owls or their habitat.

Marbled Murrelet (*Brachyramphus marmoratus*)

The murrelet ranges from the Aleutian Archipelago to central California. The distribution of murrelets becomes more disjunct at the southern extreme of their range. In Washington, Oregon, and California, there are distinct gaps between breeding populations that are thought to relate to availability of onshore nesting habitat. Murrelets are generally found in near-shore ocean waters but come inland to nest.

Murrelet nests are not evenly distributed between the coast and the inland extremes of their range, but are observed most often within about 12 miles of the ocean. However, their inland nesting distribution is not fully known because survey effort has been inconsistently distributed, especially in areas greater than 40 miles from the coast. In marine environments, there are also distinct gaps between breeding populations that are thought to relate to availability of onshore nesting habitat. It is believed that marine productivity is high along most of this coast during the breeding season which suggests foraging habitat is not limiting.

Life History and Habitat Description

The murrelet is a small robin-sized seabird of the family Alcidae in the order Charadriiformes. These small, fast flying seabirds are unique among North American alcids in their use of coastal coniferous forest, primarily late-successional trees as nesting habitat. Nesting season occurs from late March to September. Their solitary nests are usually concealed within the forest canopy and breeding birds are cryptic and primarily crepuscular at nest sites. Egg laying, incubation, and hatching occur before August 5, and feeding of young occurs from August 6 to September 15 (Hamer and Nelson, 1995). Marbled murrelets have a life history strategy unique among seabirds. Although they feed on fish and invertebrates primarily in nearshore marine waters, they nest as far as 50 miles inland from the marine environment, on large limbs of mature conifers. Marbled murrelets are mostly pelagic during the winter.

Unlike most auks, murrelets nest solitarily on mossy platforms of large branches in old-forest trees (Lank et al., 2003). Suitable habitat for murrelets may include contiguous forested areas with conditions that contain potential nesting structure.

These forests are generally characterized by large trees greater than 18 inches diameter at breast height (dbh), multistoried canopies with moderate closure, sufficient limb size and substrate (moss, duff, etc.) to support nest cups, flight accessibility, and protective cover from ambient conditions and potential avian predators (Manley, 1999; Burger, 2002; and Nelson and Wilson, 2002). Over 95 percent of measured nest limbs were ≥ 15 cm diameter, with limb diameter ranges from 7-74 cm diameter (Burger, 2002).

Threats

The Marbled Murrelet Recovery Plan (U.S. Fish and Wildlife Service, 1997) identified the primary threats to the species: (1) predation; (2) loss of nesting habitat; (3) by-catch in gill-nets, and; (4) oil pollution both chronic and from major spills. More recently, McShane et al. (2004), has concluded all threats are still present although loss of nesting habitat, particularly on Federal lands, has declined. New information indicates that predation poses a high threat level due to its affect on limiting murrelet nest success (Hebert and Golightly, 2003, Peery et al. in prep., Luginbuhl et al., 2001).

Critical Habitat

The FWS designated critical habitat for the marbled murrelet in 1996 (U.S. Fish and Wildlife Service, 1996). Coastal forests in Washington, Oregon, and northern California contain designated critical habitat. Critical habitat consists of suitable nesting habitat and does not include foraging habitat in marine areas. The FWS determined that marine foraging habitats did not need additional management consideration or protection.

The primary constituent elements of murrelet critical habitat include: 1) individual trees with potential nesting platforms, and 2) forested areas within 0.5 miles (0.8 kilometers) of individual trees with potential nesting platforms and with a canopy height of at least one-half the site-potential tree height (U.S. Fish and Wildlife Service, 1996). Individual nest trees are usually large trees, generally more than 32 inches (81 centimeters) dbh, with large branches or deformities that can serve as nest platforms. Forested areas around nest trees provide more suitable microclimate and protect nest trees from windthrow.

Designated critical habitat included most of the Late Successional Reserves (LSR) described in the Northwest Forest Plan (federal); State lands in southwestern Washington, northwestern Oregon, and California south of Cape Mendocino; as well as private lands. No tribal lands were included in the critical habitat designation. FWS designated a total of about 3.8 million acres in 32 critical habitat units. Twenty-two of the critical habitat units contain some State, county, city, or private lands. Federal land in the three states accounts for just over 3 million acres of critical habitat.

Action Area Information

Marbled murrelets do not occur on the CRG, but they do occur on the GP. The marbled murrelet recovery plan (U.S. Fish and Wildlife Service, 1997) identified six recovery zones for the marbled murrelet. The GP is included in Zones 1 and 2. There are currently no invasive plant species on the GP adversely affecting marbled murrelets or their habitat.

A Programmatic Wildlife Letter of Concurrence for the Forest (U.S. Fish and Wildlife Service 2001) identified limited operating period near marbled murrelet nests between April 1 and August 5 within the distances listed below in Table 4. If disturbance-causing activities occur farther away from nesting marbled murrelets than the distances specified in Table 4, then no adverse effect will occur.

All activities that generate noise above 92 dB must be scheduled between 2 hours after sunrise and 2 hours before sunset during the murrelet nesting season (April 1 to September 15).

Table 4. Disturbance distances for marbled murrelets within which adverse effects may occur, as specified by FWS office in Lacey, Washington.

Activity	Distance ¹
Use of chainsaw or motorized equipment	45 yards
Use of heavy equipment	35 yards
Burning	0.25 miles

¹ U.S. Fish and Wildlife Service. 2003. Appendix 1: Estimates of distances at which incidental take of murrelets and spotted owls due to harassment are anticipated from sound-generating, forest-management activities in Olympic National Forest. Unpublished report prepared by Kent Livezey, Western Washington Fish and Wildlife Office, Lacey, WA. 20 pp.

Marbled murrelets may detect and become alerted by sounds without any adverse effects occurring. Louder sounds can cause a marbled murrelet to flush from a nest or miss feeding a chick, which would be considered an “injury” (U.S. Fish and Wildlife Service 2003). Sound-only injury distances for activities that would cause disturbance to the marbled murrelet are those at 92dB and above (U.S. Fish and Wildlife Service 2003). The estimated ambient noise levels for a forest setting are at 40 dB. Hamer and Nelson (1998) measured mean decibel levels of some equipment in a forested environment at a distance of 25 m. They reported mean decibel levels of 58 dB for automobiles, 67 dB for trucks, and 72 dB for chainsaws. U.S. Fish and Wildlife Service (2003) reported higher dB levels for chainsaws used in timber harvest. The maximum 1-minute reading for the largest chainsaw (Stihl 38) was 90.8 dB, with a peak reading of 104.2 dB. Therefore, some equipment used to treat invasive weeds could exceed the 92 dB level for injury disturbance to the marbled murrelet.

Decibel readings from engines used for roadside boom spraying were measured, as discussed previously in the Northern Spotted Owl discussion. Roadside spraying equipment produced readings of 72-75 decibels within 10 yards, dropping to 64-67 decibels at 35 yards (observations in the project file). No measurements exceeded 92 dB.

No treatment areas that propose noisy mechanical methods, such as mowing or chainsaw use, are located anywhere near marbled murrelet habitat. There are two treatment sites that propose mechanical methods (mowing) and they are located at the far southern end of the forest. All murrelet habitat that is within a treatment area is located on the far northern end of the forest (GIS query).

Marbled murrelets have been documented in the Mineral Block area of the Gifford Pinchot National Forest. This includes invasive plant treatment area 35-13. One other location has been confirmed (using radar): the southern boundary of Mount Rainier National Park (treatment area 35-17).

Designated critical habitat for the marbled murrelet occurs on the Gifford Pinchot National Forest. There are 613 acres of designated critical habitat within proposed treatment areas. There is no critical habitat on the Columbia River Gorge National Scenic Area (Washington side).

There are currently no invasive plant species on the Forest adversely affecting marbled murrelets or their habitat.

Survey and Manage Species

In 1994, the U.S. Department of the Interior, Bureau of Land Management (BLM) and the USDA Forest Service adopted standards and guidelines for the management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl, commonly known as the Northwest Forest Plan (USDA Forest Service and USDI BLM, 1994). Mitigation measures were included for the management of known sites, site-specific pre-habitat disturbance surveys, and/or landscape scale surveys for about 400 rare and/or isolated species. These are species that, either because of genuine rarity or because of a lack of information, the Agencies did not know whether they would adequately be protected by other elements of the Northwest Forest Plan. This decision was amended in January 2001 by the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA Forest Service and USDI BLM, 2001). The standard and guidelines for these mitigation measures are known as Survey and Manage. The 2004 Record of Decision to Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines removed the standards and guidelines, and moved some survey and manage species onto the Region's Special Status/Sensitive Species Program (USDA Forest Service and USDI BLM, 2004).

On January 9, 2006, Judge Pechman signed an Order on Plaintiffs' Motion for Injunctive Relief (Northwest Ecosystem Alliance et al. v. Mark E. Rey et al., No. 04-844P) that:

1. "The Record of Decision dated March 22, 2004, entitled "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" (the "2004 ROD") is hereby set aside, and Defendants shall not rely on it or implement it."
2. "The Record of Decision dated January 2001, entitled "Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines" (the "2001 ROD") is hereby reinstated, including any amendments or modifications to the 2001 ROD that were in effect as of March 21, 2004." [e.g., including results of the 2001, 2002, and 2003 Annual Species Reviews (ASR)].
3. "Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2001 ROD applied unless such activities are in compliance with the provisions of the 2001 [sic] ROD (as the 2001 ROD was amended or modified as of March 21, 2004)."

"No project or activity enjoined under this Order may occur unless and until this Court modifies or vacates this Order." [or the agencies bring the activities into compliance with the 2001 ROD].

Species that were covered under Survey and Manage as of March 21, 2004 (prior to the 2004 ROD) are once again included in the Survey and Manage program. The inclusion of some of these species in the Region's Sensitive Species Program remains in effect. For the Gifford Pinchot National Forest and Washington side of the Columbia River Gorge National Scenic Area, all the mollusks and salamanders that are included in the Survey and Manage program are also included in the Sensitive Species Program and are discussed below.

Regional Forester's Sensitive Wildlife Species

The Sensitive Species Program and the Regional Forester's Sensitive Species List are proactive approaches for meeting the Agencies obligations under the Endangered Species Act and the National Forest Management Act (NFMA), and National Policy direction as stated in the 2670 section of the Forest Service Manual and the U.S. Department of Agriculture Regulation 9500-4. The primary objectives of the Sensitive Species program are to ensure species viability throughout their geographic ranges and to preclude trends toward endangerment that would result in a need for federal listing. Species identified by the FWS as "candidates" for listing under the ESA, and meeting the Forest Service criteria for protection, are included on the Regional Forester's Sensitive Species Lists; the mardon skipper meets this criteria.

Of the species included on the Regional Forester's Sensitive Species List, the Gifford Pinchot National Forest does not contain suitable habitat for the green-tailed towhee and there have been no confirmed sightings. It will be recommended for removal from the list for the Gifford Pinchot National Forest at the next update (Kogut and Wainwright, pers. comm.). It does not occur on the Columbia River Gorge National Scenic Area (Washington side).

Although the type location is located on the Gifford Pinchot National Forest, the panther jumping slug has never been relocated on either unit, despite extensive mollusk surveys, and there is considerable doubt that it is a valid taxon. It will not be discussed further in this analysis.

The Oregon slender salamander has been documented on the Oregon side of the Columbia River Gorge National Scenic Area, which is not in the action area for this analysis, and does not occur on the Gifford Pinchot National Forest, so it will not be discussed further.

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

The Townsend's big-eared bat is a large bat with unusually long ears. This bat occurs from southern British Columbia and the western U.S. to southeastern U.S. and southern Mexico. Townsend's big-eared bats inhabit a wide variety of habitats from old-growth forests to extreme desert. It roosts in buildings, caves, mines, rock crevices, and bridges. One young is born from April to July (Maser et al. 1981). This bat feeds primarily on moths, but will also eat beetles, true bugs, and flies. It captures prey in flight or by gleaning from foliage (Csuti et al. 1997). Big-eared bats hibernate in winter and are not known to migrate long distances. These bats are very intolerant of human disturbance at either winter hibernacula or summer roosts (Csuti et al. 1997). Significant declines in total number of animals and average colony size have been documented. Pierson (1988) found one-third of historic roost sites no longer being used.

Action Area Information

Townsend's big-eared bat is known to have roosts on bridges or in lava tubes on the Gifford Pinchot National Forest. It is not reported from the Columbia River Gorge National Scenic Area. No known locations are within proposed treatment areas.

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

Pacific fringe-tailed bat (a.k.a. fringed myotis) is found throughout western North America. In Oregon it occurs along the coast range, Willamette Valley, southern Cascades, and Blue Mountains. Found in a variety of habitats, the fringe-tailed bat seems to prefer forested or riparian areas (Csuti et al. 1997).

In Washington, fringe-tailed bats can be found in interior sagebrush/grassland habitats, but it is apparently absent from the Olympic peninsula (O'Farrell and Studier 1980). It is considered to have a patchy distribution and is rare in the Pacific Northwest. One young is born in late June to mid-July. Maternity colonies may number several hundred individuals. Roosts include caves, mines, rock crevices, tree cavities, conifer snags, bridges, and buildings (Cross and Waldien 1995). Fringe-tailed bats migrate between summer and winter roosts, but little is known about the type or locations of winter roosts (O'Farrell and Studier 1980). They eat beetles, moths, crickets, and other insects captured in flight or by gleaning from a surface.

Action Area Information

The Pacific fringe-tailed bat has not been documented to occur on the Gifford Pinchot National Forest, but is documented with one sighting in the Columbia River Gorge National Scenic Area (Washington side). No proposed treatment areas are within the subwatershed where the bat was sighted.

California wolverine (*Gulo gulo*)

In California, and southern Oregon and throughout the Cascades, the wolverine inhabits alpine, boreal forest and mixed vegetation (Grinnell et al. 1937; Schempf and White 1977). Wolverines inhabit dense coniferous forests and uses open sub-alpine forests up to and beyond timberline. They are associated with rocky outcrops, steep mountainous areas and transition zones between primary cover types. Forested riparian zones at upper elevations are likely to be important forage habitats for these furbearers and provide relatively safe travel corridors that allow for animals to move within and between watersheds. Prey items include small and medium-sized mammals, birds and their eggs, insects, fish, roots, berries, and carrion. Wolverines are known to regularly avoid human generated disturbance, and are sensitive to any disturbance; they will move natal den-sites several miles if disturbance is in the area of their den.

Action Area Information

There are historical sighting records of wolverines on the Gifford Pinchot National Forest. Two unconfirmed sightings were reported a few years ago. Most sightings are from wilderness, or more remote, high-elevation areas near Mount Rainier. There are no known den sites on the forest. No formal surveys for wolverine have been conducted on the Gifford Pinchot National Forest. Within the Columbia River Gorge National Scenic Area (Washington side), one juvenile male wolverine was found dead alongside Interstate 84 (Oregon), near Starvation Creek in January 1990. No other animals have been documented to occur with the Scenic Area in the last three decades.

