Endangered Species Act - Section 7
Consultation

BIOLOGICAL OPINION

Year 2000 Timber Sales - Confederated Tribes of Grand Ronde

Agency: Bureau of Indian Affairs

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date Issued: April 25, 2000

Refer to: OSB2000-0059

TABLE OF CONTENTS

I. BACKGROUND

The Natural Resources Division (NRD) of the Confederated Tribes of Grand Ronde (CTGR), in cooperation with the Bureau of Indian Affairs (BIA), proposes the regeneration harvest and commercial thinning of four timber sales on the Reservation of The Confederated Tribes of Grand Ronde (CTGR). The CTGR has a 20-year management agreement with the BIA. For the purposes of this consultation the BIA is the action agency.

The proposed timber harvest units are in the South Yamhill River subbasin, which supports two species listed by the National Marine Fisheries Service (NMFS) as threatened under the Federal Endangered Species Act (ESA). Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*) were listed as threatened under the ESA on May 24, 1999. Upper Willamette River (UWR) steelhead (*Oncorhynchus mykiss*) were listed as threatened under the ESA on March 25, 1999. Critical habitat for both of these species was designated on February 16, 2000 (effective on March 17, 2000) (65 FR 7764).

According to the BA, UWR chinook do not currently reside in the action area and there is no recorded data indicating they were present historically. The nearest known occurrence of UWR chinook is near the confluence of Salt creek and the South Yamhill River, over 40 stream miles from the Reservation. Juvenile UWR steelhead reside within the action area and are known to occur in streams on the reservation. Based on the presence of juveniles, CTGR staff suspect that adult UWR steelhead spawn in streams on the Reservation, although little spawning survey work has been done (pers. comm., K. Doerksen, Natural Resources Department, CTGR).

The BIA, U.S. Department of Interior, determined that the proposed timber harvests would have no effect on UWR chinook salmon. For the UWR Willamette River steelhead, the BIA determined that the Katsuk Salvage and Tyee Illahee timber sales are not likely to adversely affect UWR steelhead, and that the Katsuk Thinning, Oluk, and Siah timber sales are likely to adversely affect UWR steelhead. In a March 20, 2000 letter, the BIA requested concurrence on the “no effect” and “not likely to adversely affect” determinations, and formal consultation on the “likely to adversely affect” determinations.

The NMFS does not have an obligation to review “no effect” determinations by other Federal agencies, and so will not further discuss UWR chinook salmon in this biological opinion. The objective of this biological opinion is to determine whether the proposed timber harvests are likely to jeopardize the continued existence of UWR steelhead.

II. PROPOSED ACTION

The proposed action consists of timber harvest, yarding, and hauling for four timber sales on the Reservation of the CTGR. The purpose of the proposed action is to harvest timber to provide revenue for the CTGR, while mitigating for negative impacts to other natural resources.

A. Katsuk Sales

The Katsuk Sales include both thinning and salvage units. The Katsuk thinning units cover 258.5 acres and contain 226 acres that may be thinned. The primary tree species in the project area is Douglas-fir, between 50 and 60 years in age. The stocking level in these units is very high, often exceeding 250 trees per acre. The primary objective of the thinning is to increase overstory tree growth and vigor and to reduce competitive mortality. This would be accomplished by thinning from below (i.e. harvesting trees that are below the dominant canopy height).

The Katsuk salvage sale is sandwiched in the middle of the Katsuk thinning operation. This unit sits on the leeward side of a recently harvested unit. A number of trees were blown down in this unit and many others are leaning and likely to be blown over. This unit covers approximately 3 acres and would be clearcut.

The thinning sale would require the construction of 4,866 feet of new native-surface spur roads and 4,825 feet of new permanent road. Initially 300 feet of the permanent road would be rocked. Additional portions of the road would be rocked if weather conditions made it necessary. The spur roads would be water-barred, blocked and planted with grass at the completion of the proposed action. The new roads are located along ridge-tops, and no culverts will be needed.

Twenty-four new landings, covering approximately 2.4 acres would need to be constructed in addition to the 33 existing landings covering approximately 3.3 acres. Sixty-four percent of the Katsuk thinning units would be cable yarded. The remainder would receive ground-based yarding. The requires low-pressure track mounted vehicles or low ground pressure rubber tired vehicles (<7 pound per square inch pressure) for all ground based yarding activities. Also, the CTGR usually confines ground-based yarding to the drier months of spring, summer and fall to reduce soil compaction and sediment generation. A Tribal forester will administer the sale and verify whether field conditions will allow harvesting activities. The Tribal forester would have authority to halt all harvest activities if field conditions are not appropriate (i.e. wet soils and an accompanying risk of compaction or erosion, or fire hazards etc.).

Yoncalla Creek Tributary A runs near Units One and Two and is fish-bearing (cutthroat trout) for approximately half its length. A culvert near its confluence with Yoncalla Creek is a fish passage problem due to drop height and pool depth. This culvert would be replaced to remedy this fish passage problem and open up approximately 0.75 miles of fish bearing stream.

Unit-specific information on acreage, harvest method, current and target stand conditions, landings, road construction, and unit history is provided in the BA.

B. Tyee Illahee Sale

The proposed Tyee Illahee timber sale would involve the clearcut harvest of 6 acres of predominantly 105 year-old Douglas fir. Originally the Tyee Illahee timber sale was proposed as a 30 acre clearcut; the cut was reduced to 6 acres to protect an area that may contain a historic cultural trail.

The sale would be cable yarded. Harvest activities would likely take place in the summer or fall of 2000.

C. Oluk Sale

The Oluk timber sale would cover approximately 35 acres of a predominantly 117-year-old Douglas fir forest. The unit was subject to significant windstorms in 1995 and 1996, resulting in a large number of windthrown trees. Clearcut harvest is planned for May-August 2000. Ninety percent of the unit would be cable yarded with the remaining 10% receiving ground-based yarding. Four new landings would be created, covering in total approximately 0.8 acres.
After harvest, the unit would be broadcast burned in 2000 or 2001 and replanted with 80% Douglas fir, 10% Western hemlock, 10% Western red cedar at 436 trees per acre in early 2000 or 2001.

D. Siah Sale

The proposed Siah timber sale is made up of three separate harvest activities: a 23.71 acre clear-cut, a 14.51 acre habitat thinning, and a 37.84 commercial thinning from below. Forty-six percent of the units would be cable yarded, and 56% would be shovel logged. In shovel logging, logs are relayed or swung to a landing by a tracked log loader. The intent of this method is to reduce ground disturbance relative to tractor yarding.

The harvest is planned for May-August 2000. Eight new landings would be constructed covering approximately 1.6 acres. Three existing landings covering approximately 0.6 acres would also be used. No new roads would be constructed. After harvest, 1,320 feet of existing road would be ripped with an 18” winged sub-soiler and replanted.

The Siah clear-cut unit covers 23.7 acres of predominantly 95-year-old Douglas fir forest.
After harvest, the unit would be broadcast burned in 2000 or 2001, and replanted with 80% Douglas fir, 10% Western hemlock and 10% Western red cedar at 436 trees per acre in 2001 or 2002.

The Siah habitat thinning unit covers 14.51 acres of predominantly Douglas fir up to 95 years old. A formal thinning prescription has not yet been written for this unit, but the objective would be to increase species and structural diversity of the stand as well as accelerate overstory growth. With this goal in mind, the unit would likely feature several small gap clearings of 2 acres or less. All grand fir and trees over 25 inches in diameter would be retained. An equal representation and distribution of tree sizes, 12 inches or larger in diameter, would be retained.

The Siah commercial thinning unit covers 37.84 acres of predominately 58-year-old Douglas fir forest. This unit would be thinned from below to promote maximum tree growth and vigor.

E. Mitigation

The following mitigation measures proposed by the CTGR apply to all sales except as noted.

Stream buffers

Perennial fish bearing: 100-350 feet. Falling trees into, or yarding through this buffer type is not allowed without the review and approval of the NRD staff.

Intermittent fish bearing: 50-100 feet. Falling trees into or yarding through this type of buffer is not allowed without NRD staff consent.

Perennial non-fish bearing: 50-100 feet. Trees can be felled into this type of buffer. Yarding and yarding lanes are also allowed in this buffer type, although all logs must be completely suspended above the ground.

Intermittent non-fish bearing: minimum 20 feet. This buffer width is determined by the NRD staff. Falling, yarding and yarding lanes are allowed through this buffer type; logs must have one end suspended during yarding.

Yarding

To minimize soil compaction and increased erosion, ground based yarding is limited to slopes less than 30%, and harvests are generally scheduled for summer. Written within the sale contract is a clause that allows NRD forestry staff to halt harvest activities when the site is too wet or the ground is too soft. A CTGR forester will administer the sale and conduct field inspections generally every other day.

