****BIOLOGICAL EVALUATION****

THREATENED AND SENSITIVE FISH AND AQUATIC SPECIES

FOREST: Mt. Hood National Forest DISTRICT: Clackamas River District

PROJECT: Cloak Thinning Environmental Assessment

PREPARED BY: Robert Bergamini POSITION: Fisheries Biologist DATE: 03/20/04

INTRODUCTION

Forest management activities that may alter the aquatic habitat or affect individuals or populations of PETS (Proposed, Endangered, Threatened, and Sensitive) fish and aquatic species require a Biological Evaluation to be completed (FSM 267l.44 and FSM 2670.32) as part of the National Environmental Policy Act process to determine their potential effects on sensitive, threatened or endangered species. The Biological Evaluation process (FSM 2672.43) is intended to conduct and document activities necessary to ensure proposed management actions will not likely jeopardize the continued existence or cause adverse modification of habitat for:

A. Species listed or proposed to be listed as endangered (E) or threatened (T) by the USDI-Fish and Wildlife Service or National Marine Fisheries Service (NOAA Fisheries).

B. Species listed as sensitive (S) by USDA-Forest Service Region 6.

This evaluation addresses a proposal to thin and commercially harvest wood fiber in young plantations and natural fire created stands within the Clackamas River and the Oak Grove Fork watersheds. The river corridors of these watersheds are designated Tier I, Key Watersheds under the Northwest Forest Plan because they contain crucial refugia for at-risk fish species. These watersheds support populations of winter steelhead, coho salmon, chinook salmon, and resident cutthroat and rainbow trout.

The stands proposed for thinning are located within fourteen subwatersheds of the Clackamas River and Oak Grove Fork of the Clackamas River. These subwatersheds include: Lower Oak Grove Fork, Middle Oak Grove Fork, Lake Harriet, Peavine Creek, Shellrock Creek, and Kink Creek in the Oak Grove Fork of the Clackamas River, Tag Creek within the Middle Clackamas River, and Cabin Creek, Last Creek, Pinhead Creek, Dyke Creek, Big Bottom, Granite Creek, and the Austin Segment of the Upper Clackamas River watershed.

Table 1 is a summary table of effects by species, by alternative. This biological evaluation addresses all alternatives presented in the Cloak Thinning Environmental Assessment.

Project Description

The Cloak Thinning Project proposes to thin and commercially harvest wood fiber in young plantations and natural stands within matrix land and Riparian Reserves. The proposal is to thin approximately 1,332 acres of matrix land and approximately 217 acres of riparian reserves. The total acres within riparian reserves have been adjusted to account for no-cut buffers along perennial and intermittent streams and wet areas. The total acres of riparian reserves to be entered under this proposal are approximately 275 acres. The management strategy is for a one-time entry into the Riparian Reserves. The objectives of this action are to hasten tree growth to achieve a mature forest that is structurally diverse and to accelerate future large woody debris recruitment potential and snag habitat production.

The stands within the Cloak Project range in age from 35 to 86 years. The average tree height is 70 feet with dbh averaging between nine and 12 inches. The timber to be harvested is primarily Douglas fir and western hemlock, as well as a small amount of western red cedar. The current stocking levels range from 141 trees per acre to 360 trees per acre. The proposed action will thin from below by harvesting the smaller trees. The largest and dominant trees will be retained. Trees will be thinned using variable spacing to stand densities ranging from approximately 80 trees per acre (40% to 60% canopy closure).

Commercial thinning will be accomplished utilizing a combination of mechanical harvester, forwarders, tractor, skyline, and helicopter logging systems. The seasonal operation for ground-based equipment will be between May 31 and November 1. All ground based tractor operations will take place on slopes averaging less than 30% to avoid the risk of damage to soil and water resources. Mechanical harvesters will be permitted on slopes up to 40% and will be operating within the stream influence zone (one site potential tree height ~ 180 ft.). Harvesters operating within the Riparian Reserves and Matrix Land will be required to work on a layer of residual slash placed in the harvester path prior to advancing the equipment. Harvester travel routes will be limited to one pass over a path whenever possible.

On areas where tractors will be used, skid trails will be located outside of riparian reserves and trees would be directionally felled away from the stream influence zone and winched. All skyline yarding will be one end or full suspension if needed, such as when yarding over a stream channel or seep.

