

Draft

Little White Salmon River Subbasin Summary

November 15, 2000

Prepared for the
Northwest Power Planning Council

Subbasin Team Leader

Dan Rawding

Washington Department of Fish and Wildlife

Little White Salmon River Subbasin Summary

Table of Contents

Fish and Wildlife Resources.....	1
Subbasin Description	1
Fish and Wildlife Status	3
Habitat Areas and Quality	12
Watershed Assessment.....	13
Limiting Factors	14
Artificial Production	14
Existing and Past Efforts.....	15
Subbasin Management	15
Goals, Objectives, and Strategies	15
Research, Monitoring, and Evaluation Activities.....	17
Fish and Wildlife Needs.....	17
Subbasin Recommendations	19
FY 2001 Projects Proposals Review.....	19
Projects and Budgets.....	19
Research, Monitoring and Evaluation Activities.....	21
Needed Future Actions.....	21
Actions by Others.....	22
Appendix 1 – Spring Chinook HGMP	
Appendix 2 – Fall Chinook HGMP	
Appendix 3 – Coho HGMP	

Little White Salmon River Subbasin Summary

Fish and Wildlife Resources

Subbasin Description

General Location

The Little White Salmon River originates in the Gifford Pinchot National Forest west of Monte Cristo Peak in south-central Washington and enters Drano Lake near Cook, Washington. Drano Lake, a backwater created by impoundment of the Columbia River, enters Bonneville Reservoir at River Mile (RM) 162 (Figure 1).

