South Fork Thinning Project
Fisheries Biological Evaluation

Clackamas River Ranger District
Mt. Hood National Forest
Fifth Field Watersheds: Middle Clackamas River, Lower Clackamas River, and Milk Creek

Date:10/08/05

Table 1. List of Proposed, Endangered, Threatened, or Sensitive (PETS) Fish and Aquatic Mollusk Species found on the Mt. Hood National Forest and addressed under this Biological Evaluation:

Endangered Species Act Listing by ESU	Date of Listing	Suitable Habitat Present	Species Present	Effects of Actions Alternatives			
Threatened				***A***	***B***	***C***	***D***
Lower Columbia River steelhead (*Oncorhynchus mykiss*)	3/98	No	No	NE	NE	NE	NE
Lower Columbia River chinook (*Oncorhynchus tshawytscha)*	3/99	No	No	NE	NE	NE	NE
Columbia River Bull Trout (*Salvelinus confluentus*)	6/98	No	No	NE	NE	NE	NE
Middle Columbia River steelhead (*Oncorhynchus mykiss*)	3/99	No	No	NE	NE	NE	NE
Upper Willamette River chinook (*Oncorhynchus tshawytscha)*	3/99	No	No	NE	NE	NE	NE
Upper Willamette River steelhead (*Oncorhynchus mykiss*)	3/98	No	No	NE	NE	NE	NE
Lower Columbia River coho *(Oncorhynchus kisutch)*	7/05	No	No	NE	NE	NE	NE
Regional Forester's Sensitive Species LIst							
Interior Redband Trout *(Oncorhynchus mykiss spp.)*	7/04	No	No	NI	NI	NI	NI
Columbia dusky snail *(Lyogyrus n. sp. 1)*	7/04	Yes	Unk	NI	NI	NI	NI

Abbreviations/ Acronyms:

NE	No Effect
NLAA	May Affect, Not Likely to Adversely Affect
LAA	May Afffect, Likely to Adversely Affect
Unk	Species presence unknown but suspected
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

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_____Date:_____

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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 Biological Evaluation (BE) addresses a proposal to thin and commercially harvest wood fiber in young plantations on approximately 497 acres within the Middle Clackamas River, Lower Clackamas River, and Milk Creek fifth-field watersheds within the Mount Hood National Forest. The objective of this action is 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.

This Biological Evaluation addresses all alternatives presented in the South Fork Thinning Environmental Assessment (EA).

PROJECT LOCATION

The South Fork Thinning project area is located within the Middle Clackamas, Lower Clackamas, and Milk Creek fifth-field watersheds. The legal description of the project area is Township 5 South, Range 4 East, Sections 11, 15, 23, and Township 5 South, Range 5 East, Sections 8, 10, 15, 17, and 18, of the Willamette Meridian, Clackamas County, Oregon.

The proposed treatment area is located within five subwatersheds of the Clackamas River and one subwatershed of Milk Creek, which is a tributary to the Molalla River. The total area of the six subwatersheds is 26,810 acres and includes: Memaloose Creek, Lower South Fork of the Clackamas, Upper South Fork of the Clackamas, Upper Clear Creek, Little Clear Creek, and Canyon Creek.

The South Fork of the Clackamas River and Upper Clear Creek watersheds are non-Key Watersheds under the Northwest Forest Plan. The South Fork and Clear Creek watersheds support populations of spring and fall chinook salmon, winter steelhead, and coho salmon over four miles downstream of the proposed project areas. The Canyon Creek subwatershed supports populations of winter steelhead and coho salmon. All of these watersheds also support populations of resident cutthroat and rainbow trout.

South Fork of the Clackamas River
The South Fork of the Clackamas River watershed is located in western Oregon on the west slope of the Cascade Range in Clackamas County. The South Fork watershed is a non-Key watershed under the Northwest Forest Plan. There is a mix of ownership in the watershed with the majority of the land (79%) administered by the Mt. Hood National Forest. The Bureau of Land Management (BLM) also administers approximately 18% of the watershed and 3% of the watershed is in private ownership.

The South Fork Clackamas River watershed is approximately 17,648 acres in size and is one of the smallest watersheds of the Clackamas River drainage. The watershed is oriented north to south and is comprised of two major drainages, The South Fork of the Clackamas River and Memaloose Creek. Memaloose Creek is a 4th order tributary that enters the South Fork at River Mile (RM) 0.6. The South Fork of the Clackamas River enters the mainstem Clackamas at RM 34.8.