Site Preparation and Replanting

After clearcut harvesting the area is usually broadcast burned in preparation for replanting conifers at 436 trees per acre. Douglas fir makes up about 90% of the replanted species with Western hemlock and Western red cedar making up the balance. Mesic sites are generally replanted with a higher percentage of Western red cedar. The CTGR tries to replant the proportion of species that inhabited the site before harvest activities.

III. LISTED SPECIES AND CRITICAL HABITAT

A. Biological Information

UWR steelhead trout occupy the Willamette River and its tributaries upstream from Willamette Falls. Detailed information on the status and life history of UWR steelhead is provided in Busby et al. (1995, 1996). The native steelhead of this basin are late-migrating winter steelhead, entering fresh water primarily in March and April. Early migrating winter steelhead and summer steelhead have been introduced to the Upper Willamette River Basin; however, these non-native populations are not components of this ESU.

The relationship between anadromous and non-anadromous *O. mykiss* in this geographic area is unclear. Non-anadromous *O. mykiss* are known to occupy the Upper Willamette River Basin; however, mostly above natural and manmade barriers (Kotow 1995, as cited in Busby et al. 1996). Due to introductions of non-native steelhead stocks and transplantation of native stocks within the basin, the present distribution of native Upper Willamette River Basin steelhead, and their relationship to non-anadromous and possibly residualized *O. mykiss* within the basin, are unclear (Busby et al. 1996).

B. Critical Habitat

Critical habitat for UWR steelhead was designated on February 16, 2000 (effective on March 17, 2000) (65 FR 7764). However, based on a consideration of the Federal Government's trust responsibilities to Indian tribes, particularly as addressed in the Secretarial Order, and out of respect for tribal sovereignty over the management of Indian lands, NMFS has determined that Indian lands should be excluded from the final critical habitat designation for these salmon and steelhead species. The Indian lands specifically excluded from critical habitat are those defined in the Secretarial Order, including: (1) Fee lands, either within or outside the reservation boundaries, owned by the tribal government; and (2) fee lands, within the reservation boundaries, owned by individual Indians.

IV. EVALUATING PROPOSED ACTIONS

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 C.F.R. Part 402 (the consultation regulations). The NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of (1) Defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NMFS must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed species' life stages that occur beyond the action area. If NMFS finds that the action is likely to jeopardize, NMFS must identify reasonable and prudent alternatives for the action. Furthermore, where critical habitat has been designated, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the critical habitat. However, as described in the Background section of this Opinion, NMFS excluded reservation lands from critical habitat, so this Opinion does not include an analysis of effects on critical habitat. Additional details of NMFS' approach to jeopardy analysis are described in Attachment 1.

A. Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR § 402.02). For the purposes of this consultation, the action area includes: (1) Streams in the North Fork Agency Creek, Yoncalla Creek and Wind River subwatersheds, adjacent to and downstream of the timber harvest units, that drain into Agency Creek, and Agency Creek downstream to the South Yamhill River; and (2) streams in the Teahwit Creek and Burton Creek subwatersheds, adjacent to and downstream of the timber harvest units, that drain into Canada Creek, Willamina Creek and the South Yamhill River.

B. Biological Requirements

The first step in the method NMFS uses for applying the ESA standards of § 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. The NMFS also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NMFS starts with the information used to make its determinations to list the particular species for ESA protection (Busby et al. 1995, 1996), and then considers any new data that is relevant to those determinations.
The relevant biological requirements are those necessary for the listed species to survive and

recover to naturally reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stocks, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

The NMFS finds that these biological requirements are best expressed in terms of environmental factors that define properly functioning freshwater aquatic habitat necessary for the survival and recovery of UWR chinook and steelhead. These environmental factors include fresh-water habitat access, habitat-forming watershed processes, riparian and channel condition elements, hydrologic functions, and water quality. Within the action area, these habitat elements are necessary for prespawning survival and distribution, spawning success, egg-to-smolt survival, smolt emigration survival and timing, and smolt condition to allow the long-term survival of the species. Properly functioning watersheds, where all of the individual factors operate together to provide healthy aquatic ecosystems, are necessary for the survival and recovery of these species.

C. Environmental Baseline

1. Status of the Species

a. UWR Steelhead Trout

Pre-1960s abundance estimates specific to this ESU are not available. Dam counts at Willamette Falls indicate that the late-run (native) winter steelhead average run size for the years 1989-93 was approximately 4,200, while early-run winter and summer steelhead averaged 1,900 and 9,700, respectively. Only the late-run winter steelhead are included in this ESU; other runs are mentioned because of their possible ecological interactions with the native stock (Busby et al. 1996).

Native winter steelhead within this ESU have been declining on average since 1971 and have exhibited large fluctuations in abundance. The main production of native (late-run) winter steelhead is in the North Fork Santiam River, where estimates of hatchery proportion in natural spawning range from 14% to 54%. The major present threat to genetic integrity for steelhead in this ESU comes from past and present hatchery practices (Busby et al. 1996).

According to the BA, there is little to no data on the historic steelhead population in the action area. It is not known whether the existing steelhead population is a dwindling remnant of the discontinued state stocking program or the legacy of a historic native run.

2. Factors Affecting Species Environment Within the Action Area

Land ownership in the northern portion of the South Yamhill watershed (which includes Agency Creek, Yoncalla Creek, and Wind River) consists of 12.2% federal, 16.2% Tribal, 0.2% State of Oregon, 24.7% private, and 46.6% private industrial land (BLM 1998, as cited in the BA). Land ownership in the Willamina Creek watershed consists of 31.5% federal, 3.8% Tribal, 0.7% State of Oregon, 0.5% municipal, 24.4% private, and 39.1% private industrial land (BLM 1998, as cited in the BA).

According to the BA, forestry is the dominant land use in both the South Yamhill and Willamina Creek watersheds, especially in the upper drainages. Forests in both watersheds are fragmented and relatively young. Douglas fir dominates forested areas, with western red cedar and western hemlock occurring less commonly. Red alder is widespread and dominates some riparian and disturbed areas (BLM 1998, as cited in the BA). The lower watersheds are dominated by agriculture, rural residential, and the communities of Grand Ronde and Willamina.

According to a BLM watershed analysis (BLM 1998, as cited in BA), many streams in these two watersheds, particularly in lower reaches, have been degraded by past practices including usage of splash dams, road construction along streams, and clearcutting adjacent to streams. The analysis states:

> *Streams often lack deep pools, large wood and off channel areas needed for fish habitat. Water quality in the watersheds has been affected in the past by unregulated development of residential areas, road construction, clearcutting, and farming. Quality in the streams tends to decrease as streams flow toward the valley and the type and amount of activities that impact water quality increase. Problems with sedimentation, contaminated runoff, low oxygen levels and water temperature occur in many lower portions of the watersheds (BLM 1998, as cited in BA).*

Willamina Creek from the mouth to above East Creek at river mile 10 and the South Yamhill River upstream from the confluence with Willamina Creek are listed on the Clean Water Act 303(d) list by the Oregon Department of Environmental Quality (ODEQ) for exceeding the fecal coliform standard (ODEQ1998, as cited in the BA).

The NMFS has assembled essential environmental factors comprising properly functioning watersheds into a matrix of pathways and indicators (MPI) (NMFS 1996, Attachment 2). The MPI is a table that lists several pathways to evaluate salmonid habitat, such as water quality, channel condition, and watershed condition. For each pathway there are several habitat indicators for which ranges of values are identified that correspond to *properly functioning* condition, *at risk* condition, or *not properly functioning* condition. The NMFS and action agencies use existing data and checklists of these pathways and indicators to assess the health of stream reaches or watersheds, because habitat data is more readily available than measurements of fish population health such as egg-to-smolt survival or growth rates. Such an assessment provides a baseline description of the stream/watershed, and also allows the effects of an action (*e.g.*, a timber sale) to be evaluated.

For the subject consultation, the CTGR used The Matrix Of Factors And Indicators For The Oregon Coast Range Province, Interim Version, revised July 20, 1998 (OCR Matrix, Attachment 3). This

matrix was designed to be applied to broad valley floor reaches of 4% gradient or less and primarily 3rd- to 4th-order streams. Many of the streams on the Reservation and some of those assessed in the BA are 1st and 2nd-order and of high gradient. Although some streams may not meet the criteria for the OCR Matrix, the information in the OCR matrix was the best available for establishing the environmental baseline. Some OCR Matrix criteria for the category of function of each indicator may not be appropriate for these smaller streams, so professional judgment, along with the indicator measurement, was used in preparing the BA. In such cases the category of function indicated by the OCR Matrix and the actual category of function determined may not agree.
The MPI checklists in the BA are accompanied by detailed narrative descriptions of the current status of the environmental baseline for each habitat indicator in each subwatershed in the action area. The environmental baseline in the South Yamhill watershed is dominated by conditions rated mostly as *not properly functioning* or *at risk* (see watershed MPIs in BA). The baseline in the Willamina Creek watershed has a greater number of *properly functioning* ratings, although there are several *not properly functioning* and *at risk* ratings.