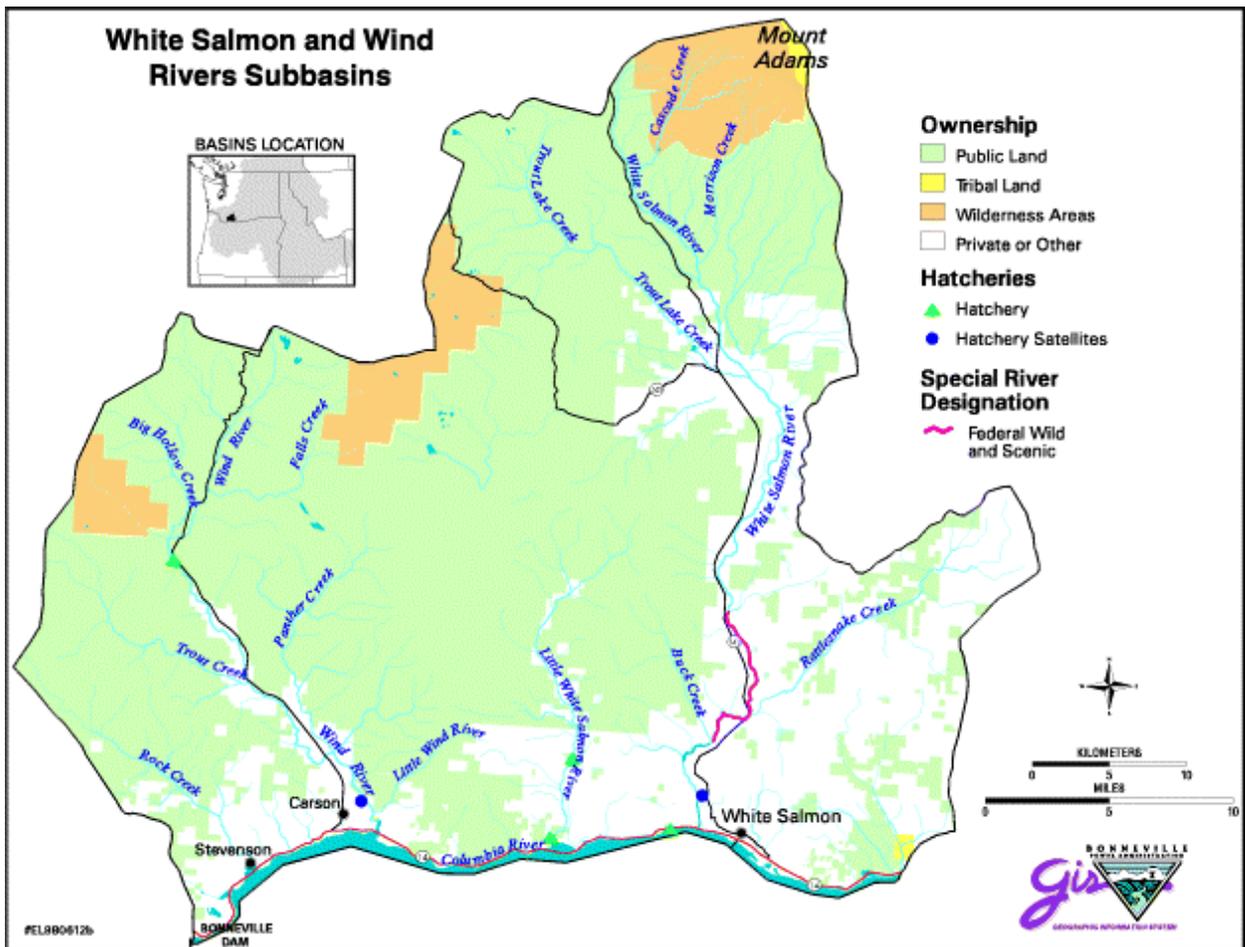


Figure 1. Location of the Wind River Subbasin in the Columbia Gorge Province

Drainage Area

The Little White Salmon River drains approximately 135 square miles of Skamania and Klickitat counties over a distance of approximately 19 miles. Principle tributaries to the Little White Salmon River include Lost (north and south), Beetle, Lusk, Homes, Berry, Cabbage, Moss, and Rock creeks.

Climate

Climatic patterns of the Little White Salmon subbasin are controlled by marine-influenced air masses from the Pacific Ocean and continental air masses from eastern Washington. Winters are usually wet and mild, while summers are warm and dry. Approximately 75% of the precipitation is delivered in the form of rainfall or snow between October and March. The mean annual precipitation is approximately 65 inches.

Topography/geomorphology

The basin is oriented northwest to southeast with elevations ranging from 80 feet to 5,300 feet. Topography varies within the watershed from gentle slopes formed by lava flows and volcanic cones to steep rugged landforms. Based on geomorphology the watershed can be split into one area containing tertiary deposits of tuff and pyroclastic flow (Monte Cristo Range) and another containing younger quaternary basalt/andesite flows originating from the Indian Heaven Area. The mainstem of the Little White Salmon River drops 3,520 feet in 19 miles for an average gradient of 3.5%. Anadromous fish passage is blocked by a series of waterfalls located 2 miles upstream from the rivers confluence with the Bonneville Reservoir.

Stream flows in the watershed range from summer low flows to peak flows in the winter. Some streams only flow during high flow events and are dry the remainder of the year (ephemeral streams). Others such as the mainstem increase from an average daily flow of less than 60 cubic feet per second (cfs) during August and September to peak flows, which exceed 2,000 cfs during the winter. The largest stream flows typically occur in response to rain-on-snow events, when heavy rains combine with high air temperatures and high winds to cause widespread snowmelt. Low flows are maintained by late season snowmelt and areas of water retention or recharge.

Geology and Soils

The geology of the Little White Salmon Watershed is dominated by past volcanic activity. Subbasin soils are the result of volcanism and glaciation. The older tertiary deposits form most of the mainstem and these deposits have a tendency to decompose into silts and clays. Soils are deep in alluvial deposits and shallow on side slopes. Landslides occur where the erosion potential of surface soil is high and soil fertility is low. Large past active deep seated slides have flowed from Augsburger Mountain toward the Little White Salmon River. The younger quaternary deposits have shallower soils and are more stable. An example of this is the Big Lava Bed flow covering 16,000 acres of the watershed.

Vegetation

Subbasin vegetation is generally comprised of mostly Douglas fir, western hemlock and grand fir. Unique habitats containing Oregon white oak and golden chinquapin are present within the watershed. There are 16,870 acres of early successional (seedling and sapling size up to 5 inches DBH); 24,840 acres of mid-successional (5-12 inches DBH), and 15,180 acres of late successional(stands greater than 880 years old and 21 inches DBH); and 14,160 acres of stands meeting the Region Six definition of old growth.

