Lower South Fork Coquille Riparian Reserve Evaluation

Introduction

Riparian Reserves are areas along all streams, wetlands, ponds, lakes and unstable areas where riparian-dependent resources receive primary emphasis. The main purpose of these reserves is to protect the health of the aquatic system and its dependent species, while also providing benefits to upland species. General guidelines for interim Riparian Reserve widths are described in the Aquatic Conservation Strategy of the Standards and Guidelines - ROD, 1994. Essentially, the width of the interim Riparian Reserves is a function of site-potential tree height, potentially unstable lands, fish presence, flow characteristics, riparian vegetation, and the inner gorge.

Process

The recommended procedures for Riparian Reserve evaluation are described in Riparian Reserve Evaluation Techniques and Synthesis (Draft - February 1997), Supplement to Section II of Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis - Version 2.2, and were used as a basic outline for the following evaluation. The steps below essentially follow the Watershed Scale Procedures in the module. This evaluation addresses the physical and biological elements that are necessary to meet the Aquatic Conservation Strategy (ACS) objectives and provide habitat benefits to terrestrial species within an integrated Riparian Reserve system. This evaluation supplements the Lower South Fork Coquille Watershed Analysis (BLM 1996). The information presented in this evaluation is intended to support the final delineation and management of the Riparian Reserve network in the Lower South Fork Coquille Watershed. Actual delineation of Riparian Reserves and posting of boundaries will occur at the project level during the EA process using the information provided herein along with additional information from field reviews.

Step 1 - Characterization

A. <u>Characterization of the extent of the interim Riparian Reserves in the analysis area</u>

The variables used to characterize the extent of the interim Riparian Reserves have been mapped or described to the extent possible with the data available.

The site potential tree height for the Lower South Fork Coquille analysis area has been defined as 220 (REFERENCE MK). Maps of unstable lands (TPCC withdrawals), geology, and soils are shown in Figures 1, 2, and 3, respectively. Additionally, analyses were performed on the landscape to evaluate surface erosion (using the Modified Soil Loss Equation) and mass wasting processes (using the Infinite Slope Equation). A detailed description of the methods and assumptions used in these analyses are presented in Appendix A. Figure 4 shows the results of the surface erosion modeling in units of tons of soil /acre/year. It should be noted that the data presented in Figure 4 represents surface erosion (on-site losses), not sediment delivery. Figure 5 shows the results of the mass wasting modeling, which derives a factor of safety. Factor of safety is a ratio of the opposing forces acting on a slope; factors of safety approaching 1 indicate highly unstable areas.

Figure 6 is a map of the stream network in the Lower South Fork Coquille analysis area showing the hydrographic pattern and distribution of fish-bearing streams.

Final determination of intermittent streams will be made in the field, based on the following definition and supporting criteria:

> Intermittent streams are defined as any nonpermanent drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria (FEIS ROD, p. B-14).

The Myrtlewood hydrologist provided the following interpretations of the terms used in the Northwest Forest Plan definition of intermittent streams:

- To be a nonpermanent drainage feature, the stream should have a stream-flow duration of less than 80% of the time.

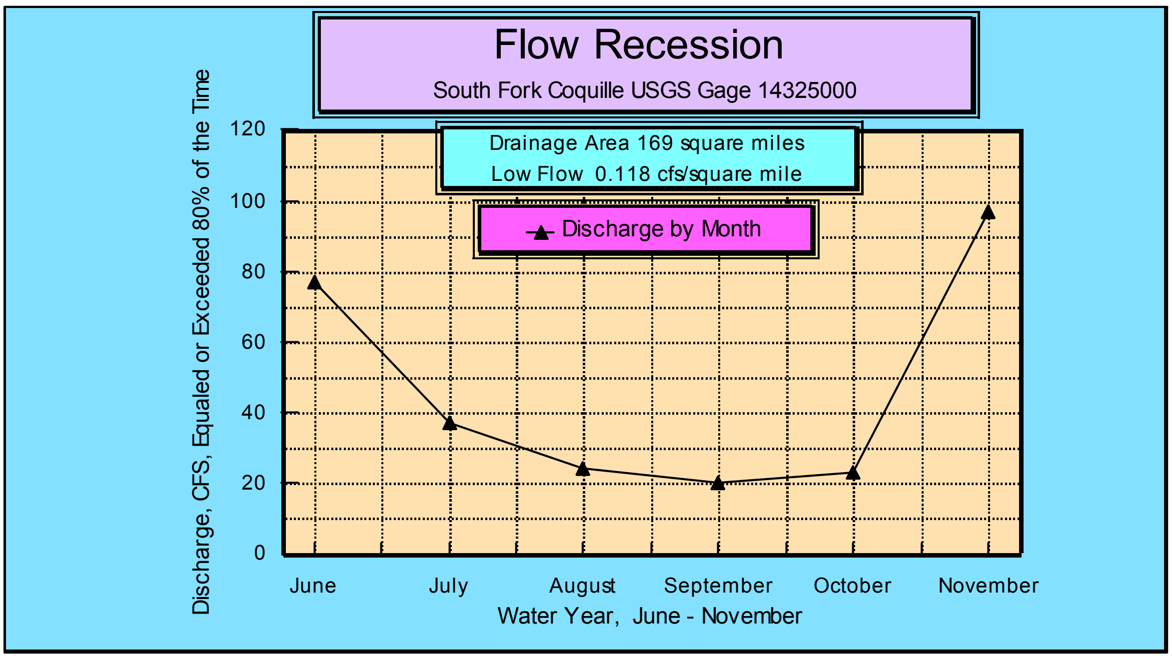
- A definable channel should have some minimum depth of incision. The channel should be able to convey stream-flow, and be essentially continuous. A definable channel can exist even though large organic debris may at times be lying in the channel or partially obscuring the channel.

- Annual scour or deposition usually is evidenced with distinct physical features. This may include: a stream scour line on the edges of the active channel, sediment accumulations behind obstructions in the channel, substrate in the channel more rounded than angular, or evidence of bank-cutting on the outside of bends.

Intermittent stream origin on Coos Bay District lands has been studied in two different geologies using the intermittent stream ROD definition and interpretive criteria. Intermittent streams were found to form at drainage areas between 4-13 acres, with a mode of about 7 acres (Carpenter 1995). Based on the topographic GIS theme, ARC/INFO may be used to generate a GRID displaying flow accumulation at each cell on the landscape. By selecting certain flow accumulation values approximating the drainage area requirement, these intermittent channel origins can be mapped, as shown in Figure 7.

Determining where an intermittent stream becomes perennial is difficult with current analytical tools. Surface water flow recession was studied for the analysis area. Figure 8 shows surface water recession during the summer/fall from June to November, based on a South Fork Coquille River USGS gaging station #14325000 (Wellman et. al. 1990). It was found that minimum perennial flow approached 0.118 cfs/mi^2 at the 80% exceedance level. The 80% exceedance flow duration approximates the 2-year 7-day low flow and was thought to define the lowest amount of stream-flow over a number of years to be classified as a perennial stream. The flow recession results from the South Fork Coquille USGS gaging station could be adjusted by area for a given month (at time of field survey) to the headwater channels in the project area. The flow at a given stream could be measured and compared with the flow recession in the basin. If the stream-flow at the site is below the basin recession flow, then the stream is most likely intermittent at that point. If the measured stream-flow at a site is above the basin recession curve for that time period, then the stream is most likely perennial.

Figure 8. Flow recession analysis for the Lower South Fork Coquille River.



An initial stratification process was used in the Lower South Fork Coquille study area to identify intermittent streams. By using Darcy's law of groundwater flow, mapped soil types, and flow recession to estimate the reduction in saturated area of small catchments during the dry season, it was found that a watershed of approximately 20-40 acres is necessary on high-permeability soil types to sustain perennial flow; streams in smaller catchments are likely to be intermittent (Dunne & Leopold 1978 and Haagen 1989). This drainage area roughly corresponds to the 1st order channels in the analysis area. Based on this stratification process, a first approximation of the extent of the intermittent stream network within the analysis area is presented in Figure 9, which shows the 1st order channels on high-permeability soils. According to this stratification process, there are approximately 131 miles of these streams in the analysis area, approximately 11 miles of which are on BLM-managed lands.

Intermittent streams in the Lower South Fork Coquille analysis area tend to be 1st order, high gradient (>10%), low sinuosity, entrenched channels, with low width/depth ratios and gravel or sand substrates. This description fits A4a and A5a stream types (Rosgen 1994). Other 1st order streams in the analysis area (those not shown in Figure 9) are more likely to be perennial. This is because the deep, fine-textured soils surrounding these channels store large volumes of water, have low permeabilities, and drain slowly. This would correspond to A6a and A6 stream types. Some of these channels are lower gradient (4-10%), and may drain perched water tables.

A perennial stream is "a stream that typically has running water on a year round basis" (FEMAT 1993). Alternate definitions include "a perennial stream or stream reach has measurable surface discharge more than 80 percent of the time. Discharge is at times partly to totally the result of spring flow or ground-water seepage because the streambed is lower than surrounding ground-water levels" (Meinzer 1923). Well-formed, adjustable channels have continuous channel boundaries and several distinct in-channel features. Fluvial action of sufficient duration (i.e., stream flowing year-round in most years) will carve a low flow channel. This is the so-called inner-berm, and is really a slight depression in the channel bottom which carries the minimum stream-flow. Streams that have ponding, such as beaver dams, or that flow over bedrock will lack this feature. However, this cross-section dip is observable in most alluvial channels. In the analysis area, some perennial seeps and outflows have not had sufficient discharge to form the inner-berm feature.

Biological criteria are also useful in distinguishing between perennial and intermittent streams, and determining the upstream terminus of perennial surface flow. The presence of aquatic invertebrates with protracted larval histories (> 1 year) (*Lara avara, Juga spp., Philocasca rivularis*), or larval amphibians (tailed frogs, Southern torrent salamanders, Pacific giant salamanders), strongly indicates perennial flow.

The extent of riparian vegetation may be used to delineate Riparian Reserves in some cases. However, the water-dependant vegetation width is very narrow in most cases for intermittent streams. It is highly unlikely that riparian vegetation would extend the Riparian Reserve beyond one-quarter site-potential tree height in the Lower South Fork Coquille analysis area.