Existing skid trails from prior entry in the project area will be used where possible. Following harvest activities, ground based skid roads will be seeded and mulched to reduce surface erosion. Water bars and/or cross ditches will be installed where needed to disperse water and control surface run-off.

No-harvest buffers (a minimum of 50 ft.) will be established along the active channel of all perennial streams. Larger buffer widths may be needed on a site-specific basis to prevent any increase in sediment delivery rates or a decrease in stream shading. No

harvesting equipment will be allowed to operate within this area. Buffer width design will take into account the stream influence zone, steepness of slope, size and location of trees, orientation of the site to the sun (aspect), slope stability, and stream bank stability. No-cut areas will include any buffer of hardwood vegetation occurring along the stream bank. No-cut buffers will generally be at the top of slope breaks on steeper ground and would circumvent all wet areas to achieve aquatic conservation strategy objectives and maintain canopy cover along riparian areas. Falling trees for skyline corridors would be avoided, but where necessary the material would be left as woody debris.

For the next 50 ft. adjacent to the no-harvest buffers along perennial streams, only low impact harvesting equipment such as, but not limited to, mechanical harvesters or skyline systems (suspension yarding), which have minimal ground disturbance would be allowed. Mechanical harvesting equipment would be required to operate on slash-covered paths. Trees in this zone would be directionally felled away from the no-harvest buffer to minimize the disturbance to the forest floor.

No-harvest buffers (a minimum of 30 ft.) will be established along the channels of all intermittent streams. Smaller buffer widths would be allowed if it is determined on a site specific basis that there would be no increase in sediment delivery rates or a decrease in stream shading which would alter stream temperatures. Buffer width design will take into account the same parameters as perennial channels. No cut areas along seeps, springs, and wet areas would extend to the outer limits of riparian vegetation and would include the first row of coniferous trees. These no cut areas will reduce the risk of sediment entering streams or and would provide sufficient shading to sustain stream temperatures. No measurable change in stream temperatures is expected as the result of implementing this project. This action would not produce any measurable change in water quality or aquatic resources. Falling trees or any equipment use within the no-harvest buffer would only allowed if it would cause no increase to sediment or decrease in stream shading.

Additionally, the project proposes to aerial fertilize approximately 460 acres of matrix lands within three years of the completion of commercial thinning. Fertilizer application would be 200 pounds of nitrogen per acre. Fertilization of the commercially thinned stands would hasten the recovery of forest canopy to meet matrix land timber objectives. Fertilization will only occur on Matrix land and not in Riparian Reserves. This will minimize the risk of fertilizer contaminating any water supply. Aerial application of urea fertilizer has the potential to enter the aquatic environment and may result in increased nitrogen levels in streams. Mitigation measures have been designed to minimize the risk of fertilizer entering streams. Application does not take place within riparian reserves, thus avoiding potential contamination of streams and areas of surface water for protection of fish and other aquatic organisms. Drift is avoided by limiting aerial application to days with little or no wind. Based on past District monitoring of forest fertilization activities, the only chance for approaching or possibly exceeding standards and thresholds would be in the case of an accidental spill. If this were to happen, the District spill containment plan would be implemented immediately with proper state and federal agencies notified.

Project Alternatives

- Alternative A - No Action

Under the No-action alternative, current management plans would continue to guide management of the project area. No timber harvest or other associated actions would be implemented to accomplish project goals.

- Alternative B - The Proposed Action

The action proposed by the Forest Service to meet the purpose and need is to thin and harvest wood fiber from approximately 1332 acres of matrix land and approximately 217 acres of riparian reserves.

On areas proposed for matrix thinning, the prescription would be adjusted on approximately 545 acres to increase forage for deer and elk. This would involve wider tree spacing and/or the inclusion of small forage enhancement areas of 1-3 acres on 10-15% of the acreage to get increased sunlight to the forest floor. A total of approximately 70 acres of scattered forage enhancement areas would be created. These areas would retain approximately 10-30 trees per acre: the lower range would be left in the smaller forage enhancement areas and the higher range would be left in larger forage enhancement areas. Shrub planting, grass seeding and nutritional supplementation may also occur in these areas where funding is available.

