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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

FEB 24 2011

In Reply Refer To:
13410-2010-F-0606

Janine Clayton
Forest Supervisor
Gifford Pinchot National Forest
10600 NE 51st Circle
Vancouver, Washington 98682

Dear Ms. Clayton:

This document transmits the U.S. Fish and Wildlife Service's Biological Opinion and letter of concurrence based on our review of the proposed Pepper Cat Thin Timber Sale located on the Mount St. Helens National Volcanic Monument, Gifford Pinchot National Forest, Skamania County, Washington. The attached document evaluates the effects of the proposed action on the threatened bull trout (*Salvelinus confluentus*), designated bull trout critical habitat, the northern spotted owl (*Strix occidentalis caurina*) (spotted owl), and designated spotted owl critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your November 10, 2010 request for formal consultation was received on November 15, 2010.

The Biological Opinion is based on information provided in the November 10, 2010 Biological Assessment for fisheries, the September 20, 2010 Biological Assessment for wildlife, and other communications between our staff. Copies of all correspondence regarding this consultation are on file in the U.S. Fish and Wildlife Service's Washington Fish and Wildlife Office in Lacey, Washington.

In summary, the enclosed Biological Opinion and letter of concurrence concludes that the proposed action "is not likely to adversely affect" the spotted owl, bull trout, and designated bull trout critical habitat, and, the proposed action "is not likely to adversely modify" designated

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spotted owl critical habitat. If there are any questions about this consultation or your responsibilities under the Endangered Species Act, please contact Vince Harke (360/753-9529) or Carolyn Scafidi (360/753-4068), of this office.

Sincerely,

Ken S. Berg, Manager
Washington Fish and Wildlife Office

cc:
Gifford Pinchot National Forest, Vancouver, WA (C. Chandler)
Gifford Pinchot National Forest, Vancouver, WA (D. Hu)

Biological Opinion and Letter of Concurrence for the Pepper Cat Thin Timber Sale Mt. St. Helens National Volcanic Monument, Gifford Pinchot National Forest

U.S. Fish and Wildlife Service Reference: **13410-2010-F-0606**

U.S. Department of the Interior
Fish and Wildlife Service
Washington Fish and Wildlife Office
Lacey, Washington

February 2011

Ken S. Berg, Manager
Washington Fish and Wildlife Office

2-24-2011
Date

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LIST OF ACROYNMS AND ABBREVIATIONS

ACS	Aquatic Conservation Strategy
Act	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)
BA	Biological Assessment
CHU	Critical Habitat Unit
dbh	Diameter at Breast Height
ECA	Equivalent Clearcut Area
Forest	Mt. St. Helens National Volcanic Monument, Gifford Pinchot National Forest
LSR	Late-Successional Reserves
mbf	Thousand Board Feet
MOCA	Managed Owl Conservation Areas
NWFP	Northwest Forest Plan
Opinion	Biological Opinion
PCE	Primary Constituent Element
project	Pepper Cat Think Timber Sale
Service	U.S. Fish and Wildlife Service
Spotted Owl	Northern Spotted Owl

Introduction

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) and letter of concurrence based on our review of the proposed Pepper Cat Thin Timber Sale located on the Mt. St. Helens National Volcanic Monument, Gifford Pinchot National Forest (Forest), Skamania County, Washington. The attached Opinion and letter of concurrence evaluates the effects of the proposed action on the threatened bull trout (*Salvelinus confluentus*), designated bull trout critical habitat, the threatened northern spotted owl (*Strix occidentalis caurina*) (spotted owl), and designated spotted owl critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This Opinion and letter of concurrence is based on information provided in the November 10, 2010 Biological Assessment (BA) for listed fish species, the September 20, 2010 BA for listed wildlife species, and other communications between the Service and Forest staff. Formal consultation was initiated on November 15, 2010, with the submission of the final BA for bull trout and bull trout critical habitat. Copies of all correspondence regarding this consultation are on file in the U.S. Fish and Wildlife Service's Washington Fish and Wildlife Office in Lacey, Washington.

CONSULTATION HISTORY

Northwest Forest Plan

National Forest and Bureau of Land Management Land and Resource Management Plans in Washington, Oregon, and northern California were amended in 1994 with the Northwest Forest Plan (USDA and USDI 1994b) (NWFP) to provide for the conservation of late-successional forest habitat and the species that depend on it, such as the spotted owl. The NWFP also established management provisions for the protection and restoration of the aquatic habitats through the Aquatic Conservation Strategy (ACS) and designation of Riparian Reserves. The Service subsequently issued a non-jeopardy Opinion (USFWS 1994) on these amendments for effects to species listed under the Act that occurred on Federal lands within the range of the spotted owl. Because the NWFP is a range-wide management strategy, the Service did not quantify or exempt incidental take for site-specific management actions. Therefore, additional consultation on Federal actions within the NWFP area is considered appropriate, including the activities considered in this document.

Additional species have been listed for protection under the Act in the NWFP area since 1994, including bull trout. The Service's non-jeopardy Opinion on the effects to bull trout from the continued implementation of the NWFP was originally issued May 25, 2000. This Opinion was revised in 2004, to evaluate proposed changes to the ACS objectives and effects to proposed bull trout critical habitat. The Service concluded that implementation of the ACS is generally beneficial to bull trout and should result in maintaining or restoring properly functioning aquatic conditions within the NWFP area (USFWS 2004). The Service revised designated bull trout critical habitat on October 18, 2010 to include many rivers, streams, and lakes on National Forest lands. To date, the Forest Service and Bureau of Land Management have not reinitiated consultation for the 2010 bull trout critical habitat within the NWFP area.

Pepper Cat Thin Timber Sale

On November 9, 2009, the Forest released a public scoping notice to solicit comments for the proposed Pepper Cat Thin Timber Sale. The scoping notice announced that comments received on the proposal would be considered by the Forest in the preparation of an Environmental Assessment under the National Environmental Policy Act. Because the Service has an opportunity to comment directly on Forest proposals through the interagency Level One Team, we chose not to submit comments in response to the scoping notice.

In May, 2010, the Forest provided a draft copy of the wildlife BA via email for early Service review and comments. Service comments on the draft BA were provided in June 2010, and incorporated into a final BA that was submitted for consultation on September 20, 2010.

On June 24, 2010, the Forest hosted an interagency site visit to the Pepper Cat Thin Timber Sale. Based on the comments and issues raised during this meeting, the Forest slightly modified the draft proposed action to minimize impacts to aquatic resources.

In the September 20, 2010 wildlife BA, the Forest determined the proposed project "may affect, and is likely to adversely affect" designated spotted owl critical habitat. The BA also determined the proposed project, "may affect, but is not likely to adversely affect" the spotted owl. On September 21, 2010, the Service acknowledged receiving the wildlife BA via email, and noted that the consultation for this project would not be initiated until the fisheries BA for the proposed action was completed.

On October 5, 2010, the Forest provided a draft copy of the fisheries BA for Level One Team review. In the draft BA, the Forest determined the proposed project "may affect, but is not likely to adversely affect" the bull trout and its designated critical habitat. On October 25, 2010, the Level One Team met and reviewed the draft BA and agreed that the BA was ready for consultation. The BA also determined that the proposed action "may affect, but is not likely to adversely affect" federally-listed Pacific salmon species under the jurisdiction of the National Marine Fisheries Service. These species have been addressed in a separate consultation completed by the National Marine Fisheries Service. On November 15, 2010, the Service received the final fisheries BA and a letter from the Forest dated November 10, 2010, requesting consultation under section 7 of the Act. Formal consultation for this project was initiated by the Service on November 15, 2010.

Concurrence for Insignificant or Discountable Effects

Bull Trout and Designated Bull Trout Critical Habitat

The Pepper Cat Thin Timber Sale (project) includes timber hauling, temporary road construction, and commercial thinning timber harvest on approximately 1,847 acres within 2,241 acres of mid-seral forest plantations located in the Middle Lewis River and Muddy River 5th field watersheds. These basins are part of the Lewis River bull trout core area that the Service considers essential for bull conservation and recovery (USFWS 2002, p. 3). The Lewis River basin is also identified

as a part of the Lower Columbia River Basins Critical Habitat Unit (CHU) which includes portions of the Lewis, White Salmon, and Klickitat Rivers (75 FR 63898:63936 [Oct. 18, 2010]).

The proposed harvest units in the project are all located on upper slopes well away from valley bottom streams. Streams located in or adjacent to harvest units are all 1st or 2nd order non-fish bearing perennial or intermittent (seasonally dry) tributary streams. Harvest units are generally located more than 0.25 to 0.5 mile upslope from fish bearing streams. The closest downstream bull trout habitat includes the mainstem Muddy River (0.35 mile downstream) which is used by adult bull trout for seasonal foraging and migration habitat, and the mainstem Lewis River (0.4 mile downstream), which is used by bull trout as foraging, migration, and rearing habitat (USFWS 2010a, p. 200). Both the Muddy River and the Lewis River are designated as bull trout critical habitat. Potential bull trout habitat is also present in Clear Creek (0.25 mile downstream), a major tributary to the Muddy River. Bull trout presence has not been documented in Clear Creek, but the stream has documented coho salmon (*Oncorhynchus kisutch*) presence, and is potentially accessible to foraging adult bull trout. There will be no effect to bull trout spawning habitat within the Lewis River core area. However, because the proposed project is located in watersheds that are known to support foraging bull trout, the Forest determined these activities "may affect" bull trout and designated bull trout critical habitat.

In the BA, the Forest identified the following project elements as having the potential to affect bull trout habitat within the action area: thinning within Riparian Reserves, temporary road construction, log hauling on unpaved roads, and landings within Riparian Reserves.

<u>Effects of Thinning within Riparian Reserves</u>

Riparian Reserves as outlined in the NWFP, are two site-potential tree heights for fish-bearing perennial streams and one site-potential tree height for non-fish bearing perennial streams and intermittent streams. A site-potential tree height is 220 ft in this project area. The Forest is proposing to commercially thin trees within Riparian Reserves, but a minimum no-harvest riparian buffer ranging from 60 ft to 100 ft, depending upon the location and proximity to downstream fish habitat, will remain intact along all streams. Thinning outside no-harvest buffers will reduce tree densities and overstory canopy cover to approximately 30 to 60 percent depending on the harvest unit.

Riparian Shade and Water Temperature

It is well established that riparian timber harvesting can increase maximum stream temperatures and diurnal fluctuations (Beschta et al. 1987, p. 191). A number of studies have been conducted to describe the relationship between riparian buffer widths and amount of shade provided. Riparian buffers of 30 m (98 ft) or more in width along small streams provide approximately the same level of shading as an old-growth forest (Beschta et al. 1987, p. 205).

Based on these findings, the minimum no-cut buffer of 100 ft on most perennial streams will maintain riparian vegetation shade sources and avoid increases in stream temperatures. Along the portions of small, non-fish bearing streams that receive a 60 ft no-harvest buffer, it is

expected that approximately 60 to 80 percent of the maximum potential shade would be maintained (DeWalle 2010, p. 323; Steinblums et al. 1984, p. 52).

Considering the high level of shade that will be maintained by no-harvest buffers, the small size of the affected streams, and the limited riparian area treated within each subwatershed, the effects of riparian thinning to stream temperature will be insignificant. Therefore, potential effects to normal bull trout growth and survival associated with water temperatures in the action area are insignificant.

Soil Disturbance and Sedimentation

Soil disturbance from thinning inside Riparian Reserves would occur primarily as a result of yarding activities when the trees are dragged along the ground to landings. No-harvest riparian buffers substantially reduce delivery of harvest-related sediments to streams (Rashin et al. 2006, p. 1325). Streams with buffers ranging from 10 m (33 ft) to 30 m (98 ft) wide had relatively small increases in sediment yield except in areas where sediment was generated by mass wasting or severe road erosion (Gomi et al. 2005, p. 892).

The proposed action incorporates 60 ft to 100 ft no-cut buffers along all stream channels, and limits yarding activities to the dry season only. Other minimization measures include post-harvest water-barring on all paths of ground disturbance to disrupt overland flow. Based on the findings reported by (Rashin et al. 2006, p. 1320) which indicated that 95 percent of all harvest-related sediment delivery to streams occurred from soil disturbances located within 10 m (33 ft) of stream channels, timber felling and yarding activities are not expected to generate significant sediment inputs to streams in the action area. Considering the effectiveness of riparian buffers to prevent sediment from reaching streams, and the downstream distances to the nearest bull trout habitat, the effects of soil erosion and sediment deposition to bull trout growth and survival in the action area are insignificant.

Windthrow in Riparian Buffers

Timber harvest often results in an increased risk of windthrow in adjacent riparian buffers. Grizzel and Wolf (1998, p. 216) studied riparian buffer strips adjacent to clearcuts on small, non-fish bearing streams in northwestern Washington and reported that an average of 33 percent of riparian buffer trees were affected by windthrow. Based on this study, the risk of windthrow adjacent to clearcuts in is relatively high. However, Rashin and others (2006, p. 1324), examined windthrow rates along both clearcut and partial-cut (thinning) timber harvests and found an average windthrow rate of 9.7 trees/100 m along clearcut edges, compared to an average of 0.7 trees per 100 m in partial cut harvests. The windthrow rate in the partial harvest units was similar to that found in unmanaged control sites. On the Olympic Peninsula, variable density thinning resulted in a blowdown rate of about 8 trees/ha in thinned stands. The overall level of wind damage was similar to unthinned stands (Roberts et al. 2007, p. 285). Based on these studies, it appears that the risk of windthrow adjacent to thinned stands is relatively low compared to clearcut areas, and that the rate of windthrow adjacent to thinned stands is comparable to that found in unmanaged stands. Therefore, the functions that riparian buffers

provide (e.g., streambank stability, riparian shade, and as a source of large wood) are expected to be maintained adjacent to thinned stands.