Major Land Uses

The Little White Salmon River subbasin is part of the Yakama Indian Nation lands ceded to the United States in the Treaty of June 9, 1855. Within this area the tribe reserves the right to hunt and fish at all usual and accustomed places in common with citizens of the territory. The upper portion of the basin and its tributaries are located within the legislated boundary of the Gifford Pinchot National Forest (GPNF) and federal ownership accounts for 68,660 acres (79%) of the watershed. The Washington State Department of Natural Resources (DNR) owns land in the middle basin, and extensive private ownership in the lower subbasin. Private ownership in the basin also extends along a narrow path on both sides of the mainstem Little White Salmon River into the headwaters, primarily in the valley bottoms. Most of the first six miles of mainstem river and its drainage are outside the GPNF, but a large portion of this area lies within the Columbia River Gorge National Scenic Area (CRGNSA). The President's Forest Plan (ROD) categorizes the Little White Salmon River Basin as a Tier 2, Key Watershed that provides habitat for salmonids.

The Little White Salmon River drainage was traditionally managed for timber production; however, under the Northwest Forest Plan, much of the drainage has been designated as riparian reserves, or reserved through other means. In addition to the GPNF and DNR, there is a limited amount of commercial timberland ownership in the lower valley. The land holdings within the CRGNSA are regulated by the CRGNSA's land use regulations as administered by Skamania County in addition to the Washington Forest Practices Act. Those outside the CRGNSA are regulated by the Washington State Forest Practices Regulations. Urban development has been concentrated in Willard, Washington, which is located five miles from the mouth of the river. Large-scale industrial activities are limited by lack of available land outside the National Forest and Scenic Area.

The river's proximity to the Portland/Vancouver area make it a popular recreation destination for cross country skiing, tubing, sledding, fishing, mineral prospecting, swimming, golfing, camping, hiking, picnicking, waterfall viewing, hunting, and berry picking.

Fish and Wildlife Status

Fish

Fish assemblages in the Little White Salmon River are divided into the area above and below the RM 2 falls. Species found downstream from the falls include spring and fall chinook, coho salmon, winter and summer steelhead, largescale and bridgelip suckers, pacific and brook lamprey, threespine stickleback, sculpins, white sturgeon, redbelt shiners, peamouth, and northern pikeminnow. Historically, pink and chum salmon likely used this area but are believed to be extirpated. Species found upstream of the falls included rainbow trout, sculpin, brook trout (non-endemic) and coho salmon (non-endemic). No anadromous fish except hatchery coho smolts, which are released from Willard National Fish Hatchery, are found above the falls at RM 2.

Steelhead (Threatened, Lower Columbia ESU, 3/98)

Natural spawning of summer and winter steelhead in the Little White Salmon River below the hatchery diversion (Figures 2 and 3). Size of historical spawning populations is not

