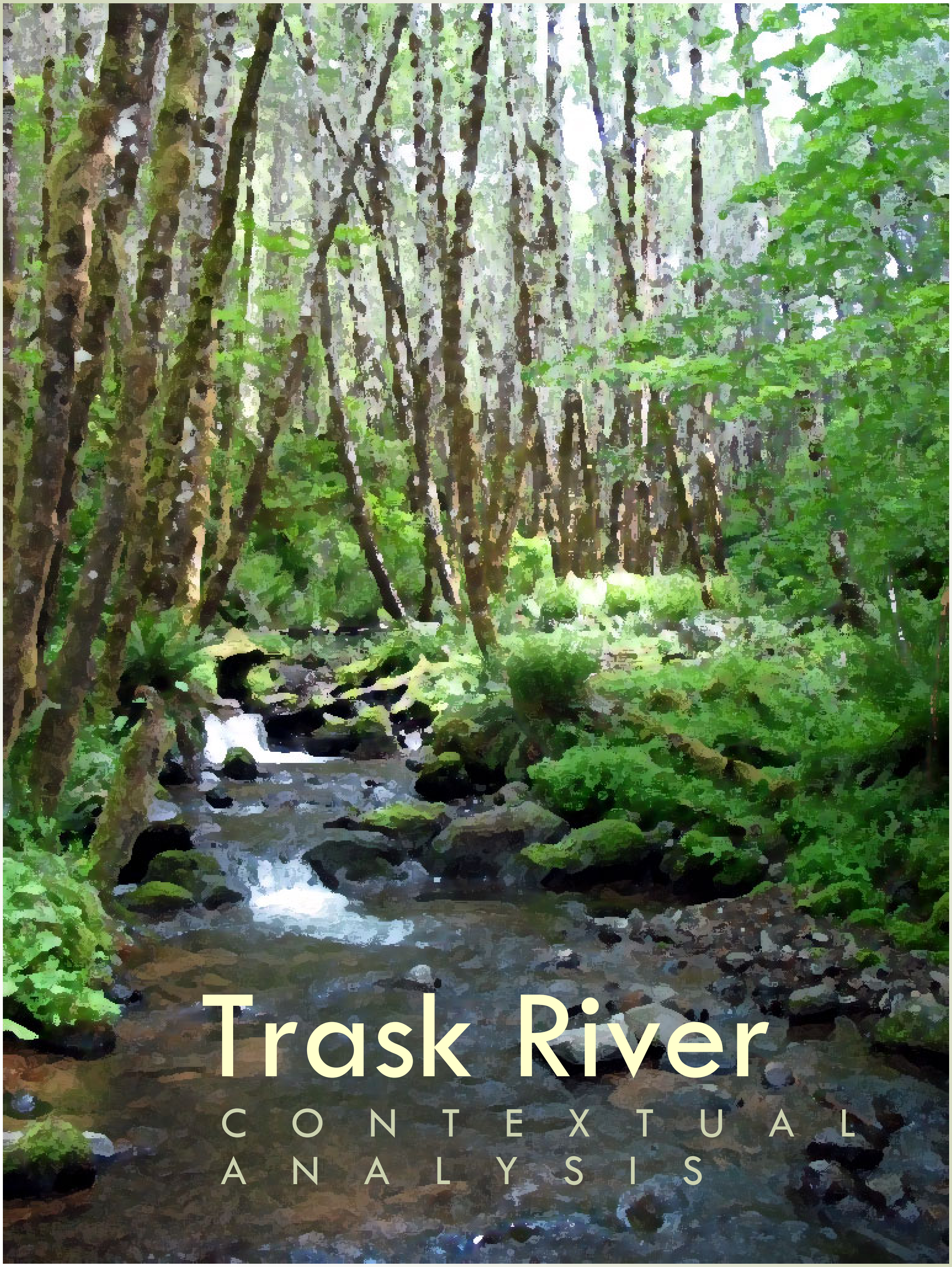
Trask River
CONTEXTUAL
ANALYSIS

CONTENTS

INTRODUCTION

This document presents brief portraits of various aspects of the Trask River study area. For each portrait, there is more information that can be derived from it however, in an effort to at least provide an initial look at the watershed I kept the narrative brief. For example, the section on geomorphology is evolving with the linkage of the terrain map with the channel gradient map to help us predict where we would expect to find more sediment accumulation. This contextual analysis is meant to help bound expected responses to management given the physical and biological template of the watershed. In the next installment I will look in more detail at the small catchments and how they vary. Some of the salient features of the physical and biological Trask Study landscape are summarized below with the more detailed sections following.

<u>Physical Setting Salient Features</u>
The Trask River study area represents an interesting mixed landscape of both volcanic and sedimentary geologies which have given rise to a variety of geomorphic units. A distinguishing feature of the geomorphic setting of the Trask Study area is, unlike the classic Tyee geology of the central Coast Range, sediment delivery processes are not driven by debris flows. While debris flows do occur, the sediment story is shaped by large ancient earthflows, steep dissected Siltez volcanics and just the slow delivery of sediment by soil creep. But for the most part, the Trask Study area is made up of “unremarkable terrain”, slopes that are not steep, nor convergent, but remain relatively stable. The streams in the various geomorphic units mirror the terrain in which they are

embedded. The flatter areas where there are alluvial terraces tend to have low gradient channels that are areas of sediment accumulation. The steepest channels (>20%) are mainly located within the steep, highly dissected Siletz Volcanic terrain. However, as the LiDAR channel network gradient map reveals, that within any terrain there are a range of gradients within a reach.

Between the Tillamook Burn and timber harvest, the conifer overstory was essentially completely removed by the 1950s. As a result, there is no evident large growth timber and an abundance of legacy roads. Many of the skid roads that were visible on the 1955 air photos, but many remain as the 2006 LiDAR imagery revealed. This fire shaped the landscape in a different way as well, it helped create the ownership pattern we see today with the former burned areas mainly belonging to the Tillamook Forest (ODF).

Biological Setting

Macroinvertebrate taxa richness was not different between the headwater sites and the larger downstream sites. Qualitative samples indicate that a few taxa were widely distributed while others occurred predominantly in either headwaters or in downstream sites. One taxon (the snail Juga) that we expected to be widespread throughout the watershed was completely absent. A preliminary cluster analysis indicated that, in general, headwater sites had a benthic invertebrate community that differed from the downstream sites. The downstream effect sites split into two distinct groups; however, the reason for this split is unclear at this time (it does not appear to result from differences in geology).

Anadromous fishes (coho salmon and steelhead) are found only lower in the watershed with cutthroat trout the dominant species higher in the watershed and in the smaller streams. Juvenile trout were found throughout the fish-bearing channel network. However, the distribution of older age classes of juvenile steelhead and cutthroat suggests that most juvenile trout in the upper watershed were cutthroat. Torrent salamanders had a very patchy distribution, being found only in some of the small, headwater streams. The distribution of giant salamanders also was patchy, but not as restricted as for torrent salamanders, and giant salamanders were found in larger streams including some with fish. Tailed frogs were widely distributed throughout the watershed, with population levels higher upstream of fish distribution.

TRASK LANDSCAPE SETTING

The East Fork of the South Fork of the Trask River (referred to as the Trask Watershed Study) is located in the Northern Oregon Coast Range (Figure1) at the divide between streams draining westward to the ocean and streams draining towards the Willamette Valley. The Trask River study area composes the upper 25 square km of the East Fork of the South Fork of the Trask River and is owned primarily by the Oregon Department of Forestry and Weyerhaeuser Company with a small portion belonging to the Bureau of Land Management. The East Fork of the South Fork of the Trask eventually joins the Trask River (453 square kilometers) which is one of the five major rivers draining into Tillamook Bay. The other rivers include the Kilchis, Wilson, Miami, and the Tillamook. The study area is located elevation ranges from 275 at the lower edge of the study to almost 1,100 m at the top of Trask Mountain.

The Trask Study is intended to examine the physical, chemical and biological response of aquatic systems to timber harvest at the scale of a single harvest unit (small watersheds indicated in various shades in Figure 1b) and to evaluate responses downstream (indicated by purple gray dots). The following sections provide information on the physical and biological setting of the Trask River study area.

Figure 1a. Location of the Trask River Study area in the Northern Oregon Coast.

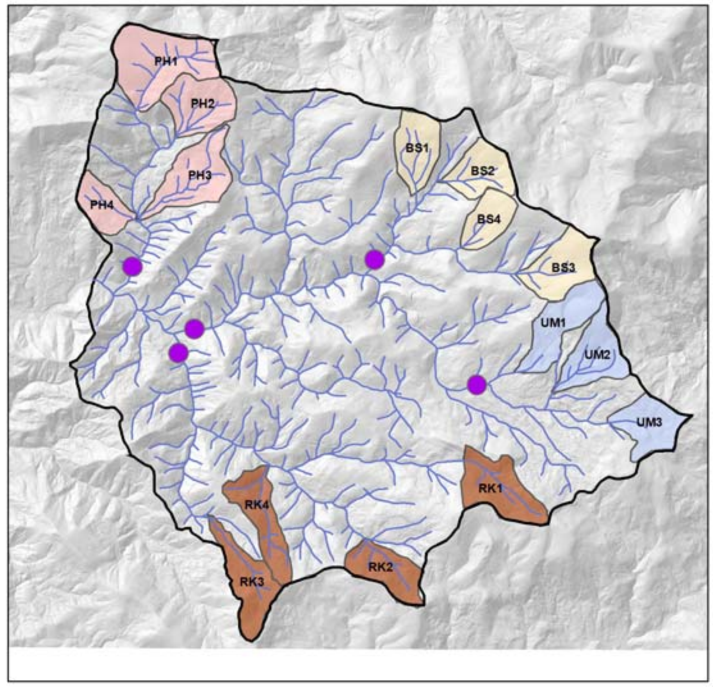

Figure 1b. Detail of study area with small study catchments indicated. Purple circles are downstream sites.

TRASK PHYSICAL SETTING

The Trask River study area is located in the Volcanics (1d) Ecoregion (Figure 2) which occurs from Cannon Beach in the north to Florence in the south. This region occurs as discrete blocks from the ocean up to 60 miles inland and is underlain by volcanic geology including basalt flows, dikes and sills, and concreted basalt materials. The Volcanics Ecoregion experiences wet winters, relatively dry summers and mild temperatures throughout the year. Heavy precipitation results from moist air masses moving off the Pacific Ocean onto land especially during winter months. Mean annual precipitation ranges from 70 to 200 inches with the majority of precipitation falling in the winter months of November, December, and January (the above information if from the OWEB Manual 1995). The following sections provide more detail on the physical setting of the Trask River study. This includes the geology, geomorphology, soils and hydrology.

