POTLATCH RIVER
WATERSHED MANAGEMENT PLAN

October 2007

Sponsored by:

Latah Soil and Water Conservation District
220 East 5th Street
Moscow, Idaho

Prepared by:

Resource Planning Unlimited, Inc.

POTLATCH RIVER WATERSHED MANAGEMENT PLAN
Table of Contents

POTLATCH RIVER WATERSHED MANAGEMENT PLAN
Table of Contents

POTLATCH RIVER WATERSHED MANAGEMENT PLAN
Table of Contents

Potlatch River Watershed Management Plan

Preface

The purpose of the Potlatch River Watershed Management Plan is to provide land owners, land managers and conservation agency staff with a guideline to facilitate the collaborative coordination of steelhead habitat restoration efforts throughout the Potlatch River watershed.

The Potlatch River Watershed Management Plan is designed to link individual land owner conservation objectives with a prioritized set of restoration strategies designed to help restore steelhead to a robust, self-sustaining population in the Potlatch River watershed.

The management plan defines priority restoration and protection strategies within individual watersheds and their respective land types. Land owners and managers, in collaboration with natural resource conservation planners within federal, state and local agencies, should use this management plan as a tool to direct voluntary steelhead restoration efforts on private and public lands within each subwatershed within the Potlatch River system.

Chapter 1.

Function of the Potlatch River Watershed Management Plan

The word "Potlatch" is an American Indian word derived from an old ceremonial gathering where gifts, feasting, and tribal leadership were demonstrated and proclaimed (Farbo 1996).

1.1 Potlatch River Watershed's Relationship to the Clearwater Subbasin Planning Process

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act, which authorized the states of Idaho, Montana, Oregon, and Washington to create the Northwest Power and Conservation Council (Council). The Act directs the Council to prepare a program to protect, mitigate, and enhance fish and wildlife of the Columbia River Basin that have been affected by the construction and operation of hydroelectric dams, while also assuring the Pacific Northwest has an adequate, efficient, economical, and reliable power supply. The Act also directs the Council to inform the public about fish, wildlife, and energy issues and to involve the public in its decision making.

In late 1996, the Clearwater River Subbasin was designated a Focus Program under the Council's Columbia River Basin Fish and Wildlife Program. The Clearwater Focus Program coordinates projects and interagency efforts to enhance and restore aquatic and terrestrial habitats in the Clearwater River Subbasin to meet the goals of the Council's Fish and Wildlife Program. The Idaho Soil Conservation Commission (ISCC) and the Nez Perce Tribal Watershed Division co-coordinate the Focus Program on behalf of state of Idaho and the Nez Perce Tribe (NPT). Work on the Clearwater subbasin planning that resulted in the *Clearwater Subbasin Assessment, Inventory, and Management Plan* (Ecovista 2003) was coordinated through the Focus Program and the Policy Advisory Committee (PAC).

Restoration projects have been conducted on private, state, federal, and tribal lands; partnerships have been developed for all projects. In addition to the ISCC and NPT, project partners have included the USDA Forest Service (USFS), Natural Resources Conservation Service (NRCS), soil and water conservation districts, private landowners, Idaho Department of Fish and Game (IDFG), Idaho Department of Lands (IDL), and the Bureau of Land Management (USDI BLM).

Four major tributaries drain into the mainstem Clearwater River: the Lochsa, Selway, South Fork Clearwater, and North Fork Clearwater Rivers. For subbasin planning purposes, the Clearwater Subbasin was segmented by the Focus Program into 27 smaller watersheds. These smaller watersheds are referred to as 6^{th} field hydrologic unit codes, which include the Potlatch River watershed.

1.2 History of the Potlatch River Watershed Planning Process

The Latah Soil and Water Conservation District (Latah SWCD) began developing a Potlatch River Watershed Management Plan in 1994. Extensive habitat, riparian and fish survey work was conducted throughout the watershed in 1995 and 1996 with the assistance of multi-disciplinary agency teams. Planning efforts waned due to a lack of funding and resources by the end of the 1990s.

By 2001, the Latah SWCD was awarded a contract through Northwest Power and Conservation Council's Fish and Wildlife Program. The funding was focused on improving instream fish habitat in the Potlatch River and the lower Clearwater River through comprehensive watershed planning, implementation of best management practices, expanded water quality, and fish habitat monitoring. The planning and implementation efforts were modeled after the Clearwater Subbasin Management Plan's recommendations (Ecovista 2003). These recommendations were the result of assessed vegetative, fish, and wildlife resources within the overall Clearwater Subbasin and the Potlatch River watershed. The assessment detailed the threats, limiting factors, and historic/current distribution of fish and wildlife.

In 2004, additional funding from the Idaho portion of the Pacific Coastal Salmon Recovery Fund was awarded to the Latah SWCD to begin implementation actions and to IDFG to conduct additional fisheries monitoring.

Also in 2004, funding was awarded to the Latah SWCD by Idaho Department of Environmental Quality (IDEQ) and the ISCC through the Water Quality Program for Agriculture. The funding was targeted at addressing water quality issues associated with listed streams in Section 5 of the 2002 Integrated Report (IDEQ 2005).

1.3 Role of the Latah SWCD in the Potlatch River Watershed Management Plan

The Latah SWCD implements natural resource conservation programs on private land throughout Latah County. The Latah SWCD annually updates their operational plan of work, referred to as the Five-Year Plan. The Five-Year Plan identifies Latah SWCD's focus on natural resource issues and programs on private lands.

Resources within Latah County are in the Latah SWCD's Five-Year Plan and defined as "Resources of Community Concern (ROCC)." Primary ROCCs are broad groups of resources. Secondary ROCCs are further delineations that represent a more refined definition for resource management purposes.

Together with the assistance of multiple agencies, the Potlatch River Watershed Management plan was developed. The Latah SWCD has adopted this plan, which focuses on the primary ROCC of **fish** with the secondary ROCC identified as **steelhead trout**.

Chapter 2.

Potlatch River Watershed Assessment

> Lewis and Clark originally named the Potlatch River "Colter Creek" after their companion, John Colter, the discoverer of Yellowstone. When excavations were made at the mouth of "Colter Creek" for the Northern Pacific Railroad, one of Lewis and Clark's medals, wrapped in many thicknesses of buffalo hide, was uncovered. It is believed to have been the medal given to the friendly Nez Perce Chief, Twisted Hair (Conley 1982).

2.1 General Watershed Description

The Potlatch River is the largest tributary to the lower Clearwater River Basin, a subwatershed of the Columbia River Basin. The Potlatch River watershed, comprised of approximately 377,776 acres (590 square miles), is characterized by steep basaltic canyons rimmed by rolling cropland in the lower reaches, and by timbered hills and high meadow terrain in the upper reaches (Schriever and Nelson 1999). The Potlatch River originates northeast of Bovill in the Beals Butte area (Figure 2.1). The basin ranges in elevation from 4,932 feet on Beals Butte to approximately 1,000 feet at the confluence with the Clearwater River. The Clearwater joins the Snake River, and then the Columbia River. The communities of Bovill, Helmer, Deary, Troy, Juliaetta, and Kendrick are the principal towns within the watershed. The upper reaches of the Potlatch River basin contains the largest contiguous area of forested land cover in the Lower Clearwater River Basin.

The Potlatch River enters the Clearwater River west of Juliaetta. The Potlatch River is approximately 56 miles long and traverses the southern half of Latah County in a southwesterly direction with roughly 1,900 miles of tributary streams. The Potlatch River watershed was segmented into 6^{th} field HUCs (hydrologic unit codes) in the Clearwater Subbasin Management Plan (Ecovista 2003). Those HUCs were grouped into a potential management units for watershed project planning purposes. For purposes of this document, the Potlatch River watershed is divided into smaller watersheds. The smaller watersheds are listed as follows and their size is displayed in Table 2.1.

- Big Bear Creek
- Boulder Creek
- Cedar Creek
- Corral Creek
- East Fork Potlatch River
- Little Bear Creek
- Little Potlatch Creek
- Middle Potlatch Creek
- Moose Creek
- Pine Creek
- Ruby Creek
- West Fork Potlatch River
- Potlatch River Headwaters (headwaters to Moose Creek)
- Potlatch River (Moose Creek to Corral Creek)
- Potlatch River (Corral Creek to Big Bear Creek)
- Potlatch River (Big Bear Creek to the mouth of the Potlatch River)

Figure 2-1. Potlatch River Watershed Location

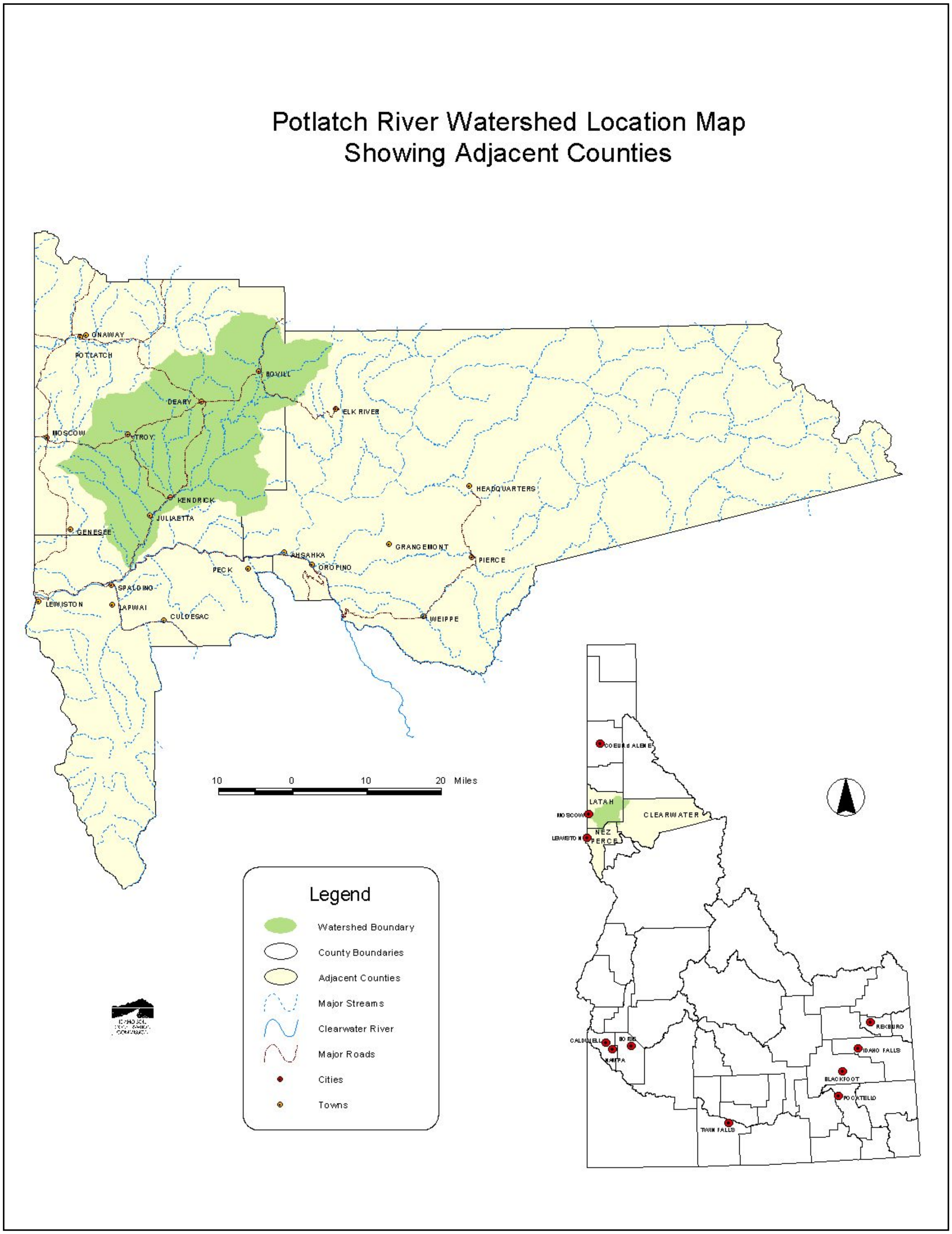


Table 2.1. Potlatch River Subwatershed Size

Subwatershed	Acres	Percent of Watershed
Big Bear Creek	61,008	16
Potlatch River Mainstem: Potlatch River Headwaters (to Moose Creek) Potlatch River (Moose Creek to Corral Creek) Potlatch River (Corral Creek to Big Bear Creek)	40,300	11
Little Bear Creek	39,745	11
Potlatch River (Big Bear Creek to the mouth of the Potlatch River)	38,000	10
Middle Potlatch Creek	35,300	9
Little Potlatch Creek	32,143	8
East Fork Potlatch River	31,500	8
Cedar Creek	25,200	7
Pine Creek	20,600	6
Corral Creek	14,300	4
West Fork Potlatch Creek	12,500	3
Boulder Creek	11,280	3
Ruby Creek	8,100	2
Moose Creek	7,800	2
Total	377,776	

2.1.1 Explanation of HUCs

HUCs are a way of identifying all of the drainage basins in the United States in a nested arrangement from largest to smallest.

The United States Geological Survey (USGS) divides and subdivides drainage basins in the United States at four different levels. Each is assigned a unique HUC consisting of eight digits based on these four levels. The four levels from largest to smallest are regions, sub-regions, accounting units, and cataloging units. HUC assignments are displayed in Appendix A.

The first level of classification divides the nation into 21 major geographic areas. These geographic areas contain either the drainage area of a major river, such as the Pacific Northwest region, or the combined drainage areas of a series of rivers.

The second level of classification divides the 21 regions into 222 subregions. A subregion includes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area.

The third level of classification subdivides many of the subregions into accounting units. These 352 hydrologic accounting units nest within, or are equivalent to, the subregions.

The fourth level of classification is the cataloging unit, the smallest element in the hierarchy of hydrologic units. A cataloging unit is a geographic area representing part of or all of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. These units subdivide the subregions and accounting units into smaller areas. Cataloging units are the equivalent of a drainage basin or "watersheds."

An eight-digit assignment uniquely identifies each of the four levels of classification within four two-digit fields. The first two digits identify the water-resources region; the first four digits identify the sub-region; the first six digits identify the accounting unit, and the addition of two more digits for the cataloging unit completes the eight-digit code.

The Potlatch River's eight-digit code is 17060306. Following the HUC numerical classification, the Potlatch River is in Region 17-Pacific Northwest Region, Subregion 1706-Lower Snake, Accounting Unit 170603-Clearwater, and Cataloging Unit 17060306.

2.2 Historic Landscape

Prior to the arrival of settlers into northern Idaho, the higher elevations of the Potlatch River watershed was largely covered by native forest. The ridges were likely open as a result of frequent fires. On warmer sites, ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) grew with a rich shrub understory dominated by oceanspray (*Holodiscus discolor*), ninebark (*Physocarpus malvaceus*), serviceberry (*Amelanchier alnifolia*), snowberry (*Symphoricarpos* spp.), and wild rose (*Rosa* spp.). Some of the ridges in moderate elevations (for example Texas and American Ridge) may have been meadow steppe with fingers of mixed conifers. Cooler north- and west-facing canyons supported some western redcedar (*Thuja plicata*), grand fir (*Abies grandis*), and western larch (*Larix occidentalis*) (Black et al. 2003).

According to Black et al. (2003), prior to 1900, the native grasslands occurred in the more mesic zone—on the wetter, eastern edge of the Palouse Prairie. This area was dominated by two perennial grass species, Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Psuedoregneria spicata*). Climax shrub communities, particularly bluebunch wheatgrass-snowberry, but also black hawthorn (*Crataegus douglasii*) and rose, grew on the northern sides of many of the loess hills. Throughout this zone, summer moisture was too low to sustain trees except near streams. Draws and waterseeps in the canyons supported a rich variety of tree species, including hawthorn and mock orange (*Philadelphus lewisii*). True riparian communities were largely limited to the Palouse and Potlatch Rivers and to the broad outwash plains along sections of the Snake and Clearwater Rivers. These riparian zones supported a narrow gallery forest of cottonwoods (*Populus trichocarpa*), quaking aspen (*P. tremuloides*), Rocky Mountain maple (*Acer glabrum*), and thinleaf alder (*Alnus incana*). Wetlands were scattered—the vegetation was diverse and typically dominated by camas, a mixture of forbs, and many grasses and grass-like plants.

Natural wildfire events from summer lightning storms played a major role in shaping these dynamic forest ecosystems. The drier ponderosa pine and Douglas fir forests had frequent, low intensity ground fires every few years, which maintained open multiple age forests and excluded fire intolerant trees, such as grand fir. The higher elevation zones had longer periods in between wildfire events, in many cases up to several-hundred-years. Infrequent but high intensity wildfires historically influenced the entire drainage, leaving a mosaic of early successional, single aged forests.

In the 1870s miners and settlers began arriving in the Palouse and Potlatch areas. Settlers cleared timbered ridges for farming, only using a limited amount of lumber for building homes and businesses. Early sawmills were small and produced lumber for local use. The arrival of railroads brought opportunities for the transportation of lumber to distant markets.

At the turn of the century, large timber companies began to log the mature stands of ponderosa and western white pine. The "White Pine King" near Bovill was a 425-year-old western white pine and cut on December 12, 1911 with a diameter of 6 feet 9 inches and a height of 207 feet (Gariglio and Hotinger 1998). Crosscut saws were used for felling and teams of horses were first used to skid logs to railroad landings and splash dams. Steam donkey engines and logging railroads became the most efficient way to log, replacing the reliance on horses. Steam donkey engines used large cable systems that could skid logs from one mile away.

A number of sawmills were built through time, beginning at Bear Creek and Pine Creek and then, one by one, springing up further east, even to the vicinity of Elk River. Early logging, roads, and fire have reduced woody debris directly through removal and indirectly by reducing recruitable debris in headwater streams.

According to the Latah County Historical Society, in 1905 the Washington, Idaho and Montana (WI&M) Railroad was built from Palouse, Washington to Harvard, Idaho, eventually terminating at Bovill in 1906. The railroad was primarily used to transport logs from the forest to the Potlatch Corporation mill, and many smaller spur railroads were built to temporarily bring the railroad closer to logging activities. The spur railroads were often built along streams, and occasionally in the streams and wetlands. Most of the spur railroads were only in place for about a year, just long enough for the logging activities to finish in that area and move to another location. According to Farbo (1996), the subwatersheds within the Potlatch River watershed that had spur railroads included West Fork, East Fork, Ruby, Boulder, Little Bear, Pine, Corral, and Moose Creeks. When logging activities were finished along spur railroads, the tracks were torn out and replaced with roadways.

The West Fork Potlatch Environmental Impact Statement prepared by the USFS (USFS 1996) states that many of the drainages and wetlands in the West Fork Potlatch River project area have been severely impacted by historic railroad logging. Railroad lines were built directly up the stream channels, straightening, relocating, and even overbuilding both headwater and fishery streams. These altered stream channels changed the energy regime and altered channel function and stability.

The introduction of the white pine blister rust in the United States during the early 1900s caused extensive mortality of white pine, leading to extensive salvage logging. Today most of the forests in the Potlatch River watershed are second- and third-growth stands, with very little native forest remaining (Gariglio and Hotinger 1998).

According to Bowersox et al. (2005), of the stream types surveyed in 2003 and 2004, forestland stream types have undergone the fewest alterations, although timber harvest and grazing occurred and continues to occur (other stream types surveyed included agricultural and canyon streams). These forestland streams are characterized by low gradients, dense canopy cover, and meadow connectivity.

2.3 Current Landscape

The upper areas of the Potlatch River watershed are dominated by Douglas fir and grand fir habitat types. The understory is predominantly hawthorn, mallow ninebark, oceanspray, bittercherry, rose, snowberry, Oregon grape, lupine and pinegrass (USDA SCS 1994).

The middle section of the Potlatch River watershed is composed of open grassland and open coniferous forest gradually increasing into a mixed, dense coniferous forest. The northerly slopes in the grassland area have varying amounts of shrubs and a few scattered ponderosa pines. As the climate becomes moister with lower temperatures, coniferous trees enter the plant community and become more dominant (USDA SCS 1994). The forest resource in the lower portion of the drainage consists of ponderosa pine and Douglas fir habitat types (Gariglio and Hotinger 1998). The lower steep southern slopes of the watershed can be characterized as open grassland areas consisting primarily of bunchgrasses. (USDA SCS 1994).

Riparian vegetation is generally well developed throughout the upper Potlatch River drainage, which provides streamside cover, stabilizes the bank structure, and reduces high summer water temperatures (Johnson 1985). The riparian vegetation is severely diminished within the lower Potlatch River as the high, scouring spring runoff precludes the establishment of an adequate riparian habitat. There is essentially no streamside cover provided by vegetation in the lower Potlatch River watershed (Johnson 1985).

The Clearwater Subbasin Management Plan identified noxious weeds found throughout the Potlatch River watershed (Ecovista 2003). Yellow starthistle is found throughout the lower mainstem and lower reaches of lower mainstem tributaries, spotted knapweed is found along the mainstem below Juliaetta to Kendrick, Big Bear Creek, West Fork Potlatch River, and Ruby Creek. Rush skeleton weed is found in the Ruby Creek watershed and hawkweed is a problem in the West Fork Potlatch River.

2.4 Climate

Climate in the Potlatch River watershed is characterized as subhumid with cool moist winters and warm drier summers. Air temperature and precipitation in the watershed varies with elevation. Average summer high temperatures range from 90ºF in the valleys to 80ºF in the mid-elevations. Daily summer high temperatures can reach more than 100ºF in the valleys and approach 100ºF in the higher elevations. January low temperatures average around 25ºF in the valleys and are colder in the higher elevations. Temperatures below 0ºF are common in the winter. The average consecutive frost free period (above 32ºF) decreases as elevation increases and ranges from 88 to 175 days.

Average annual precipitation ranges from 15-20 inches in the valleys and increases to 50 inches in the headwaters. The area is characterized by high intensity localized rainfall events during the spring and summer months. The average growing season varies from 110 to 130 days in the northern portion of the watershed and from 120 to 140 days in the southern portion (USDA SCS 1994). Average annual precipitation and climate data is shown in Table 2.2 for Moscow and Lewiston. The tables cite the average monthly precipitation with a total precipitation value. In Appendix B, the records are displayed in tables and figures that show comparisons to average historic annual precipitation for stations surrounding the Potlatch River watershed, including Moscow, Lewiston, and Elk River, Idaho.

Long-term trends in precipitation and snowfall were observed by work done in the Potlatch River watershed by the Teasdale and Barber report (2005). Reported precipitation has apparently increased over the last century within the late winter and spring period (December through March). Increases ranging from 21 to 32% were observed with late winter precipitation increasing more than early winter. Snowfall reported for December has increased 89% (from 1900 to 2000), while February and March snowfall has decreased by 6 and 7%.

Precipitation patterns in the region appear to be shifting to a wetter, rainfall-dominated regime in late winter and spring, possibly increasing the number and severity of rain-on-frozen-ground events. These trend analyses by Teasdale and Barber (2005) were made using the data collected at the University of Idaho Plant Science Farm in Moscow, Idaho. There are no long-term climate stations within the Potlatch River watershed; therefore their work depended on the nearby climate and weather monitoring stations in Moscow, Idaho.

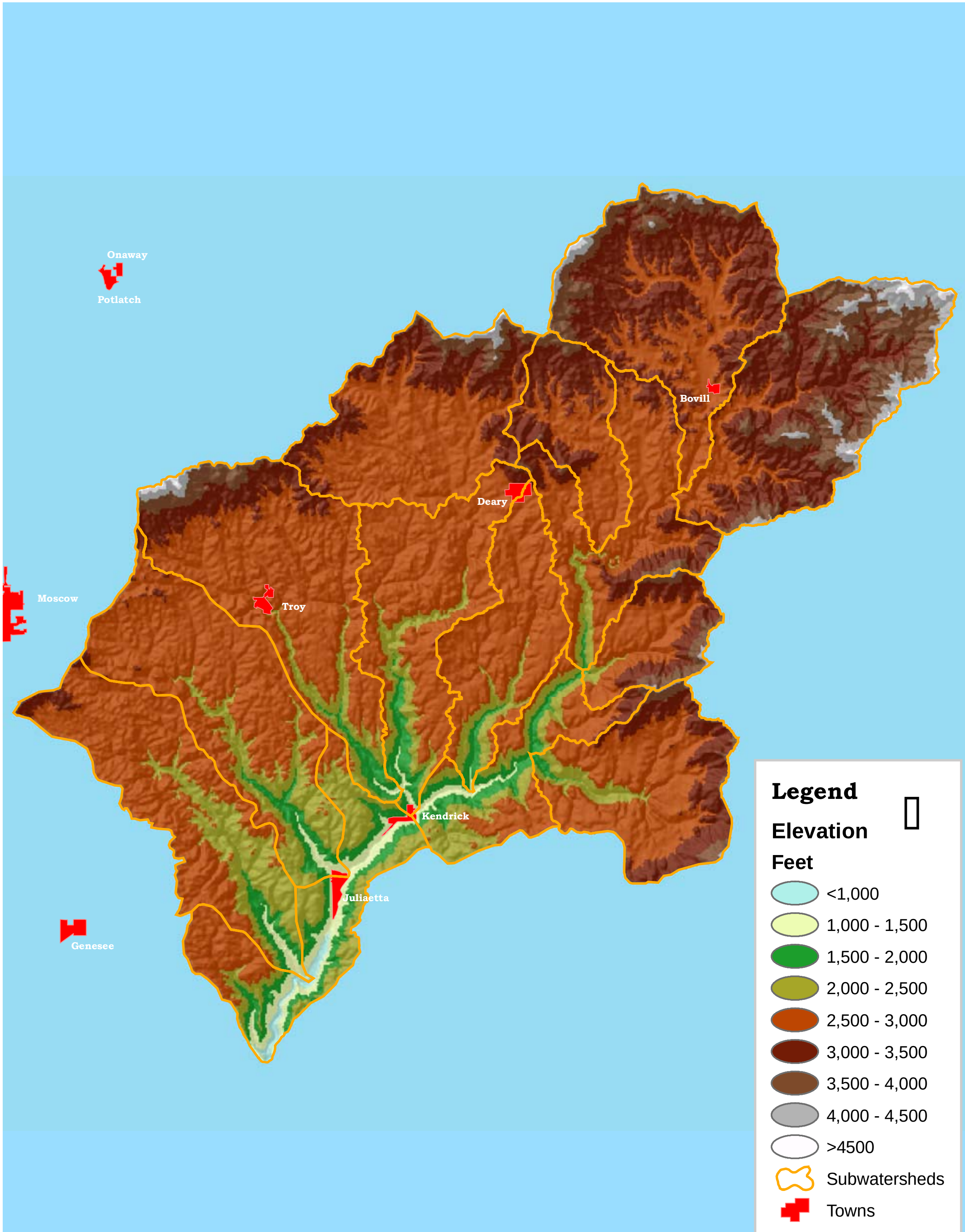
Table 2.2 Climate Summaries[1]

Latah County: station near east edge of Moscow, Idaho at University of Idaho Plant Science Farm (elevation: 2,660 feet), summary includes records between 1971 and 2000.								
	Temperature (ºF)			Precipitation (inches)				
					30% chance will have			
Month	Average daily maximum	Average daily minimum	Average monthly temp.	Average monthly precip.	Less than	More than	Ave # days with 0.1 inches or more	Ave. total snowfall
January	35.6	23.2	29.4	2.99	2.17	3.78	8	15.6
February	43.3	26.8	34.1	2.52	1.69	2.97	7	8.5
March	48.9	31.2	40.0	2.57	2.10	3.2	7	4.1
April	57.5	35.4	46.4	2.52	1.69	3.13	6	1.1
May	65.9	40.6	53.2	5.62	2.04	3.15	6	0.1
June	73.1	45.2	59.1	1.87	1.21	2.2	5	0.0
July	82.5	48.4	65.5	1.12	0.50	1.51	2	0.0
August	84.0	48.7	66.4	1.19	0.29	1.55	2	0.0
September	74.4	42.9	58.7	1.28	0.42	1.77	3	0.0
October	60.5	36.0	48.2	2.01	1.18	2.92	4	0.2
November	43.1	29.9	36.5	3.54	2.58	4.31	9	6.3
December	35.5	23.6	29.5	3.14	2.03	3.86	8	14.5
Average	58.5	36.0	47.3					
Total				27.39			67	50.4

Nez Perce County: station at Lewiston, Idaho; elevation (1,440 feet), summary includes records between 1971 and 2000.								
	Temperature (ºF)			Precipitation (inches)				
					30% chance will have			
Month	Average daily maximum	Average daily minimum	Average monthly temp.	Average monthly precip.	Less than	More than	Ave # days with 0.1 inches or more	Ave. total snowfall
January	40.1	28.0	34.0	1.15	0.75	1.44	3	3.9
February	46.4	31.2	38.8	0.96	0.56	1.14	3	2.5
March	54.6	35.6	45.1	1.12	0.81	1.33	3	0.7
April	62.4	40.6	51.5	1.30	0.83	1.73	4	0.1
May	70.8	47.0	58.9	1.56	1.07	1.78	4	0.0
June	78.7	53.5	66.1	1.16	0.74	1.42	4	0.0
July	88.4	59.2	73.8	0.72	0.30	0.96	2	0.0
August	88.5	59.3	73.8	0.75	0.20	0.98	2	0.0
September	77.7	50.9	64.3	0.80	0.28	1.15	2	0.0
October	62.9	41.2	52.1	0.96	0.54	1.34	3	0.1
November	47.7	34.1	40.9	1.21	0.78	1.47	4	1.8
December	40.0	28.5	34.3	1.05	0.64	1.22	3	3.4
Average	63.2	42.4	52.8					
Total				12.74			37	12.6

[1] Climate summaries accessed at USDA NRCS websites: ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/id/16057.txt and ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/id/160069.txt

Figure 2.2. Potlatch River Watershed General Landscape



2.5 Hydrology

Roughly 1,900 miles of tributary streams feed the Potlatch River, which is approximately 56 miles long. The stream receives most of its flow from rain and snowmelt in the winter and spring.

A USGS gauging station was returned to operation in August 2003 near the mouth of the Potlatch River. The station continues to collect real-time data including gauge height and discharge.[2] The site, referred to as USGS Station 13341570, is located approximately one mile upstream from the mouth of the Potlatch River. The station is operated in funding assistance from the Latah SWCD (see Appendix C). No USGS mainstem streamflow recordings have been collected on a continuous basis since 1960 when a USGS gauging station recorded stream gauge height and discharge from 1945-1960 at Kendrick. Other USGS stations have been in place throughout the watershed, including the East Fork Potlatch River below Mallory Creek near Bovill (1959 to 1960) and East Fork Potlatch near Bovill (1959 to 1971).

Approximately 95 percent of the annual stream flow occurs from December through June (USDA SCS 1994). On average, the February through May period accounts for 75 percent of the annual stream flow, March and April are the peak discharge months. Rain accompanied by warm chinook winds is a common occurrence in the winter and early spring, which often results in high and rapid runoff when snow pack is significant. During the winter, an intermittent snowpack covers parts of the watershed from November through March, providing additional runoff during rain events. The highest number of maximum daily precipitation events for each year occurs in November, December, or January and range from 1 to 2 inches. Precipitation events that exceed 1 inch a day in the watershed are not unusual. However, localized, high intensity rainfall may occur at any time of the year, producing high and rapid runoff.

Flow regimes were estimated for each of the streams evaluated in the *Potlatch River Subbasin Assessment and TMDLs* (IDEQ 2004). The February 1996 rain-on-snow event that caused widespread flooding in the lower Clearwater River Basin is noted in the report. The report cites references that high-runoff, rain-on-snow events, have a return rate of approximately 15 years noting that large events were recorded in 1919, 1933, 1948, 1964, and 1974.

Using NRCS Engineering Technical Release No. 20 (TR-20 Computer Program for Project Formulation-Hydrology), discharge for a five year 24-hour storm was estimated at 850 cubic feet per second (cfs) (USDA SCS 1994) under pre-settlement ground cover and canopy conditions. The same storm event under present land cover conditions has an estimated peak of 2,980 cfs. Total discharge for this peak was calculated at 1,265 acre-feet for the historic conditions and 3,720 acre-feet for present conditions.

The Potlatch River hydrograph has been altered by timber management practices, agriculture practices, mining activities, and urbanization, all of which have resulted in changes to vegetative cover, soil compaction, channel modifications, and changes in storage capacity (USDI BLM 2000). The current hydrograph reflects a flashy system where runoff occurs quickly. Instantaneous discharges of 8,000 cfs in winter and early spring followed by late summer flows less than 10 cfs are not uncommon. These flows lead to a very high movement in bedload,

[2] Stream gauge height and discharge recordings available at website: http://waterdata.usgs.gov/id/nwis/uv?13341570

suspended sediment, and organic debris and bedload deposition resulted in pool filling, channel erosion, and an overall loss in aquatic diversity (USDI BLM 2000).

The upland streams within the agricultural area of Potlatch River watershed are characterized by low gradients, incised channels, limited riparian vegetation, small substrate composition, and flashy hydrographs (Bowersox et al. 2005). The canyons located lower in the drainage are characterized by steep/timbered slopes and shallow soils. Canyons are deeply incised due to the basalt bedrock composition. Canyon streams are characterized by high gradients, large substrate size composition, riffle/pocketwater habitat types, and a flashy hydrograph. Forestland streams are characterized by low gradients, dense canopy cover, meadow connectivity, stable banks, and small substrate composition. Most streams throughout the watershed are currently dominated by Rosgen B and C channel types[3] (Bowersox et al. 2005). Some forestland streams such as Purdue, Feather and Cougar Creeks are predominantly E channel types.

2.6 Geology

The oldest rocks of the Potlatch River watershed form a thick widespread layered unit which geologists call the Belt Series, which consists of sedimentary rocks. Common examples of sedimentary rocks are stones formed of sand, silt, and clay piled by rivers into some kind of basin such as a valley, lake, or ocean. The Belt Series was formed of sediment brought by unknown rivers into a very ancient sea. Rocks in this region are identified as pre-Cambrian with ages at or more than 600 million years, some may be a billion years (Miller 1972). Some examples of the Belt Series rocks can be found in many of the higher hills at the headwaters of the Potlatch and Palouse Rivers. They are characterized by layering and are commonly split in flat or wavy slabs.

Miller (1972) reports that no fossils have been found in the Belt Series. Living things that existed when the series was formed were simple organisms without shells and skeletons. Soft parts of animals do not ordinarily fossilize.

Almost all other rock units in the basin are igneous (formed from cooling of molten rock substance). The intrusions of this igneous material are represented by granitic rocks. The granites form irregular bodies enclosed in the Belt Series rocks and are found at the surface only where the overlying host rock has been eroded away. The intrusions were formed near the periphery of the much larger intrusive body, known as the Idaho Batholith, which occupies central Idaho. The intrusions occurred mainly in the Cretaceous Period of geologic time, more popularly known as the age of the dinosaurs, approximately 130 to 150 million years ago.

When the granite intruded into the Belt Series, the character of the sedimentary rocks was changed (Miller 1972). This was the result of heat and the chemistry of soaking solutions and mineral-bearing waters. Minerals such as mica, feldspar, quartz, and garnet were added to rocks that were mostly sandstone and shale. The product is a metamorphic rock called gneiss. Examples of gneiss can be found in the Potlatch River near the Cedar Creek confluence. In addition, certain actions of the mineral-bearing waters were responsible for introducing veins of metallic mineral deposits such as gold, silver, copper, and zinc into the Potlatch River watershed.

---

[3] United States Watershed Assessment of River Stability and Sediment Supply citing Rosgen stream channel classification: http://www.epa.gov/warsss/sedsource/successn.htm

Near the town of Bovill, granitic rocks can be seen in the southeast face of the Big Rock Hill, along the East Fork Potlatch River between Little Meadow and Frei Meadow, and scattered throughout highway banks on Ruby Creek. Large areas of deeply weathered granite are found along the highway between Bovill and Clarkia.

A second group of igneous rocks is the Potato Hill Volcanics, which consists primarily of quartz latite. The formations resemble lava spouting from a volcano (Miller 1972). The volcanic material forms the entire mass of Potato Hill and Cherry Butte. A good example of an outcropping of quartz latite is uncovered in a railroad cut about a mile east of Deary.

Another kind of volcanic rock formation in the basin is known as the Columbia River Basalts. The basalts represent lavas that flowed over an enormous area covering half of the state of Washington, part of Oregon, and some of northern Idaho. These extrusions happened during the middle part of the Tertiary Period, about 6 million to roughly 30 million years ago. Examples of the basalt rock are found in road banks of the canyon near Troy, in canyon land south and west of Deary, near Kendrick and Juliaetta, and along railroad cuts south of Bovill. During periods without volcanic activity, streams, forests, and lakes formed along the landscape only to be covered by new lava. Along the Potlatch River below Juliaetta is an outcropping of shale clay, which contains fossils of semi-tropical plans such as fig and cypress.

Miller (1972) describes the flows of basalt that reached the Bovill and Deary area as late ones, because they are among the top layers of the stack. They buried a land surface formed of the three fundamental older rock units. The valleys of streams left in the formations were ancestors of the Potlatch, Palouse, and St. Maries Rivers; these ancient rivers were deeper than the present ones. The movement of the flows was arrested by the hills, and the lava cooled too much to flow further along the valleys. These events determined the edge of the basalt. Since the plateau was an effective dam across the streams, the remaining valleys beyond this edge became ponds and lakes. Sediment, some gravel, sand and clay from the surrounding hills was washed into the water bodies until they were filled. A large lake existed in the vicinity of Bovill. Some of the clay deposits formed west of Bovill have recently been mined.