The inner gorge may also be used to delineate Riparian Reserve boundaries in some places. For the purposes of this exercise, an inner gorge is defined as the first slope break above the active channel margin and terraces. Typically, an inner gorge break would only be used to define a Riparian Reserve boundary of a canyon or similar geomorphological feature. Such features are not common within this analysis area.

For the Lower South Fork Coquille analysis area, it was determined that site-potential tree height defined the widest interim Riparian Reserve boundaries, when compared to the other direct or relative measurements. Based on a site-potential tree height of 220', the GIS database indicates that interim Riparian Reserves occupy approximately 3,825 acres (52%) of BLM-managed land (7,365 acres) within Lower South Fork Coquille analysis area (65,669 acres). The output from the initial stratification process to identify intermittent channels (Figure 9) indicates that approximately 574 acres of Riparian Reserve (8% of BLM-managed land in the analysis area) is adjacent to intermittent streams. It should be noted that this riparian acreage is an estimate; sources of error include unmapped streams and the difference between the actual location of the interim Riparian Reserve boundary (based on slope distance) and the computer-generated boundary (based on horizontal distance).

B. 1. <u>Identification of the biological and physical values associated with the ACS objectives for the analysis area and characterization of the relationship between riparian features</u>

The distribution, diversity, and complexity of watershed and landscape-scale features, spatial and temporal connectivity, physical integrity of the aquatic system, water quality, the sediment regime, in-stream flows, flood plain inundation/water table elevation, species composition and structural diversity of plant communities, and habitats for well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species are the ACS-associated values pertinent to the Lower South Fork Coquille Watershed. The following is a brief description of these values and the relationships between them:

The distribution, diversity, and complexity of watershed and landscape-scale features refers to the assorted physical processes such as earth movement, deposition, erosion and disturbance which create and shape habitats at various scales (terraces, flood plains, standing and down wood, etc). This is demonstrated, for example, in the way stream side vegetation often offers a structural contrast to upland habitats within the Riparian Reserves. Management-induced disturbances that work within the natural physical processes and disturbance regime enhance the distribution, diversity, and complexity of watershed and landscape-scale features; management-induced disturbances that are outside the range of the natural physical processes and disturbance regime tend to impair these features.

In the context of this evaluation, *spatial and temporal connectivity* relates to how well the Riparian Reserves within the analysis area provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species. The distribution, diversity, and complexity of watershed and landscape-scale features, physical integrity of the aquatic system, the condition and extent of the plant community, aquatic habitat quality, water quality, and flow regime all influence the function of the Riparian Reserves with respect to connectivity.

Physical integrity of the aquatic system includes bank and bottom configurations that are appropriate for the various channel types, flow regimes, and substrates in the analysis area. The distribution, diversity, and complexity of watershed and landscape-scale features, instream flows, the sediment regime, flood plain inundation/water table elevation, species composition and structural diversity of plant communities in riparian areas all act in concert to affect the physical integrity of the aquatic system.

Water quality encompasses the physical, chemical, and biological properties of surface and groundwater, which affect the survival, growth, reproduction, and migration of individuals composing the aquatic and riparian communities. The physical integrity of the aquatic system, geology, soils, sediment regime, condition and extent of the plant community, aquatic habitat quality, flow regime, allochthonous inputs, and point/non-point-source pollution all influence water quality within the analysis area.

Elements of the *sediment regime* include the timing, volume, rate, and character of sediment input, storage, and transport. In the Lower South Fork Coquille Watershed, the sediment regime is influenced by the distribution, diversity, and complexity of watershed and landscape-scale features, physical integrity of the aquatic system, flood plain inundation, geology, soils, condition and extent of the plant community, aquatic habitat quality, flow regime, and roads.

In-stream flow pertains to the timing, magnitude, duration, and spatial distribution of peak, high, and low flows as they affect patterns of sediment, nutrient, wood routing and the maintenance of riparian, aquatic, and wetland habitats within the analysis area. The distribution, diversity, and complexity of watershed and landscape-scale features, physical integrity of the aquatic system, flood plain inundation/water table elevation, condition and extent of the plant community, soils, road density, aquatic habitat condition, and geomorphology all influence in-stream flow.

Flood plain inundation/water table elevation refers to the function of riparian zones in the storage and release of water, which helps to maintain summer base flows and moderate high flows. Riparian structures reduce velocity, reducing erosion, scour and down cutting, thereby enhancing flood plain inundation and water table elevation. The distribution, diversity, and complexity of watershed and landscape-scale features, spatial and temporal connectivity, physical integrity of the aquatic system, the sediment regime, in-stream flows, and species composition and structural diversity of plant communities all influence flood plain inundation/water table elevation.

The species composition and structural diversity of plant communities in riparian areas determines their capacity to provide thermal regulation and nutrient filtering, moderate rates of surface erosion, bank erosion, and channel migration, and supply adequate amounts and distributions of coarse woody debris. The distribution, diversity, and complexity of watershed and landscape-scale features, physical integrity of the aquatic system, flood plain inundation/water table elevation, geology, soils, aspect, elevation, latitude, in-stream flow/water availability, and past management activities all influence the species composition and structural diversity of plant communities in riparian areas.

The availability of habitats for well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species is dependant upon the distribution, diversity, and complexity of watershed and landscape-scale features, physical integrity of the aquatic system, flood plain inundation/water table elevation, spatial and temporal connectivity, water quality, the sediment regime, in-stream flows, and species composition and structural diversity of plant communities.

B. 2. Identification of species intended to benefit from Riparian Reserves

See Table 1.

C. Map of habitat types

There is no vegetation map available for this watershed. However, there are GIS age-class information for forested areas, aquatic-lotic and lentic sites, areas where seeps and springs may occur, and some rock outcrops. Figure 10 shows the distribution of some of the major habitat types within the analysis area.

D. Survey and Manage and Protection Buffer species information

There are no known sites of Survey and Manage or Protection Buffer species within the analysis area. No surveys or inventories have been completed. Sites of Survey and Manage and Protection Buffer species will be documented and managed as they are found.

Potential harvest units are now being inventoried for Del Norte salamanders and the preliminary information suggested that populations are extremely limited and isolated. The red tree vole protocol is not required for this area. Known sights of Red tree vole nests will be documented and managed as they are found.

E. List of hazards to identified physical and biological values - See Table 2.

Table 2. Risk assessment.

RESOURCE VALUE	ZONE OF EFFECT	HAZARD	VULNERABILITY / SUSCEPTIBILITY	LIKELIHOOD OF EXPOSURE	ASSOCIATED SPECIES/ GROUPS
Streambank/Slope Stability	1 & 2	Windthrow Landslide/Debris Flow Harvest Peak-/Baseflow Changes Fire Road construction/maint. Silvicultural treatment	High[1] High[2] High[3] Moderate Low Low Low	Moderate Low Moderate[4] High[5] Low Low Low	Stream Seep Riparian
Microclimate	2 - 5	Harvest Windthrow Landslide/Debris Flow Fire Road construction/maint. Silvicultural treatment	High Moderate Moderate High High Low	High Moderate Low Low High Low	Seep Riparian Late-Successional
Sediment Regime	1 - 4	Landslide/Debris Flow Road construction/maint.	High Low	Low Low	Stream
Snag & LWD/CWD Recruitment	1 - 4	Harvest Windthrow Landslide/Debris Flow Fire Road construction/maint.	High High[1] High[2] Moderate Moderate	Moderate Moderate Low Low Low	Stream/Seep Riparian Late-Successional Avian
Water Temperature	1 - 3	Peak-/Baseflow Changes Harvest Windthrow Fire	Moderate High Low High	High[5] Moderate Moderate Low	Stream Seep
Water Quantity	All	Peak-/Baseflow Changes	High	High[5]	Stream/Seep
Late-Successional Forest Characteristics	2 - 4	Harvest Fire Windthrow Road construction/maint. Silvicultural treatment Brush harvest	High High Low Moderate Low Low	Moderate Low Moderate Low Low Low	Late-Successional Bats
Talus/Rock outcrops	3 - 5	Harvest Windthrow Fire Excavation-Quarry Road construction/maint.	High Moderate High Low Moderate	High Moderate Moderate Low Moderate	Bats Herptiles

[1] On steep slopes with shallow soils and areas with high 'edge' contrast.
[2] Especially in areas immediately downstream from unstable headwalls.
[3] Highest vulnerability correlates with diminished root strength 3-7 years post-harvest.
[4] Harvest in BLM riparian areas is unlikely, but State Forest Practice Rules do not protect all riparian areas.
[5] Localized areas of increased peak-flow are likely given harvest on public and private lands.
Zone 1 - Aquatic (includes streams and seeps)
Zone 2 - Stream bank (includes splash zone)
Zone 3 - Zone of riparian influence (includes area inhabited by riparian vegetation)
Zone 4 - ½ site-potential tree height (110')
Zone 5 - One site-potential tree height (220')

Step 2 - Issues and Key Questions

1) What are the primary ecological values associated with interim Riparian Reserves in the Lower South Fork Coquille Watershed? Which of these resources are in need of special management or are currently considered to be deficient?

2) What are the potential effects of various management activities (including modification of the reserve width) on these ecological factors?

3) Which management activities are appropriate for Riparian Reserves within the analysis area?

4) Are there suitable areas where modification to the interim Riparian Reserve boundaries on intermittent streams could occur?

5) What effect would modifications of the interim Riparian Reserve boundaries have on terrestrial and aquatic species?