Western Gray Squirrel (*Sciurus griseus*)

The western gray squirrel is found from central Washington south through western Oregon and into California. Western gray squirrels prefer broad-leafed woodlands, including riparian areas and mixed conifer forest types. They occur primarily at lower elevations and produce a single litter of two or three young from February to May (Csuti et al. 1997). These squirrels eat a variety of vegetable matter, fungi, and insects. Acorns, conifer seeds, and fungi appear to be primary foods. They cache their food for the winter. Western gray squirrels remain active throughout the year and build large stick nests high in trees. Competition with eastern gray squirrels and fox squirrels and loss of oak woodlands has contributed to its decline.

Action Area Information

No sightings of western gray squirrels have been documented on the Gifford Pinchot National Forest, and suitable habitat (oaks) is limited, occurring in the extreme southeastern portion of the Forest. Western gray squirrels are documented to occur within the Columbia River Gorge National Scenic Area (on both sides). Proposed treatment areas on the Washington side may be adjacent to suitable oak woodland habitat, but are not located within suitable habitat.

Common Loon (*Gavia immer*)

The common loon breeds predominantly north of the Canadian border. In Washington, there were 16 confirmed breeding locations in the late 1980's, but none south of the Seattle area (King County) (Merrifield 2003).

In western North America it winters primarily along marine coasts, but does occasionally winter in fresh water down the Pacific states as far south as northern Baja California (Merrifield 2003). This species can be found wintering, and occasionally throughout the year, on the Columbia River from the coast upstream to Umatilla County, Oregon. It can be found at large freshwater lakes during migration. Spring migration for inland Washington likely peaks in April, while fall migration appears to peak in mid November (Merrifield 2003).

Loons feed primarily on small fish, but also eat crustaceans (including crayfish), amphibians, insects, and mollusks (Merrifield 2003). Loons are easily disturbed by humans.

Action Area Information

Common loons are reported occasionally during migration at Packwood Lake. There are no nesting records for the Gifford Pinchot National Forest or Columbia River Gorge National Scenic Area. Loons are documented to occur on the Columbia River within the Scenic Area, primarily during the winter, but occasional year-round sightings occur.

Clark's grebe (*Aechmophorus clarkia*)

The Clark's grebe is a relatively new species derived from a taxonomic splitting of the western grebe in 1985. The Clark's grebe is found on the Pacific Ocean, or large inland lakes. It feeds by diving for fish, mollusks, crabs, and salamanders. Breeding takes place from southern provinces in Canada south to the southwestern U.S., including eastern Washington, but distribution is spotty. It winters along the Pacific coast and is more common from central California south to southern Baja California (Spencer 2003a). The species is listed as sensitive because of population loss caused by the loss of lakes and ponds. Wetland habitat loss has been suggested as the primary cause of population decline in the Pacific Northwest. It breeds on large lakes with cattails (*Typha* spp.) or rushes (*Juncus* spp.). At the present time, it is unknown how invasive plants may affect the Clark's grebe.

Action Area Information

The Clark's grebe winters along the Columbia River within the Columbia River Gorge National Scenic Area. It is not found on the Gifford Pinchot National Forest.

Horned grebe (*Podiceps auritus*)

Horned grebes are found throughout the holarctic region. In North America, horned grebes breed from Alaska and northern Yukon south to eastern Oregon and Idaho and from New Brunswick south to South Dakota, Nebraska, and Wisconsin (Spencer 2003b). The horned grebe is a species whose population has been slowly declining in North America due loss of its wetland habitat (Kaufman 1996).

Horned grebes require lakes and marsh areas for nesting and resting habitat. It breeds in marshes and lakes in the eastern portions of Washington and Oregon. Invasive plants, particularly purple loosestrife and reed canary grass have adversely affected wetland habitat in the Region.

Action Area Information

The horned grebe is a sensitive species only for the National Forests in Oregon. It is a common winter resident along the Columbia River within the Columbia River Gorge National Scenic Area.

Red-necked grebe (*Podiceps grisegena*)

The red-necked grebe is found throughout a large part of the northern hemisphere. In North America, it breeds from central Alaska south to eastern Oregon and Idaho. It formerly bred south to northern Utah in the west and southern New England in the east (Spencer 2003c). There is one consistent breeding population in Oregon, at Upper Klamath Lake National Wildlife Refuge (Spencer 2003c). It is also a rare breeding on lakes in eastern Washington. Red-necked grebes are more abundant along the coast in winter.

The adult's diet is composed of small fish, aquatic and terrestrial insects and their larvae, tadpoles, salamanders, crustaceans, mollusks, and aquatic worms (Spencer 2003c).

Action Area Information

The red-necked grebe is a sensitive species only for the National Forests in Oregon. Red-necked grebe is a very rare winter migrant on the Columbia River.

Eared grebe (*Podiceps nigricollis*)

The eared grebe is possibly the most abundant grebe in the world (Spencer 2003d). It breeds widely in western North America except for western Washington and Oregon and northwestern California (Spencer 2003d). This grebe does breed in eastern Oregon and Washington on lakes and reservoirs with rushes/cattails. Eared grebes use wetlands for their open water and submerged vegetation. Open water is also important for predator defense, and for flight.

Eared grebes are largely insectivorous, feeding on beetles, flies, ants, wasps, centipedes, spiders, moth and butterfly pupae, aquatic insects, as well as consuming a few fish.

Action Area Information

The eared grebe is a documented (uncommon) winter resident of Columbia River Gorge National Scenic Area.

Ferruginous Hawk (*Buteo regalis*)

The Ferruginous hawk is a bird of prey that uses open grass and shrubland for nesting, and will migrate south in the fall. They prefer uncultivated pasture on the prairies and arid grasslands of western North America. Ferruginous hawks eat mostly ground squirrels of multiple species, and as such, can be potentially exposed to habitat loss through direct loss of nesting habitat, as well as loss of forage species. They can be affected by invasive species when those species alter the plant composition of native nesting and foraging habitat.

Action Area Information

There is no suitable habitat for ferruginous hawks on the Gifford Pinchot National Forest, and there are no known nest sites. Ferruginous hawks do not occur on the forest to any significant degree.

Individuals may fly over the forest during migration or from suitable habitat outside the forest. It is suspected to occur on the Columbia River Gorge National Scenic Area.

American Peregrine Falcon (*Falco peregrinus anatum*)

Peregrine falcons are crow/raven-sized raptors that inhabit cliffs located within approximately 0.5 mile of riparian habitat. Peregrines nest on ledges clear of rock rubble, located approximately 40 - 80 percent of total cliff height. Peregrines are aerial predators who feed mostly on birds. Much of the prey consists of species the size of pigeons and doves; however avian prey ranges in size from hummingbirds to Aleutian Canada geese (Pagel, unpub. data).

Peregrines lay 2-4 eggs in March-May, and commence incubation after the clutch is complete. Eggshell thinning induced by the metabolite of DDT (DDE), affected populations in the Pacific Northwest and elsewhere, and residual levels of DDE continue to affect the reproductive success of peregrines. Reproductive failure at peregrine nests has been chronic in northern CA and OR at all nest sites since at least 1983 due to eggshell thinning.

Eggs hatch after an incubation period of 31-33 days. Fledging occurs when the young are between 37 and 45 days of age (56 days at the upper end). Juveniles continue to be fed and protected by the adults until they disperse, which can range from 3 weeks to 3 months (Davis unpub. data, Pagel unpub. data).

Adults (or subadults in some instances) at lower and medium elevation nest sites occupy the nesting territory for the remainder of the year until the next nesting season commences at the winter solstice. In extreme instances, the adult(s) temporarily abandon the territory due to cold temperatures and/or significant reduction of availability of avian prey. During this period, the peregrines will travel to coastal, or central valley areas of CA, OR, and WA (Pagel unpub. data).

Peregrine falcons can be disturbed by human activity during the nesting season (Pagel unpub.data). Disturbance can cause: nest sites and new territories to be abandoned; active nesting attempts to fail due to egg breakage; or divert adult attention from opportunities to forage and feed eyases (Pagel unpub. data). Invasive plants do not directly affect peregrine falcons. Peregrine falcons in the Pacific Northwest are most affected by bioaccumulation of contaminants, and direct disturbance to their nesting at known or suspected nest sites; both which have caused numerous nesting failures during the previous 20 years of observation (Pagel unpub. data).

Action Area Information

Peregrine falcons have nested on the Gifford Pinchot National Forest in the past, but there are no recent nesting records. A pair was observed in the spring of 2005 flying over the Mount St. Helens National Volcanic Monument headquarters office in Amboy. The office is about 6 miles west the National Forest, so if a nest occurs in the vicinity of this area, it is likely located on private land.

This species has been sighted on the northern end of the forest occasionally and could be nesting where appropriate cliffs are present, as few recent surveys have been conducted. As of 2005, there were three known nest sites on the Washington side of the CRG, with several more sites that were historically occupied in the last decade. There are no treatment areas within 1.5 miles of known nest sites.

Great Gray Owl (*Strix nebulosa*)

The great gray owl is found throughout boreal North America and Eurasia, and ranges southward into montane and subalpine forests in western North America. They breed in spring and summer, with local and annual variation in timing influenced by snow pack and prey abundance. Fledglings leave the nest between three and four weeks of age, but before they can fly. Male owls will continue to feed the young for up to three months after the young leave the nest (Bull and Henjum 1990). The primary prey items for great gray owls in Oregon and Washington are pocket gophers (*Thomomys* spp.) and voles (*Microtus* spp. and *Clethrionomys* sp.). Suitable habitat consists of forest cover for roosting and large diameter trees for nesting in proximity to more open habitat with a grass/forb understory that provides habitat for prey (Great Gray Owl Survey Protocol 2004). Openings and meadows can be natural or man-made (e.g. clear cuts).

Action Area Information

Great gray owl does not occur on the Columbia River Gorge National Scenic Area. There are no confirmed nesting records of great gray owl on the Gifford Pinchot National Forest, but no surveys to protocol standards have been conducted and suitable habitat is present on the forest (Kogut, personal communication, 2005.; Wainwright, personal communication). Wintering owls could show up in suitable habitat as well. The Gifford Pinchot National Forest has a GIS map layer of suitable nesting and opening (foraging) habitat for great gray owls. Eight treatment areas include suitable nesting and opening habitat, as listed below in Table 6.

Table 6. Treatment areas containing mapped suitable habitat for the great gray owl on the Gifford Pinchot National Forest.

Treatment Area	Site Description	Great Gray Owl Habitat Type	Acres of Habitat w/in Treatment Area
33-04	RoadPlus	Nesting	22.7
		Opening	1.4
33-05	RoadPlus	Nesting	32.1
		Opening	4.1
33-05a	RoadPlus	Nesting	5.2
		Opening	4.1
33-05m3	Meadow	Nesting	8.8
		Opening	15.7
33-05r1	Campground	Nesting	1.7
33-05r3	Parking Area	Nesting	0.2
		Opening	0.1
33-11a	RoadPlus	Nesting	0.9
33-12a	RoadPlus	Nesting	1.6
		Opening	1.8
Total			100.4

Gray flycatcher (*Empidonax wrightii*)

Gray flycatchers are uncommon in most of the Region but may be fairly common in specific locations (Marshall et al. 2003). They are locally fairly common in dry habitats in other areas of the western United States. In northern Washington the habitat used by gray flycatchers is fairly specific. Dry open ponderosa pine stands with extensive bitterbrush and bunchgrasses understory. Tree size ranges from small (6" diameter breast height) to large (40" diameter breast height) (Woodruff, pers. com.). In central Oregon, they are commonly found in juniper, sage, and bunchgrass habitat. The common factor seems to be scattered vertical structure of evergreen trees over an extensive shrub and grass understory (savannah). They are migratory and spend winters in Arizona and Mexico, leaving breeding grounds by the end of September (Csuti et al. 1997). Gray flycatchers take insects on the wing and by foraging on the ground.

Breeding birds have been found at Conboy Lake National Wildlife Refuge southeast of the Gifford Pinchot National Forest.

Action Area Information

Surveys of appropriate habitat on the Gifford Pinchot National Forest have failed to document gray flycatchers on the forest (Flick, personal communication). They do not occur on the Columbia River Gorge National Scenic Area.

Ash-throated flycatcher (*Myiarchus cinerascens*)

The ash-throated flycatcher is designated as a sensitive species on National Forest's in Washington. They occur in oak, juniper, and riparian woodlands of the western US. Oregon is near the northern edge of their distribution (Csuti et al. 1997). Unlike other flycatchers, this species is usually a cavity nester. They fly out from a perch to catch flying insects on the wing, may glean some insects from vegetation, and may also eat some berries. They are migratory and spend winters in Mexico and Central America.

Action Area Information

Within Washington, ash-throated flycatchers breed on the Columbia River Gorge at Major Creek, Catherine Creek, Klickitat River corridor, and Burdoin Mountain (Flick, personal communication). Treatment areas overlap nesting habitat within the Klickitat River corridor, as well as portions of Catherine Creek. They do not occur on the Gifford Pinchot National Forest.

Oregon Slender Salamander (*Batrochoseps wrightii*)

The Oregon slender salamander is found in moist Douglas fir, maple, and red cedar forests up to 3000 feet. It is found along the Columbia River in Hood River and Multnomah counties, south to the west slope of the Cascades into Lane County. It lays a string of about 10 eggs in June under bark of rotting logs; hatching occurs in October. It lives primarily under bark and moss in mature and second growth Douglas fir forests, and under rocks or logs of moist hardwood forests within coniferous forest landscapes. To date, little is known about its ecology; however it appears to be found near surface during fall and spring but retreats underground in late spring and summer (Petranka 1988). Hot prescribed fire or wildfires could eliminate bark piles and advanced decay logs; "cool" burns may reduce leaf litter and some bark piles, but overall would not consume bark piles and advanced decay logs being utilized by this species.

Action Area Information

The Oregon slender salamander has been documented on the Oregon side of the Columbia River Gorge National Scenic Area. It has not been reported within the action area for the Washington side of the Scenic Area and no treatment areas are within suitable habitat. It is not found on the Gifford Pinchot National Forest.

Larch Mountain Salamander (*Plethodon larselli*)

Most of its life is spent in the subterranean environment and it is surface-active about 20 to 90 days a year, depending on location and conditions. Surface activity is triggered whenever moisture and temperature regimes are appropriate, primarily in the spring and fall. In the Columbia River Gorge this tends to be mid-February through late-May and in the fall from late September through late-November. In the Cascade Range, the activity period is approximately April through late June and late September to late November. Ideal conditions are when temperatures are between 4 degrees and 14 degrees C and soil is saturated to a depth of about 30 cm. Breeding takes place in the autumn and spring months. There is no free-living larval stage (Hallock and McAllister 2005a). Mites and springtails have been found to be common prey.

This species is a Washington and Oregon endemic. In Washington, the species occurs in the West and East Cascades Ecoregions. The main distribution is along a 58-km stretch of the Columbia River Gorge with additional, isolated populations in the Cascade Range. They have been documented in Clark, Skamania, Lewis, King, Klickitat and Kittitas Counties (Hallock and McAllister 2005a). Population distribution within the range is patchy.

