

Biological Evaluation for Imp Timber Sale

Proposed, Endangered, Threatened, and Sensitive Fish Species

Imp Timber Sale
Clackamas River Ranger District
Upper Clackamas River Watershed

Background

This Biological Evaluation (BE) replaces the original version due to changes in the proposed action, removal of associated projects from the original EA, and the addition of new alternatives.

Summary of Changes

- The proposed action will include only regeneration harvest units. Thinning Units 13, 14, and 15 have been deleted.
- Aerial fertilization project for the same units has been deleted.
- Action alternatives have been adjusted and new ones added.
- Riparian Reserve widths on Units 1, 3, and 7 will be changed from 360 ft. to 180 ft. (one site potential tree height) because these tributaries are intermittent non-fish bearing streams (meets NWFP standards and guidelines for riparian reserve widths).
- Semi-permanent road - Reconstruction of 2,900 feet of old temporary road and skid trails in addition to 500 feet of new temporary road.

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.

Alternative B - The Proposed Action

The action proposed is to harvest trees from approximately 88 acres using the reserve shelterwood regeneration method. Northwest Forest Plan standards for green tree retention and coarse woody debris in regeneration harvest would be applied. Approximately 10% of the harvest area would be retained in patches. Scattered trees would be retained to meet the green tree retention standard and to achieve silvicultural and wildlife objectives. The scattered leave trees would be retained at the rate of 10 to 12 per acre and would primarily be selected from the largest component of trees present in the unit except where smaller trees are retained for spacing and species diversity. Snags and large logs would also be retained. The harvesting operation would generally remove most of the smaller trees as well as some of the larger trees.

Temporary roads are needed to access the landings in unit 6. Most of the needed road will be reconstructed from existing temporary roads and skid trails that have been recently scarified (approximately 1,400 feet of reconstruction of an old temporary road, 1,500 feet of reconstruction of existing skid trails, and 500 feet of new temporary road

construction. These temporary roads would be obliterated and revegetated by the timber sale purchaser after completion of the project. Several miles of road reconstruction (spot rocking, brushing, addition of aggregate surfacing, and deep patching) along haul roads would also occur.

Logging methods used would include ground-based tractor and loader skidding and skyline yarding. Fuels reduction and site preparation would be accomplished through manual and machine piling and burning of logging slash prior to planting. A mix of conifer species that are adapted to the site conditions would be planted.

Alternative C

Alternative C is similar to Alternative B except it would not construct any new temporary roads. Portions of proposed harvest units that are not accessed by existing roads would be harvested by helicopter (13 acres of unit 6).

Alternative D

Alternative D has the same unit boundaries as Alternative B but instead of the 10 -12 leave trees per acre with Alternative B, it would leave approximately 30 of the largest and oldest trees per acre. Stands harvested using this alternative would retain more of the older forest stand components needed for certain animal and plant species. As in Alternative B, leave trees would primarily be selected from the largest component of trees present in the unit except where smaller trees are retained for spacing and species diversity. The units would still be considered regeneration harvests and would include site preparation and planting. As with alternative C, portions of proposed harvest units that are not accessed by existing roads would be harvested by helicopter (13 acres of unit 6).

Effects of Project Implementation

The modifications to the proposed actions of the Imp Timber Sale will not cause any change of the effects determinations to listed, candidate, or sensitive species or Essential Fish Habitat (EFH) that was not previously considered. All effects of the proposed actions on relevant aquatic habitat indicators, as defined by the NMFS (NOAA Fisheries) Matrix of Pathways and Indicators (NMFS, 1996), will remain the same as stated in the original Biological Assessment (LOC 02/28/01).

The effects of the implementation of the Imp Project on any threatened, proposed, candidate, or sensitive fish stock will be based on local populations of resident cutthroat trout and populations of listed fish species downstream of the project area in the Clackamas River. No listed fish species occur in any of the streams within the project area. The nearest proposed unit to listed fish species or habitat is unit 7 that is located within the Big Bottom subwatershed. This unit is 0.5 miles above the occurrence of listed fish species within the Clackamas River. The remaining units of the Imp Project Area are within the Pot Creek subwatershed, and are over 1.2 miles above the occurrence of listed fish species or their habitat.

Summary of Effects to listed, proposed, candidate, and sensitive species occurring within the Clackamas River Basin.

ESU Species/Status	Habitat Present	Species Present	Effects of Action By Alternative			
			A	B	C	D
<u>Threatened</u>						
**Lower Columbia River steelhead <i>(Oncorhynchus mykiss)</i>	Yes	Yes	NE	NLAA	NLAA	NLAA
Columbia River Bull trout <i>(Salvelinus confluentus)</i>	Yes	No	NE	NE	NE	NE
**Upper Willamette River chinook <i>(Oncorhynchus tshawytscha)</i>	Yes	Yes	NE	NLAA	NLAA	NLAA
Lower Columbia River chinook <i>(Oncorhynchus tshawytscha)</i>	Yes	No	NE	NE	NE	NE
Lower Columbia River chum <i>(Oncorhynchus keta)</i>	Yes	No	NE	NE	NE	NE
<u>Candidate</u>						
**Lower Columbia River/Southwest WA coho <i>(Oncorhynchus kisutch)</i>	Yes	Yes	NE	NLAA	NLAA	NLAA
<u>Sensitive</u>						
**Southwestern WA/Columbia River coastal cutthroat trout <i>(Oncorhynchus clarki clarki)</i>	Yes	Yes	NI	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 loss of viability to the population or species.