The edge of the basaltic plateau, extending to the Bovill area, marks the line of the largest meadows. The soft sediments behind the basaltic dam were easily eroded, providing the broad valley floors that adapted to meadowland. Miller (1972) suggests that classification of the meadows is possible: 1) meadows largely or wholly within the sedimentary infill include the Warren Meadow and other meadows at Bovill, extending to Collins, Moose Meadow, and Erickson, Bronson, and Shea Meadows; 2) meadows along the basalt margin, where lava made contact with older rocks include the Horse Ranch, Jim McGary Meadow, Oviatt, and Round Meadows; 3) meadows partly influenced by infill, and partly by configuration of older rocks includes Little and Frei Meadow; 4) meadows entirely within the basalt include small meadows in the drainages of Pine and Bear Creeks near Deary, and meadows partly in the basalt include Hog and Eustler Meadows; 5) meadows entirely within older rocks include Badger Meadow, and the meadows of Emerald Creek.

2.7 Soils

From the source of the Potlatch River to the mouth of the East Fork Potlatch River, the soil is composed of soft granitic materials, which decompose rapidly to form suitable spawning gravels for salmonids (Johnson 1985). Below the East Fork Potlatch River, the soils are basaltic in origin and the streambed is primarily bedrock and boulders (Buechler 1982). Soil groups throughout the watershed are included in Table 2-3.[4]

The volcanic ash in this area originated from many active volcanoes in western Washington and western Oregon, such as Mt. St. Helens, Mt. Rainier, and Glacier Peak. The greatest contribution of ash in this area came about 6,600 years ago from the eruption of Mount Mazama. Because the climate was significantly drier when the ash fell, the only soils that now have this parent material are those of the ht Helmer, Huckleberry, Molly, and Vassar series. These soils at that time had a cover of Douglas-fir, which was sufficient to retain the ash that fell (USDA SCS 1981).

[4] Soil survey information found at URL: http://www.or.nrcs.usda.gov/pnw_soil/id_reports.html

Table 2-3. Soil Units in the Potlatch River Watershed

Soil Map Unit	Description	List of Soils
A) Soils formed in loess hills on grassland plateaus.	Strongly sloping to moderately steep, moderately deep to very deep, moderately well drained to well drained soils. The major map units in this group are Palouse Silt Loam, 7 to 25 percent slopes, Naff-Thatuna silt loams, 7 to 25 percent slopes, and Naff Palouse Silt Loams, 7 to 25 percent slopes. Other soils of minor extent include Tilma, Garfield, and Athena. Slopes are predominantly 7 to 25 percent. Most areas are used for cropland. Water erosion hazard is severe or very severe. Pesticide leaching loss potential is nominal. Pesticide surface loss potential is intermediate to high.	**Palouse**: Very deep and well drained. These soils formed on south-facing concave slopes. Native vegetation is mainly grasses. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderate and the available water capacity is high. Water erosion hazard is severe. **Naff**: Very deep and moderately well drained. These soils formed on north-facing convex slopes. Native vegetation is mainly grasses. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderately slow and the available water capacity is high. Water erosion hazard is severe. **Thatuna**: Very deep and moderately well drained, formed on north-facing slopes. Native vegetation is mainly grasses. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderately slow and the available water capacity is high. A perched water table from 36 to 48 inches occurs from February to April. Water erosion hazard is severe.
B) Soils formed in loess hills on forested plateaus.	Gently sloping to strongly sloping, very deep, moderately well to well drained soils. The major map units in this group are Santa silt loam, 5 to 20 percent slopes, Taney silt loam, 7 to 25 percent slopes, Southwick silt loam, 12 to 25 percent slopes and Larkin silt loam, 12 to 35 percent slopes. Other soils of minor extent include Helmer, Driscoll and Joel. Slopes are predominantly 7 to 25 percent. Most areas are used for cropland, hay and pasture. Most soils in this group have seasonal soil wetness due to a dense silty clay loam substratum. Water erosion hazard is moderate. Pesticide leaching loss potential is nominal. Pesticide surface loss potential is intermediate.	**Santa**: Very deep and moderately well drained. These soils formed in loess on back slopes or foot slopes. Native vegetation is mainly coniferous trees. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderate above a dense silt clay loam subsoil and very slow below. The available water capacity is moderate and the effective rooting depth is 20 to 40 inches. A seasonally perched water table from 18 to 36 inches occurs from February to April. Water erosion hazard is severe. **Tansy**: Moderately deep to fragipan and moderately well drained. These soils formed on plane to concave slopes in loess hills on plateaus. Native vegetation is mainly coniferous trees. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderate above the fragipan and slow through the fragipan. A seasonally perched water table from 18 to 30 inches occurs from February to April. The available water capacity is high. Water erosion hazard is severe. **Southwick**: Very deep and moderately well drained. These soils formed on north- and east-facing concave slopes. Native Vegetation is mainly coniferous trees. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderate above a dense silty clay loam subsoil and slow below. The available water capacity is high. A seasonally perched water table from 30 to 48 inches occurs from February to April. Water erosion hazard is severe. **Larkin**: Very deep and well drained. These soils formed on concave slopes on plateaus. Native vegetation is mainly coniferous trees. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderately slow and the available water capacity is high. Water erosion hazard is severe.
C) Soils formed in volcanic ash, loess and colluvium from basalt on hills and canyons	Moderately steep to steep, moderately deep to very deep, moderately well to well drained soils. The major map units in this group are Santa silt loam, 20 to 35 percent slopes, Helmer silt loam, 20 to 35 percent slopes, and Klickson silt loam, 25 to 35 percent slopes. Other soils of minor extent include Uvi, Nasser, Taney and Spokane. Slopes are predominantly 20 to 35 percent. Most areas are used for woodland. A few areas are cleared and used for hay and pasture. Most soils in this group have seasonal soil wetness due to a dense silty clay loam substratum. Water erosion hazard is severe. Pesticide leaching loss in intermediate. Pesticide surface loss potential is intermediate.	**Santa**: Very deep and moderately well drained. These soils formed in loess on back slopes or foot slopes. Native vegetation is mainly coniferous trees. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderate above a dense silty clay loam subsoil and very slow below. The available water capacity is moderate and the effective rooting depth is 20 to 40 inches. A seasonally perched water table from 18 to 36 inches occurs from February to April. Water erosion hazard is severe. **Helmer**: Very deep and moderately well drained. These soils formed in volcanic ash overlying loess on foot slopes. Native vegetation is mainly coniferous trees. Surface texture is silt loam. Depth to bedrock is more than 60 inches. Permeability is moderate above a dense silty clay loam subsoil and very slow below. The available water capacity is low and the effective rooting depth is 20 to 30 inches. A seasonally perched water table from 24 to 30 inches occurs from February to April. Water erosion hazard is severe. **Klickson**: Very deep and well drained. These soils formed in a thin mantle of loess over colluvium and material weathered from basalt on north and east facing canyon sideslopes. Surface texture is cobbly loam. Depth to bedrock is 60 inches or more. Permeability is moderate and the available water capacity is moderate. Water erosion hazard is very severe.

Table 2-3. Soil Units in the Potlatch River Watershed *(Continued)*

Soil Map Unit	Description	List of Soils
D) Soils formed in loess and colluvium on south facing canyons	Steep to very steep, moderately deep to very deep, well drained soils. The major map units in this group are Bluesprin-Keuterville complex, 35 to 65 percent slopes, and Bluesprin-Flybow complex, 35 to 65 percent slopes. Slopes are predominantly 30 to 65 percent. Most areas are used for rangeland. Water erosion hazard is very severe. Pesticide leaching loss potential is nominal to intermediate. Pesticide surface loss potential is intermediate to high.	**Bluesprin**: Moderately deep and well drained. These soils formed in a thin mantle of loess over residual material weathered from basalt on south and west facing canyon sideslopes. Surface texture is gravelly silt loam. Depth to bedrock is 20 to 40 inches. Permeability is moderately slow and the available water capacity is low. Water erosion hazard is very severe. Native vegetation is mainly grasses with scattered coniferous trees.
E) Soils formed in loess and colluvium from basalt or metasedimentary rock on north-facing canyons and mountainsides	Steep to very steep, moderately deep to very deep, well drained. The major map units in this group are Klickson cobbly loam, 35 to 65 percent slopes and Klickson-Bluesprin complex, 35 to 65 percent slopes. Soils of minor extent include Agatha, Minaloosa, Huckleberry, Keuterville and Kettenbach. Slopes are predominantly 30 to 65 percent. Most areas are used for woodland. Water erosion hazard is very severe. Pesticide leaching loss potential is intermediate. Pesticide surface loss potential is high.	**Klickson**: Very deep and well drained. These soils formed in a thin mantle of loess over colluvium and material weathered from basalt on north and east facing canyon sideslopes. Surface texture is cobbly loam. Depth to bedrock is 60 inches or more. Permeability is moderate and the available water capacity is moderate. Water erosion hazard is very severe. Native vegetation is mainly coniferous trees.
F) Soils formed in loess and volcanic ash over residuum from granite on mountainsides	Steep to very steep, moderately deep to very deep, well drained. The major map units in this group are Vassar silt loam, 20 to 35 percent slopes, Uvi silt loam 20 to 35 percent slopes, Uvi-Vasser association, very steep and Vassar silt loam, 35 to 65 percent slopes. Slopes are predominantly 20 to 64 percent. Most areas are used for woodland. Water erosion hazard is very severe. Pesticide leaching loss potential is intermediate. Pesticide surface loss potential is high.	**Vassar**: Deep and well drained. These soils formed in volcanic ash over residuum derived from granite on mountainsides. Surface texture is silt loam. Depth to bedrock is 40 to 60 inches. Permeability is moderately rapid and the available water capacity is moderate. Water erosion hazard is very severe. Native vegetation is mainly coniferous trees.
G) Soils formed in loess, volcanic ash, and residuum derived from shale and quartzite	Very deep to moderately deep, well drained soils. The major map units in this group are Minaloosa-Huckleberry, 35 to 65 percent slopes. Other soils of minor extent in this unit are Farber soils. Most areas are used for woodland. The main limitations of this unit are the hazard of erosion and slope.	**Minaloosa**: Very deep and well drained. These soils formed in loess in residuum and colluvium derived dominantly from metasedimentary rock. Native vegetation is mainly coniferous trees. Typically, the surface is covered with a mat of organic material 0.5 inches thick. Depth to bedrock is 60 inches or more. Permeability is moderate and the available water capacity is moderate. Effective rooting depth is 60 inches or more. Water erosion hazard is very high. **Huckleberry**: Moderately deep and well drained. These soils formed in volcanic ash overlying residuum and colluvium derived from metasedimentary rock. Native vegetation is mainly coniferous trees. Depth to bedrock is 36 inches. Permeability is moderate, and available water capacity is low. Effective rooting depth is 20 to 40 inches. Water erosion hazard is very high.

2.8 Land Use and Land Ownership

Principal land use in the Potlatch River watershed includes forestland and cropland (Table 2-4 and Figure 2-3). The cropland is used primarily for dryland agricultural crop production and grazing. Forestland activities include timber harvest and management activities.

Within the forest land, the largest single ownership is private (Table 2-5 and Figure 2-4). This includes Potlatch Corporation lands and non-industrial private land ownership. The USFS manages about 14 percent of the forest land, mainly in the upper reaches of the watershed. State forest lands comprise a little over 7 percent of the forested ownership. USDI BLM administered forest lands are minimal.

Table 2-4. Land Use

Potlatch River Land Use		
	Approximate Acres	**Percent of Watershed**
Nonirrigated cropland	143,540	38
Nonirrigated pastureland	1,532	<1
Rangeland	15,231	4
Forestland	216,070	57
Urban	949	<1
Recreational	385	<1
Water	69	<1
Total Land	377,776	

Table 2-5. Land Ownership

Potlatch River Watershed Land Ownership		
	Acres	**Percent of Watershed**
Private	296,340	78
National Forest	52,368	14
Bureau of Land Management	1,472	<1
State	25,362	7
Bureau of Indian Affairs	1,051	<1
Water	69	<1
Total Land	377,776	

Figure 2-3. Land Use within the Potlatch River Watershed

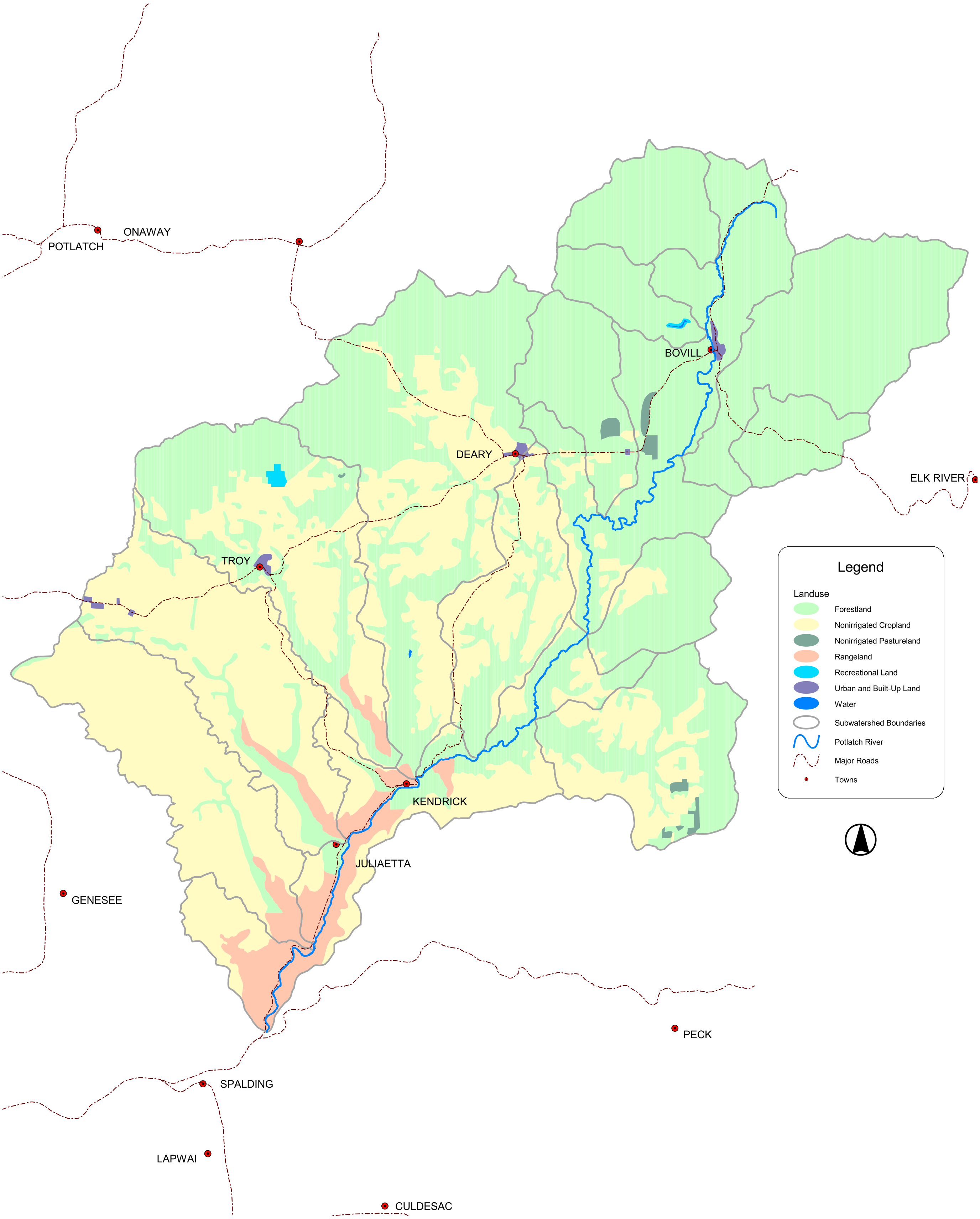
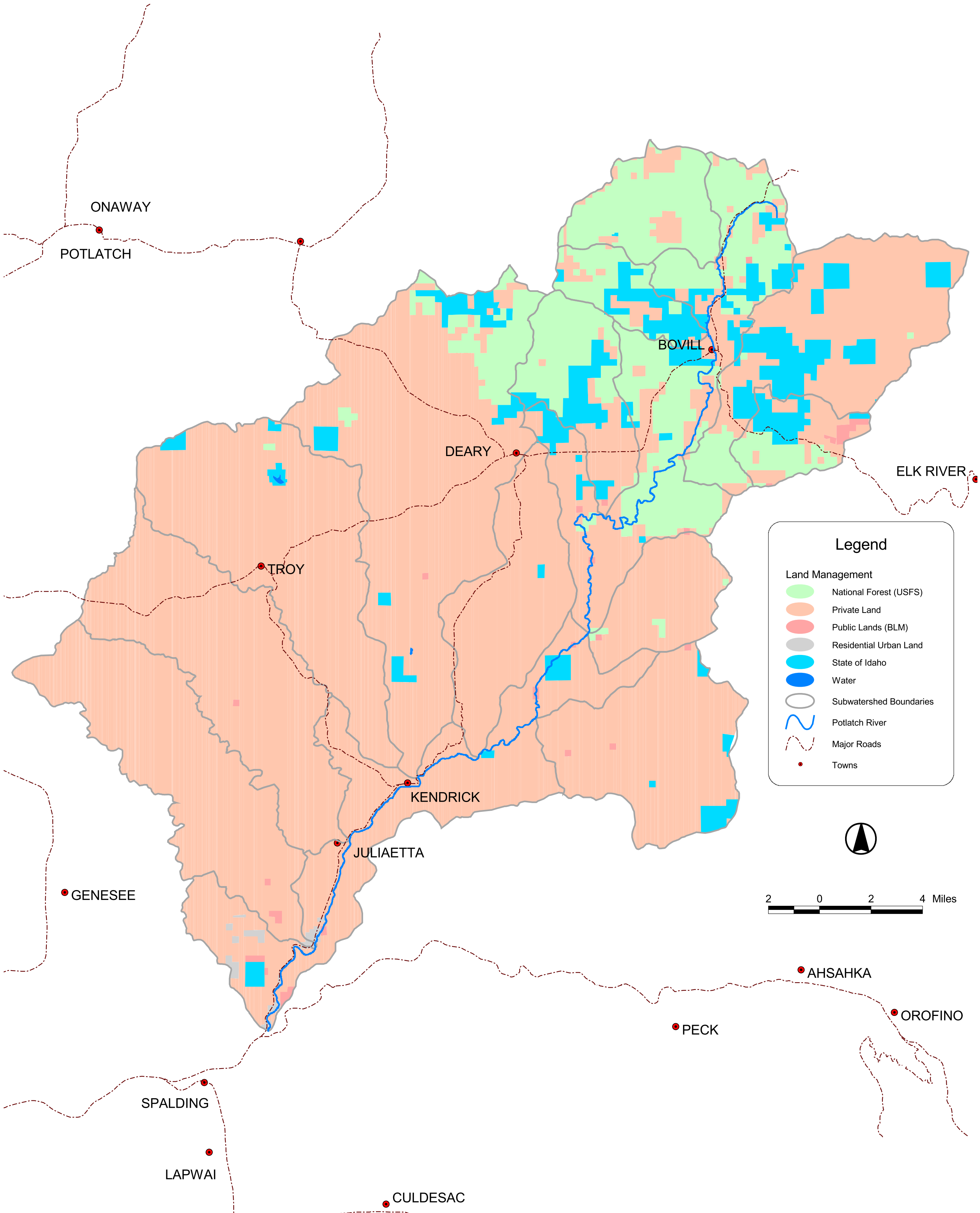


Figure 2-4. Land Ownership within the Potlatch River Watershed



2.9 Water Quality

2.9.1 Idaho Impaired Waters and TMDL

The Potlatch River watershed lays within the lower Clearwater River hydrologic unit code (HUC) number 17060306, which is comprised of 22 water body assessment units defined by Idaho Code (IDAPA 58.01.02.120.08).[5] Section 303(d) of the federal Clean Water Act (CWA) requires waters in the state that are considered to be not meeting state water quality standards to have a Total Maximum Daily Load (TMDL) established to manage and regulate pollutants to bring the waters into compliance with state standards. The *Potlatch River Subbasin Assessment and TMDLs* was drafted in December 2004 (IDEQ 2004).

Idaho water quality standards[6] (both narrative and numeric) require that surface waters of the state be protected for beneficial uses. These beneficial uses are interpreted as existing uses, designated uses, and presumed uses. Definitions of beneficial uses are defined in both *Potlatch River Subbasin Assessment and TMDLs* (IDEQ 2004) and *Water Body Assessment Guidance* (Grafe et al. 2002). According to IDEQ (2004), most of the pollutants that impair beneficial uses in streams are naturally occurring stream characteristics that have been altered by humans. Streams naturally have sediment, nutrients, etc.; when anthropogenic sources cause these to reach unnatural levels they are considered pollutants and can impair the beneficial uses of a stream.

During the summer of 1994, the IDEQ and the Latah SWCD conducted a Beneficial Use Reconnaissance Project (BURP) survey in the Potlatch River watershed (Wertz and Kinney 1995). Prior to this study, little information was available about the beneficial uses of the streams in the Potlatch River watershed. The BURP process was developed to determine the beneficial uses and the status of those uses. Listed waters within the Potlatch River watershed have been evaluated and are to be protected for primary or secondary recreation. The Potlatch River mainstem also has a designated beneficial use for domestic water supply.

During the 1994 BURP field season, data was collected on the Potlatch River mainstem, East Fork and West Fork Potlatch River, Little Potlatch and Middle Potlatch Creeks, Big Bear and Little Bear creeks, Pine Creek, Cedar Creek, and Ruby Creek. IDEQ water quality protocols were utilized to collect the following data: flow, water temperature, substrate composition, width/depth ratio, aquatic invertebrates, fish canopy cover, pool complexity, large organic debris, aquatic habitat assessment, bank stability, and Rosgen channel type.

Under the 1994 state guidelines, industrial water supply, primary contact recreation, wildlife habitat, and aesthetics are automatically designated as beneficial uses for all water bodies in Idaho. However, if the physical characteristics of the water body prevent primary contact recreation, then the designation is secondary contact recreation.

Wertz and Kinney (1995) determined that cold water biota was an existing beneficial use in all of the surveyed streams. Salmonid spawning was determined to be an existing use in 10 of the 11 streams surveyed, Little Potlatch Creek being the exception. Agricultural water supply was

[5] Idaho Water Quality Standards and Wastewater Treatment Requirements, Clearwater Basin, Clearwater Subbasin.
[6] Idaho Water Quality Standards and Wastewater Treatment Requirements found at internet website: http://www2.state.id.us/adm/adminrules/rules/idapa58/0102.pdf

determined to be an existing use in all of the water bodies. Beneficial use support status was not determined at the publication of the Wertz and Kinney (1995) report. IDEQ was developing a *Waterbody Assessment Guidance* document (Grafe et al. 2002) at the time, and intended to use that guideline to determine the support status of the beneficial uses. The conclusion of the BURP survey determined that most of the streams were in various stages of degradation. Follow up surveys were completed by IDEQ in 1996, 2001, and 2002.

The previous 1998 §303(d) listed impaired water bodies have been replaced with waters included in Section 5 of the 2002 Integrated Report (IDEQ 2005). Those waters and their respective designated and existing beneficial uses are displayed in Table 2-6. Listed pollutants and water quality conclusions from the *Potlatch River Subbasin Assessment and TMDLs* (IDEQ 2004) are listed in Table 2-7.

Table 2-6. Potlatch River Watershed Waters included in Section 5 of the Integrated Report (Idaho Department of Environmental Quality 2005) and Respective Beneficial Uses

Stream Name	Extent of Segment	Beneficial Uses
Big Bear Creek	West Fork of Big Bear Creek to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Boulder Creek	Pig Creek to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Cedar Creek	Leopold Creek to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Corral Creek	Headwaters to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
East Fork Potlatch River	Ruby Creek to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Middle Potlatch Creek	Headwaters to Potlatch River	Designated beneficial uses: Cold water aquatic life, Secondary contact recreation Existing beneficial uses: Salmonid spawning, Primary contact recreation
Moose Creek	Headwaters to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Pine Creek	Headwaters to Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Ruby Creek	Unnamed tributary 3.4 km (2.1 miles) upstream to East Fork Potlatch River	Existing beneficial uses: Cold water aquatic life, Salmonid spawning, Primary and secondary contact recreation
Potlatch River Headwaters	Headwaters to Moose Creek	Designated beneficial uses: Cold water aquatic life, Salmonid spawning, Primary contact recreation, Domestic water supply
Potlatch River (Moose to Corral)	Moose Creek to Corral Creek	Designated beneficial uses: Cold water aquatic life, Salmonid spawning, Primary contact recreation, Domestic water supply, Special resource water
Potlatch River (Corral to Big Bear)	Corral Creek to Big Bear Creek	Designated beneficial uses: Cold water aquatic life, Salmonid spawning, Primary contact recreation, Domestic water supply
Potlatch River (Big Bear to the mouth)	Big Bear Creek to the mouth of the Potlatch River	Designated beneficial uses: Cold water aquatic life, Salmonid spawning, Primary contact recreation, Domestic water supply

Table 2-7. Listed Pollutants and Water Quality Conclusions (Idaho Department of Environmental Quality 2004)

Stream Name	Segment Description	Section 5 Listed Pollutant(s)	Conclusions (from IDEQ 2004)*
Big Bear Creek	West Fork of Big Bear Creek to Potlatch River	Temperature	Identified as supporting salmonid spawning for steelhead and rainbow trout, with a spawning and incubation period of January through May. Load reductions for temperature will likely need to be allocated into tributaries of Big Bear Creek. Not listed for TMDL, although a sediment TMDL is indicated based on modeled results showing sediment loadings that exceed water quality standards. Not listed for bacteria, a bacteria TMDL for May through September is indicated by data, analyses of the data indicate that the bacteria loading is coming from livestock accessing the creek.
Boulder Creek	Pig Creek to Potlatch River	Unknown pollutants	A temperature TMDL is indicated for the fall salmonid spawning window, with the expectation that heat load reduction allocations may be needed from the tributaries. A bacteria TMDL is indicated for May through September with similar expectations that loading from tributaries may be needed.
Corral Creek	Headwaters to Potlatch River	Sediment	A migration barrier was identified where the creek goes under the old railroad grade north of Helmer. A temperature TMDL is indicated for salmonid spawning in the spring and cold water aquatic life in the summer. A sediment TMDL is indicated for periods of high flow.
East Fork Potlatch River	Ruby Creek to Potlatch River	Bacteria, nutrients, sediment, temperature	A temperature TMDL is indicated for the fall spawning window and summer cold water aquatic life with the expectation that heat load reduction allocations may be needed from contributing areas. A sediment TMDL is indicated with the expectation that sediment reduction allocations may be needed from the contributing areas.
Middle Potlatch Creek	Headwaters to Potlatch River	Bacteria, nutrients, sediment, temperature	A temperature TMDL is indicated, heat loading analyses for salmonid spawning in the spring and cold water aquatic life in the summer are indicated for all perennial streams. Analyses for intermittent streams should determine if and how they are continuing heat loading for salmonid spawning in the spring. Intermittent streams are not flowing when the lower Middle Potlatch Creek exceeds the cold water aquatic life criteria. A bacteria and nutrient TMDL is indicated during summer months. A sediment TMDL is indicated during high runoff periods.
Moose Creek	Headwaters to Potlatch River	Bacteria, nutrients, pH, sediment, temperature	Temperature TMDL is indicated for the fall brook trout spawning season. A bacterial TMDL is indicated for the months of June through October.
Pine Creek	Headwaters to Potlatch River	Ammonia, bacteria, dissolved oxygen, nutrients, oil and grease, sediment, temperature	Data indicate the need for TMDLs for phosphorus and temperature. The temperature TMDL is needed for the spring spawning window. Modeling data indicate the need for sediment in Pine Creek during periods of high flow.
Ruby Creek	Unnamed tributary 3.4 km (2.1 miles) upstream to East Fork Potlatch River	Bacteria, nutrients, sediment, temperature	A temperature TMDL is indicated for the spring and fall spawning windows, with the expectation that heat load reduction allocations may be needed from the tributaries. A bacteria TMDL is indicated for the summer months. A sediment TMDL is indicated for periods of high flow.
Potlatch River Headwaters	Headwaters to Moose Creek	Bacteria, nutrients, sediment, temperature	A temperature TMDL is indicated for the fall spawning window. A bacteria TMDL is indicated from June through October, particularly in locations where cattle are freely accessing the creek.
Potlatch River (Moose to Corral)	Moose Creek to Corral Creek	Bacteria, nutrients, sediment, temperature	A temperature TMDL is indicated for the spring spawning window, as well as summer cold water aquatic life with the expectation that heat load reduction allocation may be needed from contributing areas upstream. A bacteria TMDL is indicated for the months of May through November, primarily as it relates to cattle access to the river.

Table 2-7. Listed Pollutants and Water Quality Conclusions (IDEQ 2004) *continued*

Stream Name	Segment Description	Section 5 Listed Pollutant(s)	Conclusions (from IDEQ 2004)*
Potlatch River (Corral to Big Bear)	Corral Creek to Big Bear Creek	Bacteria, nutrients, sediment, temperature	A temperature and sediment TMDL is indicated for the Potlatch River reach from Corral Creek to Big Bear Creek. The temperature loading analyses should focus on summer cold water aquatic life temperatures.
Potlatch River (Big Bear to the mouth)	Big Bear Creek to the mouth of the Potlatch River	Ammonia, bacteria, dissolved oxygen, nutrients, oil and grease, organics, pesticides, sediment, temperature	A temperature TMDL is indicated throughout the subbasin. A sediment TMDL is indicated for periods of high flows. Bacteria (E. coli) loads are variable and likely reflect extreme loading events from further upstream, indicating a need for bacteria TMDLs. pH exceedances during periods of low flow and high water temperature require further investigation to determine cause.

* Conclusions from *Potlatch River Subbasin Assessment and TMDLs* (IDEQ 2004)

2.9.2 Additional Water Quality Monitoring Efforts and Other Evaluations

According to Latham (1987), monitoring during the 1986 water year determined a water quality problem from nonpoint source pollution activities in Little Potlatch Creek. To address this problem, the Latah SWCD began implementing a land treatment program on the identified critical cropland acres within Little Potlatch Creek. To evaluate the effectiveness of the program, a monitoring regime was developed in 1993 and initiated during the spring of 1995 to assess the status of existing beneficial uses (Gilmore and Rabe 1995), summarizing that the creek received a high level of nutrients with enrichment problems, worsening water quality conditions in the stream, especially at the lower site. Water chemistry analyzed suitable biotic conditions in the stream; however, the analysis of macroinvertebrate communities indicated only partial support of the cold water biota. In the fall of 1994, a water monitoring effort was also initiated in Little Potlatch Creek to estimate trends in watershed sediment loading (RPU 2001). The study continued through the 2000 water year with a final report documenting a trend towards decreasing sediment discharge rates because of an increased level of agricultural conservation efforts.

A preliminary water quality investigation was completed on Middle Potlatch Creek in 1993. This report found the Middle Potlatch Creek water quality conditions to be fair in the upper watershed and fish habitat was rated poor, with the greatest impacts occurring from sediment and nutrients carried by runoff from steep adjacent cropland. Little or no flow in the summer is a severe limitation to water quality conditions. The mid portion of the watershed water quality was good the habitat was rated good, and the lower section of the creek, upstream from the mouth had fair water quality conditions with a poor habitat rating. Adjacent land use was severely limiting due to streamside location of animal holding facilities, lack of riparian and range management practices and forest harvest activities (USDA SCS 1993).

The Idaho State Department of Agriculture (ISDA) has been monitoring temperature and flow since 2000 in eight Potlatch River subwatersheds identified as steelhead streams by IDFG (1999) (report unpublished at the time of this writing). The Latah SWCD installed eight additional stations to collect stream flow (see Appendix C). IDEQ collected pre-TMDL water quality data throughout the watershed during 2002.

The Clearwater National Forest (CNF) maintained a gauging station on the Potlatch River above Little Boulder Creek between 1995 and 2005. Monitoring efforts included discharge, suspended sediment, and turbidity. CNF results at the Potlatch River above Little Boulder Creek gauging station from 1995 through 2002 include mean daily suspended sediment of 8.9 mg/L, mean daily turbidity of 3.8 NTU, and mean daily discharge of 189 cfs.

During the period from April 6, 2004 through July 14, 2004 the Idaho State Department of Agriculture (ISDA), Idaho Association of Soil Conservation Districts (IASCD), and the University of Idaho Analytical Science Laboratory conducted a synoptic evaluation of pesticides on eight tributaries that discharge into the Clearwater River and the South Fork of the Clearwater River (Campbell 2004). The Potlatch River was one of those eight tributaries. Samples were collected on a bi-weekly schedule through July 14, 2004. Although there were detections of pesticide residue during this study, none of the results indicated a serious acute or chronic toxicity concern for aquatic organisms within the study area. The analytical methods used for this study are very sensitive and are capable of detecting levels in the parts per trillion range.

Even though the pesticide concentrations found were very low, the fact that they were still detected in the environment should be of concern (Campbell 2004). The sublethal effects of many agricultural chemicals on aquatic life are unknown. Many factors influence the toxicity of chemicals to aquatic life and care must be exercised when utilizing pesticides. Toxicity to fish can depend on the species as well as the age, size, and overall health. Other contributors to toxicity include water temperature, pH, turbidity, and other physical and chemical parameters of the water. With careful management it may be possible to protect crops from insects, disease, and weeds and still prevent pesticides from harming the aquatic environment.

The Latah SWCD conducted Stream Visual Assessment Protocol (SVAP) surveys in 2004 and 2005. The SVAP (USDA NRCS 1998) provided a basic level of stream health evaluation. The protocol provides an assessment based primarily on physical conditions within the assessment area. Throughout 2004 and 2005, crews of the Latah SWCD surveyed approximately 32 miles of perennial and intermittent streams in the Pine, Corral, Spring Valley, Dry, Hog Meadow, and Bear creeks. Pine Creek was selected as a focus area for the first season of stream assessment work because there are historic and current observations of steelhead spawning and over-wintering use of Pine Creek, and because the uplands contain agricultural lands where implementation of riparian buffer, filter strip, and no-till practices can contribute to improvement of habitat conditions in the anadromous fishery (data provided by Latah SWCD).

Landowners were contacted to request permission to access stream segments. The SVAP[7] was the primary tool used to document findings in the surveyed areas. Additional information was collected about channel type, erosion, macroinvertebrate presence, and vegetation. Crews consisted of two to three persons, and included people with backgrounds in fish and wildlife biology, plant ecology, geology, hydrology, and conservation planning. Latah SWCD staff invited landowners to participate in the surveys, and followed up with several of the landowners who have the most stream miles, to ask them for historic information on flows, historic vegetation, flooding events, and other issues.

[7] USDA Natural Resources Conservation Service Water and Climate Center. 1998. Stream Visual Assessment Protocol. Technical Note 99-01. Available on the web at: http://www.nrcs.usda.gov/technical/ECS/aquatic/svapfnl.pdf.

Chapter 3.
General Fish Resources within the Potlatch River Watershed

"… Coyote saw the salmon pass as he went up the first branch of the great Snake River. It goes up that way from the Columbia River, and its water is clear. Coyote saw then that the salmon were on their way up the Clearwater River to spawn, and were heading on upstream to Potlatch Creek. Suddenly he remembered that there was no gravel at the headwaters of that creek where the Chinook salmon could spawn. So he hollered after them, 'You are going up where there are only split rocks. If you want to go to a good place to spawn, go on up the big clear river.'"

From Nez Perce Legends: Nu Mee Poom Tit Wah Tit (Slickpoo et al. 1972)

3.1 General History of Fisheries Within the Potlatch River Watershed

3.1.1 Historic Fisheries

According to Johnston (1993), salmon, steelhead and trout were utilized by Euroamerican and American Indian populations over the course of a century. Salmon and steelhead moved in the main waterways and adjoining tributaries of the Potlatch River watershed; for example, Corral Creek (Tee Meadow) and Long Meadows (Round Meadow). While thermal changes due to variations in water temperature and flow regimes tend to create environments considered less beneficial to anadromous fish populations, data presented suggests that salmon and steelhead evolved within the Potlatch River despite these variable conditions, and accessed its upper watersheds.

Prior to the 1930s, primarily salmon and steelhead were harvested by utilizing live traps, gaffs and nets (Johnston 1993). The Nez Perce and Coeur d'Alene Indians reportedly fished in the upper watersheds up to the 1930s. Excavations begun in the 1960s by Idaho State University at Arrow Beach, located on the Potlatch River, uncovered net sinkers and bone fishing tools. Fishermen apparently utilized throw, seine and gill nets for harvesting fish. A historic fishing location was also found at the confluence of the East and West Fork of Potlatch River, evidenced by gaff hooks found in association with other aboriginal plant processing and hunting tools such as iron barbed hooks.

In the upper reaches of the watershed, including Corral Creek's Wet Meadows, oral traditions and archaeological evidence point to fish resources being used by American settlers in the late 19th and early mid 20th century. Johnston (1993) reports salmon fishing in the early 1920s on the West Fork Potlatch River; spearing steelhead from the mouth of Nat Brown Creek where today Highway 6 crosses the creek north of Bovill; catching steelhead, some in excess of 30 inches, in Cougar Creek in the 1920s; catching steelhead attaining lengths up to 36 inches at Camp Eight, one mile north of Bovill, in 1940; and observations of salmon spawning beds in the West Fork Potlatch Creek below Bovill in the 1930s. Accounts also describe lamprey eel that followed the migration of steelhead north of Bovill up the East and West Forks.

USDA Soil Conservation Service (USDA SCS 1994) reported that Snake River spring/summer chinook salmon have historically used the higher elevation tributaries of the Potlatch River watershed for spawning and rearing habitat. It is not known whether the Snake River fall chinook salmon historically used the lower elevations of the Potlatch River.