Large Wood and Riparian Functions

Large wood is recruited into streams from a variety of processes, including bank erosion, windthrow, chronic tree mortality, and landslides (Benda et al. 2003, p. 49). Reeves and others (2003, p. 1364) found that the majority of the wood found in streams was derived from within a distance equal to the height of streamside trees. Thinning in Riparian Reserves would result in a short-term reduction in the number of small trees that would naturally die and fall into headwater streams and contribute to instream large wood. The minimum 60 ft to 100 ft no-harvest buffers along all streams would maintain approximately 60 to 80 percent of the potential large wood and organic nutrient inputs available for recruitment along the affected stream reaches (Benda et al. 2003, p. 63). The 60-ft. no-cut buffer along steep, intermittent headwaters streams in conjunction with the upland thinning treatments would maintain riparian functions and future potential for large wood recruitment via debris flows or landslides (Reeves et al. 2003, p. 1365). There would be no reduction in potential wood recruitment along fish-bearing streams. Over the long-term, the remaining trees within the Riparian Reserve would respond to thinning with increased growth rates and diversification of understory vegetation (Harrington et al. 2005, p. 97).

Considering the riparian functions maintained by no-harvest buffers, the small size of the affected streams, and the limited riparian area treated within each subwatershed, the effects to large wood and organic nutrient inputs will be insignificant. Over the long-term, thinning will likely be beneficial to the development of late-successional forest conditions in treated stands.

<u>Effects of Road Construction, Road Maintenance, and Culvert Installations</u>

Access to harvest units will require new construction of 0.8 mile of temporary roads, and reconstruction of approximately 8.7 miles of existing roads. The Forest has identified an additional 26.5 miles of Forest roads that will require maintenance for haul routes (36 miles total). All temporary roads would be closed and decommissioned after harvest operations are complete. Road work will include culvert installation or culvert replacement on 9 stream crossings located on small, non-fish bearing perennial or intermittent streams. All road use, maintenance and culvert installations will occur during the dry weather season (June 16 to September 30) when stream channels are likely to be dry or have minimal flow. Because this road work will occur during the dry season, sediments entering streams from roads and culvert replacements will not be mobilized and transported downstream until the first fall rains occur.

Based on the work by Foltz and others (2008, p. 329), the Service assumes that culvert installations on high-gradient tributary streams that are located within 0.5 mile of fish-bearing waters have a potential to deliver suspended sediments to downstream bull trout habitat. Using 0.5 mile as a threshold distance for downstream sediment effects, we identified one culvert replacement on an intermittent stream on the 9039-377 road that is located approximately 0.25 mile upstream from the mainstem Muddy River. However, the effects of this culvert installation will be insignificant because the affected stream is a small non-fish bearing stream the drains

directly to the Muddy River. Bull trout using lower mainstem of the Muddy River (foraging, migration, and overwintering habitat) are not likely to be exposed to significant levels of sediments because the Muddy River's significant flow and high levels of natural turbidity will quickly dilute any increased suspended sediment to background levels. Therefore, the effects of sediment transport and deposition associated with road construction to bull trout growth and survival in the action area is insignificant.

Effects from Riparian Landings and Log Hauling on Forest Roads

Road maintenance activities (ditch cleaning, road grading, etc.) and timber hauling can greatly increase road surface erosion and sediment delivery to streams (Reid and Dunne 1984, p. 1759). Road sediments reach streams in two ways: roadside ditches which drain directly to stream crossings, and roadside ditches that connect to relief culverts which drain onto the forest floor (Wemple et al. 1996, p. 1195). The road surface erosion model developed by Dube and others (2004, p. A-3) assumes that that road segments that drain to the forest floor over 200 ft. away from a stream do not deliver sediment to streams. This assumption is based on a review of several studies which found a range of sediment transport distances of 30 ft to 550 ft, with sediment moving less than 150 ft in nearly all cases.

In the 36 miles of timber haul roads in the project area, there are three existing stream crossings directly over bull trout streams. All of these crossings are either paved bridges with paved or rock approaches that are in good condition; therefore, no significant sediment input is anticipated at these crossings. Other than these crossings, none of the unpaved timber-haul roads or log landings identified in the project area is located within 200 ft of streams that are also located within 0.5 mile of bull trout habitat. Two riparian landings in Unit 19 are located within 200 ft of a small tributary stream approximately 0.35 mile upstream from the mainstem Muddy River. The landings act essentially the same as roads, in that landings that are constructed in close proximity to streams (i.e., within 200 ft.) have a higher potential for delivering sediment via overland flow. However, this unit has a 100 ft no-harvest buffer along the stream which greatly reduces the potential for sediment delivery from surface erosion (Litschert and MacDonald 2009, p. 143; Rashin et al. 2006, p. 1320).

Considering the limited proximity of haul roads to bull trout habitat, the effects of the proposed action are considered to be insignificant to bull trout in the mainstem Muddy River, Clear Creek and the Lewis River. Therefore, we do not anticipate that the effects of the proposed action will measurably affect bull trout foraging, rearing, overwintering, or migratory behaviors in these streams.

Effects of Hazard Tree Felling

Hazard trees would be felled along the 36 miles of timber haul routes used for the project. Snags with the potential to fall into the roadway would be hand felled prior to haul. Where old-growth forest abuts the haul route, an estimated five snags (>16 inches dbh) per one side of road mile may be rated as a danger and felled. Total snag loss for the entire planning area is estimated at 117 snags. Any hazard tree felled within a Riparian Reserve will be left on site as down wood to retain the beneficial nutrient and habitat values provided by down logs, and there would be no

ground disturbance in Riparian Reserves associated with yarding or salvaging of felled trees. Considering the limited proximity of timber haul routes to bull trout streams, and the minimal ground disturbance associated with this activity, the effects of hazard tree felling to bull trout are insignificant.

Summary of the Effects to Bull Trout Habitat Indicators

In the analysis of the aquatic environmental baseline, the Forest applied the *Matrix of Diagnostics / Pathways and Indicators* (USFWS 1999) and determined that the overall condition of the subwatersheds in the action area is "not properly functioning" due to past and ongoing degradation of aquatic habitats, primarily from the existing road network and the effects of past riparian timber harvest. The effects of the proposed action include short-term localized impacts to turbidity, large wood recruitment, and substrate indicators, and long-term beneficial effects to riparian areas. However, there would be no measurable effects within habitats accessible to bull trout. Considering all the effects, we conclude that the condition of habitat indicators in the action area would not significantly change as a result of the proposed action (Table 1).

Table 1. Summary of the effects of the Project to aquatic habitat indicators in the action area ("Matrix of Pathways & Indicators")(USFWS 1999).

Pathway	Indicator	Baseline Conditions	Effects of the Action (Restore – Maintain – Degrade)
Local Population Conditions	Local population size	Functioning at Risk	Maintain – effects of the action are neutral.
	Growth and Survival	Not Properly Functioning	Maintain – effects of the action are neutral.
	Life History Diversity and Isolation	Not Properly Functioning	Maintain – effects of the action are neutral.
	Persistence and Genetic Integrity	Not Properly Functioning	Maintain – the effects of the action are neutral.
Water Quality	Temperature	Not Properly Functioning	Maintain – effects of the action are neutral.
	Sediment / Turbidity	Not Properly Functioning	Degrade - short-term, localized increases associated with timber hauling and temporary road construction. No measurable effects within habitat accessible to bull trout or other salmonids. .
	Chemical Contamination & Nutrients	Functioning Properly	Maintain – effects of the action are neutral.
Habitat Access	Physical Barriers	Not Properly Functioning	Maintain – effects of the action are neutral.

Pathway	Indicator	Baseline Conditions	Effects of the Action (Restore – Maintain – Degrade)
Habitat Elements	Substrate	Not Properly Functioning	Degrade - short-term, localized increases associated with timber hauling and temporary road construction. No measurable effects within habitat accessible to bull trout or other salmonids.
	Large Woody Debris	Not Properly Functioning	Degrade – short term, localized reductions in available wood inputs to headwater streams due to thinning in riparian reserves. No measurable effects within habitat accessible to bull trout or other salmonids.
	Pool Frequency / Quality	Not Properly Functioning	Maintain – effects of the action are neutral.
	Large Pools	Not Properly Functioning	Maintain – effects of the action are neutral
	Off-Channel Habitat	Functioning At Risk	Maintain – effects of the action are neutral
	Refugia	Not Properly Functioning	Maintain – effects of the action are neutral
Channel Conditions & Dynamics	Width/Depth Ratio	Functioning At Risk	Maintain – effects of the action are neutral
	Streambank Condition	Not Properly Functioning	Maintain – effects of the action are neutral
	Floodplain Connectivity	Not Properly Functioning	Maintain – effects of the action are neutral
Flow / Hydrology	Peak / Base Flows	Functioning Properly	Maintain – effects of the action are neutral.
	Drainage Network	Functioning at Risk	Maintain – effects of the action are neutral.
Watershed Conditions	Road Density / Location	Not Properly Functioning	Maintain – effects of the action are neutral
	Disturbance History	Functioning Properly	Maintain – effects of the action are neutral.
	Riparian Areas	Not Properly Functioning	Restore –thinning will result in diversification of riparian vegetation and promote development of late-successional forest habitat conditions in thinned stands.
Integration of Species and Habitat		Not Properly Functioning	Maintain – The proposed action would result in insignificant or discountable effects to bull trout and bull trout habitat indicators in the action area.

Effects to Bull Trout Critical Habitat

Primary constituent elements (PCEs) are the physical and biological features of critical habitat essential to a species' conservation. There are nine PCEs of bull trout critical habitat listed in the final rule that address the specific habitat requirements essential for bull trout conservation. The nine PCEs relate to (1) water quality; (2) migration habitat; (3) food availability; (4) instream habitat; (5) water temperature; (6) substrate characteristics; (7) stream flow; (8) water quantity; and (9) nonnative species (75 FR 63898:63931 [Oct. 18, 2010]).

PCE 1: Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

Evidence of springs, seeps, and hyporheic flow is common along the Lewis and Muddy Rivers. None of the effects associated the proposed action are expected to significantly alter water quality or quantity associated with springs, seeps, groundwater sources, and subsurface water connectivity.

PCE 2: Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

None of the proposed culvert installation, replacements, or removal occurs in fish bearing streams. Potential effects to migration habitats are discountable, because none of the anticipated effects would cause physical, biological, or water quality impediments to bull trout migration.

PCE 3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

Direct effects to aquatic habitat occur in 1st and 2nd order non-fish bearing tributary streams that are generally located more than 0.5 mile upstream from bull trout critical habitat. Downstream transport of sediments to fish-bearing stream reaches will be limited to minor pulses that coincide with the first seasonal rains in the fall or winter months following timber harvest and timber haul activities. Considering the limited proximity of haul roads and timber harvest to bull trout critical habitat, the riparian functions maintained by no-harvest buffers, the small size of the affected streams, and the limited riparian area treated within each subwatershed, the effects to bull trout food resources (macroinvertebrates and fishes) will be insignificant.

PCE 4: Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

Direct effects to aquatic habitat occur in 1st and 2nd order non-fish bearing tributary streams that are generally located more than 0.5 mile upstream from bull trout critical habitat. Considering the limited proximity of haul roads and timber harvest to bull trout critical habitat, the riparian functions maintained by no-harvest buffers, the small size of the affected streams, and the limited

riparian area treated within each subwatershed, the effects to river and stream habitat features will be insignificant.

PCE 5: Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

Considering the high level of shade that will be maintained by no-harvest buffers, the small size of the affected streams, and the limited riparian area treated within each subwatershed, the effects of riparian thinning to water temperature will be insignificant.

PCE 6: In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

There will be no effects to bull trout spawning habitat within the Lewis River core area. Considering the limited proximity of haul roads and timber harvest to bull trout critical habitat, the riparian functions maintained by no-harvest buffers, the small size of the affected streams, and the limited riparian area treated within each subwatershed, the effects of fine sediments transported to downstream bull trout critical habitat areas will be immeasurable against background conditions in these systems. Therefore, the effects to this PCE are insignificant.

PCE 7: A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

Timber harvest can affect peak/base flows based upon their site-specific effects, elevational location within a watershed, and the proportion of basin forest that has been altered by roads and prior timber harvest (Grant et al. 2008, p. 6). A clearcut harvest level of approximately 15 to 19 percent within a small drainage area (10 km^2) in the transitional rain-on-snow zone is sufficient to cause a detectable increase in peak flows, but that these changes are only detectable during low to moderate peak flow events. Grant and others (2008, p. 39) recommend using a measure of the equivalent clearcut area (ECA) within a subwatershed as an index to determine if timber harvest may result in increased peak flows.

The effects of thinning treatments on local hydrology are not well documented, but are considered to be substantially less than clearcut timber harvest (Grant et al. 2008, p. 15). We assume that thinning 50 percent of the trees over 100 percent of an area represent a 50 percent harvested ECA (Grant et al. 2008, p. 15). Using these criteria, the effects of thinning on peak/base flows in the affected subwatersheds draining to the Muddy River, Clear Creek, and Lewis River will be insignificant based on the low ECA values in these subwatersheds (less than 10 percent ECA post-harvest), and thinned stands are expected to recover full hydrologic

function within a few years. Additionally, there would be no increases in stream channel network associated with roads in the action area.