Step 3 - Current Conditions

A. <u>Prevalent conditions of riparian vegetation and related disturbances</u>

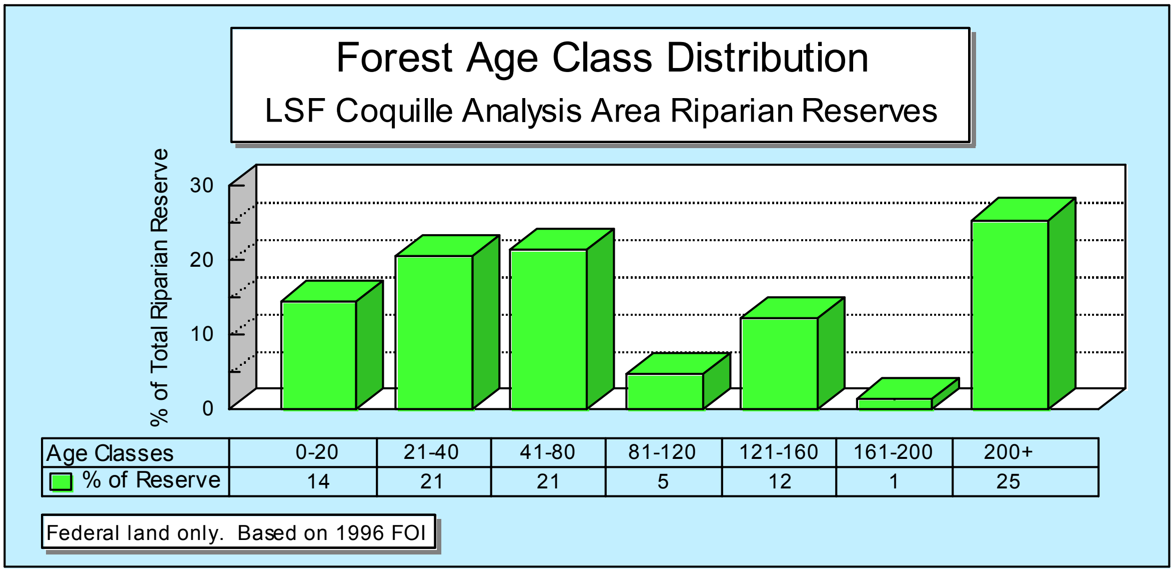
General riparian condition and the disturbance regime for the analysis area are presented in the Lower South Fork Coquille Watershed Analysis on pages 59-62 and 28-32, 36-38, 55-59, 63-67, & Appendix 5, respectively. Specific inventories of riparian areas on 1^{st} and 2^{nd} order streams, intermittent or otherwise, have not been included in this description and analysis. The available survey data indicates that this watershed has a low percentage of the riparian areas with a mature conifer component.

B. <u>Prevalent conditions and spatial distribution of major habitat components in the watershed</u>

Current conditions of the major habitat components (late-successional, riparian, lotic, lentic, seeps/springs, rock outcrops, and meadows) are presented in the Lower South Fork Coquille Watershed Analysis, pages 27-89. The spatial distribution of most of these habitats is illustrated in Figure 10. Figure 11 illustrates the spacial distribution of 40+, 80+, and 160+ year old stands within the interim Riparian Reserve. Few on-the-ground surveys have evaluated the presence or conditions of some of these features. The Lower South Fork Coquille Watershed Analysis included limited survey data, but was primarily based on GIS data (which is reliable but incomplete). Additional survey of these habitats are now being conducted.

The majority of Riparian Reserve acres are associated with small ($<3^{rd}$ order) streams, while open water habitats (ponds and large streams) are restricted to a few small ponds on private land and the South Fork Coquille River. True riparian habitats with riparian-associated vegetation are generally restricted to narrow bands along most headwater streams, but may cover much wider areas in wetlands, flood plains and along larger streams.

Figure 11a. Age-class distribution of Riparian Reserves.



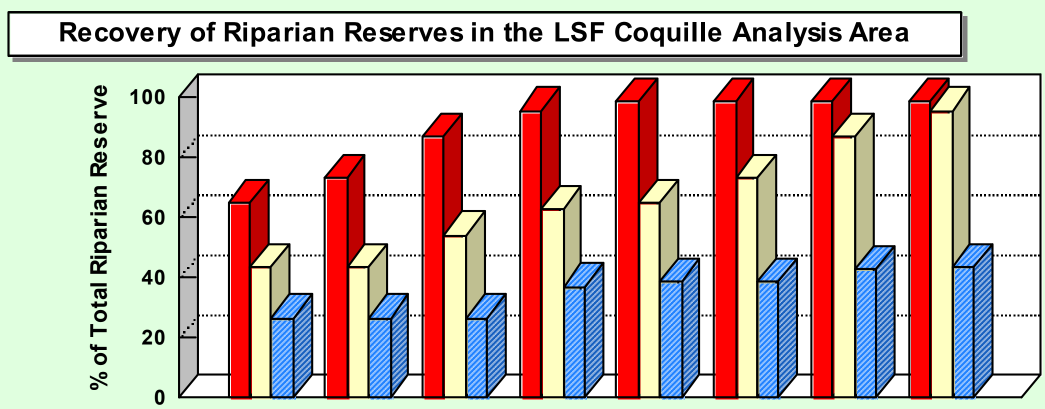
Forests on BLM-administered land in Riparian Reserves are highly biased towards 0-80 and 200+ year old forests, and biased away from 80-200 year age classes (see Figure 11a). The oldest stands in Riparian Reserves are highly concentrated in the Salmon and Baker Creek drainages (as opposed to being well distributed throughout the watershed). The function of Riparian Reserves for the ACS and for other wildlife benefits assumed in the Northwest Forest Plan is tied to late successional forest habitat. Habitat for early successional species is generally of less concern (because of its abundance and because of the ecological characteristics of species associated with early successional habitats) and is generally provided in the GFMA. As indicated in Figure 11b, it will be only 20 years before significant additional areas enter the 80-year age class, but over 70 years before >50% of Riparian Reserves contain trees older than 160 years. Within the analysis area, there are deficiencies (in some areas) of snags and large wood structure (including high-quality, non-alder hardwood nesting structures for songbirds), and habitat corridor connectivity for dispersal and connection with up-slope areas for riparian-associated and riparian-dependent wildlife species.

While spring and seep habitat is fairly common in the analysis area, it cannot be mapped with available GIS data. However, springs and seeps often occur at contacts between geological formations, and contacts between high and low permeability soils. Figure 2 shows contacts between geological formations where springs and seeps may be present. Figure 5a shows the contacts between high and low permeability soils.

Certain soil types (18E, 19F, 21D, 22E) within the analysis area have a compacted clay layer at a depth of 18 to 30 inches, which is impervious to water. This produces a perched water table, especially between December and March. This perched water table tends to surface where hillslopes are interrupted by benches. Springs/seeps are also commonly manifest where roads intercept groundwater or these perched water tables. Spring and seep habitat is important for many species of wildlife and, since they are not always along streams, they may sometimes be inadvertently missed when delineating Riparian Reserves in the field.

Rock and talus habitats are common throughout the analysis area, and are generally associated with unmapped inclusions of Digger and Umpcoos soils. While there is a high likelihood that many of these areas currently fall within interim Riparian Reserves, the precise location of rock and talus habitats will need to be defined through systematic surveys. Figure 10 shows the location of all known rock outcrops.

Figure 11b. Projected development of Riparian Reserve.



Decade	2000	2010	2020	2030	2040	2050	2060	2070
Stands =>40 years	64.93	73.42	87.23	95.60	98.94	98.94	98.94	98.94
Stands =>80 years	43.56	43.61	54.32	62.82	64.93	73.42	87.23	95.60
Stands =>160 years	26.62	26.64	26.64	37.03	38.94	38.94	42.67	43.55

Assumption: Interim riparian reserve widths are maintained.

C. <u>Current condition of physical values in the interim Riparian Reserve</u>

The current conditions of the physical values in the interim Riparian Reserves (channel/sub-watershed condition, empirical evidence of past consequences, vegetation management, stream channel stability, slope processes and stability, surface erodibility of side slopes, and soil productivity) are described in the Lower South Fork Coquille Watershed Analysis, pages 27-89. The information presented in the Watershed Analysis and figures above indicates that the quality and function of much of the riparian habitat in the Lower South Fork Coquille analysis area have been degraded.

Step 4 - Reference Conditions

A. Expected composition, character, and distribution of riparian network

The desired conditions for riparian vegetation and the disturbance regime are described in the Lower South Fork Coquille Watershed Analysis, pages 92 & 93 and Appendix 5, respectively; reference sites are identified on page 101.

B. Potential future condition of interim Riparian Reserves

Figure 11b shows the proportion of Riparian Reserves in the Lower South Fork Coquille analysis area that are 40+, 80+, and 160+ years of age, and projects the development of these areas through time. Given time and sufficient protection, the natural processes of succession and maturation should restore most degraded areas. Where insufficient native seed sources exist, or where exotic plant or alder/salmonberry-dominated stands inhibit establishment of desired native plant communities, active management may be required to restore Riparian Reserves to desired condition and function. However, given the current fuel loading conditions within this watershed and what is known of the natural disturbance regime, there is an increased potential for catastrophic fire, which would temporarily impact the composition, character, and distribution of riparian vegetation within the analysis area. Furthermore, it is likely that flooding and accelerated mass wasting (debris torrents and landslides) will further degrade channel integrity and aquatic habitat condition. These increased risk factors are the result of past management practices, including over-harvest, stream cleaning, log drives/splash dams, road construction, and fire suppression, all of which have compromised this watershed's capacity to function within the natural disturbance regime.

C. Probable species distribution in the analysis area

Wildlife and their habitats are generally described in the Lower South Fork Watershed analysis on pages 15-18, 54, & 77-89. No additional inventories of habitat have been conducted since the preparation of the watershed analysis. Fish distribution is described in the Lower South Fork Watershed Analysis on pages 67-77, and illustrated in Figure 6.

All riparian-associated and riparian dependent wildlife species (from Table 1) were probably more abundant and widespread historically. While populations are naturally dynamic, changes have been more pronounced in this century (since European settlement). Habitat loss, fragmentation, and degradation, plus introduced competition and predation from exotic species have all contributed to population declines. Concerns relative to wildlife species associated or dependent on riparian areas include declining bat populations and the isolation of Southern torrent salamanders and tailed frogs within segments of streams. These species groups are particularly susceptible to these changes and have probably experienced more pronounced declines. Other species, such as beaver, have been the target of specific removal efforts and have subsequently experienced significant declines in distribution and function. Current populations are healthy, but are probably lower than historic levels.

It is estimated that population viabilities for any plant and wildlife species will not be directly affected over the range of that species by any actions in this watershed. However, local viabilities of many plant and wildlife species are likely to be affected by management actions within this analysis area. Most of the species listed in Table 1 are likely to experience reduced population viability, limited dispersal, or local extirpation if declining habitat trends continue.