** Species known to occur on Clackamas River Ranger District

The no-action alternative would have ratings of “No Effect” for all of the fish stocks of concern. The following effects determinations apply to the action alternatives, all of the action alternatives will have the same effects to fishery resources.

Columbia River Bull Trout (*Salvelinus confluentus*) - (Threatened) 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" for the Imp project.

Lower Columbia River Steelhead (*Oncorhynchus mykiss*) - (Threatened) Adult steelhead migrate into the waters of the Clackamas River drainage above North Fork Dam primarily during April through June with peak migration occurring in May. Spawning occurs during the months of April thru June in the Upper Clackamas River and during the months of March thru June in the Oak Grove Fork. Steelhead use the majority of the mainstem Clackamas and the lower 3.7 miles of the Oak Grove Fork as spawning and rearing habitat. Winter steelhead fry emerge between late June and late July and rear in freshwater habitat for one to three years. Smolt emigration takes place March thru June during spring freshets.

Steelhead occur 0.5 miles downstream of an intermittent, non-fish bearing tributary of the Upper Clackamas River along unit 7. This unit is located within the Big Bottom subwatershed. The remaining units, located within the Pot Creek subwatershed, are more than 1.2 miles above any known occurrence of listed fish species or their habitat. Because of the distance of the project area from any presence of Lower Columbia River steelhead or its habitat the effects determination for this species for the Imp Project is "May affect, Not likely to adversely affect" (NLAA) for all of the action alternatives.

Upper Willamette River Spring Chinook (*Oncorhynchus tshawytscha*) - (Threatened) - Upper Willamette River spring chinook salmon occur in the Clackamas River. The ESU consists of both naturally spawning and hatchery produced fish. These spring chinook enter the Clackamas basin from April through August and spawn from September through early October with peak spawning occurring 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 occur in the Upper Clackamas River 0.5 miles downstream from any proposed unit within the Big Bottom subwatershed and 1.2 miles downstream from any unit within the Pot Creek subwatershed. Because of the distance of the project area to the presence of Upper Willamette River chinook and its habitat, the effects determination for this species for the Imp Project is "May affect, Not likely to adversely affect" (NLAA) for all of the action alternatives.

Lower Columbia River Fall Chinook (*Oncorhynchus tshawytscha*) (Threatened)

The fall chinook 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 and are not found on the Clackamas River Ranger District.

Because of the distance of the occurrence of fall chinook from the project area (greater than 20 miles) the effects determination for this species is "No Effect" (NE) for all of the alternatives.

Lower Columbia River Fall Chum (*Oncorhynchus keta*) (Threatened)

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. The effects determination for this species is "No Effect" (NE) for all of the alternatives.

Lower Columbia River/Southwest Washington Coho Salmon (*Oncorhynchus kisutch*) (Candidate for listing) The Clackamas River contains the last important run of wild late-run winter coho in the Columbia Basin. Coho salmon occupy the Clackamas River and the lower reaches of streams in the Upper Clackamas watershed including the lower two miles of the Oak Grove Fork. Adult late-run winter coho enter the Clackamas River from November through February. Spawning occurs mid-January to the end of April with the peak in mid-February. Peak smolt migration takes place in April and May.

Coho salmon occur 0.5 miles downstream from any unit within the Big Bottom subwatershed and 1.2 miles downstream of any unit within the Pot Creek subwatershed. Because of the distance of the project area to any presence of Lower Columbia River/Southwest Washington coho salmon or its habitat, the effects determination for this species for the Imp Project is "May affect, Not likely to adversely affect" (NLAA) for all of the action alternatives.

Southwestern Washington/Columbia River Cutthroat Trout (*Oncorhynchus clarki clarki*) - (Sensitive). Searun cutthroat have historically existed in the Clackamas River below River Mill Dam. Cutthroat have been observed going downstream over the dam complex by PGE biologists, but never observed migrating upstream. It is not known whether the Clackamas River above the hydro-complex was part of their historic range.

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. Resident coastal cutthroat trout inhabit the upper Clackamas River and its tributaries including the Oak Grove Fork. Because of the presence of resident coastal cutthroat trout in the streams within and downstream of the project area the effects determination for Southwestern Washington/Columbia River cutthroat trout is “May impact individuals or habitat but will not likely contribute to a trend towards federal listing” (MIIH) for all of the action alternatives.

Essential Fish Habitat

Essential Fish Habitat (EFH) established under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) includes those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery (i.e., properly functioning habitat conditions necessary for the long-term survival of the species through the full range of environmental variation). EFH includes all streams, lakes, ponds, wetlands, and other water bodies currently, or historically, accessible to salmon in Washington, Oregon, Idaho, and California. Three salmonid species are identified under the MSA, chinook salmon, coho salmon and Puget Sound pink salmon. Chinook and coho salmon occur on the Mt. Hood National Forest in the Clackamas River, Hood River, and Sandy River basins. Implementation of the projects covered in this BE will not adversely effect essential fish habitat. The Imp Project will not have any negative long-term effect on water or substrate essential to the life history of coho, chinook, or chum salmon that occur within the watersheds where projects will take place.