Larch Mountain salamanders are associated with talus, scree, gravelly soils and other areas of accumulated rock where interstitial spaces exist between the rock and soil. Steep slopes are also an important habitat feature. They inhabit a diverse range of forested and non-forested habitats. Occupied rocky substrates in non-forested areas are usually north facing and nonvascular plants, especially mosses, dominate the ground cover (Hallock and McAllister 2005a). In some areas of the Cascade Mountains, Larch Mountain salamanders inhabit old-growth coniferous forests without significant exposed rocky areas. They also inhabit lava tubes in the Mount St. Helens vicinity. In all of these habitats, important microhabitats include woody debris, leaf litter and rocks.

Any ground-disturbing activity or land use that changes the moisture regimes and permeability of inhabited rocky substrates, such as overstory tree removal and gravel removal, may threaten populations. Chemical applications (i.e., herbicides, pesticides, fertilizers) may affect Larch Mountain salamanders directly due to toxicity or indirectly due to loss of prey-base (Hallock and McAllister 2005a).

Action Area Information

In addition to being a Forest Service Sensitive species, the Larch Mountain salamander is also a Survey and Manage species for the Gifford Pinchot National Forest and the Columbia River Gorge National Scenic Area. According to ISMS database records, there are a total of 43 Larch Mountain salamander sites documented on the Gifford Pinchot National Forest, one of which occurs within a proposed treatment area (treatment area 33-07r4). There is also additional suitable, but un-surveyed, habitat on the forest. Some un-surveyed habitat occurs in forest blocks adjacent to roadside treatments in treatment areas 35-14, 35-18, and 35-16. There are 45 sites documented for the Washington side of the Columbia River Gorge National Scenic Area, one of which in within a proposed treatment area (treatment area 22-06).

Van Dyke's Salamander (*Plethodon vandykei*)

Van Dyke's salamander is endemic to Washington. A study by McIntyre (2003) found that the presence of Van Dyke's salamander is strongly correlated with certain key features in stream segments at a micro- and macro-habitat scale. Stream features most predictive of Van Dyke's salamander occurrence were the presence of non-forested areas on the valley wall, exposed bedrock, and deeply incised valley morphology. On a micro-habitat scale, the key variables were an absence of trees, presence of seeps or tributary streams, and areas of accumulated, small cobbles. Van Dyke's salamander has been found in upland forests, near lake shores, cave entrances, and using seeps and streamside habitat. It occurs in the Northwest Coast and Western Cascades Ecoregions with three isolated populations occupying the Olympic Peninsula, the Willapa Hills and the south Cascades Range.

Most surface activity takes place in the spring after snowmelt and before summer drought and in the fall after the onset of fall rains and before temperatures approach freezing. More specifically, most surface activity occurs when soil moisture is high (moist or wet) and soil temperatures are between 4 degrees to 14 degrees C (Hallock and McAllister 2005b). Because this species may occupy wet habitats, it is sometimes surface active even in the summer. Nests found on the Olympic Peninsula (elevations below 700 meters) were laid in early May and development was completed by early October (Hallock and McAllister 2005b). Females brood and guard the eggs during the summer.

Interestingly, small populations survived in the Mount Saint Helens' blast zone; these were probably protected by their subterranean refugia and heavy snowpack (Hallock and McAllister 2005b). Large decaying conifer logs near streams appear to be important habitat for nests. It is at risk due to its limited distribution and apparently small, isolated assemblage of populations. Van Dyke's salamander may be harmed by alterations to the riparian habitats where it resides (Hallock and McAllister 2005b).

Action Area Information

In addition to being a Forest Service Sensitive species, the Van Dyke's salamander is also a Survey and Manage species for the Gifford Pinchot National Forest. It is not a Survey and Manage species for the Columbia River Gorge National Scenic Area. According to ISMS database records, there are 25 documented sites on the Gifford Pinchot National Forest, one of which is located in a proposed treatment area (treatment area 31-10r1). There is a great deal of un-surveyed, but suitable, habitat on the forest. There are no known sites located within the Columbia River Gorge National Scenic Area.

Copes Giant Salamander (*Dicamptodon copei*)

Dicamptodon copei is a medium to large salamander (up to 20 cm total length) that inhabits small, silt-free, permanent streams or seeps, often with steep-gradients, but occasionally also are found in cold mountain lakes and ponds (Corkran and Thoms 1996; Jones and Raphael 2000; Leonard et al. 1993; Nussbaum et al. 1983). Experts are moderately confident that they are typically restricted to systems in moist coniferous forests with water temperatures that range from 8 to 14 degrees C, and are seldom above 18 degrees C. They are much more common in Washington than in Oregon.

Dicamptodon copei spend the day in streams beneath rocks or in hidden cavities (Leonard et al. 1993). They emerge at night from their diurnal hiding places and move about the stream bottom or in the moist splash zone along the banks of streams (Leonard et al. 1993; Nussbaum et al. 1983). *D. copei* is very rarely found in the metamorphosed stage and is unlikely to travel more than a few feet from a stream or lake edge (Corkran and Thoms 1996, Nussbaum 1983, as cited on NatureServe 2005).

During and after heavy rainfall, individuals can be found at night crawling among the wet rocks and vegetation at streamside. Terrestrial adults have been found at the stream edge beneath debris (Corkran and Thoms 1996; Leonard et al. 1993).

Populations are reportedly stable in Washington (NatureServe 2005). Cope's giant salamanders are extremely sensitive to stream siltation and stream warming which may be induced by activities such as logging, or stream bank clearing. Invasive plant species may alter the vegetation of stream banks and could impact this salamander.

Action Area Information

Twenty sites for Cope's giant salamander are documented on the Gifford Pinchot National Forest, one of which occurs within a treatment area. No Cope's giant salamander sites are documented within treatment areas on the Washington side of the Columbia River Gorge National Scenic Area.

Cascade Torrent Salamander (*Ryhacotriton cascadae*)

The Cascade Torrent salamander lives in the Cascade Mountains of southern Washington and northern Oregon; there is a known disjunct population in the southern Oregon Cascades. This salamander lives on and near rocks bathed in a constant flow of cold water such as cool rocky streams, alpine lakes and seeps, and in areas that are in or amongst conifer or alder forests, typically in areas with a thick canopy cover.

Cascade torrent salamanders may be active year-round at lower elevations. Larvae are fully aquatic. Adults are strongly associated with water and individuals are almost always found in contact with either free water or saturated substratum. During rainy wet periods individuals may be found in wet terrestrial forest settings away from streams or seepages. Cascade torrent salamanders can be locally common to abundant where they occur.

Breeding phenology is unknown, but may occur during most of the warmer months of the year (Hallock and McAllister 2005c). Based on the size distribution of larvae, eggs are most likely laid in the spring. Females produce relatively few eggs (usually less than 15). Based on laboratory observations, torrent salamander species may have the longest incubation period of any North American salamander, lasting 210-290 days at 8° C. The larval period is also thought to be long, as a Columbia River Gorge population was estimated to require 4.5 years before metamorphosis.

The relatively small range and narrow habitat requirements contribute to the species' current status. Mature forests, the optimal habitat for this species, have been greatly reduced by frequent harvest intervals over much of the species' range. Management activities that alter the hydrology, water temperature or integrity of small streams, headwaters and seeps are reported to cause density declines in other torrent salamander species. Increases in sedimentation may be particularly problematic for this group.

Action Area Information

This species is relatively common on northern portions of the Gifford Pinchot National Forest. There are about 133 known sites for the Cascade torrent salamander on the Forest. Two sites are within treatment areas. Fourteen portions of 6-7 timber sale units where Cascade torrent salamanders were reported also overlap treatment areas. (Older surveys did not report locations as point data, so locations are less precise.)

No specific surveys for this species have been conducted in the Columbia River Gorge National Scenic Area, but Cascade torrent salamanders are documented to occur commonly throughout Skamania county in suitable habitat (Washington Herp Atlas 2005).. No locations of Cascade torrent salamanders that are included in the NRIS database are on the Washington side of the Scenic Area.

Oregon Spotted Frog (*Rana pretiosa*)

Oregon Spotted Frogs are considered highly aquatic, and are found near vegetated edges of ponds or lakes, and also within the algae-grown overflow pools of streams (Blaustein et al. 1995, Marshall et al. 1996). This species is found near warmer wetland communities consisting of marshes, or ponds and streams with sedges, rushes, and grasses (Leonard et al. 1993) and is linked to emergent, and submerged vegetation. Breeding season in Washington starts February to March.

Extant populations occur in large shallow wetland systems associated with a stream or stream network (Hallock and McAllister 2005d). Breeding habitat is in seasonally flooded margins of wetlands. Egg masses are placed in areas where they receive little or no shading from vegetation. Waters that remain aerobic and do not freeze to the sediments are necessary for winter survival in areas subject to freezing. Beaver impounded systems appear to provide many of the habitat requirements of this species.

The species has been declining throughout its historic range in Oregon, Washington, and southwest British Columbia. Currently there are three locations where spotted frogs are found in British Columbia, six sites in Washington (Klickitat and Thurston Counties) and approximately twenty sites in Oregon (Anon 2003, Hallock and McAllister 2005d). Decline has been attributed to exotic wildlife (non-native fish and bullfrogs), habitat loss, and habitat alterations through plant species conversions via invasive plants. For example, the Oregon spotted frog is no longer found where reed canary grass has invaded historical sites (Hayes 1996). Spotted frogs also disappear when vegetative structure declines in abundance; i.e. when emergent or submerged vegetation is opened up through species alteration. This species occurs in several high Cascade lakes in Oregon, but has been extirpated from the Central Willamette valley due to introduced bullfrogs (Nussbaum et al. 1983).

Action Area Information

The Oregon spotted frog is documented in two sites in the Gifford Pinchot National Forest and is suspected to occur within the Columbia River Gorge National Scenic Area (Washington side). The two frog sites on the Gifford Pinchot National Forest are not located in any treatment areas. One known site near Columbia River Gorge National Scenic Area is on private land and not near any treatment areas.

Northwestern Pond Turtle (*Clemmy marmorata marmorata*)

Four populations of northwestern pond turtles are documented in Washington (Washington Herp Atlas 2005). Two populations are natural and two were introduced by the Washington Department of Fish and Wildlife. The introduced populations (one in the Puget Trough, the other in the Columbia River Gorge) have captive-reared and released turtles. All populations are vulnerable to factors that could cause their extirpation.

Northwestern pond turtles inhabit ponds, lakes, marshes, and the slow-moving portions of creeks and rivers in other parts of their range, but in Washington they are known from ponds and lakes (Washington Herp Atlas 2005). This species is primarily aquatic, but strays from water to lay eggs, to disperse to new water bodies, to winter out-of-water (about half of Washington's turtles winter on land) and to aestivate during periods of drought. Pond turtles spend a great deal of time basking on logs and other supporting structures at the surface of ponds.

Individuals leave the water habitats during the spring-summer months to search for egg laying sites (Nussbaum et al. 1983, Stebbins 1985). Egg laying sites are anywhere from 50-600 feet from the aquatic environment. Nest sites are usually on open sunny ground, on slopes of 4-12 percent, in heavy clay soil, and a south to southwest facing aspect. Turtles nest under dry conditions; in fact, too much soil moisture will kill the developing embryos. The major threats to this species are 1) loss of hatchlings to bullfrogs, 2) alteration of important features of aquatic or terrestrial habitats, 3) loss of nests to human activities or predators, 4) disease and competition from introduced turtles, and 5) removal from the wild by humans (Washington Herp Atlas 2005).

Action Area Information

No pond turtle locations are known on the Gifford Pinchot National Forest (D. Anderson, personal communication, 2005). The “documented” occurrence for the Gifford Pinchot National Forest listed in Table 5 is likely from the portion of the Forest that became the Columbia River Gorge National Scenic Area, based on the current and historic distribution of this species (see Washington Herp Atlas 2005). Northwestern pond turtles do occur in a treatment area on the Columbia River Gorge National Scenic Area. This location is a naturally occurring population that is supplemented by re-introduction and annually monitored by the Washington Department of Fish and Wildlife (WDFW). The site is a network of ponds that may or may not contain pond turtles in any given year. The pond turtle population in this area fluctuates between and among the various ponds. Invasive bullfrogs are also found in these ponds and pose a threat to pond turtle reproduction by preying on young turtles. In order to increase the survival of pond turtle hatchlings and minimize mortality from bullfrog predation, WDFW personnel collect hatchlings and eggs every year and bring them into captivity for hatching and a grow-out period. Once the hatched pond turtles have reached sufficient size to deter predation by bullfrogs, the pond turtles are re-released back into the ponds. WDFW has also place radio-transmitters on several pond turtles for monitoring purposes.

The Columbia River Gorge National Scenic Area has signed a Memorandum of Understanding with WDFW for cooperation and coordination in the management of the pond turtle population at the Scenic Area site (USDA Forest Service and WDFW 2005). The MOU states, among other things, that the FS will work cooperatively with WDFW to provide and improve habitat for western pond turtles, be responsible for noxious weed infestations, and consider the habitat needs of the western pond turtle when planning and implementing projects in this area. WDFW and FS also agreed to meet annually to coordinate, review, and update management objectives for the site.

The treatment area is currently invaded by Himalayan blackberry, Scot’s broom, Japanese knotweed, reed canarygrass and other invasive plants. These invasive plants pose a threat to pond turtle nesting sites by covering with vegetation the warm, open, south-facing slopes used for nest sites. Heavily vegetated sites are not suitable for pond turtle nests. The objective of the invasive plant treatments in this treatment area is to restore and protect pond turtle habitat.

Striped Whipsnake (*Masticophis taeniatus*)

This snake occurs from central Washington south to central Mexico. It is an arid area species, inhabiting grasslands, sagebrush flats, rocky stream courses, and canyon bottoms. In Washington it occurs in the Columbia Plateau Ecoregion. Striped whipsnakes eat lizards, insects, other snakes, small mammals, and young birds. The female will lay three to ten eggs in June or July and young hatch out in August or September. They use abandoned rodent burrows for communal nest sites. This snake is diurnal during warm months and hibernates in the winter. Whipsnakes are known for their very rapid locomotion.

Striped Whipsnakes have been documented in Washington 26 times. In the last decade, 3 observations have been reported (Washington Herp Atlas 2005).

Action Area Information

There are no recent known locations of striped whipsnake on the Gifford Pinchot National Forest. They are unlikely to occur on the Forest because suitable habitat is limited. There are documented sites from the Columbia River Gorge National Scenic Area from rocky areas just east of Hood River, in Oregon (Dobson and Fiedler, personal observation, 2003), but sightings within the Scenic Area in Washington state have not been documented.

Sharp-tailed Snake (*Contia tenuis*)

This snake is found primarily in the coast range mountains of central and northwestern California and southern Oregon. There are disjunct populations in north-central Oregon, Washington, and British Columbia (Vancouver Island). Sharp-tailed snakes are found in a variety of habitats, including riparian, bare rock/talus/scree, grassland/herbaceous, Savanna, shrubland/chaparral, and conifer, hardwood, and mixed woodlands (NatureServe 2005). It is often found under cover of logs, rocks, fallen branches, or talus slopes. This snake is most active in the rainy season and it retreats underground in the dry season. An unusual feature of this snake's life history is that its diet is primarily restricted to slugs.