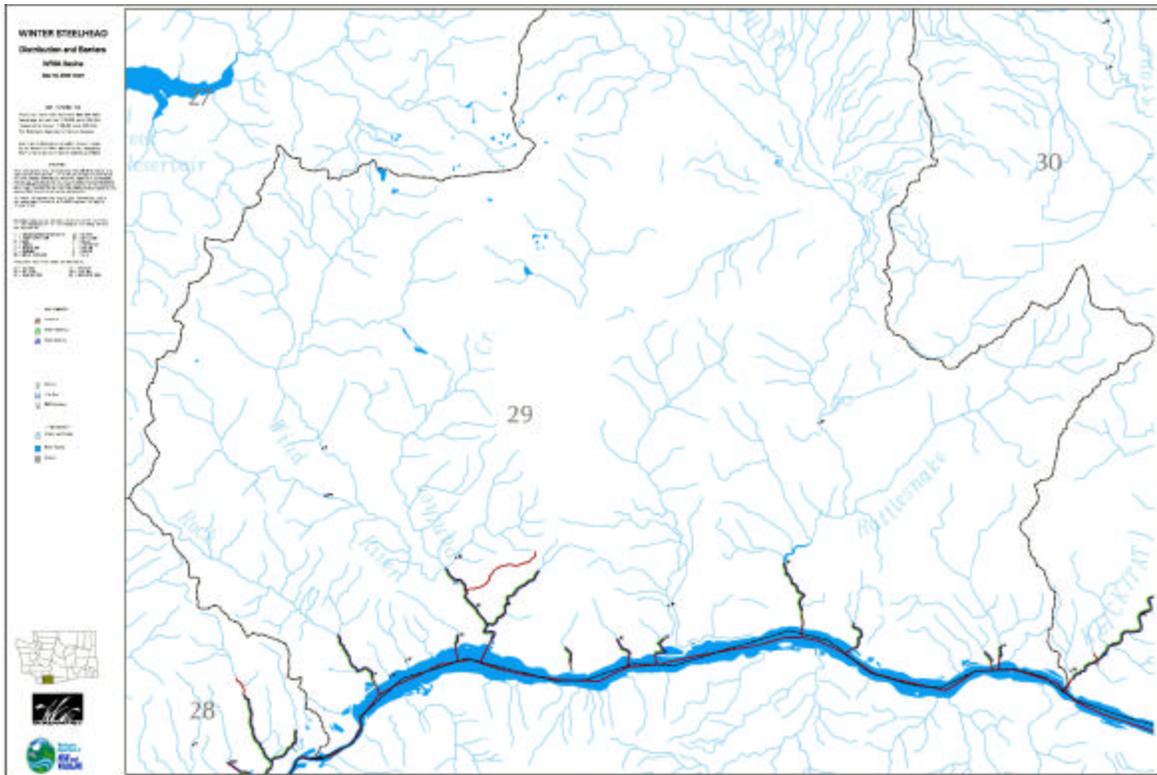


Figure 2. Distribution of winter steelhead in the Wind River Subbasin

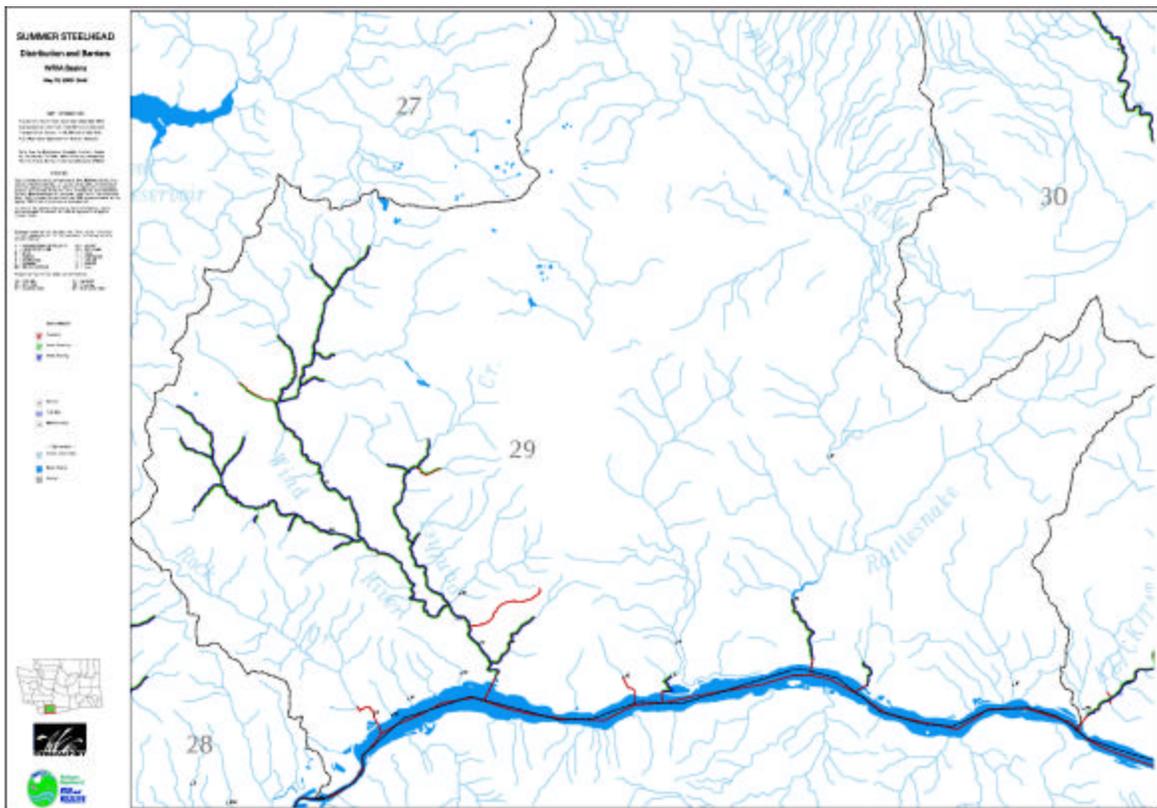


Figure 3. Distribution of summer steelhead in the Little White Salmon River Subbasin

well documented, but is believed to be low, since distribution was limited to only two miles of habitat.