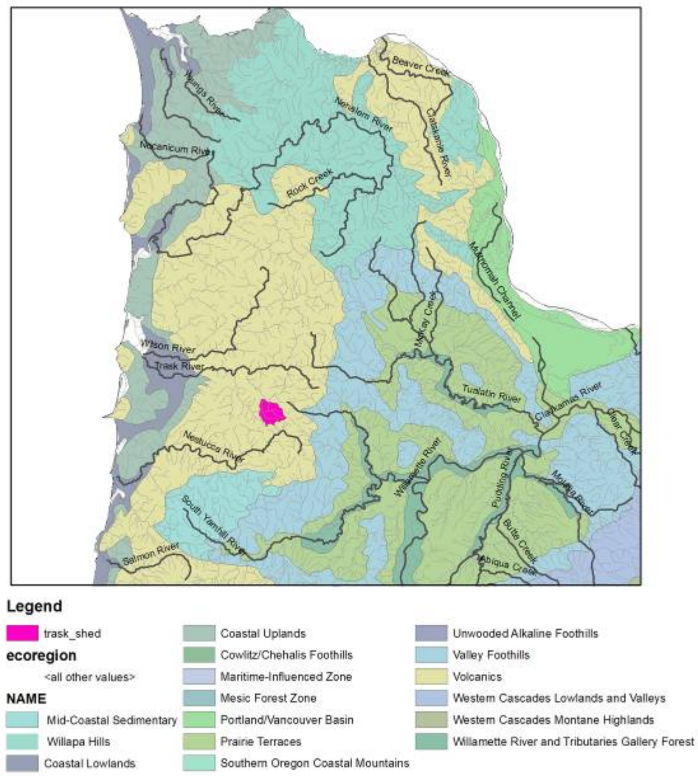

Figure 2. Ecoregions of North Oregon Coast.

Geology

The information on the geology of the Trask (Figure 3) is derived from Wells et al., (1994). The bedrock geology of the study area is a mix of igneous and sedimentary formations dating back 40 to 60 million years.

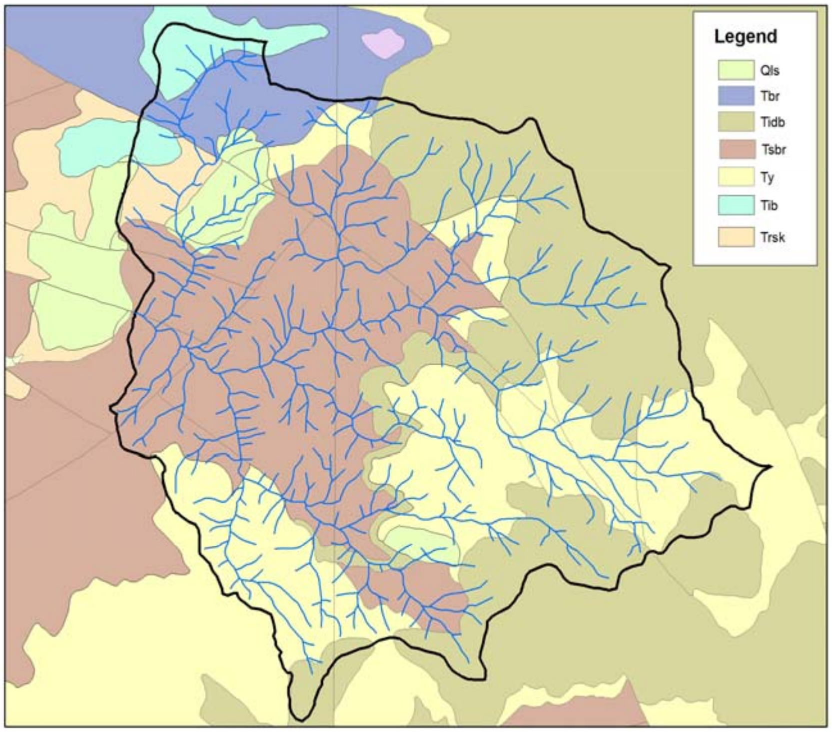

Figure 3. Geology of the Trask Study area. Qls: landslide deposits, Tbr: submarine basalt and tuffs, Tidb: diabase intrusives, Tsbr: Siletz River volcanics, Ty: Yamhill Formation, Tib: Submarine basalts, Trsk: Trask River sandstone

Surface Deposits

Qls Landslide deposits (Holocene and Pleistocene)--Poorly sorted angular to subrounded bedrock clasts in weathered muddy matrix, forming hummocky topography with closed depressions and poor drainage; also includes coherent bedrock glide blocks and colluvial aprons of angular cobbles and boulders at the base of steep slopes.

Intrusive Rocks

Tib Basalt dikes and sills (late middle Eocene)--Aphyric to abundantly plagioclase, augite, and olivine-phyric basalt dikes and sills, mostly as north-northwest to west-northwest-trending swarms cutting subaerial Tillamook flows and all older units. Dikes are compositionally and petrographically similar to Tillamook flows and represent feeder vents for the Tillamook Volcanics. Dikes are up to 10 m wide and 5 km long; some composite dikes have multiple episodes of intrusion ranging in composition from basalt to dacite.

Tidb Diabase (middle Eocene)--Aphyric to plagioclase-phyric, amygdaloidal diabase with smectite clays and zeolite vesicle fillings; locally pillowform with radial columnar joints, more commonly tabular bodies with well developed columnar joints and a layered appearance; sills are cut by the regional dike swarm that fed Tillamook Volcanics but intrude strata as young as Yamhill Formation, suggesting a minimum age of about 43 Ma; unit may include some basalt and diabase correlative with the Tillamook Volcanics.

Volcanic and Sedimentary Rocks

Ty Yamhill Formation (upper middle Eocene)--Massive to thin bedded, laminated, dark gray siltstone commonly containing thin tuff beds, thin arkosic sandstone beds, calcareous concretions, fish scales and carbonaceous plant fragments; locally contains interbeds of paper-thin laminated, black, kerogen-rich "oil shale" near the top of the section where it is interbedded with submarine basalt lapilli breccias of the Tillamook Volcanics.

Sandstone of Trask River (lower Eocene)--Thin bedded, plane laminated, fine grained, dark gray indurated turbidite sandstone and siltstone; locally concretionary and cut by carbonate veins and fracture fillings; exhibits large scale soft sediment folding as well as postlithification deformation; thickness is variable, up to 800m; apparently it is deposited on a surface of high relief on the Siletz River Volcanics; unit contains nannoplankton.

Tsbr Basalt lapilli breccia unit--Submarine and subaerial basalt lapilli breccia, pillow breccia, mudflow breccia, and basaltic sandstone and conglomerate; beds are massive to thick bedded; clasts commonly are plagioclase and pyroxene-phyric with greenish-brown smectitic clay alteration and zeolite and calcite veins and amygdules; locally oxidized red, with subaerial bombs and cinders; unit locally interfingers with overlying Sandstone of Trask River.

Geomorphology

The geomorphic expression of the underlying geology and the surficial processes include large, ancient earthflows, long smooth slopes and some steeply dissected stream-adjacent slopes. A geomorphic map (Figure 4) was developed by Ted Turner and Jim Ward and the polygons were digitized by Peter James, Weyerhaeuser Company. It is intended to only to show readily detectable features. The map used the hillshade map generated from the LiDAR DEM, slope gradient classes generated with standard ArcGIS Spatial Analyst functions and both the 1:500,000 geology map of Oregon and the 15 min geology quadrangle maps by Wells, P.D. et al., 1994 (Geologic Map of the Tillamook Highlands, Northwest Oregon Coast Range (Tillamook, Nehalem, Enright, Timber, Fairdale, and Blaine 15 minute Quadrangles).   The geomorphic map units of have not been ground–truthed.

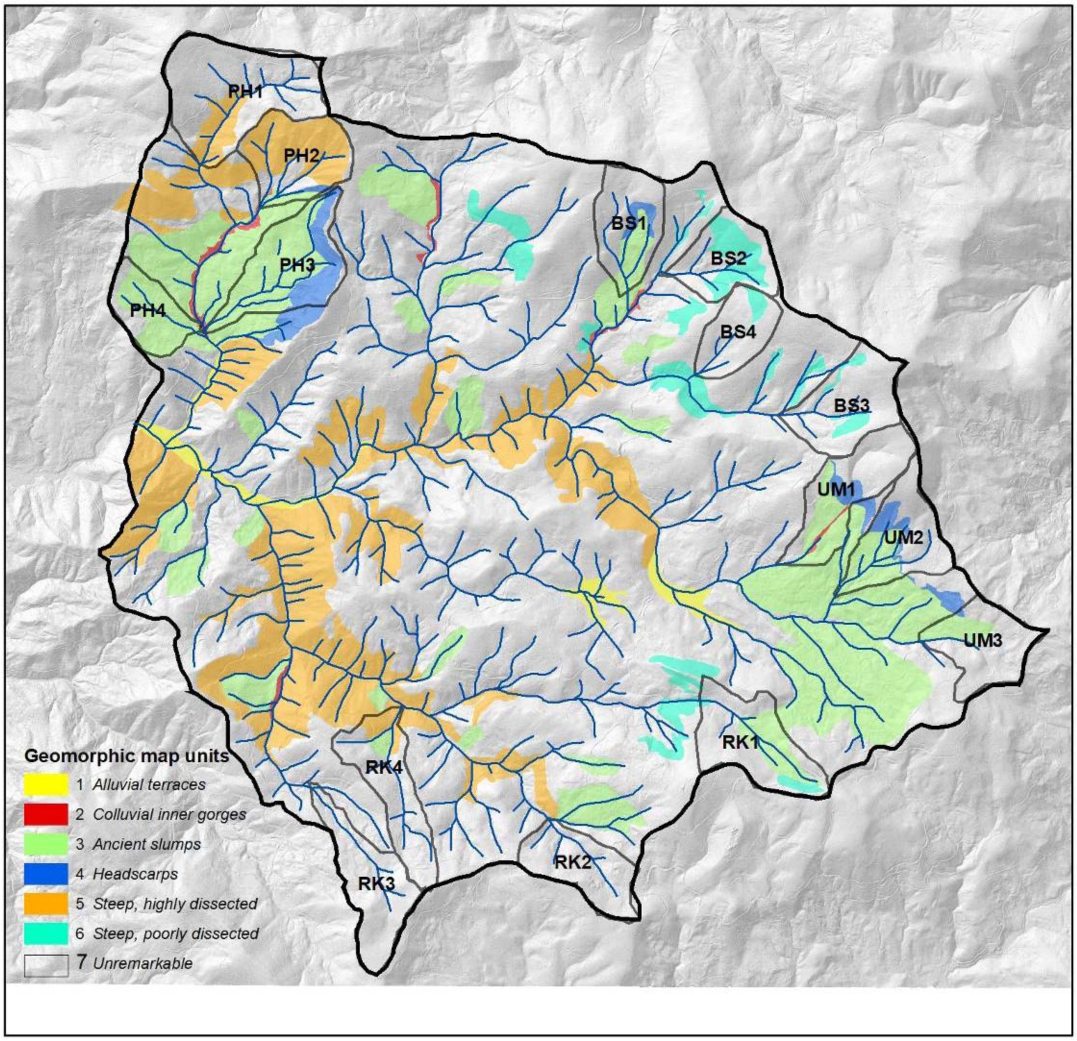

Figure 4. Geomorphic map units

1 Alluvial terraces and active floodplains. Slopes range from 0–10%. This unit includes large floodplains and valley landforms with low to moderate confinement; Holocene alluvial or strath terraces, alluvial and/or debris fans. The surface materials are mainly alluvium and colluvium (debris fans). The implied geomorphic processes are reworking of stored sediment via channel avulsion or lateral migration; mass wasting of Holocene terrace scarps; tributary debris flow deposition due to low gradient and confinement; high stream power.