Action Area Information

Sharp-tailed snakes are documented to occur on the Columbia River Gorge National Scenic Area, but they are not known from the Gifford Pinchot National Forest. It is unlikely that any focused surveys have been conducted and small colubrid snakes may be easily overlooked in areas where they do in fact occur. Suitable habitat exists on both the Gifford Pinchot National Forest and the Washington side of the Columbia River Gorge National Scenic Area.

California Mountain Kingsnake (*Lampropeltis zonata*)

The range of this species extends from southern Oregon to Baja, but there are isolated populations along the Columbia River in Washington, east of the Cascade Mountains (Csuti et al. 1997). In Washington, it prefers south facing rocky hills in pine-oak forest in small talus slides. It is usually found in wooded areas near streams, under or near rotting logs. Breeding season occurs in April and May, eggs are laid in rotting logs or loose soil in June and July, and young hatch in August and September. This snake eats snakes, lizards, birds, bird eggs, and small mammals. It may occur at high elevations. California mountain kingsnakes are inactive in cold temperatures and extreme heat. It is mainly diurnal except during hot weather when it is active at night.

The California mountain kingsnake are rare and highly prized by collectors. Over-collection for the pet trade may affect some populations.

Little is known about this species in Washington. The Washington range is limited to the southernmost areas of eastern Skamania County and western Klickitat County (GORGE) (Washington Herp Atlas 2005). The Washington occurrence is significant because it is at the northern extreme of the species' range and is isolated by over 200 miles from the rest of the range in southern Oregon and California. The NatureServe database lists the Washington population as "critically imperiled" (NatureServe 2005). Unsubstantiated reports exist for the Blue Mountains and Yakima County. The status is based on the small range and sparse number of sightings in Washington.

Action Area Information

Recorded sightings of California mountain kingsnake in Washington are on the southern portion of the Gifford Pinchot National Forest, and within the Columbia River Gorge National Scenic Area (Washington Herp Atlas 2005). A known location and suitable habitat exist within and near treatment area 22-06 on the Columbia River Gorge National Scenic Area. No specific locations are known on the Gifford Pinchot National Forest.

Mardon Skipper (*Polites mardon*)

Mardon skipper is a rare butterfly found in four disjunct populations in the south Puget Sound area, Cascade Mountains in southern Washington, the Siskiyou Mountains in southern Oregon, and extreme northwest California. It is a state endangered species in Washington. The Mardon skipper relies on native, fescue-dominated grasslands (Black et al. 2002). The butterflies emerge in June and July and females deposit their eggs into native bunchgrass. Larvae feed on fescue grasses (*Festuca* spp.) for about 3 months and pupae hibernate through the winter (U.S. Fish and Wildlife Service website, 2004). Adults prefer early blue violet (*Viola adunca*) but will feed from a variety of flowers for nectar sources. The adults strongly avoid the invasive plant Scotch broom (*Cytisus scoparius*) (Black, et al 2002). It is likely that mardon skippers are susceptible to disturbances that alter the floral and structural components of its preferred habitat (Kerwin 2005). Native grassland habitat for the Mardon skipper has been destroyed or adversely modified by agriculture, residential sprawl, fire suppression, livestock grazing, and invasive plants (Potter et al, 1999). Current threats to the habitat include forest encroachment, type conversions by native and non-native plants, development, recreational activities, grazing, agricultural practices, and application of herbicides (Black et al. 2002). Invasive plants may threaten persistence of individual sites, and management to reverse these successional regimes is likely necessary (Kerwin 2005). The butterflies are threatened by insecticides, control practices for invasive plants, military training, fire, recreational activities, and facility development (Black et al. 2002).

Action Area Information

The Mardon skipper is found in 38 meadows and created openings (old harvest units) on the Mt. Adams District and the Cowlitz Valley District of the Gifford Pinchot National Forest. Kerwin (2005) described habitat on the Forest. Occupied sites range in elevation from 1,850 feet to 5,600 feet. Occupied habitats include 15-25 year-old tree plantations that are sparsely stocked and have a relatively high ground cover of grasses and forbs. Other occupied habitats include dry meadows with a dominate ground cover of Idaho fescue, to mesic or riparian sites with a dominant ground cover of fescues and pasture grasses. Strawberry, violets, and vetch are common flowering forbs that mardon skipper have been observed using as nectar sources. It has been found that, at least in the southern Cascades populations, that in an area of suitable habitat such as a large meadow or meadow complex, the mardon skipper may use only a small portion of the area (Kerwin 2005).

Invasive plants, such as Canada thistle and houndstongue, are present in a number of these meadows and are threatening the long-term habitat integrity for the Mardon skipper on the Gifford Pinchot National Forest. Invasive plant species do not provide egg-laying or larval food plants. The Forest conducts annual monitoring of the skipper according to protocol developed by FWS. Monitoring and survey data from the Gifford Pinchot National Forest since 2000 indicate that the number of adults detected at individual sites ranges from 1 to 400+. However, the detections at most sites range from 10 to 50. Skipper populations can fluctuate widely from year to year. More than 50 adults have been detected on six sites since surveys began in 2000. Data is insufficient to determine long-term population trends on the forest.

An estimated 34 Mardon skipper sites lie within 12 treatment areas on the Gifford Pinchot National Forest. The treatment areas are roads (5), meadows (5), or plantations (2). The objective of the treatments in these sites is to maintain or improve habitat for the mardon skipper.

Puget Oregonian snail (*Cryptomastix devia*)

The Puget Oregonian snail is found from southern Vancouver Island, B.C. south through the Puget Trough and western Cascade Range in Washington to the Oregon side of the Columbia River Gorge. This snail's habitat consists of mature to late successional moist forest and riparian zones, springs, and seeps where canopy cover is generally high. The Puget Oregonian hides under logs, moss, leaf litter, and/or talus; often under, near, or on large (greater than 20 inches dbh) big-leaf maple (*Acer macrophyllum*) and vine maple (*Acer circinatum*).

Action Area Information

Most of the known sites for this snail occur on the Gifford Pinchot National Forest; primarily on the northern end of the forest. The sites are scattered wherever big-leaf maple occur, below about 2700 feet (Kogut, personal communication, 2005). The species occurs in low densities so mortality of a few individuals may cause the loss of a 'site'. On the GP, there are 15 known sites that occur within five proposed treatment areas (treatment areas 35-16a, 35-16r0, 35-16r1, 35-16r3, and 35-18). Sites may also occur along roads adjacent to treatment areas 35-14, and 35-17 (Kogut, personal communication, 2005). There are 123 known locations on the Gifford Pinchot National Forest that occur outside of any proposed treatment area. There is still much un-surveyed but suitable habitat for this species on the northern half of the Forest, and occurrence should be expected wherever big-leaf maples occur, including roadside sites. The Puget Oregonian is also known to occur on the Columbia River Gorge National Scenic Area, but not within any proposed treatment sites.

Columbia Oregonian snail (*Cryptomastix hendersoni*)

Generally found within 100 meters of streams, seeps, and springs, this snail is known from the Columbia River Gorge from The Dalles to near Rufus. It is found among moist talus, leaf litter and shrubs, or under logs and other debris. This species was originally known from areas that had few trees, but more recent mid-elevation records are from mature hemlock forests with relatively closed canopies. Exotic vegetation in riparian zones reduces the supply of native herbaceous vegetation needed by this species (BLM 1999, Burke et al. 1999).

Action Area Information

The Columbia Oregonian is known to occur on the Columbia River Gorge National Scenic Area, but not in or near the treatment sites. There are no documented sites on the Gifford Pinchot National Forest.

Dalles sideband snail (*Monadenia fidelis minor*)

The Dalles sideband is known from the Columbia River Gorge near The Dalles and up the Deschutes River. It inhabits talus or moist rocky areas around streams, seeps and springs within steppe or dry forest plant communities. It is not considered a talus obligate. This species is active only during dawn and dusk during the spring and fall seasons. Large woody debris and rocks provide refugia during summer and late winter. Forest litter and woody debris are considered necessary to provide food and cover while foraging. Loose soil is necessary for egg laying. The Dalles sideband has been found with the Larch Mountain salamander (*Plethodon larselli*).

Action Area Information

The Dalles sideband snail is known from the Columbia River Gorge National Scenic Area, but does not occur within any proposed treatment sites. It does not occur on the Gifford Pinchot National Forest.

Warty jumping slug (*Hemphillia glandulosa*)

The range of the warty jumping-slug includes British Columbia south to northern Oregon, between the western Cascade Range and the Pacific Ocean. After the first two years of project survey efforts for survey and manage mollusks, many warty jumping slug sites were documented across their range in the Northwest Forest Plan area. The majority of sites are on the Olympic Peninsula and the northern Oregon Coast Range (Hebo District of the Siuslaw National Forest), with smaller numbers on the Tillamook Resource Area (Salem District BLM) and in the southwestern Cascades (Gifford Pinchot National Forest).

The warty jumping slug is now known as locally common, abundant and well distributed in the Olympic Province and the Oregon Coast Range, but less abundant with a patchy distribution in the southwestern Cascades.

They have been found in a wide range of habitat conditions, mostly in young, second-growth forests between 35-80 years old, with a few new sites in late seral forests. Several sites have been documented in young plantations (11-15 years in age) on the Siuslaw NF and Tillamook BLM. Warty jumping slugs are often found associated with various sizes of woody debris on the forest floor, in both conifer and hardwood settings. Searching under the moss layer of the down wood often reveals a jumping slug. Woody materials in moderate to advanced stages of decomposition are often used (decay classes 3-5). They may also be found on the forest floor around swordferns (*Polystichum munitum*), or foraging on mushrooms, or in the litter of big leaf maple (*Acer macrophyllum*), vine maple (*A. circinatum*), and red alder and (*Alnus rubra*). They occupy a wide range of vegetation zones and plant associations.

Warty jumping slugs also occur in previously thinned forests. Monitoring of completed commercial thinnings on the Olympic and Siuslaw Forests revealed the presence of these jumping slugs in both recent and older thinnings, ranging between 1.5 – 12 years since completion of thinning activities.

The genus *Hemphillia* is endemic to the Pacific Northwest and its members lay eggs in the fall on the forest floor and crevices in down woody debris. It is assumed that the adults die and the eggs overwinter, with immature slugs emerging in the spring (J. Ziegler, personal observation).

Action Area Information

There are 134 sites for the warty jumping slug on the Gifford Pinchot National Forest, four of which are within two proposed treatment areas (treatment areas 31-01a and 31-08r3). It is not known from the Columbia River Gorge National Scenic Area.

Burrington's jumping slug (*Hemphillia burringtoni*)

The Burrington's jumping slug was first described as a subspecies of *H. glandulosa* by Pilsbry (1948, as cited in Wilke 2004), and later elevated to species status by Branson (1972, as cited in Wilke 2004), based on eight specimens. Wilke (2004) found that morphological characteristics were not reliable in distinguishing between *H. burringtoni* and *H. glandulosa*. There is uncertainty regarding the taxonomic relationship of *H. burringtoni* and *H. glandulosa* and recent genetic research indicates two species complexes (Wilke 2004).

Burrington's (aka keeled) jumping-slug is found on the Olympic Peninsula south to the Coast Range of northwestern Oregon. Along with the other *Hemphillia* species, they inhabit moist, undisturbed conifer forest, sometimes within riparian areas, and can be found among logs and heavy ground cover of low vegetation, litter and debris. The genus *Hemphillia* is endemic to the Pacific Northwest and its members lay eggs. Threats to this species include changes in microclimate within habitat destruction and fragmentation from timber harvest, conversion to agriculture, development, road construction, and fire.

Action Area Information

Based on the study by Wilke (2004) and lack of recorded specimens, Burrington's jumping slug does not likely occur on the Gifford Pinchot National Forest or Columbia River Gorge National Scenic Area.

Malone's jumping slug (*Hemphillia malonei*)

South-central Washington south to coastal and central Oregon is the known range for this species. The Malone jumping-slug may be found in partly open, moist Douglas-fir forest with diverse herbaceous vegetation and an abundant litter layer. It prefers ravine, gorge, or talus sites and persistent moisture is required. This slug may also be found near seeps, springs, and wet riparian areas, under or among rotting logs, ferns, and mosses. Specific forest type where it is typically found are moist forest stands, generally >50 years old, with >50% canopy cover, especially where dense sword fern and large woody material exist. Other life history traits and threats are the same as described for *H. burringtoni*. This species is more widespread and abundant than *H. burringtoni*, based on the number of current locations entered into the ISMS database.

Action Area Information

Malone's jumping slug is the most commonly found FS Sensitive mollusk on the GP with well over 500 sites in the ISMS database, all but three of which are on the southern portions of the forest (Mt. Adams and Mount St. Helens Districts). There are a total of 618 sites on the GP, 30 of which are located within six proposed treatment areas (treatment areas 31-01a, 31-01q, 31-08r3, 33-05, 33-05a, and 33-12r1). This species has been found on the CRG in marshy areas with low vegetation, but not within any treatment sites.

Blue-gray Tail-dropper (*Prophysaon coeruleum*)

This slug is found from the Puget Trough south through the western Cascade Range and Oregon Coast Range to northern California. This species is common in Oregon but very rare in Washington. It inhabits a wide range of moist and mixed forests. In open forests, the blue-gray tail-dropper is usually located in sites with higher shade and moisture levels. Like other terrestrial mollusks, it is generally associated with moist plant communities, litter, woody debris, and mosses.

Action Area Information

There are three known sites for this slug on the northern portion (Cowlitz Valley) of the GP. All sites are "classic" old-growth forest with large, deciduous trees within treatment block 36-16 (Kogut, pers. com.). One site is located at a specific treatment site (Iron Creek Campground, site 35-16r1). The species has been found in and adjacent to road prisms under swordferns and coarse woody debris. This species also occurs on the CRG, but not within any proposed treatment sites.

Management Indicator Species (MIS)

MIS are discussed below. The bald eagle is sensitive to management in riparian areas. The northern spotted owl represents wildlife species associated with mature and older coniferous forests. The bald eagle and northern spotted owl have been discussed above under the section titled “Federally Listed Species.” Peregrine falcon has been discussed above under the section titled “Forest Service Sensitive Species.”

Pileated woodpecker (Dryocopus pileatus)

The pileated woodpecker represents species that inhabit mature coniferous forest habitats. The pileated woodpecker is the largest woodpecker species in the western United States and nests in cavities of large trees or snags. It is a denizen of mature forests, relying on dead and decaying trees for foraging and nesting. Pileated woodpeckers can act as a keystone habitat modifier by excavating large numbers of cavities that are depended upon by several other species, and by influencing ecosystem processes such as decay and nutrient cycling (Aubry and Raley 2002). Pileated woodpeckers will return to areas after timber harvesting (Ehrlich 1988), however, past management in the Pacific Northwest has lead to relatively few snags and down logs, especially of large diameters, remaining in many watersheds. The pileated woodpecker is common throughout the Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area in mature and late-successional forest. Invasive plants are not affecting habitat for the pileated woodpecker.