A biological and physical inventory was completed on the Nez Perce Reservation in February 1983; this inventory included the lower seven miles of the Potlatch River. The inventory found evidence of smallmouth bass, northern pikeminnow, chiselmouth, bridgelip sucker and speckled dace. No rainbow/steelhead or chinook salmon were collected during this project (Kucera et al. 1983).

3.1.2 Historic Habitat

Historically, the Potlatch River provided spawning and rearing habitat for Snake River chinook salmon, steelhead trout, and resident fish species. According to Buechler (1982), the Potlatch River watershed historically provided about 97 miles of potential spawning habitat for chinook salmon and steelhead trout.

An estimate in 1950 suggested that approximately 40,000 square yards of suitable spawning area for steelhead and chinook occurred in the lower 22.5 miles of the drainage (Buechler 1982). A 1968 estimate suggested that the upper two-thirds of the watershed probably provided the major spawning habitat for chinook. Steelhead probably spawned throughout the system, particularly in the tributaries and upper main stem.

Buechler (1982) cited that a 1959-1960 survey of the upper Potlatch River watershed documented the principal steelhead spawning streams were Cedar, Boulder, Ruby, Fry, Bob's, Bloom, and Mallory creeks and the East Fork Potlatch River.

3.2 Current Fisheries within the Potlatch River Watershed

3.2.1 Current Fisheries

USDA SCS (1994) reports the Potlatch River and its tributaries support a cold water fishery which includes the game species of rainbow, brook, and steelhead trout. USDI BLM (2000) also reports fish species occurring in the Potlatch River to include smallmouth bass, northern pikeminnow, chiselmouth, bridgelip sucker, speckled dace, redside shiners, sunfish, and Paiute sculpin.

Ecovista (2003) stated that steelhead were reportedly widespread throughout the Potlatch River watershed. Westslope cutthroat were reportedly absent except in upper East Fork Potlatch River and brook trout were widely distributed in the main stem, West Fork, and East Fork Potlatch River, with the West Fork as a noted stronghold.

The NPT is conducting a coho reintroduction program in the Clearwater River and selected tributaries, including the Potlatch River and various tributaries (Ecovista 2003). In 1999, the NPT captured six adult and 12 jack fall chinook salmon at a weir near Juliaetta in the mainstem Potlatch River, and eight redds were reported downriver from Juliaetta.

The most recent study of fish resources within the watershed occurred in 2003 and 2004 by IDFG (Bowersox et al. 2005). Seventeen tributaries with 134 sample sites were evaluated. Stream types represented by land use were categorized by the survey, including agricultural uplands, forestland, and canyon streams. Streams surveyed within the agricultural uplands included Big Bear, Little Bear, West Fork Little Bear, Pine and Cedar Creeks. Forestland streams sampled included Moose, Pivash, Feather, Cougar, Bob's, Corral, Boulder, Little Boulder creeks, and East Fork Potlatch River. Streams representative of canyon areas included Big Bear, Little Bear, West Fork Little Bear, Pine, Cedar, Corral, Boulder and Leopold creeks. Sample site selection for the 2003-2004 study was based on pre-existing sample sites from a similar study in 1995-1996, reported by Schriever and Nelson (1999).

Fish taxa observed within the Potlatch River drainage sampling areas during the 2003-2004 study (Bowersox et al. 2005) were grouped into 12 different taxa including:

Rainbow/steelhead trout (*Oncorhynchus mykiss*)
Hatchery rainbow trout (*Oncorhynchus mykiss*)
Brook trout (*Salvelinus fontinalis*)
Largemouth bass (*Micropterus salmoides*)
Pumpkinseed (*Lepomis gibbosus*)
Yellow perch (*Perca flavescens*)
Northern pikeminnow (*Ptychocheilus oregonensis*)
Sucker (*Catostomus sp.*)
Speckled dace (*Rhinichthys osculus*)
Longnose dace (*Rhinichthys cataractae*)
Redside shiner (*Richardsonius balteatus*)
Sculpin (*Cottus sp.*)

Dace dominated the overall fish community, representing nearly 42 percent of the total fish sampled. Rainbow/steelhead trout were the most abundant fish sampled by biomass (31 percent by number and 59 percent of the biomass). The greatest rainbow/steelhead trout densities were found in the canyon streams lower in the Potlatch River drainage. The West Fork Little Bear Creek had the highest rainbow/steelhead trout density of sampled streams. Cedar Creek and Little Boulder Creek had the highest rainbow/steelhead trout densities outside of the Little Bear Creek drainage. No rainbow/steelhead trout were found during sampling in Boulder, Cougar, and Feather creeks.

Similar to the overall rainbow/steelhead trout results, when rainbow/steelhead trout densities were separated into age classes, the West Fork of Little Bear Creek had the highest age-0 rainbow/steelhead trout density. Other streams with high age-0 steelhead trout densities included Little Bear Creek and Little Boulder Creeks. Unlike the overall rainbow/steelhead trout results, age-1 rainbow/steelhead trout densities were highest in Cedar Creek. Little Bear Creek also had higher age-1 rainbow/steelhead trout density than the West Fork of Little Bear Creek. All other streams had considerably lower age-1 rainbow/steelhead trout densities.

3.2.2 Current Fish Habitat

Buechler (1982) cited accounts that suggested most of the spawning habitat in the lower 22.5 miles of the drainage have been degraded by scouring and siltation and habitat is no longer suitable.

According to Fuller et al. (1985) the mainstem Potlatch River can be divided into three separate stream reaches: from the mouth to the confluence with Cedar Creek; from the confluence with Cedar Creek to the confluence with the East Fork Potlatch; and upstream from the confluence with the East Fork. Each has its own stream conditions determined by the topography and the degree of use of the surrounding watershed.

Johnson (1985) reported that the mainstem of the Potlatch River, from Cedar Creek to the confluence with East Fork Potlatch River, is relatively undisturbed and provides the best salmonid habitat in the drainage. Pool-riffle structure is good, gravels are suitable for spawning, riparian vegetation is the most undisturbed of the mainstem, and this area receives little direct impact from land use activities. Johnson stated that upstream and downstream areas offer some potential salmonid habitat.

According to Wertz and Kinney (1995), aquatic and terrestrial management activities have significantly altered the habitat, water quality, and water quantity within the Potlatch River system. The lower Potlatch River is characterized by high runoff in early spring and extreme low flows during the summer. The lower reaches were determined to be unsuitable for salmon production due to summer low flow conditions and high water temperatures.

In the 1994 Beneficial Uses Reconnaissance Project (BURP), nine of the eleven streams tested had an existing beneficial use for salmonid spawning. The exceptions were Little and Middle Potlatch Creeks, which were reported to have attainable salmonid spawning habitat (Wertz and Kinney 1995).

Under the Idaho Forest Practices Act and the Stream Channel Protection Act, all stream crossings on fish bearing streams must provide for fish passage. A guideline issued by IDL (IDL 1998) suggests several recommendations to ensure passage will not be prevented by a provided crossing. Those recommendations include: 1) minimum water depths shall not be less than 3 inches during fish migration; 2) maximum water velocities shall not exceed the swimming ability of fish for more than a 48 hour period during fish migration; 3) no drop into a culvert's entrance (inlet) should be permitted; and 4) a maximum drop of one foot between the culvert's outlet and the water surface when a holding pool is provided.

Four natural fish migration barriers exist within the watershed. Boulder Creek has a falls approximately 2.0 kilometers upstream from its mouth that probably acts as a migration barrier to anadromous and resident fluvial fish (Schriever and Nelson 1999). Middle Potlatch Creek and Big Bear Creek also have falls at river kilometer 12.9 and 9.0, respectively, which act as migration barriers to all anadromous fish. A rockslide in 1980 resulted in an impassable barrier to anadromous fish migration at river kilometer 4.0 on Little Potlatch Creek (Johnson 1985). Several man-made fish migration barriers also exist within the watershed, including the railroad grade box-culvert on upper Corral Creek, and the concrete dam structure on the upper reaches of the West Fork of Little Bear.

The Clearwater Subbasin Assessment (Ecovista 2003) reported that habitat quality has been rated as fair in the East Fork Potlatch River for A-run steelhead and as poor throughout the remainder of the watershed.

3.3 Relationship Between Terrestrial and Aquatic Resources

A wide variety of invertebrate and vertebrate predators, and scavengers feed on salmon and steelhead (narrative taken from Ecovista 2003). Some species are not totally dependent upon salmon for their survival, but take advantage of them when available. Other species rely on the seasonal food source provided by salmon and steelhead. There are 137 wildlife species influenced by salmon and steelhead abundance.

These predator/scavenger-prey relationships are separated into five categories: 1) *Strong-consistent*: anadromous salmonids directly affect the distribution, viability, abundance, and population status of another species. Nine species have a strong, consistent relationship with anadromous salmonids. Seven of the nine species are indigenous to northern Idaho, and they include common mergansers, harlequin ducks, osprey, bald eagles, river otters, black bear, and grizzly bear. 2) *Recurrent*: routine, occasional, and localized relationships. Fifty-eight species have a recurrent relationship. 3) *Indirect*: secondary consumer relationships. Twenty-five species have an indirect relationship. 4) *Rare*: a species' diet consisting of usually less than 1 percent anadromous salmonids. Sixty-five species have a rare relationship. 5) *Unknown*: relationship may or may not exist, but there is no available data.

The stages of an anadromous salmonid's lifecycle consists of spawning and egg incubation, freshwater rearing, seaward migration, ocean rearing, return migration, spawning, and finally the carcass stage. Twenty-three species prey on anadromous salmonids during the egg incubation stage. Some waterfowl, macroinvertebrates, and other fish such as char, trout, and juvenile anadromous salmonids will eat salmonid eggs. Forty-nine species prey on anadromous salmonids during the freshwater rearing stage. Herons, other fish-eating birds, and larger fish capitalize on the vulnerable fry and smolts heading downstream. Sixty-three species, such as sea lions, harbor seals, and orcas take advantage of the anadromous salmonids during the saltwater, ocean-rearing stage. Sixteen species such as the black bear, grizzly bear, river otter, raccoon, and the bald eagle prey on anadromous salmonids on their spawning migration upstream. Eighty-three species will eat dead anadromous salmonids. Black bear, grizzly bear, river otters, raccoons, coyotes, bald eagles, ravens, gulls, and macroinvertebrates scavenge anadromous salmonids during this post-spawning period.

Throughout their life, anadromous salmonids feed on a wide variety of prey, including many kinds of freshwater and marine invertebrates and fishes. After the adult anadromous salmonids spawn and die, consumption by macroinvertebrates such as caddisflies, stoneflies, and midges begins the breakdown of anadromous salmonid carcasses. This process delivers much needed nitrogen and other nutrients to the water, sustains macroinvertebrate populations, and provides energy for the long-term health of ecosystems. Juvenile anadromous salmonids are known to feed directly on anadromous salmonid carcass flesh, anadromous salmonid eggs, and aquatic macroinvertebrates that may have previously fed on anadromous salmonid carcasses.

Anadromous salmonids are important in the transport of energy and marine-derived nutrients between the ocean, estuaries, and freshwater environments in which they reproduce. The flow of nutrients such as carbon, nitrogen, and phosphorus back upstream by spawning anadromous salmonids plays a vital role in determining the overall productivity of both watersheds and anadromous salmonid runs, now and into the future. Isotopic analyses indicate that trees and shrubs near spawning streams derive approximately 22-24 percent of their nitrogen from spawning anadromous salmonids. Ocean-reared, anadromous salmonids ingest saltwater nutrients, migrate to their spawning grounds, and then die. The nutrients are spread to vegetation by decomposition or digestion. Decomposing anadromous salmonids can be left at streamsides or carried inland. Digestion of anadromous salmonids by predators can also occur by the stream and transported inland. Nutrients are transferred through the digestion process by urination and defecation to plants in the ecosystem. This fertilization process serves to enhance riparian production. The United States Department of Energy has recently conducted a site management plan for bald eagles in the Hanford Reach area of south central Washington. Their studies have shown that changes in the eagle populations have generally corresponded to changes in the number of returning fall chinook salmon, a major fall and winter food source for eagles. The research on the Hanford Reach during the 1998-99 winter was consistent with reports from the upper Columbia River at Rocky Reach Reservoir and Rock Island Reservoir, the Clearwater River in Idaho, and the lower Snake River and Columbia River areas of Oregon and Washington.

Other studies have revealed that the anadromous salmonid/grizzly bear relationship was significant to both bears and trees in Pacific Northwest ecosystems. Chips of grizzly bear bones from museum specimens dating between the 1850s and the 1930s were examined, and 100 percent of the bone chips contained nitrogen, phosphorus, and carbon derived from the ocean. Anadromous salmonids were evidently a large part of the bear's diet, and the nutrients which were transported to terrestrial vegetation by the bears and other predators were significant as a fertilizer. This natural fertilizer from the excretions of mammals is more readily absorbed and utilized by vegetation, and the excreted phosphorus supplements the low levels of this nutrient in moist forests in which it tends to leach away. These findings support the philosophy of maintaining healthy forests through conservation of the processes and species that have sustained them in the past.

3.4 Snake River Steelhead

Steelhead in the Potlatch River watershed are considered members of the Snake River steelhead group. Snake River steelhead migrate a substantial distance from the ocean (up to 930 miles) and use high elevation tributaries (typically 3,300-6,600 feet above sea level) for spawning and juvenile rearing. Snake River steelhead occupy habitat that is considerably warmer and drier (on an annual basis) than steelhead classified in other groups.

National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) managers classify up-river summer steelhead runs into two groups based primarily on ocean age and adult size upon return to the Columbia River. Those classified as A-run steelhead are predominantly age-1 ocean fish while B-run steelhead are larger, predominantly age-2 ocean fish.

Snake River steelhead are generally classified as summer run, based on their adult run timing patterns. Summer steelhead enter the Columbia River from late June to October. After holding over in the Columbia River through the winter, summer steelhead spawn during the following spring. It is estimated that about 10,000 steelhead spawn annually in the Columbia River system (Landeen and Pinkham 1999). Spawning occurs in February through March below Dworshak Dam on the Clearwater River and other major tributaries including the Snake, Grand Ronde, and the Salmon rivers.

Unlike salmon, steelhead can return to the ocean after spawning and will return year after year to spawn where they hatched (such steelhead are referred to as kelts). After hatching, young steelhead spend one to three years in freshwater before migrating to the ocean from March through June. It is believed that when steelhead trout return to freshwater to spawn, feeding is uncommon. Many studies have shown that steelhead stomachs are empty and atrophied during this time.

Some of the largest steelhead are those that eventually end up in the upper Clearwater River. They spawn in January and February and are referred to as the B-run. These fish weigh between twelve and thirty pounds. The B-run steelhead are larger than the A-run steelhead due to the longer time spent in the ocean. The A-run steelhead return to fresh water earlier than the B-run steelhead. Adult A-run typically leaves the ocean between May and July and usually over-winter in Lower Granite Reservoir and the Clearwater River until early spring (February to April), at which point they travel up Clearwater River tributaries to begin spawning. The juvenile A-run steelhead typically spends two years in freshwater streams before a spring migration to the ocean, then typically spend only one year at sea before returning.

The Pacific Fishery Management Council (PFMC 2004) summarized habitat requirements for the freshwater portion of the life of steelhead and salmon. Those requirements are listed in Table 3-1.

3.5 Evolutionary Significant Unit and Distinct Population Segment

The Snake River Basin steelhead Evolutionary Significant Unit (ESU) was listed as a threatened species in 1997 (62 FR 43937; August 18, 1997). The Snake River steelhead ESU is distributed throughout the Snake River drainage system, including tributaries in southeast Washington, eastern Oregon and north/central Idaho. The Clearwater Subbasin contains 26 watersheds occupied by the Snake River Basin steelhead ESU and encompasses approximately 3,147 miles of streams.

The ESU includes all naturally spawned populations of steelhead in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho. NOAA Fisheries conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. NOAA Fisheries proposed that Snake River Basin *Oncorhynchus mykiss* (including steelhead and rainbow trout) remain listed as threatened (69 FR 33102; June 14, 2004). Additionally, NOAA Fisheries proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations. NOAA Fisheries filed final rules Aug. 12, 2005, with the *Federal Register* to designate critical habitat areas in Washington, Oregon, Idaho, and California for 19 species of salmon and steelhead listed as threatened or endangered under the ESA. The designations include a separate rule for 12 ESUs listed in Washington, Oregon, and Idaho, and another for 7 ESUs listed in California.

Effective February 6, 2006, NOAA Fisheries final rule was enacted, which redefined the Snake River Steelhead ESU as Snake River Basin Steelhead Distinct Population Segment (rule published in the *Federal Register* January 5, 2006). This redefinition instituted minor changes to the 2005 designations. The definition of Distinct Population Segment (DPS) is used instead of an ESU since the rule was enacted. The main distinction of this change is that DPS is defined in ESA regulations, where ESU was not, and a DPS does not require reproductive isolation, which was part of the ESU definition.

Table 3-1. Habitat Requirements for the Freshwater Portion of the Life Cycle of Steelhead and Salmon (Anadromous Salmonids)*

Habitat Requirements	Habitat Concerns
Adult Migration Pathways Adult anadromous salmonids leave the ocean, enter estuaries and rivers and migrate upstream to spawn in the stream of their birth.	-Passage blockage (e.g. culverts, dams) -Water quality (high water temperature, pollutants) -Competition with exotic species -High flows/low flows/water diversions -Channel modification/simplification -Reduced frequency of holding pools -Lack of cover, reduced depth of holding pools -Reduced cold-water refugia -Increased predation resulting from habitat modifications
Spawning and Incubation Anadromous salmonids distribute their eggs in gravel or cobble nests called redds. To survive, eggs (and the alevins that hatch and remain in the gravel) must receive sufficient water and oxygen flow within the gravel.	-Availability of spawning gravel of suitable size -Siltation of spawning gravels -Redd scour caused by high flows -Redd dewatering -Temperature/water quality problems -Redd disturbance from trampling (human, animal)
Stream Rearing Habitat Juvenile anadromous salmonids may remain in freshwater streams over a year. They must find adequate food, shelter, and water quality conditions to survive, avoid predators, and grow. They must be able to migrate upstream and downstream within their stream and into the estuary to find these conditions and to escape high water or unfavorable temperature conditions.	-Diminished pool frequency, area, or depth -Diminished channel complexity, cover -Temperature/water quality problems -Blockage of access to habitat (upstream and down) -Loss of water flows/high water flows -Predation cause by habitat simplification or loss of cover -Nutrient availability -Diminished prey/competition for prey -Stranding due to water level fluctuations -Competition with exotic species
Smolt Migration Pathways Smolts swim and drift through the streams and rivers, and must reach the estuary where there are adequate prey and water quality conditions and must find adequate cover to escape predators as they migrate.	-Water quality -Low water flows/high water flows -Altered timing/quantity of water flows -Passage blockage/diversion away from stream -Increased predation resulting from habitat simplification or modification -Stranding due to water level fluctuations -Competition with exotic species
Estuarine Habitat Estuaries provide a protected and food-rich environment for juvenile anadromous salmonid growth and allow the transition for both juveniles and adults between the fresh and salt water environments. Adults also may hold and feed in estuaries before beginning their upstream migration.	-Water quality -Altered timing/quantity of fresh water in-flow -Loss of habitat resulting from diking, dredging, filling -Diminished habitat complexity -Loss of channels, eel grass beds, woody debris -Increased predation resulting from habitat simplification -Diminished prey competition for prey -Reduction/elimination of periodic flooding -Competition with exotic species

* modified after PFMC (2004)

The DPS definition recognizes phenotypic, physiological, and behavioral distinctions between resident and anadromous *O. mykiss*, allowing resident and anadromous forms to be distinguished as a separate DPS, while the ESU concept combined co-occurring resident and anadromous fish together. In line with the change from ESU to DPS, resident *O. mykiss* are not included in the new listing.

The geographic extent of the DPS is now bounded upstream by natural and man-made barriers. Previously, the upstream extent was bounded by natural barriers and several long-standing barriers that were specifically named. The ramification of this is that removal of an artificial barrier will now expand the DPS boundary, whereas before, the ESU boundary was fixed and portions of the ESU range were considered inaccessible if they were blocked by a man-made structure. Steelhead from 6 hatcheries are considered part of the listed DPS. There are no *take prohibitions* for fin-clipped steelhead, even though they may be part of the listed DPS.

3.5.1 Assessment of NOAA Fisheries' Critical Habitat Analytical Review Teams

A recent NOAA Fisheries report (2005) included biological assessments supporting NOAA Fisheries, Northwest Region's (NWR) designation of critical habitat under section 4 of the Endangered Species Act for 12 listed salmon and steelhead DPSs. The NOAA Fisheries NWR grouped the DPSs under review in Washington, Oregon, and Idaho into four geographic domains for the purpose of assessing critical habitat. For each domain the agency convened a *critical habitat analytical review team* (CHART) charged with analyzing the best available data for each DPS to make findings regarding the presence of essential habitat features in each watershed, potential management actions that may affect those features, and the conservation value of each watershed within each DPS's range. The report summarizes the agency's mapping efforts, methods and information used, and final CHART assessments for the 12 DPSs.

Table 3-2 displays a summary of the total number of occupied riverine reaches identified for each 5th field HUC (Hydrologic Unit Code, or HUC5) within the Potlatch River watershed as containing spawning, rearing or migration Primary Constituent Elements (PCEs), as well as management activities that may affect PCEs in the watershed. This list is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on general categories.

Table 3-3 displays a summary of initial CHART scores and ratings of conservation value for habitat areas in Potlatch River HUC5 watersheds occupied by the Snake River Basin Steelhead DPS.

Table 3-2. Summary of Occupied Areas, Primary Constituent Elements, and Management Activities Affecting Primary Constituent Elements for the Snake River Basin Steelhead Designated Population Segment

Watershed	Watershed Code (HUC5)	Primary Constituent Elements (PCEs)		Management Activities
		Spawning/Rearing PCEs (mi)	Rearing/Migration PCEs (mi)	
Clearwater River/ Lower Potlatch River	1706030602	21.8	2.9	A, Fi, R
Clearwater Potlatch River/ Middle Potlatch Creek	1706030603	13.2	0.0	A, F, R, U
Big Bear Creek	1706030604	24.1	0.0	A, D, F, Fi, M, R, U
Upper Big Bear Creek	1706030605	5.1	6.6	A, D, F, Fi, M, R, U
Potlatch River/Pine Creek	1706030606	32.0	0.0	A, F, Fi, R, U
Upper Potlatch River	1706030607	62.9	1.2	A, D, F, Fi, G, M, R, U

Management activities coding is as follows: A: agriculture; D: hydroelectric dams; F: forestry; Fi: fire activity and disturbance; G: grazing; M: mineral mining; R: road building/maintenance; U: urbanization

Table 3-3. Summary of Initial Critical Habitat Analytical Review Team Scores and Ratings of Conservation Value for Habitat Areas in 5th Field Hydrologic Unit Code Potlatch River Watersheds Occupied by the Snake River Basin Steelhead Designated Population Segment

Area/Watershed	Watershed Code (HUC5)	CHART Rating of HUC5 Conservation Value
Clearwater River/Lower Potlatch River	1706030602	Medium
Potlatch River/Middle Potlatch Creek	1706030603	Medium
Big Bear Creek	1706030604	Medium
Upper Big Bear Creek	1706030605	Medium
Potlatch River/Pine Creek	1706030606	High
Upper Potlatch River	1706030607	High

Chapter 4.

Limiting Factors

> In 1927, the first dam to span the Clearwater River was constructed by the Washington Water Power Company, providing both power and flood control.
>
> The next year the river became a floating highway for log drives, delivering white pine to the newly constructed Lewiston mill, the largest in the world for many years.
>
> Cited by Robbin Johnston, 1993, *A Preliminary Examination of the Archaeological and Historical Evidence of Anadromous Fish on the Palouse Distric*t.

4.1 General Limiting Factors

The Johnson report (1985) identified four major limiting factors occurring in the Potlatch River watershed: extreme flow variation; high summer water temperatures; lack of riparian habitat; and high sediment loads.

The Clearwater Subbasin Management Plan (Ecovista 2003) summarized limiting factors for aquatic habitat in the Potlatch River watershed to include temperature, low base flow, sediment, watershed disturbances, habitat degradation, noxious weeds, and connectivity and passage.

4.2 Influences from Land Uses

Johnson (1985) noting that habitat is an important component of salmonid production, stated that declining habitat condition is the single common factor affecting nearly all of the stocks at risk. Land use practices have altered the hydrologic cycle, stream composition, and riparian habitat within the drainage (Bowersox et al. 2005). Land use practices contributing to the negative impacts in the watershed within the last century include agricultural, ranching, logging, and mining practices.

Degradation of spawning and rearing habitat has occurred on all land ownerships throughout the range of Pacific anadromous fish stocks. Detrimental changes in habitat condition include reduction in water quality (as measured by increases in temperature, changes in nutrient levels and water chemistry, and the presence of toxic substances), changes in water quality and/or timing of water flow, and reduction in habitat complexity (as indicated in loss of deep pools, reduction in amounts of large woody debris, and changes in width: depth ratios and bank angles). Extreme fluctuations in water temperature are typical of the lower Potlatch River, which can exceed lethal limits for salmonid reproduction.

According to the Johnson report (1985), the riparian vegetation is severely diminished within the lower Potlatch River as the high, scouring, spring runoff precludes the establishment of a suitable riparian habitat. There is essentially no streamside cover provided by vegetation in the lower Potlatch River watershed.

Johnston (1993) reports accounts of clay mining west of Bovill in the early 1950s by miners, which resulted in damage to the fisheries resource. Personal accounts claimed that sedimentation from the clay operations filled in many of the swimming holes as it moved from the drainages of Moose Creek and Corral Creek into the Potlatch and Clearwater.

The most severely impacted reach of the Potlatch River is between Cedar Creek and the mouth (Fuller et al. 1985). This reach receives runoff from the streams which flow through heavily used agricultural watersheds. The water temperatures are highest and the variability in flow the most extreme, which has resulted in denuded banks, embedded large cobble, and limited spawning gravels.

According to Gariglio and Hotinger (1998), timber harvesting and associated forest roads had negative effects on both water quantity and quality. These land management activities have caused increases in sediment loading, low water flow conditions, excessive water temperatures, reduction of large organic debris, and channel instability. Forest roads are recognized as the most significant contributor to forest stream sedimentation (Gariglio and Hotinger 1998). Forest road problems are most acute during major storm events and during new road construction. As with other disturbances, sedimentation generally declines with establishment of vegetation on roadsides if other erosion control measures are applied. Early timber harvesting, especially before the Idaho Forest Practices Act of 1974, had a greater impact on water quality than does current forest management practices. Old railroad beds or truck roads that are within current steam protection zones and old culverts installed without fish passage continue to adversely affect the drainage.

4.3 Hydrograph Modifications

The Potlatch River hydrograph has been altered by timber, agriculture, and mining practices, and urbanization, which has resulted in changes to vegetative cover, soil compaction, channel modifications, and changes in storage capacity (USDA SCS 1994). The current hydrograph reflects a flashy system where runoff occurs quickly. Instantaneous discharges of 8,000 cubic feet per second in winter and early spring followed by late summer flows less than 10 cfs are not uncommon (USGS gauging station records at Kendrick, Idaho from 1945-1960). Discharges of less than 5 cfs are not uncommon in recent years (USGS gauging station near the Clearwater River confluence, 2003 to present). These flows lead to very high movement in bedload, suspended sediment, and organic debris. Bedload transport and deposition created by these historic flows have resulting in pool filling, channel erosion, and an overall loss in aquatic diversity (USDI BLM 2000). Earth cover changes and subsequent land use and management have resulted in dramatic changes to peak discharge from during storm events.

4.4 Migration Barriers

As reported by Johnston (1993), the first dam to span the Clearwater River was constructed by the Washington Water Power Company in 1927. The Lewiston Dam was located on the Clearwater River just above Lewiston from 1929 to 1972, and provided both power and flood control. The lower Clearwater River was then used for log drives, delivering white pine to the newly constructed Lewiston mill. According to United States Department of Interior Fish and Wildlife Service (USFWS 2005), the native stock of spring chinook salmon in the Clearwater River became extinct because the Lewiston Dam blocked their passage. Therefore, when the spring chinook program was initiated at Dworshak, fish were obtained from several sources throughout the Columbia River basin. By 1989, enough fish were returning to the hatchery that outside sources of broodstock were no longer needed. Because the native stock of spring chinook salmon in the Clearwater River was eliminated by the Lewiston Dam, the current run that returns to the Clearwater River is not listed under the ESA.

Four natural fish migration barriers exist within the Potlatch River watershed. Boulder Creek has a falls approximately 2.0 kilometers upstream from its mouth that probably acts as a migration barrier to anadromous and resident fluvial fish. Middle Potlatch Creek and Big Bear Creek also have falls at river kilometer 12.9 and 9.0, respectively, which act as migration barriers to anadromous fish (Schriever and Nelson 1999). A rockslide in 1980 resulted in an impassable barrier to anadromous fish migration at river kilometer 4.0 on Little Potlatch Creek (Johnson 1985).

A constructed dam on upper West Fork of Little Bear Creek acts as an aquatic migration barrier. The box culvert under the railroad grade on Corral Creek near the town of Helmer also acts as fish migration impairment. Many road culverts exist throughout the Potlatch River watershed that also act as migration barriers throughout low flow periods.

4.5 Sedimentation

The draft Potlatch River Subbasin Assessment and TMDL (IDEQ 2004) reports that both suspended and bedload sediment can have negative effects on aquatic life communities. Many fish species can tolerate elevated suspended sediment levels for short periods of time, such as during natural spring runoff, but longer durations of exposure are detrimental. Elevated suspended sediment levels can interfere with feeding behavior, damage gills, reduce growth rates, and degrade spawning and rearing habitat from sediment deposition. Organic suspended materials can also settle to the bottom and, due to their high carbon content, lead to low intergravel dissolved oxygen through decomposition. In addition to these direct effects on the habitat and spawning success of fish, detrimental changes to food sources may also occur. Aquatic insects, which serve as a primary food source for fish, are affected by excess sedimentation. Increased sedimentation leads to a macroinvertebrate community that is adapted to burrowing, thereby making the macroinvertebrates less available to fish. Community structure, specifically diversity, of the aquatic macroinvertebrate community is diminished due to the reduction of coarse substrate habitat. IDEQ (2004) recommends a TMDL be established for the majority of the tributaries and mainstem in the Potlatch River because sediment loadings exceed state water quality standards.

IDEQ (2004) reports the nexus between sediment and sediment-bound nutrients is important when dealing with nutrient enrichment problems in aquatic systems. Phosphorus is typically bound to particulate matter in aquatic systems and, therefore sediment can be a major source of phosphorus to rooted macrophytes and the water column. While most aquatic plants are able to absorb nutrients over the entire plant surface due to a thin cuticle, bottom sediments serve as the primary nutrient source for most sub-stratum attached macrophytes. Sediment acts as a nutrient sink under aerobic conditions; however, when conditions become anoxic sediments release phosphorous into the water column. Nitrogen can also be released, but the mechanism by which it happens is different. The exchange of nitrogen between sediment and the water column is for the most part a microbial process controlled by the amount of oxygen in the sediment. When conditions become anaerobic, the oxygenation of ammonia (nitrification) ceases and an abundance of ammonia is produced. This results in a reduction of nitrogen oxides being lost to the atmosphere and nitrogen levels in the water increase.

Steelhead in the Potlatch River basin are considered members of the Snake River steelhead group. Snake River steelhead migrate a substantial distance from the ocean and use high elevation tributaries for spawning and juvenile rearing. Snake River steelhead occupy habitat that is considerably warmer and drier than steelhead classified in other groups (Landeen and Pinkham 1999).

Chapter 5.

Policies and Laws

Many policies and laws affect steelhead management within the Potlatch River watershed. The following sections discuss current policies and laws at the federal, tribal, state, and local levels.

5.1 Federal Policies and Laws

5.1.1 Endangered Species Act

The Potlatch River contains several species of fish listed as threatened or endangered under the Endangered Species Act (ESA), see Table 5-1. NOAA Fisheries listed Snake River fall chinook salmon as threatened on April 22, 1992. Snake River steelhead, which includes steelhead in the Potlatch River, was listed as threatened on August 18, 1997 by NOAA Fisheries.

Table 5-1. List of Threatened and Endangered Fish Species within the Potlatch River Watershed

Common Name	Scientific Name	Federal Status	Idaho State Status
Salmon, Steelhead	*Oncorhynchus mykiss*	Threatened & Endangered	
Salmon, Chinook	*Oncorhynchus tshawytscha*	Threatened & Endangered	
Trout, Bull	*Salvelinus confluentus*	Threatened	
Trout, Cutthroat	*Oncorhynchus clarki ssp.*		Species of Concern

List derived from Digital Atlas of Idaho, retrieved on 01/03/05 at website: http://www.pacificbio.org/ESIN/Infopages/Idaholist.html, modified to reflect species present within the Potlatch River watershed.

The provisions of the ESA were developed to aid in the recovery of endangered species. To conserve listed species, the ESA states that it is unlawful for anyone to "take" (i.e. kill or harm) endangered or threatened species and their habitats. The 4(d) rule, so called because its requirements and guidelines are found in Section 4(d) of the ESA, identifies actions related to threatened species that are limitations or exceptions to how the general ESA rule is enforced. An action may be exempt from enforcement under the rule if it adequately protects or conserves the listed species.

Section 7 of the ESA [16 U.S.C. 1531 et seq.] outlines the procedures for federal interagency cooperation to conserve federally listed species and designated critical habitats. Section 7(a)(1) directs federal agencies to utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of species listed pursuant to the ESA. Under this provision, federal agencies often enter into partnerships and memoranda of understanding with the USFWS or NOAA Fisheries for implementing and funding conservation agreements, management plans, and recovery plans developed for listed species. The services encourage the creation of partnerships and coordination of planning efforts to develop proactive approaches to listed species management.

ESA Section 7(a)(2) states that each federal agency shall insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. In fulfilling these requirements, each agency must use the best scientific and commercial data available. This section of the ESA defines the consultation process, which is further developed in regulations promulgated at 50 CFR §402. Permits for incidental take under Section 10(a)(l)(B) require a USFWS or NOAA Fisheries intraservice consultation.

These consultations are conducted in the same manner as under Section 7 except that the incidental take statement is governed by Section 10(a)(1)(B) to the extent that mitigation, including off-site compensation not directed at the effected individuals, may be considered. The services have developed a handbook for Habitat Conservation Planning and Incidental Take Permit Processing (November 1996), which may be referenced to for further information.[8]

5.1.2 NOAA Fisheries Critical Habitat Areas

The ESA requires the federal government to designate critical habitat for any species listed under the ESA, such as steelhead and salmon. Critical habitat is defined as specific areas with physical or biological features essential to the conservation of the species, and which may require special management considerations or protection. Critical habitat designations must take into consideration the economic impact, impact on national security, and any other relevant impact of such designation.

Between 1989 and 2000, NOAA Fisheries listed 26 evolutionarily significant units of Pacific salmon and steelhead in the Pacific Northwest and California. During that period the agency enacted final critical habitat designations for six of the 26 fish species: Snake River sockeye, Snake River fall chinook, Snake River spring/summer chinook, Sacramento winter-run chinook, central California coast coho, and southern Oregon/northern California coast coho. In February 2000, NOAA Fisheries published final critical habitat designations for 19 ESUs listed at that time. The agency stated that there would be no economic impact resulting from the designations, on the belief that very little or no additional requirements would be imposed beyond those already associated with the listing of the species themselves. A legal challenge was filed by the National Association of Homebuilders, and a federal court ruled that NOAA Fisheries did not adequately consider the economic impacts of the critical habitat designations.

In April 2002, NOAA Fisheries Service withdrew the February 2000 critical habitat designations. Another lawsuit was filed by the Pacific Coast Federation of Fishermen's Association and other plaintiffs, alleging that NOAA Fisheries failed to designate timely critical habitat for the 19 ESUs for which critical habitat had been vacated (as well as an additional listed species, the northern California steelhead). A settlement was imposed and NOAA Fisheries ultimately agreed to file final critical habitat designations by August 15, 2005, for the 20 ESUs that are listed as of that date. NOAA Fisheries filed final 2005 rules with the *Federal Register* to designate critical habitat areas in Washington, Oregon, Idaho and California for 19 species of

[8] Habitat Conservation Planning Handbook accessed at: http://www.fws.gov/endangered/hcp/hcpbook.htm.

salmon and steelhead listed as threatened and endangered under the ESA. The designations include a separate rule for 12 ESUs listed in Washington, Oregon and Idaho, and another for seven species listed in California. The final rules include analyses of the economic and other impacts of such designations, and address comments received from public and peer reviewers on the agency's proposed designations announced in November 2004.

Unlike the designations made in 2000, which relied on the USGS maps of subbasins and included all accessible river reaches within the current range of the listed species, the 2005 designations use a more specific scale in designating critical habitat for salmon and steelhead. The current designations identify stream and near-shore habitat areas where listed salmon and steelhead have actually been observed, or where biologists with local area expertise presume them to occur. These habitat areas are found within more than 800 watersheds in the Pacific Northwest and California. The final designations use information provided during the recent public comment period on the proposed rule, and information gathered by the more than 400 watershed groups already doing larger-scale salmon recovery planning efforts in Washington, Oregon, Idaho and California. The final designations also include updated scientific information to designate new "critical habitat" in estuarine and near-shore marine areas. Except for a small area in Hood Canal, Washington, unoccupied areas are not designated as critical habitat at this time.