The proposed action is to aerially apply 200 pounds of nitrogen per acre to approximately 1049 acres of second-growth conifer stands within the matrix. (This is a connected action because it would occur in thinned plantations to supplement nutrient availability. However it is contingent upon funding availability. If funding is not immediately available, the thinning of plantations without fertilization is a viable option that is fully analyzed in other alternatives.)

New temporary roads (approximately 1.8 miles) are needed to access the landings. These roads would be obliterated and revegetated after completion of the project. Some existing decommissioned or overgrown roads need to be reopened (3.4 miles) to access landings for many units. Other roads have berms or drivable waterbars that would also be temporarily removed. Upon project completion, the roads would be returned to their original condition.

Mechanical felling equipment would be allowed in many units depending on slope. These machines have several advantages in terms of safety, minimal ground disturbance, reduced damage to leave trees, and increased yarding efficiency.

- Alternative C

Alternative C is similar to Alternative B except it would build no roads, would not thin riparian reserves and would not apply fertilizer. Units that are inaccessible from existing

roads would be helicopter logged (240 acres). The creation of forage would not be an objective for this alternative. Gaps in the stands, if any, would be less than 0.1 acre in size. Alternative C would thin and harvest wood fiber from approximately 1332 acres of matrix land.

Some existing decommissioned or overgrown roads need to be reopened (3.2 miles) to access landings for many units. Other roads have berms or drivable waterbars that would also be temporarily removed. Upon project completion, the roads would be returned to their original condition.

Mechanical felling equipment would be allowed in many units depending on slope. These machines have several advantages in terms of safety, minimal ground disturbance, reduced damage to leave trees, and increased yarding efficiency.

- Alternative D

This alternative is similar to C but would eliminate the thinning of natural second-growth stands. Alternative D would thin and harvest wood fiber from approximately 1082 acres of matrix land and would reopen 3.1 miles of closed roads.

- Alternative E

This alternative is similar to B but would have larger forage enhancement areas. Alternative E would thin and harvest wood fiber from the same units described for Alternative B but would have forage enhancement areas of 3 to 5 acres in size. Leave trees would be retained at a rate of 20 to 40 trees per acre. The total quantity of forage enhancement areas would be the same as Alternative B (70 acres).

Table1. Summary of Effects to listed, proposed, candidate, and sensitive species occurring on or downstream of the Clackamas River Ranger District.

ESU Species/Status	Date of Listing	Suitable Habitat Present	Species Present	Effects of Actions Alternatives				
Threatened				***A***	***B***	***C***	***D***	***E***
Lower Columbia River steelhead (*Oncorhynchus mykiss*)	3/99	Yes	Yes	NE	NLAA	NLAA	NLAA	NLAA
Columbia River Bull trout (*Salvelinus confluentus*)	5/98	No	No	NE	NE	NE	NE	NE
****Upper Willamette River chinook** (*Oncorhynchus tshawytscha)*	3/99	Yes	Yes	NE	NLAA	NLAA	NLAA	NLAA
Lower Columbia River chinook (*Oncorhynchus tshawytscha)*	3/99	Yes	No	NE	NE	NE	NE	NE
Columbia River Chum salmon (*Oncorhynchus keta*)	3/99	Yes	No	NE	NE	NE	NE	NE
Sensitive								
Southwestern WA/Columbia River coastal cutthroat trout *(Oncorhynchus clarki)*	NA	Yes	Yes	NI	MIIH	MIIH	MIIH	MIIH
Candidate								
Lower Columbia River/Southwest WA coho *(Oncorhynchus kisutch)*	07/95	Yes	Yes	NE	NLAA	NLAA	NLAA	NLAA
Aquatic Mollusk ***Survey & Manage Species***								
Basalt juga snail *Juga (O.) sp. 2*	NA	No	No	NI	NI	NI	NI	NI
****Columbia dusky snail** *Lyogyrus n. sp. 1*	NA	No	No	NI	MIIH	MIIH	MIIH	MIIH

NE – No Effect
NLAA – May affect not likely to adversely affect
LAA – May affect likely to adversely affect
NI - No Impact
MIIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal Listing or cause a loss of viability to the population or species. but not likely to cause a trend to Federal Listing or loss of viability.