Fish species present in the South Fork watershed consist of late and early run coho salmon, winter steelhead, spring chinook, resident rainbow and cutthroat trout, brook trout, large-scale sucker, sculpin, whitefish, longnose dace, and pacific lamprey. A 70-foot falls at RM 0.4 is a migration barrier to anadromous fish. The anadromous portion of South Fork is all on Forest Service administered land. Native populations of cutthroat and rainbow trout occupy both the South Fork and Memaloose Creeks as well as major tributaries such as the East Fork of the South Fork, Oscar Creek, Elbow Creek and Cultus Creek. Brook trout, which have been stocked in lakes such as Memaloose Lake, have proliferated throughout the drainage and may be a competitive concern for resident trout.

The South Fork watershed consists of 0.4 miles of anadromous streams, 24 miles of resident fish bearing streams and 69 miles of non-fish bearing streams. The anadromous portion of the South Fork Clackamas has been considered a crucial spawning area to late run coho because of its location as a low elevation tributary. Watershed Analysis was completed on South Fork in 1997 (USDA 1997).

Upper Clear Creek
The Upper Clear Creek watershed is located within the Lower Clackamas River 5th field watershed. Clear Creek originates in the Western Cascade at an altitude of 4,219 feet atop Goat Mountain and extends northwest to State Highway 211 south of the town of Estacada, Oregon in Clackamas County. The watershed encompasses approximately 18,208 acres in five sub-basins. The five sub-basins are: Upper Clear Creek, Middle Clear Creek, Little Clear Creek, Little Cedar Creek, and Hillockburn. Upper Clear watershed is a non-Key watershed under the Northwest Forest Plan.

Land ownership within the Upper Clear Creek watershed is grouped into three types: 1) Federally managed forests (4292 acres), 2) industrial forests (12042 acres), and 3) non-industrial landowners – primarily farms, small woodlots and home sites (1874 acres). The Forest Service portion of the Federal land totals approximately 2,000 acres. Watershed Analysis was completed on Upper Clear Creek in 1995 (USDA 1995).

The Upper Clear Creek watershed contains 29.1 miles of fish bearing streams, including 4.0 miles of streams that support anadromous fish. Resident cutthroat trout are present through out the watershed. The anadromous fish that utilize the watershed include winter steelhead, coho salmon, fall chinook, cutthroat trout, and pacific lamprey. Barrier falls located at the confluence of Clear Creek and North Fork Clear Creek, about one mile upstream of the mouth of Little Clear Creek, is the upstream limit of anadromous species. Little Clear Creek is the downstream boundary of the Upper Clear Creek watershed.

PROJECT/ACTION AREA

For purposes of this BE, the Project Area has been defined as the upper headwater areas of the South Fork of the Clackamas River, Upper Clear Creek, and Milk Creek, watersheds. The subwatershed associated with these fifth-field watersheds are: Memaloose Creek, Lower South Fork of the Clackamas, Upper South Fork of the Clackamas, Upper Clear Creek, Little Clear Creek, and Canyon Creek. The project action area will extend downstream for a distance of approximately 2.0 river miles in all of these streams. Downstream of this point it is believed any potential indirect effects to PETS species from implementing this project would be not measurable and insignificant.

Memaloose Creek subwatershed is approximately 7311 acres in size. Memaloose Creek is a 3rd order stream approximately 8.3 miles in length. It is the largest creek within this subwatershed. Memaloose Creek flows into South Fork Clackamas River approximately 0.4 miles above the confluence of the Clackamas River. Memaloose Creek flows from an elevation 4120 feet at the headwaters to 760 feet at the mouth. Average stream gradient for the entire length of the stream is approximately 7.7%. A 70-foot falls at RM 0.4 on the South Fork Clackamas River is a migration barrier for ESA listed species. No ESA listed fish species occur within the Memaloose subwatershed. Resident populations of cutthroat and rainbow trout occur throughout the watershed. Brook trout have also been introduced into the watershed through stocking that has taken place in Memaloose and Williams Lakes.

There are 5 proposed thinning units (#'s 1,2,3,4, and 5) and one partial unit (#7) totaling approximately182 acres within the Memaloose subwatershed. A total of 3.8 acres are located within a Riparian Reserve. The nearest occurrence of PETS fish species to these units is 4.2 miles downstream.