5.1.3 Clean Water Act

In Idaho, state water quality standards have been established and approved by the United States Environmental Protection Agency (EPA). These standards, required under the CWA, are designed to protect, restore, and preserve water quality in waterbodies that have designated beneficial uses such as drinking water, contact recreation (e.g. fishing and swimming), and cold or warm water aquatic life (including salmonids). Designated uses have been identified for most, but not all, water bodies within Idaho. Each use has narrative and/or numeric standards that describe the level of water quality necessary to support the use. For those bodies not yet designated, the presumed existing uses are cold water aquatic life and primary or secondary contact recreation.

Designated uses and standards can be found in Idaho Code IDAPA 58.01.02. When a lake, river or stream fails to meet the water quality criteria that support its designated uses, specific actions are required under state and federal law to ensure that the impaired waterbody is restored to a healthy fishable, swimmable condition. In the Potlatch River watershed, 13 sections of rivers and streams have been identified as impaired—these water bodies are included in Section 5 of the 2002 Integrated Report (IDEQ 2005).

The IDEQ and EPA have a legal, court-ordered responsibility to ensure that these impaired waters be dealt with in a timely manner. This means that a total maximum daily load (TMDL) must be written for each identified (listed) impaired waterbody. The TMDL is a quantitative assessment of water quality problems and contributing pollutant sources. It specifies the amount of pollution reduction necessary to meet water quality standards, allocates the necessary pollutant limits among the contributing sources in the watershed, and provides a basis for taking actions needed to restore the waterbody. IDEQ is responsible for preparing the TMDLs. Stream segments within the boundaries of the Nez Perce Indian Reservation are developed through a tri-party agreement between the state of Idaho, the NPT, and EPA. TMDL development also includes coordination with the Clearwater Basin Advisory Group and Watershed Advisory Groups (BAG and WAG) as required by Idaho Code IDAPA Title 39, Chapter 36.

5.1.4 Federal Water Pollution Control Act of 1972 Section 404

US Department of Army Corps of Engineers (USACE) permits are required under §404 of the CWA for discharges of dredged or fill material into waters of the United States, including wetlands. This includes excavation activities that result in the discharge of dredged material that destroy or degrade waters of the United States. USACE permits are also required under §10 of the Rivers and Harbors Act of 1899 for work on structures waterward of the ordinary high water mark or affecting, navigable waters of the United States. The Potlatch River is included in the navigable waters of the Clearwater River upstream to River Mile 40.

5.1.5 PACFISH and InFish

PACFISH and InFish federal strategies were developed to be interim strategies to protect populations and habitats of fish species of concern on lands managed by the USFS and the USDI BLM. The strategies restrict actions in Riparian Habitat Conservation Areas (RHCA), most notably by defining the standard width of the four categories of RHCAs, which include fish-bearing streams; permanently flowing nonfish bearing streams, ponds, lakes, and wetlands greater than one acre and intermittent streams; wetlands less than one acre; landslides; and landslide-prone areas. Deviation from the defined RHCA width requires consultation with NOAA Fisheries and USFWS. Analysis to determine the effectiveness of PACFISH and InFish has not been done or the results of that analysis are not widely known (Ecovista 2003).

5.2 Tribal Treaty Rights

5.2.1 Nez Perce Tribe Treaty Rights

The Nez Perce people have inhabited the Clearwater Subbasin for millennia. The first Indian groups may have occupied the area as early as 10,000 years ago (Ecovista 2003). Prior to the treaty of 1855, the Nez Perce used the Clearwater area for hunting, fishing, gathering food, horse pasturing, and other cultural uses. The Clearwater River Subbasin is a part of the over 13 million acres in central Idaho, northeastern Oregon and southeastern Washington included in the pretreaty area of tribal use.

The Tribe reserves the right of its members to hunt and fish within and outside of the Nez Perce Reservation, and treaty rights apply to areas beyond current reservation boundaries. The treaty rights are based on the Treaties of 1855 and 1863 which maintained and protected the NPT’s historic rights to fish, hunt, and gather roots and berries and other resources on the reservation at usual and accustomed places:

- 1855 Treaty, Article 3: “The exclusive right of taking fish in all streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.”

- 1863 Treaty, Article 8: "The United States also agrees to reserve all springs or fountains not adjacent to, or directly connected with, the streams and rivers within the lands hereby relinquished, and to keep back from settlement or entry so much of the surrounding land as may be necessary to prevent the said springs or fountains being enclosed; and, further, to preserve a perpetual right of way to and from the same, as watering places, for the use in common of both whites and Indians."

5.3 State Policies and Laws

5.3.1 Forest Practices Act, Title 38, Chapter 13, Idaho Code

The Idaho Forest Practices Act (FPA) was passed by the state Legislature in 1974 and amended by the Legislature in 1980, 1986, 1987, 1989, 1990, 1991, 1992, 1995 and 2001. These rules constitute the minimum standards for the conduct of forest practices on forest land and describe the administrative procedures necessary to implement those standards. In this act, forest land is defined as federal, state, and private land growing forest tree species which are, or could be, at maturity, capable of furnishing raw material used in the manufacture of lumber or other forest products. Although the FPA rules apply to activities on federal and private lands within the state of Idaho, the state does not hold management authority over these lands. Private and owners/operators are required to obtain a *Notice of Forest Practice and Certificate of Compliance* from IDL prior to beginning forestry operations. Standards are established for stream protection zones (SPZ) around streams. These standards condition or limit practices within the SPZ, for example, skidding logs in or through streams is prohibited. The FPA also addresses large organic debris (LOD) functions, harvest practices must retain at least 75 percent of existing shade, and leave trees are designated by distance from stream, stream width, tree diameter, and number of trees. Class I streams, including lakes, are those used for domestic water supply and/or are important for spawning, rearing or migration of fish. The Class I SPZ is the area encompassed by a slope distance of 75 feet on each side of the ordinary high water mark of the stream. The Class II SPZ is the area encompassed by a slope distance of 30 feet on each side of the ordinary high water mark. Class II streams that do not contribute flow to Class I streams have a minimum of 5 feet.

5.3.2 Stream Channel Protection Act

The Idaho Department of Water Resources (IDWR) is responsible for enforcing the Stream Channel Protection Act, which requires permits for in-channel work or developments. State agencies, including the IDEQ and IDFG, have the opportunity to review and comment on the potential environmental effects of the projects. IDWR also manages Idaho's water rights program. Idaho Code gives the Water Resource Board the authority to hold instream flow water rights for the purpose of maintaining minimum streamflows to protect a variety of instream uses. No minimum streamflows have been established on rivers within the Potlatch River watershed to protect fish habitat, recreation, aquatic life, and wildlife habitat.

5.4 Local Policies and Laws

5.4.1 County Land Use Ordinances

Latah County adopted land use ordinances pursuant to the authority granted in Title 67, Chapter 65, of the Idaho Code and Article 12, Section 2, of the Idaho Constitution. Latah County is revising its land use ordinance and, if adopted as drafted, will require setbacks from intermittent and perennial streams for winter animal feeding areas and a riparian area protection zone that will prohibit construction within 100 feet of a stream. Latah County also has a flood plain ordinance that regulates the lowest allowable elevation for construction within the flood plain. Nez Perce County is drafting a development standards ordinance, which will require a site improvement permit if construction is to be within 100 feet of a perennial stream.

5.4.2 Latah County All Hazard Mitigation Plan

The Latah County All Hazard Mitigation Plan discusses floods and maintenance of floodplains, as well as hazard mitigation plans including fire, flood, landslide, and severe weather.[9]

[9] Latah County All Hazard Mitigation Plan can be accessed at: http://www.idl.idaho.gov/nat_fire_plan/county_wui_plans/latah/latahplan.htm

Chapter 6.

Conservation Programs and Management Plans

The Latah Soil and Water Conservation District cooperates with many agencies and organizations. Such cooperation facilitates interagency collaboration and provides for the inter-organizational communication necessary to accomplish the Latah SWCD conservation program.

6.1 At the Federal Level

At the federal level, there are many conservation programs and management plans administered by a multitude of agencies. Programs and plans involved in fisheries protection within the Potlatch River watershed and surrounding region include:

- Clearwater Focus Program and Policy Advisory Committee
- Endangered Species Act Implementation Plan
- Federal Columbia River Power System Biological Opinion and the Basinwide Salmon Recovery Strategy
- Columbia River Fish Management Plan
- Interior Columbia Basin Ecosystem Management Project
- Lower Snake River Fish and Wildlife Compensation Plan
- NOAA Restoration Center's Community-Based Restoration Program
- USDA Natural Resources Conservation Service Programs
- USFS Clearwater National Forest Plan
- Fish and Wildlife Service Programs and Plan

6.1.1 Clearwater Focus Program and Policy Advisory Committee

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act, which authorized the states of Idaho, Montana, Oregon, and Washington to create the Northwest Power and Conservation Council (Council). The Act directs the Council to prepare a program to protect, mitigate, and enhance fish and wildlife of the Columbia River Basin that have been affected by the construction and operation of hydroelectric dams, while also assuring the Pacific Northwest has an adequate, efficient, economical, and reliable power supply. The Act also directs the Council to inform the public about fish, wildlife, and energy issues and to involve the public in its decision making. In late 1996, the 9,645-square-mile Clearwater River Subbasin was designated a Focus Program under the Council's Columbia River Basin Fish and Wildlife Program. The purpose of the Clearwater Focus Program is to coordinate projects and interagency efforts to enhance and restore aquatic and terrestrial habitats in the Clearwater River Subbasin to meet the goals of the Council's Fish and Wildlife Program. The ISCC and the Nez Perce Tribal Watersheds Division co-coordinate the program on behalf of state of Idaho and the NPT.

The Focus Program convened the Clearwater Policy Advisory Committee (PAC) in September of 1999 to provide guidance in the development of a subbasin assessment and management plan. Work on the Clearwater Subbasin Assessment, Inventory, and Management Plan (Ecovista 2003) has been coordinated through the Focus Program and the PAC. Restoration projects have been conducted on private, state, federal, and tribal lands. Partnerships have been developed for all projects. In addition to the ISCC and NPT, project partners have included the USFS, NRCS, soil and water conservation districts, private landowners, IDFG, IDL, and the USDI BLM.

The Clearwater Focus Program continues to coordinate projects and interagency efforts to enhance and restore aquatic and terrestrial habitats in the subbasin to meet the goals of the Council's Fish and Wildlife program. The Clearwater Subbasin Plan will be reviewed and amended as necessary beginning in 2008 and every five years thereafter.

6.1.2 Endangered Species Act Implementation Plan

The EPA, NOAA Fisheries, and USFWS prepared the ESA Implementation Plan in acknowledgement of responsibilities for fish protection under the Northwest Power Act, water quality protection under the CWA, and the agencies' obligations to Indian tribes under law, treaty, and Executive Order. The implementation plan has been developed in response to the December 2000 Biological Opinions issued by the USFWS and the NOAA Fisheries on the effects to listed species from operations of the Columbia River hydropower system.

The implementation plan is a five-year blueprint that organizes the collective fish recovery actions by the three agencies. The implementation plan looks at the full cycle of the fish, also known as *gravel to gravel* management or an *All-H* approach (hydrologic, habitat, hatcheries, and harvest). However, it describes only commitments connected to the Federal Columbia River Power System (FCRPS), not the obligations of other federal agencies, states, or private parties. The implementation plan describes the three agencies' goals; the performance standards used to gauge results over time; strategies and priorities; detailed five-year action; a research, monitoring, and evaluation plan; and expectations for regional coordination.

6.1.3 FCRPS Biological Opinion and the Basinwide Salmon Recovery Strategy

NOAA Fisheries has recently developed several documents and initiatives for the recovery of ESA-listed Snake River steelhead, chinook and sockeye. The FCRPS, Biological Opinion (BiOp), and the Basinwide Salmon Recovery Strategy issued at the end of 2000 contain actions and strategies for habitat restoration and protection for the Columbia River Basin. Action agencies are identified, which will lead efforts in specific aspects of restoration on nonfederal lands. Federal land management will be implemented by current programs that protect important aquatic habitats (see PACFISH in Chapter 5 and ICBEMP in Section 6.1.5). Actions within the FCRPS BiOp are intended to be consistent with, or complement, the Council's amended Fish and Wildlife Program and state and local watershed planning efforts. NOAA Fisheries has also initiated recovery planning with the establishment of a Technical Recovery Team for the Interior Columbia, which includes Snake River stocks.

6.1.4 Columbia River Fish Management Plan

The Columbia River Fish Management Plan (CRFMP) is an agreement resulting from the US District Court case of U.S. v. Oregon (Case No. 68-513). This agreement between federal agencies, Indian tribes, and state agencies (except Idaho) set guidelines for the management, harvest, hatchery production, and rebuilding of Columbia River Basin salmonid stocks.

Appropriate harvest levels and methods were established for various levels of attainment of interim population goals for spring chinook, summer chinook, sockeye, fall chinook, summer steelhead, and coho salmon. The plan guaranteed the treaty Indian fisheries a minimum of 10,000 spring and summer chinook annually, not dependent on run size. The original CRFMP terminated in 1998; it has since been renegotiated.

6.1.5 Interior Columbia Basin Ecosystem Management Project

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) was conducted from 1993 to 1997 to develop and implement a scientifically sound, ecosystem-based management strategy for lands administered by the USFS and USDI BLM in Idaho, Montana, Wyoming, Nevada, and Utah. An important goal of ICBEMP is to provide long-term direction to replace PACFISH and InFish. The draft Environmental Impact Statement for ICBEMP was released in June 1997.

6.1.6 NOAA Restoration Center's Community-Based Restoration Program

The objective of the NOAA Restoration Center's Community-Based Restoration Program is to bring together citizen groups, public and nonprofit organizations, industry, corporations and businesses, youth conservation corps, students, landowners, local governments, and state and federal agencies to restore fishery habitat across Coastal America. The program partners with national and regional organizations to solicit and co-fund proposals for locally-driven, grass roots restoration projects that address important habitat issues within communities. Several restoration projects in the Clearwater Subbasin have been funded through various components of this program, particularly with the NPT. No programs have been initiated within the Potlatch River watershed to date.

6.1.7 USDA Farm Bill Programs

The NRCS District Conservationist and field office staff aid the Latah SWCD in working toward goals outlined in their Five-Year Plan and in many of the Latah SWCD's information and education activities.

The NRCS administers several natural resource conservation programs on private lands including the Environmental Quality Incentive Program (EQIP), the PL 566 (Public Law) Small Watershed Program, the Wildlife Habitat Incentives Program (WHIP), and the Wetland Reserve Program (WRP). Landowners work with the technical staff of the NRCS to use these programs for implementing conservation practices on their lands.

The Conservation Reserve Program (CRP) and the Continuous Conservation Reserve Program (CCRP) are conservation programs implemented on croplands and riparian areas by the USDA Farm Services Agency (FSA). These two programs are managed through the FSA, with technical assistance provided by the NRCS. These programs are voluntary and include some combination of the following: incentive payments (CCRP), cost-sharing for plantings and structures, and rental payments.

The enrollment of agricultural land with a previous cropping history into CRP has removed much of the highly erodible land from commodity production. The land is converted into herbaceous or woody vegetation to reduce soil and water erosion. CRP contracts are for a minimum of 10 years and have resulted in an increase in wildlife habitat. Practices that occur under CRP include planting vegetative cover, such as introduced or native grasses, wildlife cover plantings, conifers, filter strips, grassed waterways, riparian forest buffers, and field windbreaks.

The CCRP focuses on the improvement of water quality and wildlife habitat. Practices include shallow water areas, riparian forest buffers, filter strips, grassed waterways and field windbreaks. Enrollment for these practices is not limited to highly erodible land, as is required for the CRP, and carries a longer contract period (10-15 years), higher installation reimbursement rate, and higher annual rental rate.

The amount of CRP and CCRP acreage within the Potlatch River watershed is not available. The FSA database is tabulated by county, and does not delineate between watersheds. Therefore, some of the reported total acreage is outside of the Potlatch River watershed. Currently there are over 45,000 acres enrolled in CRP and CCRP in Latah County (representing only 10% of the cropland in Latah County).

The WHIP, administered and implemented by NRCS, provides financial incentives to develop wildlife habitat on private lands. Participants agree to implement a wildlife habitat development plan and NRCS agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices. This agreement generally lasts a minimum of 10 years from the date that the contract is signed.

The NRCS administers and implements EQIP, which provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers to comply with federal, state, and tribal environmental laws, and encourages environmental enhancement. The purposes of the program are achieved through the implementation of a conservation plan that includes structural, vegetative, and land management practices on eligible land. Five- to ten-year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree plantings, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management. The amount of acres involved EQIP contracts within the Potlatch River watershed in Latah County is not available.

Another program administered and implemented by NRCS is the Wetlands Reserve Program (WRP). This voluntary program is designed to restore wetlands. Participating landowners can establish conservation easements of permanent or 10- to 30-year duration, or can enter into restoration cost-share agreements where no easement is involved. In exchange for establishing a permanent easement, the landowner receives payment up to the agricultural value of the land and the restoration costs for restoring the wetlands. The 30-year easement payment is 75 percent of what would be provided for a permanent easement on the same site and 75 percent of the restoration cost. The 10-year easements provide for 75 percent of the cost of restoring the involved wetlands. Easements and restoration cost-share agreements establish wetland protection and restoration as the primary land use for the duration of the easement or agreement.

The Clearwater Resource Conservation and Development Council, Inc. (Clearwater RC&D) is a locally initiated, sponsored and directed program. The public, primarily through their representatives, participate in Clearwater RC&D programs through projects and activities emphasizing land conservation, community development, water management, and other environmental concerns. USDA NRCS provides a coordinator to the Clearwater RC&D, whose office is located in Moscow, Idaho. The Clearwater RC&D is an organization whose mission is to enhance the quality of life for the residents of north-central Idaho by maintaining and improving the economic, social and environmental conditions within the region. The Clearwater RC&D, governed by a volunteer council, is involved in development and protection of natural resources through such projects as cooperating in improvement of Spring Valley Reservoir and Moscow City Parks, supports the Clearwater Basin Weed Advisory Group and the Alternative Forest Products Advisory Group, and provides low-cost conifer trees for conservation plantings.

6.1.8 Clearwater National Forest Plan

Forest lands of the CNF are intermingled with state, Potlatch Corporation, and other privately owned lands. The CNF plan (USDA USFS 2004) reports that their timber management focus is on restoring the landscape to maintain a range of forest conditions, including old forests. Wildland fires are generally controlled to protect young tree stands and adjacent private property. Managers use fire each spring and fall to reduce high forest fuel accumulations and promote the establishment and growth of ponderosa pine stands. During summer and fall, livestock are managed to disperse their numbers rather than have them concentrated.

The USFS land allocation, management standards, and guidelines for national forest lands within the Potlatch River watershed are specified in the Clearwater National Forest Plan. PACFISH (anadromous fish) and the InFish (resident fish) interim strategies are measures designed to protect habitats and populations of fish. PACFISH was adopted as an amendment to the Clearwater National Forest Plan in 1995.

The CNF received funding in 2003 to begin revision of the 1987 forest plan, which will be completed by 2007. Monitoring is required in the forest plan, along with meeting the Idaho State Water Quality Standards administered by IDEQ. The format for the monitoring plan is agreed upon by the Northern and Intermountain Regions of the USFS and the IDEQ. The primary goal of monitoring is to determine if land management activities are meeting Forest Plan standards and objectives. The monitoring is divided into two major areas: on-site and instream monitoring. On-site monitoring includes baseline, implementation, BMP effectiveness and PACFISH and InFish compliance. Instream monitoring addresses the relationship between land disturbance activities and water quality and fisheries habitat. It includes baseline, effectiveness, and validation monitoring. Annually each forest publishes a compilation of monitoring projects and releases it at the Clearwater Interagency Monitoring Coordination meeting held each spring.

6.1.9 United States Fish and Wildlife Service Programs and Plan

The USFWS administers the Partners for Wildlife Program. The purpose of the program is to restore and enhance fish and wildlife habitat on private lands through partnerships. A special emphasis is placed on the restoration of riparian areas, wetlands and native plant communities, especially if they benefit rare plant and animal species. Cost share partners can include WHIP, EQIP, WRP and state and private programs.

The Private Stewardship Grant Program (PSGP) is administered by the USFWS, and provides grants and other assistance on a competitive basis to individuals and groups engaged in private, voluntary conservation efforts that benefit species listed or proposed for listing as endangered or threatened under the Endangered Species Act of 1973, candidate species, or other at-risk species on private lands. Eligible projects include those offered by landowners and their partners who need technical and financial assistance to improve habitat or implement other activities on private lands. The PSGP supports on-the-ground conservation actions as opposed to planning or research activities, and does not fund the acquisition of real property either through fee title or easements.

6.1.10 Lower Snake River Fish and Wildlife Compensation Plan

The USFWS administers the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP). This plan was authorized by the Water Resources Development Act of 1976 (Public Law 94-587) to mitigate and compensate for fish and wildlife losses caused by the construction and operation of the four lower Snake River dams and navigation lock projects. The fishery resource compensation plan identified the need to replace adult salmon and steelhead and resident trout fishing opportunities. The size of the anadromous program was based on estimates of salmon and steelhead adult returns to the Snake River Basin prior to the construction of the four lower Snake River dams. In the Clearwater River, the LSRCP funds the Clearwater Hatchery, operated by IDFW and the chinook salmon production portion of the Dworshak North Fork Hatchery operated by the USFWS. A summary document describing the LSRCP and its role in individual subbasins has been compiled and submitted under separate cover to the Independent Science Review Panel and the Columbia Basin Fish and Wildlife Authority.

6.2 Nez Perce Tribal Programs and Management Plans

The NPT is a major natural resource manager with a number of departments and divisions responsible for protecting, enhancing, and restoring tribal resources both on the reservation and within the Tribe's treaty territory. Tribal departments contributing to this document include Department of Fisheries Resource Management (with seven divisions) and the Department of Natural Resources, comprised of Wildlife, Forestry, Water Resources Division, and Cultural Resources. A number of planning processes are currently underway as a result of interagency coordination.

The 1998 Unified Watershed Assessment and Watershed Restoration Priorities Plan was prepared by the NPT in response to the Clean Water Action Plan of 1998. It identifies watersheds containing tribal fee and trust lands and tribal usual and accustomed fishing places, and sets out priorities for restoration. The prioritization list of watersheds is similar to that of applicable CWA Section 5 of the 2002 Integrated Report (IDEQ 2005). The NPT Water

Resources Division implements restoration work in watersheds within the Reservation upon completion of TMDLs that have been developed under a tri-party agreement between the NPT, EPA, and the IDEQ.

Wy-Kan-Ush-Mi Wa-Kish-Wit is the Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs, and Yakama Tribes, published in 1996 (Ecovista 2003). This plan includes adult return targets for each subbasin in the Columbia Basin. Wy-Kan-Ush-Mi Wa-Kish-Wit recommends habitat restoration actions that focus on limiting, restricting, or eliminating land uses and enhancing populations with implementation of broodstock, supplements release, and production programs.

6.3 At the State Level

At the state level, there are many conservation programs and management plans administered by a multitude of state agencies. Programs and technical assistance for plans in fisheries protection within the Potlatch River watershed and the surrounding region are offered through:

- Idaho Department of Fish and Game Plans
- Idaho Conservation Data Center Programs
- Idaho Department of Environmental Quality Programs
- Idaho Soil Conservation Commission Programs
- Idaho Department of Lands Programs
- Idaho Department of Water Resources Programs
- Idaho Department of Transportation Programs
- Idaho Association of Soil Conservation Districts Programs
- University of Idaho Programs

6.3.1 Idaho Department of Fish and Game Plans

Under Title 36 of the Idaho Code, the IDFG is responsible to preserve, protect, and perpetuate fish and wildlife in the state of Idaho and provide supplies of fish and wildlife to the citizens of the state for hunting, fishing, and trapping. IDFG works to preserve, protect, perpetuate, and manage wildlife. IDFG management plans and policies relevant to fish and wildlife and their habitat in the Clearwater Subbasin include the A Vision for the Future: Idaho Department of Fish and Game Policy Plan, 1990-2005; the Idaho Department of Fish and Game Strategic Plan; the Idaho Department of Fish and Game Five Year Fish Management Plan: 2001-2006; the White-tailed Deer, Mule Deer and Elk Management Plan; the Black Bear Management Plan 2000-2010; the Nongame Plan 1991-1995; the Upland Game Plan 1991-1995; the Waterfowl Plan 1991-1995; the Moose, Sheep and Goat Plan 1991-1995; the Mountain Lion Plan 1991-1995; and the Furbearer Plan 1991-1995.

The IDFG assists the Latah SWCD in working with cooperators on improving wildlife habitat through various landowner incentive programs. The IDFG also assists the Latah SWCD with community meetings, workshops, and information and education programs.

The Habitat Improvement Program (HIP) is a program administered by IDFG to create and improve habitat for upland game and waterfowl on public and private land. Initiated in 1987, the program is designed primarily to help private landowners to use their property to the benefit of upland game birds and waterfowl. Landowners are provided with financial assistance for provide waterfowl nesting structures, wildlife ponds, irrigation systems, fence materials, food plots, and herbaceous, shrub and tree plantings to provide food, and nesting, brood-rearing and winter cover.

In Latah County, from 1987-2003, 4,430 acres had been improved through HIP (3,961 acres for upland birds and 469 acres for waterfowl). Nesting cover, woody cover, food plots, ponds and nest structures were the main practices implemented. The database currently does not allow a breakout by watershed, but it is estimated that 3,410 acres and 249 acres for upland birds and waterfowl, respectively, are in the Potlatch River watershed.

From 2002-2005, 4,749 acres have been improved through HIP in the county (3,961 acres for upland birds and 469 acres for waterfowl). Dense nesting cover, woody cover, food plots, shallow water developments, riparian protection, and Farm Bill Program project enhancements were the main practices implemented. It is estimated that 2,822 acres are located within the Potlatch River watershed. These acres may be divided into 2,712 acres for upland birds and 110 acres for waterfowl habitat in this watershed.

The IDFG has also developed the Clearwater Pheasant Initiative (CPI) that provides funding for pheasant habitat projects in the Clearwater Region. These funds complement current HIP funds, but are focused on improving woody cover, planting food plots, and managing crop residue. Many of the acres enrolled under the CPI are located within the Potlatch River watershed.

The IDFG is working with the University of Idaho Landscape Lab to map critical wildlife habitat and vertebrate species richness. This information can be used by the Latah County Planning Commission to identify which habitats are most critical to protect, and where conservation of soil, water and open space resources is most critical, and where and how restoration efforts might be most effective.

6.3.2 Idaho Conservation Data Center Programs

The Idaho Conservation Data Center (CDC), administered by IDFG, is the central repository for information related to the state's rare plant and animal populations. The operating philosophy of the CDC is to provide accurate, comprehensive, and timely information on Idaho's rare species to decision makers at the earliest stages of land management planning. The staff of the CDC are involved with rare plant and natural area surveys and the development of conservation strategies. These activities assist government agencies and private organizations to identify unique areas for protection from disturbance and development.

6.3.3 Idaho Department of Environmental Quality Programs

The IDEQ conducts biological and physical habitat surveys of water bodies under the Beneficial Use Reconnaissance Project (BURP); the primary purpose is to determine the support status of designated and existing beneficial uses. IDEQ completed BURP surveys on most streams in the Potlatch River watershed for potential inclusion in Section 5 of the 2002 Integrated Report (IDEQ 2005).

The IDEQ has primacy to administer the CWA §319 Nonpoint Source Management Program in Idaho. The program is responsible for administering grants awarded annually on a competitive basis and for providing technical support to watershed implementation activities. Funding projects must focus primarily on improving the water quality of lakes, streams, rivers, and aquifers. Projects must be consistent with the Idaho Nonpoint Source Management Plan, for which there are seven project sectors: agriculture, urban storm water runoff, transportation, silviculture, mining, ground water activities, and hydro-habitat modification. Projects located in watersheds with an approved TMDL are general priorities for funding under this program.

IDEQ initiated TMDL development for the Potlatch River watershed in 2004, beginning with a subbasin assessment and TMDL, which included water quality monitoring. TMDLs for all streams listed in the Clearwater are scheduled to be completed by the end of calendar year 2006. IDEQ is currently working on the implementation phase of the TMDL; implementation plans are developed by local watershed advisory groups utilizing the information gathered in the subbasin assessment.

The IDEQ 2002-2007 Strategic Plan includes three strategies that are relevant to protecting and restoring ecosystem resources: 1) improve ground water quality in degraded areas and protect all ground water; 2) improve the surface water quality in areas identified as not supporting their beneficial uses or where the state believes threatened or endangered species exist; 3) improve environmental quality in areas subject to past or present mining activities.

6.3.4 Idaho Soil Conservation Commission Programs

The Idaho Soil Conservation Commission (ISCC) was created by the Idaho legislature in 1939 and consists of five commission board members appointed to five-year terms by the Governor of Idaho. ISCC staff provides technical and administrative support to the 51 Conservation Districts in Idaho. ISCC has provided funding through direct grants, grants and loans through the Resource Conservation and Rangeland Development Program (RCRDP), and through financial incentives under the Water Quality Program for Agriculture (WQPA), all of which supplement EPA 319 funds used on agricultural lands.

The purpose of the RCRDP is to provide low-interest loans to private landowners to improve those rangeland and riparian areas with the greatest public benefit. The intent of WQPA is to contribute to protection and enhancement of the quality and value of Idaho's waters by controlling and abating water pollution from agricultural lands. The program provides financial assistance to soil conservation districts who conduct water quality planning studies and implement water quality projects.

The ISCC also administers the Idaho Agricultural Pollution Abatement Plan (AgPlan). The fourth revision of the AgPlan was certified by Governor Dirk Kempthorne in March 2003. The AgPlan is Idaho’s response to Section 208 of the federal CWA (PL 92-500) and represents the agricultural portion of the State Water Quality Management Plan. The AgPlan is the implementing action plan for all nonpoint source agricultural sector activities in the state. The implementation strategy contains six actions items:

- Identify waters with beneficial uses threatened or impaired by agricultural activities
- Prioritize waters to determine implementation effort needed

- Identify management strategies for implementation
- Define authorities, regulations, and commitments to ensure implementation occurs
- Implement feedback loop process
- Communicate evaluation results, conclusions, and recommendations

6.3.5 Idaho Department of Lands Programs

The IDL manages in trust approximately 40,443 acres in Potlatch River watershed. IDL is responsible for the management and maintenance of nearly 2,500,000 acres of endowment lands in the State of Idaho, providing income to the endowment beneficiaries. The IDL is also responsible for administering surface mining laws, placer mining laws, navigable waters, the Idaho Forestry Act Fire Hazard Reduction Law, the Idaho Forest Practices Act, as well as the Idaho Lake Protection Act, which requires permits for work on or above the lake bed and below the ordinary high water mark.

Latah SWCD works with the IDL to implement conservation programs private lands. The IDL employs Private Forestry Specialist available to assist private wood lot owners. IDL also assists with many Latah SWCD information and education programs.

IDL provides assistance to private landowners to develop timber management plans that comply with site-specific best management practices in tributary watersheds to protect riparian areas and water quality. The IDL administers the state Stewardship Program, which provides cost-share dollars to perform forestry practices. The 2002 Farm Bill replaced Stewardship Incentives Program (SIP) with the Forest Land Enhancement Program (FLEP) which now provides cost share assistance in implementing the state's Stewardship Program.

6.3.6 Idaho Department of Water Resources Programs

The Idaho Department of Water Resources (IDWR) is responsible for enforcing the Stream Channel Protection Act, which requires permits for in-channel work or developments. State agencies, including the IDEQ and IDFG, have the opportunity to review and comment on the potential environmental effects of the projects. IDWR also manages Idaho’s water rights program. Idaho Code gives the Water Resource Board the authority to hold instream flow water rights for the purpose of maintaining minimum stream flows to protect a variety of instream uses. No minimum stream flows have been established on rivers within the Potlatch River watershed to protect fish habitat, recreation, aquatic life, and wildlife habitat.

6.3.7 Idaho Department of Transportation Programs

The Idaho Department of Transportation (ITD) develops project plans through the State Transportation Improvement Program (STIP) which include a five-year project implementation phase and a one-year project development phase. Corridor planning is conducted in more urban areas of Idaho in addition to STIP, but has not been implemented as a planning methodology in the Potlatch River watershed (ITD District 2).

The Idaho Transportation Department provides the Latah SWCD current information on the status and plans of proposed new highway construction, and carries out beneficial conservation work affecting the highway right-of-way and adjacent agricultural lands. The ITD also provides input to interested parties regarding soil and water conservation or flood prevention problems affected by existing or potential highway work.

Projects planned for implementation within the next five years in the Potlatch River watershed by the ITD include:

- Bear Ridge Grade: pavement rehabilitation on State Highway 3 from milepost 13.6 to 17.8.
- Bovill Pedestrian Enhancement: construction of a bike path in Bovill on State Highway 3 from milepost 38.7 to 39.2.
- Bank stabilization planned for State Highway 3 above Bear Creek.
- Routine maintenance activities.

The Idaho Legislature created the Local Highway Technical Assistance Council (LHTAC) in 1994 to assist local road districts to secure federal road funds for qualifying projects. The Idaho Association of Counties, Idaho Association of Cities, and the Association of Highway Districts appoint members to the council, which is comprised of three members from each organization.

6.3.8 Idaho Association of Soil Conservation Districts Programs

The Idaho Association of Soil Conservation Districts (IASCD) performs water quality monitoring throughout the Potlatch River watershed. Water quality data will be used in part by local, state, and federal entities to develop TMDLs.

6.3.9 University of Idaho Programs

The University of Idaho (UI) has been directly involved in activities addressing fish, wildlife and water quality issues through projects conducted by faculty and students within the College of Agricultural and Life Sciences and the College of Natural Resources.

The UI Experimental Forest is a multiple-use, working forest of over 8,000 acres administered by the College of Natural Resources. Project areas within the Potlatch River watershed include the Big Meadow Creek Unit, the Blodgett Outdoor Classroom, and the Student Management Unit in the Big Meadow Creek drainage. Activities such as timber, watershed, wildlife and range management, as well as many types of recreation, take place on the forest. Objectives of the experimental forest are to provide university students a field laboratory in which to observe and practice what they have learned in the classroom, to provide an area in which to demonstrate to the public the latest forest land management techniques, to provide a land base for research projects conducted by faculty and students of the college. Student chapters of professional societies, such as The Wildlife Society, the Society of Range Management, the Society of American Foresters, and the American Fisheries Society actively participate in surveys, educational outreach, and watershed improvement activities.

The University of Idaho Cooperative Extension Service (CES) conducts education programs in Latah County. CES agents are trained in agriculture, forestry, and related fields and have expertise in giving demonstrations, conducting group meetings, and working with the public and media. The CES agents assist Latah SWCD in working with youth groups, organizing judging teams, and developing and participating in outdoor conservation activities. The CES also has other specialists trained in soils, irrigation, range, and agricultural economics that can be utilized by the public.

6.4 At the Local Level

At the local level, many groups are involved in fisheries protection programs within the Potlatch River watershed and surround region, including:

- Conservation Districts
    - Latah Soil and Water Conservation District
    - Nez Perce Soil and Water Conservation District
- Clearwater Basin Advisory Group
- Potlatch Watershed Advisory Group
- North and South Latah County Highway Districts
- Latah County Board of Commissioners
- Palouse-Clearwater Environmental Institute
- Palouse Land Trust
- Palouse Prairie Foundation
- Three Rivers Chapter of Trout Unlimited
- Moscow Civic Association

6.4.1 Conservation District Programs

The Latah SWCD is 1 of 51 conservation districts in Idaho, which serve 99% of the state's area. The mission of the Latah SWCD is to, "Lead local efforts to promote the stewardship of natural resources, through the development of comprehensive plans and the implementation of strategies for economic and ecological sustainability, on behalf of the citizens, through the coordination of leadership information and funding."

The Latah SWCD provides the public with a formal channel for cooperating with one another and within county, state, tribal, and federal agencies in resource conservation on lands within Latah County. The Latah SWCD offers guidance, technical and financial assistance, and information to people with land use and other natural resource needs and concerns. District Supervisors and staff supply educational information to increase community awareness about the sustainable management of our local natural resources.

The Resource Conservation Plan facilitates these activities by outlining procedures and methods, prioritizing current needs, and identifying future expectations. It also provides a means to focus the District's staff and financial resources, allowing the District board to measure progress and results, promote sustainable resource management, and encourage collaboration between individuals, organizations and government agencies. The Latah SWCD seeks to ensure that the land, water and wildlife resources under its care will be viable and sustainable for current future generations.

In Nez Perce County, the Potlatch River runs along State Highway 3 from its mouth near the community of Arrow, upstream just north of the Little Potlatch Creek confluence. For almost 60 years the Nez Perce Soil and Water Conservation District has been committed to supporting the conservation and wise management of Nez Perce County's natural resources. Today, the Nez Perce SWCD continues to meet the needs of landowners and land users throughout the area by offering information and technical guidance as well as financial cost-share assistance to individuals with land or resource needs and concerns.

6.4.2 Clearwater Basin Advisory Group

Basin advisory groups (BAG) were created by Idaho state water quality code (Idaho Code §39-3613). The duties of each BAG are specified by Idaho Code §39-3614. The BAGs designated by the director of the Idaho Department of Health and Welfare advise the director on water quality objectives for each river basin in the state. The Clearwater BAG is composed of ten members representing industries and interests affected by the implementation of water quality programs within the Clearwater basin. The BAGs make recommendations to IDEQ concerning monitoring, designated beneficial use status revisions, prioritization of impaired waters, and solicitation of public input.

6.4.3 Watershed Advisory Group

Watershed advisory groups (WAG) were created by Idaho state water quality code (Idaho Code §39-3615). WAGs, with members appointed by BAGs, are formed to provide advice to the IDEQ for specific actions needed to control point and nonpoint sources of pollution within watersheds where designated beneficial uses are not fully supported. WAG duties are specified in Idaho Code §39-3616. The code specifically calls for creation of WAGs for water bodies that were labeled as "high priority" on the TMDL schedule established for Idaho state.