DISCUSSION

Lower Columbia River Steelhead
(*Oncorhynchus mykiss*)
Threatened

Habitat and Life History Information

The life history of steelhead trout is more variable than other Pacific salmon (Oncorhynchus genus) concerning time spent in the ocean, freshwater residence, and the times of emigration from and immigration into freshwater habitat. Like cutthroat trout (Oncorhynchus clarki clarki) but unlike other Pacific salmon, steelhead do not usually die just after spawning. Incidence of repeat spawning appears to vary widely within the steelhead range with a very small percentage of fish spawning up to four times. In general, steelhead females have a higher survival rate during and after spawning than males.

Adult Clackamas winter steelhead enter the waters of the Mt. Hood National Forest primarily during April through June with peak migration occurring in May. The native winter steelhead in the Clackamas River above North Fork Dam use the majority of the mainstem and tributaries as spawning and rearing habitat. Very little spawning has been documented in tributaries of less than 4th order. Winter steelhead fry emerge between late June and late July and rear in freshwater habitat for one to three years. Juvenile steelhead during their first year, usually are found in riffle habitat but some of the larger juvenile steelhead will be found in pools and faster runs. The steelhead fry in the Clackamas River smolt and emigrate downstream March through June during spring freshets.

Columbia River Bull Trout
(*Salvelinus confluentus*)
Threatened

Habitat and Life History Information

Bull trout (*Salvelinus confluentus*) were once prolific in the Clackamas River system. At present, they are believed to be extinct. Adult bull trout, once present in the Clackamas River, exhibited a fluvial life history character, maintaining residence in the main river and larger tributaries. It is quite likely that adult bull trout in the Clackamas River migrated to the Willamette and Columbia rivers prior to construction of River Mill Dam. Adult bull trout would reside in the mainstem and larger tributaries until their spawning period during mid-August through September, at which time they would migrate upstream to smaller tributaries to spawn.

Cool water temperature is a critical habitat factor for juvenile bull trout. Higher egg survival and more rapid growth rates for both fry and juvenile bull trout is a function of cooler water temperatures. The distribution of bull trout within a basin has been

associated with water temperature regimes throughout the basin. Temperatures above 14 degrees celsius act as thermal barriers to the closely related arctic char. Juvenile bull trout exhibit fixed-site territoriality and are found closely associated with the stream bed. The bottom-dwelling bull trout is found to primarily occupy pool habitats or small pockets of water with slower velocities (0 to 0.1 meters/second). Bull trout tend to exhibit a preference to pool or pocket water habitats that offer hiding cover or visual isolation. Woody debris, larger substrates, turbulence and undercut banks tend to provide necessary cover elements. Another critical habitat factor for bull trout is clean, un-embedded substrate. Juvenile bull trout are considered quite sensitive to stream sedimentation. Juvenile bull trout densities decline as the interstitial spaces within the streambed substrate fill with fine sediments.

Juvenile bull trout migrate from their natal headwater streams downstream between the ages of 1 and 3 to rear as adults. The migration periods for juvenile bull trout are quite variable, occurring between spring and fall. Much of the available information on bull trout life histories and habitat requirements come from studies conducted in Montana and British Columbia. Very few studies have been conducted in Oregon or Washington.

Upper Willamette River Chinook
(*Oncorhynchus tshawytscha*)
Threatened

Habitat and Life History Information

The Clackamas River spring chinook salmon (Upper Willamette River ESU) consist of both naturally spawning and hatchery produced fish. These spring chinook spawn from mid September through early October with peak spawning ocurring the 3rd week in September. These fish primarily spawn and rear in the mainstem Clackamas River and larger tributaries. Adults in the Lower Clackamas drainage spawn in Eagle Creek, below River Mill Dam and between River Mill and Faraday diversion dams. Spawning in the upper Clackamas drainage has been observed in the mainstem Clackamas from the head of North Fork Reservoir upstream to Big Bottom, the Collawash River, Hot Springs Fork of the Collawash River, lower Fish Creek, South Fork Clackamas River and Roaring River.