Since 1998, Skamania stock summer steelhead have been released in the Little White Salmon River watershed. Due to the reduced ecological and genetic risks in the Little White Salmon River, Wind River releases were transferred to this site to provide local recreational and tribal fishing opportunities. All hatchery steelhead are adipose fin clipped and the river has been managed under catch-and-release sport fishing regulations for wild steelhead since 1986.

The Drano Lake area of the Little White Salmon River supports a tremendous steelhead fishery. As upriver summer steelhead migrate up the Columbia River, they seek refuge in the cooler waters of Drano Lake. These fish will hold in the cooler water for days or weeks before continuing their upstream migration. This area provides a thermal refuge for summer steelhead stocks migrating up the Columbia River.

Chinook salmon (Threatened, Lower Columbia ESU, 3/99)

Natural spawning of spring chinook in the Little White Salmon River did not occur until a hatchery was built on the Little White Salmon River. The WDFW believes the majority of naturally spawning fish are hatchery strays, and that this population is not self-sustaining. Currently, spring chinook salmon in the Little White Salmon River are managed for hatchery production.

Natural spawning of tule fall chinook in the Little White Salmon River occurs below the barrier (Figure 4). Completion of Bonneville Dam inundated the primary habitat in the lower Little White Salmon River and created Drano Lake. Natural production is