Lower South Fork Clackamas River subwatershed is comprised of the South Fork of the Clackamas River and all of its tributary streams from RM 0.0 to RM 4.0. The Lower South Fork subwatershed is approximately 3608 acres in size. A falls at RM 0.4 is a migration barrier for ESA listed species. Above this barrier resident rainbow and cutthroat trout occur throughout the watershed. Stream gradient from RM 0 to RM 4.0 averages 5% and increases to 12% from RM 4.0 to RM 9.0. The entire riparian area along the mainstem South Fork in the subwatershed lies within a Late Successional Reserve and is virtually undisturbed. These Riparian Reserves consist of late-seral stands of Douglas fir, western hemlock and western red cedar. Recruitment potential for LWD is excellent.

Proposed thinning units within the Lower South Fork lie within the Oscar Creek drainage. Oscar Creek is a 2nd order stream approximately 2.1 miles in length. It flows into the South Fork Clackamas River at approximately RM 3.0. Oscar Creek flows from an elevation of 3600 feet at the headwaters to 1600 feet at the mouth. Average gradient for the entire stream is 18%. Cutthroat trout occur within the first 0.5 miles of Oscar Creek h

There is one proposed thinning unit (#6) and one partial unit (#7) totaling approximately 85 acres within the Lower South Fork Clackamas River subwatershed. A total of 2.2 acres are located within a Riparian Reserve. The nearest occurrence of PETS fish species to these units is 4.4 miles.

Upper South Fork Clackamas River subwatershed begins at RM 4.0 of the South Fork Clackamas River and continues to the headwaters at RM 9.0. The subwatershed is 4,397 acres in size and consists of first and second order tributaries that enter the South Fork Clackamas River. Resident cutthroat and rainbow trout are present to approximately RM 8.5. A falls at RM 0.4 of the South Fork is a migration barrier for anadromous fish thus there are no ESA listed fish species that occur within the Upper South Fork subwatershed. Windthrow frequently occurs in the fall and winter within this subwatershed. Wind patterns, timber harvest and road building activities have resulted in windthrow along streams within Riparian Reserves. Consequently many perennial and intermittent streams lack necessary stream shading and LWD recruitment potential.

There is one proposed thinning unit (#8) totaling 48 acres within the Upper South Fork Clackamas River subwatershed. Approximately 2.3 acres are located within Riparian Reserves. The nearest occurrence of PETS fish species to this unit is over 6.2 miles.

Upper Clear Creek subwatershed encompasses approximately 18,208 acres**.** Clear Creek is a 5th order stream that flows through this subwatershed. Clear Creek flows between two subwatersheds, Middle Clear Creek and Upper Clear Creek. The first 4 miles of Clear Creek within the Middle Clear Creek subwatershed has anadromous fish (steelhead and coho salmon) up to the barrier falls at the confluence of Clear Creek and North Fork Clear Creek. Above these falls on Clear Creek (Upper Clear Creek subwatershed) are resident cutthroat trout.

Little Clear Creek is a major tributary to Clear Creek. Little Clear enters the mainstem Clear Creek at approximately RM 24. Anadromous fish species are not believed to utilize Little Clear Creek although no barriers have been identified. Resident cutthroat trout do occur within Little Clear Creek. A small portion of one proposed unit (#9) approximately 2.4 acres is located within the upper headwater region of Little Clear Creek. The unit is outside of riparian reserves and approximately one mile above the fish any bearing stream.

Five proposed thinning units thinning units (#11,12,13, and portions of unit #9, and 10) are located within the Upper Clear Creek subwatershed. A total of approximately 167 acres are proposed for thinning. A total of 65.8 acres are within the Riparian Reserves. The nearest occurrence of PETS fish species to any of these units is over 5 miles.

Canyon Creek subwatershed is approximately 3,288 acres and contains approximately 7.5 miles of fish bearing streams including 3.5 miles of stream that supports anadromous fish species. The anadromous species that utilize the watershed include winter steelhead and coho salmon. Resident cutthroat trout occur throughout the fish bearing section of Canyon Creek. Portions of two units (#9 and 10) totaling approximately 25 acres are located within the upland headwater region of the Canyon Creek subwatershed. These units are located outside of any riparian reserve and over four miles away from any occurrence of PETS fish species.

ACTIVITIES COMMON TO ALL ALTERNATIVES

The South Fork Thinning Project proposes to thin approximately 497 acres (423 acres of matrix land and 74 acres of the dry upland portion of riparian reserves). The stands are plantations ranging in age from 36 to 54 years. The average tree height ranges from 60 feet to 90 feet with dbh averaging between 10 and 15 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 190 trees per acre to 361 trees per acre. The management strategy is for a one-time entry into the Riparian Reserves. The objective of this action is 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 proposed action will thin from below harvesting the smaller trees. The largest and most dominant trees will be retained. Trees will be thinned using variable spacing (approximately 40% to 65% canopy closure). Post-harvest stand density of approximately 80 trees per acre is prescribed within the Riparian Reserves. Post-harvest stand densities within Matrix lands will range from 120 to 140 trees per acre.