Spring chinook (*Oncorhynchus tshawytscha*) do not appear to utilize tributaries as rearing areas for their young. Studies in Fish Creek show most fry emigrate to the mainstem Clackamas River soon after emergence. This is consistent with behavior of spring chinook in other rivers like the McKenzie. Also some juveniles rear in the reservoirs of the North Fork Dam complex. Peak downstream movement of juveniles occurs in the month of May over North Fork Dam followed by a fall migration in October and November. Juveniles spend about one year in fresh water before smolting and migrating to the Pacific Ocean. They generally remain in the ocean from 3-4 years (range 2-8 years) before they mature and return to their parent streams to spawn.

Lower Columbia River Chinook
(*Oncorhynchus tshawytscha*)
Threatened

Habitat and Life History Information

The fall chinook (*Oncorhynchus tshawytscha*) within the Clackamas Subbasin are thought to originate from "tule" stock which was first released into the subbasin in 1952 and continued until 1981. Since 1981 no fall chinook have been released into the Clackamas River. However some adult fall chinook released as juveniles above Willamette Falls may have strayed into the Clackamas River.

Historically fall chinook spawned in the mainstem Clackamas River above the present site of the North Fork Dam before its construction. Currently the "tule" stock of fall chinook spawn below River Mill Dam and in the lower reaches of Clear Creek. Fall Chinook spawn late August through September. These fish primarily spawn and rear in the mainstem Clackamas River and larger tributaries. The eggs hatch in about two months and the young remain in the gravel 2-3 weeks after hatching. The young remain in fresh water from a few days to 1 year before migrating to the ocean. They generally remain in the ocean from 3-4 years (range 2-8 years) before they mature and return to their parent streams to spawn.

Columbia River Chum salmon
(*Oncorhynchus keta*)
Threatened

Habitat and Life History Information

The lower Columbia River fall chum (*Oncorhynchus keta*) spend most of their life in a marine environment. Adults typically enter spawning streams ripe, promptly spawn and die all within two weeks of arrival. Adults are strong swimmers, but poor jumpers and are restricted to spawning areas below barriers, including minor barriers that are easily passed by other anadromous species. Peak spawning occurs between late October and early November. Juveniles after emergence migrate to estuaries where they rapidly adapt to the marine environment. This usually occurs between March and June. The brief stay in the estuarine environment appears to be important for smoltification and early feeding and growth. Mature chum spend anywhere from 6 months to 6 years in the ocean environment.

Lower Columbia River/SW Washington Coho Salmon
(*Oncorhynchus kisutch*)
Candidate for Listing

Habitat and Life History Information

Adult late-run winter coho salmon (*Oncorhynchus kisutch*) enter the Clackamas River from November through February. Spawning occurs mid-January to the end of April with the peak occurring mid-February. Spawning of late run winter coho salmon is believed to be restricted to the mainstem Clackamas River and its tributaries upstream of North Fork Dam. A three-year cooperative radio telemetry study with the USFS, ODFW, PGE, and NW Steelheaders revealed that 80 percent of the fish tagged for three separate run years (1988-89, 89-90, 90-91) spawned in the mainstem Clackamas River between North Fork Reservoir and river mile (RM) 50.3 just downstream of the Oak Grove Fork. Forest Service fisheries biologists believe, however, that the three-year study does not give a true picture of the spawning distribution or focal points due to particular biases in the study. It is believed that the true spawning distribution of late run winter coho salmon is greater and extends further upriver and into the larger tributaries based on independent spawning surveys conducted throughout the upper drainage.

After spawning, eggs incubate in the stream bed gravels until the fry emerge between late May and early July, dependent on the time of spawning and water temperatures during the incubation period. Upon emergence, coho fry tend to occupy slower velocity habitats (i.e., side channels and alcove pools) offering heavy amounts of woody debris cover. Coho fry are often found tightly schooled near heavy concentrations of slash and woody debris cover. Over-wintering habitat for juvenile coho salmon appears to be a critical component for freshwater survival. Off-channel ponds, side channels, and alcove pools offer cover and protection against higher stream velocities during winter flows.

Smoltification takes place between April and June. During this physiological change process, juvenile coho same become silvery in appearance as they migrate downstream to the ocean. Some juvenile coho migrate downstream passing through the North Fork Dam migrant bypass system at other times of the year, however the majority appear to be parr. The peak smolt migration takes place in April and May.