2 Colluvial inner gorges; landslide margin channels. The slopes in this map unit are variable. The landforms include inner gorges and stream adjacent slumps in landslide toes. The surface material is mainly landslide deposits and alluvium. The implied geomorphic process delivering sediment to stream channels includes incised channels; inner gorge slides; erodible stream banks

3 Deep-seated landslides. Slopes range from 10–40%. This unit includes complex and irregular hummocky topography; disrupted drainages; small landslide scarps over

50%. The surface material is landslide deposits; poorly–drained soils locally; large blocks of parent material in the slide mass. The slopes of this unit are potentially sensitive to changes in groundwater conditions during wet seasons; potentially sensitive locally to alteration of surface hydrology; stream undercutting may reactivate portions of slide toes

4 Headscarps of Pleistocene megaslide complexes. Slopes are 70% or greater. This unit includes precipitous bedrock scarps; back–tilted benches and sag ponds. The surface material is mainly weathered bedrock and thin soils. Sediment is delivered by shallow debris slides and rock fall. However, there is a low sediment delivery potential to fish streams via mass wasting due to distance of this unit from streams.

5 Steep, dissected Siletz volcanic terrain. Slopes are 60% and steeper. This unit is made up of alternating ridge and valley topography and bedrock inner gorges. The surficial material is weathered bedrock, shallow sideslope soils, thicker soils in unchanneled draws. This unit is the source areas for shallow debris slides and debris flows with possible long run-outs on the debris flows.

6 Steep, poorly dissected plutonic terrain. Slopes are 60% and greater. This unit is made up of steep planar and convex slopes that have a fairly low drainage density compared to Siletz terrain it also includes bedrock inner gorges. The surface material is weathered bedrock, shallow sideslope soils and thicker soils in unchanneled draws. This unit is the source area for more open–slope debris slides and slumps however, there is less sediment delivery via mass wasting due to lower density of convergent landforms.

7 Unremarkable landforms. Slopes range from 0–50%. This unit includes gentle gradient, uniform, planar and convex slopes; ridge tops; broadly arcuate and unchanneled draws. The material is mainly colluvial and residual soil.   Soil creep is dominant mass wasting process.

Stream Channel Morphology

The channels of Trask River study area range from the wide, low gradient reaches at the confluence of Rock Creek and EFSF Trask to a few scattered steep (>30%) reaches on very small streams (Figure 5). A channel gradient map was derived using the LiDAR DEM (David Hockman-Wert) and then classified based on Montgomery and Buffington (1993) channel types as an example. This was done to give a rough idea of the channel gradients in the watershed. Figure 5 shows the distribution of channel types in the study area.

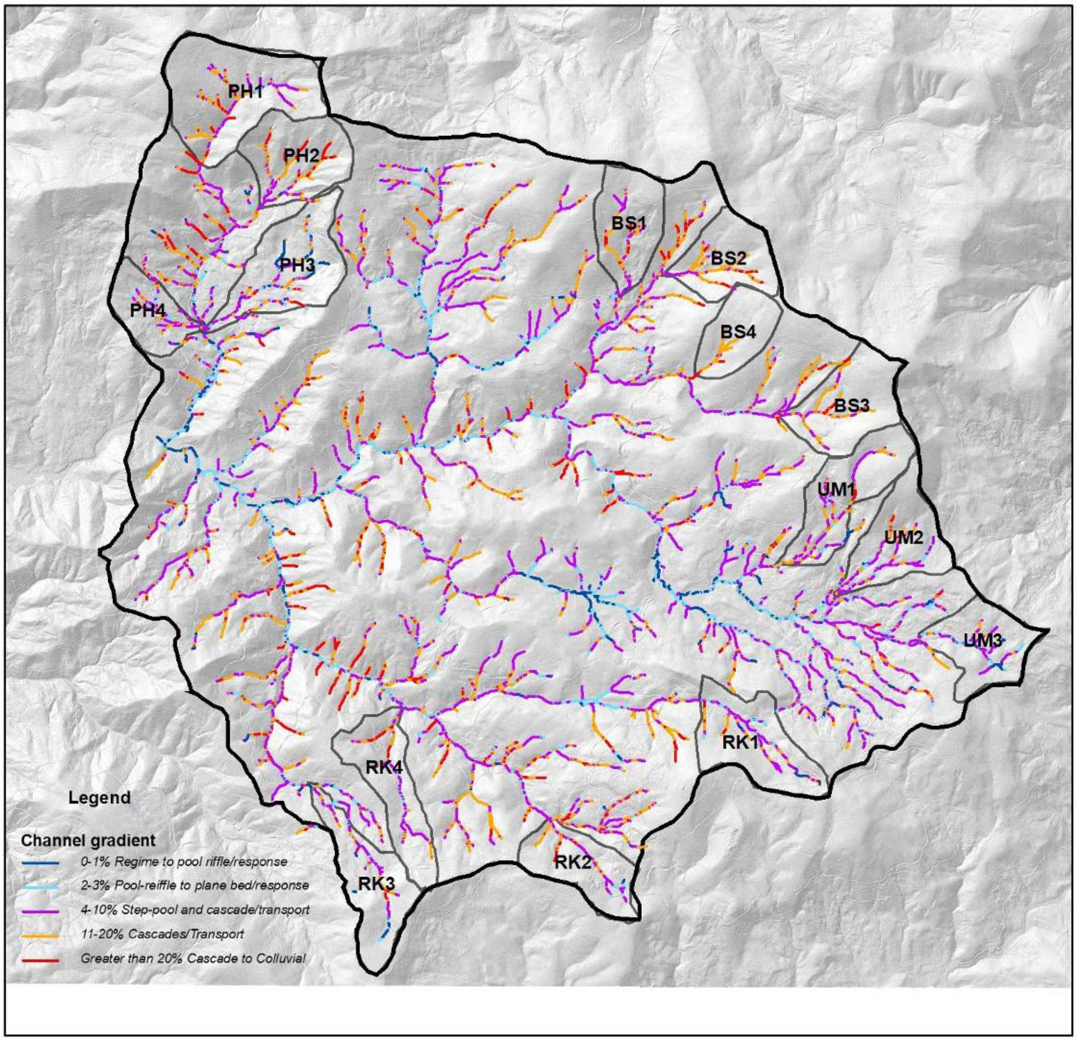

Figure 5. Channel gradients with small catchments indicated.

The dark blue lines represent low gradient reaches termed "regime" to pool-riffle. Regime means that they have many mobile bed forms. These low gradient reaches would are considered response reaches since they tend to be areas of accumulation of sediment or wood. The lighter blue channels are the pool riffle channels to plane bed channels, their gradient ranges from over 1% to 3%; these are also response reaches. The magenta lines represent 4-8% step-pool to cascade reaches, which tend to transport sediment rather than accumulate as much as the lower gradient reaches. The orange lines are 11-20% cascade to colluvial reaches that are both transport and sources areas of sediment from mass wasting events. Red lines are channels or hollows steeper than 20%, which are also sources reaches.

To understand the delivery and routing of sediment the geomorphic map which represents sources of sediment (Figure 4) and the stream gradient map (Figure 5) which represents the potential for a channel to route sediment were combined (Figure 6).

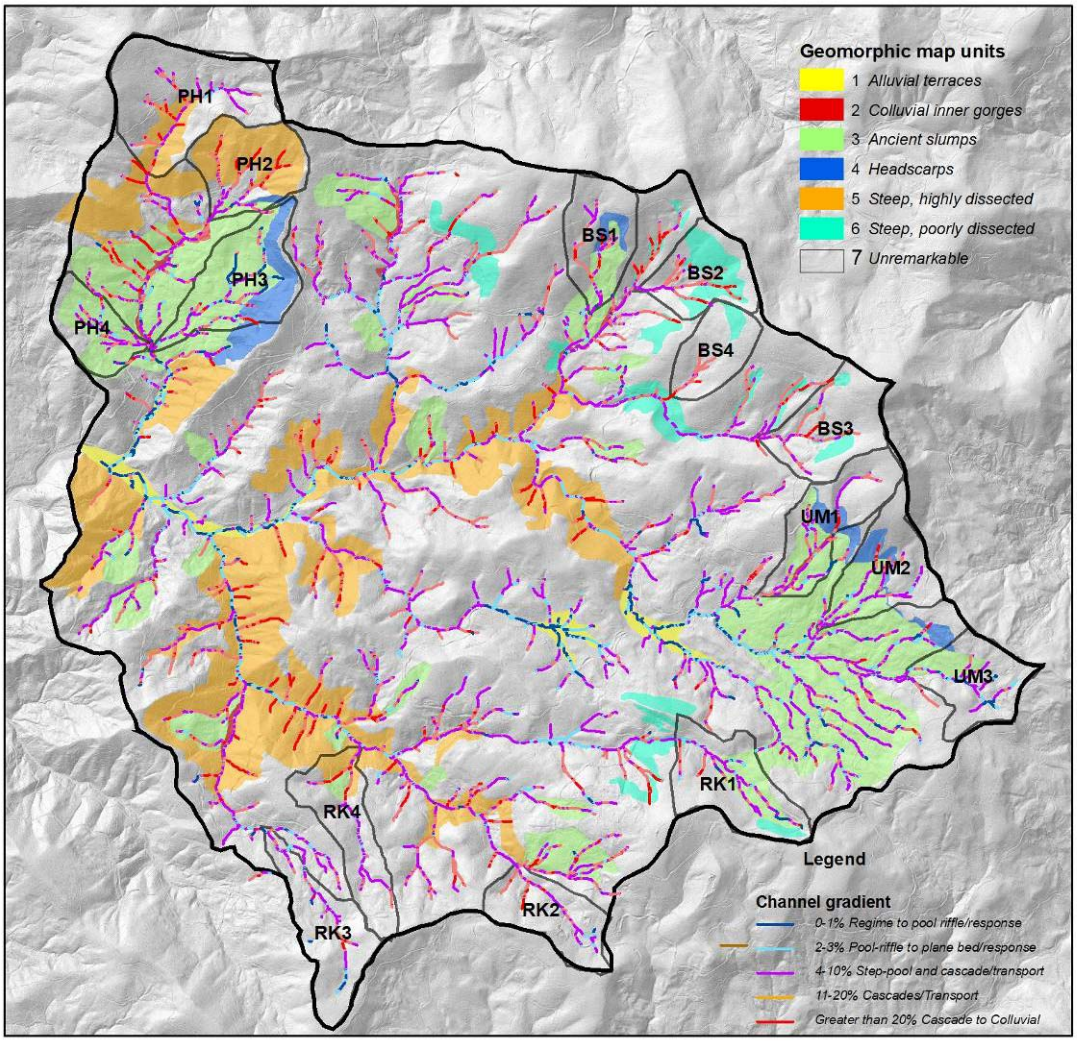

Figure 6. Combined channel gradient and geomorphic map unit maps with study catchments indicated. The background is the hillshade derived from the LiDAR DEM.