Existing system roads, closed temporary roads from previous entries, and new temporary roads will provide access to the project area. Maintenance to the existing system roads prior to hauling will include spot patching, sealing, brushing, and ditch cleanout where needed. Ditch cleanout would be the removal of any material that may have slid into the ditch line that could impede the drainage capability. Existing ditch line vegetation would be maintained whenever possible to reduce the risk of erosion. Re-opening old temporary roads will consist of removing any gates or berms blocking vehicle access, brushing overgrown areas, blading, and spot rocking where needed. Road construction will be restricted to the dry season between June 1 and October 31 unless unusually dry conditions permit activities outside this window.

The new temporary roads will be of native surface and located along ridge tops, outside of any Riparian Reserve. No temporary road will cross any stream channel. Following harvest activities this road and newly constructed landings will be ripped and seeded.

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.

Additionally, the project proposes to aerial fertilize approximately 178 acres of second growth plantations in matrix land. Fertilization is proposed in units 1, 3, 4, 5 and 7. 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 not occur within 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.

DESCRIPTION OF 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

Alternative B would thin plantations by using the same logging method used for the original harvest. Old roads, landings and skid trails would generally be reused.

Alt. B

Unit	Acres	GB	S	H	Reuse Old Temp Roads (ft)	New Temp Roads (ft)
1	25	25				
2	50	11	39			
3	16	16				
4	13	13				
5	12	12				
6	28	8	20			
7	112	99	13			
8	48	9	39			
9	25	25			800	
10	25	25			600	
11	105	40	65		600	
12	25		25			
13	13		13			
Total	**497**	**283**	**214**		**2000**	

Alternative C

Alternative C would be similar to B in units where there are few resource concerns. In other units a new logging method and road system would be proposed in order to

alleviate impacts resulting from using the original logging systems. Since future thinning or other forest management is likely to occur in plantations, the new logging method and/or road system would be designed and located to serve long-term management and transportation needs. Units with changed logging systems or roads are highlighted.

Alt. C

Unit	Acres	GB	S	H	Reuse Old Temp Roads (ft)	New Temp Roads (ft)
1	25	25				
2	50	11	39			
3	16	16				
4	13	13				
5	12	12				
6	28	8	20			
7	112	99	13			
8	48	9	39			
9	25		25			500
10	25	25			600	
11	105		98	7	600	
12	25		25			
13	13		13			2300
	497	**218**	**272**	**7**	**1200**	**2800**

Alternative D

Alternative D would be similar to C except it would eliminate new road construction. In units affected by the deletion of road construction with this alternative, the units would be logged using helicopter or other logging systems. Units with changed logging systems or roads are highlighted.

Unit	Acres	GB	S	H	Reuse Old Temp Roads (ft)	New Temp Roads (ft)
1	25	25				
2	50	11	39			
3	16	16				
4	13	13				
5	12	12				
6	28	8	20			
7	112	99	13			
8	48	9	39			
9	25	17		8	800	
10	25	25			600	
11	105	0	98	7	600	
12	25		25			
13	13			13		
	497	**235**	**234**	**28**	**2000**	

COMPARISON OF ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE

The potential effects to water quality and fisheries for Alternative C and D would be less than that of Alternative B. These alternatives do not include any new temporary road construction; therefore there would be no risk of erosion or sediment entering streams due to the construction of temporary roads. There would be slightly less risk of erosion from harvest operations under alternatives C and D since helicopter logging would be used instead of ground based or skyline yarding systems on parts of some units. Because of less ground disturbance, the chance of sediment reaching the stream channel is even less likely than Alternative B. On units where temporary access roads would not be built, longer skidding distances may be used. This would result in many passes of equipment over a mainline skid trail, which when completed would have a very similar effect to that of a temporary road.

INTERRELATED OR INTERDEPENDENT ACTIONS

Secondary impacts include interrelated projects that have no independent utility apart from the proposed action, and interdependent projects that are a part of a larger action and depend on the larger action for justification.

There are no interrelated or interdependent actions for the proposed action.

PRESENCE OF PETS FISH AND AQUATIC SPECIES WITHIN OR DOWNSTREAM OF THE ACTION AREA

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."