/S/ *Robert Bergamini*

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Environmental Baseline and Effects of Proposed Actions(s) on Relevant Indicators

The effects of the proposed project to listed fish species will be based on aquatic resources in the Pot Creek subwatershed within the planning area and the Upper Clackamas River watershed downstream of the project area. Natural and man-made barriers restrict the passage of anadromous species into the planning area. Lower Columbia River steelhead, Upper Willamette River chinook, and Lower Columbia River/Southwest WA coho salmon are found approximately 0.5 miles downstream of the project area within the Big Bottom subwatershed, and over 1.0 mile downstream of units within the Pot Creek subwatershed. Resident coastal cutthroat trout inhabit reaches that are located within and downstream of the planning area.

Upper Clackamas River Watershed - 5th field baseline

Water Quality

Temperature: Environmental Baseline = ***Properly Functioning***

The temperature regime of the tributaries and mainstem Clackamas River upstream of the Collawash River is indicative of cold, spring fed systems. Water temperatures of the mainstem Upper Clackamas River rarely exceed 11°C with frequent temperatures in the 8° C to 10°C range. Temperature data from 1997 is available for the mainstem Upper Clackamas River at Switch Creek RM 59.6. Mean monthly maximum temperatures did not exceed 13°C for this reach during the summer. Tributaries to the Upper Clackamas River often have temperature ranges during the summer from 5° C to 12° C.

The measured water temperatures approximate the optimum range of preferred temperatures for salmonids (Meehan and Bjornn 1991). All measured water temperatures within the Upper Clackamas River watershed meet Department of Environmental Quality water quality standards for water temperatures (OAR Chapter 30, Division 41, Department of Environmental Quality). The temperatures are considerably below the upper biological threshold for salmonids and stayed at least 1° C below the Oregon Department of Environmental Quality management threshold.

Effects of the actions = ***Maintain.***

The proposed project will have no effect on stream temperature in the Upper Clackamas River. Riparian reserve widths and no cut buffers where thinning in riparian reserves will take place have been established. Stream canopy cover will be maintained and will provide sufficient stream shading to sustain stream temperatures. No significant change in stream temperatures will result from the implementation of this project.

Sediment: Environmental Baseline = ***Properly Functioning***

Little turbidity monitoring data is available for the Upper Clackamas watershed. Sediment levels in the substrate of streams within the watershed are relatively low and are in acceptable limits for salmonid production (Upper Clackamas Watershed Analysis,

1995). It has been commonly observed that the Upper Clackamas watershed runs much clearer than other watersheds in this area during storm events. The hydrograph for the Upper Clackamas is less variable, with more moderate peaks during high flow events as compared to other watersheds downstream, which may partially explain the clearer water and lower turbidity observed in this watershed. The Upper Clackamas is also fed in large by many cold, stable flowing springs that arise from bedrock aquifers, rather than the more typical surface runoff or near surface water tables that supports many streams.

From observations during snorkel, V* (a method to assess the percentage of sediment in pools), and other surveys of the Upper Clackamas, fine sediments do not appear to be a common component of substrate composition. Specific samplings for sediment percentages are not available for this area.

Effects of the actions = Maintain.

The potential exists for some surface erosion and silt to enter stream channels as the result of project activities. Adherence to BMP's and mitigation measures, such as no cut buffers and suspension yarding to minimize ground disturbance, will reduce the risk of fine sediments entering stream channels. Implementation of this project is not expected to result in any measurable effects to steelhead habitat caused by sediment input into stream courses.

Chemical Contaminants/Nutrients: Environmental Baseline = Properly Functioning

There is no known chemical pollution in the Upper Clackamas watershed and the water quality is considered very good for salmonids (Upper Clackamas Watershed Analysis 1995). This is based on five years of water quality sampling. Results from sampling sites show that the mainstem and tributaries have very low concentrations of measured constituents. It has a pH in the neutral to slightly alkaline range, with low conductivity and very low concentrations of sodium, potassium, calcium, and dissolved nitrogen and phosphorus. In fact levels of measured chemical nutrients such as phosphorus were found to be even lower than expected for small forested streams.

Effects of the actions = Maintain.

Project activities would not increase chemical pollution in the Upper Clackamas River, except if an accidental spill occurred through a vehicle accident or other mishap. Precautions will be taken during project implementation to reduce the risk of any chemical spills entering the stream.

Mitigation measures have been designed to minimize the risk of fertilizer entering streams. Direct application is avoided by using a no application buffer to avoid 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.

Habitat Access

Physical Barriers: Environmental Baseline = ***At Risk***

The Upper Clackamas watershed has several road systems that contain culverts that act as physical barriers to fish passage. Because some of these culverts are on small streams that are accessible to anadromous fish, the baseline would rate "at risk" based on the criteria developed in the National Marine Fisheries Service (NMFS) matrix. There are no physical barriers on the mainstem Upper Clackamas River below the project area. All dams located downstream in the Lower Clackamas River allow fish passage.

Effects of the actions = Maintain.

Culverts or natural barriers on Pot, Lost, Cabin, and Campbell Creeks limit the passage of LCR steelhead or UWR chinook into the habitat within the Imp planning area. Project implementation will not create any new barriers or provide any additional fish passage into these areas or the mainstem Clackamas River.

Habitat Elements

Substrate: Environmental Baseline = ***Properly Functioning***

Surveys of the Upper Clackamas (Upper Clackamas Watershed Analysis 1995) show dominant substrate consisting of cobble or small and large boulder for the mainstem and most tributaries of the Upper Clackamas. Specific information on embeddedness is not available but most of the main stem and main tributaries appear to have clean gravel. Current conditions would thus rate "properly functioning" based on the criteria developed in the National Marine Fisheries Service (NMFS) matrix of pathways and indicators for evaluating the effects of human activities on anadromous salmonid habitat.