The Potlatch River WAG was formed in 2006 to develop the Potlatch River Tributaries Subbasin TMDL Implementation Plan.

6.4.4 Highway Districts

Best management practices for erosion and sediment control in county road construction and maintenance within the subbasin is administered by both the North and South Latah County Highway Districts. North and South Latah County Highway Districts are responsible for road construction and maintenance for all county roads in Latah County, Idaho. The highway districts of Latah County work with the Latah SWCD to see that needed conservation practices are applied on road banks and cuts.

6.4.5 Latah Board of County Commissioners

The Latah Board of County Commissioners (BOCC) works with the Latah SWCD to help local people with the conservation, development, and wise use of natural resources. They assist the Latah SWCD in carrying out its resource conservation and development program by evaluating requests for zoning variances, allocating funds, and cooperating with land users in establishing conservation structures practices.

6.4.6 Palouse-Clearwater Environmental Institute

The Palouse-Clearwater Environmental Institute (PCEI) is a 501(c)(3) non-profit organization based in Moscow, Idaho. The mission of PCEI is to increase citizen involvement in decisions that affect our region's environment. PCEI consists of six main program areas: Watersheds, Environmental Education, Green Living, Alternative Transportation, Alternative Energy, and AmeriCorps Placement. The Watersheds Program has been actively engaged in watershed restoration since the early 1990s, beginning with Adopt-a-Stream programs, litter clean-up, and storm drain labeling. PCEI implemented restoration projects on several watersheds outside the Potlatch River watershed. Restoration projects include streambank stabilization and resloping, restoration of floodplain connectivity, wetlands construction, revegetation with native riparian species, and restoration of channel complexity. The primary targets of watershed restoration efforts have been water quality improvements involved in TMDL development and implementation, including reductions in sediments, bacteria, nutrients, and temperature.

6.4.7 Palouse Land Trust

The Palouse Land Trust was formed in 1995 to help landowners and communities in the Palouse region conserve and protect unique and open areas. The major mechanism in accomplishing this is through conservation easements. Several projects managed by the Palouse Land Trust within the region include conservation easements such as the Fosberg Preserve, the Berman Creekside Park, Emerald Creek Garnet, Idler's Rest Preserve, the Stage Property, and a co-held easement at Cougar Bay on Lake Coeur d'Alene.

6.4.8 Palouse Prairie Foundation

The Palouse Prairie Foundation formed in 2002. Their mission is to promote preservation and restoration of native Palouse Prairie ecosystems in Latah and Whitman Counties through public awareness, education, literature resource, encouraging responsible local seed production, and acting as a leader or consultant in Palouse Prairie restoration efforts.

6.4.9 Three Rivers Chapter of Trout Unlimited

A local chapter of Trout Unlimited was established in the spring of 2004. The Three Rivers Chapter of Trout Unlimited has an area of interest which includes the Potlatch and Palouse River watersheds. Trout Unlimited's mission is to conserve, protect and enhance cold water fisheries. In its short existence, the Three Rivers Chapter has supported several erosion control projects, assisted IDFG officials with steelhead tagging projects, and provided educational opportunities for local youth groups.

Chapter 7.

Implementation Plan

The goal of the Potlatch River Watershed Management Plan is to specify restoration and protection strategies that help restore steelhead to a robust, self-sustaining population in the Potlatch River watershed.

7.1 Introduction

The Latah SWCD is an important link in implementing sound resource conservation programs that are acceptable to, and for the benefit of, the residents of Latah County and the State of Idaho. The Latah SWCD annually updates their plan of work, referred to as the Five-Year Plan. The Five-Year Plan identifies the Latah SWCD's focus on issues that motivate individuals and community organizations to voluntarily dedicate time, energy, and resources to the protection and enhancement of natural resources within the region.

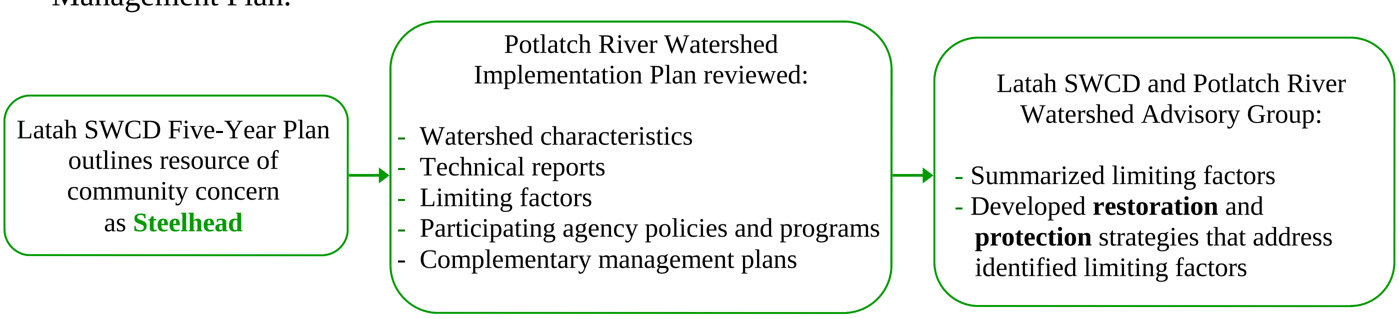
Steelhead are listed as one of the resources of community concern in the Latah SWCD's Five-Year Plan. The Latah SWCD's center of attention with the development of this Potlatch River Watershed Management Plan is to focus on **steelhead**. In order to increase steelhead production potential in areas that are most likely to benefit and yield the highest returns, efforts concentrate on protection and restoration.

7.2 Planning Process

Previous technical reports were reviewed and summarized in Chapter 3 (General Fish Resources within the Potlatch River Watershed). The Limiting Factors chapter, Chapter 4, summarizes conditions and situations that limit support of a self-sustaining population of steelhead in the Potlatch River watershed. Laws, policies, and resource management plans are reviewed in Chapter 5 to provide the foundation for a Potlatch River watershed specific implementation plan for A-run steelhead. Chapter 6 provides an overview of conservation programs and management plans involved in fisheries protection within the Potlatch River watershed and the surrounding region at the federal, tribal, state, and local levels.

The Potlatch River Technical Advisory Group assisted the Latah SWCD develop the Potlatch River Watershed Management Plan by using the information obtained in the planning process described in previous chapters.

The following flow chart summarizes the development of the Potlatch River Watershed Management Plan.



7.3 Existing Management Plans and Recommendations

The Latah SWCD began developing a Potlatch River Basin Management Plan in 1994. Habitat, riparian, and fish survey work was conducted throughout the watershed in 1995 and 1996 with the assistance of multi-disciplinary agency teams. Due to a lack of funding, planning efforts were discontinued until 2001 when the Latah SWCD was awarded a contract through Northwest Power and Conservation Council's Fish and Wildlife Program. The funding centered on evaluating instream fish habitat in the Potlatch River through comprehensive watershed planning, improving fish habitat and water quality through implementation of BMPs, and fish habitat monitoring. In 2004, additional funding from the Idaho portion of the Pacific Coastal Salmon Recovery Fund was awarded to the Latah SWCD and to IDFG to conduct additional fisheries monitoring.

7.3.1 Clearwater Subbasin Management Plan

Planning and implementation efforts since 2001 followed the Clearwater Subbasin Management Plan's recommendations (Ecovista 2003) as a foundation to build this Potlatch River Watershed Management Plan. The Clearwater Subbasin Management Plan (Ecovista 2003) reviewed the fish, wildlife and vegetative resources within the Clearwater Subbasin Management Plan's Assessment section. The assessment details the threats, limiting factors, and historic/current distribution of wildlife within the Clearwater subbasin as well as the Potlatch River watershed. The Clearwater Subbasin Management Plan (Ecovista 2003) assessed the Potlatch River watershed based on 27 sixth-field hydrologic codes. A-run steelhead trout are reported to be widely distributed throughout the Potlatch River watershed. Limiting factors to steelhead throughout the entire Potlatch River system are reported to include high water temperatures, low base flows, sediment delivery, watershed disturbances, habitat degradation, increases in noxious weeds, and lack of connectivity and impaired passage. The management plan summary and recommendations includes:

> The upper Potlatch River watershed is the largest contiguous area of forested land cover in the lower Clearwater River assessment unit.[10] The most limiting factors for fish included temperature, low base flow, sediment, watershed disturbance, and habitat degradation. Restoration priorities include temperature, sediment, roads, and grazing.
>
> The middle reaches of the Potlatch River watershed have mixed agriculture and forest land cover. Surface erosion hazards are considered very high throughout and road densities are typically moderate. Restoration priorities include temperatures, surface erosion and sedimentation, and ponderosa pine inventory/protection/restoration needs.
>
> The lower Potlatch River watershed has substantial amounts of agricultural/range land cover coupled with very high surface erosion hazard, moderate to high landslide hazard, and moderate to high road densities. Restoration priorities include temperature, sediment, ponderosa pine and prairie inventory/protection/restoration needs.

---

[10] The lower Clearwater River assessment unit refers to the area studied in the Clearwater Subbasin Management Plan (Ecovista 2003); Clearwater Subbasin Assessment Table 62 Limiting Factors, (page 346) and Table 67 Primary characteristics of PMUs (page 366); Clearwater Subbasin Management Plan Table 9 Restoration issues and related priorities (page 93).

7.3.2 US Bureau of Reclamation

The US Bureau of Reclamation studied the feasibility of putting a storage reservoir in the middle reaches of the East Fork Potlatch River to augment low summer flows, control high summer water temperatures, restore they hydrograph and stream process, and reduce erosion in the mainstem of the Potlatch River (Ecovista 2003). The Bureau of Reclamation's study determined that the costs associated with the reservoir would be greater than the benefits. The benefits include an optimistic estimate of 1,300 returning adult steelhead spawners after five years of increases in the population. The capital expenditures and the operating costs were much greater than the monetary benefits attributed to increased steelhead production, although the US Bureau of Reclamation study concluded that flow and temperature regimes must be controlled to promote increases salmonid use on the Potlatch River, and the storage reservoir was recommended as the best enhancement measure for the Potlatch.

7.3.3 Clearwater National Forest Plan

The draft forest plan of proposed actions for the CNF (USDA USFS 2004), suggests the following goals for restoration and/or protection of forest health, and fish and wildlife habitat: confine noxious weed infestations and eliminate them from meadows, travel routes and southerly aspects; restore western white pine in moist forest types; restore watershed processes and steelhead trout habitat by limiting erosion and soil deposits in stream channels; confine off-highway vehicles to designated routes (non-winter season); and incorporate in allotment management plans the need to provide food and cover for wildlife.

7.3.4 Potlatch River Basin Forestry Committee

A Potlatch River Basin Forestry Committee was formed in 1997 and included representatives from NRCS, IDL, NPT Fisheries Department, Northwest Management Inc., Potlatch Corporation, USFS and USFS Intermountain Research Station, IDEQ, and the University of Idaho College of Forestry and Range Sciences. The purpose of the forestry committee was to assist the Latah SWCD in the evaluation and prioritization of projects on forested lands within the watershed. The forestry committee utilized a "working knowledge approach" in 1998 (Gariglio and Hotinger), along with the actual and potential occurrence of fish populations in the Potlatch River watershed, to derive treatment units, treatment recommendations, and treatment priority recommendations.

Two treatment units were devised for forested lands throughout the watershed. The treatment units were categorized by soil type and landform. A description of treatment units and the soils associated with each forest land treatment unit is displayed in Appendix D.

The forestry committee recommended the following:

- Maintain the continuous application and enforcement of the Forest Practices Act
- Evaluate subwatersheds using a field based procedure such as the IDL Cumulative Watershed Effects process to identify specific problems and appropriate BMP solutions
- Continue to use the silvicultural management approach of reintroduction of blister rust resistant white pine into its natural range
- Restore riparian areas to improve water quality and fish habitat

7.3.5 Potlatch River Total Maximum Daily Load (TMDL)

IDEQ initiated TMDL development for the Potlatch River watershed in 2004, beginning with a subbasin assessment, which included water quality monitoring. TMDLs for all streams listed in the Clearwater River watershed are scheduled to be completed by the end of calendar year 2006. IDEQ is currently working on the implementation phase of the TMDL; implementation plans are developed by local watershed advisory groups utilizing the information gathered in the subbasin assessment.

Conclusions in the draft Potlatch River Subbasin Assessment and TMDL (IDEQ 2004) generalized that very few streams throughout Clearwater River region meet the temperature state water quality standard. Two water bodies in the Potlatch River watershed, Cedar Creek and the Potlatch River from the East Fork to Corral Creek, show support of their beneficial uses but exceed the water quality standard for both sediment and temperature.

The IDEQ (2004) reports three water bodies, Moose Creek, West Fork Potlatch, and the Potlatch River headwaters, show the opposite conclusions as stated above, wherein they fail to show support of their beneficial uses, yet exhibit no data or indication of significant sediment loading above background. The three adjacent water bodies are in the upper northwest corner of the Potlatch River watershed, are reportedly dominated by low relief, silty-loess soils, significant swampy meadows, and E type stream channels. With their low gradient E type channels (Rosgen classification), flood waters simply move out of the channels and across the meadows, carrying virtually no sediment so long as cattle have not destabilized the stream banks (IDEQ 2004). However, these types of channels and meadow vegetation reportedly do not provide much spawning habitat for fish, or much substrate for macroinvertebrates.

Conclusions of the draft report are summarized in the following table, indicating restoration needs targeted at bringing the streams into full support of beneficial uses. For more detail on beneficial uses, see Chapter 2, Water Quality, of this Potlatch River Watershed Management Plan.

Table 7-1. Summary of Data Assessments for Potlatch River Subbasin Assessment and TMDLs (IDEQ 2004)

Water Body Name	Beneficial Uses^	Temperature Status	Bacteria Status*	Sediment Status	Nutrient Status
Big Bear Creek (West Fork to Potlatch River)	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning and summer cold water aquatic life	Exceeds near Deary, OK near mouth	Exceeds	OK
Boulder Creek (Pig Creek to Potlatch River)	CWAL, SS, PCR/SCR	Exceeds for fall salmonid spawning	Exceeds	OK	OK
Cedar Creek (Leopold Creek to Potlatch River)	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning and summer cold water aquatic life	OK	Exceeds	OK
Corral Creek	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning and summer cold water aquatic life	OK	Exceeds	OK
East Fork Potlatch River (Ruby Creek to Potlatch River)	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning and summer cold water aquatic life	OK	Exceeds	OK
Middle Potlatch Creek	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning and summer cold water aquatic life	OK in upper watershed, exceeds near mouth	Exceeds	OK in upper watershed, exceeds near mouth
Moose Creek (above Moose Creek reservoir)	CWAL, SS, PCR/SCR	Exceeds for fall salmonid spawning	Exceeds	OK	OK
Moose Creek (below Moose Creek reservoir)	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning and summer cold water aquatic life	Exceeds	OK	OK
Pine Creek	CWAL, SS, PCR/SCR	Exceeds for spring salmonid spawning	OK	Exceeds	OK
Ruby Creek	CWAL, SS, PCR/SCR	Exceeds for spring and fall salmonid spawning	Exceeds	Exceeds	OK
West Fork Potlatch River	CWAL, SS, PCR, DWS	Exceeds for summer cold water aquatic life, and spring and fall salmonid spawning	OK at headwaters, exceeds at Cougar Creek to Potlatch River reach	OK	OK
Potlatch River (headwaters to Moose Creek)	CWAL, SS, PCR, DWS	Exceeds for fall salmonid spawning	Exceeds	OK	OK
Potlatch River (Moose Creek to Corral Creek)	CWAL, SS, PCR, DWS	Exceeds for spring salmonid spawning and summer cold water aquatic life	Exceeds at upper reach, OK at lower reach	OK	OK
Potlatch River (Corral Creek to Big Bear Creek)	CWAL, SS, PCR, DWS	Exceeds for summer cold water aquatic life	OK	Exceeds	OK
Potlatch River (Big Bear Creek to Clearwater River)	CWAL, SS, PCR, DWS	Exceeds for summer cold water aquatic life and fall salmonid spawning	OK	Exceeds	OK

^ CWAL=cold water aquatic life, SS=salmonid spawning, PCR=primary contact recreation, SCR=secondary contact recreation, DWS=domestic water supply
* OK indicates water quality standards were not exceeded

7.3.6 Idaho Department of Fish and Game

According to IDFG (Schriever and Nelson 1999), the hydrologic cycle of the watersheds needs to return to a more normal pattern in order to sustain and enhance populations of resident and anadromous trout in the lower tributaries of the Potlatch River watershed. Schriever and Nelson (1999) suggest that present short, high peak runoff periods need to be restored, as much as possible, to runoff periods that occur over a broader time period. This will help decrease streambed scouring, bedload movement, sedimentation, cobble embeddedness, high summer temperatures and increase minimum stream flows and stream bank stability, all of which are critical components of healthy fish habitat. Additionally, the multi-layer riparian vegetation component needs to be restored, allowing greater bank stability, shading and stabilizing low flows.

Schriever and Nelson (1999) state that habitat recovery in headwater streams will largely depend on restoring full function in riparian ecosystems, improving livestock management, and controlling sediment and runoff from road construction. Creating fully functioning riparian ecosystems will require a long-term commitment, for example, producing stands of trees old enough to recruit large organic debris to streams is a long-term commitment. In prioritized critical reaches, habitat enhancement projects are warranted to accelerate natural processes of providing improved channel stability and habitat complexity.

Schriever and Nelson (1999) recommended that any supplementation of existing populations of Potlatch River watershed steelhead be limited to Potlatch River stocks and that genetic analysis of Potlatch River steelhead should be a prerequisite to any supplementation proposal.

Bowersox et al. (2005) performed a qualitative habitat assessment (QHA) to produce a ranked list of Potlatch River tributaries for protection and restoration. Along with the ranking, the modeling also analyzed individual reach attributes and weighted these scores to provide a measure of which stream attributes are contributing to a need for protection or restoration. The QHA user guide[11] states that the QHA does not make assessment decisions, it is used to organize the thoughts of the various local experts and present information that watershed planners may find useful in making decisions.

Based on the QHA for protection, the less altered watersheds in forest land types (streams found higher in the drainage) are recommended for protection. These reaches are in watersheds with less alteration, resulting in current conditions close to reference conditions. Habitat attributes of forest-dominated watersheds high on the list for protection are typically habitat diversity, low temperature conditions, and stabilized flow regimes. Though these conditions for streams such as Purdue Creek may not be optimal for rainbow/steelhead trout, they are at or near reference conditions and some streams, such as the East Fork Potlatch River, represent fair steelhead habitat. These forested land types, though of lesser restoration rank, also have restoration needs. Restoration needs in forested land types typically need to address high temperatures, fine sediment, low flow, and lack of habitat diversity.

Agricultural plateau and canyon land types rank low for protection. These areas of the watersheds are greatly altered from reference conditions. Attributes of these streams that should

[11] Qualitative Habitat Assessment (QHA) User Guide Version 1.1, dated June 21, 2003.

be protected are low temperature and cobble substrate without embeddedness problems. Streams within the agricultural plateau land types ranked highest for restoration indicating their departure from reference conditions. Attributes most in need of restoration include high temperature conditions and unstable flow conditions.

Restoration and protection ranking for stream reaches within the Potlatch River watershed is displayed below. Ranking represents the priority for protection and restoration of a given stream reach; the first stream listed is highest in priority.

Streams that ranked high for **restoration** included:

- Upper Big Bear Creek
- Upper Pine Creek
- Pine Creek
- Big Bear Creek
- Upper Little Bear Creek
- Little Boulder Creek
- Cedar Creek
- Corral Creek
- Little Bear Creek
- Leopold Creek
- Lower Potlatch River
- Little Potlatch Creek
- Upper Potlatch River
- Ruby Creek
- Moose Creek
- Boulder Creek
- Middle Potlatch Creek
- Pivash Creek
- East Fork Potlatch River
- Feather Creek
- Purdue Creek
- Cougar Creek
- Bob's Creek

Streams that ranked high for **protection** included:

- Bob's Creek
- East Fork Potlatch River
- Purdue Creek
- Pivash Creek
- Moose Creek
- Ruby Creek
- Upper Potlatch River
- Boulder Creek
- Leopold Creek
- Middle Potlatch Creek
- Little Bear Creek
- Little Boulder Creek
- Little Potlatch Creek
- Cedar Creek
- Big Bear Creek
- Corral Creek
- Pine Creek
- Upper Little Bear Creek
- Upper Big Bear Creek
- Lower Potlatch River
- Upper Pine Creek
- Feather Creek
- Cougar Creek

7.4 Summary of Limiting Factors

For the purpose of this planning effort, a limiting factor is defined as a current condition that limits the ability of the stream habitat to fully sustain populations of steelhead in the Potlatch River watershed. The following chart summarizes the limiting factors described earlier in Chapter 4.

Limiting factors are addressed in the management plan's **restoration** strategies by specific practices. The **protection** strategy includes management efforts, which address environmental threats to the individual subwatershed and overall Potlatch River watershed system. These threats include hydrograph instability, erosion and sediment delivery, high water temperature, and migration barriers.

Summary of Limiting factors:

- High water temperature
- High flashy stream flows
- Low summer base flows
- Lack of complexity in stream composition
- Migration barriers
- Sedimentation

7.5 Potlatch River Watershed Implementation Plan

7.5.1 Summary of Implementation Strategies

Implementation strategies that facilitate increasing steelhead production potential are outlined within this section. Implementation of the restoration and protection strategies will achieve the goal of this management plan, which is to:

Specify restoration and protection strategies that help restore steelhead to a robust, self-sustaining population in the Potlatch River watershed.

7.5.2 Streams within Land Types

Specific implementation strategies are developed for three general land types including canyon, forested, and agricultural upland land types. Generally, streams within the canyon land type in the Potlatch River watershed are characterized by high gradients, large substrate size composition, riffle/pocketwater habitat types, and a distorted hydrograph. Streams within the forested land types are characterized by low gradients, dense canopy cover, meadow connectivity, stable banks, small substrate composition, and cool water temperatures. The streams within the agricultural upland land types are characterized by low gradients, incised channels, limited riparian vegetation, small substrate composition, and an altered hydrograph.

Figures 7-1 to 7-3 display examples of streams within the canyon, forested, and agricultural land types (photos provided by Latah SWCD).

Figure 7-1. Example of a Stream within the Canyon Land Type

Figure 7-2. Example of a Stream within the Forested Land Type

Figure 7-3. Example of a Stream within the Agricultural Upland Land Type

7.5.3 Implementation Plan

The implementation plan includes two sets of strategies—restoration and protection. Restoration strategies are defined per subwatershed within the Potlatch River watershed, and protection strategies are applicable to the entire watershed. The watershed is divided into smaller subwatersheds and named for specific stream segments, including (listed in alphabetical order):

- Bear Creek (including Big Bear and Little Bear Creeks)
- Boulder Creek
- Cedar Creek
- Corral Creek
- East Fork Potlatch River
- Little Potlatch Creek
- Middle Potlatch Creek
- Moose Creek
- Pine Creek
- Ruby Creek
- West Fork Potlatch River
- Upper Mainstem Potlatch River (headwaters to Big Bear Creek)
- Lower Mainstem Potlatch River (Big Bear Creek to the mouth of the Potlatch River)

Figure 7-4. Subwatersheds within the Potlatch River Watershed

7.5.3.1 Restoration Strategies and Prioritization

Tables 7-2 thru 7-14 display specific restoration strategies for each subwatershed. A ***subwatershed snapshot*** precedes each set of tables, and is intended to review details about the highlighted subwatershed identified by stream reach within the Potlatch River watershed.

Within each subwatershed, restoration strategies are prioritized (general restoration strategies are detailed in Appendix E). The individual strategies were ranked through a facilitated discussion by the Potlatch River Technical Advisory Group. The Potlatch River Technical Advisory Group worked through each strategy within each subwatershed to determine high, medium and low priorities. The following variables were considered in order to determine strategy priorities:

- Steelhead production response potential
- Landowner/Operator potential interest
- Potential to redirect existing conservation agency resources
- Potential to secure additional needed technical and/or financial resources
- Probability of future land-use activities supporting proposed subwatershed restoration efforts

Upon consideration of these variables, a high, medium, or low ranking was assigned to each restoration strategy (a prioritization matrix is displayed in Appendix F).

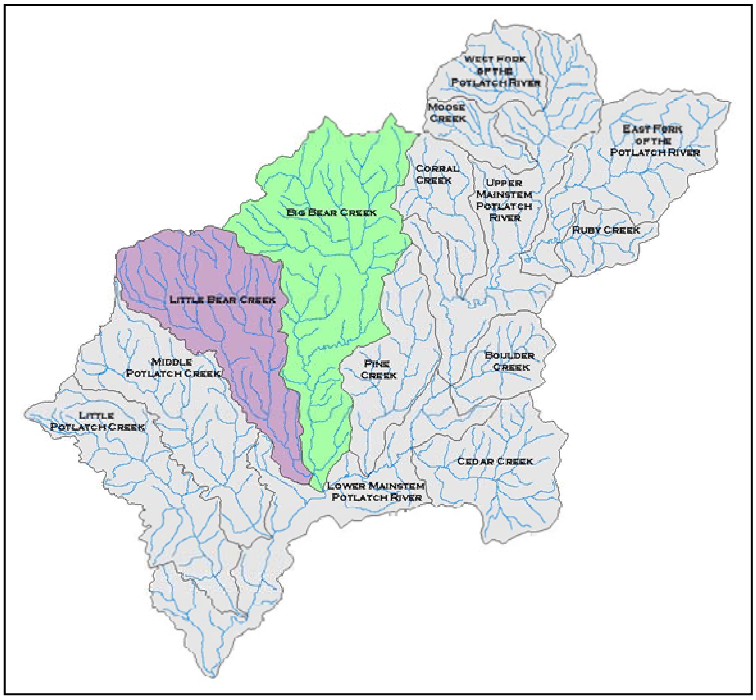
High Priority – A high priority ranking implies a priority commitment towards the active solicitation of additional technical and financial assistance for implementation. High priority strategies also reflect the ability and willingness to coordinate the redirection of existing conservation programs towards specified strategies. In addition, a high ranking implies active engagement of individual landowners, private and public, to consider implementation of the defined strategies.

Medium Priority – A medium priority ranking implies a secondary commitment to actively solicit additional technical and financial assistance for implementation, and to coordinate the redirection of existing conservation programs towards these strategies. Medium priority strategies will be addressed when high priority strategies have already been fully addressed or there are limited opportunities to address high priority strategies within a given subwatershed.

Low Priority – These strategies are addressed only when there are limited opportunities to address high or medium priority strategies. There will be a limited effort to actively seek additional technical and/or financial assistance and existing conservation programs are not redirected to these strategies at the expense of high or medium priorities.

Subwatershed Snapshot

7.5.3.2 Bear Creek Subwatershed (including Big Bear and Little Bear Creeks)



The Big Bear Creek subwatershed is a south-facing watershed in the lower portions of the Potlatch River watershed.

Big Bear Creek, the largest subwatershed within the Potlatch River watershed, includes approximately 61,008 acres, representing 16% of the overall watershed. The confluence of Big Bear Creek and the Potlatch River is near the town of Kendrick.

The Little Bear Creek subwatershed is a south-facing watershed in the lower portions of the Potlatch River watershed, west of Big Bear Creek. Little Bear Creek is approximately 39,745 acres, representing nearly 11% of the overall watershed. The confluence of Little Bear Creek and Big Bear Creek is about 1 mile upstream of the mouth of Big Bear Creek.

The Big Bear and Little Bear subwatersheds include agricultural uplands and canyon stream types (Bowersox et al. 2005).

Waters of Big Bear Creek do not support identified beneficial uses (IDEQ 2004). Big Bear Creek from the West Fork of Big Bear Creek to the mouth (including Little Bear Creek and its tributaries) is listed for temperature in Section 5 of the 2002 Integrated Report (IDEQ 2005). Big Bear Creek is identified as supporting salmonid spawning for steelhead and rainbow trout, with a spawning and incubation period of January through May.

The highest overall fish densities present in electrofishing sites in 2003-2004 IDFG surveys were found in large canyon streams such as the Big Bear Creek (Bowersox et al. 2005). Dace and rainbow/steelhead trout constituted the majority of fish sampled.

A natural barrier in Big Bear Creek exists at approximately stream mile 5.6. The surveys found an overwhelming dominance of dace above the barrier. Species such as redside shiner, northern pikeminnow, and sucker were absent from sites above the barrier and steelhead/rainbow were uncommon. The barrier on the Big Bear Creek drainage was characterized as impassable for adult steelhead by previous studies on the drainage (Johnson 1985, Schriever and Nelson 1999). However, in both these instances and during the Bowersox et al. (2005) study, at least one rainbow/steelhead trout was observed above the barrier. While some individuals may have residualized in the upper reaches of Big Bear Creek prior to the barriers existence, it is also possible that the barrier is passable at specific flows. Earlier studies determined that adult salmonids have ideal leaping conditions when the height of the falls to the depth of the downstream pool is 1:1.25. Conditions below the Big Bear Creek barrier should meet or exceed this ratio, especially during higher flow years.

In all watersheds monitored, with the exception of Big Bear Creek, average rainbow/steelhead trout densities within sampled streams located lower in the Potlatch River watershed increased in 2003-2004 compared to 1995-1996. The exception existed in Big Bear Creek below the barrier which had much higher rainbow/steelhead trout densities during the 1995-1996 field season. Differences in adult steelhead returns and sampling efficiency could account for these variations.

Based on the QHA, upper Big Bear Creek is listed as the highest priority for restoration by IDFG (Bowersox et al. 2005), while Big Bear Creek is listed 4th highest out of 23 streams. In streams prioritized in terms of protection, Big Bear Creek ranked 15th highest out of 23 streams, while Upper Big Bear Creek ranked 19th highest.

Upper Little Bear Creek is listed as the 5th highest priority for restoration by IDFG (Bowersox et al. 2005), while Little Bear Creek is listed 9th highest out of 23 streams. In streams prioritized in terms of protection, Little Bear Creek ranked 11th highest out of 23 streams, while Upper Little Bear Creek ranked 18th highest.

Table 7.2 Bear Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Big Bear Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
High	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration (a natural barrier exists at approximately steam mile 5.6).	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
High	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
High	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation
High	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
Medium	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs > Stabilize streambed - Other > Evaluate streambed substrate composition	- Stream/habitat complexity

Table 7.2 Bear Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Big Bear Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Medium	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
Low	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
Low	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
Low	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
Low	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Quantify migration barriers (dependent on the potential to remove the barrier in the canyon)	- Migration barriers

Table 7.2 Bear Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Big Bear Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Low	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Quantify migration barriers (dependent on the potential to remove the barrier in the canyon)	- Migration barriers
Low	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Low	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Table 7.2 Bear Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Little Bear Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration (migration barrier on West Fork Little Bear)	- Other > Evaluate removal of West Fork Little Bear dam	- Migration barriers
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs > Stabilize streambed - Other > Evaluate streambed substrate composition	- Stream/habitat complexity
M	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
M	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
M	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation

Table 7.2 Bear Creek Watershed Implementation Plan Conservation Strategies

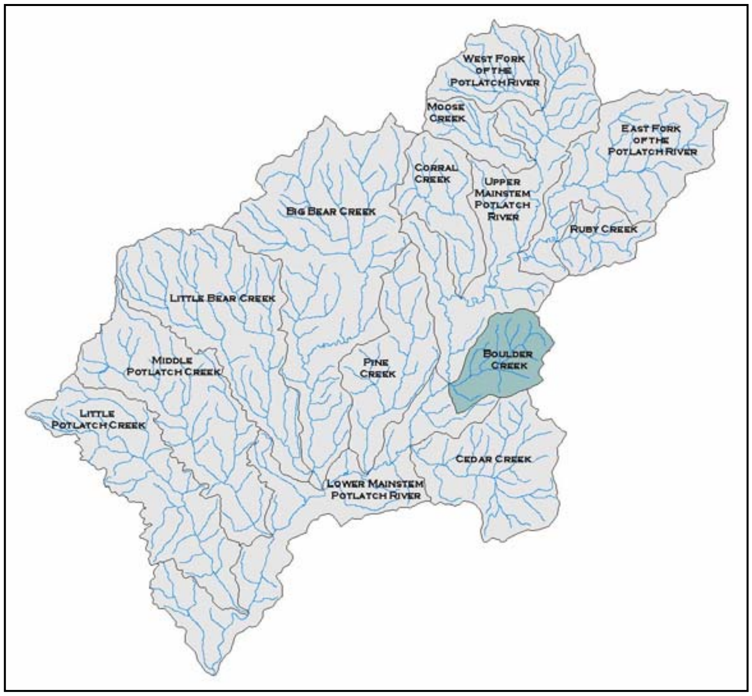
Conservation Objective: *Restoration* in Little Bear Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
M	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
M	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Roadway BMPs > Evaluate extent of migration barriers (culverts)	- Migration barriers

Table 7.2 Bear Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Little Bear Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
L	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		

Subwatershed Snapshot

7.5.3.3 Boulder Creek Subwatershed



The Boulder Creek Subwatershed is a west-facing watershed in the middle portion of the Potlatch River watershed. The subwatershed, including Little Boulder Creek, is nearly 80% forestland, with an area of agriculture, CRP, hay, and pasture around the community of Park (IDEQ 2004). The Boulder Creek subwatershed includes predominantly canyon and forested stream types (Bowersox et al. 2005).

Boulder Creek is one of the smaller subwatersheds in the Potlatch River watershed, totaling 11,280 acres and representing only 3% of the overall watershed.

Waters of Boulder Creek support identified beneficial uses (IDEQ 2004). Boulder Creek, from Pig Creek to its mouth, is listed for unknown pollutants in Section 5 of the 2002 Integrated Report (IDEQ 2005). The stream is identified as supporting its beneficial uses of cold water aquatic life, salmonid spawning, and primary and secondary contact recreation. Water temperatures for salmonid spawning and bacteria levels were reported to exceed standards.

Clearwater National Forest (CNF) manages the Little Boulder Campground, which is located near the confluence of Little Boulder Creek and the Potlatch River.

Boulder Creek has a falls at stream mile 1.2 that probably acts as a migration barrier to anadromous and resident fluvial fish (Schriever and Nelson 1999).

Transitional and forestland streams, including Boulder Creek, had the lowest fish densities present in electrofishing sites in the 2003-2004 IDFG surveys (Bowersox et al. 2005). No rainbow/steelhead trout were found in Boulder Creek (samples were from above a known natural barrier). Little Boulder Creek had one of the highest rainbow/steelhead trout densities outside of the Cedar Creek and Little Bear Creek drainages. Little Boulder Creek showed high age-0 steelhead trout densities.

Based on the QHA, Boulder Creek is listed as the 16th highest priority for restoration by IDFG (Bowersox et al. 2005), while Little Boulder Creek is listed 6th highest out of 23 streams. In streams prioritized in terms of protection, Boulder Creek ranked 8th highest out of 23 streams, while Little Boulder Creek ranked 12th highest.

Table 7.3 Boulder Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Boulder Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration (a falls exists at stream mile 1.2).	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs	- Stream/habitat complexity
L	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
L	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows

Table 7.3 Boulder Creek Watershed Implementation Plan Conservation Strategies

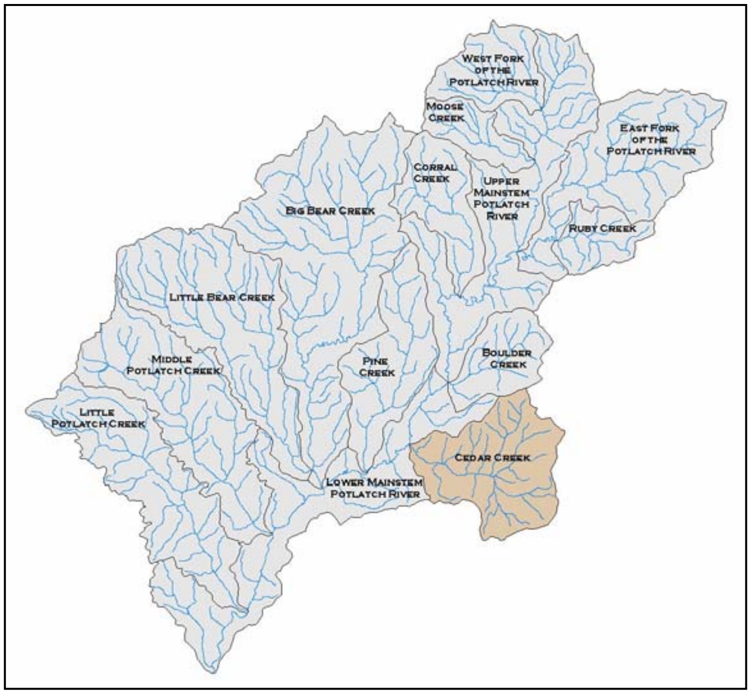
Conservation Objective: *Restoration* in Boulder Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows
L	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
L	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
L	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation

Table 7.3 Boulder Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Boulder Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Quantify migration barriers (dependent on the potential to remove the barrier in the	- Migration barriers
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Quantify migration barriers (dependent on the potential to remove the barrier in the	- Migration barriers
L	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.4 Cedar Creek Subwatershed



Cedar Creek subwatershed is a west-facing watershed in the southeast portion of the Potlatch River watershed. Cedar Creek is 25,200 acres in size, representing approximately 7% of the overall watershed. The Cedar Creek subwatershed includes agricultural uplands and canyon stream types (Bowersox et al. 2005). Leopold Creek is a major tributary dominated by canyon stream types.