As would be expected, the steeper upslope areas contain streams that are steeper. So for example, the steep, highly dissected Siletz River volcanics contain more streams that have gradients greater than 20%. Conversely, the ancient slumps in the watershed have streams channels that tend to have lower gradients. The small study catchments vary between and within clusters. Pothole Creek appears to have the greatest diversity in catchment morphology (Figure 7a). The uppermost small catchments are in steep dissected terrain while the lower two are located on low gradient ancient slumps. The B&S cluster has three similar small catchments (BS2, 3 and 4) that are in steep un-dissected terrain while BS1 is mainly on an ancient slump (Figure 7b). The upper mainstem cluster has the most similar morphology amongst the catchments with all of them having some part of an ancient slump (Figure 7c). The Rock Creek cluster, like BS Creek has three similar catchments and one that is different (Figure 7d). RK 2, 3 and 4 are mostly in "unremarkable" terrain though RK 4 has some steep, dissected areas in the lower part. RK1, like the Upper mainstem cluster, has an ancient slump within it. Of the 15 small study catchments, 7 have ancient slumps as part or all of their geomorphology.

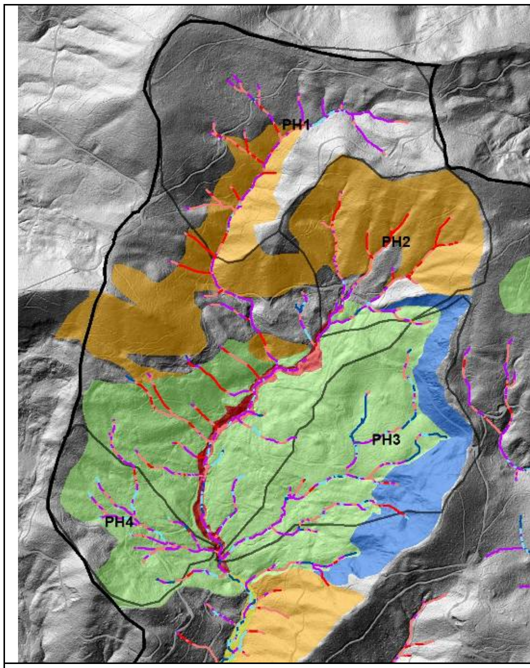

Figure 7a. Pothole Creek cluster detail

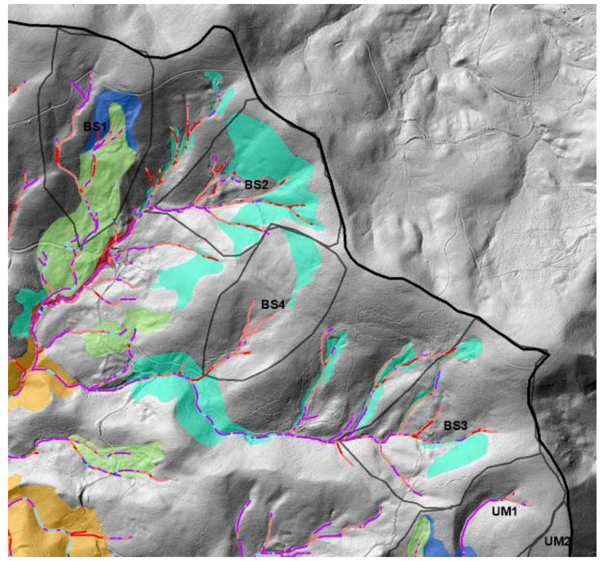

Figure 7b. BS Creek detail

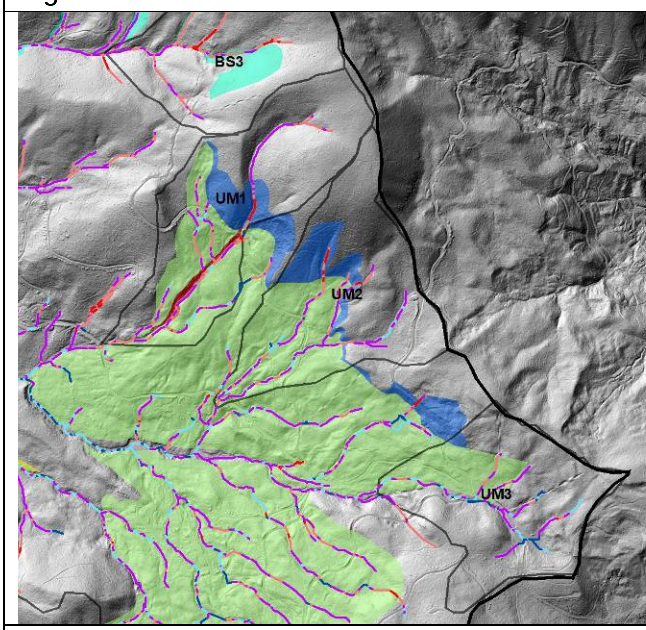

Figure 7c. Upper mainstem detail

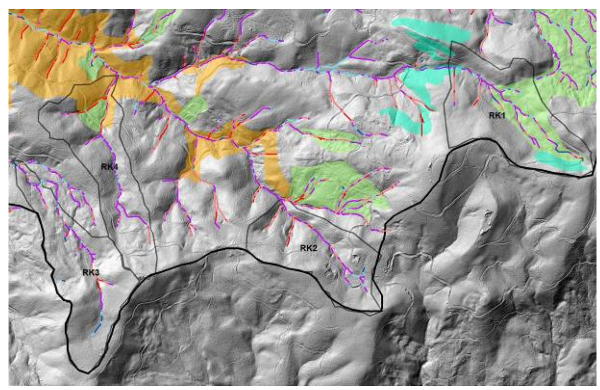

Figure 7d. Rock Creek detail.

Soils

The information for the soils section was derived from the NRCS digital soil survey data for Tillamook and Yamhill Counties (Figure 8). The soils of the Trask Study area are fairly similar across the watershed with most of the area mapped as medial[1] loam to cobbly loam. There is a definite county difference between Yamhill and Tillamook Counties on how the soils were mapped. However, overall the soils are low in clay content and well-drained.

The largest mapped unit is the Murtip-Caterl-Laderly complex which makes up approximately 50% of the watershed (all slopes classes). This complex contains loam to very gravelly loam-textured soils to a depth of 76 to 125 cm. The next soil series complex is the Hemcross-Klistan complex which makes up approximately 32% of the watershed. The Hemcross series of the complex is a loam while the Klistan series has a very to extremely gravelly loam texture with a depth of approximately 100 cm. The soils of Yamhill County are mapped as mainly the Hembre silt loam and the Klickitat stony loam.

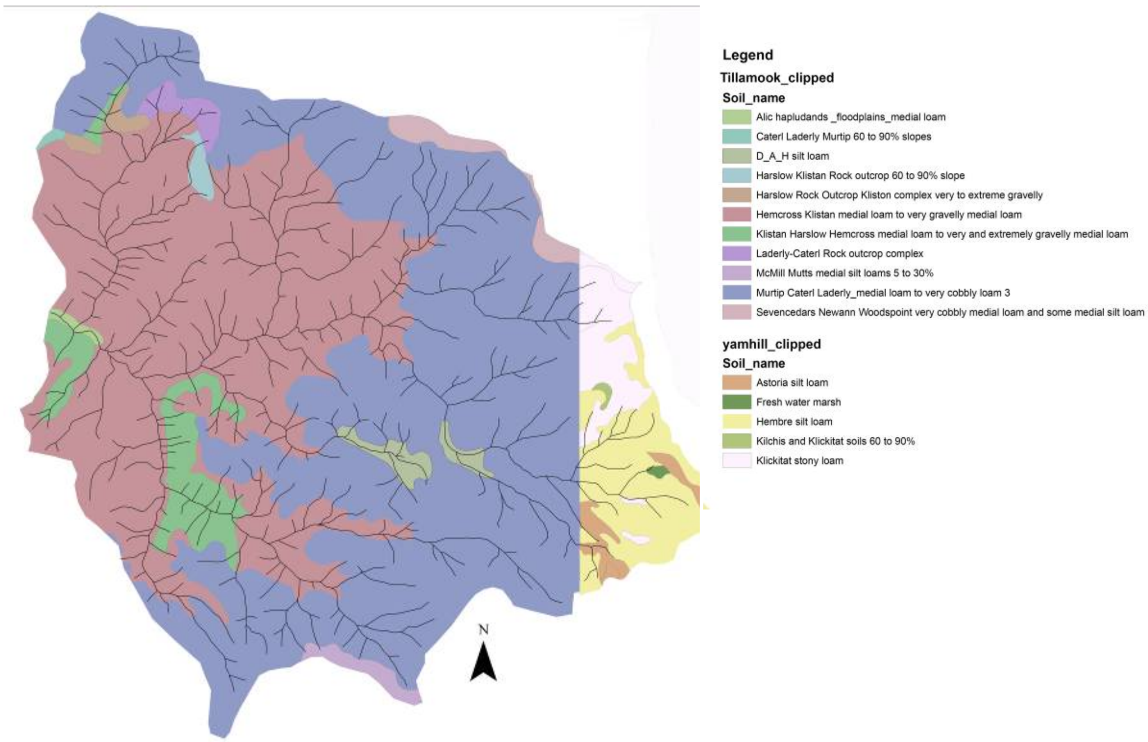

Figure 8. Trask Watershed study soils.

Since the surface soil textures are mainly loams to silt loams, even to depth, eroded surface material is unlikely to contain high amounts of very fine particles which stay in suspension longer and contribute more to higher turbidity (e.g., Hudson 2001). The McMill-Mutt complex mapped in Tillamook County has silty clay loam subsoils, which would contribute smaller particles to the water column if they eroded at depth and delivered to a stream channel. Likewise, the soils mapped in Yamhill County have silt loam surface textures, but have silty clay to silty clay loam subsoils, which would be more likely to contribute to turbidity. Since mapped soil unit boundaries are fairly coarse, especially in forested areas, and given the fact that there is such a discrepancy at the

[1] Medial refers to the fine earth portion of the soil that has andic properties. Andic properties mean that the soil material must have less than 25% organic carbon and meet other specific requirements. For this report I will refer to the medial loams as loams.

county line, more work would be needed to check map unit boundaries and soil series.

Hydrology and Water Quality

Two stations recording discharge were installed in 2005. In autumn 2006 these stations were upgraded to also record turbidity and suspended sediment transport. Three additional stations were installed in the winter of 2006-2007; these sites will record all three parameters.

Climate

More on precipitation patterns which could include what we have found currently with our climate stations.

Daily Flows for Trask and Rock Creeks

Flow data from October of 2005 through January 2007 are shown in Figure 9. These gages are located at the mouth of Rock Creek and on the EFSF Trask just above Rock Creek. As this figure shows, the highest flows for the study period so far occurred in January of 2006.