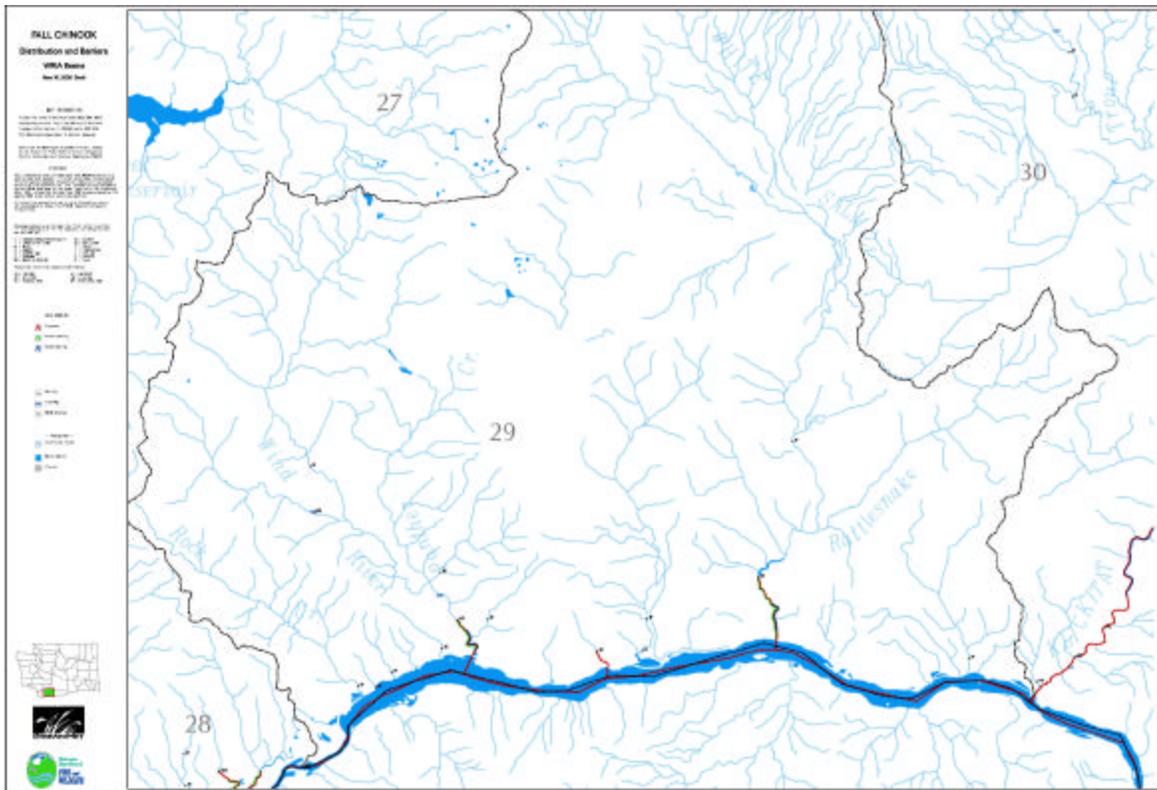


Figure 4. Distribution of fall chinook in the Wind River Subbasin

likely composed of hatchery strays. The abundance of the fall chinook salmon has been Enumerated since 1997 (Figure 5).

Bright fall chinook salmon originated from the Columbia River above McNary Dam. These fish have been reared at Bonneville and Little White Salmon hatcheries to mitigate for chinook salmon lost due to the construction and operation of mainstem Columbia River dams. Stray brights from these facilities have been observed in the Little White Salmon River and natural production of bright fall chinook occurs in the Little White Salmon River. Bright fall chinook salmon tend to spawn later than tule fall chinook (Figure 6) and the abundance of bright fall chinook salmon has been enumerated since 1997 in the Little White Salmon River.

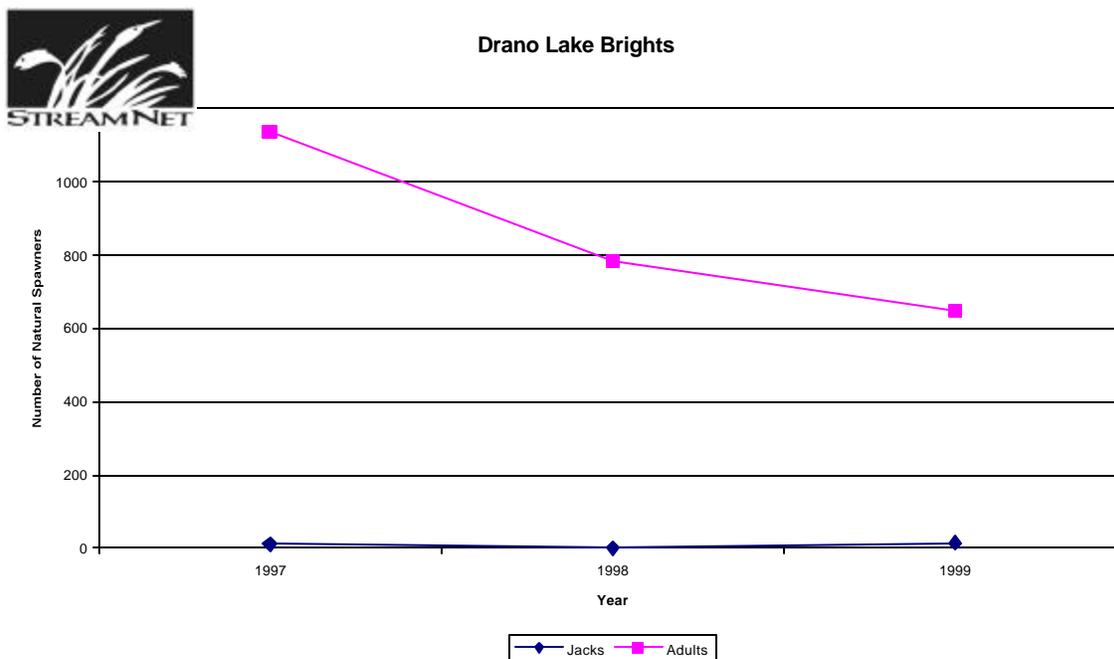


Figure 5. Bright Fall Chinook abundance estimates in the Little White Salmon River

Bull Trout (Threatened, 1998)

The status of bull trout in the Little White Salmon River is unknown. Bull trout have been observed in Drano Lake and managers believe these fish are part of an adfluvial population, which uses the Bonneville Pool. The WDFW has initiated a bull trout sampling project in the Columbia Gorge Province to more accurately determine the distribution of bull trout in the Little White Salmon River and other Washington tributaries. Until this project is completed, there is insufficient information to determine distribution, assess population status, or develop a recovery plan for these fish.