Step 5 - Synthesis and interpretation

A. <u>Function of the riparian network in the analysis area with respect to the ACS objectives</u>

Table 3. Function of the riparian network in the Lower South Fork Coquille Watershed with respect to the ACS objectives

ACS OBJECTIVE	RATING *	JUSTIFICATION
Objective 1- Distribution, diversity and complexity of landscape-scale features	Not properly functioning	In terms of distribution, diversity, and complexity, the best riparian habitats within the analysis area are found within the Key Watershed portion, largely due to the concentration of federally-managed land there. However, Generally poor riparian habitat exists within the Lower South Fork Coquille relative to 5th field watershed (S. Fk. Coquille River), because management-related fragmentation and management-induced disturbances outside the range of the natural physical processes and disturbance regime have impaired these features and simplified the landscape.
Objective 2 - Spatial & temporal connectivity	Not properly functioning	High densities of culverts and roads and timber harvest within the analysis area have reduced connectivity in riparian areas. Lower South Fork Coquille River is down-cut and disconnected from its flood plain. Poor water and habitat quality within the analysis area reduces within- & between-watershed connectivity. Refugia are isolated. As indicated in Figure 12, the configuration of the Riparian Reserves and ownership in the Lower South Fork Coquille analysis area does not provide connections with adjacent sub-watersheds.
Objective 3 - Physical integrity of aquatic system	Not properly functioning	Most fish-bearing streams in watershed down-cut due to lack of large roughness elements. Large wood is generally deficient in streams and flood plains. Large-scale reduction of bank integrity along Lower South Fork Coquille River and tributaries due to agricultural development and timber harvest in riparian areas.
Objective 4 - Water Quality		Not properly functioningLower South Fork Coquille River is identified as water-quality limited, due to high temperature, low dissolved oxygen, and fecal coliform.
Objective 5 - Sediment Regime	Not properly functioning	Excessive fine sediments and/or turbidity and higher-than-expected width/depth ratios have been observed in some tributaries. There has been a management-related increase in landslide frequency.
Objective 6 - Instream Flows	At risk	Low flows are being exacerbated by poor channel conditions and out-of-stream uses.
Objective 7 - Flood plain Innundation	Not properly functioning	Most streams disconnected from flood plains and receive little or no seasonal innundation.
Objective 8 - Species Community Diversity and Riparian Veg Function	Not properly functioning	Riparian plant communities are generally simplified, with a preponderance of the early to mid-seral condition, and compromised LWD dynamics.
Objective 9 -Plant, Invertebrate, and Vertebrate Habitat	Not properly functioning	Habitat for late-seral and old growth-associated riparian-dependent species is isolated or non-existent in most drainages. (See Figures 11 and 12)

* assessment of the watershed as a whole and not any site specific condition.

B. Differences between existing and expected wildlife habitats

It is estimated that the current Riparian Reserve age class distribution (Figure 11a) produces lower quality habitats than is expected for the watershed. Habitats less than 80 years old represent 56% of the BLM-administered Riparian Reserves. Only 26% of the Riparian Reserves are 160+ years old and estimated to be fully functional. The remaining 74% is estimated to be only partially functional for many wildlife species, and may not provide full connectivity to essential habitats for the more mobile species. It is expected to take more than 80 years to have >50% of the BLM-managed Riparian Reserves older that 160 years and in a fully functional condition. The Connectivity Blocks seem to have poor spacial distribution (Figure 11) of older-age Riparian Reserve. The objectives of the Connectivity Blocks are not likely to be realized until there is a substantial increase in functional Riparian Reserve. There are five sections of LSR where Riparian Reserves are not fully functional at present, and are not likely to be fully functional for the next few decades.

Wildlife habitats within Riparian Reserves are expected to provide optimal amounts of snags and down coarse wood with decay classes somewhat evenly represented. Matrix lands are typically managed to retain the minimum amounts of these features. The combined quantity and quality of structures in the reserves and Matrix lands are currently not at a level of function to satisfy management objectives.

C. Synthesis of riparian habitat stratifications

Table 4 is an evaluation of riparian areas in the watershed based on their capacity to provide the key physical and biological values discussed earlier. In this table, those values have been integrated into eight “indicators” of key habitat areas, both for the present and future. This analysis was conducted at the drainage level.

Table 4. Results of the composite Riparian Reserve area ranking process

Indicator	Salmon Cr.		Baker Cr.		Rowland Cr.		Dement Cr.		Yellow Cr.		Mill Cr.		LSF Coquille	
	Curr	Pot	Curr	Pot	Curr	Pot	Curr	Pot	Curr	Pot	Curr	Pot	Curr	Pot
Large Proportion LS Habitat	H	H	M	H	L	H	L	L	L	L	L	L	L	L
Contiguous Habitats	M	H	M	H	M	H	L	L	L	L	L	L	L	L
Provides connections betw. drainages and adjacent Rip. Reserves	H	H	L	M	L	M	L	L	L	L	L	L	M	H
High LWD and Snags[1]	L	H	M	H	L	H	L	M	M	M	L	L	L	M
Potential for Riparian Restoration	L	M	M	M	M	H	M	H	L	L	L	L	L	M
Road Density	L	L	H	H	L	L	H	L	M	M	M	M	M	M
Quality of Aquatic Habitat	M	M	M	M	M	H	L	M	?	?	?	?	?	?
Aquatic Habitat Restoration Potential	L	M	M	M	H	H	L	M	L	M	L	M	L	M

Curr = Current Pot = Potential H = High value M = Medium value L = Low value

No significant inventories for snags or down logs have been conducted. The rating is based solely on the known occurrence of past salvage activities which removed these structures and the presence of roads parallel to the stream which facilitated theft and removal of individual down logs (areas with known salvage activity or roads received "L", all others received "M").

D. Characteristics/conditions that are most important to understanding the riparian system and function at the site scale.

The characteristics important to understanding the Lower South Fork Coquille riparian ecosystem structure and function at the site scale could include:

- position in stream/riparian network
- duration of flow (i.e., perennial vs. intermittent)
- magnitude of peak and base flows
- soil type
- local topography, geology, & geomorphology
- disturbance regime and history
- presence and distribution of aquatic, riparian-dependent, and riparian-associated plant and animal species
- desired function (spatially and temporally)
- flood plain dynamics
- management history (including unauthorized uses; i.e., livestock)

- aspect/potential exposure to solar radiation
- presence of and proximity to seeps, springs, and rock outcrops
- mass wasting/sediment & LWD delivery potential
- vegetation, habitats and age-class
- connectivity with the riparian system and the terrestrial system

E. Susceptibility and exposure of the key values to hazards

Refer to Table 2.

Step 6 - Recommendations

1. Restore riparian features, processes, and functions, including aquatic and terrestrial wildlife habitat:

   - Site-specific inventory of the riparian areas on 1st and 2nd order streams and wetlands (both greater than and those less than 1 acre in size) is needed.

   - Consider acquisition or conservation easement of privately owned lands to establish continuity in federally managed lands and enhance connectivity within the Key Watershed.

   - When the need to reduce open road density is identified through the TMO process, consider treating road systems within Riparian Reserves first.

   - Where roads retard or prevent attainment of ACS objectives, decommissioning of the road or development of alternate access routes should be considered.

   - Riparian Reserves should contain optimum levels of coarse wood and snags representing all decay classes well-distributed throughout the reserve. Where deficiencies exist , consider creating these structures artificially.

2. Adjust interim Riparian Reserve boundaries (ranked high to low priorities):

   Based on the proceeding analysis and the professional judgement of botany, fisheries, hydrology, soils, and wildlife specialists, there are limited opportunities to modify the interim Riparian Reserve boundaries on intermittent streams/seeps wetlands within the Lower South Fork Coquille analysis area in accordance with the Aquatic Conservation Strategy. The team recognizes that the Lower South Fork Coquille analysis area encompasses diverse geomorphic features and habitats, and that the distributions of the species in Table 1 within this area are not mapped or completely understood. Therefore, any modifications of interim Riparian Reserve boundaries must be analyzed at the site level and tailored to the specific features of the site. To this end, the following recommendations are intended to guide the interdisciplinary team in subsequent site-level analysis and planning:

a) Seeps/springs/wetlands - ensure they are included within Riparian Reserves and that the reserve widths are sufficient to maintain the characteristics of the site (e.g. shading, cool water, sediments, stable substrates, similar flow patterns/timing, maintenance of riparian vegetation, etc.). Pages C-30 and C-31 from the ROD should be referenced in the decision process for management of wetlands, seeps and springs. See Figures 2 and 3 for possible seep/spring/wetland locations.

b) Rocky habitats - Where rocky habitats occur within the interim Riparian Reserves, ensure that buffers are sufficient to maintain the characteristics of the site (e.g. temperature, humidity and wind velocity). Interim Riparian Reserve widths should not be reduced where such reductions would isolate TPCC withdrawal areas.

c) In order to maintain habitat to support well-distributed populations of Northern spotted owls, dispersal habitat (conifer stands 40+ years old) should be maintained in at least 75% of the BLM-administered Riparian Reserve acreage. Riparian Reserve boundary modifications should not preclude the attainment of 75% owl dispersal habitat within Riparian Reserves in the analysis area and its LSR and Connectivity Blocks in the next 20 years.

d) Only approximately 26% of Riparian Reserves are presently >160 yrs of age; therefore the old-growth forest component of the Riparian Reserves is deemed inadequate to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species at present. Additionally, because of the current condition and skewed ageclass distribution within the Riparian Reserves, very little accrual of functional old-growth habitat is possible for several decades. Given these circumstances, any modification of interim reserve widths that reduces the amount of functional late-seral or old-growth riparian habitat, or retards the accretion of functional old-growth Riparian Reserve habitat from the 80+ age class, is likely to retard or prevent attainment of ACS objectives. Therefore, modifications to interim Riparian Reserve boundaries in areas with functional late-seral or old-growth riparian habitat are not recommended at present.

e) Interim Riparian Reserve boundaries should be maintained in areas with sensitive soils (Figure 1), and areas subject to mass wasting or shallow rapid debris flows (Figure 5). Note: Figures 4 and 5 are intended to be used by the interdisciplinary team during the EA process to identify areas of relatively high and low stability, where modification of the interim Riparian Reserve boundary may be more or less appropriate. It should be noted that the maps are model outputs and require field verification. The maps are perhaps most useful for prioritizing areas for field review, and graphically illustrating similarities and differences in stability across the landscape. Analysis of unstable areas, including a landslide inventory, is available in the Lower South Fork Coquille Watershed Analysis (BLM 1996).

f) Riparian Reserves should be at least 100' wide on each side of intermittent streams to maintain LWD dynamics; except: 1) where a ridge line exists within 100' of a stream, in which case the ridge line may be used to delineate the Riparian Reserve boundary, and 2) where discontinuous/disjunct stream channels preclude the possibility of downstream conveyance of LWD, in which case an appropriate site-specific prescription could be developed to maintain the characteristics of the site.

g) Modification of interim Riparian Reserve boundaries should be tracked in a GIS database.

h) The predictive tools or models used to determine the boundaries of intermittent stream channels, and field reviews using observed physical or biological indicators to delineate these channels needs to be monitored to validate the processes. A sample of intermittent channels should be visited in September-October to determine the presence or absence of stream-flow and key supporting biological indicators. Flow recession analysis needs to be completed to ensure low flows of the season fall within the 80% flow duration, based on the years of record. This information will help adjust and build the stream delineation methods for intermittent streams.