Based on the information described above, NMFS finds that the environmental baseline does not currently meet all of the biological requirements for the survival and recovery of listed UWR steelhead trout within the action area. Restoration of properly functioning watersheds is necessary to achieve aquatic conditions and processes that will be sufficient to meet the needs of the species for survival and recovery. Actions that retard attainment of properly functioning watersheds would not be consistent with the needs of the listed species for survival and recovery.

V. ANALYSIS OF EFFECTS

A. Effects of Proposed Action

1. Methods of Analysis

The CTGR determined whether each action is expected to restore, maintain, or degrade aquatic habitat factors described in the MPI. If any of the indicators was predicted to be degraded by an action, the CTGR determined that action to be *likely to adversely affect* the listed species.

To aid in the effects analysis, NMFS used a computer-generated slope stability analysis model (SHALSTAB) to locate and map areas potentially susceptible to shallow landslides (Dietrich et al. 1992, 1993, 1995; Montgomery and Dietrich 1994). For this analysis, NMFS used digitized 7.5 minute USGS quadrangle maps with enhanced topographical contours at 10-m intervals, and Geographic Information System harvest unit boundary polygons provided by the CTGR. The model assigns to each 10-meter topographic cell a relative hazard rating (low, medium, or high). Field verification of the output of the model highlighted one significant source of error. That error originated in the original topographic map that was used to develop the 10-m digital elevation model (DEM).

NMFS staff inspected several harvest units in the Katsuk and Tyee Illahee Sales to partially verify the model in areas predicted to be highly unstable. In at least part of the Tyee Illahee sale, the on-ground topography was not reflected correctly in the topographic information, nor, consequently, in the DEM or model. The actual slope of the ground was estimated as close to 100% whereas the topographic information showed it to be 30 to 50% slope. This discrepancy was expressed in the landslide model, showing that area to have a low, rather than high or chronic landslide probability. NMFS staff did not inspect all of the harvest units so this error may have occurred in more than one location.

The NMFS also used the DEMs to generate a map showing percent slope. This was done to help identify steep planar hillsides that have been shown to have increased risk of landslides (Oregon Department of Forestry 1999). The same error that occurred in the landslide analysis (topographic map error) also occurred here.

2. General Effects of Road Construction and Use

Construction of a road network can greatly accelerate erosion rates in a watershed (Haupt 1959, Swanson and Dyrness 1975, Swanston and Swanson 1976, Beschta 1978, Gardner 1979). Cederholm et al. (1981) reported that the percentage of fine sediments in spawning gravels increased above natural levels when more than 2.5% of a basin area was covered by roads. Unpaved road surfaces continually erode fine sediments, adding significant amounts of sediment to streams (Reid and Dunne 1984, Swanston 1991). Roads and related ditch networks are often connected to streams, providing a direct conduit for sediment. On steep hills, road construction or improper maintenance can greatly increase landslide rates relative to undisturbed forest (Swanson and Dryness 1975, Swanston and Swanson 1976, Furniss et al. 1991, Oregon Department of Forestry 1999), delivering large pulses of sediment to streams. Increased sediment delivery can adversely modify stream channel morphology by filling pools and interstitial spaces used for salmonid holding and rearing, covering spawning gravels, and causing streams to become wider and shallower (Hicks et al. 1991, Furniss 1991). Roads built near watercourses can eliminate part of the riparian vegetation (Furniss 1991), reducing LWD recruitment and shade. Riparian roads also constrain the natural migration of the stream channel where channel migration zones are present.

Road networks can intercept, divert, and concentrate surface and subsurface water flows, thereby increasing the watershed's drainage network (Hauge et al. 1979, Furniss 1991, Wemple et al. 1996). This can change peak and base stream flows and increase landslide rates. Stream crossings can restrict channel geometry and prevent or interfere with migration of adult and juvenile anadromous fish (Furniss et al. 1991). Crossings can also be a source of sedimentation, especially if they fail or become plugged with debris (Furniss 1991, Murphy 1995).

3. General Effects of Timber Harvest

Logging operations have the potential to adversely affect upland and riparian ecological functions and characteristics that shape aquatic habitat (Gregory et al. 1987, Chamberlin et al.1991). These functions and characteristics include provision of shade and cover, nutrient processing, food web support, sediment routing and composition, stream channel form, bank stability, water quality, flow timing and volume, and linkages to the floodplain (Sullivan et al. 1987, Gregory et al. 1991, Spence et al. 1996).

Log yarding and subsequent prescribed burning activities can increase soil exposure, runoff, and surface erosion (Chamberlin et al. 1991). The magnitude of effects depends on the degree of disturbance, slope, soil types, the time required for revegetation, and whether runoff can be concentrated by roads or other features.

Increases in sediment supply beyond the transport capability of the stream can cause stream channel instability, aggradation, widening, loss of pools, and a reduction in gravel quality (Sullivan et al. 1987, Swanston 1991). For salmon, these changes can mean reduced spawning success when spawning areas are covered, eggs and fry are buried, food abundance is reduced, and over-wintering habitat is lost (Hicks et al. 1991).

LWD is an important component of freshwater salmonid habitat. LWD regulates sediment and flow routing, influences stream channel complexity and stability, and provides hydraulic refugia and cover within stream systems (Bisson et al. 1987, Gregory et al. 1987, Hicks et al. 1991, Sedell and Beschta 1991). LWD also plays a key role in retaining salmon carcasses (Cederholm and Peterson 1985), a major source of nitrogen and carbon in stream ecosystems (Bilby et al. 1996). Forest management activities within a distance equal to one-site potential tree height of streams have the potential to change the distribution, size, and abundance of LWD that is recruited from adjacent riparian areas and hill slopes (Hicks et al. 1991, Ralph et al. 1994, Murphy 1995, Spence et al. 1996).

Logging within a distance equal to the height of a site-potential tree of a stream has the potential to affect LWD recruitment from the streamside stand (FEMAT 1993, Spence et al. 1996). However, because LWD recruitment potential declines rapidly moving away from the stream, a buffer of 100 feet includes about 80-98% of streamside LWD recruitment potential, depending on stand age and other factors (Murphy and Koski 1989, McDade et al. 1990, Van Sickle and Gregory 1990). Additional wood can be recruited to fish-bearing streams from upslope and upstream areas through landslides and debris flows (McGarry 1994, Reeves et al. 1995). In some areas, wood transported in this manner may constitute up to 50% of the wood recruited to downstream reaches (McGarry 1994). McDade et al. (1990) could not account for 48% of the existing LWD pieces in a study of recruitment from streamside areas.

Stream shade (important for controlling water temperature) can be affected by logging within a distance equal to approximately three-quarters of a site potential tree height (FEMAT 1993, Spence et al.

1996). For small streams, the riparian buffer width needed to provide 75-90% shade varies widely, from 30-145 feet (Beschta et al. 1987). The majority of litterfall (a source of nutrients to the stream) is provided by vegetation within a distance equal to one-half to three-quarters of a site potential tree height (FEMAT 1993). Bank stability can be affected by removing trees in the zone where roots can extend to the stream bank (Beschta 1991) (up to approximately 30 feet from the stream for mature conifer trees, or wider where there is a channel migration zone).

Headwater streams play an important role in watershed function by storing and routing sediment, and providing high quality water, LWD, organic litter, and dissolved nutrients into the lower gradient fish-bearing streams (Sullivan et al. 1987, Murphy 1995, Spence et al. 1996). LWD in headwater streams increases sediment retention by forming depositional areas and dissipating energy; retains non-woody organic matter, allowing it to be biologically processed prior to downstream export as dissolved and particulate nutrients; and delays surface water passage, allowing it to be cooled by mixing with ground water (Bisson et al. 1987).

Recently-logged areas often experience an increased rate of landslides (Swanston and Swanson 1976, Sidle et al. 1985, Swanston 1991, Oregon Department of Forestry 1999). A likely reason for this increase is altered soil shear strength. Soil shear strength decreases as tree roots gradually decay over a period of 2-10 years (Ziemer 1981, Sidle et al. 1985). Landslides originating from harvested hillslopes, and that travel along harvested stream channels, will deliver primarily sediment rather than LWD to streams (Hicks et al. 1991, Reeves et al. 1995). The rate and composition of landslides (Reeves et al. 1995), channel gradient and tributary junction angle (Benda and Cundy 1990), and the presence of mature trees in runout zones that can reduce debris flow runout distance (Oregon Department of Forestry 1999) are major factors determining effects of these events on fish habitat.