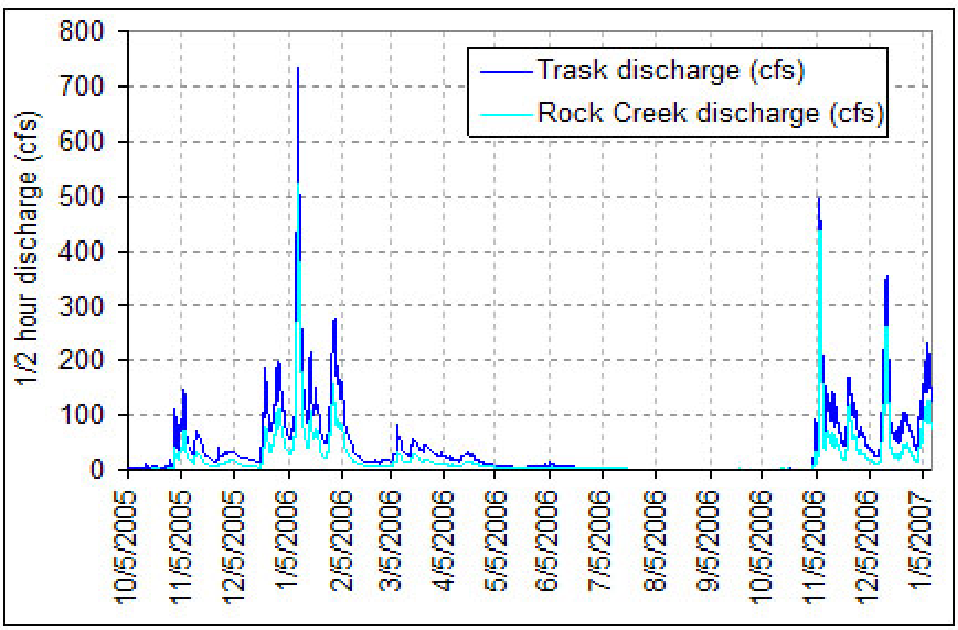

Figure 9. EFSF Trask and Rock Creek daily flow

Peak flows

The main peak flow generating mechanism in the Trask River drainage, as well as for most of the Coast Range, is high rainfall. Rain-on-snow can occur and has occurred in the Coast Range, but it rarely contributes significantly to storm runoff except during some very large flood events (i.e., 50-100 year) (Greenberg and Welch 1998). For example, in the early February flood of 1996, the Saddle Mountain SNOTEL site, which is near the study area, had 14" of snow melt and 20.4" of rainfall, making snowmelt 40% of the storm precipitation.

The largest peak flow event on the lower Trask since 1932 was the February 1996 event (Figure 10), which was roughly a 50-year event. However, this was outside the period of record and was reconstructed using from a flood mark and slope-area calculations. The next highest flood for the period of record was December 22, 1964 and was approximately a 25-year event. The third highest was January 11, 1972, which was also approximately a 25-year event. Note: in looking at the flows associated with the return periods, understand they are rough estimates for the newer gage, which is at a new location and also includes more flood events, especially the large event of 1996, than the discontinued gage.

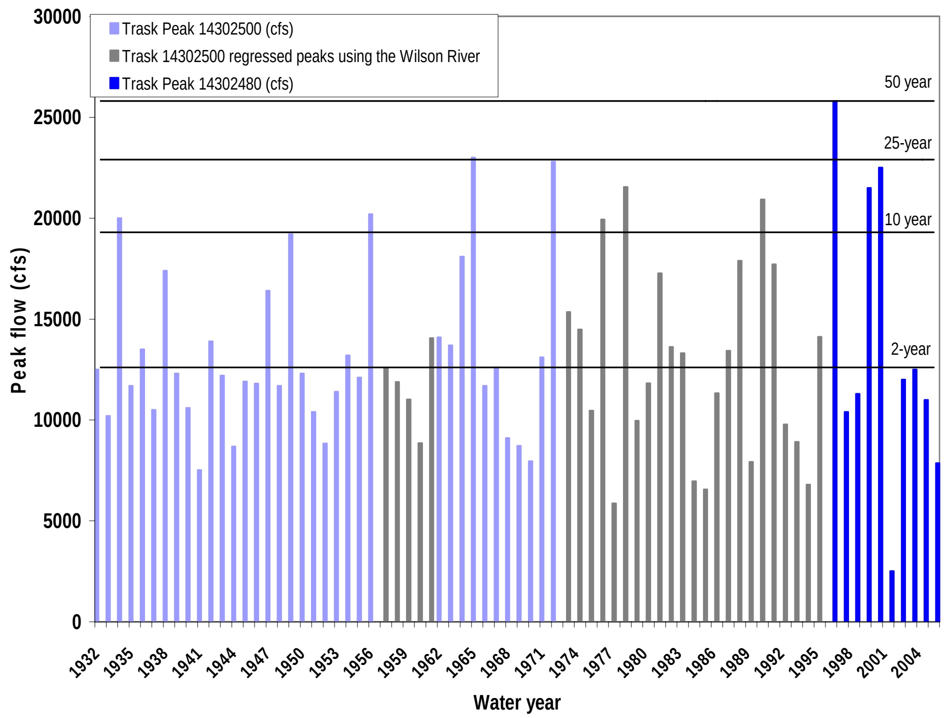

Figure 10. Trask Peak Flow History The recent peak flow history (i.e., instantaneous annual maximums) of the Trask was reconstructed from the gages in Trask as well as the Wilson River gage as mentioned previously. The return periods were from Wellman et al. 1993 and are for the discontinued Trask River gage since those values were readily available.

Water Quality: Temperature

Water temperatures were recorded at 1/2 intervals during the summer of 2006 (June 21st-Sept 22nd,) at 35 sites in the Trask (Figure 11). Continuously recording thermistors (Onset Computer Corporation, Pocasset, Mass.) were used at 33 sites and two sites, Rock Creek mouth and the Trask mainstem above Rock Creek had temperature probes included in the capacitance probes. The thermistors were calibrated according to protocol established in the Water Quality Monitoring Technical Guide Book (OWEB 1999).

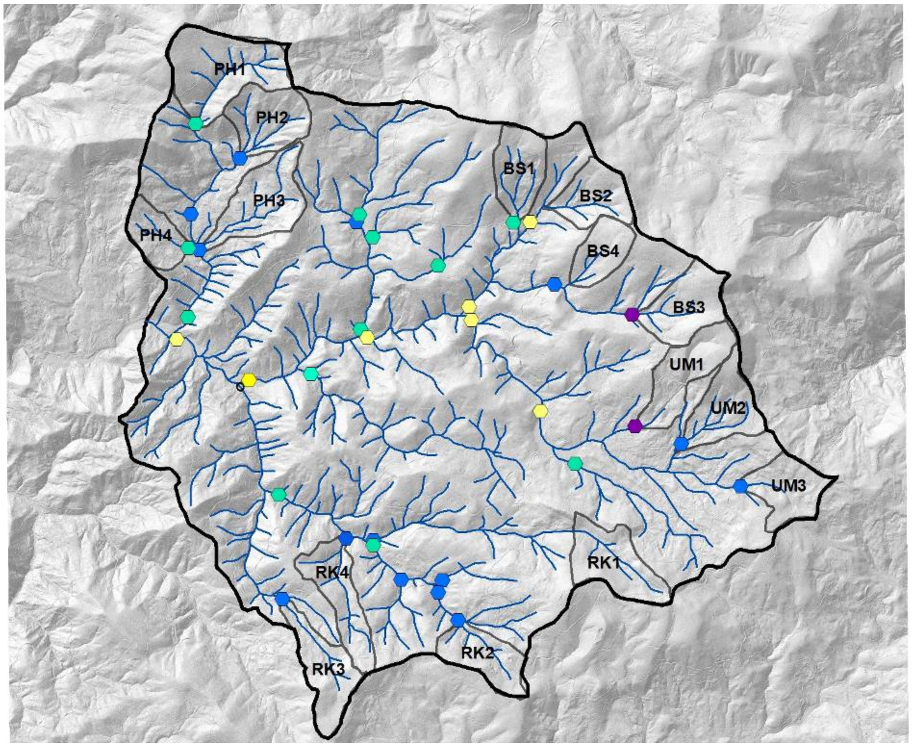

Figure 11. Location of summer of 2006 temperature probes with maximum temperatures indicated. Purple dots are summer maximums of 9-11°C; blue are 12-14°C; green are 15-17°C and yellow dots are 18-20°C.

The temporal pattern of summer daily maximum temperatures is shown in Figure 12. Most of the streams followed a similar pattern for maximum daily temperatures. The warmest temperatures occurred in the largest streams with the lower Trask having the highest maximum. The lowest maximum temperatures occurred in the upper mainstem catchment (white line) and in BS3 (black line).

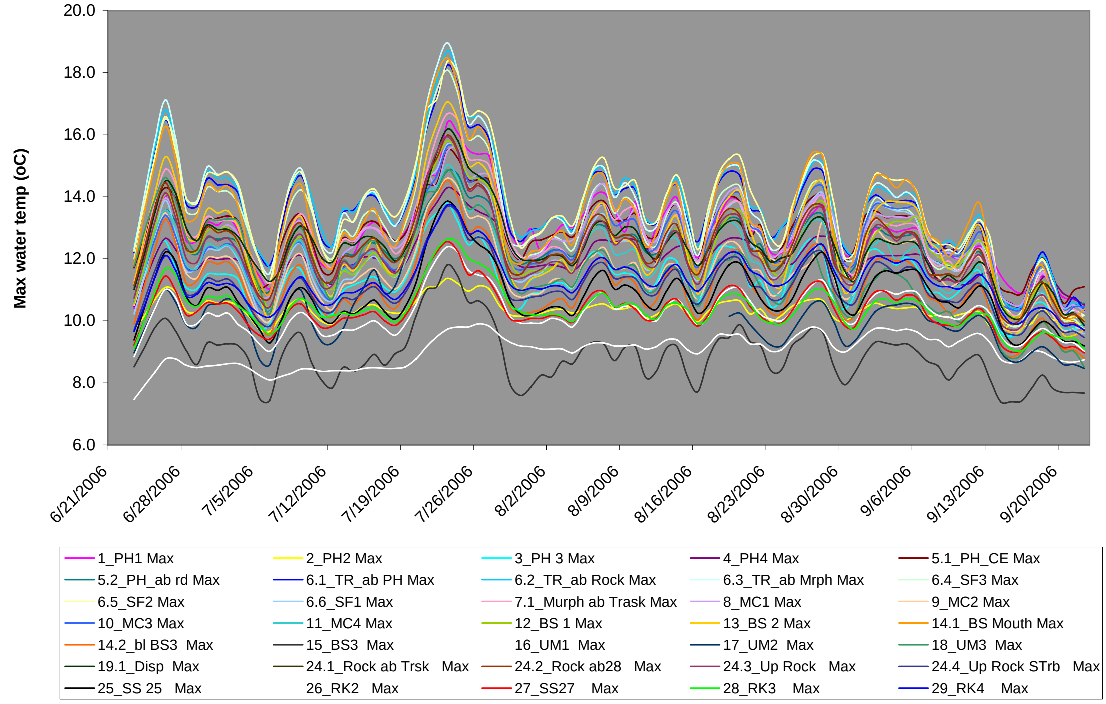

Figure 12. Daily maximum temperatures (°C) for all monitored sites in the Trask study area.