Effects of the actions = Maintain.

Project activities will not change substrate composition in the main stem Clackamas River. Mitigation measures such as a 50 foot "no cut buffer" along the streams where riparian thinning is proposed, suspension yarding of logs, no yarding across stream channels or wet areas, and restrictions on ground disturbance to drier seasons, reduces the risk of sediment input into project area streams. The use of mitigation measures and adherence to General Best Management Practices (BMP's) would allow for very little erosion to effect habitat downstream of the project area.

Large Woody Debris: Environmental Baseline = ***Not Properly Functioning***

The presence of large woody debris in streams meeting the standards in the NMFS matrix of 80 pieces per mile (pieces greater than 24" diameter and 50' long) varies within the watershed. The mainstem Upper Clackamas River falls way below these standards. The

lack of woody debris in the mainstem does not necessarily reflect degraded habitat. Because of the size and amount of flow of the Upper Clackamas River, LWD is not retained in the system. However, enough late seral forest does exist along the watershed's mainstem and tributaries to continue recruiting at a level commensurate with the last two decades. Although much of the fisheries habitat appears to be high quality, the low pieces per mile results in a baseline condition of "not properly functioning" for the large woody debris parameter.

*Effects of the actions = **Maintain.***

Streams within the planning area currently do not meet properly functioning standards for the amount of LWD. Cabin Creek with 10 pieces of LWD per mile, Campbell Creek 65 pieces per mile, and Lost Creek with 13.8 pieces of LWD per mile fall below the matrix standards and lack potential sources of woody debris recruitment. Thinning in the riparian reserves along Campbell Creek will accelerate future large woody debris availability in this area. Project implementation will not have any effect to the wood density of the mainstem Clackamas River.

*Pool Frequency: Environmental Baseline = **Not Properly Functioning***

The Upper Clackamas Watershed Analysis (1995), indicated that this watershed in general is below standards for frequency of main channel pools. Stream surveys have been completed on most of the named streams in the Upper Clackamas watershed. The range of pools per mile varies from a low of 2.1 pools per mile on the Austin segment of the main Upper Clackamas River, to 45 pools per mile on Fawn Creek (Upper Clackamas Watershed Analysis, 1995). It is difficult at this time to determine if this is a natural characteristic of this particular watershed or that past management activities, such as removal of log jams have contributed to this current condition. The judgement would be that it is "not properly functioning" using the criteria developed in the National Marine Fisheries Service (NMFS) matrix of pathways and indicators for evaluating the effects of human activities on anadromous salmonid habitat.

*Effects of the actions = **Maintain.***

The potential exists for some surface erosion and silt to enter stream channels as the result of project activities. Adherence to BMP's and mitigation measures, such as no cut buffers and suspension yarding to minimize ground disturbance, will reduce the risk of fine sediments entering stream channels and filling in pool habitats. Implementation of this project is not expected to result in any measurable sediment input into stream courses. Pool frequency in the Upper Clackamas will not be affected by project activities.

*Pool Quality: Environmental Baseline = **Properly Functioning***

Stream survey data indicates that most of the main channel pools of the mainstem Upper Clackamas River are greater than three feet deep. Fine sediments do not appear to be influencing pool depths. Some of the tributary streams to the Upper Clackamas do not have many pools greater than three feet in depth but this is usually because the small size

of some of these streams. The Big Bottom area has some very large pool habitat units that in some areas are associated with an abundance of large woody debris and debris jams which make excellent fish habitat. Following years of high escapement the Big Bottom area of the Upper Clackamas River and areas downstream often support large numbers of juvenile steelhead trout and coho salmon (1995 Accomplishments Report for the Clackamas River Fisheries Working Group).

*Effects of the actions = **Maintain**.*

Riparian reserve widths, adherence to BMP's and mitigation measures such as no cut buffers, where riparian thinning will take place, suspension yarding to minimize ground disturbance, and seasonal restrictions on off-road ground based systems, will reduce the risk of fine sediments entering stream channels and filling in pool habitats. Implementation of this project is not expected to result in any measurable sediment input into stream courses. Project activities will not have any effect on pool quality within the Upper Clackamas River.

*Off Channel Habitat: Environmental Baseline = **At Risk***

In some areas of the mainstem and on a number of tributaries, off channel habitat is quite abundant in the Upper Clackamas watershed, and is often surrounded by old growth riparian forest. The Big Bottom area of the watershed is particularly rich in off channel habitat and is characterized by a very wide, forested flood plain of old growth conifer forest (Upper Clackamas Watershed Analysis, 1995). On lower reaches of the Upper Clackamas, Road 46 constricts the channel and has either cut off or filled in much off channel habitat formerly connected to the main river. Side channel/wetland restoration projects along the mainstem have begun to restore floodplain function to this area of the river. Elsewhere, the presence of off-channel habitat varies, with steeper gradient headwater streams showing the least amount of this habitat.

*Effects of the action = **Maintain***

Off channel habitat does exist in Cabin Creek, and downstream of the project area in the lower reaches of Pot and Campbell Creeks. The lower reaches of these streams are characterized by low gradient, braided stream channels, which contain many secondary channels and off channel habitats. These habitats provide excellent refuge areas for fish. Implementation of this project is not expected to result in any measurable sediment input into streams downstream of the planning area that could cut off and isolate this off channel habitat from the main channels. Off channel habitat located on these streams will continue to function in its present condition. This project will have no effect to side channel habitat along the mainstem Upper Clackamas River.