3. Areas for potential management projects (ranked high to low priority areas) within the interim Riparian Reserve boundaries:

Refer to pages 99-102 of the Lower South Fork Watershed Analysis. Additionally, consider prescribed burning within Riparian Reserves with excessive fuels loading.

Literature Cited:

Carpenter, D.P. 1995. Morphometric comparisons of ephemeral and intermittent stream channels in two types of Western Oregon geologies. Unpublished report.

Corn, P.S. and R.B. Bury. 1989. Logging in Western Oregon: responses of headwater habitats and stream amphibians. For. Ecol. Manage., 29:39-57.

Dunne, T., and L.B. Leopold. 1978. Water in environmental planning. W. H. Freeman and Co., New York. 818 p.

EPA. 1980. An approach to water resources evaluation of non-point silvicultural sources (a procedural handbook). Environmental Research Laboratory, Atlanta, GA. EPA-600/8-80-012.

FEMAT. 1993. Forest ecosystem management: An ecological, economic, and social assessment. Interagency Report.

Frest, T.J., and E.J. Johannes. 1993. Mollusc species of special concern within the range of the Northern Spotted Owl. Final Report prepared for the Forest Ecosystem Management Working Group, USDA Forest Service, Pacific Northwest Region, Portland, OR. Deixis Consultants, Seattle, WA.

Haagen, J.T. 1989. Soil survey of Coos county Oregon. USDA, Soil Conservation Service. 269 p.

Maser C., B.R. Mate, J.F. Franklin, C.T. Dyrness. 1981. Natural history of Oregon coast mammals. USDA For. Serv. Gen. Tech. Rep. PNW-133. Pac. Northwest For. and Range Exp. Stn., Portland, OR. 496 p.

Meinzer, O.E. 1923 Outline of ground-water hydrology, with definitions. U.S. Geological Survey Water-Supply Paper 494. 71 p.

McDade, M. H., Swanson, F. J., Franklin, J. F., Van Sickle, J. 1990. Source distances for coarse woody debris entering small streams in western Oregon and Washington. Can. J. For. Res. 20: 326-330.

Nussbaum, R.A., E.D. Brodie Jr., R.M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. Univ. of Idaho Press, Moscow. 332p.

Rosgen, D. L. 1994. A classification of natural rivers. Catena 22, (1994) 169-199.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.L. Jack, and W.J. Zielinski (tech. eds.). 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the western United States. Gen. Tech. Rep. RM-254. Ft. Collins, CO: U.S. Department of

Agriculture, Forest Service, Rocky Mountain forest and Range Experiment Station. 184 p.

Ursitti, V. 1991. Riparian vegetation and abundance of woody debris in streams of southwest Oregon. Masters Thesis, Oregon State University, Corvalis, OR. (p. 82).

Wellman, R.E., J.M. Gordon and R .L. Moffatt. 1990. Statistical summaries of stream-flow data in Oregon. USGS Open-File Report 90-118.

Table 1. Species expected to benefit from Riparian Reserve protection in the Lower South Fork Coquille analysis area with habitat associations.

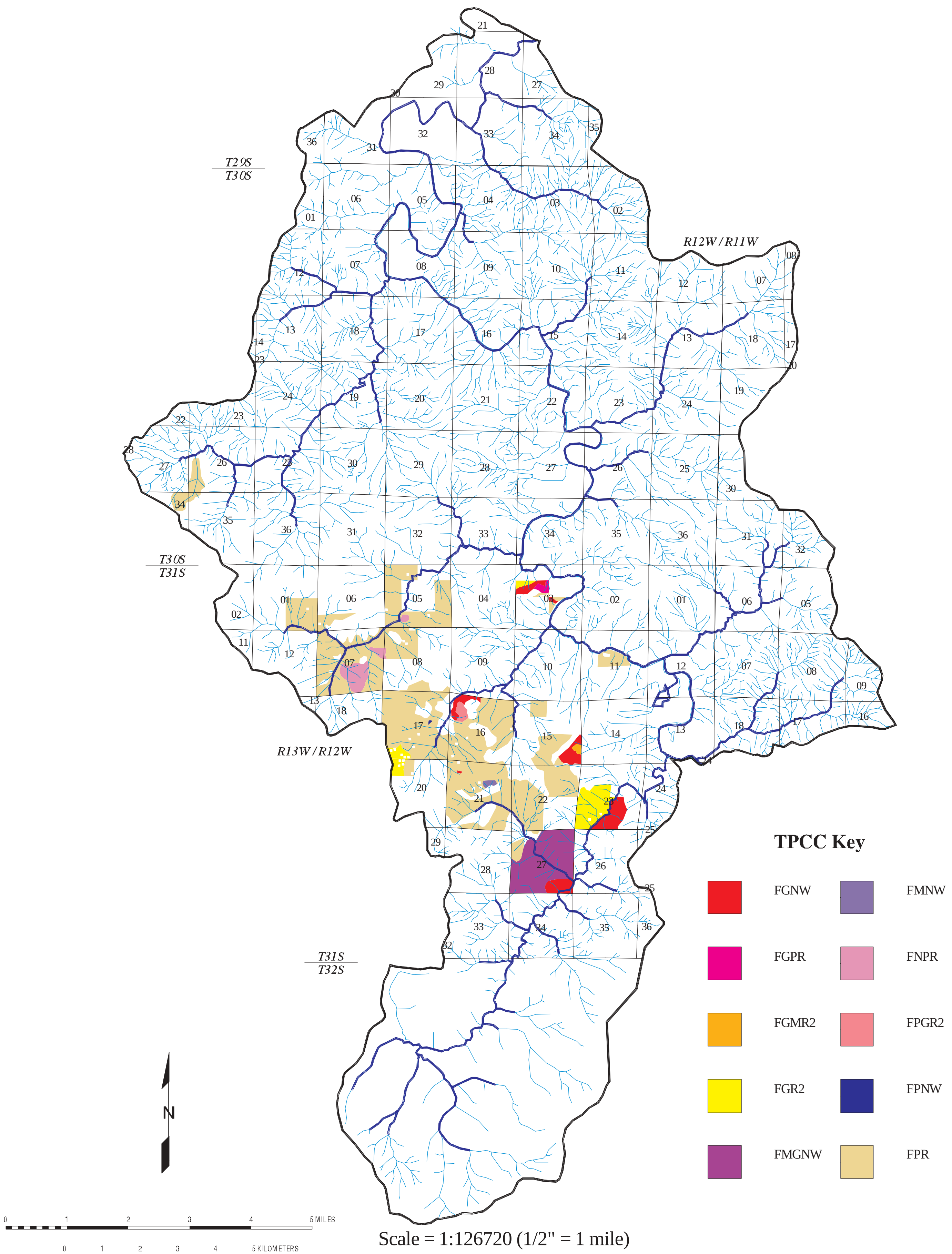
		Habitat Associations					
Species	ACS	Late-Seral[1]	Riparian	Aquatic - Lotic	Aquatic - Lentic	Seeps, Springs	Rock, Talus
PLANTS							
BYROPHYTES							
Antitrichia curtipendula		X	X				
Douinia ovata		X	X				
Kurzia makinoana			X				
Plagiochila satoi		X	X				
Racomitrium aquaticum	ACS		X				
Scouleria marginata	ACS			X			
FUNGI - Rare gilled Mushrooms							
Clitocybe subnitopoda		X					
FUNGI -Moss Dwelling Mushrooms							
Galerina atkinsoniana		X	X				
Galerina cerina		X					
Galerina hetrocysis		X	X				
Galerina vittaeformis			X				
Rickenella setipes			X				
FUNGI - Mycorrhizal							
Gomphus clavatus			X				
Gomphus kauffmanii		X					
FUNGI							
Sarcosoma mexicana		X					
LICHENS - Riparian							
Collema nigrescens		X					
Platismatia lacunosa			X				
Ramalina thrausta		X	X				

		Habitat Associations					
Species	ACS or S&M	Late-Seral[1]	Riparian	Aquatic - Lotic	Aquatic - Lentic	Seeps, Springs	Rock, Talus
Usnea longissima		X	X				
LICHENS - Decaying Wood							
Cladonia umbricola		X					
Icmadophila erictorum		X					
LICHENS - Forage							
Alectoria sarmentosa		X					
Bryoria capillaris		X					
Bryoria glabra		X					
LICHENS - Rock							
Pilophorus acicularis		X					
LICHENS							
Lobaria hallii		X					
VASCULAR PLANTS							
Adiantum jordanii		X	X				
Allotropa virgata		X					
Erythronium revolutum		X	X				
Iliamna latibracteata		X	X				
INVERTEBRATES							
Beer's false water penny beetle	ACS		X	X			
Burnelli's false water penny beetle	ACS		X	X			
Montane bog dragonfly	ACS		X		X	X	
Denning's Agapaetus caddisfly	ACS		X	X		X	
AMPHIBIANS							
Southern torrent salamander	ACS	X	X	X		X	
Tailed frog	ACS	X	X	X		X	
Northwestern pond turtle	ACS		X	X	X		
Foothill yellow-legged frog	ACS		X	X			