Water Quality: Water Chemistry

The influence of harvest on nutrient levels and primary production in streams has been evaluated in larger channels but very rarely in small streams and the propagation of effects downstream from a harvest unit has never been evaluated. These properties have been recognized as key determinants of the productivity of invertebrate and fish populations over the last decade. Initial sampling at 28 sites across the Trask watershed revealed fairly substantial variation in nutrient concentrations among the proposed study sites. In general, there appeared to be an increase in the concentration of most dissolved constituents with increasing stream size. However, there are also substantial differences among sub watersheds, with Pothole Creek (PH sites in Figure 1b) generally exhibiting higher sodium, calcium, sulfate and ortho-phosphate levels, RK and UM with low nitrate levels and the BS cluster with low potassium levels.

FIRE HISTORY AND VEGETATION PATTERNS

The Tillamook Burn

The following information was adapted from Walstad et al., 1990. The Tillamook Burn was a collection of at least 4 separate fire episodes starting in 1933 with the 240,000 fire in Northwestern Oregon near Hebo. The second Tillamook fire occurred in 1939 and consumed approximately 190,000 acres near Saddle Mountain. The 3rd burn occurred in 1945 and consumed 180,000 acres between the Wilson River and Salmonberry Creek fires. The final burn occurred in 1951 and was 33,000 acres in the Elkhorn and North Fork Trask area. When the fires burned a portion of the Trask study area (presumably the Elkhorn and North Fork fires since the upper Trask is nearest to that area) a portion of the watershed had already been harvested (Figure 13). Since this is the 1936 coverage, we can assume that by 1951 when the last fire burned, that more of the area had been harvested. Figure 14 shows the 1955 aerial photos of the central area of the watershed.

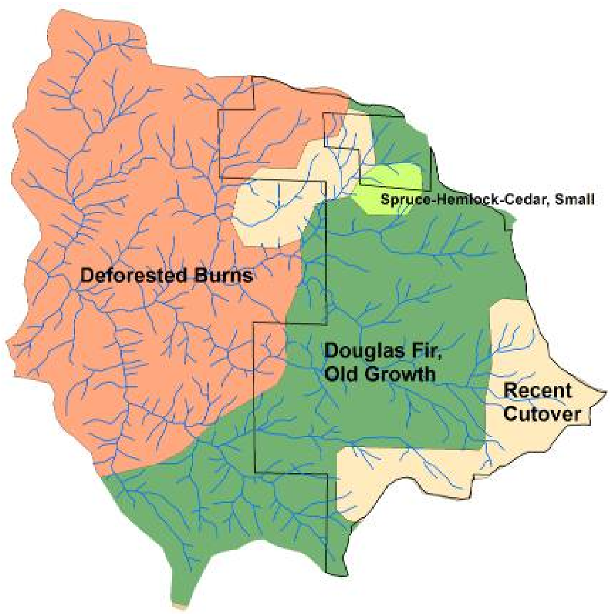

Figure 13. 1936 Fire map. This map was constructed from data from the ICBEMP website on the historical vegetation of Oregon and Washington.

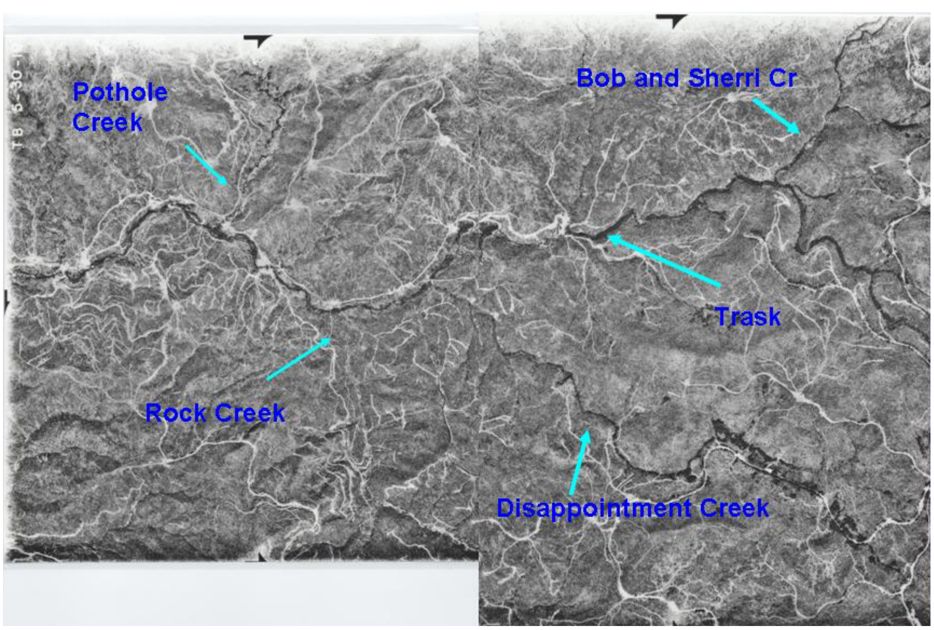

Figure 14. 1955 aerial photographs of the central portion of the Trask study area with the various streams indicated.

Current Pattern of Vegetation

Most of the watershed is dominated by second growth conifer (Figure 15). Many stands have had thinning by ODF while several stands on Weyerhaeuser ownership were ready for harvest or recently harvested.

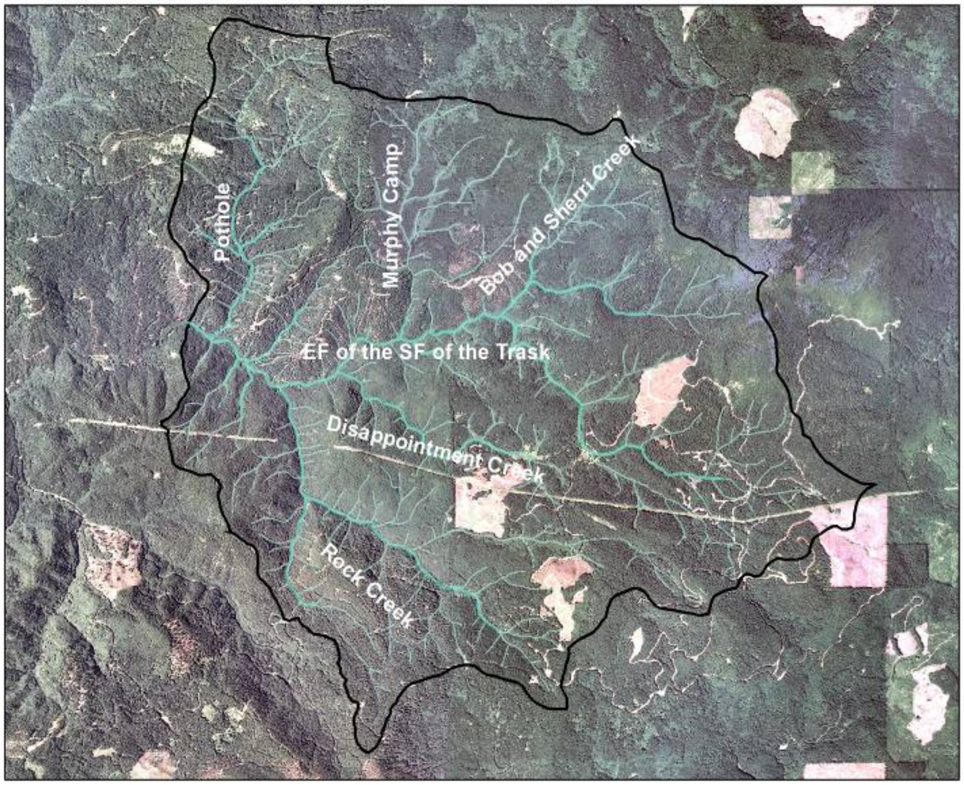

Figure 15. 2005 orthophoto of the Trask watershed with stream names indicated.

The following figure (Figure 16) is from the CLAMS project based on 1996 satellite imagery. As this figure shows, most of the Trask Study watershed is in medium sized conifers. There are scattered areas of both large and smaller diameter conifers as well. The stream channels, especially along the Trask are comprised of hardwoods or mixed stands. The BS cluster contains the greatest amount of hardwoods (mainly alder) while Rock Creek has the greatest amount of larger conifers. Pothole and the Upper Mainstem cluster is a mix of conifer and mixed conifer/hardwood stands.

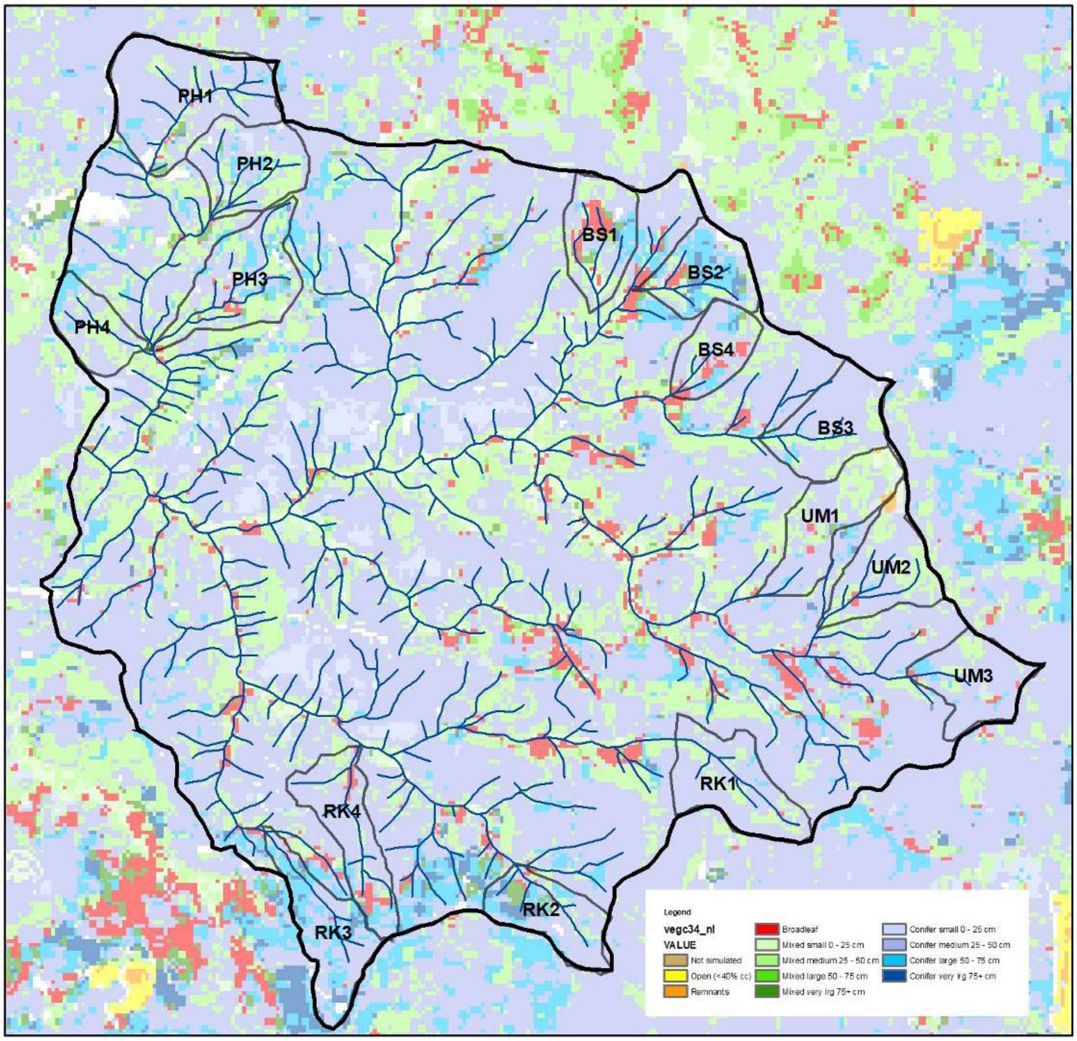

Figure 16. Trask Study area vegetation from CLAMS 1996.