*Refugia: Environmental Baseline = **Properly Functioning***

The Upper Clackamas River drainage provides excellent, high quality habitat for steelhead, resident trout, and other aquatic organisms (Upper Clackamas Watershed Analysis, 1995). There are very good riparian and aquatic connectivity linkages throughout the upper basin. The Big Bottom area of the watershed is particularly rich in

off channel habitat and is characterized by a very wide forested flood plain of old growth conifer forest. Most of the main stem of the Upper Clackamas and most of the fish bearing, perennial streams in the watershed have a fairly high percentage of late seral, old growth forest riparian zones, with intact native fish populations.

*Effects of the actions = **Maintain***

Project implementation will not affect the refugia available to sensitive fish species in Cabin, Pot, Lost, Campbell Creeks, or the Upper Clackamas River. Five acres of riparian reserves will be entered along a section of Campbell Creek for commercial thinning. A 50-foot no-cut buffer will decrease the potential of surface run-off and sediment entering the stream channel. This action will accelerate future large woody debris and snag habitat production providing the opportunity to meet the desired future condition for stream and riparian area habitats quicker than natural processes. No other riparian reserves will be entered in the planning area.

Channel Conditions

Width/Depth Ratio: Environmental Baseline = ***Not Properly Functioning***

Although overall habitat for fish appears to be above average, the width to depth ratio below the project area was estimated at 30 in the 1997 stream survey of the Upper Clackamas River. The high W/D ratio obtained from this survey may be the result of the difficulty in determining bankfull width following the flood events of 1996. There is limited data available pertaining to this habitat parameter for the Upper Clackamas watershed. Using the criteria developed in the NMFS matrix of pathways and indicators this will place the baseline as "not properly functioning" for this reach of the Upper Clackamas River.

*Effects of the actions = **Maintain***

This project will not measurably increase peak flows, cause direct bank damage, or measurably affect sediment delivery to the lower reaches of Cabin, Pot, Lost, Campbell Creek, or the Upper Clackamas River which could potentially affect width to depth ratios. Adherence to BMP's and mitigation measures, will maintain the width to depth ratios in the Upper Clackamas River and the streams within the project area. Implementation of this project is not expected to result in any measurable effects to the width to depth ratio.

Streambank Condition: Environmental Baseline = ***At Risk***

The flood conditions of 1995/1996 have resulted in above average amounts of bank cutting and failure of road side riprap along the mainstem for that year. The floods of 1995/1996 are believed by hydrologists to have reached the 100 year recurrence interval in the Clackamas River. However, overall it is estimated that 80% or more of the channel banks are still in a stable condition. The most active erosion (post flood) is found in the lower portions of the mainstem river (downstream of Big Bottom) where Road 46 impinges on the riparian and constrains the river's banks and flood plain. Most tributaries

and much of the mainstem river from Big Bottom upstream showed very little streambank erosion. An exception is the area on the Upper Clackamas in the vicinity of the confluence of Cub Creek with the mainstem and from there upstream on the Clackamas for about two miles. This area witnessed very active movement and recruitment of large, old growth sized wood into the stream channel and into large debris jams that dynamically changed the river channel and its location. Much of this change resulted in improved fish habitat and aquatic conditions in general. It is believed that most areas affected by the flood will soon return to pre-flood conditions of stability.

*Effects of the actions = **Maintain.***

Bank stability along streams located within the project area are properly functioning with less than 10% of the stream banks actively eroding. Riparian reserve widths and no-cut buffers are designed so project activities will not measurably increase peak flows or affect sediment delivery that can lead to bank erosion. The project actions will not impact bank stability within the Upper Clackamas River.

*Floodplain Connectivity: Environmental Baseline = **At Risk***

Floodplain connectivity is very good for most of the Upper Clackamas River. One large exception is the area downstream of Big Bottom where Road 46 has cut off the river from its floodplain or filled in the floodplain during the road's construction in the 1950's. The present baseline rating is at risk as a result of these conditions on the lower portions of the watershed.

*Effects of the actions = **Maintain.***

The stream reaches within the planning area are typically B channel types where floodplains are naturally limited. The lower most reaches of these streams, downstream of the planning area, are C channel types where connectivity with the floodplain is good. The project activities will not limit the streams from using their floodplains in these reaches and will have no effect on floodplain connectivity in the Upper Clackamas River.

*Change in Peak/Baseflow: Environmental Baseline = **At Risk***

There has been some change to peak/baseflows from the building of roads and the resulting interception of subsurface drainage networks and the removal of forest cover during timber harvest. Road building and timber harvest can have the potential to move watersheds in a direction away from hydrologic stability and recovery if the effect is great enough. At this time both of the affects are in the moderate category since stream network expansion due to roads is 9% or less and most of the subwatersheds in the Upper Clackamas are at 70% or greater, aggregated recovery percentage (ARP) (Upper Clackamas Watershed Analysis, 1995). The baseline environmental conditions would thus be rated "at risk".

*Effects of actions = **Maintain.***

Project activities that have the potential to change peak/baseflows include the regeneration of 88 acres and the construction of approximately 500 ft. of new temporary

road and reconstruction of 2900 ft. of old temporary roads and skid trails. The units proposed for regeneration harvest are located on upper ridges and upland terraces. The harvest areas are on relatively flat gentle terrain within the headwater reaches of the watersheds. The streams within this area typically run intermittent during the summer months. The location of these units in relation to water sources will minimize the risk of any effects on peak/baseflows. The temporary road is located on a ridgetop outside of riparian reserves and will not cross any streams. It will be obliterated following harvest activities.