		Habitat Associations					
Species	ACS or S&M	Late-Seral[1]	Riparian	Aquatic - Lotic	Aquatic - Lentic	Seeps, Springs	Rock, Talus
Red-legged frog	ACS	X	X	X	X	X	
FISH							
Chinook salmon (fall)	ACS			X			
Coho Salmon	ACS			X	X		
Winter steelhead	ACS			X			
Pacific Lamprey	ACS			X			
Coastal cutthroat trout	ACS			X	X		
MAMMALS							
Pacific Western Big-eared Bat **		X	X	X	X	X	X
American Marten **		X	X	X			
White-footed vole *	ACS		X				
Fisher **		X	X	X			
Red Tree vole *		X	X				
Beaver	ACS		X	X	X		
BIRDS							
Northern spotted owl **		X	X				
Northern Goshawk **		X					
Bald Eagle **		X	X	X	X		
Marbled Murrelet **		X	X				
Purple Martin **		X					
Pileated Woodpecker *		X	X				
American Peregrine Falcon **		X	X				X

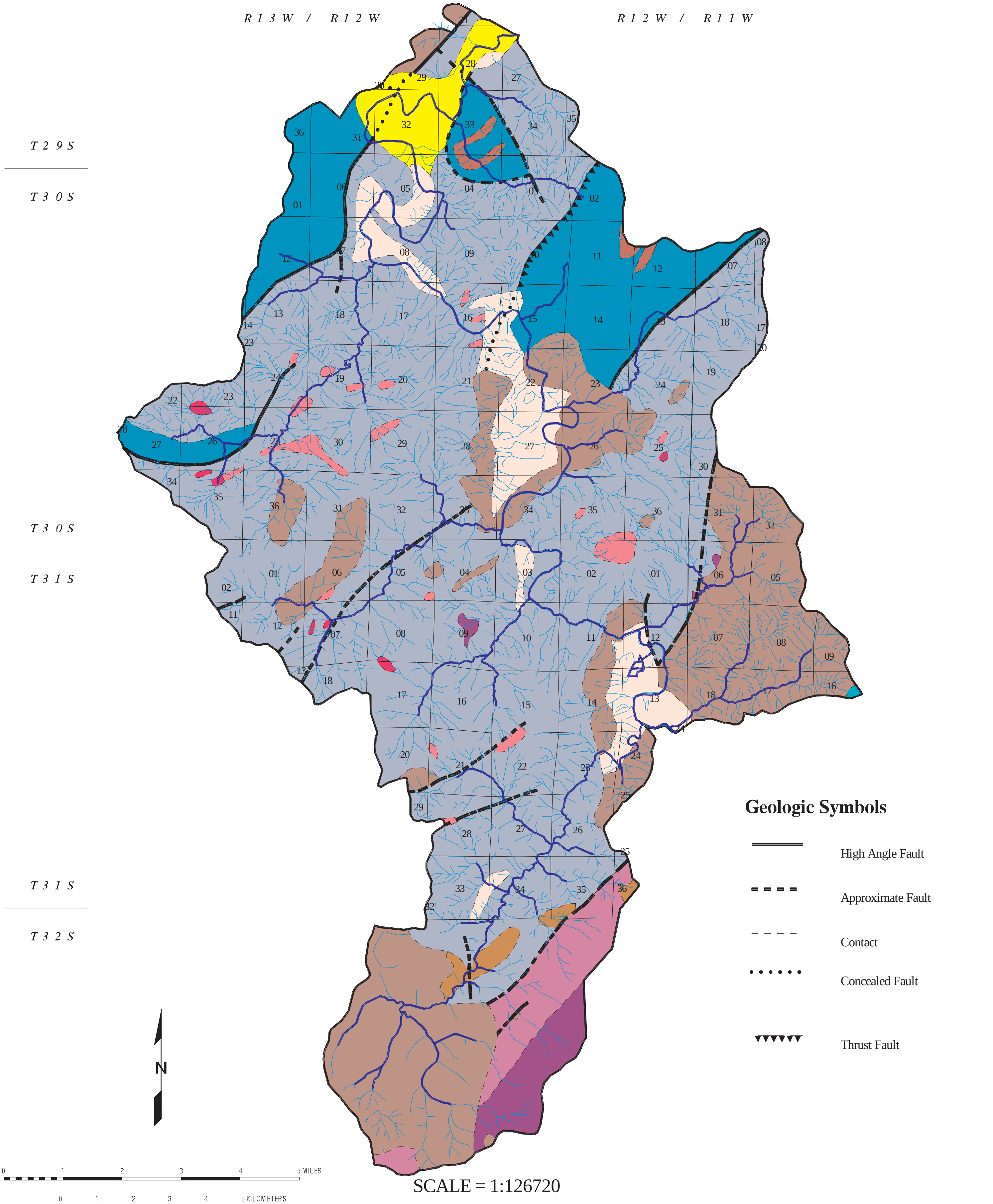
* special status species of local concern known to be in the watershed, benefitted by Riparian Reserves.
**special status species of regional concern thought to be in the watershed, benefitted by Riparian Reserves.
[1] Many of these are late-seral associates, not obligates. This classification is due in part because of a habitat quality issue.

Figure 1. TPCC fragile and withdrawn areas within the Lower South Fork Coquille Watershed



Scale = 1:126720 (1/2" = 1 mile)

Figure 2. Geologic map of the Lower South Fork Coquille Watershed



Legend for Lower South Fork Coquille Watershed Geology Map

Quaternary Alluvial Deposit [Qal]: Consisting of varying proportions of unconsolidated clay, silt, sand and gravel.

Quaternary Terrace [Qt]: Elevated deposits of loosely compacted rudely bedded sand and minor gravel with subordinate organic matter found locally.

Tyee Formation [Tet]: Thick sequence of rhythmically bedded micaceous sandstone and siltstone.

Lookingglass Formation [Telg]: Rhythmically bedded non-micaceous sandstone and siltstone; basal beds are coal-bearing and conglomeratic locally near the base of the section.

Roseburg Formation [Ter]: A thick sequence of sandstone and siltstone; rhythmically bedded locally containing minor conglomerate and massive sandstone.

Roseburg Formation [Terv]: As above with large sub-units composed of pillow and brecciated submarine basalts.

Humbug Mountain Conglomerate [Khm]: Conglomerate containing clasts of chert, schist, diorite, greenstone and sandstone.

Otter Point Formation [Jop]: Composed of primarily sheared sedimentary rock.

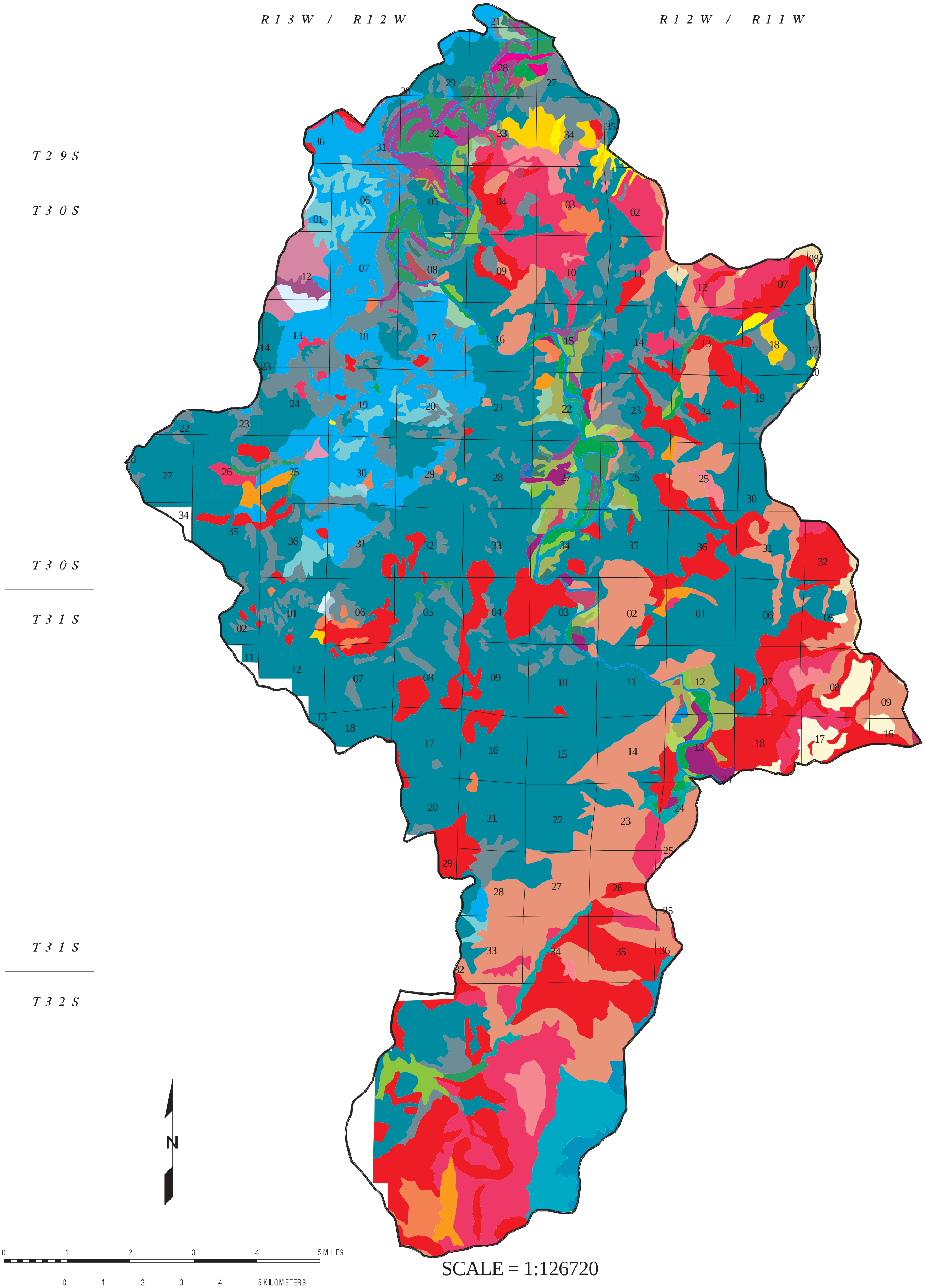
Otter Point Formation [Jov]: As above with subordinate volcanic strata.

Otter Point Formation [Js]: As above with areas of serpentine and bodies of blueschist, also known as the Colebrooke Schist.