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 through June in the Upper Clackamas River and during the months of March through June in the Oak Grove Fork. Steelhead use the majority of the mainstem Clackamas and major tributaries such as the South Fork of the Clackamas River, Fish Creek, Roaring River, Oak Grove Fork, Collawash River, and the

Hot Springs Fork of the Collawash 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 through June during spring freshets.

LCR steelhead do not occur in any of the streams that flow within proposed units of the South Fork Project. The nearest occurrence of LCR steelhead is over 4 miles downstream.

Upper Willamette River Steelhead (*Oncorhynchus mykiss*) - (Threatened) Upper Willamette River steelhead occur in the Willamette River and its tributaries upstream from Willamette Falls. Adults migrate into the Upper Molalla drainage during late January through the end of April. Spawning occurs from February through May in tributary streams such as Milk Creek, lower Canyon Creek, the North Fork Molalla River, Table Rock Fork Molalla River and the mainstem Molalla River. Smolt emigration takes place March through July.

UWR steelhead do not occur in any of the streams that flow within proposed units of the South Fork Project. The nearest occurrence of UWR steelhead is over 4 miles downstream of the project area within Canyon Creek.

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 lower Clear Creek, Deep Creek, and 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, Roaring River, and the first 0.4-mile of the South Fork Clackamas River.

Upper Willamette River chinook do not occur within any of the streams that flow within the South Fork units. The nearest occurrence of UWR chinook to any proposed unit within the Clackamas River, South Fork Clackamas, or Clear Creek watershed is over 4.0 miles.

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 in the mainstem Clackamas River 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 above River Mill Dam. The nearest occurrence of LCR chinook to the project area is within lower Clear Creek over 15 miles downstream.

Lower Columbia River Coho Salmon (*Oncorhynchus kisutch*) (Threatened)
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 in the mainstem Clackamas River and in the lower reaches of the South Fork of the Clackamas River and Clear Creek. The anadromous portion of the South Fork Clackamas has been considered a crucial spawning area to late run coho because of its location as a low elevation tributary. The nearest occurrence of LCR coho salmon to the South Fork Project area is over four miles downstream of any proposed thinning unit.

Columbia Dusky Snail
(*Lyogyrus n. sp. 1*)
C3 species *Survey and Manage* (ROD)

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 species have been identified in both the Clackamas and Sandy River watersheds. Potential habitat for the Columbia Dusky Snail occurs in the Action Area.

EFFECTS DETERMINATION

The effects determination of the South Fork Thinning Project will be based on project elements of the action alternatives that could have potential direct or indirect impacts on PETS fish and aquatic species or their habitats. These project elements include:

- Timber harvest
- Road construction
- Yarding
- Log haul
- Road decommissioning (obliteration)
- Fertilization

The analysis of effects focused on relevant habitat indicators that potentially could be affected by these project elements. The relevant habitat indicators include:

- Peak/Base Flow
- Temperature
- Sediment
- Chemical Contaminants/Nutrients

Direct Effects

Potential direct effects associated with project elements of the South Fork Thinning Project are: increased levels of fine sediment in local streams generated during road building, road obliteration, logging, and hauling. An increase in stream temperature caused by loss of streamside vegetative cover by thinning within Riparian Reserves, an increase in peak flows caused by removal of vegetative cover, and chemical contamination caused by fertilizer entering a stream channel.

To determine potential direct effects to PETS species, each of the relevant habitat indicators was evaluated by proximity to the action area, probability that an effect would occur, and magnitude of the action, if needed.

Flow

Any potential increase in flow in the Project Area is not expected to be measurable at the downstream end of the Action Area due to the distance and relatively low probability of any potential flow increase. Current conditions in the project area indicate a low risk for peak flow enhancement. Since the proposed action will maintain all treated stands at no less than 40% crown closure, this proposal results in no additional risk. There would be no increase in the drainage network due to roads as a result of the project since road segments proposed for construction have no hydrologic connection.

Temperature

The no-cut buffers along perennial and intermittent streams would insure that the majority of shade producing vegetation would remain. Since the streams within the project area are relatively small (3-10 ft. width), the no-cut buffers would provide adequate canopy cover to maintain existing shade components thus, maintaining stream temperatures. Intermittent streams within the project area only carry water during wet times of the year (winter and spring) when temperatures are cooler, and no significant increase in stream temperature is expected downstream. No water quality effects are foreseen, and the low probability of effects would decrease, as the canopy and ground cover are re-established to pre-harvest conditions. All of the existing shade components will be maintained. There is a very low probability that implementation of the project will increase solar radiation. No measurable change in stream temperatures is expected as the result of implementing this project. Current stream temperatures in all streams within and downstream of the project area are expected to be maintained.