PCE 8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

Direct effects to aquatic habitats occur in 1st and 2nd order non-fish bearing tributary streams that are generally located more than 0.5 mile upstream from bull trout critical habitat. Downstream transport of sediments to fish-bearing stream reaches will be limited to minor pulses that coincide with the first seasonal rains in the fall or winter months following timber harvest and timber haul activities. Considering the limited proximity of haul roads and timber harvest to bull trout critical habitat, the riparian functions maintained by no-harvest buffers, the small size of the affected streams, and the limited riparian area treated within each subwatershed, the effects to water quality and quantity in designated bull trout critical habitat will be insignificant.

PCE 9: Sufficiently low levels of occurrence of nonnnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

Potential effects associated with this PCE are discountable, because none of the proposed actions would result in changes to nonnative species presence or distribution within the action area.

Concurrence for Bull Trout and Designated Bull Trout Critical Habitat

Considering the limited proximity to bull trout and critical habitat in the project area, and the project effects, we concur that the Pepper Cat Thin Timber Sale is not likely to adversely affect the bull trout or its designated critical habitat. Potential adverse effects to bull trout typically associated with timber harvesting (e.g., water quality degradation and aquatic habitat impacts sufficient to disrupt normal spawning, rearing, foraging, and migration behaviors) are not anticipated. Therefore, effects to bull trout associated with the proposed thinning are considered to be insignificant. The effects to bull trout critical habitat associated with commercial thinning are considered to be insignificant because the function of the PCEs of critical habitat would be maintained in the action area.

Spotted Owl

The project area includes 12 historic spotted owl territories that were documented during spotted owl surveys in the 1990s. No formal spotted owl surveys have been conducted in the project area within the past 10 years, so the current status of these territories is unknown. Spotted owl monitoring has indicated that established spotted owl territories are fairly stable, and that some territories may be occupied by different pairs of spotted owls over many years (Forsman et al. 1984, p. 19). In the absence of current survey data, the Service considers historic sites to be occupied unless there is compelling evidence to discount occupancy.

Effects of Timber Harvest to Spotted Owls

Timber harvest can affect spotted owls by reducing the total amount of nesting, roosting, and foraging habitat within a spotted owl's home range. The result may be that the spotted owls continue to persist at the territory, but marginal habitat conditions in the territory may compromise the spotted owl's ability to survive and successfully reproduce. This is the basis for the Services' recommended management thresholds for evaluating habitat removal within a spotted owl home range (60 FR 9483:9491 [Feb. 17, 1995]).

The Pepper Cat Thin Timber Sale would not directly affect spotted owl nesting, roosting, or foraging habitat (i.e., suitable habitat). Only dispersal habitat and unsuitable habitat would be affected. The effects of thinning young stands within the median home-range area surrounding historic spotted owl sites are considered to be insignificant because there would be no loss or adverse effects to suitable habitat within the action area or within historic spotted owl territories.

Effects of Noise Disturbance to Nesting Spotted Owls

Due to the proximity of proposed thinning units to unsurveyed spotted owl nesting habitat, the Forest determined that the noise and activity associated with timber harvest "may affect" nesting spotted owls. The proposed use of chainsaws and heavy equipment will cause increased levels of sound in the action area. We have previously completed analyses of the potential for noise disturbance to spotted owls (USFWS 2003, pp. 265-285). We concluded that spotted owl nesting behaviors may be disrupted by loud noise and activity that occurs in close proximity to an active nest site during the early portion of the nesting season (USFWS 2003, p. 273). The spotted owl early nesting season is defined as March 1 to June 30 on the Forest. Early nesting season behavior includes nest site selection, egg laying, incubation, and brooding of nestlings to the point of fledging (Forsman et al. 1984, pp. 32-38).

The Forest has incorporated a seasonal restriction for the project to minimize potential disturbance to nesting spotted owls associated with timber harvest activities. No timber harvesting, road construction, or yarding activities will be conducted during the spotted owl early breeding season (March 1 to June 30) in any harvest units that are located adjacent to unsurveyed suitable nesting habitat. This restriction applies to all timber harvest units in the project.

Noise disturbance that occurs during the latter half of the spotted owl breeding season (July 1 – Aug. 30) would not disrupt nesting spotted owls. In the late nesting season, juvenile spotted owls have fledged and are able to thermoregulate, fly short distances, and are no longer completely dependent upon the adults for daily feedings (Forsman et al. 1984, p. 38). A flush response from either an adult or juvenile at this stage of development is not likely to reduce the juvenile owls' fitness or ability to survive. Therefore the biological effect of potential noise disturbance that occurs during the late nesting season is considered to be insignificant.

Because the project description includes a seasonal operating restriction for all harvest units, the effects of noise disturbance to spotted owls are considered to be insignificant. This seasonal restriction may be waived if surveys conducted according to the Services' approved survey protocol indicate no spotted owls are nesting in the project area.

Effects of Hazard Tree Felling

Any decayed trees or snags located along a haul road that are considered to be an imminent hazard to human safety may be felled. The Forest estimated there would be approximately 117 snags felled associated with 36 miles of haul roads used for the Pepper Cat Thin Timber Sale. Felled snags would be left on site to provide down logs. Hazard tree felling is considered a programmatic forest management activity covered under an informal programmatic consultation for forest management on the Forest (Service reference # 2010-I-0151, Jan. 19, 2010). The programmatic consultation specifies that hazard tree felling from within suitable spotted owl nesting, roosting, and foraging habitat will only occur outside the early spotted owl nesting season (March 1 – June 30) to be consistent with a "may affect, not likely to adversely affect" determination. The Forest reserves the right to fell hazard trees that are considered an imminent hazard to human safety at any time. However, hazard trees felled during the spotted owl early nesting season must be consulted on separately, using emergency consultation procedures (50 CFR 402.05). For the purpose of this analysis, we assume that all hazard tree felling associated with the Pepper Cat Thin Timber Sale will occur outside the early nesting season and be consistent with the criteria established in the programmatic consultation.

No documented spotted owl nest trees may be felled. Therefore, hazard tree felling along haul routes would only result in the loss of habitat components such as individual trees or snags. Of concern is the loss of potential nest trees or large trees adjacent to potential nest trees. A potential nest tree does not mean that it is a nest tree; just that it has the structural elements (e.g., large side cavities, a broken top, mistletoe brooms, etc.) that could provide for spotted owl nesting. Removal of individual hazard trees along haul routes would not result in a measurable loss (i.e., acres) of suitable habitat, and these impacts would not be detectable within the home range of a spotted owl or across the landscape.

The loss of large tree structures, including potential nest trees from within suitable spotted owl habitat would have localized impacts, but would not result in the loss of any suitable habitat stand. These impacts could include the loss of future potential nest sites, loss of flying squirrel denning habitat, and minor microclimate changes. Hershey and others (1998, p. 1408) found evidence that selective or single-tree harvesting had occurred in 31 percent of the nest sites within their study area. In the majority of the sites less than 10 "large" trees had been removed. This suggests that minor losses of individual trees within a nest stand do not necessarily reduce its functionality or use. Spotted owls in the Washington Cascades occupy large territories encompassing thousands of acres of suitable habitat (Hanson et al. 1993, p. 24). Loss of individual large trees or snags within a stand of suitable habitat is considered a minor habitat modification. With the application of a seasonal timing restriction for hazard tree felling, potential disturbance to spotted owls during the early nesting season will be avoided. Therefore, the effects of hazard tree removal are considered to be insignificant.

Effects to Spotted Owl Dispersal

Dispersal habitat is not considered to be suitable spotted owl habitat. Dispersal habitat is young, mid-seral forest that spotted owls use when transiting between patches of suitable old-forest habitat. Dispersal habitat includes younger and less diverse forest stands than suitable foraging

or roosting habitat, such as even-aged, pole-sized stands, but such stands should contain some minimal roosting structures and foraging opportunities to allow for temporary resting and feeding for dispersing spotted owls (USFWS 2008, p. 50).

Spotted owls use both dispersal habitat and suitable nesting, roosting, and foraging habitats during dispersal movements. Landscapes that contain at least 50 percent of forest cover that is either suitable habitat or dispersal habitat are considered capable of supporting successful spotted owl dispersal (Thomas et al. 1990, pp. 309-310). While there is uncertainty regarding the forest conditions required for spotted owl dispersal, it is assumed dispersal success is better in landscapes where habitats more closely resembles suitable habitat (USFWS 2008, p. 19).

There are 51 timber harvest units in the Pepper Cat Thin Timber Sale which will result in thinning a total of 1,847 acres. Approximately 1,477 acres of spotted owl dispersal habitat will be thinned, and 370 acres of unsuitable stands will be thinned. Dispersal habitat in thinned stands will be maintained on 1,105 acres, or, downgraded to unsuitable habitat on 372 acres. Thinning in stands that are currently too dense for spotted owl dispersal will create dispersal habitat on about 150 acres. The result will be a net reduction of 222 acres of dispersal habitat across the action area. Overstory canopy cover in thinned stands will recover rapidly, and minimum dispersal habitat conditions are expected to recover in heavily-thinned stands within approximately 10 years.

The Pepper Cat Thin Timber Sale action area encompasses over 31,000 acres in portions of the Muddy River and Middle Lewis River 5th field watersheds. Approximately 69 percent of this landscape currently supports suitable nesting, roosting, foraging (48 percent) or dispersal habitat (21 percent). The short-term reduction of 222 acres of dispersal habitat represents less than one percent of the available dispersal habitat in the project area.

Both suitable old-forest habitat and young forest dispersal habitat is generally abundant and well-distributed across the action area. Considering the information presented above, the short-term loss of up 222 acres of dispersal habitat is not expected to measurably affect spotted owl dispersal behavior or success in the action area.

Effects of Interrelated and Interdependent Actions

A total of 0.8 mile of new temporary road would be constructed. These roads would be ripped and seeded after harvest; therefore, they do not represent a permanent loss of potential spotted owl habitat. Other actions that have the potential to affect spotted owls include piling and burning slash, planting conifer seedlings, and pre-commercial thinning in the post-harvest regeneration stands. The noise and activity from these actions could potentially disturb spotted owls if they occur adjacent to occupied habitat. The interrelated actions associated with the project implementation are considered programmatic forest management activities. The Forest has determined that these activities "may affect, but are not likely to adversely affect" the spotted owl and its designated critical habitat. These activities are covered under an informal programmatic consultation for forest management on the Forest (Service reference # 2010-I-0151, Jan. 19, 2010).

Concurrence for Spotted Owl

Considering the current status of the spotted owl in the action area, and the project effects, we concur that the Pepper Cat Thin Timber Sale is not likely to adversely affect the spotted owl. Potential adverse effects to spotted owls typically associated with timber harvesting (e.g., disruption of nesting behavior or loss of suitable habitat within a territory) are not anticipated, therefore effects to spotted owls associated with the proposed thinning are considered to be insignificant.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following description of the proposed action is summarized directly from information provided in the BA, and in the Forest's *Preliminary Environmental Analysis for the Pepper Cat Thin Timber Sale* – November 2010.

Summary of the Proposed Action

The Forest proposes to commercially thin 1,847 acres within approximately 2,241 acres of timber stands on the Mount St. Helens National Volcanic Monument, Gifford Pinchot National Forest. The Pepper Cat Thin Timber Sale planning area includes portions of the Muddy River and Middle Lewis River 5th field watersheds. The Forest has the following objectives for this project:

- Thin young tree plantations to improve habitat for wildlife and aquatic resources.
- Remain consistent with the 1990 *Gifford Pinchot National Forest Land and Resource Management Plan*, as amended by the NWFP.
- Offer one or more timber sales to provide a portion of the total volume of timber sold by the Forest in fiscal year 2011 or later.

The primary purpose and need of the project is to accelerate the development of late-successional forest within Late-Successional Reserves (LSR) and Riparian Reserves in order to support fish and wildlife species. All of the timber stands in the proposed action originated from tree plantations following clear-cut timber harvest from 1962 to 1973. These young stands are dense, even-aged stands comprised of mostly Douglas-fir (*Pseudotsuga menziesii*).

The project area includes the timber harvest units, all sale-associated road work, and the haul routes for each harvest unit. The legal description of the project area is Township 7 North, Range 6 East, Sections 12 and 13; and Township 7 North, Range 7 East, Sections 5-9, 15-21, 29, and 30, Willamette Meridian, Skamania County, Washington.

<u>Forest Service Land Management Objectives</u>

Management direction on the Forest comes from the 1990 *Gifford Pinchot National Forest Land and Resource Management Plan*, as amended by the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (NWFP) (USDA and USDI 1994b). These two documents guide planning on the forest by land allocation, and contain standards and guidelines that must be adhered to. Lands considered for silvicultural treatment within the Pepper Cat Thin Timber Sale planning area occur within LSR, and Riparian Reserve land allocations. The project is expected to meet standards and guidelines and Management Area direction these allocations, as well as meet the objectives and intent of the NWFP.

Late-Successional Reserves

All of the Pepper Cat harvest units occur within the Lewis LSR (RW-149)(USDA and USDI 1994a, p. G-13). The objective for these lands is to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old growth related species, including the spotted owl. The Forest's 1997 Late-Successional Reserve Assessment recognized a need for commercial thinning in stands less than 80 years old with the objectives of accelerating growth, increasing plant species diversity, increasing structural diversity, and to provide a mechanism to create snags and down wood where needed. The Lewis LSR is also designated as spotted owl critical habitat (Southwest Washington Cascades), and was recommended as a managed owl conservation area in the spotted owl recovery plan (USFWS 2008, p. 93).

Riparian Reserves

Some of the units have portions dedicated to riparian reserve management. Riparian Reserves are portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. The objective for treating the Riparian Reserve portions of these stands is to encourage the growth of larger conifers, including increased tree diameter and wide vigorous crowns, increase species diversity, and augment future sources of coarse wood for the riparian forest floor and in streams.