Cavity excavators

A large number of species rely on cavities in trees for shelter and nesting. The Gifford Pinchot National Forest LRMP (USDA 1990), which also covers the Washington side of the Columbia River Gorge National Scenic Area, has designated the hairy woodpecker as the representative cavity excavator for this Management Indicator category. The following information was taken from Marshall et al. 2003.

Hairy woodpecker (Picoides villosus) – The hairy woodpecker is distributed from Alaska to Panama, across Canada and the U.S., and south from Newfoundland to Bahamas. Preferred habitat consists of mixed conifer and ponderosa pine and adjacent deciduous stands. They nest in snags with light to moderate decay. The main diet is beetles, and ants, which they obtain by foraging on mature and old-growth conifers but also on deciduous trees during breeding. Hairy woodpeckers are common on the Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area.

Wood duck (Aix sponsa)

Wood ducks represent species that require mature deciduous riparian habitat. This species is found in various locations throughout the western U.S. It breeds in most of Washington and Oregon, except southeastern Oregon, and is a year-round resident along the coastal portions of the two states. Wood ducks are associated with wooded wetlands and they nest in tree cavities. Artificial nest boxes placed for them are readily accepted in lieu of tree cavities. Wood ducks feed on acorns, seeds of trees, shrubs, and aquatic plants berries, and grapes (Martinson 2003). Most feeding is done in flooded areas.

The wood duck is a common nester at many lower elevation ponds and wetlands on the GP. They use nest boxes that have been placed for them at a number of ponds. This duck is particularly common in treatment blocks 35-16 and 35-18. Some wood duck ponds are adjacent to (or in some cases at the edge of) roads proposed for treatment. Some invasive plants, such as Japanese knotweed, could adversely affect habitat for the wood duck by reducing access to foraging areas.

Barrow's goldeneye (Bucephala islandica)

Barrow's goldeneye represents species that require coniferous forest riparian and wetland areas. More than 90% of the world's population breeds west of the Rocky Mountains from central Alaska south to northern California (Scheuering 2003). The winter distribution concentration on the Pacific coast occurs from Alaska to northern Washington (Scheuering 2003). It breeds primarily on inland waters at higher elevations such as alpine and sub-alpine lakes, reservoirs, and rivers. Barrow's goldeneye normally nests in cavities of dead and dying trees in forested areas. They eat aquatic invertebrates and also some buds and tubers of aquatic plants.

Barrow's goldeneyes nest at a few high-elevation lakes and large ponds on the Gifford Pinchot National Forest (e.g. Packwood and Walupt Lakes) and it is a fairly common migrant. One known site is located within or adjacent to treatment area 33-03r3. Some invasive plants could adversely affect habitat for Barrow's goldeneye by reducing access to foraging areas.

Roosevelt elk and Columbian black-tailed deer

These two species are known throughout the Gifford Pinchot National Forest and, to a lesser extent, the Columbia River Gorge National Scenic Area (Washington side). There are several established herds of Roosevelt elk that reside on the Forest as year-round residents, as well as many that are migratory. The scenic area is generally too fragmented, and contains too much disturbance to provide much elk habitat, but they do occur around Wind Mountain and the North Bonneville area (C. Fiedler, personal communication, 2005).

Deer occur throughout the forest and scenic area, and both species use a combination of habitats comprised of cover and forage areas that are not too fragmented by road systems. Taber and Raedeke (1980) reported that winter mortality, legal harvest, and poaching were the primary causes of elk mortality. Poaching is the second leading cause of mortality to elk in Washington State (WDFW 2004). As one might expect, a high density of roads can have a negative impact on elk with increased disturbance from legal hunting and poaching (CEMG 1999).

Extensive winter range for these species occurs throughout the Gifford Pinchot National Forest below 2400 feet in elevation. A few elk calving areas are mainly adjacent to small ponds and wetlands below 3500 feet elevation, and scattered widely. On the Cowlitz Valley Ranger District, hundreds of elk consume forage in private fields and pastures throughout the winter, many of which have significant infestations of Scotch broom (Kogut, personal observation). Invasive plants on the forest are present in important foraging areas and if infestations expanded, the quality and quantity of available forage could be reduced.

The Gifford Pinchot National Forest has a Limited Operating Period restriction for projects in winter range from December 1 to April 1. The calving area Limited Operating Period is May 15 to July 1. A portion of one road proposed for treatment (treatment area 33-12a) passes through an area of the forest that contains important foraging areas from spring through fall (Wainwright, personal communication, 2005).

Mountain goat (Oreamnos americanus)

The mountain goat is most often found above the timberline, but will also use forested areas in winter. It feeds primarily on grasses, forbs, shrubs, and lichen. There is a restricted hunting season in Washington. Mountain goats are sensitive to habitat changes from timber or fire management and to disturbance from recreation and roads. Invasive plants threaten the quality and quantity of available forage.

The mountain goat is common on the northern portion of the Gifford Pinchot National Forest, which contains 90% or so of the goats on the Forest. Mountain goats do not occur within or adjacent to any proposed treatment areas. They were present historically in Columbia River Gorge National Scenic Area (Washington side), but there is no longer a resident population there. In the 1990's a solitary goat entered the scenic area from the Mount Adams area of the Gifford Pinchot National Forest, and it remained near Lyle, Washington until it died a few years later (C. Fiedler, personal communication, 2006).

Pine marten

The pine marten (American marten, *Martes americana*) represents species that inhabit mature coniferous forest habitats. Pine martens occur in forests containing snags and down logs, which provide suitable denning sites. The pine marten is most closely associated with heavily forested east and north-facing slopes that contain numerous windfalls (Maser 1998). They tend to avoid areas that lack overhead protection and the young are born in nests within hollow trees, stumps, or logs. Martens do not tolerate concentrated human use or habitat modification (Maser et al. 1981).

Pine martens spend a great deal of time in trees and can even leap from branch to branch between trees. They eat a variety of small mammals, particularly squirrels, as well as voles, mice, pika, and rabbits. Invasive plants are not impacting habitat for the pine marten.

The pine marten is fairly common in mature and late-successional forests on Cowlitz Valley Ranger District, Gifford Pinchot National Forest, more so in higher elevation (silver-fir zone) forests. It has been found denning in snags and down logs in campgrounds, such as Walupt Lake (treatment area 35-14r1) (Kogut, personal communication, 2005.). There are 6 recorded locations for pine marten within 5 treatment areas on the Gifford Pinchot National Forest. Pine martens may be present in some isolated areas of the Columbia River Gorge National Scenic Area (Washington side), but there are no known locations within treatment areas in the scenic area.

Birds of Conservation Concern

Rufous hummingbird (*Selasphorus rufus*)

The rufous hummingbird may be the most wide ranging hummingbird in North America (Patterson 2003). It has occurred in every state and most Canadian provinces. It is a common visitor at backyard nectar feeders. Rufous hummingbirds are found in a wide variety of habitats, though it shows a breeding preference for wooded areas with a high canopy and well-developed understory (Patterson 2003). They feed on nectar of many plants, including flowering currant, salmonberry, and pacific madrone, but show a preference for tubular flowers. Hummingbirds will also glean insects.

Olive-sided flycatcher (*Contopus cooperi*)

The most famous attribute of this bird is its song, which sounds like *quick three beers*, at least to birders. Olive-sided flycatchers perch at the top of a tall tree or snag and dart out to catch flying insects. It breeds only in coniferous forests of North America, from Alaska south to Baja California in the west, and from Canada to North Carolina in the east. It winters in Central and South America. This flycatcher is often found along the wooded shores of streams, lakes, marshes and bogs. Breeding Bird Survey data has shown highly significant population declines for all continental, national, and regional analyses. The causes of population decline are thought to be habitat alteration and losses on wintering grounds because of the relatively consistent declines throughout the breeding range of the species (Altman 2003).

Loggerhead shrike (*Lanius ludovicianus*)

Loggerhead shrikes are famous for impaling their prey on thorns and barbed wire. They breed from Canada south throughout most of the U.S. and Mexico. In the Pacific Northwest, they are found primarily in open habitats of eastern Oregon and Washington. Loggerhead shrikes use elevated perches for hunting and singing, open grassy areas for hunting, and scattered shrubs or small trees for nesting (Holmes 2003). These birds are opportunistic predators, eating primarily insects during the breeding season and small vertebrates in the winter.

Oregon vesper sparrow (*Pooecetes gramineus affinis*)

Vesper sparrows breed in Canada and most of the northern U.S. and winter in the southern U.S. and Mexico (Altman 2003). They are found in cropland, desert, grassland, and shrubland/chaparral habitats. Vesper sparrows eat seeds, waste grain, and insects. They forage on the ground; sometimes taking food items from low foliage. The subspecies known as Oregon vesper sparrow is found west of the Cascade crest in the Willamette and Umpqua Valleys and may also breed on islands in the Columbia River (Altman 2003). The nest is located on the ground, often against a clump of vegetation or at the base of a small shrub or tree.

Brewer's sparrow (*Spizella breweri*)

Brewer's sparrow breeds from Canada south through eastern Washington to southern California, Arizona, and New Mexico. They winter primarily in Baja California and Mexico. It is abundant east of the Cascades. This bird breeds in short shrublands, often using big sagebrush. Brewer's sparrow eats small insects gleaned from foliage and seeds taken from the ground.

Sage sparrow (*Amphispiza belli*)

This sparrow is common within its range. Sage sparrows breed in the Great Basin from central Washington south and east to New Mexico. The nest is placed in a dense tall bush. It is a short distance migrant and winters in California, Nevada, and west Texas to Baja California and Mexico. Sage sparrows are most commonly associated with big sagebrush communities. They forage almost exclusively on the ground for insects and seeds.

Washington State Listed Species (National Scenic Area)

The 1992 Management Plan (revised 2006) for the Columbia River Gorge National Scenic Area (NSA) requires that NEPA documents include effects to Washington State Endangered, Threatened, Sensitive, and Candidate species with historic or suspected range in the NSA. Some species on the Washington state are on federal or regional lists and have been discussed previously, including: Cascade torrent salamander, Larch Mountain salamander, Columbia Spotted frog, Oregon Spotted frog, Northwestern pond turtle, California mountain kingsnake, sharptail snake, striped whipsnake, bald eagle, Northern spotted owl, Ferruginous hawk, peregrine falcon, common loon, grizzly bear, gray wolf, California wolverine, Pacific fisher, Columbian white-tailed deer, Western gray squirrel, Townsend's big-eared bat, and mardon skipper butterfly.

The following paragraphs discuss life history information about species that are on Washington state lists but not on federal or regional lists. The following discussion pertains to the existing condition on the Scenic Area.

Northern Leopard Frog

The northern leopard frog is one of the most widely distributed amphibians in North America. Declines in the populations of this species have been reported from throughout North America, including the Pacific Northwest. In Washington, museum records indicate that the leopard frog inhabited at least 18 general areas in eastern Washington, many of these along the Columbia River and its major tributaries. Presently in WA, they are found only in Grant County. There are no recent records from the Scenic Area, and they are likely extirpated. Northern leopard frogs breed in spring, soon after ice and snow have disappeared, usually in March or April. Egg masses are typically attached to emergent vegetation, including sedges or rushes, but can be unattached. They are generally deposited in water less than 26 in deep and tend to be clumped in areas well exposed to sunlight.

Western toad

Western Toads occur in a variety of terrestrial habitats including forests, meadows and brush. Breeding usually occurs in permanent ponds and shallow lake edges (<18" depth) in mid to late spring. Tadpoles rear in areas with the warmest temperatures, typically the shallowest areas. Transformed toads are primarily terrestrial, but often occur near water bodies, especially in drier climates. Western toads are documented within the Washington portion of the Scenic Area, in the White Salmon River area and east to Major/Catherine creeks. They are likely found in other areas west of White Salmon where there are patches of suitable habitat. There are presently no known sites within the Scenic Area in Oregon.

Northern goshawk

This species has a wide distribution in North America, Europe and Asia in forested areas. In Oregon, most breeding areas are to the east of the Cascades, while in Washington, the species also occupies some sites in the Western Cascades and the Olympic peninsula. The goshawk is associated with mature and late-successional forests. Suitable habitat includes foraging, nesting, and post-fledging family area habitat. Mature and late-successional habitats are considered potential nesting habitat and earlier forested seral stages are considered potential foraging habitat. Moist mixed conifer and moist ponderosa pine late-successional areas are preferred habitats, although forest structure appears to be the more limiting factor to goshawk habitat rather than stand composition (i.e. tree species). Preferred nest stands have a minimum of 40% canopy cover; and the nest sites within these stands have >60% canopy cover (Reynolds et al. 1991).

Goshawk prey varies by region and consists of a variety of small to large birds and chipmunks, squirrels and hares and sometimes reptiles as the opportunity arises. Presently, no nest sites are known in the NSA, although suitable habitat occurs.

Golden eagle

The golden eagle ranges throughout much of western North America in a variety of habitats. It is most common locally in open habitats (for foraging) with cliffs (for nest sites); although large trees are also used for nesting. This species subsists primarily on large rodents such as rabbits, hares, ground squirrels, and prairie dogs. All known nest sites within the Scenic Area are in open country east of the Cascades, including a nest on Miller Island. Nests within the NSA are in proximity to high-use recreation areas and the eagles are accustomed to human presence and noise.

Merlin

The Merlin is a small falcon that breeds throughout the northern forests and prairies of North America, Europe, and Asia. The merlin is an occasional winter resident in southern Washington, including the Scenic Area. Known breeding areas are in Northern Washington and the Puget trough in semi-open areas that may facilitate hunting. Wintering habitat within the Scenic Area is considered to be any area less than 1000 feet in elevation, where there is abundant prey of small birds.

Flammulated owl

This owl ranges over much of the west in open ponderosa pine forests. In Oregon and Washington, the species occurs east of the Cascade crest during the breeding season (May to mid-August) and then returns south to Mexico and beyond. The flammulated owl is strictly nocturnal and catches insect prey in flight as well as on the ground. This owl is potentially present in areas adjacent to the Burdoin, Catherine Creek, and Balfour treatment sites.

Western grebe

The Western grebe ranges over most of the Pacific coast from Canada to Mexico. It breeds inland on large freshwater lakes or wetlands that harbor dense emergent or floating vegetation. Wintering habitat includes any large open water (saltwater or freshwater) such as the Columbia River, large lakes, estuaries and coastal areas. Diet of the Western grebe is largely composed of small fish and aquatic invertebrates, although it will opportunistically feed on other small prey, such as amphibians. Within the Scenic Area, there are no known breeding sites, although the species is commonly seen on the Columbia River during non-breeding and migration periods.

American white pelican

This pelican species ranges through much of the interior North America, from Canada to Mexico during the breeding season. It winters in coastal areas of southern CA, Mexico and the U.S. Gulf states. The American white pelican nests in large colonies on islands of large rivers, lakes and wetlands that are free of human disturbance. East of the Cascades, non-breeders are commonly seen in the Columbia River, near tributary mouths, during the summer. Within the Scenic Area, post-breeders are often seen within the Klickitat River delta. Feeding is accomplished on the surface by dipping its bill in shallow water for small fish and invertebrates.