Vegetation: Hardwoods

The following map was created from Weyerhaeuser and ODF stand layer data (Figure 17) to give more detail on the hardwood component in the watershed. Attempts were made to make the stand attributes match, but they are not identical. Also note that there was no stand information for the BLM block in upper B&S Creek.

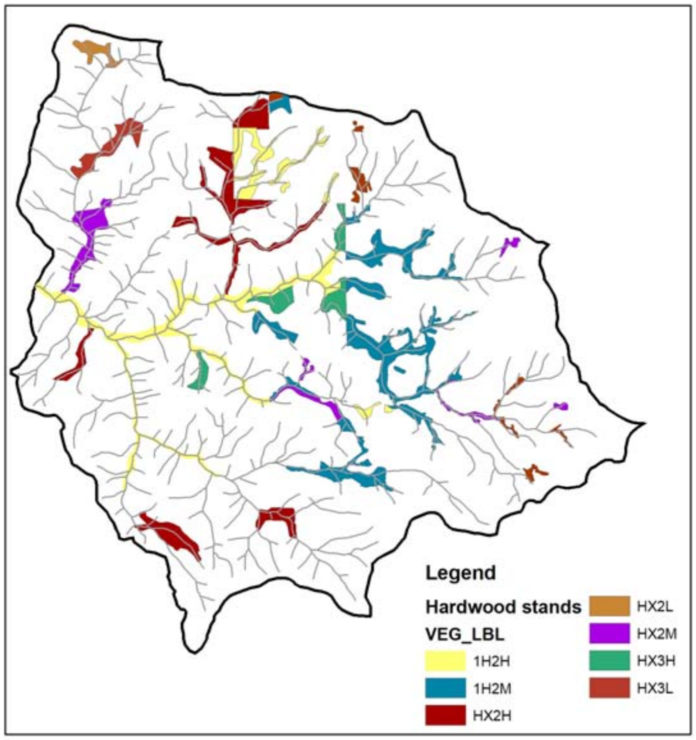

Figure 17. Hardwood stands. The H indicates a hardwood stand (ignore the first number and the X). The Number indicates the size of the trees with 1 = < 8” dbh, 2=8-24”, 3=14-20”. 4=20-30 and 5=> 30” dbh. The L, M and H at the end indicates stocking density. L=low <30%, M=medium 30-60% and H=high >60%

RECENT MANAGEMENT

The majority of the recent management includes all activities conducted since the mid-1990s (Figure 18). However, there was one ODF pre-commercial thin in the southwest corner of the watershed in 1980.

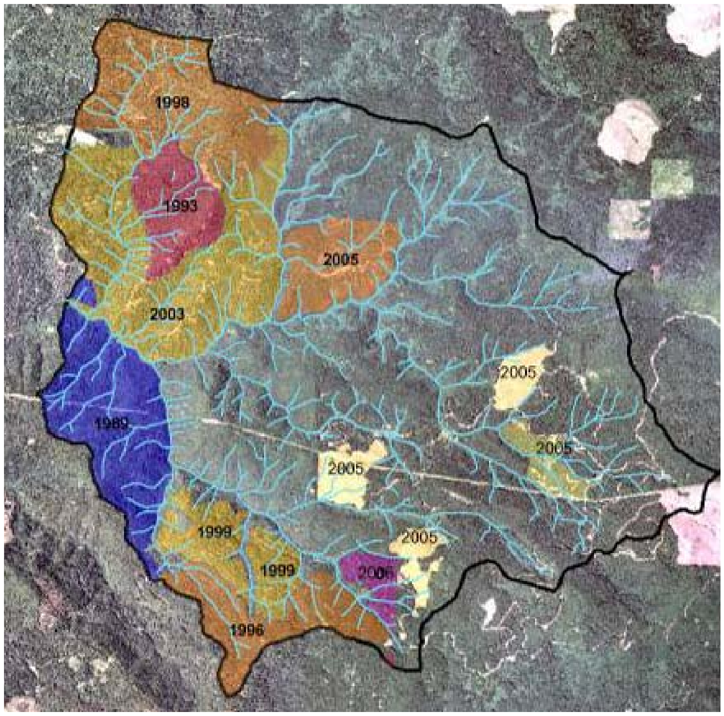

Figure 18. Current Trask harvest activity map overlaid on 2005 orthophoto. The yellow areas are clearcut units, dark blue indicates pre-commercial thin, the light orange are partial cuts to a basal area target of 110-130 ft^2/ac, the dark orange are thinned to 120-140 ft^2 per acre of basal area. The red is thinning to 130-150 ft^2 per acre while the pink is 140-160 ft^2 per acre.

The ODF units are all thinnings or partial cuts with varying basal area targets (ft^2 per acre). The ODF thinnings were mainly cable yarded to a road up open corridors. These corridors are visible on aerial photographs (Figure 19). In several cases, the thinning corridor extended to the stream channel.

Figure 19. Google Earth image showing thinning corridors along the lower Trask River near the confluence of Pothole Creek.

Harvest on Weyerhaeuser land has all been clearcut by either ground based or cable yarding. The size of the harvest areas range from 22.5 to 48.3 ha. Two of the units abut fish-bearing streams and have buffers. For the harvest units not adjacent to fish-bearing streams, wildlife trees we left along small, non-fish streams. The following figures show more detail on the harvest units (Figure 20).

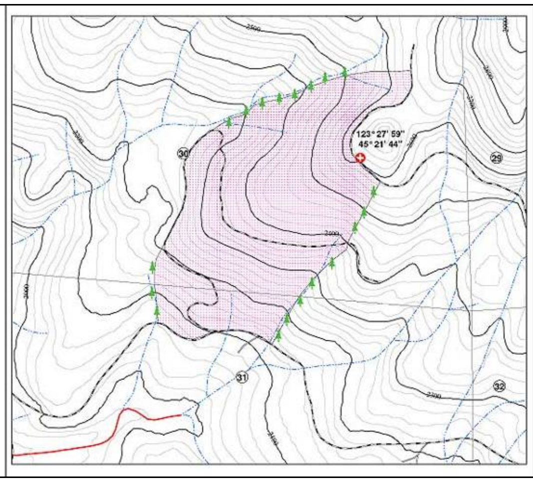

Figure 20a. Harvest unit in T2S R6W Sect 30, 31.

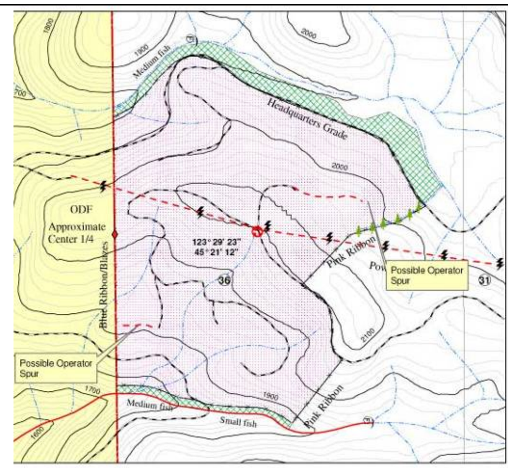

Figure 20b. T2S R7W Sect. 36

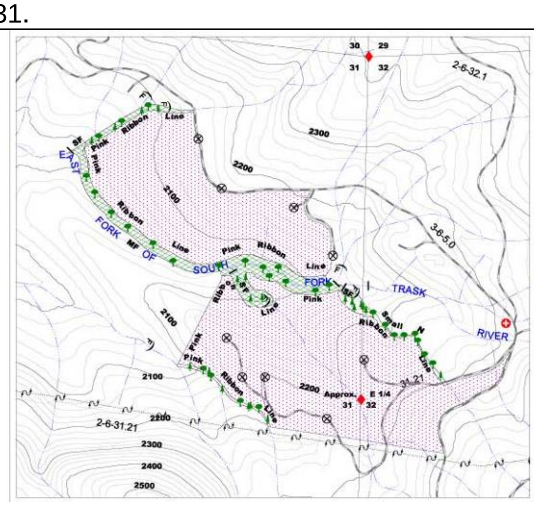

Figure 20c T2S R6W Sect. 31 and 32.

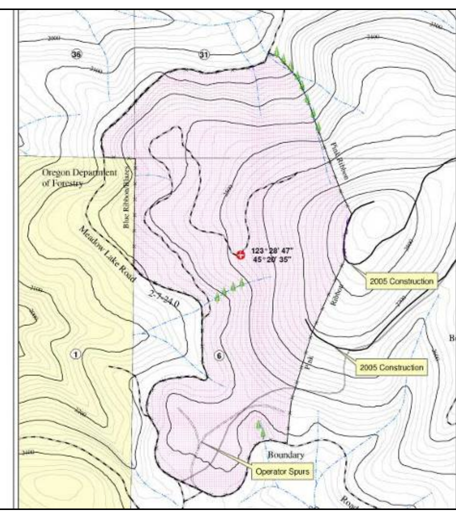

Figure 20d T2S R6/7W Sect. 31, 26 and 6

Road building was generally in conjunction with harvest units within the study area or for units just outside the study area. The harvest maps above show the spur roads that were constructed for the unit.

The current road network in the Trask Study area was essentially developed prior to 1955 (Figure 21). The 1955 air photos showed that the current mainline, secondary and spur roads existed at that time (Figure 22). Recent road activity includes reconstruction of the Toll Road in the headwaters of B&S Creek and spur roads for the Weyerhaeuser harvest units and the ODF thinning units.