Key Watersheds

The Muddy River and Middle Lewis River have been designated as a Tier 1 Key watershed under the NWFP. Key Watersheds are one of four components making up the Aquatic Conservation Strategy under the NWFP. Tier 1 Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also are considered a high priority for watershed restoration. Ongoing riparian and in-stream restoration work is occurring along portions of Clear Creek, Pine Creek, and the Muddy River in addition to road decommissions and fish passage culvert road improvements throughout the Muddy River watershed.

Pepper Cat Thin Timber Sale Project Elements

Variable Density Thinning Treatments

Thinning treatments will consist of light, moderate, and heavy thinning. In most units only Douglas-fir would be removed. Thinning would be from below, leaving the largest trees in the stand. All trees >20 inches diameter at breast height (dbh) would be left. Thinning will seek to reduce the relative stand density to 25 to 35 (Curtis 1982). For the purpose of this analysis, these are categorized as light to heavy thinning intensity. Both ground-based and sky-line cable yarding systems will be used.

- Light Thinning - Target relative density of 35. This would leave approximately 105 to 135 trees per acre and a canopy cover of 50 to 60 percent. This is applied to stands with a high preponderance of Riparian Reserve or to mitigate concern for potentially unstable soils.

- Moderate Thinning - Target relative density of 30. This would leave approximately 85 to 115 trees per acre and a canopy cover of 40 to 50 percent. This is applied to most stands.

- Heavy Thinning - Target relative density of 25. This would leave approximately 65 to 90 trees per acre and a canopy cover of 30 to 40 percent. This is applied to promote variability at the stand or landscape level.

Minor tree species would be left in all stands regardless of condition. These trees will provide future stand differentiation in tree size, tree spacing, and canopy layering. It will promote overall variation. The few disturbance agents that are present would be utilized to improve variation and structure. Trees with dwarf mistletoe would be favored as leave trees, as would trees with broken tops, multiple tops, or lean. The presence of laminated root rot will be ignored. To further enhance diversity, three to ten percent of a stand would be in canopy gaps that are 0.25 to 0.5 acre in size. All of the predominant tree species between 6 to 20 inches dbh would be removed within gaps. These gaps will maximize the development of minor species left within them.

In a portion of the moderate thinned units, gaps would be one to two acres in size. This is applied to stands within deer and elk biological winter range. These larger gaps would provide dual benefits of stand diversification and ungulate forage. There will be 10 percent or more of the stand left unthinned to allow natural suppression mortality and variation. Unthinned areas will include the inner portions (closest to the stream) of Riparian Reserves. Other areas of observed biodiversity would not be thinned. All existing large downed logs (>20 inches large end) and snags (>15inches dbh) would be left where safe to do so. A total of 3 to 5 trees per acre will be felled and left onsite as coarse wood in a portion of the harvest units. Coarse wood tree sizes are typically only 6 to 14 inches dbh, and would have limited long-term value as coarse wood. However, small logs they do have ecological value in the short term, particularly for terrestrial mollusks and salamanders.

Thinned trees that may be removed would yield from 6 to 19 mbf (thousand board feet) per treatment acre. Total yield from all commercial thin units would be 23,900 mbf.

Riparian Buffers

Protective vegetation no-harvest areas (i.e., buffers that would not be commercially thinned) would be implemented to protect sensitive areas, such as all streams, ponds, and wetlands, as well as on potentially unstable soil areas. This is expected to prevent sediment delivery to streams from felling and yarding activities and will help maintain stream temperature and slope stability, as well as protect riparian vegetation. Minimum no-harvest buffers that are 60 ft to 100

ft wide will be applied to all intermittent or non-fish bearing perennial streams. There would be no thinning treatments adjacent to fish-bearing stream reaches. The proposed action will not thin areas providing shade to any perennial streams.

Log Landings

Approximately 163 landings (146 ground and 17 skyline cable) will be needed to harvest timber. Three new skyline landings and five new ground-based landings will be constructed. The other 155 landings were constructed during the previous timber harvest operations of the mid-1960's to mid-1970's era. Landings for ground-based logging are approximately 0.25 acre in size and landings for skyline cabling logging are approximately 0.125 acre in size. The total area cleared for landings will be approximately 39 acres, distributed across 163 sites. No landings will be created or re-used that are within 200 ft of perennial or intermittent streams that are also within 0.5 river mile from any listed fish or designated fish habitat (i.e. critical habitat for bull trout and Essential Fish Habitat for coho and Chinook salmon).

Road Maintenance, Reconstruction, and Construction

No new permanent road construction would occur under the proposed action, but approximately 0.8 mile of new temporary road would be constructed, used, and rehabilitated, and approximately 8.7 miles of existing temporary roads would need some reconstruction to allow access to various landings and thinning units. Road work will include culvert installation or culvert replacement on nine stream crossings located on small, non-fish bearing perennial or intermittent streams. All road use, maintenance and culvert installations will occur during the dry weather season (June 16 to September 30) when stream channels are likely to be dry or have minimal flow. Temporary road construction is located to avoid stream crossings. All temporary roads would be weatherized and vehicle access will be prevented.

In addition, the proposed action includes the treatment and maintenance of an estimated 36 miles of Forest roads in order to improve road conditions before and after timber haul. Maintenance may include road surface work, fill repair, brushing, blading, and drainage improvement. Post-haul maintenance would also occur as needed after the close of the sale. Major haul routes include Wind River Highway, Curly Creek Road, and Forest Road 90.

Hazard Tree Felling

Hazard trees would be felled along the haul routes used for the timber sale. Snags with the potential to fall into the roadway would be hand felled prior to haul. Where old-growth forest abuts the haul route, an estimated five snags (>16 inches dbh) per one side of road mile may be rated as a danger and felled. Total snag loss for the planning area is estimated at 117 snags from 2,478 acres of old-growth forest. Where feasible, hazard trees would be felled back into the stand and left to function as large woody debris. Trees falling into the road prism may be removed by the public as firewood if the wood is sound; otherwise, it would be pushed off the roadway. While this hazard abatement work is likely to be implemented through these timber sale contracts, it is a Forest road management requirement for any road open to the public, and thus a potential effect even if Pepper Cat is not implemented. Danger tree felling solely

attributable to haul routes opened specifically for Pepper Cat would total an estimated seven large snags from adjacent old-growth.

Interrelated Actions

Post-harvest logging slash would be either machine or hand piled. Where fire is a risk, piles would be burned or slash pulled back away from travel corridors. Tree planting and elk browse protection would occur on 10 acres adjacent Lewis River near the Little Creek confluence. This is within a Wildlife Special Management allocation. This area was clearcut in the 1950's. Deer and elk browsing has kept an area on the immediate south side of the Lewis River devoid of large trees. The intent of this project is to develop tree cover immediately adjacent the south side of the Lewis River to provide shade and reduce water temperatures during summer low flows.

The majority of trees from this project would be sold commercially; however, cut logs from Unit 22 would be supplied as fish logs for the Pepper-Lewis restoration project. Unit 22 was chosen due to its relatively easy access and proximity to the Pepper-Lewis project site. The trees, with root wads attached where possible, would be taken from the creation of two, one acre openings in the northeastern part of the unit. The large openings would be within the treatment prescription for the unit. The effects of the proposed aquatic restoration project are covered under a separate programmatic consultation for aquatic habitat restoration activities in Oregon and Washington (Service Reference #2010-F-0475, Nov. 9, 2009).

To enhance wildlife emphasis areas, 15 acres would be inter-planted with conifers. In addition, opportunities to plant shade tolerant species in landings and bigger gaps would be considered to increase stand complexity after the harvest is complete and funding allows.

Project Implementation

Road construction and timber harvest activities are expected to occur over a period of five to ten years after the timber sale contract is awarded. The Forest expects to offer the Pepper Cat Thin Timber Sale for in 2011. Seasonal yarding and hauling restrictions will limit activities to the dry season – July 1 to October 1.

Conservation Measures

The following minimization measures have been incorporated into the proposed action to minimize project impacts to wildlife, soils, and aquatic resources and will be implemented by the Forest:

Conservation Measures for Wildlife

- To minimize noise disturbance to nesting spotted owls, implement a limited operating period of March 1 through June 30 for all timber harvest activity. If surveys are done to protocol, and no spotted owls are found to be nesting near a given unit or haul route, the limited operating period can be dropped for that unit or route. This restriction applies to all harvest units and hazard tree felling.

- To minimize noise disturbance within elk and deer winter range, implement a limited operating period of December 1 through March 31 for all timber harvest activity.

- To minimize noise disturbance adjacent to an osprey nest, delay harvest activity in the northern end (approximately 5 acres) of Unit 34 until August 30 unless it is determined that the nest is inactive.

- Retain hazard trees that are felled along haul routes to add to large woody debris on the ground.

Project Design Measures

- To provide for future snags, favor existing defective green trees for retention in the treated portions of the units, including those with broken tops due to snow damage and those with multiple boles and tops.

- Retain hardwood trees, especially big-leaf maple, in all units. Exceptions would be for hardwood trees growing on temporary road and landing locations. Alder can be thinned if it exists in dense stands.

Enhancement Measures

- Cut and leave 5 trees per acre, and girdle 5 trees per acre around the *Tetraphis geniculata* management patches in Units 12, 27, 30, 46, and 52. This measure would create small snags and logs immediately, and to add to large woody debris on the ground over time. This measure may provide a growing substrate for *Tetraphis geniculata* as well as improving habitat for small wildlife species.

- Create snags and logs in units that have larger trees (at least 13.5" average dbh) at a rate of about 3 per acre in Units 29, 37, 47, 49, and 50.

<u>Conservation Measures for Aquatic Resources</u>

- All timber sale activities (e.g., felling, yarding, haul, road-related work) will be restricted to a limited operating season, defined as June 1 to October 15, with the additional requirement that any aspect of operations may be suspended during anomalous rain events during this period. Restoration work will be completed by October 15. Exceptions for any harvest activity outside this period will require concurrence by the project Hydrologist, Soils Scientist, and/or Fish Biologist, with periodic review and daily diary reports, and extra mitigation applied (e.g., sediment catchments at landings and road worksites, as needed). The objective of this measure is limit ground disturbing activities to the dry season thereby minimizing soil rutting, compaction, surface erosion and sediment delivery.

- All instream work provisions that are applicable to this project's activities would be followed, as specified in the *Memorandum of Understanding (MOU), dated January*

2005, between the Washington Department of Fish & Wildlife (WDFW) and US Forest Service, Regarding Hydraulic Projects. There are no activities currently proposed for the Pepper Cat Thin Sale that would necessitate adherence to instream work windows (i.e. July 15 to August 15 for this portion of the Lewis River basin) because the instream work associated with this project (i.e. culvert replacements) are either in intermittent non fish-bearing streams that will be dry during the proposed work or, if in wetted non fish-bearing streams, are located at least 0.25 river mile from fish-bearing waters.

- All streams within or adjacent to units will be protected to maintain or improve Riparian Reserve conditions in accordance with the Aquatic Conservation Strategy of the NWFP and the Clean Water Act. Thinning is prescribed in the outer perimeter of the Riparian Reserves. A no-harvest buffer immediately adjacent to streams within the Riparian Reserves prohibiting equipment operation, timber removal and temporary road construction or reconstruction is designated as 60 ft to 100 ft for all streams. Skyline yarding corridors are permitted through no-harvest buffers on intermittent streams, providing full suspension can be achieved within the entire no-harvest buffer width and less than 10 percent of the no-harvest buffer is affected by the corridor. A 60 ft no-harvest buffer is prescribed for all wetlands greater than 1 acre.

- Harvested trees will be felled away from streams, springs, wetlands, or other Riparian Reserve features, including the no-harvest buffers around these hydrologic features. Exceptions would be trees which are leaning towards these features, or when conditions would not allow safe felling. Any portion of a felled tree that lands in the no-harvest buffer will be left on the ground. The objective of this is to prevent damage to riparian vegetation and soils within Riparian Reserves.

- Prior to the wet season (October 1 to June 30) or any expected seasonal period of precipitation and runoff, cross drains and grade breaks will be installed on all temporary roads, skid trails, landings, and skyline corridors. Erosion control measures will be designed in coordination with an aquatic resource specialist or soils scientist, prior to the close of the timber sale, and implemented by the purchaser by October 1st. The objective of this measure is to reduce risk of soil displacement through rill, gully and splash erosion processes.

- All permanent culverts installed on system roads and all temporary road drainage structures (e.g. culverts) that will be left in place into the wet season (October 1 to June 30), will be designed to accommodate 100-year flow events to be consistent with the 1995 *Gifford Pinchot Land Resource Management Plan Standards and Guidelines*. Temporary drainage structures will be designed to meet the base flow condition (approximately 36 inches) if utilized only during the dry season (July 1 to Sept 30) and removed prior to the fall wet season. If new structures are to weather through fall and winter, they must comply with standards and guidelines as if a permanent structure. Road improvement will be designed to effectively allow water to be conveyed through the road prism without causing erosion or loss of slope stability. The objective of this design feature is to ensure channel transport function and hydrologic connectivity.

- A Spill Prevention and Response Plan will be developed and pre-approved prior to project implementation. The plan will include appropriate operational measures for handling hazardous materials. A Hazardous Material kit will be on site, and would contain materials to control/contain a spill of fuel, oils, and/or hydraulic fluid. Fueling equipment will be located outside of riparian reserves. All service work on heavy machinery and refueling will be done on an established (preferably paved) system road at a site approved by the Forest. The objective of this measure is to reduce the potential for damage to the stream and flood plain as a result of a hazardous material spill (e.g., hydraulic fluid, lubricants, gasoline, oils), reduce the potential for soil contamination (which may then erode into a waterbody), as well as to make access to the spill site faster should a spill occur and other vehicles are called in to aid in containment and clean-up efforts.