Serpentinite [Jsp]: A greenish soft rock composed of minerals of the serpentine group; an alteration product of ultramafic rocks, such as peridotite, occuring as concordant sheets a
nd tectonically emplaced dikes.

Galice Formation [Jgv]: Dark gray, fissile mudstone and siltstone interbedded with thin beds of fine-grained sandstone with subordinate volcanic rocks.

Figure 3. Soil Type Map for the Lower South Fork Coquille Watershed



SCALE = 1:126720

Legend for Lower South Fork Coquille Watershed Soil Map

- Coos County -

9
10A
10B
10C
13D
13E
13F
57
48
14F
15F
49E
49F
50D
50E
58F
No Data

17B
24
25
33
36C
36D
37C
47B
63B
63C
63D
65
44D
44E
45D
45E
46D
46E

18E
19F
20C
20D
20E
21D
22E
51D
51E
53D
53E
W

Figure 4. Surface erosion modeled with MSLE for the Lower South Fork Coquille Watershed

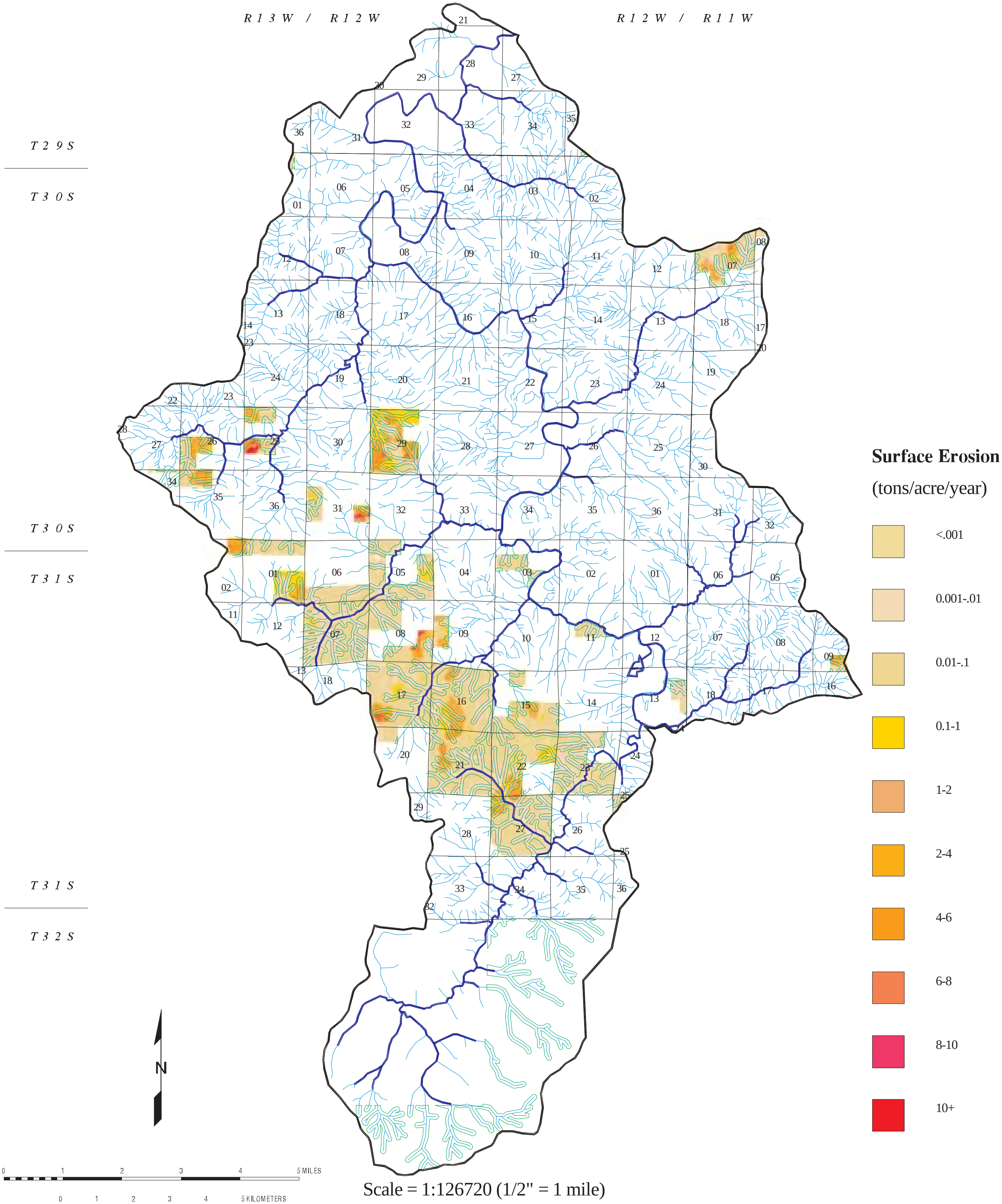


Figure 5. Mass wasting modeled with ISE for the Lower South Fork Coquille Watershed