Coho salmon will generally spend two years in the ocean before migrating back to their natal stream to spawn at age three. Some precocious males will return after only one year at sea to spawn at age two--these are called "jacks".

SW Washington/Columbia River Cutthroat Trout
(*Oncorhynchus clarki*)
Sensitive (USFS)

Habitat and Life History Information

Coastal cutthroat trout exhibit diverse patterns in life history and migration behaviors. Populations of coastal cutthroat trout show marked differences in their preferred rearing environments (river, lake, estuary, or ocean); size and age at migration; timing of migrations; age at maturity; and frequency of repeat spawning. Four major life history patterns have been described for the subspecies:

1) Anadromous or searun populations migrate to the ocean (or estuary) for usually less than a year before returning to fresh water. Anadromous cutthroat trout either spawn during the first winter or spring after their return or undergo a second ocean migration before maturing and spawning in fresh water. Anadromous cutthroat are present in most coastal rivers.
2) Fluvial populations are fish that undergo in-river migrations between small spawning tributaries and main river sections downstream, similar to the ocean migrations of searun cutthroat trout. This pattern is common in larger river systems such as the Willamette, Rogue, Umpqua, and Nehalem.
3) Adfluvial populations migrate between spawning tributaries and lakes or reservoirs. Migrations may involve inlet or outlet streams. Juveniles may spend from one to three years in tributaries before migrating into the lake. Adfluvial populations occupy select lake systems in the Cascade Mountains and along the coast
4) Nonmigratory (resident) forms of coastal trout occur in small headwater streams and exhibit little instream movement. They generally are smaller, become sexually mature at a younger age, and may have a shorter life span than many migratory cutthroat trout populations. Resident cutthroat trout populations are often isolated and restricted above waterfall barriers, but may also coexist with other life history types.

Coastal cutthroat trout tend to spawn in very small (first and second order) tributaries. They spawn from December-May in gravel redds in streams; alevins (24 mm) emerge from gravel during June and July. Young fry move into channel margin and backwater habitats during the first several weeks. During the winter, juvenile cutthroat trout use low velocity pools and side channels with complex habitat created by large wood. Coastal searun cutthroat juveniles rear on freshwater for 2-3 years. At 10-25 cm the smolts migrate during April and May to estuaries and marine water; reside close to shore, usually over cobble/sand beaches influenced by freshwater source (e.g. creek or stream). They usually remain close to natal estuary (within 10 km), but may range up to 70 km. Immatures and adults return to overwinter in freshwater streams in fall and return to estuarine areas in spring. Adults hold in tidal pools as early as July in preparation for spawning migration as 4-5 year olds.

Columbia Dusky Snail
(*Lyogyrus n. sp. 1*)
Survey and Manage

This species of aquatic mollusks has a very sporadic distribution in the central and eastern Columbia Gorge, WA and OR. Known sites on the Mt. Hood National Forest occur in Clackamas, Multnomah, and Hood River counties. Lyogyrus have been identified in the Upper Clackamas, Lower Clackamas, and Oak Grove Fork watersheds.

This species occurs in cold, well oxygenated springs and spring outflows on soft substrates in shallow, slow-flowing areas where it appears to feed on decaying organic particles. It prefers areas without macrophytes (macroscopic emergent and submerged aquatic plants), but may also occur in areas with watercress and water hemlock. It co-occurs with *Pristinicola hemphilli* and Juga (*Oreobasis*) spp., which are typically found in small, cold, pristine springs.

Basalt Juga
(*Juga Oreobasis*) n. sp. 2
Survey and Manage

This species occurs sporadically in springs in the central and eastern portions of the Columbia Gorge, OR side only: Hood River and Wasco counties Oregon, including sites in Mt. Hood National Forest and sites in the Columbia Gorge National Scenic Area. It is known to occur at 28 sites.

This species occurs in small, shallow, undisturbed perennial springs and small springs that flow into the Columbia River. It prefers gravel substrates where watercress is usually present. Occupied springs are often surrounded by basalt talus. It appears to graze on periphyton and perilithon.