4. Timber Harvests in South Yamhill Watershed

a. Katsuk Thin Sales

Units of these sales occur in the Yoncalla Creek Tributary A, Yoncalla Creek, Agency Creek's upper reaches, and North Fork Agency Creek subwatersheds, all of which drain into Agency Creek. The CTGR completed separate MPI analyses for each of these subwatersheds. UWR steelhead trout juveniles inhabit Agency Creek and North Fork Agency Creek. None of the harvest units are adjacent to streams known to be used by the listed species.

The CTGR found that the Katsuk Thin Sales would *degrade* watershed conditions by increasing road density. The CTGR also determined that the following habitat factors were *not properly functioning*, and that the proposed sales would *maintain* the existing condition: physical barriers; substrate; large woody debris (Yoncalla Creek and N. Fork Agency Creek only); off-channel habitat (all but Yoncalla Tributary A); percent area in pools; pool quality (Agency and N. Fork Agency Creek only); disturbance history; and stream influence zone. The CTGR found that other factors were properly functioning and would be *maintained* by the proposed sales. Based on this information, the CTGR determined that the Katsuk Thin Sales are *likely to adversely affect* listed UWR steelhead trout.

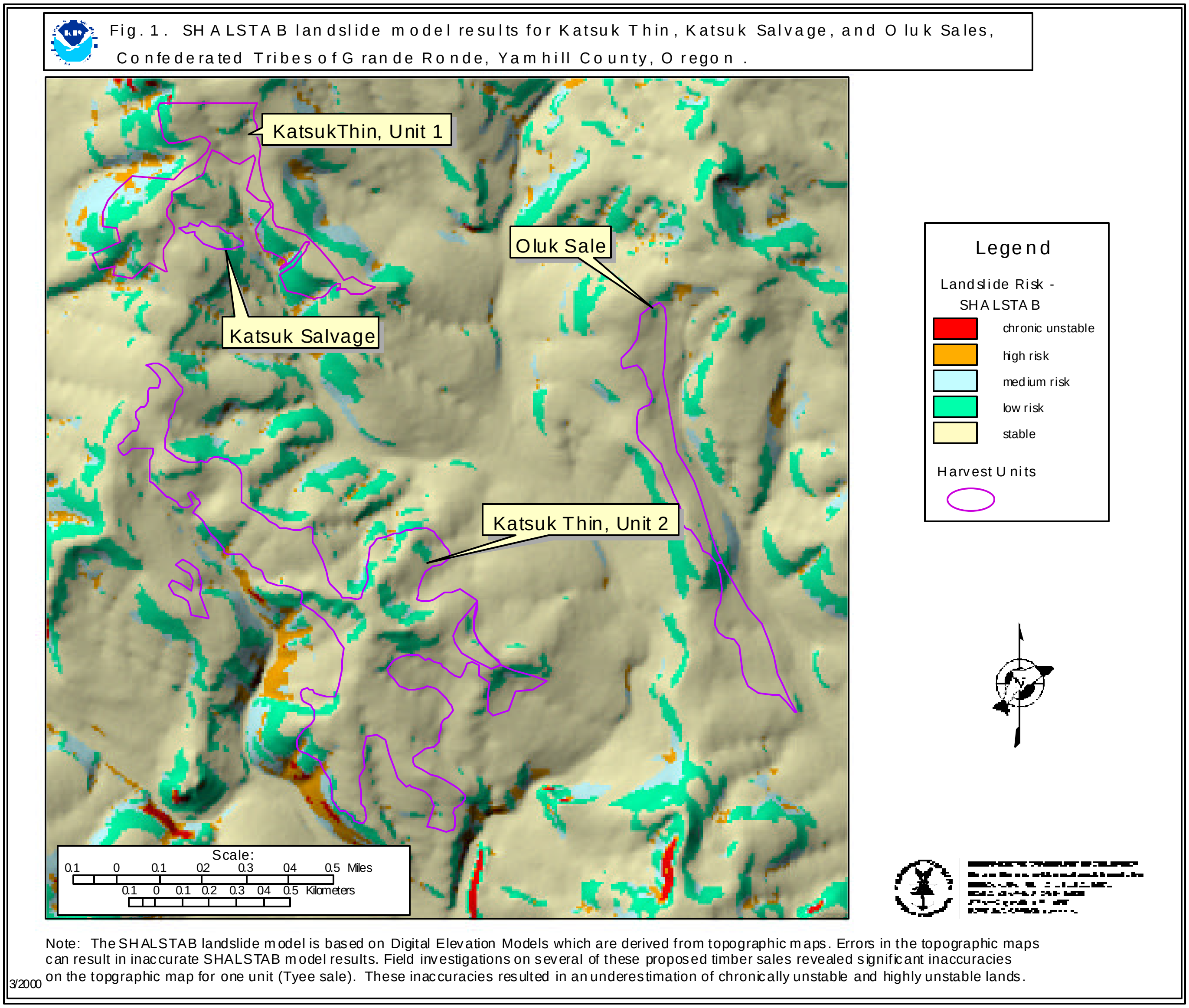
Although road density can be a useful indicator of landscape-scale disturbance, specific information on road location, design, use and maintenance is helpful to determining effects of particular actions. Almost all of the new roads are located along ridge-tops, outside of landslide-prone areas. The road is limited to a 25-foot wide corridor with a 10-12 foot running surface width. The roads have been designed so that stream crossings and cross-drain culverts are not needed, which reduces erosion problems resulting from culvert fills and concentration of road drainage onto potentially unstable areas. Given the location of the roads on the ridgetops and lack of evidence otherwise, the CTGR does not expect to encounter springs at the proposed road locations. The proposed roads would be relocated or re-engineered if springs were found during road construction.

Regardless of how well roads are engineered, constructed, and mitigated, some additional sediment generation is virtually inevitable from road construction (Furniss 1991). However, the CTGR have proposed road-building methods and mitigation designed to minimize adverse effects in time and space. The CTGR requires end-hauling of excavated material on slopes over 45%, which reduces the landslide risk from sidecast fill material. Also, sidecasting is restricted to the 25-foot wide road corridor. These provisions would be written into the timber sale contract and a Tribal forester administering the sale would verify that contract requirements are met. Adverse effects from log hauling are likely for this sale because the harvest schedule includes year-round activity. Log truck traffic on wet, unpaved roads can greatly increase sediment yield (Reid and Dunne 1984).

Directing surface runoff away from unstable sidecast or fill material, reestablishing natural drainage patterns where possible, and executing follow-up inspections and corrections are important for successful road treatment programs (Harr and Nichols 1993). Spur roads would be water-barred, scarified and planted with grass at the completion of the proposed action, which reduces sediment generation. To respond to concerns raised by NMFS, the CTGR will determine the placement of waterbars to avoid directing drainage onto perched fills and concave slopes that may be potentially unstable. Following harvest completion, the roads would be blocked at their origin with boulders or gates.

Although the layouts of the Katsuk Thin Sales avoided most of the high and moderate risk landforms predicted by SHALSTAB, small areas of unstable lands were predicted in two locations on the west side of Unit 1, in one location in the southeast corner of Unit 1, and near the end of Spur Road 2a in Unit 2 (Fig. 1). The Slopes for these sales are shown in Figure 2.

Figure 1. SHALSTAB landslide model results for Katsuk Thin, Katsuk Salvage, and Oluk Sales.