Sandhill crane

The sandhill crane breeds in Alaska, Canada and into the United States, while wintering south into Mexico and into the central valley of CA. Breeding habitat includes isolated open wet meadow or prairie, lakeshore, and shallow marshland. Birds arrive at breeding grounds in early March and leave by mid-October. Migration stops are usually open fields, river bottom and estuary shores. Sandhills are thought to have nested on both the west and east sides of the Cascades in the past, but all known nesting areas are now east of the Cascades in both Oregon and Washington.

The closest site to the Scenic Area is Conboy Lake NWR. The Lesser Sandhill crane migrates through both Oregon and Washington state but does not breed here. This subspecies, as well as possibly the other two subspecies, is an occasional visitor and sometime winter resident in low elevation areas, such as Sauvie Island Wildlife Management Area, Ridgefield NWR, and Vancouver lake. Their diet includes insects, invertebrates, waste grain, tubers and shoots that can be gleaned from the ground.

Yellow-billed cuckoo

This species is a neotropical migrant and was historically found breeding throughout much of the United States and Northern Mexico. It is currently considered extirpated from Washington and Oregon since the 1950's. Its habitat was thought to be riparian and brushy woodlands.

Lewis' woodpecker

A species found in open forests consisting of oak woodland, mixed oak/conifer, and riparian ponderosa pines, cottonwoods and oaks. This species will also use orchards, and is tolerant of urban areas. Lewis' woodpeckers nest in large snags, often adjacent to water courses. This species takes insects on the wing or gleans from vegetation, eats carpenter ants, bees, wasps, mayflies, beetles and grasshoppers, and stashes most of acorn, pine nuts and berries for winter use (Wisdom et al. 2000). It is an opportunistic feeder eating insects in spring and summer and fruits and acorns in fall and winter. A year-round resident of pine/oak forests in Klickitat and Wasco counties within the Scenic Area, it is found in habitats adjacent to the Burdoin, Catherine Creek, and Balfour treatment sites.

White-headed woodpecker

This species is a ponderosa pine forest specialist, ranging from Washington to California. Their diet consists largely of pine seeds, wood-boring larvae and insects and it forages primarily on branches, trunk and some cones of trees, and also occasionally on the ground. White-headed woodpeckers are a year-round resident of Oregon and Washington forests, although there may be some movements into lower elevations during the winter. This species excavates and nests in snags. There are currently no records of this species within the Scenic Area, although they have been documented at higher elevations in Klickitat and Wasco counties.

Black-backed woodpecker

This species is closely associated with dead or dying forests at mid to high elevations, east of the Cascades. This woodpecker's main diet is larvae of wood-boring beetles gathered from under bark of trees. Its occurrence is likely tied to availability of bark beetles that occur after stand stressing events, such as fires. It ranges largely within Canadian forests, with a southern limit within the northern tier states of the United States. The black-backed woodpecker is a year-round but sporadic resident in eastern Washington and Oregon. It has not been documented in the Scenic Area.

Sharp-tailed grouse

Sharp-tailed grouse were found associated with dryland native bunchgrass prairies, shrub-steppe, and early forest successional forest habitat throughout most of the western U.S. The population in the Pacific Northwest has declined dramatically due to overwhelming conversion of native habitat. This species is extirpated from most of its historic habitat in eastern Oregon and Washington, including Klickitat County. A remnant population remains in NE Washington.

Sage Thrasher

The sage thrasher inhabits most of the western U.S. where there is arid habitat of sagebrush steppes, as well as some grassland with open scattered junipers. It migrates south for the winter; into the southern states and northern Mexico. The sage thrasher is a sagebrush obligate and will use small fragments of this community between cultivated areas to survive. There are currently no records of this species within the Scenic Area, although it may have been in the eastern edge of the Area in the past.

Vaux's swift

This swift is a neotropical migrant that moves north to the Pacific states and Canadian provinces for the breeding season (roughly May to August). It nests in large cavities and hollow trees within mature forests. Birds have also taken to using available residential and industrial chimneys as nest and roost sites, especially during migration. The Vaux's swift forages on the wing for insects over a wide variety of habitats, including urban areas, water, open fields and forested areas.

Purple Martin

The purple martin breeds throughout much of the United States, except for the plains states and the Rocky Mountains, extending into Mexico and portions of Canada. Locally it is found mainly west of the Cascades in both Oregon and Washington. The purple martin is believed to primarily use artificial nestboxes for its colonial nesting in this area. Most nests are near rivers and estuaries, as the birds forage over open water and fields. Its diet is composed of flying insects caught on the wing. This species winters in S. America.

White-tailed jackrabbit

This species ranges from eastern Washington to N.E. CA, east to Minnesota, Iowa and Kansas in sagebrush steppe, native grassland and, now, cultivated fields. Its diet is composed of grasses, forbs, shrub tips, and bark. Some habitat exists within the extreme east end of the Scenic Area near The Dalles in OR, and Dallesport in WA.

Washington ground squirrel

This species is a Pacific Northwest endemic; eastern central Washington and north Central Oregon. The WA ground squirrel requires sandy soil in sagebrush-steppe communities. Much of this habitat has been converted to agricultural lands. This species is not currently documented in the Scenic Area, although it may have been present historically along the eastern edge.

Gray-tailed vole

This small herbivore has a very limited range, with distribution limited to Clark County in WA, and the Willamette valley in Oregon. Its habitat consists of low-elevation grassland. In the last century, this habitat has been rapidly converted to agriculture use, of which the species seems to have successfully adapted. The Scenic Area overlaps slightly with its range on the extreme west edge, at Steigerwald NWR.

Columbia River tiger beetle

This predatory beetle is endemic to the Columbia and Snake River sandbars east of the Cascade crest. Much of its habitat has been lost with the construction of mainstem dams, and human disturbance of remaining sandbar habitat. Little is currently known of its present distribution or population trend.

Yuma Skipper butterfly

The main population of this species is in the Great Basin area w/outliers in central and eastern OR/WA. Its habitat is thought to be in low elevation alkaline aridlands, usually around freshwater marshes, streams, ponds or canals that contain *Phragmites* reeds. The one record within the Scenic Area was in 1999, where it was found at Maryhill on ornamental *Miscanthus* (Pyle, 2002).

Chinquapin hairstreak butterfly

This butterfly ranges from Baja to southern Washington. In Oregon and Washington, the species requires chinquapin (*Chrysolepis chrysophylla*) as a host plant, versus oaks in California. Within the Scenic Area, it is known from Stevenson, WA, and it may occur in Oregon around Cascade Locks if the host plants are present.

Johnson's hairstreak butterfly

This butterfly ranges from central California to southwest BC; in the Cascades, Blue/Wallowas, Coast and Siskiyou. The Johnson's hairstreak is linked to old-growth and mature forest habitat. Caterpillars feed on dwarf mistletoe on western hemlock and Douglas-fir.

AQUATIC SPECIES

For purposes of addressing Pacific salmon and other aquatic species of local interest within the context of their status and life history, brief summaries from various sources are presented in this document. Additional information related to brief life history information, status of populations at the Evolutionary Significant Unit (ESU) or Distinct Population Segment (DPS) scale, threats and conservation measures can be found in the following sources:

- Regional Invasive Plant EIS Fisheries Biological Assessment, Environmental Baseline,
- NMFS Federal Register documents (<http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm>),
- USFWS Federal Register documents (<http://www.fws.gov/pacific/bulltrout/>),
- Lower Columbia Salmon Recovery and Fish and Wildlife Plan (<http://www.nwcouncil.org/fw/subbasinplanning/lowerColumbia/plan/>)
- Draft Columbia River and Puget Sound Bull Trout Recovery Plans (<http://www.fws.gov/pacific/bulltrout/recovery.html>)

Federally Listed Fish Species (Section 7, Endangered Species Act)

Lower Columbia River Steelhead ESU

The Columbia River Gorge National Scenic Area and Gifford Pinchot National Forest are located within the Lower Columbia River Steelhead ESU in Oregon and Washington. The Lower Columbia River steelhead ESU was listed as threatened on March 19, 1998 (63 FR 13347). The Lower Columbia River ESU encompasses all steelhead runs in tributaries between and including the Cowlitz and Wind Rivers on the Washington side of the Columbia River, and the Willamette and Hood Rivers on the Oregon side. Recovery planning for Lower Columbia River steelhead is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_wlc.htm

Critical habitat was designated for Lower Columbia River steelhead on February 16, 2000 (65 FR 7764), but was vacated by court order on April 30, 2002. Critical Habitat for this species was proposed on December 14, 2004 (69 FR 74572). A final designation was published on September 2, 2005 (70 FR 52630).

The populations of steelhead that make up the Lower Columbia River ESU are distinguished from adjacent populations by genetic and habitat characteristics. The ESU consists of summer and winter coastal steelhead runs in the tributaries of the Columbia River as it cuts through the Cascades. These populations are genetically distinct from inland populations (east of the Cascades), as well as from steelhead populations in the Upper Willamette River basin and coastal runs north and south of the Columbia River mouth. The following runs are not included in the ESU: the Willamette River above Willamette Falls (Upper Willamette River ESU), the Little and Big White Salmon rivers (Middle Columbia River ESU), and runs based on four imported hatchery stocks (early-spawning winter Chambers Creek/Lower Columbia River mix, summer run Skamania Hatchery stock, winter Eagle Creek National Fish Hatchery stock, and winter run Clackamas River ODFW stock) (NOAA Fisheries 1998). This area has at least 36 distinct runs (Busby et al. 1996), 20 of which were identified in the initial listing petition. In addition, numerous small tributaries have historical reports of fish, but no current abundance data.

The major runs in the ESU for which there are estimates of run sizes and trends are the Coweeman River winter runs, North and South Fork Toutle River winter runs, Kalama River winter and summer runs, East Fork Lewis River winter run, Wind River summer runs, Clackamas River winter run, and Sandy River winter run.

Distribution within Action Area

National Forest lands are found within six 4th HUC sub-basins identified for this ESU: Lower Cowlitz, Lower Columbia/Clatskanie, Lower Columbia/Sandy, Clackamas, Middle Columbia/Hood, and Lewis. There are 23 streams all together in this ESU that have at least five miles of anadromous fish habitat inside NF land. Clackamas River inside Clackamas sub-basin (42 miles) and Wind Creek inside Lower Columbia/Hood sub-basin (19 miles) are the two rivers that have the highest amount of anadromous fish habitat (as shown in the parentheses) within this ESU.

Lower Cowlitz sub-basin, approximately 15 percent of which is within Gifford Pinchot NF, has 1 major stream, NF Toutle River, which contains more than five miles of anadromous fish habitat inside the National Forest land. NF Toutle River holds roughly 12 miles of anadromous fish habitat inside the NF land.

Lower Columbia/Clatskanie sub-basin (with 30 percent as part of the ESU area, approximately 10 percent of which is within Gifford Pinchot NF) does not have any major streams that contain more than five miles of anadromous fish habitat inside the National Forest land.

Lower Columbia/Sandy sub-basin, approximately 35 percent of which is within Mt. Hood NF, another 10 percent of which is within Columbia River Gorge National Scenic Area, and another few percent of which is within Gifford Pinchot NF, has 4 major streams that contain more than five miles of anadromous fish habitat inside the National Forest land, all of which are on the Oregon side.

Middle Columbia/Hood sub-basin (with 45 percent as part of the ESU area, approximately 35 percent of which is within Gifford Pinchot NF, another 30 percent of which is within Mt. Hood NF, and another 5 percent of which is within Columbia River Gorge NF) has 13 major streams that contain more than five miles of anadromous fish habitat inside the National Forest land, including Columbia River, WF Hood River, Lake Branch, MF Hood River, EF Hood River, Dog River, Eagle Cr., Wind Cr., Trout Cr., Panther Cr., Herman Cr. EF Hood River holds roughly 13 miles of anadromous fish habitat inside Mt Hood NF land, and Wind Cr. holds roughly 19 miles of that on Gifford Pinchot NF land.

Lewis sub-basin (with 30 percent as part of the ESU area, approximately 50 percent of which is within Gifford Pinchot NF) has 1 major stream, EF Lewis River, which contains more than five miles of anadromous fish habitat inside the National Forest land. EF Lewis River holds roughly 8 miles of anadromous fish habitat inside the NF land.

Middle Columbia Rive Steelhead ESU

Columbia River Gorge National Scenic Area is located within the Middle Columbia River Steelhead ESU in Oregon and Washington. The Middle Columbia River steelhead ESU was listed as threatened on March 25, 1999 (64 FR 14517). The Middle Columbia River ESU encompasses Columbia River basin and tributaries upstream from and exclusive of the Wind River in Washington and the Hood River in Oregon, to and including the Yakima River in Washington. Recovery planning for Middle Columbia River steelhead is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_columbia.htm

Critical habitat was designated for Middle Columbia River steelhead on February 16, 2000 (65 FR 7764), but was vacated by court order on April 30, 2002. Critical Habitat for this species was proposed on December 14, 2004 (69 FR 74572). A final designation was published on September 2, 2005 (70 FR 52630).

Distribution with Action Area

Columbia River Gorge National Scenic Area is found within Middle Columbia/Hood 4th HUC sub-basin identified for this ESU. The Middle Columbia/Hood sub-basin has 45 percent as part of the ESU area, approximately 10 percent of which is within Mt. Hood NF. This species uses the mainstem of the Columbia River as migration to other 4th HUC subbasins in the Middle Columbia ESU.

Major drainages in this ESU are the Deschutes, John Day, Umatilla, Walla-Walla, Yakima, and Klickitat river systems. The Columbia River Gorge National Scenic Area covers the lower Klickitat river. Almost all steelhead populations within this ESU are summer-run fish, the exceptions being winter-run components returning to the Klickitat and Fifteen Mile Creek watersheds. A balance between 1- and 2-year-old smolt emigrants characterizes most of the populations within this ESU. Adults return after 1 or 2 years at sea.

Most fish in this ESU smolt at two years and spend one to two years in salt water before re-entering fresh water, where they may remain up to a year before spawning. Age-2-ocean steelhead dominate the summer steelhead run in the Klickitat River, whereas most other rivers with summer steelhead produce about equal numbers of both age-1- and 2-ocean fish. Juvenile life stages (i.e., eggs, alevins, fry, and parr) inhabit freshwater/riverine areas throughout the range of the ESU. Parr usually undergo a smolt transformation as 2-year-olds, at which time they migrate to the ocean. Subadults and adults forage in coastal and offshore waters of the North Pacific prior to returning to spawn in their natal streams. A non-anadromous form of *O. mykiss* (redband trout) co-occurs with the anadromous form in this ESU, and juvenile life stages of the two forms can be very difficult to differentiate. In addition, hatchery steelhead are also distributed within the range of this ESU.

Upper Columbia River Steelhead ESU

The mainstem of the Columbia River within boundaries of the Columbia River Gorge National Scenic Area is used as a migration corridor by the Upper Columbia River steelhead. The Upper Columbia River steelhead ESU was listed as endangered on August 18, 1997 (62 FR 43937). The Upper Columbia River ESU encompasses Columbia River basin and tributaries upstream from and exclusive of the Yakima River in Washington, to the U.S.-Canadian border.