According to IDEQ (2004), beneficial uses are being supported in Cedar Creek. Cedar Creek from Leopold Creek to its mouth is listed for channel instability most likely reflected in sediment loading to the stream in Section 5 of the 2002 Integrated Report (IDEQ 2005). Cedar Creek is identified as having steelhead and rainbow trout, with a spawning and incubation period of January through May. Although IDEQ determined that Cedar Creek supports beneficial uses, water quality standards for both sediment and temperature are exceeded.

The highest overall fish densities present in electrofishing sites were found in large canyon streams including Cedar Creek (Bowersox et al. 2005). Cedar Creek had the highest rainbow/steelhead trout densities present outside of the Little Boulder Creek and Little Bear Creek drainages during the 2003-2004 IDFG monitoring. In the Potlatch River study area, age-1 rainbow/steelhead trout densities were highest in Cedar Creek.

Based on the QHA, Cedar Creek is listed as the 7th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). Leopold Creek ranked 10th highest for restoration. In streams prioritized in terms of protection, Cedar Creek ranked 14th highest out of 23 streams, while Leopold ranked 9th highest.

Table 7.4 Cedar Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Cedar Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Other > Evaluate streambed substrate composition	- Stream/habitat complexity
M	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
M	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
M	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation

Table 7.4 Cedar Creek Watershed Implementation Plan Conservation Strategies

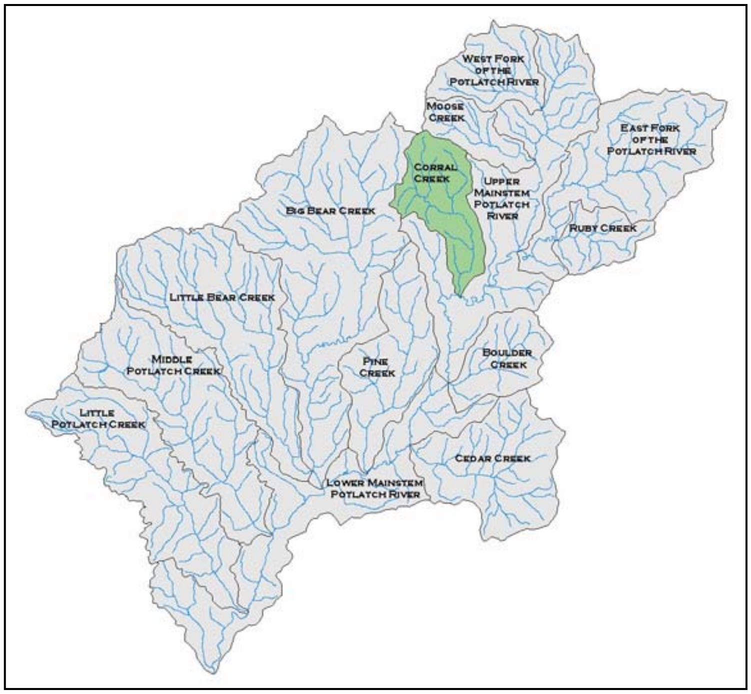
Conservation Objective: *Restoration* in Cedar Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
M	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
M	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
L	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures
L	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation

Table 7.4 Cedar Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Cedar Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Quantify migration barriers (e.g. culverts)	- Migration barriers
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Quantify migration barriers (e.g. culverts)	- Migration barriers
L	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.5 Corral Creek Subwatershed



The Corral Creek subwatershed is a south-facing watershed in the north-central portion of the Potlatch River watershed. The Corral Creek subwatershed is 14,300 acres in size, representing approximately 4% of the overall watershed. The subwatershed includes predominantly forested and canyon stream types (Bowersox et al. 2005).

According to IDEQ (2004), Corral Creek does not support all of the listed beneficial uses. Corral Creek is listed for sediment in Section 5 of the 2002 Integrated Report (IDEQ 2005), and identified as supporting salmonid spawning for steelhead and rainbow trout, with a spawning and incubation period of January through May. Water quality standards for sediment are exceeded, as are temperature standards for spring salmonid spawning and summer cold water aquatic life.

A migration barrier has been identified where the creek goes through a culvert in the railroad grade just north of the town of Helmer.

According to Bowersox et al. (2005), fish species composition in the forestland streams was dominated by brook trout and sculpin but overall species composition was more evenly distributed among a variety of species. 2003-2004 monitoring results indicated a strong correlation between trout abundance and large organic debris in forestland streams.

Based on the QHA, Corral Creek is listed as the 8th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). In streams prioritized in terms of protection, Corral Creek is ranked 16th highest out of 23 streams.

Table 7.5 Corral Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Corral Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
H	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
H	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
H	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration (a migration barrier exists at the railroad grade culvert north of Helmer).	- Other > Quantify migration barriers (dependent on the potential to remove the barrier in the	- Migration barriers
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs > Stabilize streambed - Other > Evaluate streambed substrate composition	- Stream/habitat complexity

Table 7.5 Corral Creek Watershed Implementation Plan Conservation Strategies

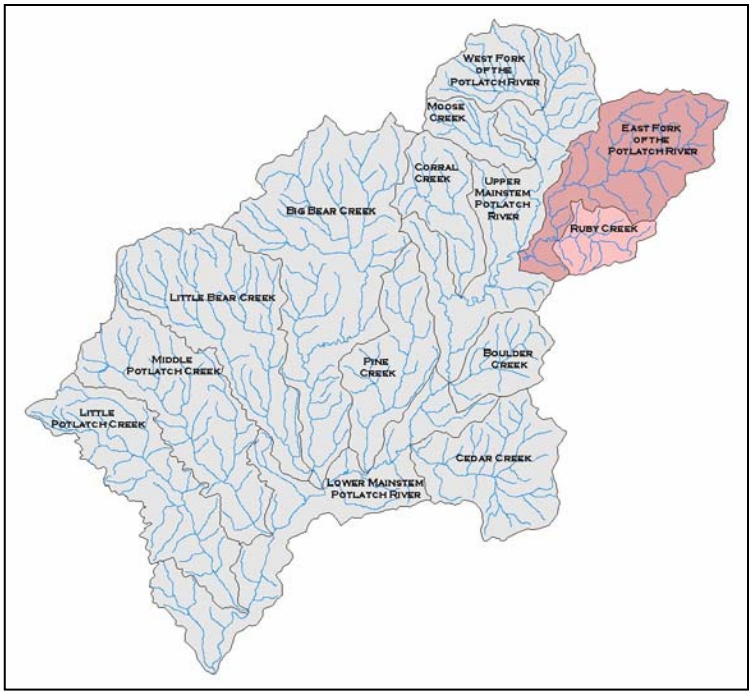
Conservation Objective: *Restoration* in Corral Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
L	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows

Table 7.5 Corral Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Corral Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.6 East Fork Potlatch River Subwatershed



The East Fork Potlatch River subwatershed is a southwest-facing watershed in the northeast portion of the Potlatch River watershed. The East Fork Potlatch River subwatershed is 31,500 acres in size, representing approximately 8% of the overall watershed. Bob's Creek and Pivash Creek are major tributaries in the East Fork Potlatch River subwatershed. The subwatershed is dominated by forested stream types (Bowersox et al. 2005).

According to IDEQ (2004), the East Fork Potlatch River from Ruby Creek to its mouth is listed for sediment, temperature, nutrients and bacteria in Section 5 of the 2002 Integrated Report (IDEQ 2005). Salmonid spawning is an existing beneficial use in the East Fork Potlatch River. The East Fork is identified as having steelhead and rainbow trout, with a spawning and incubation period of January through May. Support status of various locations upstream is variable. Water quality standards for sediment are exceeded, as are temperature standards for spring salmonid spawning and summer cold water aquatic life.

According to Bowersox et al. (2005), fish species composition in the forestland streams was dominated by brook trout and sculpin but overall species composition was more evenly distributed among a variety of species. 2003-2004 survey results indicated a strong correlation between trout abundance and large organic debris in forestland streams. Transitional and forestland streams, including Pivash Creek, had the lowest fish densities.

Based on the QHA, the stream is listed as the 19th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). Bobs Creek is listed as 23rd and Pivash Creek as 18th. In streams prioritized in terms of protection, Bob's Creek is ranked the highest, while the East Fork Potlatch River is ranked 2nd highest out of 23 streams, and Pivash Creek ranked as 4th.

Table 7.6 East Fork Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in East Fork Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
M	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Low summer base flows - High water temperatures - Sedimentation
L	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs	- Stream/habitat complexity
L	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
L	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation

Table 7.6 East Fork Potlatch River Watershed Implementation Plan Conservation Strategies

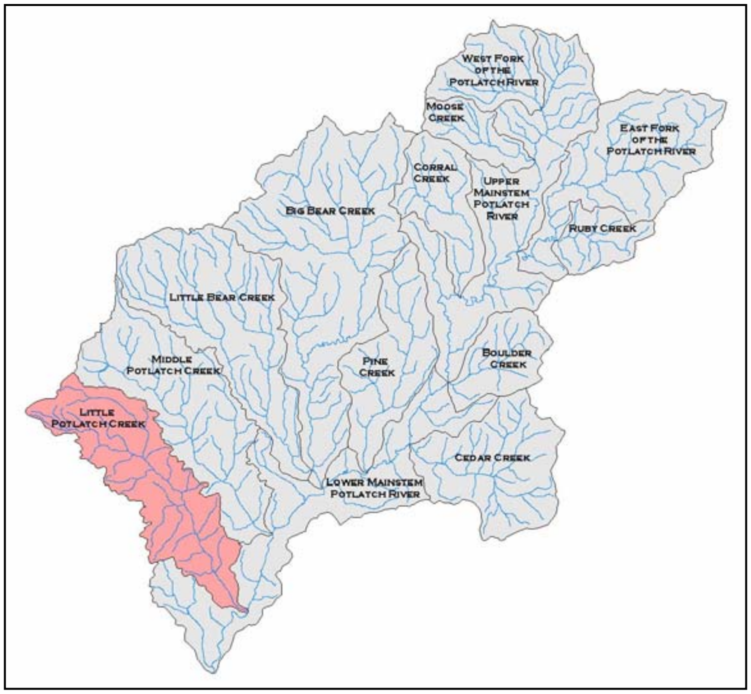
Conservation Objective: *Restoration* in East Fork Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
L	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers

Table 7.6 East Fork Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in East Fork Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
L	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.	- Other > Investigate potential for water retention facilities	- High flashy stream flows - Low summer base flows
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.7 Little Potlatch Creek Subwatershed



The Little Potlatch Creek subwatershed is a southeast-facing watershed in the lower portions of the Potlatch River watershed. The Little Potlatch Creek subwatershed is 32,143 acres in size, representing approximately 8% of the overall watershed. The subwatershed consists primarily of upland agricultural stream types (Bowersox et al. 2005).

A rockslide at stream mile 2.5 occurred in 1980 and resulted in an impassable barrier to anadromous fish migration (Johnson 1985).

According to IDEQ (2004), Little Potlatch River is not listed in Section 5 of the 2002 Integrated Report (IDEQ 2005). IDEQ presumes the stream supports cold water aquatic life, and primary and secondary contact recreation.

Based on the QHA, Little Potlatch Creek is listed as the 12th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). In streams prioritized in terms of protection, Little Potlatch Creek is ranked 13th highest out of 23 streams.

Table 7.7 Little Potlatch Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Little Potlatch Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration. (A natural barrier exists at approximately steam mile 5.6.)	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
L	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
L	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
Not Applicable	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		

Table 7.7 Little Potlatch Creek Watershed Implementation Plan Conservation Strategies

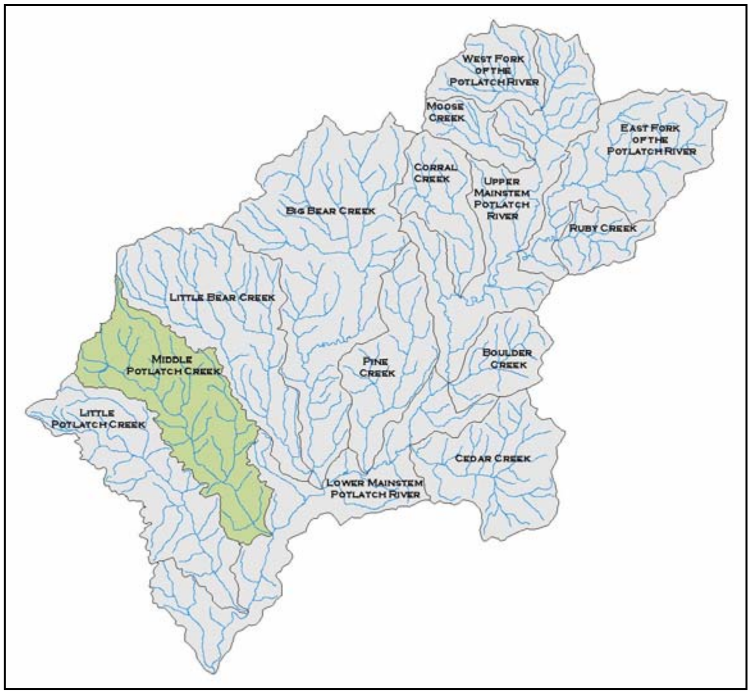
Conservation Objective: *Restoration* in Little Potlatch Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		
Not Applicable	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		

Table 7.7 Little Potlatch Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Little Potlatch Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.8 Middle Potlatch Creek Subwatershed



The Middle Potlatch Creek subwatershed is a southeast-facing watershed in the lower portions of the Potlatch River watershed. The Middle Potlatch Creek subwatershed is 35,300 acres in size, representing approximately 9% of the overall watershed. The subwatershed includes predominantly upland agricultural stream types (Bowersox et al. 2005).

A natural falls located at stream mile 8.0 acts as a migration barrier to anadromous fish (Johnson 1985).

According to IDEQ (2004), Middle Potlatch Creek is not supporting its beneficial uses, and is listed for sediment, temperature, nutrients and bacteria in Section 5 of the 2002 Integrated Report (IDEQ 2005). Middle Potlatch Creek is identified as having steelhead and rainbow trout, with a spawning and incubation period of January through May. Water quality standards for sediment are exceeded, as are temperature standards for spring salmonid spawning and summer cold water aquatic life, bacteria in the lower reaches, and nutrients in the lower reaches.

Based on the QHA, Middle Potlatch Creek is listed as the 17th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). In streams prioritized in terms of protection, Middle Potlatch Creek is ranked 10th highest out of 23 streams.

Table 7.8 Middle Potlatch Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Middle Potlatch Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration. (A natural barrier exists at approximately steam mile 5.6.)	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
L	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
L	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation
L	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation

Table 7.8 Middle Potlatch Creek Watershed Implementation Plan Conservation Strategies

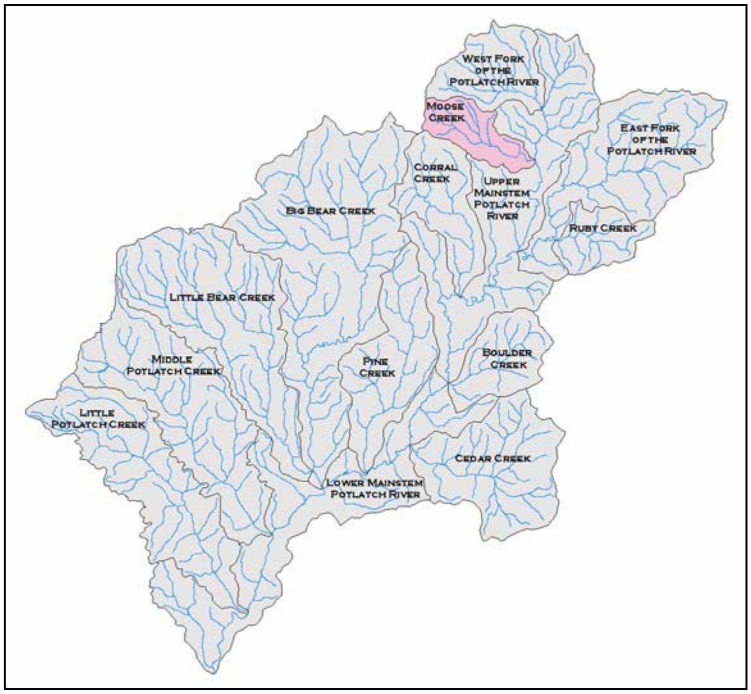
Conservation Objective: *Restoration* in Middle Potlatch Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
L	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
Not Applicable	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		

Table 7.8 Middle Potlatch Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Middle Potlatch Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.9 Moose Creek Subwatershed



The Moose Creek subwatershed is an east-facing watershed in the upper portions of the Potlatch River watershed. The Moose Creek subwatershed is 7,800 acres in size, representing approximately 2% of the overall watershed. The subwatershed includes predominantly forested stream types (Bowersox et al. 2005).

According to IDEQ (2004), Moose Creek above and below Moose Creek Reservoir is listed for sediment, temperature, nutrients, pH and bacteria in Section 5 of the 2002 Integrated Report (IDEQ 2005). Salmonid spawning is an existing use. Water quality standards for bacteria are exceeded, as are temperature standards for spring salmonid spawning above and below the reservoir, and summer cold water aquatic life below the reservoir.

According to Bowersox et al. (2005), fish species composition in the forestland streams was dominated by brook trout and sculpin. Results of the 2003-2004 surveys indicated a strong correlation between trout abundance and large organic debris in forestland streams.

Based on the QHA, Moose Creek is listed as the 15th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). In streams prioritized in terms of protection, Moose Creek is ranked 5th highest out of 23 streams.

Table 7.9 Moose Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Moose Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
M	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
M	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration. (A migration barrier exists at the reservoir.)	- Other > Evaluate ramifications of migration barrier removal	- Migration barriers
Not Applicable	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		

Table 7.9 Moose Creek Watershed Implementation Plan Conservation Strategies

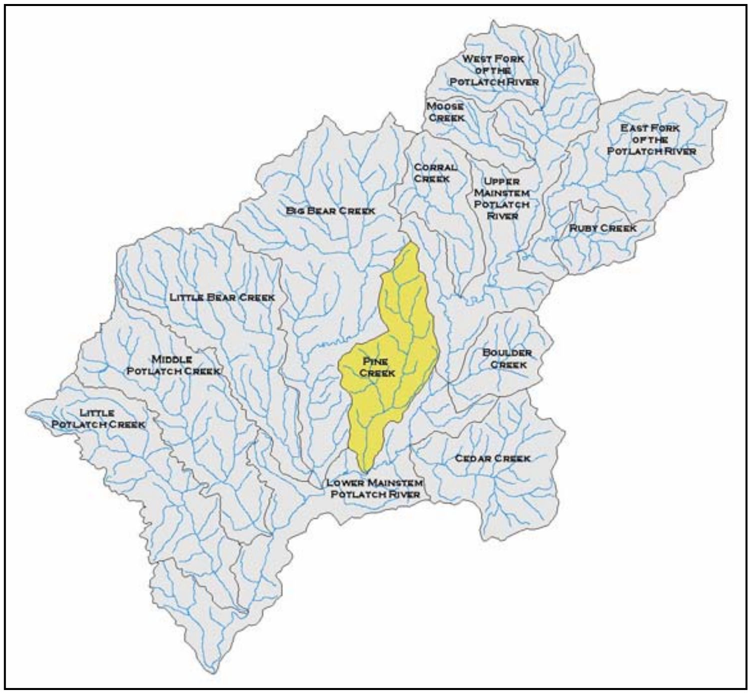
Conservation Objective: *Restoration* in Moose Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		
Not Applicable	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		

Table 7.9 Moose Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Moose Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.10 Pine Creek Subwatershed



The Pine Creek subwatershed is a south facing watershed in the lower portions of the Potlatch River watershed. The Pine Creek subwatershed is 20,600 acres in size, representing approximately 6% of the overall watershed. The subwatershed includes agricultural uplands and canyon stream types (Bowersox et al. 2005).

According to IDEQ (2004), Pine Creek is listed for bacteria, nutrients, sediment and temperature in Section 5 of the 2002 Integrated Report (IDEQ 2005). Salmonid spawning is an existing use in Pine Creek and is identified as supporting steelhead and rainbow trout, with a spawning and incubation period of January through May. Water quality standards for sediment are exceeded, as are temperature standards for spring salmonid spawning.

Based on the QHA, Upper Pine Creek is listed as the 2nd highest priority highest priority out of 23 streams for restoration, while Pine Creek is ranked 3rd by IDFG (Bowersox et al. 2005). In streams prioritized in terms of protection, Pine Creek is ranked 17th highest out of 23 streams, while Upper Pine Creek is ranked 21st.

Table 7.10 Pine Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Pine Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs > Stabilize streambed - Other > Evaluate streambed substrate composition	- Stream/habitat complexity
M	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
M	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation
M	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
M	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation

Table 7.10 Pine Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Pine Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures
L	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
L	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers

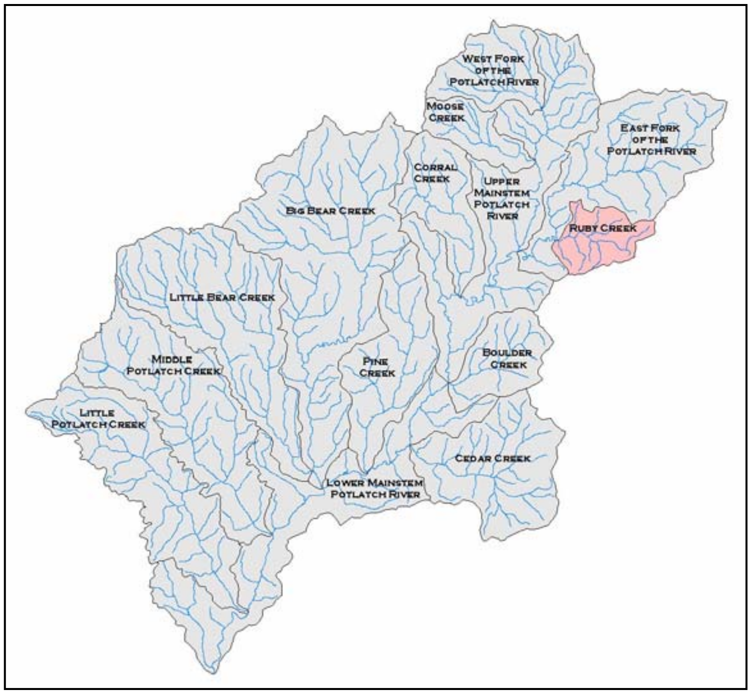
Table 7.10 Pine Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Pine Creek

Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.11 Ruby Creek Subwatershed



The Ruby Creek subwatershed is a west-facing watershed and major tributary to the East Fork Potlatch River. Ruby Creek is found in the upper portion of the Potlatch River watershed. The Ruby Creek subwatershed is 8,100 acres in size, representing approximately 2% of the overall watershed. The subwatershed comprised of predominantly forested stream types (Bowersox et al. 2005).

According to IDEQ (2004), Ruby Creek is listed for bacteria, nutrients, sediment and temperature in Section 5 of the 2002 Integrated Report (IDEQ 2005). Ruby Creek shows full support of it identified beneficial uses. Salmonid spawning is an existing use in Ruby Creek and is identified as having steelhead and rainbow trout, with a spawning and incubation period of January through May. Water quality standards for sediment and bacteria are exceeded, as are temperature standards for salmonid spawning.

According to Bowersox et al. (2005), fish species composition in the forestland streams was dominated by brook trout and sculpin. 2003-2004 survey results indicated a strong correlation between trout abundance and large organic debris in forestland streams. Transitional and forestland streams had the lowest fish densities.

Based on the QHA, Ruby Creek is listed as the 14th highest priority highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005). In streams prioritized in terms of protection, Ruby Creek is ranked 6th highest out of 23 streams.

Table 7.12 Ruby Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Ruby Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
L	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
Not Applicable	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		

Table 7.12 Ruby Creek Watershed Implementation Plan Conservation Strategies

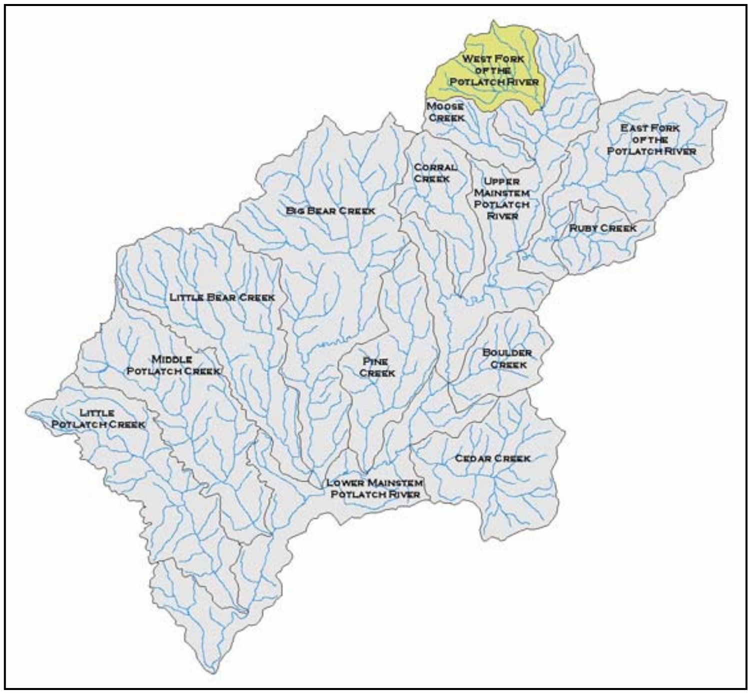
Conservation Objective: *Restoration* in Ruby Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		
Not Applicable	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		

Table 7.12 Ruby Creek Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Ruby Creek				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.12 West Fork Potlatch River Subwatershed



The West Fork Potlatch River subwatershed is an east- and southeast-facing watershed and found in the headwaters of the Potlatch River watershed. Cougar and Feather Creeks are the major tributaries within the West Fork Potlatch River subwatershed. The subwatershed is 12,500 acres in size, representing approximately 3% of the overall watershed. The subwatershed comprised of predominantly forested stream types (Bowersox et al. 2005).

According to IDEQ (2004), the West Fork Potlatch River is listed for sediment in Section 5 of the 2002 Integrated Report (IDEQ 2005). Salmonid spawning is an existing beneficial use in the West Fork Potlatch River. The West Fork is identified as having steelhead and rainbow trout with a spawning and incubation period of January through May. Water quality standards for sediment are exceeded from the Cougar Creek confluence to the mouth, as are temperature standards for summer cold water aquatic life and salmonid spawning.

According to Bowersox et al. (2005), fish species composition in the forestland streams was dominated by brook trout and sculpin. 2003-2004 survey results indicated a strong correlation between trout abundance and large organic debris in forestland streams. Transitional and forestland streams, including Pivash Creek, had the lowest fish densities.

No rainbow/steelhead trout were sampled in Cougar Creek and Feather Creek during the 2003-2004 IDFG monitoring (Bowersox et al. 2005).

Based on the QHA, Feather Creek is listed as the 20th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005), while Cougar Creek is listed as 22nd. In streams prioritized in terms of protection, Feather Creek and Cougar Creek are ranked low; 22nd and 23rd out of 23 streams respectively.

Table 7.12 West Fork Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in West Fork Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
H	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
H	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
L	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.	- Other > Evaluate water velocity and depth related to migration barrier remediation	- Migration barriers
Not Applicable	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		

Table 7.12 West Fork Potlatch River Watershed Implementation Plan Conservation Strategies

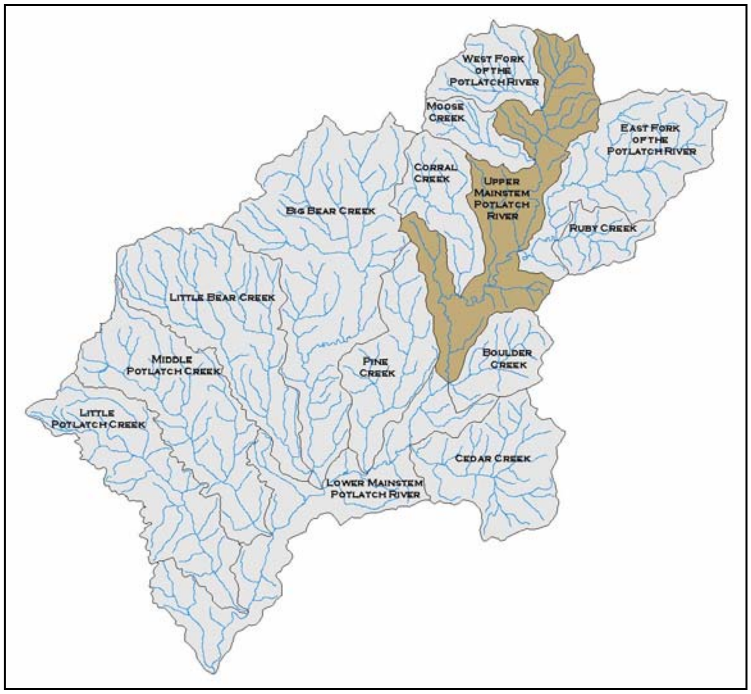
Conservation Objective: *Restoration* in West Fork Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		
Not Applicable	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		
Not Applicable	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		

Table 7.12 West Fork Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in West Fork Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.13 Upper Mainstem Potlatch River Subwatershed



The Upper Mainstem Potlatch River subwatershed is a south- and southwest-facing watershed. The upper mainstem includes a headwaters area, with the uppermost mainstem, Porcupine, Nat Brown and Purdue Creeks, and continues to the confluence of Moose Creek. From the Moose Creek confluence to the Corral Creek confluence, the mainstem subwatershed includes several small tributaries and Hog Meadow Creek. From the confluence of Corral Creek to the confluence of Big Bear Creek, the mainstem subwatershed includes Rock Creek and several smaller tributaries.

The Upper Mainstem Potlatch River subwatershed is 40,300 acres in size, representing approximately 11% of the overall watershed. The upper mainstem subwatershed is comprised of canyon and forested stream types (Bowersox et al. 2005).

According to IDEQ (2004), the Potlatch River Mainstem headwaters listed in Section 5 of the 2002 Integrated Report (IDEQ 2005) for sediment, nutrients, temperature and bacteria. Salmonid spawning is an existing beneficial. The Potlatch River headwaters are identified as having steelhead and rainbow trout with a spawning and incubation period of January through May. Water quality standards for bacteria are exceeded, as are temperature standards for fall salmonid spawning.

The Potlatch River Mainstem from the confluences of Moose Creek to Corral Creek is listed for bacteria, nutrients, sediment and temperature in Section 5 of the 2002 Integrated Report (IDEQ 2005). Salmonid spawning is an existing use in this section and is identified as having steelhead, rainbow and cutthroat trout, with a spring spawning and incubation period of January through May. Water quality standards for bacteria are exceeded in the lower reaches, as are temperature standards for spring salmonid spawning and summer cold water aquatic life.

The Potlatch River Mainstem from the confluences of Corral Creek to Big Bear Creek is listed in Section 5 of the 2002 Integrated Report (IDEQ 2005) for bacteria, nutrients, sediment and temperature. Salmonid spawning is a designated beneficial use; fall chinook salmon is the only species identified as possibly spawning in this reach. Water quality standards for sediment are exceeded, as are temperature standards for summer cold water aquatic life.

According to Bowersox et al. (2005), fish species composition in the forestland streams was dominated by brook trout and sculpin. 2003-2004 survey results indicated a strong correlation between trout abundance and large organic debris in forestland streams. Transitional and forestland streams, including Purdue Creek, had the lowest fish densities.

Based on the QHA, the Upper Potlatch River is listed as the 13th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005), while Purdue Creek is listed as 21st. In streams prioritized in terms of protection, Purdue and Upper Potlatch River are ranked high; 3rd and 7th out of 23 streams respectively.

Table 7.13 Upper Mainstem Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Upper Mainstem Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs	- Stream/habitat complexity
M	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
M	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High water temperatures - Sedimentation
M	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation

Table 7.13 Upper Mainstem Potlatch River Watershed Implementation Plan Conservation Strategies

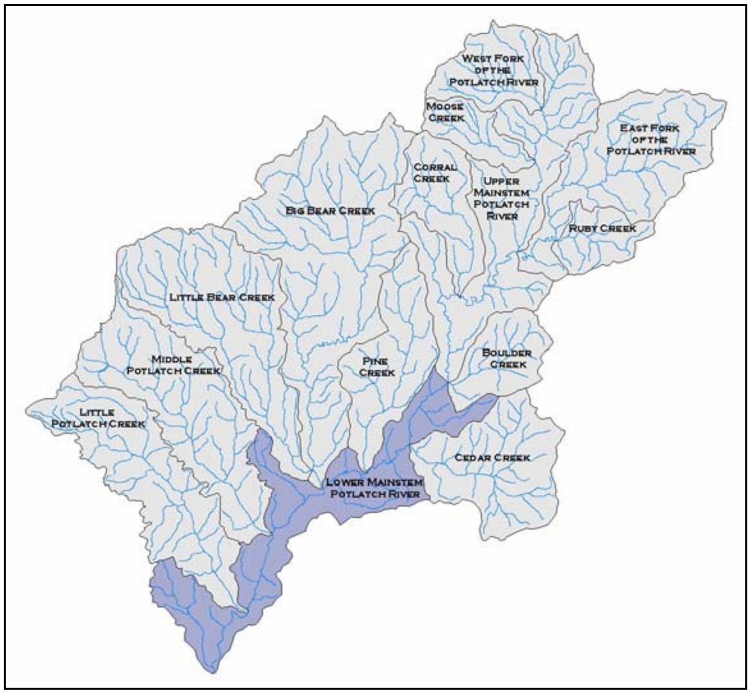
Conservation Objective: *Restoration* in Upper Mainstem Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
M	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Livestock BMPs - Forestry BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- Low summer base flows - High water temperatures - Sedimentation
M	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
M	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
M	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Livestock BMPs - Forestry BMPs - Roadway BMPs	- Sedimentation
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		

Table 7.13 Upper Mainstem Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Upper Mainstem Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

Subwatershed Snapshot

7.5.3.14 Lower Mainstem Potlatch River Subwatershed



The Lower Mainstem Potlatch River subwatershed is a southwest-facing watershed. The lower mainstem includes several small tributaries from the confluence of Big Bear Creek to the mouth of the Potlatch River. The river is bordered by State Highway 3 and an old railroad grade. The towns of Kendrick and Juliaetta occur along this reach.

The Mainstem Lower Potlatch River subwatershed is 38,000 acres in size, representing approximately 10% of the overall watershed. The lower mainstem subwatershed is mainly comprised of canyon stream types (Bowersox et al. 2005).

According to IDEQ (2004), the Lower Mainstem Potlatch River is listed for bacteria, dissolved oxygen, nutrients, ammonia, oil and grease, organics, pesticides, sediment and temperature in Section 5 of the 2002 Integrated Report (IDEQ 2005). Salmonid spawning is a designated beneficial use; fall chinook salmon is the only salmonid species identified as possibly spawning in this reach. Water quality standards for sediment are exceeded, as are temperature standards for summer cold water aquatic life and fall salmonid spawning.

Based on the QHA, the Lower Mainstem Potlatch River is listed as the 11th highest priority out of 23 streams for restoration by IDFG (Bowersox et al. 2005. In streams prioritized in terms of protection, the Lower Potlatch River Mainstem is ranked low, 20th out of 23 streams.

Table 7.14 Lower Mainstem Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Lower Mainstem Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
H	Canyon	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- Stream/habitat complexity - Sedimentation
M	Canyon	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs > Stabilize streambed - Other > Evaluate streambed substrate composition	- Stream/habitat complexity
M	Agricultural Uplands	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity
M	Canyon	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High water temperatures - Sedimentation
M	Agricultural Uplands	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.	- Riparian/Floodplain/Wetland BMPs - Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs - Other > Investigate extent of meadows and wetlands	- High flashy stream flows - Low summer base flows - High water temperatures - Stream/habitat complexity - Sedimentation

Table 7.14 Lower Mainstem Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Lower Mainstem Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
L	Agricultural Uplands	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.	- Agricultural/Rangeland/Pastureland BMPs - Livestock BMPs - Roadway BMPs	- High flashy stream flows - Low summer base flows - Stream/habitat complexity - Sedimentation
Not Applicable	Forest	Restore riparian/floodplain areas to increase shading, increase woody debris recruitment, reduce streambank erosion, increase instream habitat complexity, and maintain adequate stream discharge.		
Not Applicable	Forest	Restore meadow/wetlands to minimize peak storm discharge and maintain adequate summer stream flows.		
Not Applicable	Forest	Restore upland ecosystem functions to minimize peak storm discharge and maintain adequate summer stream flows, reduce erosion and sedimentation, and improve water quality.		
Not Applicable	Canyon	Eliminate migration barriers to allow for stream connectivity and out-migration.		

Table 7.14 Lower Mainstem Potlatch River Watershed Implementation Plan Conservation Strategies

Conservation Objective: *Restoration* in Lower Mainstem Potlatch River				
Prioritized Restoration Strategies	**Land Type Categories**	**Restoration Strategies**	**Priority Restoration Practices** General Category/Specific Practices (when applicable)	**Primary Limiting Factors**
Not Applicable	Agricultural Uplands	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Forest	Eliminate migration barriers to allow for stream connectivity and out-migration.		
Not Applicable	Canyon	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Agricultural Uplands	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		
Not Applicable	Forest	Develop artificial water retention facilities to maintain adequate summer stream flows and minimize peak storm discharge.		