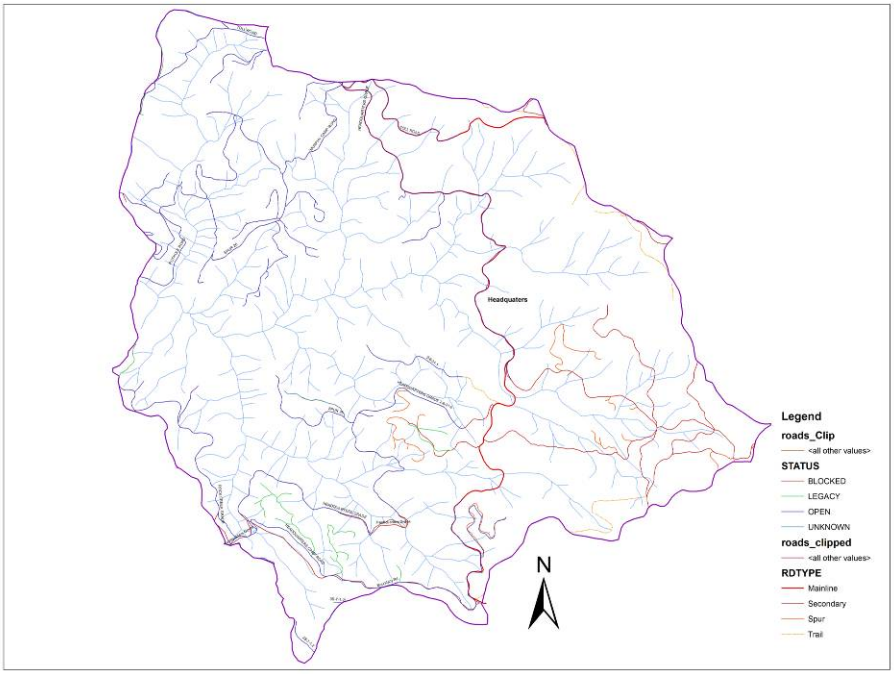

Figure 21. Trask Roads. The mainline roads include the Headquarters Grade and the Toll roads.

The history of roads in the study area shows that by 1955 there were numerous skid roads and other access roads, many of which are no longer in use. Figure 22 shows a detail of the area around where the upper mainstem crosses Headquarters grade road from 1955 and then from a hillshade rendering of the 2006 LiDAR DEM. Inside the orange box show an area where there are no current roads but where in the past were several skid roads.

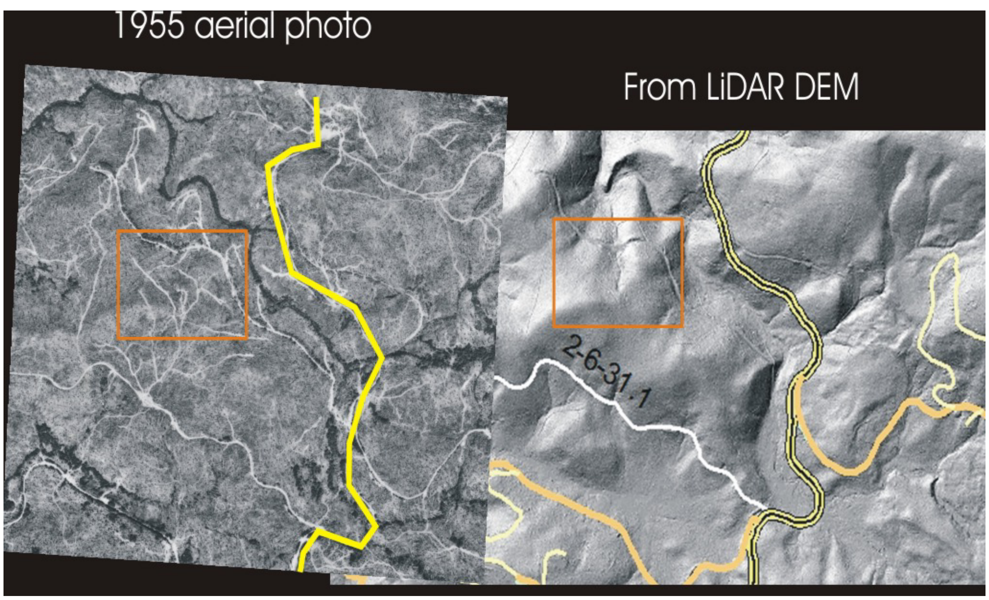

Figure 22. Road examples from 1955 and from the 2006 LiDAR DEM.

Other Land Uses

Pothole Creek had in-stream wood placement (stumps and logs) in 1997.
1998 was a big flood year for the Trask (Thanksgiving Storm)

There has been extensive use of the watershed by ATV, however, at this point I don't have a map of the trails.

THE AQUATIC ENVIRONMENT

Fish

Fish distribution throughout the study area and fish abundance at randomly selected stream reaches was assessed during summer 2006. These data indicate that anadromous fishes (coho salmon and steelhead) are found only lower in the watershed with cutthroat trout the dominant species higher in the watershed and in the smaller streams (Figure 23). Juvenile trout (those too small to differentiate between cutthroat and steelhead) were found throughout the fish-bearing channel network. However, the distribution of older age classes of juvenile steelhead and cutthroat suggests that most juvenile trout in the upper watershed were cutthroat. Several species of stream amphibians were captured during the fish surveys and in supplemental surveys to assess amphibian distribution. Torrent salamanders had a very patchy distribution, being found only in some of the small, headwater streams. The distribution of giant salamanders also was patchy, but not as restricted as for torrent salamanders, and giant salamanders were found in larger streams including some with fish. Tailed frogs were widely distributed throughout the watershed, with population levels higher upstream of fish distribution.

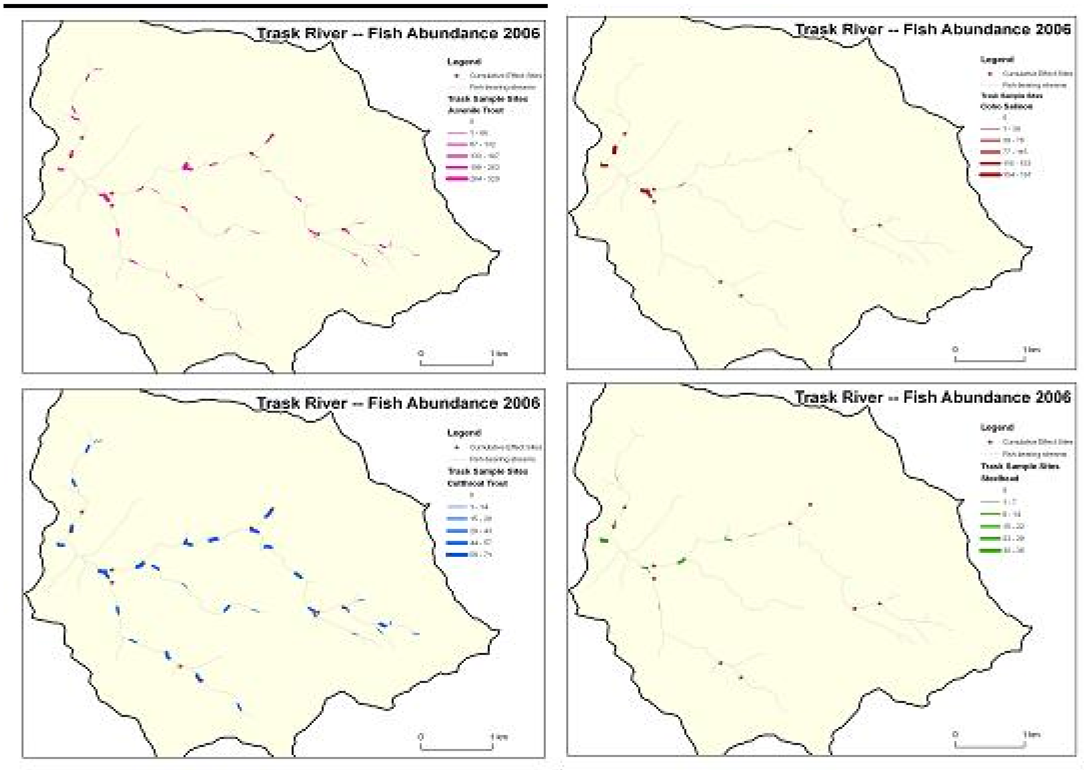

Figure 23. Fish distribution in the Trask

Invertebrates

Benthic invertebrates were collected at 18 sites (10 headwater sites and 8 downstream t sites) in conjunction with periphyton sampling during the week of June 26th-30th, 2006. At each site, 1 qualitative and 5 quantitative samples were collected. Quantitative samples were taken using a Surber sampler and were designed to estimate abundances of benthic invertebrates at each study reach. These samples were augmented with qualitative samples collected to get a more complete indication of the invertebrate fauna at each study site.

Quantitative samples are currently being analyzed. The qualitative samples were analyzed this summer. A total of 69 taxa were identified from the qualitative samples. Taxa richness across the sites ranged from 10 to 33. No difference exists in taxa richness between the headwater sites (mean richness = 17) and the cumulative effect sites (mean richness = 19). The qualitative samples indicate that a few taxa were widely distributed (e.g., chironomid midges, caddisflies in the genus Rhyacophila, and Baetis mayflies). Others occurred predominantly in either headwaters (e.g., the stoneflies Moselia and Yoraperla, and the mayfly Cinygma) or in cumulative effects sites (e.g., blackflies and the mayfly Epeorus). One taxon (the snail Juga) that we expected to be widespread throughout the watershed was completely absent.

A preliminary cluster analysis was conducted on the qualitative data (Figure 24). This analysis is based on simply on taxa presence/absence. This analysis indicates that, in general, headwater sites had a benthic invertebrate community that differed from the downstream sites. The downstream effect sites split into two distinct groups; however, the reason for this split is unclear at this time (it does not appear to result from differences in geology).

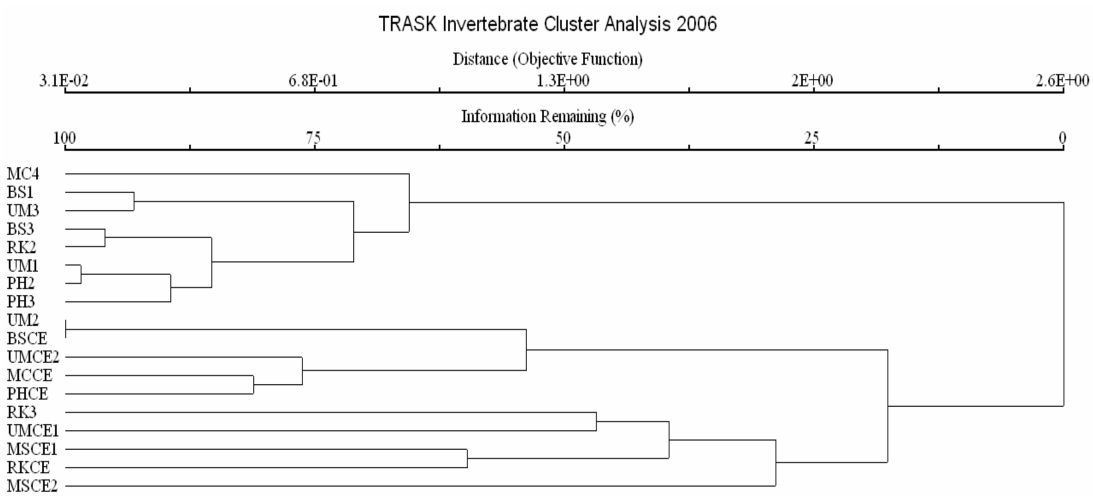

Figure 24. Cluster analysis of the invertebrate communities from 18 sample sites in the Trask study area. The highest-level separation suggests that stream size plays a key role in determining invertebrate community composition.

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