Sediment

Ground disturbing activities associated with temporary road building within the South Fork Project Area have been designed to minimize the risk of erosion and the potential for sediment to be transported to streams. Road construction would be restricted to the dry season between June 1 and October 31. This restriction would reduce the risk of any surface erosion due to ground disturbance. The proposed temporary roads are located on dry ground, would not cross any stream channels, and would have no hydrologic link to any water source. These roads would be constructed on relatively flat terrain along ridgetops, which would avoid an increase in the drainage network. Because of the distance of the proposed temporary roads to any water source and the fact that these roads do not cross any perennial or intermittent streams, vegetative buffers would act as an effective barrier to any sediment being transported into stream channels by surface erosion or runoff. All temporary roads would be obliterated and revegetated directly following completion of harvest operations to help reduce compaction and increase infiltration rates. Impact to water quality or fisheries resources caused by sedimentation due to road construction or road obliteration, if any, would be short-term and undetectable at a watershed scale.

Thinning within riparian reserves is a ground disturbing activity that has the potential to cause a temporary reduction in water quality by allowing sediment to enter the stream channel from surface erosion or run-off. No-cut buffers, a minimum of 50 ft. wide, along perennial streams and a minimum buffer width of 30 ft. along intermittent channels, have been established for the South Fork Project. Buffer width design would 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 would include any buffer of hardwood vegetation occurring along the stream bank. No-cut buffers would generally be at the top of slope breaks on steeper ground and would circumvent all wet areas to maintain canopy cover along riparian areas. These vegetative buffers would act as an effective barrier to any sediment being transported into stream channels by surface erosion or run-off and would minimize the risk of any channel or water quality impacts. These buffer widths would allow soil infiltration between the unit and any water source. The use of skyline or helicopter yarding systems on steeper ground within riparian reserves will minimize ground disturbance. Seasonal restrictions on ground-based operations would further reduce the risk of soil disturbance and run-off. Even if some soil movement occurred, the vegetated buffer strips along every perennial or intermittent channel would act as an effective barrier. The probability that measurable amounts of fine sediment would enter any stream within the project area as a direct result of logging activity is low.

Log hauling would not measurably increase the amount of fine sediment in streams. The roads along the haul route are rocked or paved at stream crossings, and road ditches are well vegetated. The potential for sediment input into streams along the haul routes will be minimized by permitting haul only when conditions would prevent sediment delivery to streams. Any sediment that would enter a stream during haul activities would be at crossings along aggregate surfaced roads. The majority of these crossings are at small streams that would not be flowing, or would have very little flow, during the normal season of operation (June 1 to October 31). Any sediment that leaves the road surface

due to run-off is expected to disperse over land or be stored within these small channels. It is very unlikely that any measurable amount of sediment produced during log haul would be transported to stream channels where fish species occur. There are no listed fish species that occur immediately downstream of any aggregate surfaced stream crossing along the haul route. If any sediment did enter stream courses from hauling activities, it would be in very small amounts and for a short-term duration. No adverse effect to fish or their habitat would occur from hauling logs.

Chemical Contaminants

Aerial application of urea fertilizer has the potential to enter the aquatic environment by direct application, drift, overland flow and subsurface drainage, which may result in increased nitrogen levels in streams. Small amounts of fertilizer in streams would likely have little affect on fish and may encourage increased productivity of algae and periphyton. Direct application poses the greatest risk to water quality and the aquatic environment, but can be prevented by adequate buffer strips around streams and wet areas. Design criteria have been incorporated to minimize the risk of fertilizer entering streams. No fertilizer would be applied within Riparian Reserves or wet areas. Buffers where no fertilizer would be applied would be two-site potential tree heights along fish bearing streams and one-site potential tree height along other streams and wet areas. These buffer widths would prevent the introduction of fertilizer into streams by direct application, overland flow and subsurface drainage. Drift would be avoided by limiting aerial application to days with little or no wind. Application of fertilizer would not take place under adverse weather conditions such as: when wind speeds are in excess of 10 miles per hour, dense fog, snow, or heavy rain. Fertilization would only occur when soil conditions are moist and approximately 0.5 inch or less of rainfall is forecast within 4 days following application. Application of fertilizer would not be made on more than one inch of snow or during heavy rainfall where there would be a chance of overland flow of fertilizer in solution. Adherence to these design criteria would insure that very little, if any fertilizer would enter any stream course. The probability that fertilization outside of Riparian Reserves would have adverse effects to fish species or water quality is low.