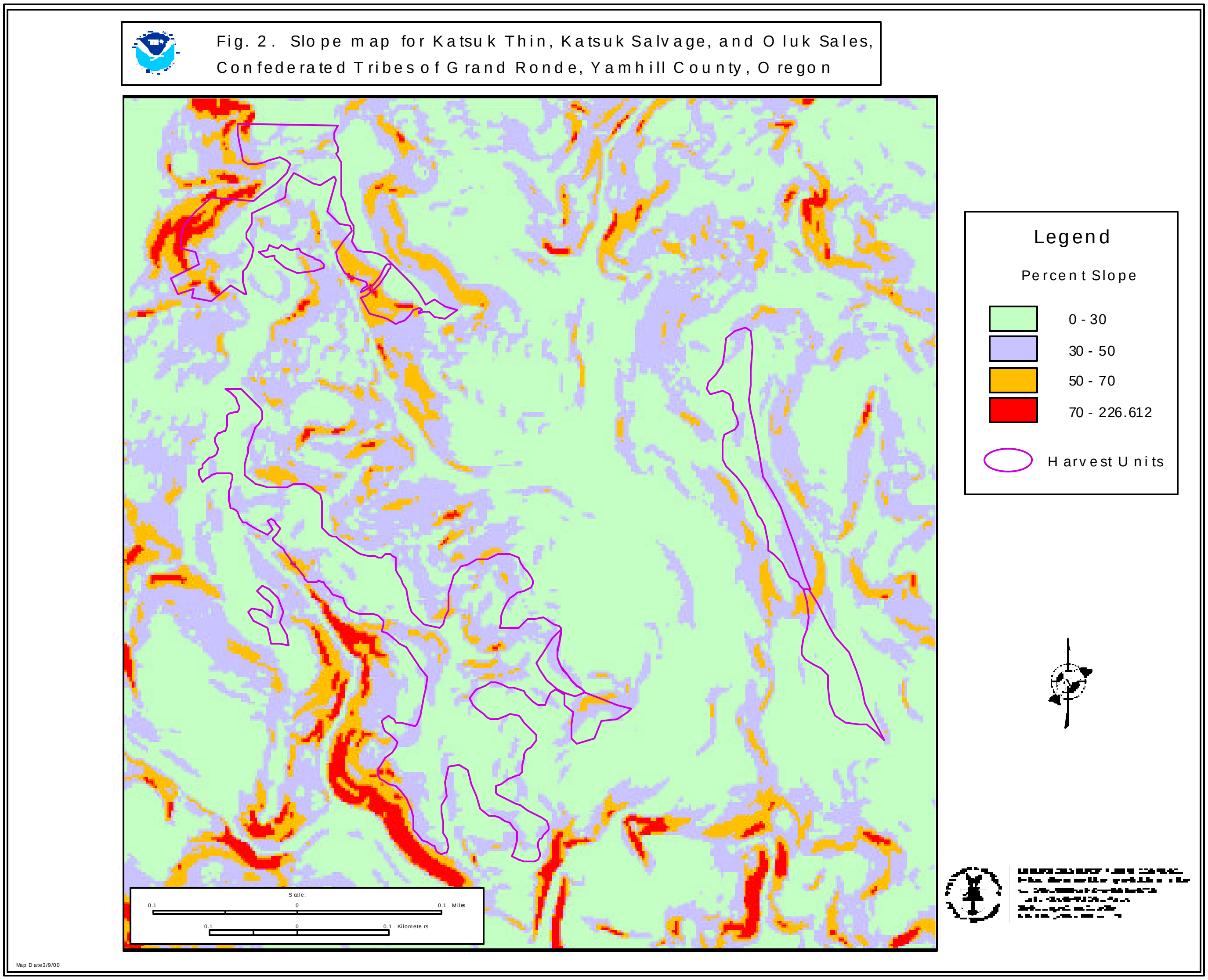


Figure 2. Slope map for Katsuk Thin, Katsuk Salvage, and Oluk Sales.

NMFS and CTGR staff inspected the route of Spur Roads 2 and 2a on February 16, 2000. Steep areas were found to the north side of the end of Spur 2a, and downhill from the end of the road. Thinning was planned within both steep areas.

In a second field inspection, the NRD forestry staff determined that one of the predicted high-risk areas in Unit 1 is a steep slope that leads to a large bench. The proposed sale boundary would end at the edge of the slope break. No harvest activities would occur on the steep slope, and most possible landslides likely would be captured by the bench before they could reach the stream. NRD forestry staff did not find any other major causes of concern in the remainder of Unit 1. In Unit 2, the CTGR would limit harvest activities to slopes <70% to reduce landslide risk. Also, the road will be modified to ensure road drainage would be channeled to the shallower slopes on the southern side of the ridge, reducing landslide risk associated with the steeper northern slopes.

The Katsuk thinning activities would occur at a minimum of 221 feet from any fish-bearing stream. The Katsuk boundary is one average (current, not site potential) tree height (142 feet) from any perennial non-fish bearing streams. These buffers fully provide the riparian functions of bank stability, shade, and litterfall, and almost all of the potential for LWD recruitment and sediment filtration (FEMAT 1993, Murphy 1995, Spence et al. 1996). Intermittent streams would have buffers at least 20-30 feet wide. These buffers will provide a portion of the potential LWD recruitment and are likely adequate to help retain sediment and possibly provide some wood to downstream reaches during high flow events. Additional LWD will be provided by the thinned stands outside the riparian areas.

A short-term increase in sediment yield is likely from harvest and yarding activities adjacent to the intermittent streams. The CTGR's yarding requirements and oversight will help minimize sediment generation.

b. Katsuk Salvage Sale

The CTGR determined that the Katsuk Salvage Sale, located in the Yoncalla Creek Tributary A subwatershed, would not *degrade* any of the habitat factors, and therefore is *not likely to adversely affect* listed UWR steelhead trout.

An intermittent, non-fish bearing stream forms the northern boundary of this sale. The layout of this sale avoided areas of high and medium landslide risk predicted by SHALSTAB (Fig. 1). Slopes are moderate, less than 50% in some areas and less than 30% elsewhere along the stream (Fig. 2). The CTGR established a buffer 25 feet wide along this stream. Nearly all the fallen trees that crossed the delineated buffer were marked for retention. There were several fallen trees where just a portion of the tree crossed into the buffer. In some of these cases, the trees would be salvaged. The buffer selected will provide a portion of the potential LWD recruitment and is likely adequate to help retain sediment and possibly provide some wood to downstream reaches during high flow events.

The east end of the Katsuk salvage is within approximately 100 feet of a perennial non-fish bearing stream that becomes fish bearing 1500 feet downstream. These buffers fully provide the riparian functions of bank stability, shade, and litterfall, and almost all of the potential for LWD recruitment and sediment filtration (FEMAT 1993, Murphy 1995, Spence et al. 1996).

A short-term increase in sediment yield is likely from the clearcut harvest, yarding and burning activities adjacent to the intermittent stream. The CTGR's yarding requirements and oversight will help minimize sediment generation from the harvest. Adverse effects are from log hauling are unlikely for this sale because the harvest would take place during the summer.

c. Tyee Illahee Sale

The CTGR found that this sale would not *degrade* any of the habitat factors in the Yoncalla Creek subwatershed. The CTGR also determined that the following factors were not properly functioning, and that the proposed sales would *maintain* the existing condition: physical barriers; road density and location; disturbance history; and stream influence zone. The CTGR found that the other factors were *properly functioning* or *functioning at risk* and would be *maintained* by the proposed sales. Based on this information, the CTGR determined that the Tyee Illahee Sale is *not likely to adversely affect* listed UWR steelhead trout.

The CTGR has adjusted this sale based on the results of the SHALSTAB model (Fig. 3), the slope map (Fig. 4), and field inspections by NMFS and the CTGR. At the eastern end of the sale, a portion of the unit was removed from the sale to protect the small perennial non-fish stream to the north of the unit, and adjacent 70% to 90% slopes (Area 1, Fig. 5). SHALSTAB also predicted a small high-risk area near the center of the unit (Area 2, Fig. 5). Field investigation revealed a 0.05 acre triangular shaped slope, with an average slope of 70%. No water, seeps or signs of slope instability was found. The field crew determined that no additional protection appeared warranted for this area. A small stream inside one of the units was redefined to reflect actual field conditions and further protect a small stream corridor that includes some predicted high risk areas for landslides (Area 4, Fig. 5). This buffer widens to 50 feet downstream where the stream becomes perennial and encompasses a streamside wetland. Additional field inspection of this stream by NRD forestry staff showed the area to have slopes of 45% to 65%, and no sign of recent landslides, although two pistol-butted trees found within the proposed buffer suggest some soil movement. The Department does not consider this area to be significantly at risk for landslides. SHALSTAB also mapped as high risk an area just east of the intermittent stream that dissects the unit (just east of number 5, Fig. 5). A field survey by the NRD forestry staff did not find any signs of unstable slopes in this area (pistol butted trees, recent slumps etc.). The CTGR does not propose additional protection for this area. At the western end of the sale, a proposed landing was eliminated along with a steep north facing slope (Area 6, Fig. 5).

Through the above changes to the Tyee Sale, the CTGR has adequately avoided most of the high risk sites within the sale boundaries. However, the mapped high risk area just east of number 5, Fig. 5, would face an increased risk of mass failure if harvested. This increased risk can be mitigated by avoiding harvest on inner gorges of >60% slope, concave slopes of >65% slope, and planar slopes >70% slope that represent areas with increased rates of landslides from the storms of 1996 (Oregon Department of Forestry 1999).

Figure 3. SHALSTAB landslide model results for Tyee Illahee Sale.