- After activities are complete, temporary roads and landings will be closed and restored. Restoration will include having all stream crossings structures removed which were installed for the timber sale, including any road fill and road surfacing (rock) from within bankfull width of the stream course. Temporary roads and landings which were established for the timber sale will be ripped, de-compacted, or subsoiled to a depth of 18 inches (minimum). The result will be an uneven, rough surface without furrows, and be accomplished immediately following logging activities. De-compaction will encompass the entire landing and the sight distance (to discourage a bypass) from the beginning of the road, no less than 200 ft. The rest of the road will have drainage reestablished. Available logging slash will be placed across the de-compacted surface. No ground-based equipment will be operated on subsoiled portions of roads and landings after de-compaction is completed to prevent re-compacting treated roadways and landings. Post-harvest motorized access to temporary roads will also be prevented by construction of an approved closure device (e.g., construction of a 4-foot high earth berm or other suitable material at the road entrance). Closure to vehicles is required to prevent subsoiled areas from being re-compacted, prevent erosion and sediment delivery, and to allow vegetation to develop. The objective of this measure is to rehabilitate areas compacted during management activities, accelerate recovery of compacted soils, and facilitate water infiltration and re-vegetation on those disturbed areas. These measures will also provide ground cover for exposed soils in order to reduce the potential for offsite erosion and maintain soil organic matter to prevent nutrient and carbon cycle deficits.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment.

The action area for the Pepper Cat Thin Timber Sale includes the timber harvest units, all sale-associated road work, and the haul routes for each timber unit. Specific areas include the Muddy River Tribs (east), and lower Clear Creek 7th field sub-basins, downstream to their confluences with the mainstem Muddy River in the Muddy River 5th field watershed. The action area also

includes the Little Creek, Big Creek, Pepper Creek, Lewis River Sidewall Tribs (north), and Lewis River Sidewall Tribs (south) 7th field sub-basins of the Middle Lewis River 5th field watershed, downstream to their confluences with the mainstem Lewis River (Table 2). Both 5th-field watersheds are located within the Lewis River basin, a major tributary to the lower Columbia River.

Table 2. Sub-basins in the Pepper Cat Thin Timber Sale action area.

5th.-field watershed	Sub-basin name (7th field watershed)	Sub-basin area (acres)	Area of proposed action thinning in sub-basin (acres)	Area of sub-basin proposed for thinning (percent)
Muddy River	Lower Clear Creek	3,366	273	7.4
	Muddy River Tribs East	1,105	185	16.7
Middle Lewis River	Pepper Creek	2,031	216	10.6
	Little Creek	2,785	44	1.6
	Sidewall Tribs N	4,332	976	22.5
	Big Creek	1,869	33	1.8
	Sidewall Tribs S	2,542	115	4.3
Totals		20,017	1,847	9.2

All of the Pepper Cat harvest units occur within the Lewis LSR. The Lewis LSR is also designated as a spotted owl critical habitat unit (Southwest Washington Cascades), and was recommended as a managed owl conservation area in the spotted owl recovery plan (USFWS 2008, p. 93). The action area for effects to spotted owls includes all National Forest lands located within 1.8 miles of the proposed harvest units, and totals 31,154 acres. This distance is the median home range radius for spotted owls in the western Cascades of Washington (USFWS 1992, p. 2).

ANALYTICAL FRAMEWORK FOR ADVERSE MODIFICATION DETERMINATIONS

Adverse Modification Determination

This Opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Opinion relies on four components: (1) the *Status of Critical Habitat*, which evaluates the range-wide and provincial condition of designated critical habitat for the spotted owl in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery

function of the critical habitat at the provincial and range-wide scales; (2) the *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of affected critical habitat units in the action area; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on spotted owl critical habitat are evaluated in the context of the range-wide condition of the critical habitat at the provincial and range-wide scales, taking into account any cumulative effects, to determine if critical habitat at the range-wide scale would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the spotted owl.

The analysis in this Opinion places an emphasis on using the intended range-wide and provincial scale recovery functions of spotted owl critical habitat and the role of the action area relative to those intended functions as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Please note that a "may affect, likely to adversely affect" determination for spotted owl critical habitat that triggers the need for completing an adverse modification analysis under formal consultation is warranted in cases where a proposed Federal action will: (1) reduce the quantity or quality of existing spotted owl nesting, roosting, foraging, or dispersal habitat at the stand level to an extent that it would be likely to adversely affect the breeding, feeding, or sheltering behavior of an individual spotted owl; (2) result in the removal or degradation of a known spotted owl nest tree when that removal reduces the likelihood of owls nesting within the stand; or (3) prevent or appreciably slow the development of spotted owl habitat at the stand scale in areas of critical habitat that currently do not contain all of the essential features, but have the capability to do so in the future; such actions adversely affect spotted owl critical habitat because older forested stands are more capable of supporting spotted owls than younger stands. Adverse effects to an individual tree within spotted owl critical habitat will not trigger the need to complete an adverse modification analysis under formal consultation if those effects are not measurable at the stand level.

STATUS OF NORTHERN SPOTTED OWL CRITICAL HABITAT

Legal Status

On January 15, 1992, the Service designated northern spotted owl (spotted owl) critical habitat within 190 CHUs which encompassed nearly 6.9 million acres of Federal lands in California, Oregon, and Washington (57 FR 1796-1838). On August 13, 2008, the Service revised spotted

owl critical habitat into 29 units, comprised of 174 subunits, on approximately 5,312,300 acres of Federal lands in California, Oregon, and Washington (73 FR 47326-47522).

Primary Constituent Elements

Primary constituent elements are the physical and biological features of critical habitat essential to a species' conservation. PCEs identified in the spotted owl critical habitat final rule include forest types that support the spotted owl across its geographic range when they occur in concert with a) nesting, roosting, foraging, and/or dispersal habitat, or b) lands capable of developing one or more of these habitats in the future (73 FR 47347-47348).

Forests

Forest types that support the spotted owl across its geographic range. These forest types are primarily Sitka spruce, western hemlock, mixed conifer and mixed evergreen, grand fir, Pacific silver-fir, Douglas-fir, white fir, Shasta red fir, redwood/Douglas-fir (in coastal California and southwestern Oregon), and the moist end of the ponderosa pine coniferous forests zones at elevations up to approximately 3,000 ft (914 m) near the northern edge of the range and up to approximately 6,000 ft (1,828 m) at the southern edge. These forest types may be in early-, mid-, or late-seral stages. This PCE is essential to the conservation of the species because it provides the biotic communities that are known to be necessary for the spotted owl. This PCE must occur in concert with at least one of the PCEs below. (73 FR 47347)

Nesting, roosting, and foraging habitat

The forest types described above that contain one or more of the habitat types described below to meet the home range needs of territorial pairs of spotted owls throughout the year or that are habitat-capable of developing one or more of these habitat types. Areas that are „„habitat capable'' of developing an essential habitat component are those forest types described above and that provide the requisite ecological conditions (e.g., moisture regime, soils, aspect, slope, potential vegetative community) for growing and sustaining the structural conditions required for that habitat component. A home range provides the habitat components essential for the survival and successful reproduction of a resident breeding pair of spotted owls. The amount, quality, and configuration of these habitat types required for a home range varies according to local conditions and factors such as the degree of habitat fragmentation, proportion of available nesting habitat, and primary prey species. The core area of the home range is used most intensively and usually includes the nesting area. The remainder of the home range is used for foraging and roosting. The size of home ranges extend from approximately 2,955 acres (1,196 ha) in the Oregon Cascades to approximately 14,271 acres (5,775 ha) on the Olympic Peninsula of Washington. The size of core areas extends from approximately 500 acres (202 ha) in the southern part of the species' range to approximately 4,057 acres (1,642 ha) in the northern part of the range (73 FR 47347). The three habitat types within the home range of a spotted owl are:

Nesting habitat

Nesting habitat is essential to provide structural features for nesting, protection from adverse weather conditions, and cover to reduce predation risks. It includes a moderate to high canopy

closure (60 to 80 percent); a multi-layered, multi-species canopy with large (generally greater than 30 inches (76 cm) dbh) overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other platforms); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly. Patches of nesting habitat, in combination with roosting habitat must be sufficiently large and contiguous to maintain spotted owl core areas and home ranges, and must be proximate to foraging habitat. Nesting habitat can also function as roosting, foraging, and dispersal habitat (73 FR 47347).

Roosting habitat

Roosting habitat is essential to provide for thermoregulation, shelter, and cover to reduce predation risk while resting or foraging. It differs from nesting habitat in that it need not contain those specific structural features used for nesting (such as trees with cavities, broken tops, and mistletoe platforms), but does contain moderate to high canopy closure (60 to 80 percent); a multi-layered, multi- species canopy; large accumulations of fallen trees and other woody debris on the ground; and open space below the canopy for spotted owls to fly. Roosting habitat will also function as foraging and dispersal habitat, but not as nesting habitat due to lack of nesting structures (73 FR 47347).

Foraging habitat

Foraging habitat is essential to provide a food supply for survival and reproduction. It contains some roosting habitat attributes but can consist of more open and fragmented forests or, especially in the southern portion of the range where some younger stands may have high prey abundance and structural attributes similar to those of older forests, such as moderate tree density, subcanopy perches at multiple levels, multi-layered vegetation, or residual older trees. Foraging habitat can also function as dispersal habitat (73 FR 47348).

<u>Dispersal habitat</u>

Forest types described above that provide one or both of the habitat components described below that are essential to the dispersal of juvenile and non-territorial spotted owls, or that are capable of developing one or both of these components. Dispersal habitat can occur in intervening areas between larger blocks of nesting, foraging, and roosting habitat or within blocks of nesting, roosting, and foraging habitat. Dispersal habitat is essential to maintaining stable populations by supporting transient spotted owls which can fill territorial vacancies when resident spotted owls die or leave their territories, and to providing adequate gene flow across the range of the species (73 FR 47348). The two types of dispersal habitat are:

A. Habitat supporting the transient phase of spotted owl dispersal contains stands with adequate tree size and canopy closure to provide protection from avian predators and minimal foraging opportunities. This may include younger and less diverse forest stands than foraging habitat, such as even-aged, pole-sized stands, but such stands should contain some roosting structures and foraging habitat to allow for temporary resting and feeding during the movement phase.

B. Habitat supporting the colonization phase of spotted owl dispersal is generally equivalent to roosting and foraging habitat described above, although it may be present in smaller amounts than that needed to support nesting pairs.

The critical habitat designation describes the PCEs essential to support the life history functions of the spotted owl in the amount and configuration required for the species' conservation. Because not all life history functions require all of the PCEs, not all of the critical habitat will contain all of the PCEs. Some units contain all PCEs and support multiple life processes, while some units contain only a portion of the PCEs necessary to support the species' particular use of that habitat. However, all of the critical habitat units in the designation support at least the first PCE described (forest-type) in conjunction with at least one of the other PCEs described above (73 FR 47348).

Conservation Role of Critical Habitat

The conservation role of spotted owl critical habitat is to identify those lands that are essential to the recovery of the species that may require special management considerations or protections (73 FR 47344). Generally, the conservation role of spotted owl critical habitat is to support a viable spotted owl population at the rangewide scale by providing a network of functional units within each physiographic province (73 FR 47358). For a wide-ranging species such as the spotted owl, where multiple CHUs are designated, each unit has a provincial and rangewide role in contributing to the conservation of the species. The size and distribution of the CHUs is the based on the "managed owl conservation areas (MOCAs) recommended in the 2008 *Final Recovery Plan for the Northern Spotted Owl* (USFWS 2008) in the western portion of the species range, and on proposed MOCAs recommended under Option 1 in the *Draft Recovery Plan for the Northern Spotted Owl* (USFWS 2007) in the eastern portion of the species range (73 FR 47330).

The MOCAs comprise a network of both large habitat blocks (capable of supporting 20 or more breeding pairs of owls (MOCA 1s), and small habitat blocks (capable of supporting up to 19 breeding pairs of owls (MOCA 2s). The MOCAs (and subsequent CHUs) form a habitat network designed to support stable and well-distributed populations of spotted owls over time and allow for movement of spotted owls across the landscape (USFWS 2008, p. 13). The Federal lands comprising the MOCA network of the final recovery plan include areas of congressionally reserved lands, such as designated wilderness areas; these areas were therefore included in the recovery plan's assessment that the MOCA network is sufficient to achieve the recovery of the spotted owl. As in the 1992 designation of critical habitat, congressionally-reserved lands such as designated Wilderness areas and National Parks are not included within the boundaries of the critical habitat designation. However, the contribution of these congressionally-reserved areas must be considered in any evaluation of the sufficiency of the overall conservation habitat network for the recovery of the spotted owl (73 FR 47328).

Current Condition of Critical Habitat

Summary of Range-wide Conditions

We designated 29 units as critical habitat for the spotted owl on Federal lands in Washington, Oregon, and California. These areas encompass over 5.3 million acres. Currently we estimate that approximately 98 percent of these lands are "habitat capable" (i.e., lands that are capable of supporting forest types that spotted owls use). Within the CHUs, many habitat areas are currently fragmented primarily due to past timber harvest, wildfire, disease, and wind-throw. Based on the spotted owl habitat data developed for monitoring the NWFP (Davis and Lint 2005), we estimate that approximately 50 percent of the lands within CHUs currently contain spotted owl habitat (2.6 million acres). Given natural events such as fire, windstorms, and insect damage, not all habitat capable lands in a CHU are likely to be high quality habitat at any one time. However, these lands retain the physical and biological features necessary to allow for the regrowth of the habitat characteristics required by spotted owls and are essential to achieving the area, quality, and configuration of habitat blocks required for recovery of the owl (USFWS 2008, p. 13).