7.5.3.2 Protection Strategies

The protection strategies include management efforts, which address environmental threats to the subwatershed and overall Potlatch River watershed system. These environmental threats include:

- Hydrograph instability
- Erosion and sediment delivery
- High water temperature
- Migration barriers

Protection strategies can be applied to subwatersheds in order to address identified environmental threats; protection strategies include:

- Implement riparian protection measures
- Minimize erosion
- Maintain shade density
- Maintain stream connectivity

The respective management efforts applied to each protection strategy when applicable includes the following list (definitions of management efforts found in Appendix E). Management efforts, shown in alphabetical order include:

- Continue to control noxious and invasive weeds
- Continue to implement direct seeding on annually cropped lands
- Follow proper culvert installation guidelines
- Maintain forest health
- Maintain proper grazing management plans
- Maintain riparian health
- Minimize road density
- Practice proper timber harvest techniques

> "Based upon observation during this study and other work conducted in the Potlatch River drainage, water temperature and stream discharge likely limit juvenile rainbow/steelhead trout survival in the drainage."
>
> *Potlatch River Basin-Fisheries Inventory 2003-2004 (Bowersox et al. 2005).*

Chapter 8.

Monitoring

8.1 Monitoring Plan

Monitoring will accompany watershed restoration and protection efforts at three levels:

1) Potlatch River watershed scale
2) Individual subwatershed scale
3) Specific project scale

8.1.1 Potlatch River Watershed Scale Monitoring

Watershed scale monitoring will assess large-scale trends within the system. Monitoring for changes in the Potlatch River hydrograph will take place through the maintenance of existing Latah SWCD stream gauging stations currently located within priority watersheds. Monitoring will also include the maintenance of the USGS gauging station currently located at the mouth of the Potlatch River. Dependent on outside agency and financial support, fish production surveys will also continue.

Watershed-scale water quality trends will be approximated by comparing the TMDL baseline water quality parameters collected by IDEQ over the past several years, and their future sampling scheduled every five years.

8.1.2 Individual Subwatershed Scale Monitoring

Monitoring at the subwatershed scale will include evaluating water quality and habitat parameters. Examples include subwatershed hydrograph monitoring, SVAP surveys (USDA NRCS 1998), long-term photo points, water temperature recording, and water quality monitoring (e.g. sediment delivery).

Fish production and composition trend surveys of individual subwatersheds will continue. Results will be compared to previous studies and congruent mainstem surveys.

8.1.3 Specific Project Scale Monitoring

The evaluation of an implemented BMP will be achieved through project specific monitoring (using guidance presented in RPU 2003). Monitoring examples include long-term photo points, riparian habitat condition surveys (SVAP), water temperature monitoring, and erosion control surveys.

i. REFERENCES

LIST OF REFERENCES

Bowersox, Brett, Nathan Brindza, and Tom Biladeau. 2005. Potlatch River Basin Fisheries Inventory. Latah, Clearwater, and Nez Perce Counties, Idaho. Idaho Department of Fish and Game. January 2005.

Buechler, Gary. 1982. Idaho Andadromous Fish Habitat Rehabilitation Study-Potlatch River. US Fish and Wildlife Service Ecological Services, Boise Idaho. March 1982.

Campbell, Kirk. 2004. Synoptic Evaluation of Pesticide Concentrations-Clearwater River Basin, Central Idaho. Idaho State Department of Agriculture Water Quality Technical Report W-12. In cooperation with the Environmental Protection Agency, Idaho Soil Conservation Commission, Idaho Association of Soil Conservation Districts, and the University of Idaho Analytical Science Laboratory Moscow, Idaho. December 2004.

Conley, Cort. 1982. Idaho for the Curious. Cambridge, Idaho. Backeddy Books.

Ecovista. 2003. Draft Clearwater Subbasin Summary, Inventory, Assessment and Management Plan. Contracted by Nez Perce Tribe Watershed Division. In cooperation with Clearwater Policy Advisory Committee. November 2003.

Farbo, Tom. 1996. White Pine Wobblies and Wannigans: A History of Potlatch Logging Camps: North Central Idaho 1903-1986. Lewiston, Idaho. Steeley Print and Binding.

Fuller, Ross K., P.A. Kucera, D. B. Johnson. 1985. A Biological and Physical Inventory of the Streams Within the Nez Perce Reservation Synopsis of Three Year of Stream Inventory on the Nez Perce Reservation. Lapwai, Idaho. August 1985.

Gariglio, Frank and Myron Hotinger. 1998. Potlatch Basin Forestry Committee Report Draft. USDA Natural Resources Conservation Service (Gariglio) and Idaho Department of Lands (Hotinger). February 1998.

Gilmore, Shelly and Fred W. Rabe, Ph.D. 1995. Beneficial Use Assessment Little Potlatch Creek. Sponsored by Latah Soil and Water Conservation District. October 1995.

Grafe, C.S., C.A. Mebane, M.J. McIntyre, D.A. Essig, D.H. Brandt, and D.T. Mosier. 2002. The Idaho Department of Environmental Quality Water Body Assessment Guidance, Second Edition. Idaho Department of Environmental Quality, Boise, Idaho.

Heekin, Trish. 2005. Summary of Survey Work: Potlatch River Watershed-Surveys Completed in 2004 and Survey Work Planned for 2005. Latah Soil and Water Conservation District. January 2005.

[IDEQ] Idaho Department of Environmental Quality. 2004. Draft Potlatch River Subbasin Assessment and TMDLs. December 2004.

[IDEQ] Idaho Department of Environmental Quality. 2005. Principles and Policies for the 2002 Integrated (303d/305b) Report. September 30, 2005.

[IDL] Idaho Department of Lands. 1998. State Forester Forum: Fish Passage Guidelines When Installing Stream Crossings. Forest Practices No. 12. July 1998.

[IDWR] Idaho Department of Water Resources. 2005. E-mail correspondence from Genna Ashley-Poulson, Idaho Department of Water Resources, Boise, Idaho to Shelly Gilmore, Resource Planning Unlimited, Inc. Correspondence dated October 26, 2005.

Interior Columbia Basin Technical Recovery Team. 2003. Independent Populations of Chinook, Steelhead, and Sockeye for Listed Evolutionarily Significant Units Within the Interior Columbia River Domain, Working Draft. July 2003.

Interior Columbia Basin Technical Recovery Team (ICBTRT). 2005. Updated population delineation in the interior Columbia Basin. Memorandum from M. McClure et al. to NMFS NW Regional Office. May 11, 2005.

Johnson, David B. 1985. Nez Perce Tribe, Fisheries Biologist. A Biological and Physical Inventory of Clear Creek, Orofino Creek, and the Potlatch River, Tributary Streams of the Clearwater River, Idaho. Bonneville Power Administration, Division of Fish and Wildlife.

Johnston, Robbin. 1993. A Preliminary Examination of the Archaeological and Historical Evidence of Anadromous Fish on the Palouse District. USDA Forest Service, Clearwater National Forest. December 1993.

Kucera, P.A., J.H. Johnson, and M.A. Bear. 1983. A Biological and Physical Inventory of the Streams Within the Nez Perce Reservation. Fisheries Resource Management. Lapwai, Idaho. February 1983.

Landeen, Dan and Allen Pinkham. 1998. Salmon and His People. Western Printing, Lewiston, Idaho.

Latah County Historical Society. 1981. Railroad Man: A Conversation with W.J. Gamble.

Latham, Ramon. 1987. Water Quality Status Report No. 76. Little Potlatch Creek, Latah County, Idaho. Idaho Department of Health and Welfare-Division of Environment, Lewiston, Idaho.

Miller, John B. 1972. The Trees Grew Tall. Moscow, Idaho. The News Publishing Company.

Nez Perce Soil and Water Conservation District. 1998. Confined Animal Feeding Operations Inventory and Analysis. Potlatch River Basin, Lapwai River Basin, Lower Snake-Clearwater River Basin. March 1998.

Nez Perce Soil and Water Conservation District, Nez Perce Tribe Department of Fisheries Resource Management-Watershed Division, and Latah Soil and Water Conservation District. 2004. Healthy Habitat-Healthy Fish. Version 1. August 2004.

[NOAA Fisheries] National Oceanic and Atmospheric Agency Fisheries. 2005. Final Assessment of NOAA Fisheries' Critical Habitat Analytical Review Teams for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead. Prepared by NOAA Fisheries Protected Resources Division, Portland, Oregon. August 2005. http://www.nwr.noaa.gov/1salmon/salmesa/crithab/F-CHART-INTRO.PDF

PACFISH Strategy. 1993. Executive Summary. USDA Forest Service, USDI Bureau of Land Management.

[PFMC] Pacific Fishery Management Council. Pacific Fishery Management Council Information Sheet: Essential Fish Habitat. September 2004.

[RPU] Resource Planning Unlimited, Inc. 2001. Little Potlatch Creek 1995-2000 Water Years Trend Monitoring. Sponsored by Latah Soil and Water Conservation District. Prepared by Resource Planning Unlimited, Inc., Shelly Gilmore. Moscow, Idaho. March 2001.

[RPU] Resource Planning Unlimited, Inc. 2003. The Idaho Agricultural Best Management Practices: A Field Guide for Evaluating BMP Effectiveness.

Schriever, Ed and Doug Nelson. 1999. Potlatch River Basin Fisheries Inventory: Latah, Clearwater, and Nez Perce Counties, Idaho. Idaho Department of Fish and Game.

Slickpoo, Allen P. Sr., Leroy L. Seth, and Deward E. Walker Jr. 1972. Nez Perce Tribe of Idaho. Library of Congress Catalog Number 77-189890. Second Edition 1972.

Teasdale, Gregg N., and Michael E. Barber. 2005. Aerial Assessment of Ephemeral Gully Erosion and Channel Erosion in the Lower Potlatch River Basin. Research Report. State of Washington Water Research Center, Pullman, WA.

USDA Forest Service. 2001. Final Environmental Impact Statement West Fork Potlatch Ecosystem Management Project. Latah County, Idaho. November 2001.

[USDA SCS] USDA Soil Conservation Service. 1993. Preliminary Investigation Report Middle Potlatch Creek. Latah County, Idaho. June 1993.

[USDA SCS] USDA Soil Conservation Service. 1994. Preliminary Investigation Report Potlatch River. Latah, Clearwater, Nez Perce Counties, Idaho. April 1994.

[USDA NRCS] USDA Natural Resources Conservation Service. 1998. Stream Visual Assessment Protocol. National Water and Climate Center. Technical Note 99-1. December 1998.

[USDA USFS] USDA Forest Service. 2004. Draft Clearwater and Nez Perce National Forests, Proposed Action for Forest Plan Revisions. September 2004.

[USDI BLM] United States Department of Interior Bureau of Land Management. 2000. Biological Assessment of Ongoing and Proposed BLM Activities on Fall, Chinook Salmon, Steelhead Trout, Bull Trout, and BLM Sensitive Species. Cottonwood, Idaho. March 2000.

[USFWS] United States Fish and Wildlife Service. 2005. Idaho Fishery Resource Office Projects internet site accessed on 01/03/05 at URL: http://idahofro.fws.gov/projects/default.htm.

Wertz, Lisa and John Kinney. 1994. Beneficial Use Reconnaissance Project: Potlatch River Watershed Latah, Clearwater, and Nez Perce Counties North Central Idaho. Idaho Division of Environmental Quality North Central Idaho Regional Office. December 1995.

POTLATCH RIVER WATERSHED MANAGEMENT PLAN

APPENDIX A

HUC Assignments

Table A-1. HUC Assignments*

Stream	4th Field HUC	5th Field HUC	6th Field HUC
West Fork of the Upper Potlatch River	17060306	1706030609	170603060901
East Fork of the Potlatch River	17060306	1706030609	170603060902
Upper Big Bear Creek	17060306	1706030611	170603061101
Corral Creek	17060306	1706030610	170603061002
Hog Meadow - Potlatch River	17060306	1706030610	170603061001
Little Bear Creek	17060306	1706030611	170603061103
Lower Big Bear Creek	17060306	1706030611	170603061102
Pine Creek - Potlatch River	17060306	1706030610	170603061006
Middle Potlatch Creek	17060306	1706030612	170603061202
Boulder Creek	17060306	1706030610	170603061003
Little Potlatch Creek	17060306	1706030612	170603061203
Rock Creek - Potlatch River	17060306	1706030610	170603061004
Cedar Creek	17060306	1706030610	170603061005
Howard Gulch - Potlatch River	17060306	1706030612	170603061201

* HUCs presented by Idaho Department of Water Resources (IDWR 2005)

POTLATCH RIVER WATERSHED MANAGEMENT PLAN

APPENDIX B

Precipitation Tables and Graphs

Table B-1. Precipitation Summary for Moscow, Idaho[1] (recorded in inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1900	2.47	2.68	2.48	2.08	3.27	0.29	0.35	0.78	0.79	3.24	2.14	5.53	26.10
1901	2.93	3.06	2.28	1.83	2.40	2.20	0.59	0.17	1.26	0.71	2.94	3.10	23.47
1902	2.29	3.49	1.18	1.21	3.38	0.59	2.33	0.27	1.29	1.24	6.59	3.73	27.59
1903	3.80	0.22	1.77	0.87	3.63	1.80	0.57	1.43	1.57	1.65	2.79	2.37	22.47
1904	1.22	1.60	2.77	1.21	0.73	2.74	1.30	0.11	0.38	1.49	0.75	1.25	15.55
1905	0.78	0.65	2.01	1.91	2.00	2.89	0.10	0.19	2.74	2.43	1.88	2.04	19.62
1906	1.96	1.65	2.00	0.35	2.67	1.19	0.03	2.06	0.60	0.82	7.48	6.12	26.93
1907	5.77	2.62	2.79	0.62	0.81	2.58	1.58	1.60	0.87	0.78	0.98	2.90	23.90
1908	1.47	1.77	2.76	1.30	2.00	1.07	0.13	0.95	0.93	1.97	1.05	1.41	16.81
1909	4.11	3.23	1.03	2.06	1.62	0.65	3.65	0.00	1.64	1.75	5.77	1.58	27.09
1910	2.58	3.50	2.64	1.77	1.86	0.00	0.00	0.00	0.56	2.48	4.11	1.87	21.37
1911	1.01	1.13	0.37	0.08	2.17	0.80	0.10	0.76	0.86	1.01	1.64	1.16	11.09
1912	2.78	3.50	1.17	1.77	4.03	0.75	0.44	2.10	1.76	2.07	2.60	2.69	25.66
1913	8.43	1.51	4.52	1.43	2.70	3.78	0.19	0.63	0.91	2.36	3.26	1.03	30.75
1914	2.68	1.95	0.76	1.76	2.00	1.36	0.70	0.00	2.04	2.04	1.78	1.25	18.32
1915	1.36	1.32	1.53	2.07	4.08	0.40	1.02	0.08	0.31	1.66	3.16	2.11	19.10
1916	2.67	2.03	4.88	1.01	1.36	2.20	1.12	1.17	0.64	0.30	2.64	2.13	22.15
1917	2.86	1.76	2.13	3.63	1.81	0.72	0.05	0.00	1.57	0.00	1.39	5.79	21.71
1918	3.21	2.18	2.04	0.46	0.94	0.95	0.93	0.80	0.75	2.15	1.81	1.62	17.84
1919	2.26	4.58	1.57	1.55	1.27	0.04	0.00	0.48	0.83	1.61	3.87	3.04	21.10
1920	2.79	0.30	2.69	2.72	1.35	1.66	0.54	1.22	2.52	2.35	2.53	3.04	23.71
1921	3.95	2.70	3.25	2.86	1.80	1.47	0.19	0.30	1.43	1.56	3.98	1.88	25.37
1922	2.04	1.49	2.50	1.47	0.47	0.22	0.00	1.52	0.75	1.00	1.32	2.91	15.69
1923	3.93	1.71	1.56	2.52	1.44	3.37	1.19	0.26	0.25	1.73	3.02	3.95	24.93
1924	2.34	2.63	0.96	0.37	0.05	1.01	0.68	0.46	0.65	1.34	4.26	2.40	17.15
1925	4.06	1.90	1.33	1.04	2.74	0.94	0.06	0.75	0.47	0.86	1.64	3.18	18.97
1926	2.03	3.31	0.57	0.61	0.90	2.78	0.04						10.24
1927			0.39	0.89	1.22	1.84	0.43	0.93	4.13	1.99	6.24	2.60	20.66
1928	3.20	0.33	4.05	1.88	0.49	0.56	1.02	0.07	0.31	1.22	1.37	1.18	15.68

[1] Precipitation summaries accessed at USDA NRCS website: ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/id/16057.txt

Table B-1. Precipitation Summary for Moscow, Idaho (recorded in inches) *continued*

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1929	3.63	0.84	1.38	1.39	0.58	2.14	0.03	0.20	0.33	1.07	0.04	4.54	16.17
1930	1.34	3.36	2.85	1.90	2.36	1.14	0.08	0.10	1.60	1.23	2.05	1.45	19.46
1931	2.57	1.31	3.92	1.21	0.39	1.30	0.06	0.00	1.08	1.87	3.38	3.92	21.01
1932	3.48	2.87	5.08	1.28	2.92	0.37	0.48	0.10	0.17	1.83	5.13	3.43	27.14
1933	5.12	2.92	1.51	0.75	1.19	1.05	0.15	0.78	2.14	3.88	1.90	8.02	29.41
1934	2.96	0.32	3.30	1.31	0.77	4.15	0.09	0.02	0.68	3.44	2.47	2.96	22.47
1935	2.73	1.06	2.55	2.93	0.24	0.61	0.47	0.34	0.26	1.25	0.96	2.59	15.99
1936	5.12	2.17	1.92	0.52	0.86	1.59	0.34	0.00	1.18	0.30	0.24	2.74	16.98
1937	3.60	2.77	2.25	3.81	0.69	2.92	0.23	0.49	0.79	1.51	3.60	4.05	26.71
1938	1.62	1.79	2.30	1.60	0.91	1.27	0.30	0.17	0.84	1.80	2.55	1.35	16.50
1939	1.39	3.76	2.35	0.55	0.57	0.81	0.72	0.00	0.36	1.12	0.34	3.51	15.48
1940	2.18	4.14	2.38	2.60	0.72	0.36	1.46	0.00	4.21	4.51	3.41	2.55	28.52
1941	1.79	1.13	1.17	2.29	4.40	3.44	0.30	0.83	2.67	0.98	2.79	3.80	25.59
1942	1.18	1.28	1.31	1.35	2.13	1.63	0.77	0.05	0.38	1.98	4.30	3.96	20.32
1943	2.55	1.74	2.19	1.20	1.70	2.21	0.73	0.47	0.50	2.85	1.06	1.54	18.74
1944	0.66	2.40	1.01	2.85	0.70	1.96	0.00	0.81	0.95	0.65	1.21	0.94	14.14
1945	2.43	1.65	3.06	1.55	2.73	1.79	0.01	0.56	3.21	0.94	3.60	3.07	24.60
1946	3.67	1.97	2.02	1.13	1.03	1.97	0.18	0.37	1.48	2.31	3.39	2.72	22.24
1947	2.71	1.53	1.24	2.21	0.37	2.05	0.18	0.19	3.81	3.88	3.35	2.53	24.05
1948	3.03	3.94	1.31	3.37	6.97	1.88	2.40	0.10	0.96	0.68	4.43	4.95	34.02
1949	1.20	3.79	1.92	1.04	1.29	0.46	0.48	0.26	1.27	1.75	2.22	2.82	18.50
1950	4.09	2.99	3.79	1.03	0.97	3.43	0.29	0.45	0.32	4.06	2.99	2.78	27.19
1951	2.18	1.65	1.21	0.36	1.04	2.08	0.54	0.68	0.59	3.75	1.97	5.07	21.12
1952	1.69	1.62	1.77	1.30	1.52	2.73	0.20	0.23	1.23	0.04	0.40	2.03	14.76
1953	7.03	2.63	1.76	1.44	1.77	1.28	0.00	1.27	0.29	0.26	3.40	3.73	24.86
1954	4.01	0.86	1.40	1.64	1.63	1.63	1.04	2.51	1.22	0.96	1.93	2.75	21.58
1955	1.11	1.25	1.80	2.06	0.91	0.78	1.80	0.03	2.00	3.65	3.99	3.59	22.97
1956	3.51	1.92	2.12	0.14	3.04	1.84	1.05	1.52	0.33	2.23	1.13	2.76	21.59
1957	1.86	1.69	2.36	1.56	3.05	1.70	0.00	0.37	0.19	2.66	1.92	2.92	20.28
1958	2.71	2.87	1.26	4.60	0.47	1.91	0.82	0.07	0.50	1.61	4.83	4.12	25.77
1959	4.76	2.19	0.98	1.22	2.19	1.95	0.20	1.36	2.94	1.85	2.15	1.01	22.80

Table B-1. Precipitation Summary for Moscow, Idaho (recorded in inches) *continued*

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1960	1.22	2.20	2.20	1.89	1.83	0.90	0.00	1.71	0.76	2.37	3.92	2.45	21.45
1961	1.85	5.38	2.22	1.90	2.33	0.82	0.22	0.71	0.41	1.73	3.37	2.98	23.92
1962	1.01	1.21	3.02	2.38	2.07	0.42	0.19	0.67	1.91	2.68	2.53	3.35	21.44
1963	0.57	2.36	2.33	2.61	0.90	1.73	0.38	0.74	1.73	1.35	3.66	1.97	20.33
1964	7.27	1.14	1.38	1.27	1.27	2.73	1.54	1.20	0.99	0.89	6.81	5.31	31.80
1965	3.48	1.10	0.80	2.80	1.08	2.24	0.47	1.43	0.36	0.35	1.64	0.89	16.64
1966	3.33	1.32	2.33	0.46	0.72	1.00	0.68	0.41	0.06	1.31	3.58	3.76	18.96
1967	3.46	0.35	1.57	2.75	1.94	2.06	0.04	0.00	0.53	3.28	0.76	3.48	20.22
1968	0.96	4.34	1.82	0.83	1.57	1.45	0.65	1.75	2.89	3.31	4.05	3.57	27.19
1969	4.83	0.70	0.85	3.89	1.56	1.05	0.06	0.00	1.41	1.29	0.72	3.70	20.06
1970	7.67	2.71	2.54	1.52	1.51	2.58	1.89	0.16	1.83	2.51	3.52	2.32	30.76
1971	2.89	1.99	2.95	2.07	2.45	4.81	0.96	1.60	1.87	2.22	3.40	3.09	30.30
1972	4.28	3.88	4.39	2.02	3.20	0.99	0.59	0.91	1.21	1.62	1.87	5.86	30.82
1973	2.57	0.95	2.06	0.50	2.60	0.84	0.02	0.13	2.03	1.60	7.32	6.92	27.54
1974	6.70	2.92	3.15	2.19	1.66	2.30	1.18	0.06	0.25	0.05	2.48	2.98	25.92
1975	4.96	2.93	2.34	2.97	1.85	1.76	2.65	2.82	0.00	3.84	3.25	3.70	33.07
1976	1.86	2.78	2.47	2.87	2.90	1.54	0.84	2.63	0.06	2.31	0.93	1.21	22.40
1977	0.77	0.76	1.67	0.47	2.86	0.59	0.67	2.86	2.51	1.09	3.90	4.71	22.86
1978	3.04	2.30	1.63	4.74	2.24	0.93	1.05	2.29	1.55	0.09	1.92	2.55	24.33
1979	1.08	4.13	2.06	3.30	2.82	1.01	0.49	0.99	0.41	3.19	2.85	3.30	25.36
1980	3.65	1.71	2.67	1.51	4.80	1.99	1.12	1.00	1.08	0.75	3.90	3.88	28.06
1981	1.84	3.34	2.81	3.01	2.09	3.43	1.00	0.01	1.03	2.81	2.83	4.66	28.86
1982	3.75	3.20	2.70	2.38	1.52	0.67	1.98	1.20	2.38	2.89	2.29	2.72	27.68
1983	2.81	3.62	4.07	1.83	2.23	2.96	1.91	0.77	1.20	1.73	5.95	2.82	31.90
1984	2.16	1.38	2.64	2.05	2.48	3.51	0.66	0.94	1.04	2.36	5.02	2.13	26.37
1985	0.45	1.68	1.49	1.12	1.76	2.04	0.11	1.46	3.75	1.96	2.18	0.54	18.54
1986	4.40	4.26	2.28	2.04	2.80	0.53	1.31	1.81	3.43	1.07	4.45	0.71	29.09
1987	1.80	1.92	2.51	1.75	2.42	2.15	2.90	0.07	0.00	0.00	1.09	3.43	20.04
1988	2.17	1.39	3.82	2.80	2.22	2.10	1.62	0.00	1.28	0.72	4.84	1.33	24.29
1989	3.35	1.18	4.10	1.03	2.84	1.46	0.20	5.02	1.01	2.17	2.90	1.56	26.82
1990	4.51	1.28	1.41	3.69	4.37	1.63	0.70	1.12	0.05	4.22	3.98	1.57	28.53

Table B-1. Precipitation Summary for Moscow, Idaho (recorded in inches) *continued*

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1991	2.10	1.43	3.03	2.39	4.32	2.68	0.60	0.18	0.16	0.75	4.91	1.91	24.46
1992	2.66	2.94	0.40	3.04	0.58	1.39	1.73	2.43	2.07	0.99	3.92	1.48	23.63
1993	1.59	0.85	2.98	5.17	2.46	1.84	2.69	0.73	0.06	1.59	1.31	2.40	23.67
1994	2.42	1.31	1.22	2.58	2.16	1.68	0.10	0.07	0.64	4.51	4.25	3.18	24.12
1995	3.77	2.64	3.91	2.26	1.37	3.56	1.16	1.74	1.41	3.23	5.56	4.26	34.87
1996	4.75	6.09	1.83	5.70	3.97	0.69	0.41	0.09	1.29	3.40	4.08	6.92	39.22
1997	4.37	2.30	3.55	5.12	1.78	0.93	2.55	0.63	1.21	4.02	3.44	2.65	32.55
1998	3.51	2.22	1.80	2.12	5.20	2.34	2.05	0.61	2.84	1.40	5.96	6.00	36.05
1999	3.41	4.98	2.04	0.74	1.75	2.27	0.23	1.49	0.07	2.11	3.56	4.49	27.14
2000	2.21	3.34	3.15	2.06	3.00	1.40	0.16	0.02	2.61	1.52	2.01	1.64	23.12
2001	1.39	1.11	2.19	3.58	1.36	1.86	0.93	0.07	0.49	3.84	3.37	2.85	23.04
Average Annual Precipitation for a Recorded Period 1900 through 2001													23.43

Table B-2. Precipitation Summary for Elk River, Idaho[2] (recorded in inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1952	3.91	2.56	3.04	0.95	2.34	3.81	0.30	0.00	0.49	0.07	1.10	6.08	24.65
1953	12.33	4.60	2.38	3.93	4.27	1.36	0.00	1.25	0.52	1.26	2.47	8.35	42.72
1954	9.62	2.89	2.01	4.13	2.07	3.59	0.57	3.67	0.63	1.67	3.50	4.43	38.78
1955	2.91	5.59	6.13	3.49	2.29	2.18	2.36	0.03	2.60	5.58	9.09	7.14	49.39
1956	5.62	4.63	5.54	0.87	3.11	2.57	1.11	2.38	0.00	3.72	2.13	4.37	36.05
1957	3.36	5.44	3.44	4.11	5.17	1.60	0.47	0.64	0.33	4.19	4.07	7.00	39.82
1958	6.39	5.45	2.29	6.74	0.99	4.38	1.14	0.57	2.90	3.49	8.40	6.06	48.80
1959	8.14	3.43	3.65	3.94	3.15	2.36	0.09	1.17	7.79	5.69	6.06	2.84	48.31
1960	3.58	4.67	5.67	4.90	4.29	1.29	0.12	2.45	0.90	2.94	6.20	2.76	39.77
1961	4.34	7.10	4.45	4.93	2.85	1.31	0.24	0.51	2.23	4.94	5.76	6.39	45.05
1962	4.00	1.75	5.72	2.92	3.54	1.39	0.20	0.96	2.54	3.82	3.62	3.71	34.17
1963	2.13	4.46	3.35	3.98	0.86	2.70	0.33	0.43	1.92	1.54	5.35	4.51	31.56
1964	9.06	2.09	7.14	4.53	1.84	3.22	2.32	2.72	1.76	2.55	5.78	13.13	56.14
1965	9.58	4.24	1.06	4.55	1.35	2.84	0.84	2.53	1.26	1.49	3.71	1.93	35.38
1966	7.06	2.94	5.30	1.26	1.10	1.75	0.15	0.63	0.26	3.89	5.54	5.62	35.50
1967	9.76	2.89	4.18	2.85	2.32	2.52	0.00	0.00	0.93	5.14	2.39	5.41	38.39
1968	2.86	7.82	3.00	2.14	2.54	2.06	0.98	3.12	3.77	4.54	4.60	7.31	44.74
1969	8.00	2.81	1.87	2.92	2.73	1.72	0.05	0.05	2.22	2.78	1.42	4.07	30.64
1970	8.84	4.14	3.95	3.55	1.94	4.37	1.51	0.08	3.58	3.20	5.53	4.33	45.02
1971	9.01	3.75	4.12	2.83	4.24	4.34	1.09	0.43	2.87	2.49	4.49	8.71	48.37
1972	7.85	4.85	5.02	2.55	3.25	1.21	1.17	1.20	1.34	2.00	2.33	4.95	37.72
1973	3.63	0.79	1.82	1.08	2.02	1.54	0.03	0.14	2.13	2.04	10.70	4.37	30.29
1974	6.41	6.32	5.00	2.57	2.10	1.81	0.48	0.37	0.48	0.01	3.11	5.39	34.05
1975	8.40	4.33	3.68	2.46	2.09	1.75	0.68	3.06	0.14	3.72	3.27	3.96	37.54
1976	6.56	4.98	2.15	1.78	1.74	1.92	1.21	2.17	1.12	0.96	1.54	1.94	28.07
1977	2.18	1.81	4.67	0.18	4.85	0.79	1.45	2.55	4.60	2.18	5.85	7.72	38.83
1978	3.56	3.78	3.11	2.45	3.18	0.83	1.77	2.34	1.60	0.24	4.35	4.05	31.26
1979	3.11	6.92	2.77	3.66	3.32	1.27	0.73	1.33	0.25	2.96	2.34	4.46	33.12

[2] Precipitation summaries accessed at USDA NRCS website: ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/id/16035.txt

Table B-2. Precipitation Summary for Elk River, Idaho (recorded in inches) *continued*

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1980	4.86	3.91	4.07	1.51	4.19	3.58	1.52	0.86	2.49	0.74	2.75	8.85	39.33
1981	2.24	5.46	2.20	3.08	2.37	4.75	1.64	0.12	2.21	3.20	4.26	6.58	38.11
1982	6.06	4.06	2.78	2.12	0.95	1.98	2.20	0.94	2.21	3.29	3.46	4.07	34.12
1983	4.30	3.97	2.55	1.18	2.54	3.80	2.71	1.34	1.90	1.34	6.53	5.45	37.61
1984	4.55	1.59	3.53	1.28	4.04	2.80	0.05	0.99	2.68	4.41	4.26	7.16	37.34
1985	0.92	3.20	2.87	1.79	3.11	2.32	0.04	2.65	4.60	2.78	4.58	0.93	29.79
1986	4.49	8.85	3.68	2.28	2.39	0.48	1.47	0.62	4.32	0.94	5.04	1.27	35.83
1987	1.86	4.41	3.77	1.35	2.65	1.42	4.56	0.67	0.04	0.02	2.79	4.25	27.79
1988	3.99	2.99	4.18	3.23	2.78	2.30	1.81	0.22	0.93	1.72	5.78	3.20	33.13
1989	5.84	1.74	5.46	1.68	3.28	2.01	0.97	2.32	1.26	1.29	3.94	2.84	32.63
1990	6.66	6.10	2.13	3.55	5.21	3.27	0.93	1.04	0.03	5.64	5.24	4.77	44.57
1991	3.81	1.94	2.08	3.15	4.00	4.16	0.48	0.50	0.60	0.78	3.88	3.07	28.45
1992	2.66	3.26	0.42	3.10	1.83	2.85	3.78	1.21	2.89	1.05	4.85	3.10	31.00
1993	3.10	0.66	3.80	4.53	3.13	2.58	3.43	0.70	0.21	1.64	1.51	3.57	28.86
1994	3.87	3.01	1.46	2.08	2.18	1.65	0.46	0.15	0.48	4.01	9.80	5.38	34.53
1995	4.10	5.53	2.88	2.18	2.26	3.39	2.41	2.05	2.49	6.58	7.42	5.79	47.08
1996	7.62	7.41	0.99	6.40	3.38	1.20	0.20	0.55	1.97	3.46	4.25	11.77	49.20
1997	6.82	4.51	6.14	5.86	2.06	2.15	3.61	1.00	2.67	4.47	3.26	2.69	45.24
1998	5.18	1.23	2.49	2.53	6.09	2.52	2.01	0.17	1.94	1.58	7.40	5.71	38.85
1999	5.68	7.85	1.50	0.64	1.35	3.38	0.33	1.20	0.27	3.52	5.48	7.28	38.48
2000	5.22	4.88	2.63	2.39	2.58	1.72	0.54	0.02	1.23	2.68	1.85	4.72	30.46
2001	2.44	2.32	1.74	2.79	2.24	2.38	1.01	0.05	0.34	4.98	6.10	5.64	32.03
Average Annual Precipitation for a Recorded Period 1952 through 2001													37.57

Table B-3. Precipitation Summary for Lewiston, Idaho (recorded in inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1949	0.42	1.20	0.93	1.29	1.56	0.35	0.22	0.10	1.31	0.35	1.42	0.78	9.93
1950	1.80	1.14	1.42	0.76	1.34	4.70	0.36	0.28	0.49	2.79	1.77	1.89	18.74
1951	0.51	0.39	0.66	0.45	1.05	2.36	0.35	0.53	0.34	2.10	0.67	0.72	10.13
1952	0.48	0.83	0.45	1.59	1.82	2.95	0.22	0.01	0.64	0.03	0.31	0.86	10.19
1953	2.88	0.84	1.13	0.90	1.93	1.68	0.00	1.00	0.04	0.40	1.56	0.99	13.35
1954	0.94	0.27	1.21	0.74	0.84	2.21	0.37	1.23	1.01	0.36	0.86	0.20	10.24
1955	0.66	0.62	0.96	1.28	0.96	0.52	1.72	0.00	1.96	1.83	1.93	1.65	14.09
1956	2.54	1.44	1.18	0.05	3.37	2.32	0.30	2.10	0.23	1.32	0.39	0.84	16.08
1957	1.56	0.79	1.68	0.68	3.14	1.20	0.11	0.40	0.12	1.80	0.77	1.16	13.41
1958	0.55	1.41	0.85	2.03	1.00	1.71	1.10	0.09	0.37	1.06	2.24	2.79	15.20
1959	1.48	1.30	0.31	1.08	1.03	1.65	0.36	1.26	1.93	0.94	0.29	0.63	12.26
1960	0.80	0.64	1.45	1.31	1.67	0.58	0.03	1.92	0.69	1.42	1.39	0.78	12.68
1961	0.84	1.55	1.82	1.12	1.86	0.51	0.17	0.68	0.51	0.61	2.14	1.12	12.93
1962	0.51	0.76	1.43	0.43	2.83	0.98	0.12	0.61	0.83	1.62	1.37	1.67	13.16
1963	0.78	0.91	1.07	1.03	0.46	1.39	0.42	0.61	0.52	0.58	0.97	1.50	10.24
1964	0.49	0.22	0.55	0.93	0.27	3.11	2.15	0.66	0.87	0.94	1.35	3.28	14.82
1965	2.99	0.40	0.54	1.93	0.48	0.95	0.82	1.41	0.28	0.34	1.10	0.15	11.39
1966	1.43	0.71	0.97	0.31	0.42	0.68	0.28	0.48	0.22	0.97	1.81	1.70	9.98
1967	1.28	0.29	1.18	1.78	1.17	1.93	0.03	0.00	0.60	0.88	0.45	1.46	11.05
1968	0.65	1.42	0.62	0.40	0.97	1.34	0.41	1.64	1.27	1.34	2.01	2.13	14.20
1969	2.98	0.76	0.25	2.33	1.25	2.38	0.21	0.00	1.38	1.10	0.29	1.51	14.44
1970	3.56	0.65	1.14	1.03	1.26	2.28	1.48	0.02	1.29	0.89	1.36	0.14	15.10
1971	1.67	0.73	1.08	0.74	1.92	2.53	0.70	0.96	1.57	1.01	1.45	1.13	15.49
1972	1.36	1.47	2.70	0.97	1.61	0.93	0.74	0.68	0.83	1.20	0.93	1.66	15.08
1973	0.72	0.66	0.50	0.12	1.58	0.24	0.01	0.02	1.12	1.64	2.79	2.99	12.39
1974	1.36	1.64	0.73	1.66	0.76	0.50	0.40	0.01	0.10	0.06	0.55	0.77	8.54
1975	2.84	1.50	0.99	1.25	1.01	1.29	0.68	1.09	0.00	1.92	0.56	2.09	15.22
1976	0.54	0.71	0.75	1.29	1.41	1.22	0.43	1.76	0.33	1.13	0.25	0.26	10.08
1977	0.34	0.36	0.92	0.10	1.63	0.35	0.39	1.65	2.22	0.55	1.65	2.10	12.26
1978	1.92	1.47	1.09	3.29	1.06	0.30	0.56	1.90	1.06	0.00	1.06	0.96	14.67

Table B-3. Precipitation Summary for Lewiston, Idaho (recorded in inches) *continued*