Indirect Effects

Potential indirect effects may include increased amounts of fine sediment downstream in rivers or at the intake of municipal water providers, due to erosion from harvest units and roads. 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 any stream course, substantially reducing the impacts of soil disturbance and run-off on water quality downstream of the project area. The probability of any indirect effects impacting PETS species or habitat downstream of the project area is low.

Cumulative Effects

Cumulative effects associated with the South Fork Thinning Project would focus around changes in the timing and/or magnitude of flow events resulting from past, present and future forest conditions. Past disturbances within the South Fork, Upper Clear Creek, and Canyon Creek subwatersheds include timber harvest and road-building activities along with recreational use such as off-road vehicle usage. The harvest levels in recent years

has been well below the level projected by the Northwest Forest Plan due to appeals, litigation and areas established for survey and manage species.

Analysis on past thinning projects has shown that there are little if any measurable impacts to hydrologic function at the subwatershed scale. Cumulatively, watershed conditions in the short-term may be slightly decreased by harvest activities, but would be improved in the long-term by improving the number, type and health of the trees and stands over the long-term. Implementation of the South Fork Thinning Project would maintain all riparian conditions at the 5th and 6th field watershed scales.

ESA Cumulative Effects

ESA cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation [50 CFR section 402.02]. The project area is located completely within federal lands. There are no non-federal projects that are known occurring or are being planned in the Action Area at this time.

CONCLUSION

The implementation of the South Fork Thinning Project warrants a **"No Effect" (NE)** determination for Lower Columbia River steelhead, Lower Columbia River chinook, Upper Willamette River chinook, Upper Willamette River steelhead, Columbia River bull trout, and Lower Columbia River coho salmon and their designated or proposed critical habitat. A **"No Impact" (NI)** determination is warranted for Interior Redband trout and the Columbian Dusky Snail. These effects determinations are appropriate for all of the action alternatives because of the proximity of the proposed project area to ESA species or suitable habitat, the relatively minor magnitude of effects in the Project Area, and of the low potential for impacts generated at the project area to be transported to downstream reaches where these species are known or suspected to occur. There is a low probability of any direct of indirect effects to any listed or proposed fish or aquatic species or their habitat within or outside of the designated action area. This effects determination is based on the following reasons:

- The proximity of the harvest units to habitat where PETS species occur. The nearest occurrence of PETS fish species to the project area is over four miles.

- Project design features such as no-cut buffers along streams and seasonal restrictions for ground-based operations.

- The use of cable yarding and/or helicopters on steeper ground, within Riparian Reserves.

- Potential sediment delivery to streams during log transport will be minimized by restricting log haul to times when road related run-off is not present.

- Construction of new temporary roads will be on relatively flat ground or along ridge tops with no hydrological link to any water source.

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.

DETERMINATION OF EFFECTS – CRITICAL HABITAT

Critical habitat for twelve Evolutionary Significant Units (ESUs) of West Coast salmon and steelhead listed under the Endangered Species Act of 1973 (ESA) was designated on September 2. 2005. The ESUs that have designated critical habitat occurring within the watersheds associated with the South Fork Thinning Project include: UWR Chinook, UWR steelhead, LCR Chinook and LCR steelhead. Critical habitat includes the stream channels within the designated stream reaches, and includes a lateral extent as defined by the ordinary high-water line or bankfull elevation. Within these areas, the primary constituent elements essential for the conservation of these ESUs are those sites and habitat components that support one or more life stages, including: freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, estuarine areas, near-shore marine areas, and off-shore marine areas that support growth and maturation.

There is no critical habitat that occurs within the South Fork Project area. Designated critical habitat occurs downstream of the project area in the mainstem Clackamas River (UWR Chinook, LCR Chinook, and LCR steelhead), South Fork Clackamas River ((UWR Chinook and LCR steelhead), Lower Clear Creek (UWR Chinook, LCR Chinook, and LCR steelhead), Milk Creek (UWR Chinook and UWR steelhead), and Canyon Creek (UWR steelhead). Because the distance of the project area to any designated critical habitat is over three miles the effects determination for the South Fork Thinning Project on Designated Critical Habitat is "No Effect" (NE) for all of the project alternatives.