Section 7 analyses of activities affecting spotted owl critical habitat consider the effects of proposed actions on the ability of the critical habitat to support a viable spotted owl population at the scale of individual CHUs, the physiographic province, and the rangewide scales (73 FR 47358). Since the revision of critical habitat in August, 2008, the Service has completed section 7 consultations on the removal of approximately 1,197 acres of suitable spotted owl habitat within critical habitat units in Washington, Oregon, and California (Table 3). The Service concluded that the effect of this habitat loss is not likely to destroy or adversely modify designated critical habitat.

Table 3. Changes in spotted owl suitable habitat within designated critical habitat from August 13, 2008 to present (January 28, 2011), resulting from Federal management actions and natural events by physiographic province.

Physiographic Province[4]		Evaluation Baseline[1]	Suitable[2] Critical Habitat Removed/Downgraded[3]			Percent Provincial Baseline Affected	Percent of Total Effects
		Acres of suitable habitat	Habitat loss to management activities (acres)	Habitat loss to natural events (acres)	Total Acres		
WA	Olympic Peninsula	149,090	7	0	7	<0.01%	0.58%
	Eastern Cascades	188,720	38	45	83	0.04%	6.93%
	Western Cascades	415,620	0	3	3	<0.01%	0.25%
	Western Lowlands	0	0	0	0	0	0.00%
OR	Coast Range	303,680	0	0	0	0	0.00%
	Klamath Mountains	210,430	1	0	1	<0.01%	0.08%
	Cascades East	109,140	873	0	873	0.8%	72.93%
	Cascades West	498,020	4	0	4	<0.01%	0.33%
	Willamette Valley	0	0	0	0	0	0.00%
CA	Coast	53,480	0	0	0	0	0.00%
	Cascades	137,010	173	0	173	0.13%	14.45%
	Klamath	583,690	53	0	53	<0.01%	4.43%
Total		2,648,880	1,149	48	1,197	0.04%	100

1. Revised critical habitat baseline is based on range-wide habitat maps developed by Davis and Lint (2005).
2. Nesting, roosting, foraging (NRF) habitat.
3. Includes effects reported by each field office.
4. Defined by the NWFP as the twelve physiographic provinces, as presented in Figure 3&4-1 on page 3&4-16 of the FSEIS (USDA and USDI 1994a).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Southwest Washington Cascades CHU

The Forest is proposing to use commercial thinning to harvest timber from 1,842 acres located within the Southwest Washington Cascades CHU. The Southwest Washington Cascades CHU encompasses approximately 523,700 acres, and includes lands administered by the Mt. Baker-Snoqualmie, Gifford Pinchot, and Okanogan-Wenatchee National Forests (73 FR 47355 [Aug. 13, 2008]). Approximately 90 percent of the Southwest Washington Cascades CHU is located

within the boundaries of the Forest (474,800 acres). There are six subunits within this CHU which correlate directly to managed owl conservation areas identified in the spotted owl recovery plan (73 FR 47326 [Aug. 13, 2008]). The subunits provide a network of both large habitat blocks (capable of supporting 20 or more breeding pairs of owls, and small habitat blocks (capable of supporting up to 19 breeding pairs of owls). The critical habitat subunits form a habitat network designed to support stable and well-distributed populations of spotted owls over time and allow for movement of spotted owls across the landscape (USFWS 2008, p. 13).

Conservation Role of Critical Habitat Subunit W-03

The Pepper Cat Thin Timber sale is located in CHU subunit W-03, which encompasses 143,950 acres and includes over 78,000 acres (54 percent) of suitable spotted owl habitat (USFWS 2008, p. 85). The subunit encompasses the entire Lewis LSR and includes additional National Forest lands outside of the LSR boundary. This CHU subunit is a large habitat block capable of supporting 20 or more breeding pairs of owls by providing essential nesting, roosting, foraging and dispersal habitat adjacent to the Mt. St. Helens National Volcanic Monument, and to provide important breeding habitat connectivity across the Forest from the Lewis River basin north to the Cowlitz River basin. Approximately 47,900 acres (33 percent) of the forest within the subunit consists of early-seral and mid-seral stands less than 80 years-old that are currently classified as unsuitable habitat or dispersal habitat for spotted owls.

Spotted owl surveys in the 1980's and early 1990s documented 49 activity centers of spotted owl pairs or resident singles in the subunit. The current number of spotted owls located within the subunit is unknown, but is likely less than what was historically documented due to an apparent decline of 30 to 50 percent in spotted owl populations in the Washington Cascades over the past 20 years (Anthony et al. 2006, p. 25).

Present Condition of the Action Area

The action area for the Pepper Cat Thin Timber Sale includes all lands located within 1.8 miles of the proposed harvest units, and totals 31,154 acres. The action area encompasses the southern portion of critical habitat subunit W-03.

Disturbance History

Historically, spotted owl habitat in the action area was affected by large stand-replacing fires. In 1902, the Lewis River Fire burned the northern part of the action area east of Forest Road 25 along Clear Creek. Part of the affected area was re-burned in the 1920 Copper Creek Fire. Most of the unmanaged stands that burned in 1902 have recovered to the point that they now provide suitable spotted owl foraging habitat.

More recently, suitable habitat in the action area has been altered by clearcut timber harvest on both private and National Forest lands. The National Forest lands were extensively harvested with clearcut logging from the 1950s through the 1980s. Currently, about 31 percent of the action area consists of young stands originating from clearcuts that are currently unsuitable as spotted owl habitat (Table 4). About 69 percent of the action area currently supports nesting,

roosting, foraging, and dispersal habitats. Since August 13, 2008, the Service has consulted on 736 acres of commercial thinning in dispersal habitat or unsuitable habitat in subunit W-03 (Wildcat Timber Sale).

Table 4. Spotted owl habitat in the action area.

Habitat Type	Acres	Percent of landscape
Suitable nesting habitat	5,927 acres	19 %
Suitable foraging habitat	9,086 acres	29 %
Dispersal habitat	6,549 acres	21 %
Unsuitable	9,592 acres	31 %
Totals	31,154 acres	100 %
Total acres suitable for dispersal	21,562 acres	69 %

The individual stands proposed for thinning all originated as Douglas-fir plantations following clearcut timber harvest in the 1960s and 1970s. These stands are typified by a high level of canopy closure (80 to 90 percent), a suppressed forb and shrub understory, very low levels of snags and down wood and a high stem density of 240 to 400+ trees per acre. The average stand diameter ranges from 11 to 14 inches dbh. The high stem density and small diameter of the trees indicates these stands in their current condition are unsuitable as spotted owl habitat, or provide only marginal dispersal habitat for spotted owls. The affected stands likely only provide cover with limited foraging opportunities for dispersing spotted owls moving between patches of suitable nesting, roosting, and foraging habitat. Spotted owl prey species such as northern flying squirrels (*Glaucomys sabrinus*) and Townsends' chipmunks (*Tamias townsendii*) are likely present only in very low densities in these stands due to the absence of large-diameter trees, snags, down logs, and understory vegetation (Carey 1995, p. 648).

EFFECTS OF THE PROPOSED ACTION

Summary of the Proposed Action

There are 51 timber harvest units in the Pepper Cat Thin Timber Sale which will result in thinning a total of 1,847 acres from within 2,241 acres of young stands identified for thinning treatments in the action area. Approximately 18 percent of the total area identified for thinning will be left untreated as "skips" in no-harvest riparian buffers, or as site buffers to protect sensitive species, wetlands, or unstable soils. Approximately 1,477 acres of spotted owl dispersal habitat will be thinned, and 370 acres of unsuitable stands will be thinned.

Analysis of Project Effects to Primary Constituent Elements

Effects to Forests Capable of Supporting Spotted Owls

All of the proposed harvest units are located in forests that currently contain one or more PCEs or are „„habitat capable'' of developing the PCEs of spotted owl critical habitat. Natural forest types in the action area include western hemlock (*Tsuga heterophylla*) and Pacific silver-fir (*Abies amabilis*) plant associations that are highly productive and capable of developing late-successional forest habitat. A total of about 58 acres within the action area will be cleared to create large gaps, log landings and new temporary roads. However, all roads, landings, and canopy gaps will be reforested following timber harvest, and will eventually develop late-successional forest. There would be no reduction in habitat capable acres in the action area.

Effects to Spotted Owl Nesting, Roosting, and Foraging Habitat

None of the commercial thinning units considered in this consultation presently contain spotted owl nesting, roosting, and foraging habitat, so the effects to the this PCE are limited to scattered hazard tree removal, and long-term successional effects associated with variable density thinning treatments.

Effects of Hazard Tree Felling

Any decayed trees or snags located along a haul road that are considered to be an imminent hazard to human safety may be felled. The Forest estimated there would be approximately 117 snags felled from 2,478 acres of old-growth stands associated with the 36 miles of haul roads used for the Pepper Cat Thin Timber Sale. This equates to approximately 1 snag/21 acres of old forest habitat in the affected stands. The estimate of 2,478 acres of old-growth is derived from the Forest's vegetation database which maps individual stands based on forest stand exam data and aerial photo interpretation. Felled snags would be left on site to provide down logs. Snags and down logs are important habitat components of spotted owl nesting, roosting, and foraging habitats because they provide habitat for spotted owl prey species (Carey 1995, p. 658), and snags occasionally provide nesting structures used by spotted owls (Hershey et al. 1998, p. 1402). Average snag densities in western hemlock plant associations on the Forest range from 11 to 99 snags per acre (Topik et al. 1986, p. 39). Spotted owls in the Washington Cascades occupy large territories encompassing thousands of acres of suitable habitat (Hanson et al. 1993, p. 24). Removal of scattered, individual trees or snags from within spotted owl critical habitat is considered to be a minor habitat modification, because the loss of individual trees does not affect the functionality of a stand to provide PCEs (73 FR 47326:47358 [Aug. 13, 2008]). Key habitat elements such as large overstory trees, overstory canopy cover, and multiple canopy layers are maintained at the stand scale. Therefore, the effects of hazard tree felling are considered to be insignificant.

Effects of Variable Density Thinning

The proposed variable density thinning will promote the long-term development of roosting and foraging habitats in these stands. A primary effect of thinning is an increase in growing space that allows the largest trees in the stand to continue their rapid juvenile growth in diameter, height and crown (Chan et al. 2006, p. 2696; Harrington et al. 2005, p. 97). Treated stands are expected to attain Douglas-fir trees >32 inches dbh approximately 10 years earlier than would occur under natural stand development (USFS 2010, p. 79). Another effect of thinning is the development of a mid-canopy of shade intolerant trees. The availability of growing space, both in the thinned areas and gaps, will allow shade tolerant seedlings and saplings to develop into larger trees, that will result in a varied and multi-layered forest canopy most commonly associated with late-successional forest (Chan et al. 2006, pp. 2708-2709).

Thinning delays the development of snags and downed logs due to a decrease in inter-tree competition and mortality. This delay is expected to be as much as 30 years for the heavily thinned stands (USFS 2010, p. 79). The proposed thinning would cause a reduction in the number of small snags and logs that would have been recruited over time in the absence of thinning through suppression mortality, but this effect would be partially offset by mitigation to retain defective green trees that could become snags in a relatively short time, and with the creation of additional snags in several harvest units. In addition, small snags would still be expected to be created naturally in the unthinned portions of the units and in Riparian Reserves. The snags and logs that would have developed in the absence of thinning would have had marginal value for wildlife, due to their small size, and they would not remain on the landscape for very long. The proposed thinning would reduce the amount of time needed to achieve suitable spotted owl habitat in the treated stands. Development of large trees with deep crowns, multiple canopy layers, and understory vegetation would be accelerated, resulting in long-term beneficial effects to the future development of spotted owl nesting, roosting, and foraging habitat.

Windthrow Effects

Thinning units in critical habitat will open the forest canopy and could potentially increase the risk for windthrow within adjacent suitable spotted owl habitat stands. Rashin and others (2006, p. 1324) examined windthrow rates along both clearcut and partial-cut (thinning) timber harvests and found an average windthrow rate of 9.7 trees/100 m along clearcut edges, compared to an average of 0.7 trees per 100 m in partial cut harvests. The windthrow rate in the partial harvest units was similar to that found in unmanaged control sites. On the Olympic Peninsula, variable density thinning resulted in a blowdown rate of about 8 trees/ha in thinned stands. The overall level of wind damage was similar to unthinned stands (Roberts et al. 2007, p. 285). Internal edges created by canopy gaps, skid trails, and unthinned patches did not increase windthrow effects (Roberts et al. 2007, p. 285). Potential edge effects that would degrade suitable spotted owl habitat such as increased windthrow are not expected. Therefore, the effect of thinning to adjacent nesting, roosting, foraging habitat is considered to be insignificant.

Effects to Spotted Owl Dispersal Habitat

Dispersal habitat would be affected, with approximately 1,477 acres of dispersal habitat directly affected by commercial thinning. For management purposes, the Forest defines spotted owl dispersal habitat as conifer stands with an average tree diameter of 11 inches dbh or greater, with at least 40 percent canopy cover, and an average stem density of 300 trees per acre or less. This definition is based on Thomas et al. (1990, p. 310), and the Washington Forest Practices Board definitions for spotted owl habitat (WAC-222-16-085).

The effects to spotted owl dispersal habitat vary depending on thinning intensity. These effects fall into 3 categories: (1) dispersal habitat maintained, (2) dispersal habitat downgraded to unsuitable habitat, and (3) unsuitable habitat upgraded to dispersal habitat. Table 5 summarizes the effects to spotted owl critical habitat by unit.