PETS species that occur in the Clacklamas River Basin

Columbia River Bull Trout *(Salvelinus confluentus)*
Bull trout were once prolific in the Clackamas River system. At present, they are believed to be extinct. Adult bull trout that occurred in the Clackamas River exhibited a fluvial life history character, maintaining residence in the main river and larger tributaries. It is quite likely that adult bull trout in the Clackamas River migrated to the Willamette and Columbia rivers prior to construction of River Mill Dam. Adult bull trout would reside in the mainstem and larger tributaries until their spawning period during mid-August through September, at which time they would migrate upstream to smaller tributaries to spawn.

U.S. Forest Service fisheries biologists conduct fisheries sampling on an annual basis on many streams throughout the Clackamas River watershed upstream of North Fork Reservoir. To date, these sampling efforts have never yielded capture of bull trout. After

several years of intensive sampling, U.S. Forest Service fisheries biologists believe that bull trout in the Clackamas River are considered to be "functionally extinct." Since bull trout are not present in the Clackamas River system the effects determination for this species is “No Effect” (NE) for the Cloak Thinning Project.

Lower Columbia River Steelhead (*Oncorhynchus mykiss*)
LCR steelhead do not occur in any of the streams within the planning area of the Cloak Project. However, LCR steelhead do occur in the mainstem Oak Grove Fork and Upper Clackamas Rivers approximately 0.2 to 0.6 miles downstream of several intermittent, non-fish bearing tributaries that flow within proposed Cloak thinning units. These units are located within the Lower Oak Grove Fork and Big Bottom subwatersheds. Steelhead also occur approximately 0.6 to 0.8 miles downstream of units within the Cabin Creek and Tag Creek subwatersheds of the Clackamas River. All other units within the Cloak Project area are located greater than one mile above any occurrence of LCR steelhead.

Upper Willamette River Spring Chinook (*Oncorhynchus tshawytscha*)
Upper Willamette River chinook do not occur within the Cloak planning area. They occur in the mainstem Clackamas River, Oak Grove Fork of the Clackamas River, and Pinhead Creek. Pinhead Creek is the only stream that flows through the planning area that supports UWR chinook salmon. Spring chinook salmon have been documented in the lower reach of Pinhead Creek approximately 1.4 miles downstream from unit # 481. Spring chinook salmon also occur in the mainstem Clackamas River 0.2 to 0.6 miles downstream of proposed units along Tag Creek, Cabin Creek, and several intermittent, non-fish bearing tributaries within the Big Bottom subwatershed. The nearest occurrence of UWR chinook to any proposed unit within the Oak Grove Fork watershed is approximately 1.3 miles.

Lower Columbia River Fall Chinook (*Oncorhynchus tshawytscha*)
Fall chinook primarily spawn and rear in the mainstem Clackamas River and larger tributaries below river Mill Dam and are not found on the Clackamas River Ranger District.

Lower Columbia River Fall Chum (*Oncorhynchus keta*)
Fall chum historically have inhabited the lower portion of the Clackamas River but no current records are available to confirm any chum presence within the Clackamas River.

Lower Columbia River/Southwest Washington Coho Salmon (*Oncorhynchus kisutch*)
Coho salmon occur in the mainstem Clackamas River approximately 0.6 to 0.8 miles downstream of units within the Cabin Creek and Tag Creek subwatersheds and approximately 0.2 to 0.6 miles downstream of several intermittent, non-fish bearing tributaries that flow within proposed Cloak thinning units. These units are located within the Lower Oak Grove Fork and Big Bottom subwatersheds.

Southwestern Washington/Columbia River Cutthroat Trout (*Oncorhynchus clarki*)
Resident coastal cutthrout trout are present within the perennial streams that flow through the project area. They are also present within the streams downstream of the project area.

Columbia Dusky Snail (*Lyogyrus n. sp. 1*)
Lyogyrus have been found in most of the perennial streams within the Cloak Project area. Surveys have confirmed the presence of *Lyogyrus* in Tag Creek, Mag Creek, Cabin Creek, and Kink Creek.

Basalt Juga (*Juga Oreobasis*) n. sp. 2
The Basalt Juga snail has never been found on the Mt. Hood National Forest.