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1979	0.97	1.12	0.69	2.17	1.56	0.70	0.21	0.57	0.18	1.57	1.44	0.97	12.15
1980	1.72	1.57	1.23	0.76	1.87	1.31	0.89	0.47	0.97	0.68	1.00	0.88	13.35
1981	0.89	1.22	1.93	0.92	1.11	1.94	0.92	0.01	1.01	1.41	1.54	1.31	14.21
1982	1.57	0.75	1.29	1.14	0.65	0.46	1.74	0.47	0.97	1.98	0.39	1.03	12.44
1983	0.95	1.46	1.48	1.12	1.15	1.70	0.96	0.93	0.74	0.87	1.00	1.15	13.51
1984	0.71	0.46	1.66	1.15	1.68	1.58	0.27	0.93	0.21	0.91	0.89	0.70	11.15
1985	0.27	0.67	0.67	0.93	1.29	0.92	0.57	0.91	1.82	0.60	0.62	0.36	9.63
1986	1.13	2.02	0.63	0.37	1.39	0.41	0.56	0.84	0.94	0.30	1.44	0.53	10.56
1987	0.56	0.44	0.91	0.83	0.84	1.44	2.60	0.34	0.01	0.00	0.31	0.81	9.09
1988	0.98	0.17	1.04	1.12	0.91	1.69	0.88	0.08	0.82	0.17	2.04	0.53	10.43
1989	1.61	0.33	1.69	0.65	2.57	1.61	0.07	2.96	0.64	0.63	0.67	0.30	13.73
1990	0.84	0.26	1.05	2.08	2.39	0.71	0.35	0.71	0.04	1.18	1.05	0.93	11.59
1991	0.14	0.32	1.11	0.79	3.74	1.86	0.53	0.03	0.24	0.15	2.00	0.40	11.31
1992	0.71	0.74	0.42	1.76	0.49	0.75	1.34	1.37	0.84	0.67	1.25	0.39	10.73
1993	0.99	0.70	1.17	2.78	1.97	1.63	1.19	0.62	0.07	0.67	0.64	0.80	13.23
1994	0.89	0.74	0.28	1.50	1.21	1.05	0.54	0.08	0.37	1.10	0.88	1.05	9.69
1995	1.39	0.59	1.85	1.55	0.93	2.60	0.14	1.31	1.21	2.40	1.64	1.37	16.98
1996	1.62	2.00	1.16	2.59	2.75	0.67	0.11	0.07	0.47	1.12	2.27	2.62	17.45
1997	2.43	0.71	1.69	2.52	0.81	0.93	1.03	0.47	0.98	1.77	1.12	0.60	15.06
1998	1.77	0.33	0.87	1.29	3.78	0.77	2.42	0.17	1.90	0.62	2.67	1.00	17.59
1999	0.58	1.30	1.02	0.71	1.31	1.50	0.20	1.06	0.00	1.23	1.62	1.14	11.67
2000	0.89	2.22	0.95	0.99	1.46	1.27	0.03	0.12	2.48	1.18	0.71	0.72	13.02
2001	0.98	0.66	0.85	1.65	0.60	1.12	0.59	0.14	0.19	1.86	1.23	0.64	10.51
Average Annual Precipitation for a Recorded Period 1949 through 2001													12.76

Figure B-1. Annual Precipitation Recorded in Moscow, Idaho

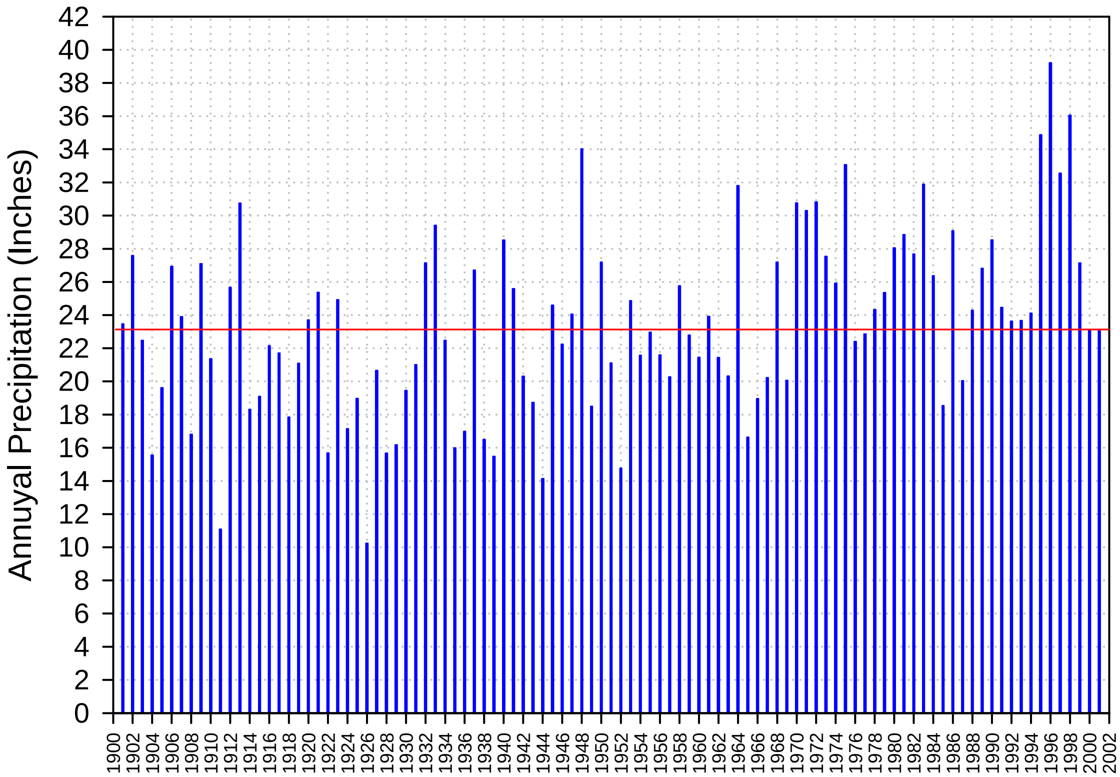
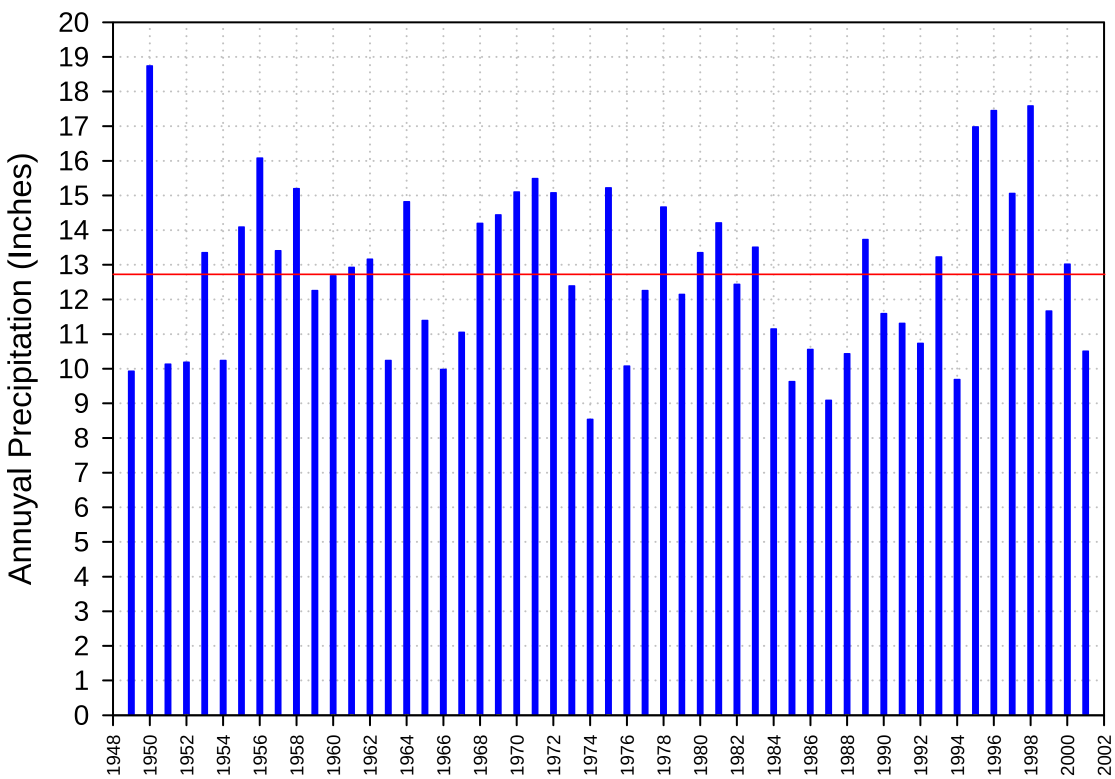


Figure B-2. Annual Precipitation Recorded in Lewiston, Idaho

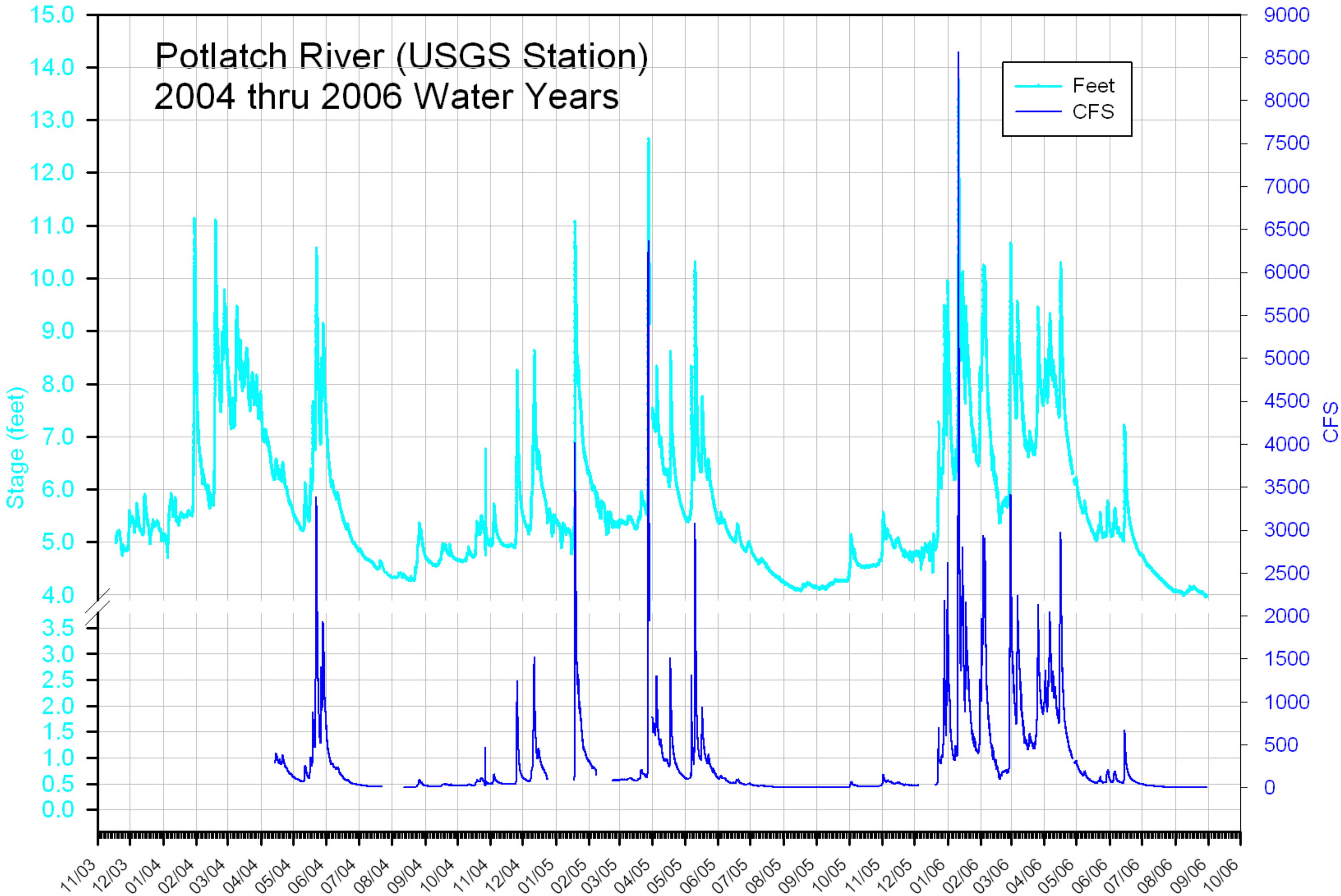


POTLATCH RIVER WATERSHED MANAGEMENT PLAN

APPENDIX C

Potlatch River Watershed Stage Recordings (United States Geological Survey)

Figure C-1. Potlatch River Watershed Stage Recording (recorded at USGS station near the mouth)



POTLATCH RIVER WATERSHED MANAGEMENT PLAN

APPENDIX D

Potlatch Basin Forestry Committee

Potlatch Basin Forestry Committee

A Potlatch Basin Forestry Committee was formed in 1997 and utilized a working knowledge approach (Gariglio and Hotinger), along with the actual and potential occurrence of fish populations, to derive treatment units, treatment recommendations, and treatment priority recommendations for projects on forest lands within the Potlatch River watershed. The committee included representatives from NRCS, IDL, NPT Fisheries Department, Northwest Management Inc., Potlatch Corporation, USFS and USFS Intermountain Research Station, IDEQ, and University of Idaho College of Forestry and Range Sciences.

Two treatment units were devised for forested lands throughout the watershed. The treatment units were categorized by soil type and landform.

> Forested Lands Treatment Unit 1. These areas have a low priority for fisheries habitat restoration.
>
> Forested Lands Treatment Unit 2. These areas have a moderate priority for fisheries habitat.

Table C-1. Soils Associated with Forest Land Treatment Units (Latah County Soil Survey Map Unit and Description)

Soil Map Unit	Soil Type and Description
Treatment Unit 1	
25	Latah 0-3%
26	Latahco 0-3%
28	Latahco-Thatuna 0-5%
2	Aquic Xerofluvents
7	Crumerine 0-3%
27	Latahco-Lovell 0-3%
38	Porrett 0-3%
29	Lovell 0-3%
Treatment Unit 2	
23	Larkin 3-12%
35	Palouse 3-7%
44	Southwick 3-12%
53	Thatuna 3-7%
15	Joel 3-7%
50	Taney 3-7%
39	Santa 2-5%

APPENDIX E

General Restoration Practices and Protection Efforts

The Implementation Plan in Chapter 7 includes two strategies—restoration and protection. Restoration strategies are defined per subwatershed within the Potlatch River watershed, and protection strategies are applicable to the entire watershed.

General Restoration Practices

Riparian/Floodplain/Wetland Restoration Best Management Practices (BMPs)

- Riparian/Wetland Restoration – These practices are designed to revegetate streamside areas to aid in erosion and sediment control, and provide shading. Revegetation efforts will focus on the use of native stock whenever feasible and emphasize the control of invasive species. Restoration practices may include:
  - Tree and shrub plantings
  - Herbaceous plantings

- Floodplain Restoration – These practices are designed to reconnect the floodplain to the stream and reestablish the functions provided by the floodplain. Restoration practices may include:
  - Riverine wetland construction
  - Reestablishing stream sinuosity

- Instream Habitat Restoration – These practices are designed to stabilize streambanks from unnatural accelerated erosion. Habitat restoration may also include increasing habitat complexity. Instream habitat restoration practices may include:

  - Pool development
  - Large woody debris development
  - Erosion control including streambank stabilization
  - Streambed stabilization

Agricultural/Rangeland/Pastureland BMPs

Agricultural/Rangeland/Pastureland BMPs are designed to minimize erosion from active agricultural fields, decrease nutrient and pesticide runoff, increase riparian vegetation, reduce invasive weeds, and increase overland flow infiltration. BMPs may include:

- Direct seeding
- Erosion and sedimentation control structures
- Filter and buffer strips
- Conservation cover (grass, herbaceous, tree and shrub planting)

Livestock BMPs

Livestock BMPs are designed to minimize damage to riparian areas and water quality through the minimization of livestock's direct access to riparian areas and the stream, and minimize surface runoff from concentrated feeding operations. Livestock BMPs may include:

- Exclusion fencing

- Grazing management plans and ancillary practices
  - Perimeter fencing
  - Mineral lick placement away from streamside
  - Hardened crossings
  - Off-site water development
- Nutrient management systems

Forestry BMPs

Forestry BMPs are designed to minimize damage to riparian areas and water quality, and increase overland flow infiltration. Forestry BMPs may include:

- Forest road stabilization
  - Road grass seeding
  - Road rocking
- Forest road abandonment
- Forest road culvert replacement to meet fish passage state guidelines
- Forest road bridge and bottomless arch stream crossings
- Riparian conifer tree planting
- Upland seral species conifer tree planting
- Forest thinning

Roadway BMPs

Roadway BMPs are designed to minimize damage to riparian areas and water quality caused by roadways and railways. In addition, roadway BMPs would include practices designed to minimize migration barriers and increase stream connectivity. Roadway BMPs may include:

- Erosion control
  - Road surfacing with rock
  - Proper culvert placement to minimize road erosion
- Proper culvert installation (with specific attention to inlet and outlet position)
- Culvert replacement
  - Resizing culverts to accommodate high and low flows
  - Fish friendly culvert installation
  - Replacing culverts with bridges

Other BMPs

Other BMPs – This general category captures specific restoration practices that do not fit into the previously defined categories, including:

- Artificial water storage
  - Surface water storage and release structures for low flow augmentation
  - Spring development and impoundments for low flow augmentation
  - Water storage to moderate peak discharge
- Investigation, research, assessments, surveys and evaluation

Protection Efforts

Environmental threats are addressed in the implementation plan's restoration strategies and their corresponding management efforts (Chapter 7). These threats include hydrograph instability, erosion and sediment delivery, high water temperature, and migration barriers.

Shown below is a brief description of the identified management efforts and the rationale that ties the efforts to their ability to address environmental threats. Protection efforts, displayed in Chapter 7, are shown in alphabetical order and include:

- Continue to control noxious and invasive weeds
- Continue to implement direct seeding on annually cropped lands
- Follow proper culvert installation guidelines
- Maintain forest health
- Maintain proper grazing management plans
- Maintain riparian health
- Minimize road density
- Practice proper timber harvest techniques

Continue to control noxious and invasive weeds is an effort to deter aggressive, non-native plants. Riparian and wetland areas are vital components of a healthy ecosystem and should be protected from invasion by noxious weeds. Invasive weed species can be extremely competitive in a riparian setting and can crowd out valuable native species, forming a solid stand of weeds. Weeds often do not stabilize soils as well as desirable riparian vegetation, leading to soil erosion in the riparian area and loss of the stream channel. Management techniques include a selection of control methods to prevent new weed introductions, detection and eradication of existing infestations, the proper management of livestock, and revegetation.

Noxious weeds also pose a threat to the upland native plant communities and wildlife species that depend on them. These noxious weed plant species can increase fire hazards, replace valuable forage with non-palatable or less nutritious forage, cause economic losses to adjacent farming and ranch communities, decrease the quality of recreational activities, and reduce the diversity of native plant and animal communities.

Continue to implement direct seeding on annually cropped lands is an protection effort that includes the use of management systems during seeding and harvest of annually cropped agricultural fields. Direct seeding encourages maximization of crop residues by limiting soil disturbing activities. Direct seeding is often referred to as no-till seeding, conservation tillage, and mulch tillage for example. The maximization of crop residues on the soil surface reduces erosion and subsequent sediment delivery to nearby streams. The practice also encourages and promotes water infiltration; enhancing the soil's ability to retain precipitation in the agricultural uplands longer into the growing season. This moisture retention directly increases the crop's moisture availability and indirectly affects the rate of runoff within the watershed.

Follow proper culvert installation guidelines is an important effort to provide fish passage and stream connectivity within the watershed. Improper culvert placement can create barriers that block the use of the upper watersheds. Temporal barriers block migration some of the time and result in loss of production by the delay they cause. Partial barriers can block smaller or weaker fish. Fish passage can be ensured by proper culvert installations with attention paid to eliminating excessive drops at culvert outlet, discouraging high velocity within culvert, providing proper culvert size to provide adequate flow depth and eliminating excess turbulence within the culvert, and discouraging debris accumulation at the culvert inlet.

Maintain forest health is an important protection effort within the watershed. Forest health may be defined as a condition wherein a forest has the capacity across the landscape for renewal, recovery from a wide range of disturbances, and retention of its ecological resiliency while meeting current and future needs of people for desired levels of values, uses, products, and services.[a] Maintaining forest health includes the science of silviculture, which is the agriculture of trees—how to grow them, how to maximize growth and return, and how to influence tree species compositions to meet landowner or environmental objectives. The Clearwater Subbasin Management Plan (Ecovista 2003) recommends a priority protection within the watershed should include ponderosa pine inventory and protection.

Maintain proper grazing management plans includes controlling cattle grazing in riparian areas that may result in negative riparian and water quality outcomes such as excessive nutrient bacteria contributions, erosion and sedimentation, streambank degradation, and vegetation alteration. Appropriate grazing management can involve controlling the timing, frequency, and intensity of cattle use. Riparian grazing plans should be site-specific and may include the following options: determine the critical periods (e.g. late spring-early summer or late summer-early fall) of a riparian site and limit grazing during the critical periods; incorporated periods of extended rest or deferment from grazing; limit cattle access to surface water when adjacent streambanks and shorelines are overly wet and susceptible to trampling and sloughing; control the timing, frequency, and intensity of cattle grazing; protect streambanks by preventing cattle from congregating near surface waters using fencing, alternative water sources, supplemental feeding, and herding; and incorporate vegetation buffer strips along stream sides. [b]

Maintain riparian health is a protection effort that includes protecting the transition zones between water and upland areas. Healthy riparian areas are able to support unique plant communities often made up of shrubs, trees, grasses, sedges, rushes, and forbs, which provide streamside protection, shading, and habitat. A healthy riparian area is one that performs the essential functions of filtration and sediment trapping, ground water recharge, biomass production and energy dissipation. Maintaining a healthy riparian area may include practices such as minimizing grazing and timber harvest activities, controlling noxious weeds, and instream structures that protect streambank degradation.

Minimize road density is an important watershed protection effort because road failures can contribute both fine and coarse sediment to streams. Roads adjacent to streams with in areas with steep gradients and steep road grades are some of the largest contributors of sediment. Accumulated road failures in large storm events can have catastrophic effects, such as filling in

[a] USDA Forest Service, Forest Health Protection. Definition accessed at internet site: http://www.fs.fed.us/foresthealth/

[b] Taken from guidelines for Managing Cattle Grazing in Riparian Areas to Protect Water Quality: Review of Research and Best Management Practices Policy by J. Mosley, P. Cook, A. Griffis, and J. O'Laughlin, accessed at internet site: http://www.uidaho.edu/cfwr/pag/pag15es.html

pools and reducing habitat complexity.[c] Surface erosion from roads can produce chronic sources of fine sediment which can diminish salmon and steelhead spawning success. Minimizing road density can include careful planning and road construction practices and road decommissioning.

Practice proper timber harvest techniques include the protection efforts of implementing best management practices during timber harvest and stand maintenance that protect riparian areas and water quality. These techniques include a lengthy list of BMPs outlined in the Idaho Forest Practices Act[d] Forest Stewardship Guidelines for Water Quality.[e] Examples of practices used in proper timber harvest techniques include: minimizing stream crossings and careful location of stream crossings; streambank protection methods such as avoiding cutting trees and destroying understory in the riparian areas; and proper design, location, and maintenance of access roads, skid trails and landings to protect the site from erosion.

---

[c] Klamath Resource Information System, Watershed Conditions: Roads and Erosion Report accessed at internet site: http://www.krisweb.com/watershd/roads.htm

[d] The Forest Practices Act was passed by the 1974 Idaho Legislature to assure the continuous growing and harvesting of forest trees and to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat. The Act requires forest practices rules for state and private lands to protect, maintain, and enhance our natural resources. Federal land practices must meet or exceed the requirements of the state rules.

[e] Idaho Department of Lands Forest Practices Act Forest Stewardship Guidelines for Water Quality accessed at internet site: http://www.idahoforests.org/bmps.htm

POTLATCH RIVER WATERSHED MANAGEMENT PLAN

APPENDIX F

Restoration Strategy Prioritization

Big Bear Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon	Restore Riparian/Floodplain Areas		3				2					1		3					0		9	M	Opportunities to do instream work exist, including streambed stabilization and boulder placement. Limited technical assistance for planning and engineering.
	Restore Meadow/Wetland Systems				0				0				0				0			0	0	No ranking applied	Wet meadows not found in canyon lands.
	Restore Upland Ecosystem Functions			1			2				2					1			0		6	L	
	Eliminate Migration Barriers	5					2					1			2			1			11	H	Migration barrier is natural, removal or modification will require evaluation to determine practicality or appropriateness.
	Develop Artificial Water Retention Facilities				0				0				0				0			0	0	No ranking applied	Artificial water retention facilities not recommended in canyon lands.
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands	Restore Riparian/Floodplain Areas	5				3				3				3				1			15	H	
	Restore Meadow/Wetland Systems	5						1		3				3				1			13	H	
	Restore Upland Ecosystem Functions	5				3				3				3				1			15	H	
	Eliminate Migration Barriers			1			2					1				1		1			6	L	Low ranking unless the lower canyon land barrier is addressed; investigate potential barriers e.g. culverts.
	Develop Artificial Water Retention Facilities		3				2					1				1		1			8	L	Some discussion as to the benefit of retention facilities; whether facilities would address peak flow regulation.
	Other				0				0				0				0		0		0	No ranking applied	
Forest	Restore Riparian/Floodplain Areas			1			2				2				2			1			8	L	Low support to put restoration efforts in to the forest system for this watershed.
	Restore Meadow/Wetland Systems		3				2				2				2			1			10	M	
	Restore Upland Ecosystem Functions			1			2				2				2			1			8	L	
	Eliminate Migration Barriers			1			2					1				1		1			6	L	Low ranking unless the lower canyon land barrier is addressed; investigate potential barriers and their removal, e.g. culverts.
	Develop Artificial Water Retention Facilities			1			2					1				1		1			6	L	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Little Bear Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon	Restore Riparian/Floodplain Areas		3			3						1		3					0		10	M	
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	Wet meadows not found in canyon lands.
	Restore Upland Ecosystem Functions			1			2				2					1			0		6	L	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0			0	0	No ranking applied	Artificial water retention facilities not recommended in canyon lands.
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands	Restore Riparian/Floodplain Areas	5				3				3				3					0		14	M	Landowner interest in riparian restoration projects, although existing conditions include relatively intact riparian areas, and therefore projects may be limited.
	Restore Meadow/Wetland Systems	5				3				3				3					0		14	M	Landowner interest in meadow restoration projects, although existing conditions include relatively intact areas, and therefore projects may be limited.
	Restore Upland Ecosystem Functions	5					2			3				3					0		13	M	Landowner interest unknown, therefore projects may be limited.
	Eliminate Migration Barriers			1		3						1				1		1			7	L	Migration barrier located on West Fork Little Bear; barrier removal would increase potential steelhead habitat; may investigate potential barriers and their removal, e.g. culverts.
	Develop Artificial Water Retention Facilities		3				2					1				1			0		7	L	
	Other				0				0				0				0		0		0	No ranking applied	
Forest	Restore Riparian/Floodplain Areas			1		3					2				2				0		8	M	Some forest land owned by University of Idaho, not commercially harvested. Other forest lands private ownership. Riparian areas in forest lands mostly intact.
	Restore Meadow/Wetland Systems			1			2				2				2			1			8	M	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	
	Eliminate Migration Barriers		3				2					1				1		1			8	H	Migration barrier located on West Fork Little Bear; barrier removal would increase potential steelhead habitat.
	Develop Artificial Water Retention Facilities			1			2					1				1			0		5	L	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Boulder Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas		3				2						0		2				0		7	M	Grazing in canyon, practices could include fencing to enhance riparian restoration.
	Restore Meadow/Wetland Systems				0		2						0		2				0		4	L	
	Restore Upland Ecosystem Functions			1			2						0		2				0		5	L	
	Eliminate Migration Barriers		3				2						0		2				0		7	M	Modifications to natural barrier (falls) could be evaluated for restoration, habitat above the falls is relatively good.
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas		3				2						0		2				0		7	L	Habitat above the natural barrier in the canyon inaccessible, minimizing the need for restoration efforts.
	Restore Meadow/Wetland Systems		3				2						0		2				0		7	L	Agricultural lands consist of grazing and some hayland.
	Restore Upland Ecosystem Functions			1			2						0		2				0		5	L	Agricultural lands consist of grazing and some hayland.
	Eliminate Migration Barriers			1			2						0		2				0		5	L	Investigate potential barriers and removal, e.g. culverts if barrier in lower canyon land is addressed.
	Develop Artificial Water Retention Facilities				0		2						0		2				0		4	L	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas		3				2						0		2				0		7	L	Habitat above the natural barrier in the canyon inaccessible, minimizing the need for restoration efforts.
	Restore Meadow/Wetland Systems		3				2						0		2				0		7	L	
	Restore Upland Ecosystem Functions			1			2						0		2				0		5	L	
	Eliminate Migration Barriers			1			2						0		2				0		5	L	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Cedar Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	L	Meadows in relatively good shape, low priority for restoration.
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	Stabilization of canyon walls would reduce sediments in the stream.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	
	Restore Meadow/Wetland Systems	5					2				2				2				0		11	H	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	
	Eliminate Migration Barriers			1			2				2				2				0		7	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities				0		2				2				2				0		6	L	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	L	
	Eliminate Migration Barriers			1			2				2				2				0		7	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities		3				2				2				2				0		9	M	Limiting factors include stream flow and high water temperature.
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Corral Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas		3			3					2				2				0		10	M	
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas	5				3					2				2				0		12	L	Very little agricultural uplands, predominantly grazing in forest lands and canyons.
	Restore Meadow/Wetland Systems	5				3					2				2				0		12	L	Very little agricultural uplands, predominantly grazing in forest lands and canyons.
	Restore Upland Ecosystem Functions		3			3					2				2				0		10	L	Very little agricultural uplands, predominantly grazing in forest lands and canyons.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities		3				2				2				2				0		9	L	Very little agricultural uplands, predominantly grazing in forest lands and canyons.
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas	5				3					2				2				0		12	H	Barrier removal would allow steelhead access to areas above railroad grade, riparian areas have impacts from grazing.
	Restore Meadow/Wetland Systems	5									2				2				0		9	H	Barrier removal would allow steelhead access to meadows above railroad grade.
	Restore Upland Ecosystem Functions		3			3					2				2				0		10	H	
	Eliminate Migration Barriers	5					2				2				2				0		11	H	Process initiated to eliminate migration barrier at railroad grade near Helmer.
	Develop Artificial Water Retention Facilities			1			2				2				2				0		7	L	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

East Fork Potlatch River Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	L	Mostly forest lands in watershed, riparian restoration would reduce sediment loads and produce large woody debris.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	L	Mostly forest lands in watershed, riparian restoration would reduce sediment loads and produce large woody debris.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	L	Very little agricultural uplands, predominantly grazing in forest lands.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	L	Very little agricultural uplands, predominantly grazing in forest lands.
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	L	Very little agricultural uplands, predominantly grazing in forest lands.
	Eliminate Migration Barriers			1			2				2				2				0		7	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities				0		2				2				2				0		6	L	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas	5					2				2				2				0		11	H	Mostly forest lands in watershed, riparian restoration would help produce future large woody debris.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	L	
	Eliminate Migration Barriers			1			2				2				2				0		7	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities				0		2				2				2				0		6	L	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Little Potlatch Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	
	Eliminate Migration Barriers		3			3							0				0		0		6	M	Natural rock slide may be a migration barrier; investigate fish passage and possible remediation.
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas			1		3							0				0		0		4	L	Some landowner interest in riparian plantings, use exclusion, off site watering, and stream crossings.
	Restore Meadow/Wetland Systems			1		3							0				0		0		4	L	
	Restore Upland Ecosystem Functions			1			2						0				0		0		3	L	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Watershed consists mainly of agricultural uplands.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Middle Potlatch Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	
	Eliminate Migration Barriers		3				2						0				0		0		5	M	Natural barrier is a steelhead migration barrier; investigate fish passage and possible remediation.
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas			1			2						0				0		0		3	L	Natural barrier in canyon would need investigated and passage restored before restoration in agricultural areas would yield steelhead production response.
	Restore Meadow/Wetland Systems			1			2						0				0		0		3	L	
	Restore Upland Ecosystem Functions			1			2						0				0		0		3	L	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas			1					0				0				0		0		1	L	Watershed consists mainly of agricultural uplands.
	Restore Meadow/Wetland Systems			1					0				0				0		0		1	L	Watershed consists mainly of agricultural uplands.
	Restore Upland Ecosystem Functions			1					0				0				0		0		1	L	Watershed consists mainly of agricultural uplands.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Moose Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Very little canyon lands in the watershed, predominantly forest lands.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, predominantly grazing in forest lands.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	Riparian and instream habitat improvements will get the most response from steelhead.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	
	Eliminate Migration Barriers			1			2				2				2				0		7	L	Moose Creek Reservoir is a migration barrier. Investigate potentials for barrier remediation.
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Pine Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	Riparian area already in fair condition; steelhead response to restoration activities may be weak.
	Restore Meadow/Wetland Systems			1			2				2				2				0		7	L	A limited amount of meadow/wetland area; steelhead response to restoration activities may be weak.
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	L	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas	5					2				2				2				0		11	M	A relatively small amount of forest lands exist in the watershed.
	Restore Meadow/Wetland Systems	5					2				2				2				0		11	M	
	Restore Upland Ecosystem Functions	5					2				2				2				0		11	M	
	Eliminate Migration Barriers			1				1				1				1			0		4	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas			1			2				2				2				0		7	L	
	Restore Meadow/Wetland Systems			1			2				2				2				0		7	L	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	Limiting factors are low stream flows and high water temperatures.
	Eliminate Migration Barriers			1				1				1				1			0		4	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities		3				2				2				2				0		9	M	Limiting factors are low stream flows and high water temperatures.
	Other								0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Ruby Creek Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Mostly forest lands in watershed.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	Mostly forest lands in watershed.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, predominantly grazing in forest lands.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, predominantly grazing in forest lands.
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, predominantly grazing in forest lands.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas	5					2				2				2				0		11	H	Mostly forest lands in watershed, riparian restoration would help produce future large woody debris.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	L	Few meadow areas identified.
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	L	
	Eliminate Migration Barriers			1				1				1				1			0		4	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

West Fork Potlatch River Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Mostly forest lands in watershed.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	Mostly forest lands in watershed.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, some grazing in forest lands.
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, some grazing in forest lands.
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	Very little agricultural uplands, some grazing in forest lands.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas	5					2				2				2				0		11	H	Large woody debris production would provide greatest habitat needs for steelhead.
	Restore Meadow/Wetland Systems	5					2				2				2				0		11	H	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	H	Large woody debris production would provide greatest habitat needs for steelhead.
	Eliminate Migration Barriers			1			2				2				2				0		7	L	Investigate existence of potential migration barriers and their removal; e.g. culverts.
	Develop Artificial Water Retention Facilities				0				0				0				0			0	0	No ranking applied	
	Other				0				0				0				0			0	0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Upper Mainstem Potlatch River Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	Important canyon area for steelhead production.
	Restore Meadow/Wetland Systems			1			2				2				2				0		7	M	
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands																							
	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	M	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest																							
	Restore Riparian/Floodplain Areas	5					2				2				2				0		11	H	Limiting factors are high water temperatures and instream habitat.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	Limiting factors are high water temperatures and instream habitat.
	Restore Upland Ecosystem Functions		3				2				2				2				0		9	M	Limiting factors are high water temperatures and instream habitat.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.

Lower Mainstem Potlatch River Restoration Strategy Prioritization

Land Type	Restoration Strategies	Steelhead Production Response Potential				Landowner/Operator Potential Interest				Potential to Utilize Existing Conservation Agency Resources				Potential to Obtain Additional Technical and/or Financial Resources				Probability of Future Land Uses Supporting Completed Restoration Activities			Restoration Strategy Ranking		
		Strong (5 points)	Moderate (3 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Strong (3 points)	Moderate (2 points)	Weak (1 point)	NA (0 points)	Supportive (1 point)	Unknown (0 point)	Inconsistent (minus 1 point)	Sheet Score (Total Points)	Ranking (High, Medium or Low)	Comments
Canyon	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	Limiting factors include high water temperatures and poor water quality.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	Limiting factors include high water temperatures and poor water quality.
	Restore Upland Ecosystem Functions	5					2				2				2				0		11	H	Anthropogenic activities (dredging) degraded stream and water quality. Limiting factors include high water temperatures and poor water quality.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Agricultural Uplands	Restore Riparian/Floodplain Areas		3				2				2				2				0		9	M	Limiting factors include high water temperatures and poor water quality.
	Restore Meadow/Wetland Systems		3				2				2				2				0		9	M	Limiting factors include high water temperatures and poor water quality.
	Restore Upland Ecosystem Functions			1			2				2				2				0		7	L	Limiting factors include high water temperatures and poor water quality.
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	
Forest	Restore Riparian/Floodplain Areas				0				0				0				0		0		0	No ranking applied	
	Restore Meadow/Wetland Systems				0				0				0				0		0		0	No ranking applied	
	Restore Upland Ecosystem Functions				0				0				0				0		0		0	No ranking applied	
	Eliminate Migration Barriers				0				0				0				0		0		0	No ranking applied	
	Develop Artificial Water Retention Facilities				0				0				0				0		0		0	No ranking applied	
	Other				0				0				0				0		0		0	No ranking applied	

Strong - A strong potential represents a high probability of success with additional technical and/or financial resources. A strong potential also indicates a strong willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Moderate - A moderate potential represents a mid-range probability of success with additional technical and/or financial resources. A moderate potential also indicates a mid-range or unknown willingness by landowners, operators and/or agencies to address the identified restoration strategy.

Weak - A weak potential represents a known low probability of success even with significant inputs of additional technical and/or financial resources. A weak potential also indicates a known, or perceived, unwillingness by landowners, operators and/or agencies to address the identified restoration strategy.

NA - Not applicable.

No ranking applied - A potential ranking does not apply or is not recommended to the identified restoration strategy.