Coastal cutthroat trout (ESA candidate)

Because of the limited information and the lack of sampling that specifically targeted cutthroat trout, the status of coastal cutthroat trout in the watershed is unknown, but, if present, the population number appears to be very low, the distribution appears to be very limited, and the sea-run form may be extirpated.

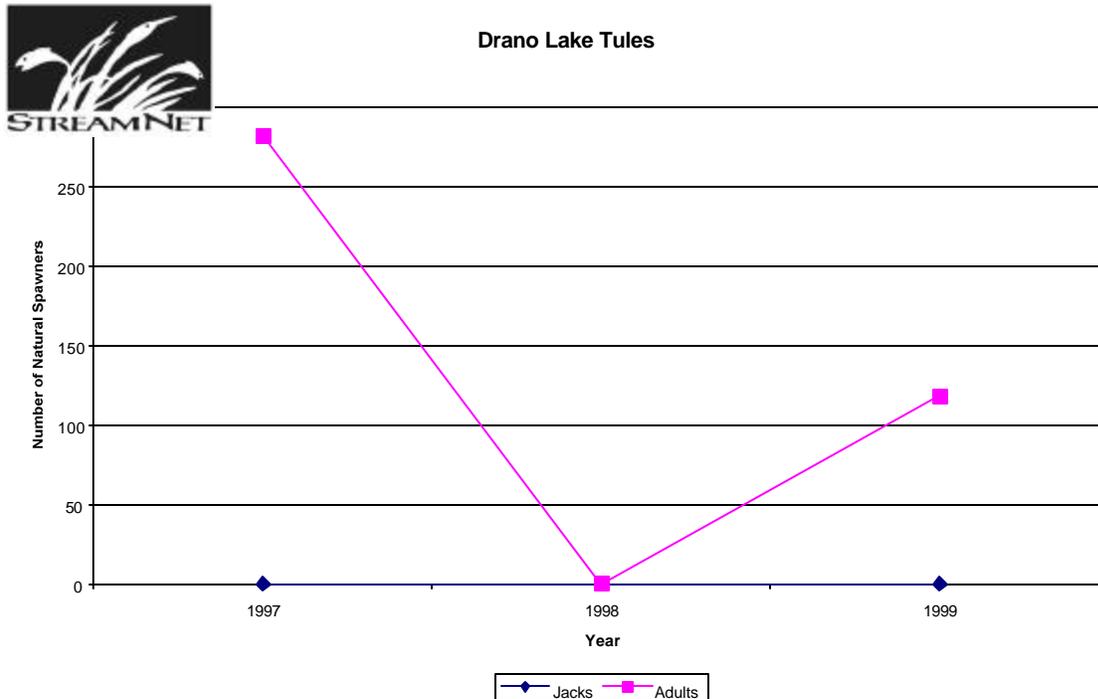


Figure 6. Tule Fall Chinook abundance in the Little White Salmon River, 1997-99

Coho (ESA candidate, Lower Columbia ESU, 7/95)

A small spawning population of coho persists in the Little White Salmon River. The WDFW believes that upstream adult coho distribution was limited to the area below RM 2 (Figure 7). Hatchery coho are released in the basin and hatchery strays are a likely source of any natural production.

Resident Rainbow

Resident rainbow trout are native to the Little White Salmon River drainage. Hatchery rainbow trout have also been stocked into this watershed. Initially, hatchery trout were stocked throughout the basin but most of the current stocking is confined to areas adjacent to camping sites in the middle section of the river. The purpose of this program is to provide recreational opportunities for local anglers. The status of the rainbow trout population is unknown.

Brook trout

Brook trout are non-indigenous to the Wind River watershed. Hatchery releases have been discontinued but naturally reproducing populations have been established within this watershed. The status of brook trout populations is unknown at this time.

Pacific Lamprey – YIN Species of Concern

Pacific lamprey were historically and are currently important to the Yakama Indian Nation. The status of this species is unknown.