Table 5. Summary of changes to spotted owl habitat by harvest unit.

Harvest unit number	Harvest unit acres	Habitat before thinning	Target canopy cover after thinning	Habitat after thinning
4	12.3	Dispersal	30% - 40%	Non-habitat
5	41.8	Dispersal	40% - 50%	Dispersal
6	44.9	Dispersal	40% - 50%	Dispersal
7	25.6	Dispersal	30% - 40%	Non-habitat
8	13.2	Dispersal	40% - 50%	Dispersal
9	29	Non-habitat	40% - 50%	Dispersal
10	58.6	Non-habitat	40% - 50%	Non-habitat
11	32.1	Non-habitat	30% - 40%	Non-habitat
12	49.5	Dispersal	40% - 50%	Dispersal
13	22.5	Dispersal	40% - 50%	Dispersal
14	18	Non-habitat	30% - 40%	Non-habitat
15	33.6	Non-habitat	40% - 50%	Non-habitat
16	11	Dispersal	30% - 40%	Non-habitat
17	5.3	Dispersal	30% - 40%	Non-habitat
18	35.8	Dispersal	40% - 50%	Dispersal
19	20.8	Non-habitat	50% - 60%	Non-habitat
20	46	Dispersal	40% - 50%	Dispersal
21	46.6	Non-habitat	40% - 50%	Dispersal
22	37.9	Non-habitat	40% - 50%	Dispersal
23	1.9	Non-habitat	30% - 40%	Non-habitat
24	82.3	Dispersal	40% - 50%	Dispersal
25	37	Dispersal	40% - 50%	Dispersal
26	23.5	Dispersal	40% - 50%	Dispersal
27	46.8	Dispersal	40% - 50%	Dispersal
29	34.8	Dispersal	40% - 50%	Dispersal

Harvest unit number	Harvest unit acres	Habitat before thinning	Target canopy cover after thinning	Habitat after thinning
30	26.3	Dispersal	40% - 50%	Dispersal
31	32.9	Dispersal	30% - 40%	Non-habitat
32	41.6	Dispersal	40% - 50%	Dispersal
33	47.2	Dispersal	40% - 50%	Dispersal
34	110.4	Dispersal	30% - 40%	Non-habitat
35	83.4	Dispersal	40% - 50%	Dispersal
36	77.3	Dispersal	30% - 40%	Non-habitat
37	24.2	Dispersal	50% - 60%	Dispersal
38	75.9	Dispersal	40% - 50%	Dispersal
39	42.9	Dispersal	40% - 50%	Dispersal
40	55.9	Dispersal	30% - 40%	Non-habitat
41	49.2	Dispersal	40% - 50%	Dispersal
42	35.8	Dispersal	40% - 50%	Dispersal
43	36.7	Non-habitat	50% - 60%	Dispersal
44	22.6	Non-habitat	40% - 50%	Non-habitat
45	26	Non-habitat	30% - 40%	Non-habitat
46	24.4	Dispersal	40% - 50%	Dispersal
47	100	Dispersal	40% - 50%	Dispersal
48	10.8	Dispersal	40% - 50%	Dispersal
49	6.4	Dispersal	50% - 60%	Dispersal
50	28.6	Dispersal	40% - 50%	Dispersal
51	6	Non-habitat	30% - 40%	Non-habitat
52	30.2	Dispersal	40% - 50%	Dispersal
53	4	Dispersal	30% - 40%	Non-habitat
54	9.5	Dispersal	30% - 40%	Non-habitat
55	28.2	Dispersal	30% - 40%	Non-habitat
Total acres	1,847.2			
Total dispersal habitat thinned – 1477.2 acres				
Total dispersal habitat maintained – 1,105.3 acres				
Total dispersal habitat downgraded to non-habitat – 372.4 acres				
Total non-habitat upgraded to dispersal habitat – 150.2 acres				
Total non-habitat that remains non-habitat – 219.6 acres				

Dispersal Habitat Maintained

Moderate and light thinning treatments will maintain dispersal habitat on 1,105 acres. Most thinning is of moderate intensity, which will reduce tree densities in stands from > 240 trees per acre to < 115 trees per acre. Overstory canopy cover will be reduced from > 80 percent to 40 to

50 percent. Treated stands will continue to meet the minimum dispersal habitat definition with average tree diameter of 11 inches dbh or greater, with at least 40 percent canopy cover, and an average stem density of 300 trees per acre or less. Dispersal habitat would be degraded somewhat due a short-term loss of existing small snags, destruction of down logs, and reductions in overstory canopy cover. However, these effects would be short-term since the overstory is expected to close back in at a rate of about 2 percent per year (Chan et al. 2006, p. 2696), and the project is expected to result in increased large snag and down log densities in thinned stands. The structural features necessary for dispersal habitat (i.e., overstory canopy cover and moderate tree densities) will be maintained in all stands thinned with moderate or light thinning treatments.

Dispersal Habitat Downgraded to Unsuitable Habitat

Heavy thinning treatments will downgrade dispersal habitat to unsuitable habitat on 372 acres. Heavy thinning will reduce tree densities from > 240 trees per acre to < 90 trees per acre. Overstory canopy cover will be reduced from > 80 percent to 30 to 40 percent. The structural features necessary for dispersal habitat (i.e., overstory canopy cover and moderate tree densities) would not be maintained, and represents a short-term loss of the dispersal habitat PCE in heavily thinned stands. However, these effects would be short-term since the overstory canopy cover is expected to close back in at a rate of about 2 percent per year. Stands thinned to less than 40 percent canopy cover should recover a minimum dispersal habitat condition within 5 to 10 years.

In addition to the thinning effects described above, there will be a cumulative total of about 58 acres of dispersal habitat removed to create canopy gaps, log landings and new temporary roads. However, all roads, landings, and canopy gaps will be reforested following timber harvest, and will eventually develop late-successional forest.

Unsuitable Habitat Upgraded to Dispersal Habitat

Moderate and light thinning treatments will upgrade unsuitable habitat to dispersal habitat on 105 acres. Most thinning is moderate intensity, which will reduce tree densities in unsuitable stands from > 300 trees per acre to < 115 trees per acre. Overstory canopy cover will be reduced from > 80 percent to 40 to 50 percent. Reduced stem densities in patches that currently have greater than 300 trees per acre would be beneficial to the function of the dispersal habitat, as spotted owls may avoid stands where stem density is greater than 300 trees per acre (Hanson et al. 1993, p. 57). Treated stands will transition from unsuitable to meet the minimum dispersal habitat definition with average tree diameter of 11 inches dbh or greater, with at least 40 percent canopy cover, and an average stem density of 300 trees per acre or less.

Unsuitable Habitat Maintained

Thinning treatments will maintain unsuitable habitat on 220 acres. These are dense stands of pole sized trees less than 11 inches dbh. Most thinning is moderate intensity. Reduced stem densities in patches that currently have greater than 300 trees per acre would be beneficial to the rapid development of the dispersal habitat. Treated stands will likely transition from unsuitable to dispersal habitat within 5 to 10 years after thinning.

Summary of Thinning Effects to Dispersal Habitat

There are 51 timber harvest units in the Pepper Cat Thin Timber Sale which will result in thinning a total of 1,847 acres. Approximately 1,477 acres of spotted owl dispersal habitat will be thinned, and 370 acres of unsuitable stands will be thinned. Dispersal habitat in thinned stands will be maintained on 1,105 acres, or, downgraded to unsuitable habitat on 372 acres. Thinning in stands that are currently too dense for spotted owl dispersal will create dispersal habitat on about 150 acres. The result will be a net reduction of 222 acres of the dispersal habitat PCE across the action area. Overstory canopy cover in thinned stands will recover rapidly, and minimum dispersal habitat conditions are expected to recover in heavily-thinned stands within approximately 10 years.

Effects of Interrelated and Interdependent Actions

All temporary roads and log landings would be ripped and seeded after harvest; therefore, they do not represent a permanent loss of critical habitat PCEs. Other actions include piling and burning slash, planting conifer seedlings, and pre-commercial thinning in the post-harvest regeneration stands. The interrelated actions associated with the project implementation are considered programmatic forest management activities. The Forest has determined that these activities "may affect, but are not likely to adversely affect" the spotted owl critical habitat. These activities are covered under an informal programmatic consultation for forest management on the Forest (Service reference # 2010-I-0151, Jan. 19, 2010).

Effects to Dispersal Habitat Connectivity in CHU Subunit W-03

Early conservation strategies for the spotted owl recommended maintaining at least 50 percent of the landscape with forests capable of supporting spotted owl dispersal (i.e., trees averaging greater than or equal to 11 inches dbh with greater than 40 percent canopy cover) (Thomas et al. 1990, p. 310). The Pepper Cat Thin Timber Sale action area encompasses over 31,000 acres in in the southern half of CHU subunit W-03. Approximately 69 percent of this landscape currently supports suitable nesting, roosting, foraging (48 percent) or dispersal habitat (21 percent). The short-term reduction of 222 acres of dispersal habitat represents less than one percent of the available dispersal habitat in the project area.

Although large areas of non-forested habitat (e.g., Willamette Valley) appear to act as barriers to dispersal, spotted owls regularly disperse through highly fragmented landscapes that are typical in western Washington and western Oregon (Forsman et al. 2002, p. 22). Although it is clear from this study that spotted owls disperse across fragmented forest landscapes, we do not know if survival rates of dispersing owls are influenced by the amount of forest fragmentation or the amount of suitable habitat encountered along the dispersal path. Lamberson et al. (1992, p. 511) suggested that survival of dispersing spotted owls may be lower in fragmented forests or in areas with little old forest. However, Miller (1989, p. 2) found no correlation between forest fragmentation and survival or dispersal distance of spotted owls.

While there is uncertainty regarding the forest conditions required for spotted owl dispersal, it is assumed that dispersal success is better when the dispersal habitat more closely resembles

nesting, roosting, and foraging habitat (i.e., suitable habitat)(USFWS 2008, p. 19). Landscape analysis indicates that over 78,000 acres (54 percent) of CHU Subunit W-03 currently provides suitable spotted owl nesting, roosting, and foraging habitat (USFWS 2008, p. 85), with additional acres that provide young forest dispersal habitat. Land use allocations such as visual corridors, riparian management zones, unstable soil areas, and special management areas that support higher-quality spotted owl habitat are also expected to facilitate dispersal of spotted owls (USFWS 2008, p. 19).

Both suitable old-forest habitat and young forest dispersal habitat is generally abundant and well-distributed across the action area. This indicates that dispersal habitat is likely not a limiting factor in this landscape. Considering the information presented above, the short-term loss of up 222 acres of dispersal habitat is not expected to measurably affect spotted owl dispersal connectivity or success at the scale of the action area or the Southwest Washington Cascades CHU subunit W-03.

Effects to the Conservation and Recovery Role of the Washington Southwestern Cascades CHU

In the 2010 draft revised recovery plan for the spotted owl, the Service identified thinning in young forests as a Recovery Action: "*In west-side forests managed for spotted owl habitat we recommend land managers implement silvicultural techniques in plantations, overstocked naturally regenerated stands and modified younger stands to accelerate the development of structural complexity and biological diversity that will benefit spotted owl recovery"* (USFWS 2010b, p. 42).

Several research studies have shown that commercial thinning can be beneficial to the development of late-successional forest characteristics by promoting stand diversity and by accelerating the development of understory shrubs which provide habitat for small mammals that spotted owls prey upon (Carey and Wilson 2001, p. 1014; Gomez et al. 2005, p. 1680; Wilson and Carey 2000, p. 131). In the draft revised spotted owl recovery plan, the Service emphasizes that thinning treatments should retain the oldest and largest trees in the stands or any trees with characteristics that create stand diversity (e.g., bole and limb deformities) and should focus on structural diversity in the mid-to upper story layers, but not at the expense of large snags or existing species diversity (USFWS 2010b, p. 42). The proposed Pepper Cat Thin Timber sale is consistent with these recommendations by retaining all trees that are larger than 20 inches dbh, and by promoting species diversity and stand heterogeneity within the action area and the CHU.

Although the proposed action will result in the short-term loss of about 222 acres of dispersal habitat, the proposed treatments are expected to maintain important structural features such as large overstory trees, live trees with decay and deformities, snags, and down logs. By retaining these features in the treated stands, the proposed thinning will maintain the structures necessary to support both the short-term development of dispersal habitat, and the long-term development of spotted owl nesting, roosting, and forging habitat. Therefore, the proposed would not diminish the conservation and recovery role of the CHU for providing well-distributed nesting, roosting, foraging and dispersal habitats in the Southwest Washington Cascades.

Effects to the function of CHUs in the Washington Western Cascades Province

For the reasons described above, the proposed Pepper Cat Timber Sale would not affect the function of the CHUs at the scale of the Washington Western Cascades physiographic province, or at the rangewide scale.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

In the lower Muddy River and Middle Lewis River watersheds there is a mix of Federal and non-Federal lands. Non-Federal lands in the area are managed primarily for timber production. Therefore non-Federal actions that could affect adjacent spotted owl critical habitat are reasonably certain to occur within the action area. These will primarily include road management and timber harvest operations. Private timber harvest in the area must comply with the Washington Forest Practices Act (RCW 76.09) as well as the Washington Administrative Code with respect to the Washington Forest Practices Rules (WAC 222). However, the Service completed a formal consultation on the Washington State Forest Practices Rules in 2006 and anticipated that there would be degradation and loss of suitable spotted owl habitat in CHUs from windthrow effects located within 400 ft of private forest practices clearcut harvest boundaries. At the scale of individual CHU subunits, there could be a loss of up to 1 percent of suitable spotted owl habitat over a 50 year period. Although the Service determined that windthrow from adjacent private timber harvest "may affect, and is likely to adversely affect" designated spotted owl critical habitat, we concluded that these effects are not likely to destroy or adversely modify spotted owl critical habitat (USFWS 2006, p. 419). Because these effects have already been addressed through section 7 consultation, they are not considered as cumulative effects.