Increase in Drainage Network: Environmental Baseline = ***At Risk***

As was mentioned above, in the range of 9% increase in drainage network has occurred due to the construction of roads in the watershed. This results in a call of "at risk" under the criteria set forth in the NMFS matrix of pathways and indicators.

Effects of the actions = Maintain.

No change in expanding or reducing the drainage network is expected with project implementation. The temporary road will be obliterated once project operations are completed. No other roads will be closed within the planning area at this time.

Watershed Conditions

Road Density/Location: Environmental Baseline = ***Not Properly Functioning***

The amount of roads within the Upper Clackamas River watershed ranges from 1.6 to 4.8 miles of road per square mile in the subwatersheds. The average is 3.1 miles per square mile for the watershed (Upper Clackamas River Watershed Analysis, 1995). This average road density exceeds the threshold level of 3.0 set forth in the NMFS matrix indicators.

Effects of actions = Maintain.

The 0.65 mile temporary road will be obliterated once project operations are completed. No other roads are scheduled to be closed within the planning area at this time.

Disturbance History: Environmental Baseline = ***Properly Functioning***

The Mt. Hood National Forest uses the Aggregate Recovery Percent (ARP) model to model the potential risks due to rain on snow events. The ARP index is used to calculate cumulative effects of past and future harvest activities on hydrology. Although ARP and Equivalent Clear-cut Acres (ECA) are not identical models, the intent is to determine the risk of watershed cumulative effects. The current ARP values within the Upper Clackamas River watershed are above the Mt. Hood National Forest Land Resource Manage (LRMP) threshold of 65%. At this time, all of the subwatersheds have ARP values above 70%. Values below 65% suggest a likelihood of increased magnitude and frequency of peak flows, and subsequent channel degradation.

Effects of actions = Maintain.

ARP values are calculated for the year 2004 when this sale is scheduled for harvest. ARP values will be above the threshold of concern for all subwatersheds included in the project area. ARP values will be 74% in the Pot Creek watershed and 84% in the Big Bottom watershed. The ARP values for the Pot Creek sub-watershed would decline to 71.9% following project implementation. The ARP value in the Big Bottom subwatershed would decline to 83.5% after harvest. The ARP values would remain above the Mt. Hood National Forest Land and Resource Management Plan threshold of 65% for this sale.

Riparian Reserves: Environmental Baseline = At Risk

The Riparian Reserves along the mainstem and most of the larger tributaries have remained largely intact with the exception of the Road 46 right-of-way. Currently, watershed wide, the Riparian Reserves have an average of 74% of their area (Upper Clackamas Watershed Analysis) in mature or mid and late seral stage forest (26% mid and 48% late seral). Riparian Reserves also have 20% of their area in early seral forest condition (mostly due to timber harvest) and 6% of the riparian area is occupied by non-forest (i.e.-talus rock). The baseline condition would be rated as "at risk" according to the matrix indicators.

Effects of actions = Maintain.

No Riparian Reserves will be entered during implementation of the Imp Project.

Upper Clackamas River

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Forest: **Mt. Hood National Forest**
ESU: **Lower Columbia River steelhead, Upper Willamette River chinook, Lower Columbia River chinook, Southwestern WA/Columbia River cutthroat trout, Lower Columbia River/Southwest WA coho salmon**
Project: **Imp Timber Sale**

Ranger District: **Clackamas River**
Watershed: **Upper Clackamas River**

PATHWAYS INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning ¹	At Risk ¹	Not Properly Functioning ¹	Restore ²	Maintain ²	Degrade ²
<u>Water Quality:</u> Temperature	X				X	
Sediment	X				X	
Chem. Contam./Nut.	X				X	
<u>Habitat Access:</u> Physical Barriers		X			X	
<u>Habitat Elements:</u> Substrate	X				X	
Large Woody Debris			X		X	
Pool Frequency			X		X	
Pool Quality	X				X	
Off-channel Habitat		X			X	
Refugia	X				X	
<u>Channel Cond. & Dyn.:</u> Width/Depth Ratio			X		X	
Streambank Condition		X			X	
Floodplain Connectivity		X			X	
<u>Flow/Hydrology:</u> Peak/Base Flows		X			X	
Drainage Network Inc.		X			X	
<u>Watershed Conditions:</u> Road Dens. & Loc.			X		X	
Disturbance History	X				X	
Riparian Reserves		X			X	

¹These three categories of function ("properly functioning," "at risk," and "not properly functioning") are defined for each indicator in the "Matrix of Factors and Indicators" table found in the document "Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale" (National Marine Fisheries Service 1996).

²Effects are based on which way this project is likely to move the relevant indicator, but no change in baseline is expected.

Pot Creek Watershed

6th field baseline

Water Quality

Temperature: Environmental Baseline = ***Properly Functioning***

Temperature data using continuous recorders were taken in 1998 in Pot Creek. Summer stream temperatures were recorded during the months of July through October. The seven day maximum stream temperatures ranged from 41.6° F. to 49.7° F. for this period. The high maximum temperatures were recorded during times of rearing and migration. These temperatures are within the ranges of preferred rearing and spawning requirements for salmonids according to the "Matrix of Pathways and Indicators".