DETERMINATION OF EFFECTS – ESSENTIAL FISH HABITAT

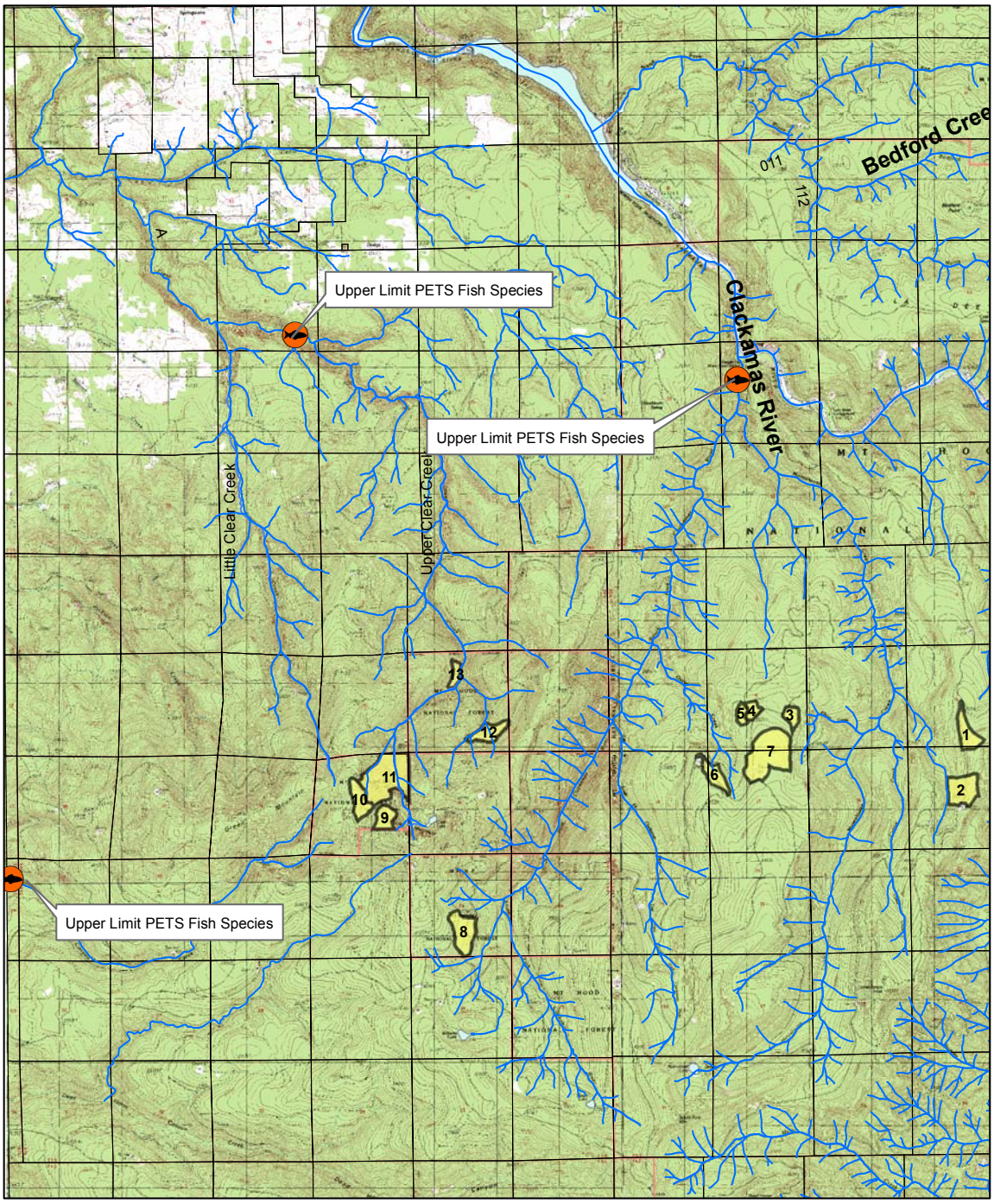
Essential Fish Habitat (EFH) established under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) includes those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery (i.e., properly functioning habitat conditions necessary for the long-term 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. Chinook and coho salmon utilize the Clackamas River, South Fork Clackamas River, and Clear Creek for rearing and spawning habitat. The proposed project is located approximately four miles above any habitat that could be utilized by chinook or coho. Implementation of the project covered in this BE will have **No Effect**

on essential fish habitat for chinook or coho salmon. The proposed project will not have any effect on water or substrate essential to the life history of coho, chinook, or chum salmon that occur within any basin on the Mt. Hood National Forest.

This activity will not jeopardize the existence of any of the species of concern or adversely modify critical habitat and will not adversely affect Essential Fish Habitat as designated under the 1996 Amendment to the Magnuson-Stevens Act.

Based on the **No Effect** determination of this project proposal, consultation with USFW and NOAA Fisheries is not required.

South Fork Thinning Project
PETS Fish Distribution



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