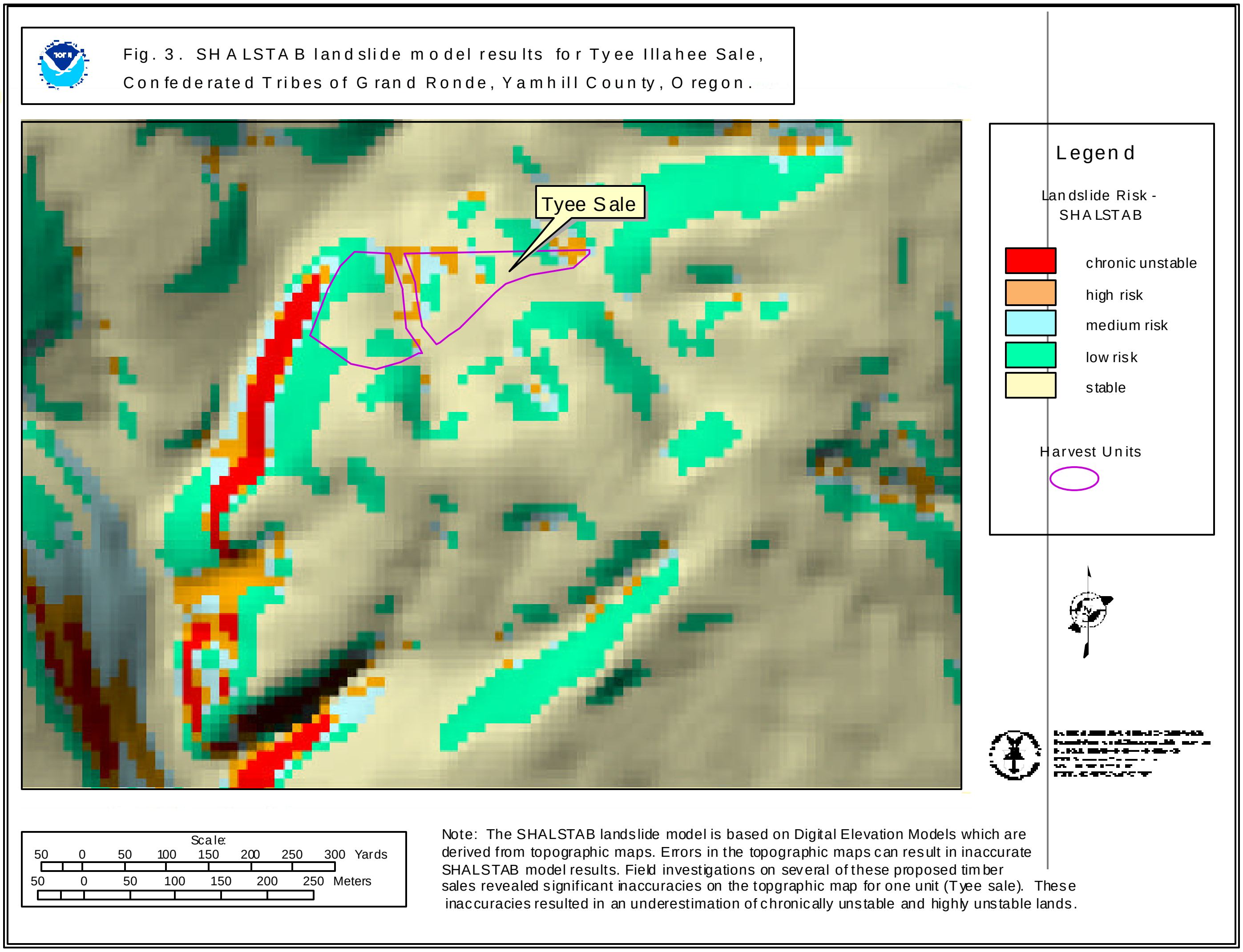


Figure 4. Slope map for Tyee Illahee Sale.

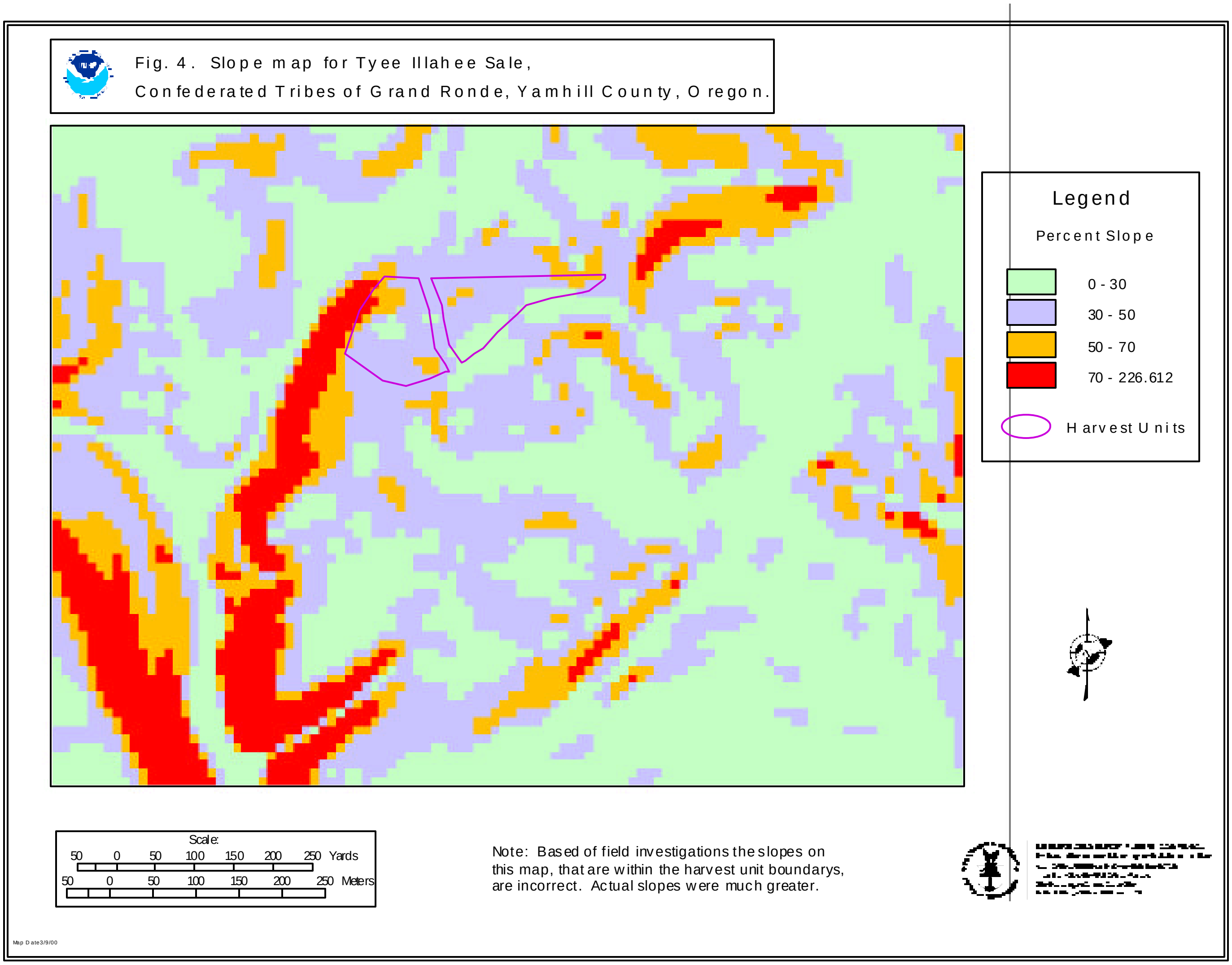


Figure 5. Changes proposed by the CTGR for the Tyee Illahee Sale. The old sale boundary is shown by the orange line. The new sale boundary is shown by the yellow line. Perennial streams are solid blue lines. Intermittent streams are dashed blue lines. Solid green and solid blue areas were removed from the harvest area. Numbers refer to areas discussed in the text.

The Tyee sale is 5,500 feet from fish-bearing waters and is adjacent to a perennial non-fish bearing stream. This stream will receive a buffer of 100 feet. A tributary non-fish perennial streams flows to the north of the unit. At the northeast corner of the unit the stream is within 83 feet of the unit. The stream flows out around the unit and is up to 260 feet from the north side of the unit. The stream then flows past the northwest corner and is within 140 feet of the unit. A second perennial tributary to the above stream will receive a buffer of at least 50 feet and two intermittent tributaries will receive buffers of at least 25 feet. The buffers selected will provide the majority of streamside LWD recruitment for the perennial streams, and a portion of the LWD for the intermittent streams that likely is adequate to help retain sediment and possibly provide some LWD to downstream areas during high flows. The 50-foot perennial buffers will provide moderate to high shading, and these buffers widen before the streams join downstream, allowing for additional cooling.