Recovery planning for Upper Columbia River steelhead is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_columbia.htm

Critical habitat was designated for Upper Columbia River steelhead on February 16, 2000 (65 FR 7764), but was vacated by court order on April 30, 2002. Critical Habitat for this species was proposed on December 14, 2004 (69 FR 74572). A final designation was published on September 2, 2005 (70 FR 52630).

Snake River spring/summer chinook salmon ESU

The Snake River spring/summer chinook salmon ESU uses the mainstem of the Columbia River as migration in order to reach Snake River. The species was listed as threatened on April 22, 1992 (57 FR 14653), includes all natural-origin populations in the Tucannon, Grande Ronde, Imnaha, and Salmon Rivers. Some or all of the fish returning to several of the hatchery programs are also listed including those returning to the Tucannon River, Imnaha, and Grande Ronde hatcheries, and to the Sawtooth, Pahsimeroi, and McCall hatcheries on the Salmon River. This ESU includes production areas that are characterized by spring-timed returns, summer-timed returns, and combinations from the two adult timing patterns. Runs classified as spring chinook are counted at Bonneville Dam beginning in early March and ending the first week of June; runs classified as summer chinook return to the Columbia River from June through August. Returning fish hold in deep mainstem and tributary pools until late summer, when they emigrate up into tributary areas and spawn. In general, spring type chinook tend to spawn in higher elevation reaches of major Snake River tributaries in mid- through late August, and summer run Snake River chinook spawn approximately 1 month later than spring-run fish.

Recovery planning for Snake River spring/summer chinook is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_columbia.htm

Critical habitat was designated for Snake River spring/summer chinook salmon on December 28, 1993 (58 FR 68543). Critical habitat is designated to include river and tributary reaches presently or historically accessible (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams) to Snake River spring/summer chinook salmon in the Snake River basin. Migratory habitat in the Columbia River mainstem from the mouth to the Snake River confluence is also included.

Snake River fall Chinook ESU

The Snake River fall Chinook use the mainstem of the Columbia River as migration in order to reach Snake River. The Snake River fall chinook salmon ESU, listed as threatened on April 22, 1992, (57 FR 14653), includes all natural populations of fall chinook salmon in the mainstem Snake River below Hell's Canyon Dam, and the Tucannon, Palouse (to Palouse Falls), Grande Ronde, Imnaha, Salmon, and Clearwater Rivers. Fall chinook from the Lyons Ferry Hatchery are included in the ESU but are not listed. Recovery planning for Snake River fall chinook is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_columbia.htm

Critical habitat was designated for Snake River fall chinook salmon on December 28, 1993, (58 FR 68543). Critical habitat for the listed ESU is designated to include river reaches presently or historically accessible (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams) to Snake River fall chinook salmon in the Columbia River from its mouth upstream to the confluence of the Columbia and Snake Rivers; all Snake River reaches from the confluence of the Columbia River, upstream to Hells Canyon Dam; the Palouse River from its confluence with the Snake River upstream to Palouse Falls; the Clearwater River from its confluence with the Snake River upstream to its confluence with Lolo Creek; the North Fork Clearwater River from its confluence with the Clearwater River upstream to Dworshak Dam.

Upper Columbia River Spring-Run Chinook ESU

The Upper Columbia River Spring-Run Chinook use the mainstem of the Columbia River as migration in order to reach the upper region of the Columbia River. The Upper Columbia River chinook salmon ESU, listed as endangered on March 24, 1999 (64 FR 14308), includes all natural populations of spring-run chinook salmon spawning in all river reaches accessible to chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River

Recovery planning for Upper Columbia River chinook is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_columbia.htm

Critical habitat was designated for Upper Willamette River chinook salmon on February 16, 2000 (65 FR 7764), but vacated by court order on April 30, 2002. Critical Habitat for this species was proposed on December 14, 2004 (69 FR 74572). A final designation was published on September 2, 2005 (70 FR 52630).

Lower Columbia River Chinook ESU

The Columbia River Gorge National Scenic Area, and Gifford Pinchot National Forest are located within the Lower Columbia River Chinook ESU in Oregon and Washington. The Lower Columbia River chinook salmon ESU, listed as threatened on March 24, 1999 (64 FR 14308), includes all natural populations of chinook salmon spawning below impassable natural barriers from the mouth of the Columbia River to the crest of the Cascade Range, just east of the Hood River in Oregon and the White Salmon River in Washington. This ESU excludes populations above Willamette Falls and in the Clackamas River.

Recovery planning for Lower Columbia River chinook is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_wlc.htm

Critical habitat was designated for Lower Columbia River chinook salmon on February 16, 2000 (65 FR 7764), but vacated by court order on April 30, 2002. Critical Habitat for this species was proposed on December 14, 2004 (69 FR 74572). A final designation was published on September 2, 2005 (70 FR 52630).

Distribution with Action Area

Lower Cowlitz sub-basin, approximately 15 percent of which is within Gifford Pinchot NF, has 1 major stream, NF Toutle River, which contains more than five miles of anadromous fish habitat inside the National Forest land. NF Toutle River holds roughly 12 miles of anadromous fish habitat inside the NF land.

Lower Columbia/Clatskanie sub-basin, less than 5 percent of which is within Gifford Pinchot NF, does not have any major streams that contain more than five miles of anadromous fish habitat inside the National Forest land.

Lower Columbia/Sandy sub-basin, approximately 35 percent of which is within Mt. Hood NF, another 10 percent of which is within Columbia River Gorge National Scenic Area, and another few percent of which is within Gifford Pinchot NF, has 4 major streams that contain more than five miles of anadromous fish habitat inside the National Forest land.

Middle Columbia/Hood sub-basin (with 45 percent as part of the ESU area, approximately 35 percent of which is within Gifford Pinchot NF, another 30 percent of which is within Mt. Hood NF, and another 5 percent of which is within Columbia River Gorge National Scenic Area) has 11 major streams that contain more than five miles of anadromous fish habitat inside National Forest land, including Columbia River, WF Hood River, Lake Branch, MF Hood River, EF Hood River, Dog River, Eagle Cr., Wind River, Trout Cr., Panther Cr., and Herman Cr. Some of these streams are located on the Oregon side. Wind River holds roughly 19 miles of that inside Gifford Pinchot NF land.

Lewis sub-basin (with 30 percent as part of the ESU area, approximately 50 percent of which is within Gifford Pinchot NF) has 1 major stream, EF Lewis River, which contains more than five miles of anadromous fish habitat inside the National Forest land. EF Lewis River holds roughly 8 miles of anadromous fish habitat inside the NF land.

The LCR chinook salmon ESU has been subject to intensive hatchery influence. Hatchery programs to enhance chinook salmon fisheries in the lower Columbia River began in the 1870s, releasing billions of fish over time. That equals the total hatchery releases for all other chinook ESUs combined (Myers et al. 1998). Although most of the stocks have come from inside the ESU, more than 200 million fish from outside the ESU have been released since 1930 (Myers et al. 1998). In addition, the exchange of eggs between hatcheries in this ESU has led to the extensive genetic homogenization of hatchery stocks (Utter et al. 1989).

Lower Columbia River Coho ESU

Originally part of a larger Lower Columbia River/Southwest Washington ESU, Lower Columbia River coho were identified as a separate ESU and listed as threatened on June 28, 2005. The ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, and includes the Willametter River at Willametter Falls, Oregon, as well as twenty-five propagation programs that were determined not to be divergent relative to the local natural population(s) within the ESU.

Distribution within the Action Area

Lower Cowlitz sub-basin, approximately 15 percent of which is within Gifford Pinchot NF, has 1 major stream, NF Toutler River, which contains more than five miles of anadromous fish habitat inside the National Forest land. NF Toutle River holds roughly 12 miles of anadromous fish habitat inside the NF land.

Lower Columbia/Clatskanie sub-basin, less than 5 percent of which is within Gifford Pinchot NF, does not have any major streams that contain more than five miles of anadromous fish habitat inside the National Forest land.

Lower Columbia/Sandy sub-basin, approximately 35 percent of which is within Mt. Hood NF, another 10 percent of which is within Columbia River Gorge National Scenic Area, and another few percent of which is within Gifford Pinchot NF, has 4 major streams that contain more than five miles of anadromous fish habitat inside the National Forest land.

Middle Columbia/Hood sub-basin (with 45 percent as part of the ESU area, approximately 35 percent of which is within Gifford Pinchot NF, another 30 percent of which is within Mt. Hood NF, and another 5 percent of which is within Columbia River Gorge National Scenic Area) has 11 major streams that contain more than five miles of anadromous fish habitat inside the National Forest land. The majority of these streams are on the Oregon side.

Lewis sub-basin (with 30 percent as part of the ESU area, approximately half of which is within Gifford Pinchot NF) has 1 major stream, EF Lewis River, which contains more than five miles of anadromous fish habitat inside the National Forest land. EF Lewis River holds roughly 8 miles of anadromous fish habitat inside the NF land.

Columbia River Chum ESU

The Columbia River Gorge National Scenic Area and Gifford Pinchot National Forest are located within the Columbia River Chum ESU in Oregon and Washington. The Columbia River Chum ESU, listed as threatened on March 25, 1999 (64 FR 14508), includes all natural-origin populations of chum in lower Columbia River tributaries located downstream from Bonneville Dam on the Columbia River and Merwin Dam on the Lewis River. Historically, chum salmon were abundant in the lower reaches of the Columbia River, but currently are primarily limited to the tributaries downstream of Bonneville Dam. The majority of known natural chum salmon production (less than 1,000 annually) occurs in Grays River, Hamilton Creek (including Hamilton Springs), Duncan Creek, Ives Island complex, St. Cloud area of the Columbia River, and Hardy Creek. Annually, a small number of chum are counted passing Bonneville Dam as well; nothing is known about the behavior of these fish. There is incidental spawning of chum in the lower reaches of White Salmon, and small numbers may be using the mouth of tributaries above Bonneville dam.

Recovery planning for Columbia River chum salmon is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_wlc.htm

Critical habitat was originally designated for Columbia River chum salmon on February 16, 2000 (65 FR 7764), but was administratively withdrawn on April 30, 2002. Critical Habitat for this species was proposed on December 14, 2004 (69 FR 74572). A final designation was published on September 2, 2005 (70 FR 52630).

Distribution with Action Area

Middle Columbia/Hood sub-basin (with 20 percent as part of the ESU area, approximately 20 percent is within Mt. Hood NF, and another 15 percent of which is within Columbia River Gorge National Scenic Area) has 2 major streams that contain more than five miles of anadromous fish habitat inside the National Forest land, including Eagle Cr. and Herman Cr.

Lower Columbia/Sandy sub-basin (with 55 percent as part of the ESU area, approximately 10 percent of which is within Columbia River Gorge National Scenic Area, and another few percent of which is within Gifford Pinchot NF) does not have any major streams that contain more than five miles of anadromous fish habitat inside the National Forest land.

Snake River Sockeye ESU

No National Forest in Region Six is contained within the Snake River Sockeye ESU, which is located in Southwest Idaho. However, the Snake River Sockeye does use Columbia River and Snake River within Oregon and Washington as a migration corridor to get to and leave from their ESU area in Idaho. The Snake River sockeye salmon ESU was listed as endangered on November 20, 1991, (56 FR 58619) and includes populations of sockeye salmon from the Snake River basin, Idaho (extant populations occur in the Salmon River subbasin). Under NOAA Fisheries' interim policy on artificial propagation (58 FR 17573), the progeny of fish from a listed population that are propagated artificially are considered part of the listed species and are protected under ESA. Thus, although not specifically designated in the 1991 listing, Snake River sockeye salmon produced in the captive broodstock program are included in the listed ESU.

Recovery planning for Snake River sockeye is ongoing, and recovery planning status can be reviewed online at: http://research.nwfsc.noaa.gov/trt/trt_columbia.htm

Designated critical habitat (58 FR 68543, December 28, 1993) extends from the mouth of the Columbia River upstream to the Snake River confluence, up the Snake River to the Salmon River confluence, and up the Salmon River mainstem and tributaries to the five lakes still accessible (Stanley, Redfish, Yellow Belly, Pettit, and Alturas), and includes the lakes and their inlet creeks. Adult Snake River sockeye salmon enter the Columbia River in late spring and early summer and reach the spawning lakes in late summer and early fall. Smolts begin emigration in April, and are present in the Columbia River estuary through the early summer months.

Coastal Puget Sound Bull Trout DPS

Bull trout are native to North America. Although they closely resemble another char, the Dolly Varden (*Salvelinus malma*), and the ranges of the two species overlap along the Coastal/Puget Sound region of Washington State and British Columbia, bull trout are genetically more closely related to an Asian char (*Salvelinus leucomaenis*) than to Dolly Varden. Historically, bull trout have been recorded from the McCloud River in Northern California, the Klamath Basin in Oregon, and throughout much of interior Oregon, Washington, Idaho, western Montana and British Columbia. Bull trout also occur east of the Continental Divide in the headwaters of streams entering Hudson Bay and the Arctic Ocean (Quigley and Arbelbide 1997).

Bull trout express two distinct life history forms, resident and migratory (Rieman and McIntyre 1993). Resident populations are often found in headwater streams where they spend their entire lives. Migratory forms spawn in tributary streams, rear for one to three years before migrating downstream to larger rivers or lakes. Bull trout can also be anadromous in coastal and Puget Sound drainages but to a lesser extent than Dolly Varden (Brown 1992).

The Coastal Puget Sound DPS of bull trout encompasses all Pacific Coast drainages within the State of Washington, including Puget Sound. The DPS is separated from other populations of bull trout by the Columbia River basin to the south and the crest of the Cascade Mountain Range to the east. The population segment is highly significant to the species as a whole, since all types of bull trout can live in the Puget Sound area, including the only known anadromous forms of bull trout in the coterminous United States. Also unique to this population segment is the overlap in distribution with Dolly Varden, another native char species extremely similar in appearance to bull trout, but distinct genetically.

The USFWS has identified 347 subpopulations of native char (bull trout and/or Dolly Varden) within the Coastal Puget Sound DPS. These subpopulations were grouped into five analysis areas based on their geographic location: Coastal, Strait of Juan de Fuca, Hood Canal, Puget Sound, and Transboundary. These groupings were made to identify trends that may be specific to certain geographic areas. A total of 14 bull trout core areas occur within the Coast Puget Sound DPS, of which GPNF presumably has bull trout habitat in the Upper Nisqually River. No bull trout have been observed on GPNF lands in the Upper Nisqually River.

Critical habitat for bull trout does not include National Forest lands.