Effects of the actions = ***Maintain.***

The proposed project will have no effect on stream temperature within Pot Creek. Riparian reserve widths and no cut buffers have been established. Stream canopy cover will be maintained and will provide sufficient stream shading to sustain stream temperatures. No significant change in stream temperatures will result from the implementation of this project. .

Sediment: Environmental Baseline = ***No Data***

No data are available on percent fines in spawning gravel or turbidity in Pot Creek. The 1998 Pot Creek stream survey (Serres and Taylor, 1998) stated overall bank erosion was minimal.

Effects of the actions = ***Maintain.***

The potential exists for some surface erosion and silt to enter stream channels as the result of project activities. Adherence to BMP's and mitigation measures, such as no cut buffers, yarding away from stream channels and wet areas, and suspension yarding to minimize ground disturbance, will reduce the risk of fine sediments entering stream channels. Implementation of this project is not expected to result in any measurable effects to anadromous or resident fish habitat caused by sediment input into stream channels. There is not expected to be any detectable affect to turbidity or gravel quality where there are threatened fish species.

Chemical Contaminants/Nutrients: Environmental Baseline = ***Properly Functioning***

There is no known chemical pollution in the Pot Creek sub watershed. There are no current management activities on the National Forest that would increase chemical pollution. There is a low probability of accidental spill or a vehicle accident. Contingency plans have been developed in case of an accidental chemical spill during contractor implementation.

Effects of the actions = ***Maintain.***

Project activities would not increase chemical pollution in Pot Creek, except if an accidental spill occurred through a vehicle accident or other mishap. Precautions will be taken during project implementation to reduce the risk of any chemical spills entering the stream.

Habitat Access

Physical Barriers: Environmental Baseline = ***Not Properly Functioning***

A culvert located under FS Road 4660 is a barrier to fish passage. This culvert has a jump height of 4.5 feet with no pool below the outflow. This project would not create any barriers to anadromous fish passage.

Effects of actions = Maintain.

Project implementation will not create any new barriers nor will it provide passage over any existing barriers along Pot Creek to anadromous or resident fish species

Habitat Elements

Substrate: Environmental Baseline = ***Properly Functioning***

Gravel/cobble is the dominant substrate above the Rd. 4660 culvert. Substrate below this culvert is dominated by sand/silt. There appears be little embeddeness of substrate in Pot Creek.

Effects of actions = Maintain.

Project activities are not anticipated to change substrate composition in Pot Creek. Mitigation measures such as no cut buffers along riparian areas where thinning is proposed, suspension yarding of logs, no yarding across stream channels or wet areas, and restrictions on ground disturbance to drier seasons, reduces the risk of sediment input into project area streams.

Large Woody Debris: Environmental Baseline = ***At Risk***

Pot Creek within the planning area currently does not meet standards for properly functioning conditions for instream woody debris. Potential sources of woody debris recruitment are good. The majority of wood in Pot Creek is less than 24 inches in diameter.

Effects of actions = Maintain.

Project implementation will not have any effect to the wood density of Pot Creek. Riparian Reserve widths will insure future recruitment.

Pool Frequency: Environmental Baseline = ***Not Properly Functioning***

Pool frequency along Pot Creek falls below the standards for pool frequency in all stream reaches and would thus rate a "not properly functioning".

Effects of actions = Maintain.

The potential exists for some surface erosion and silt to enter stream channels as the result of project activities. Adherence to BMP's and mitigation measures, such as no cut buffers and suspension yarding to minimize ground disturbance, will reduce the risk of fine sediments entering stream channels and filling in pool habitats. Project implementation is not expected to result in any measurable sediment input into stream channels. Pool frequency in Pot Creek will not be affected by project activities.

Pool Quality: Environmental Baseline = Not Properly Functioning

The number of large deep pools available for resting and cover in Pot Creek is low. Pools are mainly formed by channel substrate and wood. Because of the size and depths of the main channel pools along Pot Creek this parameter would be not properly functioning.

Effects of actions = Maintain.

Riparian reserve widths will reduce the risk of fine sediments entering stream channels. The action would not affect pool depths because there is little likelihood of detectable fine sediments entering Pot Creek.

Off-channel Habitat: Environmental Baseline = At Risk

Off channel habitat is good in the lower reach of Pot Creek. Beaver activity has created complex habitats with large pools and areas of braiding. Several side channels were observed along the upper reaches that were dry or provided little flow.

Effects of actions = Maintain.

Little off-channel habitat exists in Pot Creek within the vicinity of the project area or directly downstream of the project area. The implementation of this project will have no effect on off-channel habitat along Pot Creek.

Refugia: Environmental Baseline = At Risk

Stream buffers throughout the Pot Creek watershed are moderately adequate due to past management activities. Past harvest activities have impacted several areas where little or no stream buffers were present.

Effects of actions = Maintain.

Project activities will not affect the refugia within Pot Creek.

Channel Condition & Dynamics

W/D Ratio: Environmental Baseline = Properly Functioning

The width to depth ratio of Pot Creek is consistent with the stream types observed all reaches. Width to depth ratios were 23 in reach 1, 10.7 in reach 2, and 10.3 in reach 3. Management activities have not appeared to have impacted width to depth ratios within Pot Creek.

Effects of the actions = Maintain.

This project will not increase peak flows, cause direct bank damage, or measurably affect sediment delivery to streams that could potentially affect width to depth ratios. Adherence to BMP's and mitigation measures, will maintain the width to depth ratio within Pot Creek.