Short-term increases in sediment yield are likely due to the clearcut harvest, yarding and burning activities. The CTGR's yarding requirements and oversight will help minimize sediment generation from the harvest. Adverse effects from log hauling are possible for this sale because the harvest includes possible hauling during the fall, when significant rainfall is possible. Log truck traffic on wet, unpaved roads can greatly increase sediment yield (Reid and Dunne 1984).

d. Oluk Sale

The CTGR found that this sale would *degrade* watershed conditions in the Wind River Tributary 1 subwatershed due to increased forest fragmentation affecting disturbance history. The CTGR also determined that the following factors were *not properly functioning*, and that the proposed sales would *maintain* the existing condition: physical barriers; LWD; road density; and stream influence zone. The CTGR found that the other factors were *properly functioning* or *functioning at risk* and would be *maintained* by the proposed sales. Based on this information, the CTGR determined that the Oluk Sale is *likely to adversely affect* listed UWR steelhead trout.

The layout of this sale avoids areas with high or medium risk for landslides predicted by SHALSTAB (Fig. 1) and the slope map (Fig. 2). A small stream forms the eastern boundary of the unit. This stream is fish bearing (cutthroat trout) for about 1/3 of its length. The fish-bearing portion of the stream adjacent to the proposed harvest unit will have a buffer with a minimum width of 170 feet and an average width of 185 feet. The remainder of the unit would receive a buffer with a minimum width of 170 feet. These buffers fully provide the riparian functions of bank stability, shade, and litterfall, and LWD recruitment, and likely will provide all or nearly all of the sediment filtration function expected from a mature conifer forest (FEMAT 1993, Murphy 1995, Spence et al. 1996). The CTGR's yarding requirements and oversight will help minimize sediment generation from the harvest.

Adverse effects from log hauling are possible for this sale because the harvest schedule includes the late spring, when significant rainfall is possible. Log truck traffic on wet, unpaved roads can greatly increase sediment yield (Reid and Dunne 1984).

e. Landscape-Scale Effects of Combined Sales, Agency Creek Watershed

This section considers potential landscape-scale or cumulative effects (as defined in the Council of Environmental Quality's regulations implementing the procedural provisions of the National Environmental Policy Act[1]) of the Katsuk Thinning, Katsuk Salvage, Tyee Illahee, and Oluk Timber Sales that occur in various subwatersheds of the Agency Creek watershed. The increased watershed disturbance from these sales has the potential to increase cumulative effects arising from existing

[1]Cumulative effects are defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7).

watershed problems with forest fragmentation, LWD, substrate, off-channel habitat, pool frequency and quality, stream influence zone, and physical barriers.

A possible cumulative effect related to increased forest fragmentation from the clearcut sales and road construction is increased volume of peak flows and altered peak flow timing (Jones and Grant 1996). These effects often are most pronounced in the rain-on-snow zone (Christner and Harr 1982, Harr 1986). However, since this area is lower in elevation than the rain-on-snow zone (pers. comm., K. Doerksen, Natural Resources Department, CTGR), significant hydrologic effects resulting from increased forest fragmentation due to this sale are unlikely. Also, Thomas and Megahan (1998) reanalyzed Jones' and Grants' (1996) data and found conclusive increases for peak flows only in small watersheds. Thomas and Megahan (1998) concluded that peak flow increases resulting from clearcut harvests were not detectable for flows with greater than 2-year return intervals (i.e. effects were detectable only for small storms). The ecological significance of peak flow increases for small storm events is not known. Peak flow increases from the road construction in the Katsuk Salvage are unlikely due to the lack of direct connections of the new, mostly ridgetop roads to the stream system, and their planned closure after temporary use.

Cumulative effects in the form of short-term increases in sediment yield are likely to accrue due to the combined effects of road construction and use in the Katsuk Thinning Sale, and harvest, yarding and burning activities in the Katsuk Thinning, Katsuk Salvage, and Tyee Illahee Sales.

5. Willamina Creek Watershed

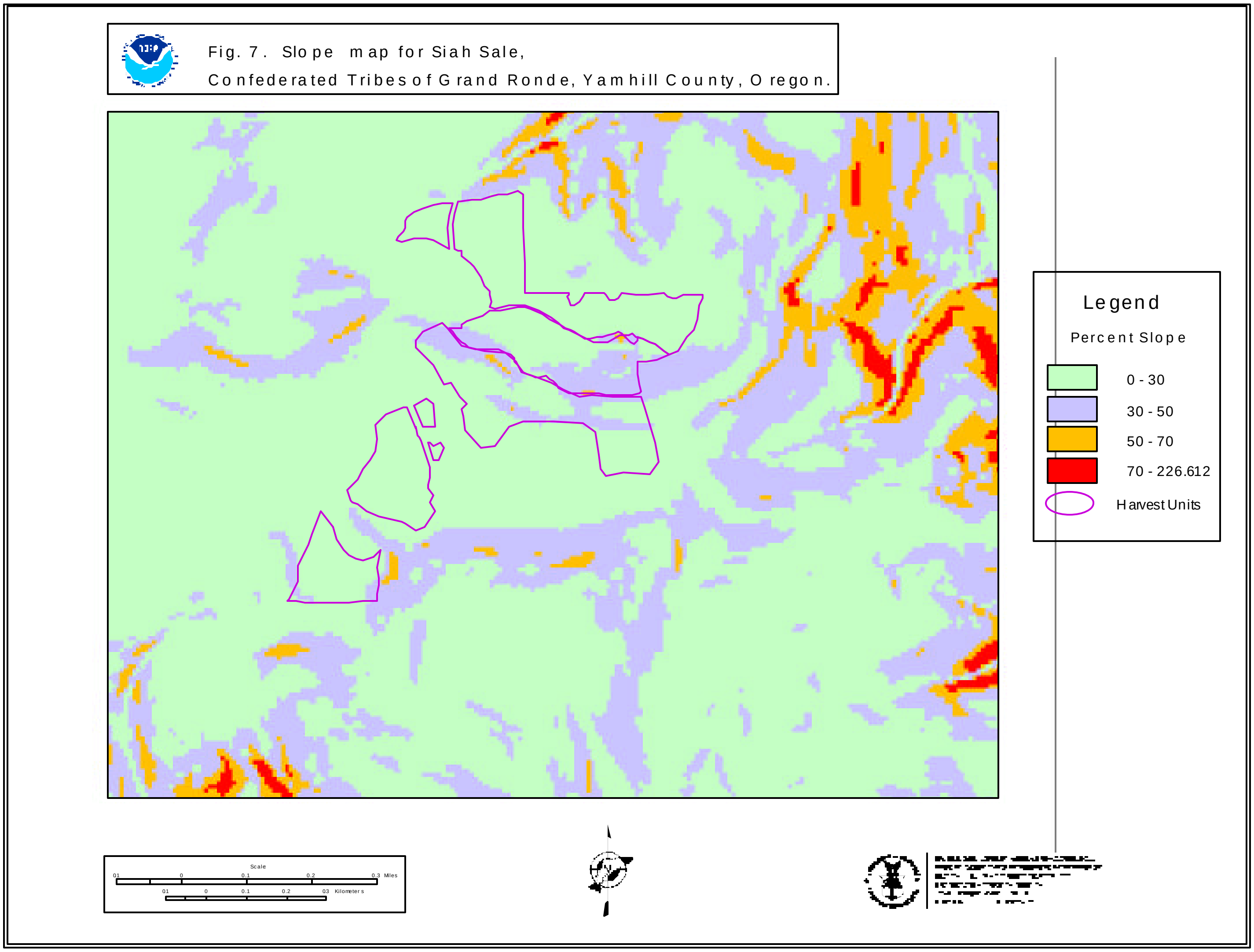
a. Siah Sale

The CTGR found that this sale would *degrade* watershed conditions in the Teahwit Creek subwatershed due to increased forest fragmentation affecting disturbance history. The CTGR also determined that the following factors were *not properly functioning*, and that the proposed sales would *maintain* the existing condition: physical barriers; substrate; road density; and stream influence zone. The CTGR found that the other factors were *properly functioning* or *functioning at risk* and would be *maintained* by the proposed sales. Based on this information, the CTGR determined that the Siah Sale is *likely to adversely affect* listed UWR steelhead trout.

This sale does not include areas with high risk for landslides predicted by SHALSTAB (Fig. 6) and the slope map (Fig. 7). Only a small area with predicted moderate risk of landslides is included near the boundary of the thinning unit. Several intermittent, non-fish bearing streams that drain into Teahwit Creek are adjacent to the clearcut units. They received buffers of 20-30 feet in width. The buffers selected will provide a portion of the potential LWD recruitment and are likely adequate to help retain sediment and possibly provide some wood to downstream reaches during high flow events.

Figure 6. SHALSTAB landslide model results for Siah Sale.

Figure 7. Slope map for Siah Sale.



Teahwit Creek, which is a non-fish bearing perennial stream in the area of the harvest, has a buffer that varies from 80 feet at the west end, to 57 feet in the middle, to 120 feet at the east end. The average buffer is approximately 85 feet wide. This stream runs west to east and is partially shielded by a steep terrace on the southern side. The buffer is several rows of conifers past the slope break of the terrace. Given the aspect, the preserved terrace and the width of retained conifers, the CTGR felt that adequate shading, LWD recruitment, and other riparian functions would be provided. The NMFS agrees that the buffer provides the needed riparian functions at this site.