Columbia River Bull Trout DPS

The FWS recognizes 141 subpopulations of bull trout in the Columbia River DPS within Idaho, Montana, Oregon, and Washington with additional subpopulations in British Columbia. Approximately 79 percent are unlikely to be reestablished if extirpated and 50 percent are at risk of extirpation from naturally occurring events due to their depressed status (U.S. Fish and Wildlife Service, 1998b). Many of the remaining bull trout occur as isolated subpopulations in headwater tributaries, or in tributaries where the migratory corridors have been lost or restricted. Few bull trout subpopulations are considered “strong” in terms of relative abundance and subpopulation stability. Those few remaining strongholds are generally associated with large areas of contiguous habitats such as portions of the Snake River Basin in central Idaho, the Flathead River in Montana, the Wenaha River and the Blue Mountains in Washington and Oregon. The listing rule characterizes the Columbia River DPS as generally occurring as isolated subpopulations, without a migratory life form to maintain the biological cohesiveness of the subpopulations, and with trends in abundance declining or of unknown status.

Extensive habitat loss and fragmentation of subpopulations have been documented for bull trout in the Columbia River basin and elsewhere within its range (Rieman and McIntyre 1993). Reductions in the amount of riparian vegetation and road construction in the Columbia River basin due to timber harvest, grazing, and agricultural practices have contributed to habitat degradation through elevated stream temperatures, increased sedimentation, and channel embeddedness. Mining activities have compromised habitat conditions by discharging waste materials into streams and diverting and altering stream channels. Residential development has threatened water quality by introducing domestic sewage and altering riparian conditions. Dams of all sizes (i.e., mainstem hydropower and tributary irrigation diversions) have severely limited migration of bull trout in the Columbia River basin. Competition from non-native trout (U.S. Fish and Wildlife Service, 1998b) is also considered a threat to bull trout.

Generally, where status is known and population data exist, bull trout populations in the Columbia River DPS are declining (Thomas, 1992; Pratt and Huston, 1993; Schill, 1992). Bull trout in the Columbia River basin occupy about 45 percent of their estimated historic range (Quigley and Arbelbide, 1997). Quigley and Arbelbide (1997) considered bull trout populations strong in 13 percent of the occupied range in the interior Columbia River basin. Rieman et al. (1997) estimated that populations were strong in 6 to 24 percent of the subwatersheds in the entire Columbia River basin.

Distribution within the Action Area

The Columbia River bull trout distribution within the GPNF and CRGNSA Invasive Plant EIS planning area includes the Lower Columbia River recovery unit, which is one of 15 recovery units for the Columbia River bull trout DPS. This unit includes the Lewis River and Klickitat River core areas in Washington. Current distribution of bull trout in the Lower Columbia Recovery Unit is fragmented and bull trout exist in two core areas (Lewis and Klickitat).

Local populations are Rush and Pine creeks (Swift Creek Reservoir) and Cougar Cree (Yale lake) in the Lewis River Core Area; and the West Fork Klickitat River in the Klickitat River Core Area. The establishment of additional local populations in the Lewis River Core Area is essential to recovery. While no local populations within the White Salmon River have been identified, this system contains core habitat, and after reconnection with the Columbia River could support bull trout. Additional spawning and rearing areas within the Klickitat River have not been identified.

It is likely that historic distribution of bull trout was more expansive than currently observed. Bull trout in the Lower Columbia Recovery Unit persist at low levels in fragmented local populations. Migratory bull trout persist at low numbers within this recovery unit by virtue of adopting an adfluvial life history in Swift Creek Reservoir and Yale Lake. Adult population estimates for bull trout in Swift Creek Reservoir (Pine and Rush creeks combined) ranged from 101 to 542 from 1994 to 2001, respectively. The majority of spawning occurs in Rush Creek and the 8-year average for both creeks is 309 bull trout. Bull trout in Rush and Pine creeks are not at risk from inbreeding depression. Conversely, the local population in Cougar Creek is significantly below 100 individuals and is considered at risk. Overall, the Lewis Core Area is probably below 1,000 spawning adults annually and should be considered at risk from the deleterious effects of genetic drift.

Bull trout in the West Fork Klickitat local population are thought to be primarily resident and low numbers indicate that this local population is at risk from inbreeding depression. If fluvial bull trout persist in the Klickitat Core Area, their abundance is most likely below 100 spawning adults, and therefore should be considered at risk from inbreeding depression. Abundance of both resident and migratory bull trout in the Klickitat Core Area is likely below 1,000 spawning individuals and the core area is considered at risk from genetic drift.

Bull trout in this area are threatened by habitat fragmentation and degradation, blockage of migratory corridors, poor water quality, past fisheries management practices, improper grazing practices and the introduction of non-native species. A discussion of bull trout status within Lower Columbia River Recovery Unit can be found in Chapter 20 of the Draft Bull Trout Recovery Plan (U.S. Fish and Wildlife Service 2002a).

Final designation of critical habitat includes 121 stream miles, but only for non-Federal lands that have greater than ½ mile of river frontage and are located between specific endpoints for the streams. Final critical habitat is designated stream segments on Lewis River (Lower), Lewis River (Upper), Pine Creek, unnamed creek off Swift Creek Reservoir, unnamed creek off Pine Creek, White Salmon River, Clearwater Creek, Fish Lake Stream, Klickitat River, Little Muddy Creek, Trappers Creek, Two Lakes Stream, unnamed off Fish Lake Stream, and West fork Klickitat River.

Critical habitat for bull trout does not include National Forest lands.

Forest Service Sensitive Aquatic Species

Columbia dusksnail (*Lyogyrus n. sp. 1*)

(From Frest and Johannes, 1999)

This conch snail species is found in springs and spring outflows, from low to high elevations, in cold, pure, well-oxygenated water. It is found most often in small springs on soft substrates. This species is endemic to the Columbia River Gorge, on both sides of the river, and was found west of the Cascade crest. It is currently found sporadically in the central and eastern Columbia River Gorge. It is on the

Regional Forester's sensitive species list on the Columbia River Gorge National Scenic area and the Gifford Pinchot National Forests.

Pygmy Whitefish (*Prosopium coulteri*)

The following species description is from Hallock and Mongillo (1998). The pygmy whitefish is a remnant of the last ice age with spotty distribution across northern North America. They are in Lake Superior, western Montana, northern Idaho, Washington, southwest Alaska and western Canada. The species has also been found on the Chukotski Peninsula in Russia. The pygmy whitefish is most commonly found in cool lakes and streams of mountainous regions. Pygmy whitefish spawn in streams or lakes from late summer to early winter, depending on location.

Historically the pygmy whitefish was found in at least 15 lakes in Washington, but the current distribution is limited to nine. Piscicides, introductions of exotic fish species or declining water quality were responsible for extirpation in six lakes. Washington State is at the extreme southern edge of their native range in North America. Pygmy whitefish have not been documented on Gifford Pinchot National Forest and are currently distributed in lakes off National Forest lands.

Interior Redband Trout (*Oncorhynchus mykiss ssp.*)

The Interior Redband trout (often referred to as the Columbia River redband trout, Fraser River redband trout, Kamloops trout or steelhead) is a subspecies of the coastal rainbow trout (*Oncorhynchus mykiss irideus*) that is native to western North America. Interior Redband Trout have been a subject of regional concern for many years, but little is known about its genetic purity, abundance, and habitat requirements and locations. Redbands are typically a stream-resident fish that make short spawning migrations either in the same stream or often into smaller tributaries. Physiological studies have strongly suggested that the redbands are better adapted to local adverse environmental conditions. Although redband trout prefer cool, clean, relatively low gradient streams, they are able to withstand a wider temperature variation than other trout. Interior redband trout reach sexual maturity in 2 to 3 years. They spawn from late April through mid-June, depending on water temperatures. The fry typically emerge from the gravel in mid-July.

Interior redband trout feed mainly on aquatic insects but eat what is available to them. Large adults also eat fish. River populations are mostly insect eaters. Redbands have hybridized with westslope cutthroat trout and these crosses are considered to be naturally occurring and historic. Hybridization between redbands and rainbows is considered to be a danger to the continued existence of redband trout.

The historic range of the redband extended from the eastern slope of the Cascade Range south to the Sacramento-San Joaquin basin, east into northwestern Montana, and north into upper north British Columbia, Canada. Little is known about exact locations of existing resident interior redband populations. These fish have not been documented on Gifford Pinchot National Forest.

Washington State Listed Species on the Columbia River Gorge National Scenic Area

The following species are on Washington state endangered species lists. Bull trout and anadromous salmonid species, which are also on the state list, have been discussed above.

River Lamprey

River lampreys (*Lampetra ayresii*) are found from just north of Juneau, Alaska, to San Francisco Bay in California. However, detailed information on their distribution is lacking. River lampreys are associated with large river systems such as the Fraser, Columbia, Klamath, Eel, and Sacramento Rivers. River lamprey production appears to be concentrated only in particular rivers, and only in the lower portions of these large rivers. The river lamprey is thought to be closely related to the resident western brook lamprey (69 FR 247, 12/27/2004).

Little information is available on river lamprey life history. Metamorphosis from the ammocoete to macrophthymia life stage occurs between July and April. Macrophthymia are thought to live deep in the river channel, which may explain why they are rarely observed. As adults, their oral disc develops just before they enter the ocean between May and July. During the approximately 10 weeks they are at sea in the parasitic phase, they remain close to shore, feeding primarily on smelt and herring near the surface. Their life span is 6 to 7 years. River lampreys lay 11,400 to 37,300 eggs per adult female (ibid).

In Washington, there are no historical distribution records for river lamprey, although the species probably occurred in most major rivers. The current distribution of river lamprey includes rivers and streams along the coast from the mouth of the Columbia River to the mouth of the Hoh River, throughout Puget Sound, and in the Lake Washington basin, but not on the Olympic Peninsula. Two records (1931 and 1959) of river lamprey in Lake Cushman, suggest this lake may have once supported an adfluvial (lake dwelling) population. River lamprey ammocoetes were trapped in the 1980s in the lower reach of the Nisqually River, but no river lamprey population estimates or in-stream distribution information are available.

Eulachon

Eulachon (*Thaleichthys pacificus*) occur from northern California to southwestern Alaska; annually ascend the Columbia River to spawn in the mainstem and its tributaries downstream of Bonneville Dam; occur in offshore marine waters and spawn in tidal portions of rivers; spawn in variety of substrates but sand most common; juveniles rear in nearshore marine areas; plankton-feeders eating crustaceans such as copepods and euphausiids; larvae and post-larvae eat phytoplankton, copepods; important prey species for fishes, marine mammals, and birds. The fish typically enter the Columbia River in early to mid-January, followed by tributary entry in mid to late January. Within the Scenic Area, eulachon are presently known to spawn in the mainstem Columbia River as well as the Sandy River from December to May, with peak spawning from February to March. Historically this species spawning distribution was to the Hood River, prior to the construction of Bonneville Dam.

Spawning occurs during spring when water temperature is 40 to 50 degrees F (4 to 10 degrees C). Eggs stick to substrate and incubation is temperature-dependent (range 20 to 40 days). Larvae drift downstream to salt water to April

Leopard dace

Leopard Dace (*Rhinichthys falcatus*) are a small cyprinid fish that have a distribution restricted to the Fraser and Columbia River systems east of the Cascade Mountains. Much of the original habitat of these fishes in the Columbia River is now dammed.

Within Washington, Leopard dace currently inhabit the lower, mid, and upper sections of the Columbia, Snake, Yakima and Similkameen Rivers; utilize habitat on or near the bottom of streams and small to mid-sized rivers with velocities less than 1.6 feet/sec (0.5 m/second); prefers gravel and small cobble substrate covered by fine sediment with summer water temperatures ranging between 59 and 64 degrees F (15 and 18 degrees C); juveniles feed primarily on aquatic insects, adult leopard dace consume terrestrial insects; breeding occurs during the summer, where adhesive eggs are broadcasted over gravel beds. Spawning takes place from May to July. Incubation and emergence is unknown.

Mountain sucker

Distribution of Mountain sucker (*Catostomus platyrhynchus*) is restricted to Columbia River system, could potentially be in lower Klickitat River; found in clear, cold mountain streams less than 40 feet wide and in some lakes; prefer deep pools in summer with moderate current; juveniles prefer slower side channels or weedy backwaters; diet consists largely of diatoms and algae scraped from rocky substrates. Spawning occurs from June to July.

California floater (mussel)

The California floater (*Anadonta californiensis*) is a freshwater filter feeder requiring clean, well-oxygenated water; declining through much of historical range; known to occur in Columbia and Okanogan Rivers and several lakes; Known sites within the NSA include impounded ponds adjacent to the Columbia River; intolerant of habitats with shifting substrates, excessive water flow fluctuations, or seasonal hypoxia; fertilization takes place within the brood chambers of the female mussel; the fertilized eggs develop into a parasitic stage called glochidia; released glochidia attach to species-specific host fish; juvenile and adult mussels attach to gravel and rocks; More sites are being documented as surveys are ramping up for all native mussel species. Spawning takes place in the spring. Incubation is in a brood pouch, duration unknown, glochidia attach to host fish during metamorphosis

Great Columbia River spire snail

The Columbia pebble snail, or great Columbia River spire snail, is a member of the *Hydrobiidae* family, which includes several species of endangered aquatic snails. All species of this family have gills, and thus require streams with a relatively high dissolved oxygen content. Suitable streams for these snails must be relatively pristine as well, since high turbidity levels may injure or clog their fragile gill tissue. Due to these requirements, the Columbia pebble snail is only found in the colder, clear streams of the Snake-Columbia River system. Columbia pebble snails graze on submerged gravel, scraping algae off the rocks with a toothed appendage called a radula. These snails are quite short-lived, usually reaching sexual maturity within a year, at which time they breed and die. Because about 90 percent of the population turns over annually, a disruption or disturbance during the breeding season can have devastating effects. Hydroelectric projects along the Snake and Columbia Rivers significantly reduced populations of this snail due to the increase of water agitation below dams as well as decreased levels of aquatic primary producers (<http://www.pacificbio.org/ESIN/ESIN.html>).

Historically, Columbia pebblesnails were widespread throughout the Lower Snake and Columbia Rivers, as well as their larger tributaries. Today, however, this species is limited to the relatively few reaches of the Columbia River system that remain free-flowing. Recent surveys have confirmed the presence of this species in a few sites along the Columbia, Okanogan, Wenatchee and Methow Rivers in Washington, as well as the Deschutes River in Oregon, and the Snake River in Idaho (ibid).

Giant Columbia River limpet

Historically, the Giant Columbia River limpet (*Fisherola nuttalli*) was in almost the entire Columbia River basin, now it is restricted to a few remaining sites. In WA, it was confirmed in the Hanford Reach of the Columbia River, as well as the Okanogan, Wenatchee and Methow rivers. In OR, it is only found in the Deschutes River. It's been found in streams and rivers, at least 30 meters wide, up to 100 meters wide. Waters are unpolluted, cold, well-oxygenated, with a permanent flow and cobble-boulder substrate. Limpet habitat occurs on diatom covered rocks in the main channels, or fast-flowing water (rapids), of streams. They feed by scraping algae and diatoms from rock surfaces in the streams and may occasionally feed on other plant surfaces. They are sporadically distributed at present in the Columbia River and in a few major tributaries in Idaho, Montana, Oregon, and Washington. Populations have been lost from most tributaries and almost all the Columbia River itself; impoundment, nutrient enhancement, and loss of rocky substrate are common threats.