CONCLUSION

After reviewing the current status of spotted owl critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Pepper Cat Thin Timber Sale, as proposed, is not likely to destroy or adversely modify designated critical habitat.

Implementation of the Pepper Cat Thin Timber Sale will not remove or adversely affect spotted owl nesting, roosting, or foraging habitat. The proposed action will result in the net loss of approximately 222 acres of the dispersal habitat PCE. Impacts associated with this commercial thinning are expected to be short-term in nature (10 years), with long-term benefits associated with accelerated tree growth and understory development that will promote development of spotted owl nesting, roosting, and foraging habitat in the CHU. Dispersal habitat is not limiting

in the Southwest Washington Cascades CHU, therefore the short-term loss of 222 acres of dispersal habitat would not result in an appreciable reduction in the capability of the CHU to provide the intended conservation role for the species. The Southwest Washington Cascades would continue to function as intended by providing essential nesting, roosting, foraging, and dispersal habitat as well as providing essential breeding habitat connectivity within the Western Washington Cascades physiographic province.

In summary, the direct, indirect, and cumulative effects from the action would not diminish the value or function of the critical habitat to maintain a stable, self-sustaining, and interconnected population of spotted owls and provide the intended conservation and recovery role within the Southwest Washington Cascades CHU, the Western Washington Cascades physiographic province; or across the species' listed range.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is defined by the Service as an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to any applicants, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest 1) fails to assume and implement the terms and conditions or 2) fails to require any applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

The Service does not anticipate the proposed action will incidentally take any listed species. Since no take is anticipated or exempted, no reasonable and prudent measures and terms and conditions are provided below. If take is detected during implementation of the proposed action, reinitiation of formal consultation should be requested, and any operations causing such take must cease pending the outcome of the reinitiated consultation.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service offers the following non-binding conservation recommendations to the Forest to promote the recovery of federally-listed species and their habitats:

- Conduct protocol surveys for spotted owls in the project area to determine if historic spotted owl activity centers are still occupied, and if any other spotted owl activity centers are present in the project action area.

- Work towards attaining road densities of less than 1 mile per square mile in bull trout watersheds.

- Improve watershed conditions by removing culverts, closing roads, and revegetating treated areas, as appropriate.

- Employ all protection measures feasible to retain the largest available snags, trees, and down woody debris for the purpose of accelerating development of nesting, roosting, and foraging habitat.

- Report to the Service for the purpose of baseline updates, all actions analyzed in this Opinion that are ultimately deferred (not implemented).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the proposed Pepper Cat Thin Timber Sale as outlined in the November 10, 2010 request for consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

LITERATURE CITED

Anthony, R.G., E.D. Forsman, A.B. Franklin, D.R. Anderson, K.P. Burnham, G.C. White, C.J. Schwarz, J. Nichols, J.E. Hines, G.S. Olson, S.H. Ackers, S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, K.M. Dugger, K.E. Fehring, T.L. Fleming, R.P. Gerhardt, S.A. Gremel, R.J. Gutiérrez, P.J. Happe, D.R. Herter, J.M. Higley, R.B. Horn, L.L. Irwin, P.J. Loschl, J.A. Reid, and S.G. Sovern. 2006. Status and trends in demography of northern spotted owls, 1985-2003. Wildlife Monographs 163:2-68.

Benda, L.E., D. Miller, J. Sias, D. Martin, R.E. Bilby, C. Veldhuisen, and T. Dunne. 2003. Wood recruitment processes and wood budgeting. American Fisheries Society 37:49-73.

Beschta, R.L., R.E. Bilby, G.W. Brown, L.B. Holtby, and T.D. Hofstra. 1987. Stream temperatures and aquatic habitat: fisheries and forest interactions. Pages 191-232 *In* E.O. Salo, ed. Streamside management: forestry and fishery interactions, University of Washington, Institute of Forest Resources, Seattle, Washington.

Carey, A.B. 1995. Sciurids in Pacific Northwest managed and old-growth forests. Ecological Applications 5(2):648-661.

Carey, A.B., and S.M. Wilson. 2001. Induced spatial heterogeneity in forest canopies: Responses of small mammals. Journal of Wildlife Management 65(4):1014-1027.

Chan, S.S., D.J. Larson, K.G. Maas-Hebner, W.H. Emmingham, S.R. Johnston, and D.A. Mikowski. 2006. Overstory and understory development in thinned and underplanted Oregon Coast Range Douglas-fir stands. Canadian Journal of Forest Research 36(10):2696-2711.

Curtis, R.O. 1982. A Simple Index of Stand Density for Douglas-Fir. Forest Science 28(1).

Davis, R., and J. Lint. 2005. Chapter 3: habitat status and trends. Pages 21-88 *In* J. Lint, ed. Northwest Forest Plan-the first 10 years (1994-2003): status and trends of northern spotted owl populations and habitat, Gen. Tech. Rep. PNW-GTR-648. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.

DeWalle, D.R. 2010. Modeling stream shade: riparian buffer height and density as important as buffer width. Journal of the American Water Resources Association 46(2):323-333.

Dube, K., W. Megahan, and M. McCalmon. 2004. Washington road surface erosion model. Prepared for State of Washington Department of Natural Resources, February 20, 2004.

Foltz, R.B., K.A. Yanosek, and T.M. Brown. 2008. Sediment concentration and turbidity changes during culvert removals. Journal of Environmental Management 87(3):329-340.

Forsman, E.D., R.G. Anthony, J.A. Reid, P.J. Loschl, S.G. Sovern, M. Taylor, B.L. Biswell, A. Ellingson, E.C. Meslow, G.S. Miller, K.A. Swindle, J.A. Thrailkill, F.F. Wagner, and D.E. Seaman. 2002. Natal and breeding dispersal of northern spotted owls. Wildlife Monographs 149(1):35.

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. Wildlife Monographs 87:1-64.

Gomez, D.M., R.G. Anthony, and J.P. Hayes. 2005. Influence of thinning of Douglas-fir forests on population parameters and diet of northern flying squirrels. Journal of Wildlife Management 69(4):1670-1682.

Gomi, T., R.D. Moore, and M.A. Hassan. 2005. Suspended sediment dynamics of small forest streams of the Pacific Northwest. Journal of the American Water Resources Association 41:877-898.

Grant, G.E., S.L. Lewis, F.J. Swanson, J.H. Cissel, and J.J. McDonnell. 2008. Effects of forest practices on peak flows and consequent channel response: a state-of-science report for western Oregon and Washington. Pacific Northwest Research Station, Forest Service, USDA, General Technical Report PNW-GTR-760, Portland, Oregon, May, 2008. 76 pp.

Grizzel, J.D., and N. Wolff. 1998. Occurrence of windthrow in forest buffer strips and its effect on small streams in northwest Washington. Northwest Science 72(3):214-223.

Hanson, E., D. Hays, L.L. Hicks, L. Young, and J.B. Buchanan. 1993. Spotted owl habitat in Washington: A report to the Washington Forest Practices Board. Washington Forest Practices Board Spotted Owl Scientific Advisory Group, Olympia, WA, December 20, 1993.

Harrington, C.A., S.D. Roberts, and L.C. Brodie. 2005. Tree and understory responses to variable-density thinning in western Washington. Pages 97-106 *In* C.E. Peterson, C.C. Maguire, and A. Douglas, eds. Balancing ecosystem values: innovative experiments for sustainable forestry. Proceedings of a conference. General Technical Report PNW-GTR-635, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Hershey, K.T., E.C. Meslow, and F.L. Ramsey. 1998. Characteristics of forests at spotted owl nest sites in the Pacific Northwest. Journal of Wildlife Management 62(4):1398-1410.

Lamberson, R.H., R. Mckelvey, B.R. Noon, and C. Voss. 1992. A dynamic analysis of Northern Spotted Owl viability in a fragmented forest landscape. Conservation Biology 6(4):505-512.

Litschert, S., and L. MacDonald. 2009. Frequency and characteristics of sediment delivery pathways from forest harvest units to streams. Forest Ecology and Management 259(2):143-150.

Miller, G.S. 1989. Dispersal of juvenile spotted owls in Western Oregon. Master's Thesis. Oregon State University, Corvallis, OR.

Rashin, E.B., C.J. Clishe, A.T. Loch, and J.M. Bell. 2006. Effectiveness of timber harvest practices for controlling sediment related water quality impacts. Journal of the American Water Resources Association (JAWRA) 42(5):1307-1327.

Reeves, G.H., K.M. Burnett, and E.V. McGarry. 2003. Sources of large wood in the main stem of a fourth-order watershed in coastal Oregon. Canadian Journal of Forest Research 33:1363-1370.

Reid, L.M., and T. Dunne. 1984. Sediment production from forest road surfaces. Water Resources Research 20(11):1753-1761.

Roberts, S.D., C.A. Harrington, and K.R. Buermeyer. 2007. Does variable-density thinning increase wind damage in conifer stands on the Olympic Peninsula? Journal of Applied Forestry 22:285-296.

Steinblums, I.J., H.A. Froehlich, and J.K. Lyons. 1984. Designing stable buffer strips for stream protection. Journal of Forestry 82:49-52.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl: a report of the Interagency Scientific Committee to address the conservation of the northern spotted owl. U.S. Department of the Interior, Bureau of Land Management, Fish and Wildlife Service, and National Park Service, Portland, Oregon, May 1990. 427 pp.

Topik, C., N. Halverson, and D.G. Brockway. 1986. Plant association and management guide for the western hemlock zone: Gifford Pinchot National Forest. Pacific Northwest Region, Forest Service, USDA, R6-ECOL-230A-1986.

USDA, and USDI. 1994a. Final Supplemental Environmental Impact Statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl, Portland, Oregon. 557 pp.

USDA, and USDI. 1994b. Record of decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl; standards and guidelines for management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl (Northwest Forest Plan), Portland, Oregon. 232 pp.

USFS. 2010. Pepper Cat Thin Environmental Assessment. Mount St. Helens National Volcanic Monument, Gifford Pinchot National Forest, Skamania County, Washington, November 2010. 192 pp.

USFWS. 1992. Protocol for surveying proposed management activities that may impact Northern Spotted Owls. 17 pp.

USFWS. 1994. Biological opinion for the preferred alternative (9) of the supplemental environmental impact statement of habitat for late successional and old-growth forest within the range of the northern spotted owl. Appendix G. *In* USDA Forest Service and USDI Bureau of Land Management (eds). Final environmental impact statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl, Portland, Oregon.

USFWS. 1999. A framework to assist in making Endangered Species Act determinations of effect for individual or grouped actions at the bull trout subpopulation watershed scale: draft report. 47 pp.

USFWS. 2002. Chapter 20 of the bull trout *(Salvelinus confluentus)* draft recovery plan: Lower Columbia Recovery Unit, Washington. USFWS, Region 1, Portland, Oregon. 102 pp.

USFWS. 2003. Biological opinion and letter of concurrence for effects to bald eagles, marbled murrelets, northern spotted owls, bull trout, and designated critical habitat for marbled murrelets and northern spotted owls from Olympic National Forest program of activities for August 5, 2003, to December 31, 2008. Western Washington Fish and Wildlife Office, 1-3-03-F-0833, Lacey, Washington, August 05, 2003.

USFWS. 2004. Biological and conference opinion on the effects to the bull trout (*Salvelinus confluentus*) and bull trout proposed critical habitat from continued implementation of Forest Service land and resource management plans and Bureau of Land Management resource management plans as amended by the 1994 Northwest Forest Plan record of decision, as amended by the October 24, 2003, supplemental environmental impact statement regarding aquatic conservation strategy clarification amendments to the 1994 Northwest Forest Plan record of decision. Pacific Regional Office, Oregon Fish and Wildlife Office, and Western Washington Fish and Wildlife Office, U.S. Fish and Wildlife Service, 1-7-04-F-0106, January 9, 2004. 179 pp.

USFWS. 2006. Biological opinion for the issuance of an incidental take permit (PRT-TE121202-0) to the state of Washington for the implementation of the Washington forest practices habitat conservation plan. Western Washington Fish and Wildlife Office, 1-3-06-FWF-0301, Lacey, WA, May 16, 2006. 1152 pp.

USFWS. 2007. 2007 draft recovery plan for the northern spotted owl *(Strix occidentalis caurina)*: merged options 1 and 2. USFWS, Portland, Oregon, April 2007. 173 pp.

USFWS. 2008. Final recovery plan for the northern spotted owl, *Strix occidentalis caurina*. U.S Fish and Wildlife, Portland, Oregon, May 13, 2008. 142 pp.

USFWS. 2010a. Bull trout final critical habitat justification: rationale for why habitat is essential, and documentation of occupancy. Idaho Fish and Wildlife Office, Boise, Idaho, Portland, Oregon, September 2010. 1035 pp.

USFWS. 2010b. Draft revised recovery plan for the northern spotted owl, *Strix occidentalis caurina*. U.S Fish and Wildlife, Portland, Oregon, September 8, 2010. xii + 163 pp.

Wemple, B.C., J.A. Jones, and G.E. Grant. 1996. Channel network extension by logging roads in two basins, Western Cascades, Oregon. Water Resource Bulletin 32:1-13.

Wilson, S.M., and A.B. Carey. 2000. Legacy retention versus thinning: Influences on small mammals. Northwest Science 74(2):131-145.