Several intermittent streams adjacent to the commercial thinning units drain into Burton Creek. The CTGR did not complete an MPI for Burton Creek, due to a lack of data, small stream size, high gradient, and a waterfall that blocks anadromous fish passage downstream from the harvest units. The intermittent streams will receive buffers at least 25 feet wide. This buffer width will provide a portion of the potential LWD recruitment and is likely adequate to help retain sediment and possibly provide some wood to downstream reaches during high flow events.

Cumulative effects resulting from forest fragmentation are possible but unlikely from this sale (see discussion above for Agency Creek watershed). Cumulative effects in the form of short-term increases in sediment yield are likely to accrue due to the clearcut harvest, yarding and burning activities in the Siah clearcut sale. Adverse effects from log hauling are possible for this sale because the harvest schedule includes the late spring, when significant rainfall is possible. Log truck traffic on wet, unpaved roads can greatly increase sediment yield (Reid and Dunne 1984).

B. Cumulative Effects

For the purposes of the ESA, cumulative effects are defined in 50 CFR 402.02 as "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." For the purposes of this analysis, the action area encompasses: 1) Streams in the North Fork Agency Creek, Yoncalla Creek and Wind River subwatersheds, adjacent to and downstream of the timber harvest units, that drain into Agency Creek, and Agency Creek downstream to the South Yamhill River; and 2) streams in the Teahwit Creek and Burton Creek subwatersheds, adjacent to and downstream of the timber harvest units, that drain into Canada Creek, Willamina Creek and the South Yamhill River. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. In addition, non-Federal actions that require authorization under section 10 of the ESA will be evaluated in section 7 consultations. Therefore, these actions are not considered cumulative to the proposed action.

Information on specific activities planned or foreseeable on non-Federal land was not provided in the BA. The NMFS is not aware of any future new (or changes to existing) State and private activities within the action area that would cause greater impacts to the proposed and listed species than presently occurs. The NMFS assumes that management impacts from non-Federal activities which have degraded or hindered recovery of anadromous fish habitat will continue in the short term at similar intensities as in recent years. This assumption may be conservative in the long term, given development of non-Federal conservation programs, such as the Oregon Plan for Salmon and Watersheds, and possible development of habitat conservation plans with non-Federal entities to fulfill the requirements of section 10 of the ESA.

VI. CONCLUSION

NMFS has determined that, based on the available scientific and commercial data, the Year 2000 timber sales of the CTGR are not likely to jeopardize the continued existence of Upper Willamette River steelhead Trout. In arriving at this determination, NMFS considered the current status of the listed and proposed species; biological requirements for survival and recovery; environmental baseline conditions; the effects of the action; and the cumulative effects of actions anticipated in the action area.

The following sales are likely to adversely affect the listed species, and result in their incidental take, for the following reasons:

Katsuk Thinning:	short-term increase in sediment yield resulting from harvest, yarding, new road construction, and hauling during wet weather periods.
Katsuk Salvage:	short-term increase in sediment yield from harvest, yarding and burning.
Tyee Illahee:	short-term increase in sediment yield from clearcut harvest, increased landslide risk in one area, yarding, burning, and possible hauling during wet weather periods
Siah:	short-term increase in sediment yield from harvest, yarding and burning.

Take associated with these activities is not likely to be of a magnitude or duration that would appreciably diminish the likelihood of survival and recovery of these species. Development and application of the reasonable and prudent measures identified in the Incidental Take Statement (Section X, below) has the potential to minimize adverse effects from the proposed actions.

VII. CONSERVATION RECOMMENDATIONS

Section 7 (a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or to develop additional information. NMFS believes the following conservation recommendations (the first four of which have been the subject of previous discussions and verbal agreement between NMFS and the CTGR) are consistent with these obligations, and therefore should be implemented by the BIA:

1. The BIA should encourage the Confederated Tribes of Grand Ronde (CTGR) to continue their stream surveys and their ongoing inventories of riparian and upland vegetation.
2. The BIA should encourage the CTGR to begin surveys to identify UWR steelhead spawning locations and times. This should be done on a trial basis first, in cooperation with NMFS, to develop methods that will not result in an unauthorized "take" of this listed species.
3. The BIA should encourage the CTGR to survey their existing road system to identify potential flow alteration, erosion, and mass failure problems, and to identify possible opportunities for restoration work. This work would complement the planned culvert survey.
4. The BIA should encourage the CTGR to develop in-house capability to use the SHALSTAB model as a means to identify potentially unstable areas and improve timber sale planning.
5. The CTGR has its own riparian and upland strategies for maintaining and restoring fish habitat. The BIA should encourage the CTGR to develop an effectiveness monitoring program to determine the effectiveness of these strategies.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed species or their habitat, NMFS requests notification of the implementation of any conservation recommendations.

VIII. REINITIATION OF CONSULTATION

Consultation must be reinitiated if: The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

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XI. INCIDENTAL TAKE STATEMENT

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

Sections 4 (d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patters such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary; they must be implemented by the action agency so that they become binding conditions of any grant or permit issued, as appropriate, in order for the exemption in section 7(o)(2) to apply. The BIA has a continuing duty to regulate the activity covered in this incidental take statement. If the BIA (1) fails to require adherence to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

A. Amount or Extent of the Take

For the purposes of this Opinion, incidental take is defined as take of Upper Willamette River (UWR) steelhead trout (fertilized eggs, fry, juveniles, or adults) that results from activities described in the biological assessment (BA) for the Katsuk Thinning, Katsuk Salvage, Tyee Illahee, Siah, and Oluk Timber Sales of the Confederated Tribes of Grand Ronde (CTGR). This incidental take is expected to be in the form of harm and mortality to UWR steelhead from short-term increases in sedimentation related to new road construction, harvest, yarding, burning, and hauling.

The amount or extent of incidental take resulting from the proposed action is difficult to quantify due to the difficulty in finding individuals that have been killed or otherwise taken by the project. Therefore, even though NMFS expects some low level of incidental take to occur due to the actions covered by this biological opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species. In instances such as these, NMFS designates the expected level of take as "unquantifiable." Based on the information in the BA, NMFS anticipates that an unquantifiable amount of incidental take of UWR steelhead could occur as a result of the actions covered by this biological opinion. In the accompanying biological opinion, NMFS determined that this level of anticipated take is not likely to jeopardize the continued existence of the listed species.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measure(s) are necessary and appropriate to minimizing take of Upper Willamette River steelhead trout:

1. The Bureau of Indian Affairs (BIA) shall work with the CTGR to ensure that any significant changes in anticipated road design features are reported to NMFS.

This measure will help insure that NMFS can review any road design changes (such as unanticipated stream crossings or realignments) prior to their construction.

2. The BIA shall work with the CTGR to ensure that additional measures to reduce sediment generation are implemented.

This measure is self-explanatory.

3. The BIA shall work with the CTGR to ensure that harvest contracts and protective measures for fish habitat are completed as described in the Tribe's biological assessment.

Implementation monitoring is a critical component of any forest management strategy that includes protective measures for fish habitat.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the BIA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The BIA shall require the CTGR to inform NMFS of any significant changes to the planned road design for the Katsuk Thinning Sale, such as unanticipated stream crossings or road realignments, prior to their construction.

2a. The BIA shall work with the CTGR to ensure that road drainage from Spur Road 2a in the Katsuk Thinning Sale is not directed onto the steep slope to the north of the road.

2b. The BIA shall require the CTGR to avoid timber hauling when road conditions would generate excessive sediment, such as during intense or prolonged rainfall, or when the road surface begins to deteriorate as evidenced by the increasing presence of surface mud, rutting, ponding, etc.

2c. The BIA shall require the CTGR to avoid harvest on inner gorges of >60% slope, concave slopes of >65% slope, and planar slopes >70% slope for the mapped high risk area east of area number 5, (Fig. 5), Tyee Illahee Sale.

3a. The BIA shall require the CTGR to develop an implementation monitoring plan that includes, at a minimum:

    (1) post-sale measurement of riparian buffer widths at representative locations in each harvest unit; and

    (2) inspection for excessive damage to soil, vegetation, streambanks, or stream channels from felling, yarding corridors, soil compaction, scarring, or prescribed burning.

3b. The BIA shall require the CTGR to develop and submit the monitoring plan to NMFS within 60 days of the date of the final biological opinion.

3c. The BIA shall require the CTGR to submit monitoring results for all activities other than prescribed burning for each harvest unit to NMFS within 60 days of completion of felling and yarding. Monitoring results for prescribed burning activities shall be submitted within 60 days of completion of those activities.