Effects of Project Implementation

The effects of the implementation of the Cloak Thinning Project on PETS fish and aquatic species is based on local populations of resident cutthroat trout and populations of listed fish species within and downstream of the project area in the Oak Grove Fork and Clackamas River. There are no threatened or candidate fish species that occur within any of the proposed units of the project area.

The no-action alternative would have ratings of "No Effect" for PETS fish species and aquatic organisms. The following effects determinations apply to the action alternatives.

The implementation of this project warrants a "**May Affect, Not Likely to Adversely Affect" (NLAA)** determination for Lower Columbia River steelhead, Upper Willamette River chinook and Lower Columbia River/Southwest WA coho salmon. A determination of **"May impact individuals or habitat but will not likely contribute to a trend towards federal listing" (MIIH)** is warranted for Southwest Washington/Columbia River cutthroat trout and the Columbia Dusky Snail**.** A **"No Effect" (NE)** determination is warranted for Columbia River chinook, Columbia River chum salmon, because these species are not present (nor were known to be present historically) upstream of River Mill Dam, which is over 30 miles downstream from the project area. A **"No Effect" (NE)** determination is also warranted for Columbia River bull trout - this species has been extirpated from the Clackamas River system. A **"No Impact" (NI)** determination is warranted for the Basalt Juga since this species has never been found on the Forest. This project is not expected to have any long-term adverse effects on any listed, proposed, or candidate fish or aquatic species.

The ground disturbing activities associated with thinning in riparian areas and reserves has the potential to allow sediment to enter the stream channel from surface erosion and run-off, causing a temporary reduction in water quality. Establishing no-harvest buffers a minimum of 50 ft. wide along perennial streams and 30 ft. minimum width along intermittent channels will minimize the risk of any channel impacts, including detrimental effects to water quality caused by sediments reaching the stream channels. No water quality effects are foreseen, and the small probability of effects would decrease, as the canopy and ground cover are re-established to pre-harvest conditions.

Ground based equipment will be restricted to drier periods between June 1 and October 31 to reduce the risk of soil compaction and surface erosion. Ground based tractor

operations will be outside of the stream influence zone (~180 ft.) and will be prohibited on slopes greater than 30% to reduce the risk the risk of damage to soil and water resources. Mechanical harvesters will be required to operate on slash-covered forwarder paths while in the Riparian Reserves and Matrix Lands. The use of designated skid trails will keep detrimental soil impacts from exceeding 15% of the total acreage within the project area as recommended by Mt. Hood Forest Plan standards for soils. Following harvest activities, ground based skid roads will be seeded, mulched, and fertilized to reduce erosion. Water bars and/or cross ditches will be installed where needed to disperse water and control surface runoff.

Designation of the no-harvest buffer widths will take into account stream influence zone, steepness of slope, size and location of trees, silvicultural prescription, aspect, slope stability, and stream bank stability. Riparian hardwoods will not be harvested. No logs will be dragged across streams, and only low impact ground-based equipment (mechanical harvester) will be allowed within 100 ft. of perennial streams. Mechanical harvesters with a reach of approximately 20 ft. to 30 ft. will operate along the outside edge of the stream influence zone approximately 75 ft. to 80 ft. from the active channel on units where thinning will occur within this zone. Slash covered forwarder paths and no-harvest buffers will protect against sediment being delivered to streams. The riparian buffer widths, harvest methods, and the location of the units in relation to water will minimize the risk of any channel impacts, including detrimental effects to water quality caused by sediments reaching the stream channels.

Aerial harvest on steeper ground by skyline yarding with one end suspension and the use of helicopters are low-impact methods that will eliminate and/or minimize the ground disturbance and impacts associated with ground-based logging systems on slopes >30%. These methods will minimize the risk and impacts of soil compaction, erosion, and mass wasting in the steeper areas of units.

Following project design criteria such as designated no-harvest buffers along streams and wet areas, location of skid trails, landings, and yarding corridors, no yarding across stream channels or wet areas, and restrictions on ground disturbance to drier seasons, reduces the risk of sediment input into any stream channel. The use of project design criteria and adherence to General Best Management Practices (BMP's) will allow for very little, if any, erosion or sediment transport into the stream course, substantially reducing the impacts of soil disturbance and run-off on water quality.

/s/ Robert Bergamini

_____

Robert Bergamini 03/20/04