Streambank Condition: Environmental Baseline = Properly Functioning

Survey data collected on streambank conditions indicate that stream banks along Pot Creek are stable. No major bank instability, erosion, or sedimentation was identified during stream surveys of Pot Creek. Riparian reserves and no-cut buffers are designed so project activities will not measurably increase peak flows or affect sediment delivery that can lead to bank erosion.

Effects of actions = Maintain.

The project actions will not impact bank stability along Pot Creek.

Floodplain Connectivity: Environmental Baseline = Properly Functioning

Geomorphological constraints dominate the majority of the length Pot Creek. Stream reaches of within and downstream of the planning area are B channel types where floodplains are naturally limited. This is a natural characteristic of this channel type.

Effects of actions = Maintain.

The project activities will have no effect on floodplain connectivity in Pot Creek.

Flow/Hydrology

Change in Peak/Baseflows: Environmental Baseline = Properly Functioning

No data is available for change in peak/baseflows in Pot Creek. Evidence of increased peak flows is not apparent according to the Upper Clackamas River Watershed Analysis. It is my professional opinion that peak and base flows in the Upper Clackamas River are comparable to an undisturbed watershed of similar size and geology.

Effects of Actions = Maintain.

Project activities are not expected to increase peak/baseflows in Pot Creek or the Upper Clackamas River. Thinning prescription will retain 60% to 70% of the canopy within the project area. The stands are expected to recover to 80% canopy closure within five to eight years. Peak/base flows would not be affected by the proposed project.

Drainage Network Increase: Environmental Baseline = ***At Risk***

There has been a moderate increase of 11% in drainage network density due to the construction of roads in the Pot Creek watershed. I would place this environmental baseline indicator in the at risk category under the criteria set forth in the NMFS matrix of pathways and indicators.

Effects of Actions = ***Maintain***.

Approximately 500 feet of semi-permanent road will be constructed to access the stands. The road is a ridge top road located on flat terrain and does not intersect any streams, seeps, or springs. Because of the location on flat terrain any run-off from this road will disperse on the ground and not reach any stream course. This road will be obliterated following harvest activities. Implementation of this project will not cause an increase in drainage network within the Pot Creek or the Upper Clackamas River watershed.

Watershed Condition

Road Density/Location: Environmental Baseline = ***Not Properly Functioning***

There are 4.8 miles of road per square mile in the Pot Creek watershed. Three miles of road per square mile are roads within the Riparian Reserves. The miles of roads per square mile would place the environmental baseline in the not properly functioning category. Most of the roads are not valley bottom roads, but there are 11 stream crossings throughout the watershed.

Effects of Actions = *Short-term* ***Degrade***, *Long-term* = ***Maintain***.

The proposed project will not significantly increase road density. A 500-foot long semi-permanent road to access the stands will be removed following project completion.

Disturbance History: Environmental Baseline = ***Properly Functioning***

Past disturbances within the Pot Creek watershed include timber harvest and road building activities. The Mount Hood Forest Plan employs an analysis tool referred to as aggregate recovery percentage (ARP) to assess hydrologic recovery. The ARP model examines the effect of harvested openings and roads on hydrologic recovery. Current ARP value in the Pot Creek watershed is 74%.

Effects of Actions = ***Maintain***.

The ARP value would decline by 1% to 2% with the proposed action following harvest. The ARP value in the Pot Creek watershed would decline to 72% following harvest activities. The ARP value would remain above the Mt. Hood National Forest Land and Resource Management Plan threshold of 65% for this sale.

Riparian Reserves: Environmental Baseline = ***At Risk***

The riparian reserves have been altered by past timber harvest. Most riparian reserve areas in this watershed now support second growth trees. Fifty-five percent of the 537 acres of Riparian Reserve in the Pot Creek watershed are early seral stage, 13% mid seral, and 33% is late seral stage.

*Effects of Actions = **Maintain.***

The proposed project will not enter the Riparian Reserves of Pot Creek.

Pot Creek

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Forest: Mt. Hood National Forest
 ESU: Lower Columbia River steelhead, Upper Willamette River chinook, Lower Columbia River chinook, Columbia River chum salmon, Southwestern WA/Columbia River cutthroat trout, Lower Columbia River/Southwest WA coho salmon
 Project: Imp Timber Sale
 Ranger District: Clackamas River
 Watershed: Pot Creek - 6th field watershed, Upper Clackamas River

PATHWAYS INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning ¹	At Risk ¹	Not Properly Functioning ¹	Restore ²	Maintain ²	Degrade ²
Water Quality: Temperature	X				X	
Sediment	*****	No Data	*****		X	
Chem. Contam./Nut.	X				X	
Habitat Access: Physical Barriers			X		X	
Habitat Elements: Substrate	X				X	
Large Woody Debris		X			X	
Pool Frequency			X		X	
Pool Quality			X		X	
Off-channel Habitat		X			X	
Refugia		X			X	
Channel Cond. & Dyn.: Width/Depth Ratio	X				X	
Streambank Condition	X				X	
Floodplain Connectivity	X				X	
Flow/Hydrology: Peak/Base Flows	X				X	
Drainage Network Inc.			X		X	
Watershed Conditions: Road Dens. & Loc.		X			X Long term	X Short term
Disturbance History	X				X	
Riparian Reserves		X			X	

¹These three categories of function ("properly functioning," "at risk," and "not properly functioning") are defined for each indicator in the "Matrix of Factors and Indicators" table found in the document "Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale" (National Marine Fisheries Service 1996).

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