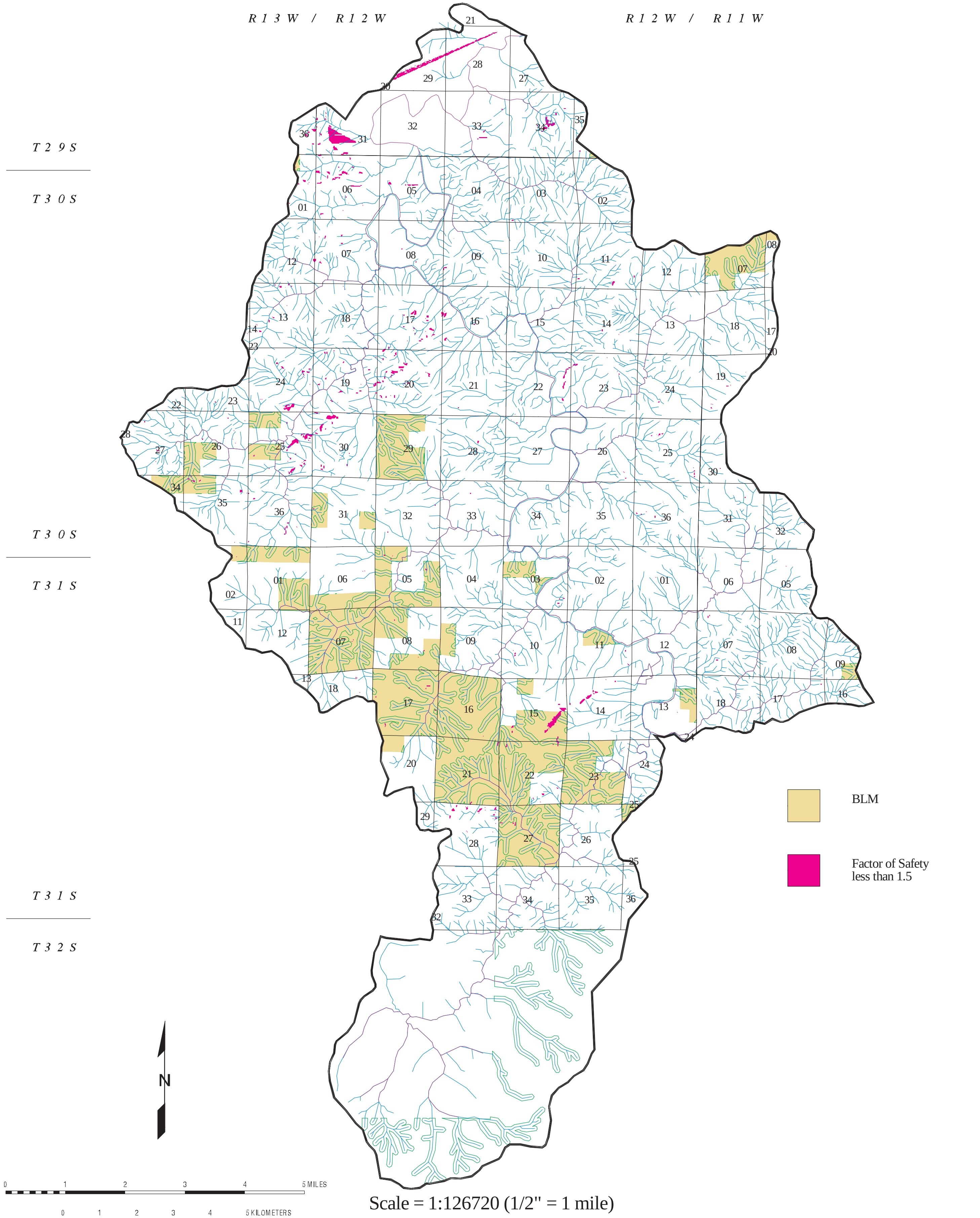


Figure 6. Fish-bearing streams in the Lower South Fork Coquille Watershed

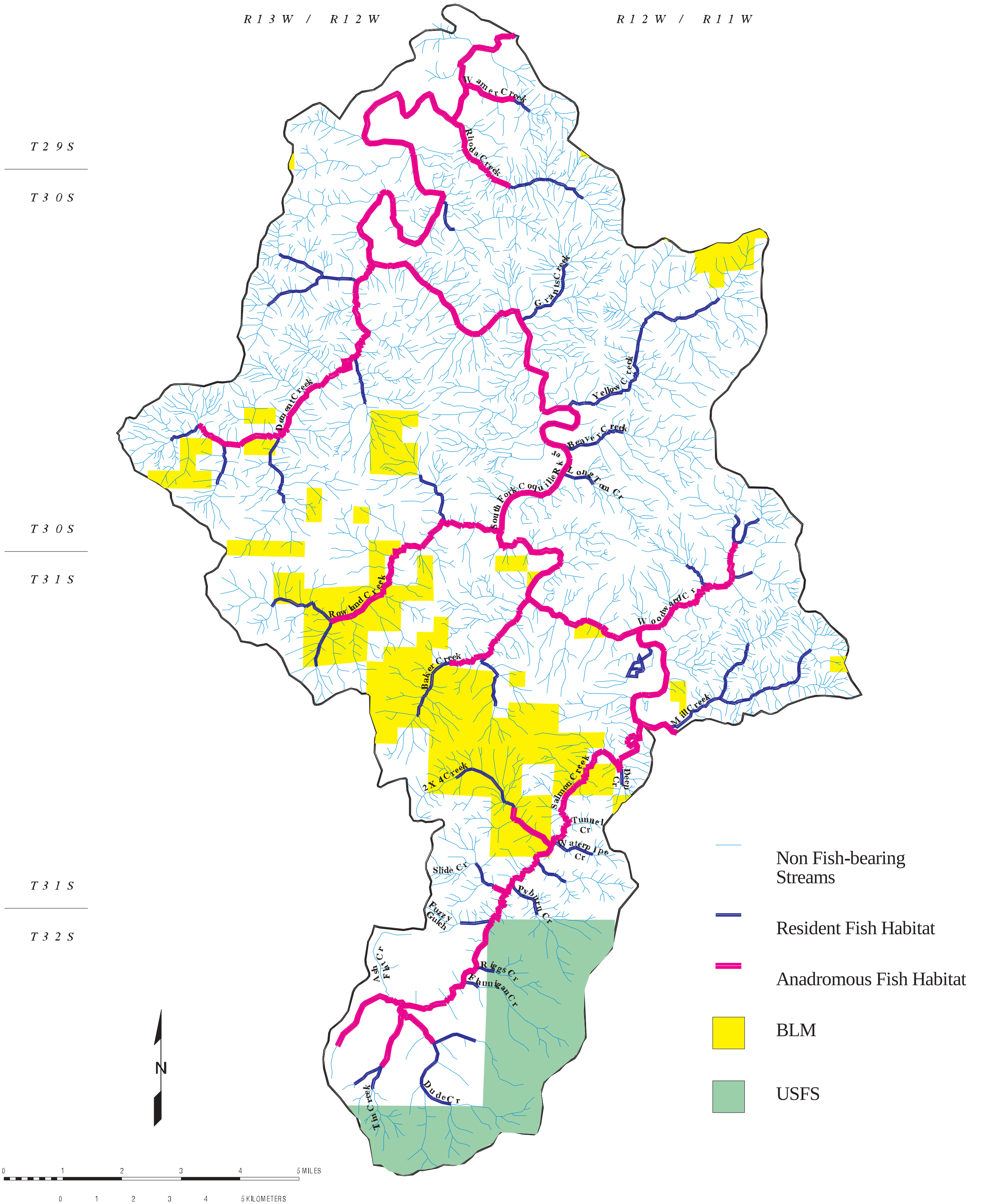


Figure 7. Example of flow accumulation modeling for the Lower South Fork Coquille Watershed

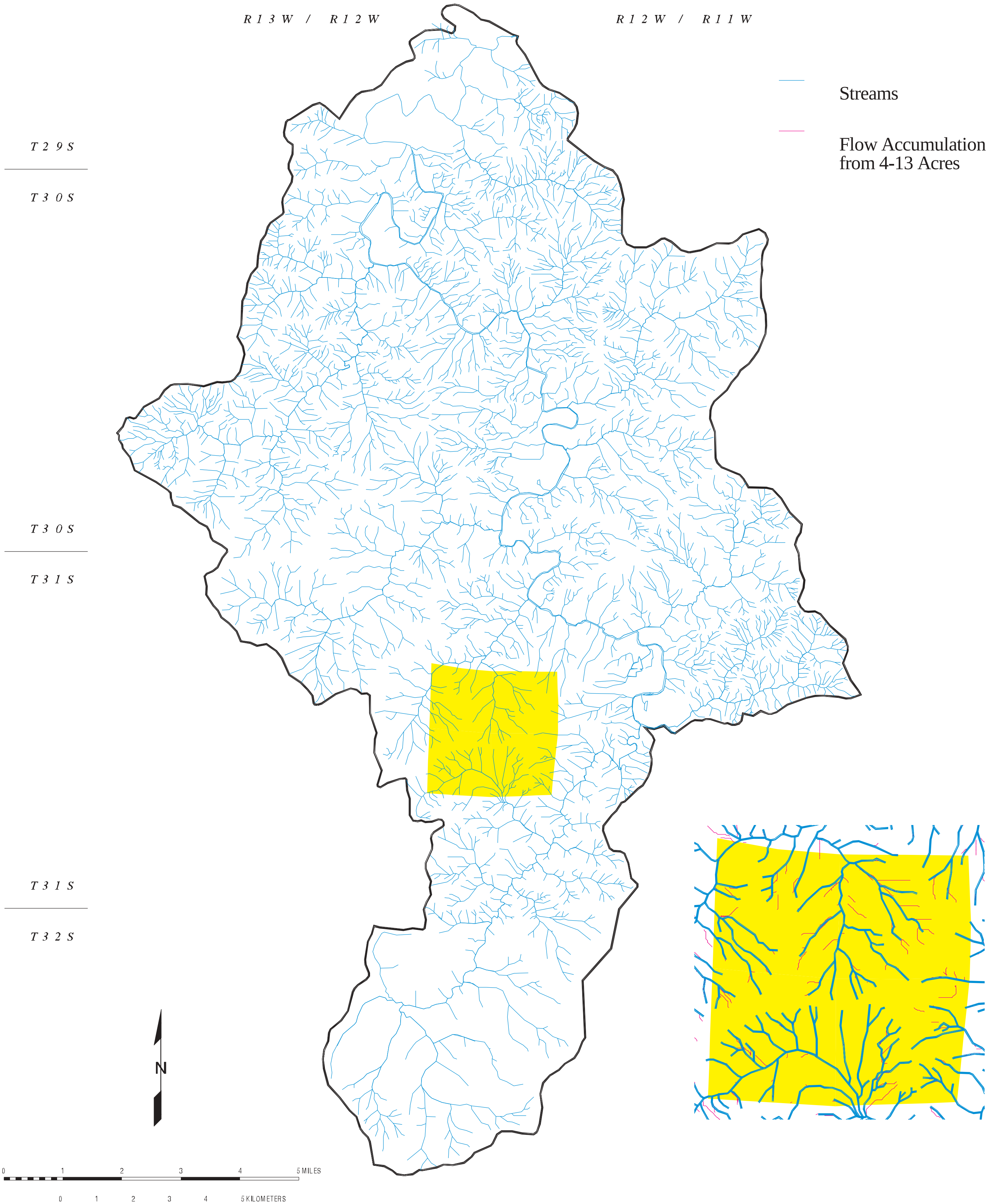
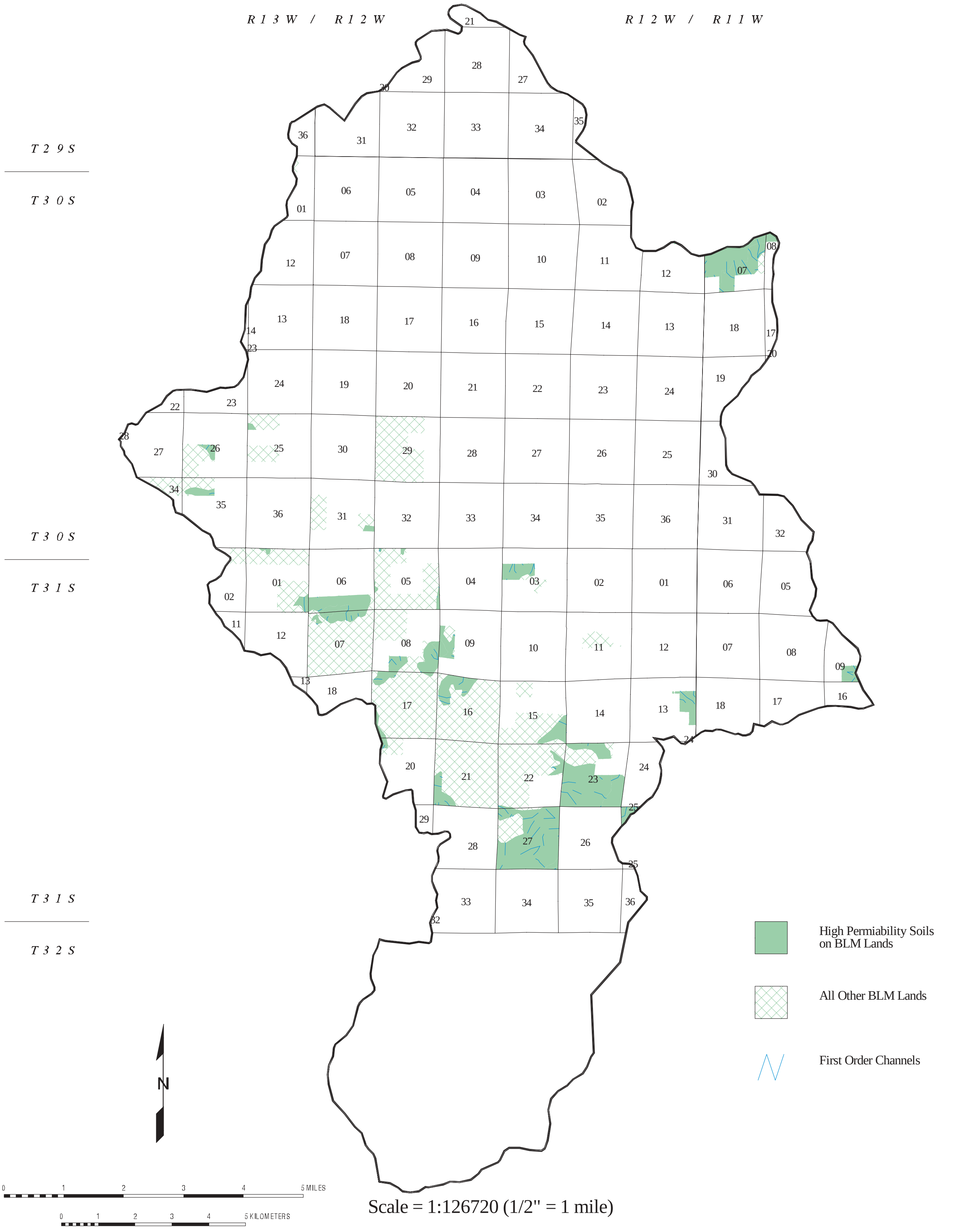


Figure 9. Estimated intermittent streams for the Lower South Fork Coquille Watershed: first order channels on high permeability soils (infiltration rate = 2-6 inches/hour)



Scale = 1:126720 (1/2" = 1 mile)

Figure 12. Riparian reserves 80+ years old on BLM & USFS lands in and adjacent to the Lower South Fork Coquille Watershed