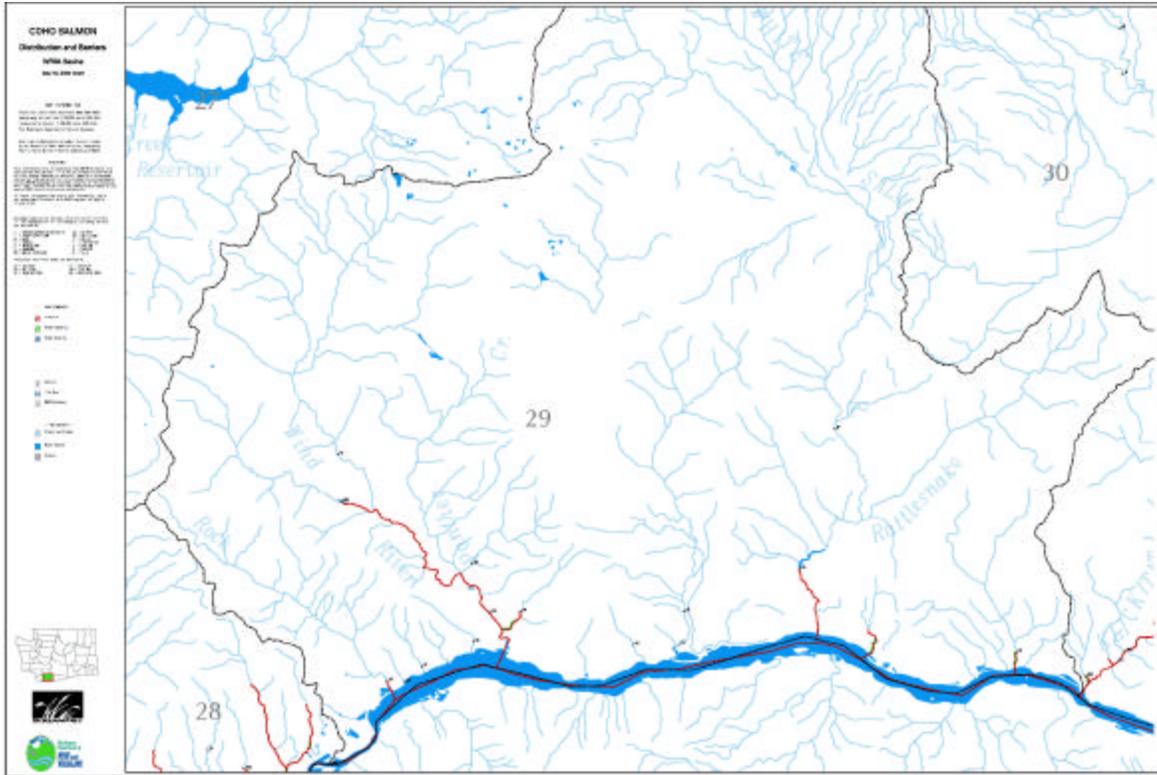


Figure 7. Coho distribution throughout the Wind River Subbasin

Wildlife

Black-tailed deer - (WDFW Priority Species)

Black-tailed deer inhabit most of western Washington and extend their range east of the Cascades in the Columbia River Gorge. Typically, black-tailed deer reside in finite home ranges in the lower elevation temperate forests. Along the Cascades there are specific migration patterns from winter and summer ranges. The Little White Salmon River is considered important black-tailed deer habitat and the majority of the upper drainage is in the Gifford Pinchot National Forest (Raedeke, K. 1989 draft report). The lower drainage is considered important deer winter range and specific habitat has been identified by the USFS. Timber harvest and conversion to residential land patterns threatens to reduce the carry capacity of the lower drainage to support wintering migratory deer.

Fisher (“Endangered” in Washington, 10/98; Federal “Species of Concern”)

The Little White Salmon River subbasin is part of the historical range of the fisher (Figure 8). Overtrapping, and loss and alteration of habitats are considered the most significant reasons for the decline of fishers in Washington. Although extensive surveys for fishes have been conducted throughout their historical range, no known population of fishers exists in Washington. The apparent absence of fishers in Washington represents a significant gap (i.e., lack of population continuity) in the species range from Canada to Oregon and California. Riparian habitats, especially those with large diameter snags, live trees and downed logs, are considered high quality habitats for fishers, especially for resting and reproduction. Loss and fragmentation of these habitats can limit the suitability

of a landscape for fishers. Oregon now has a resident population of fishers in the Cascades that could serve as a source population for Washington. However, the Bonneville Dam makes the Columbia River a more formidable barrier for fisher dispersal from Oregon to Washington.

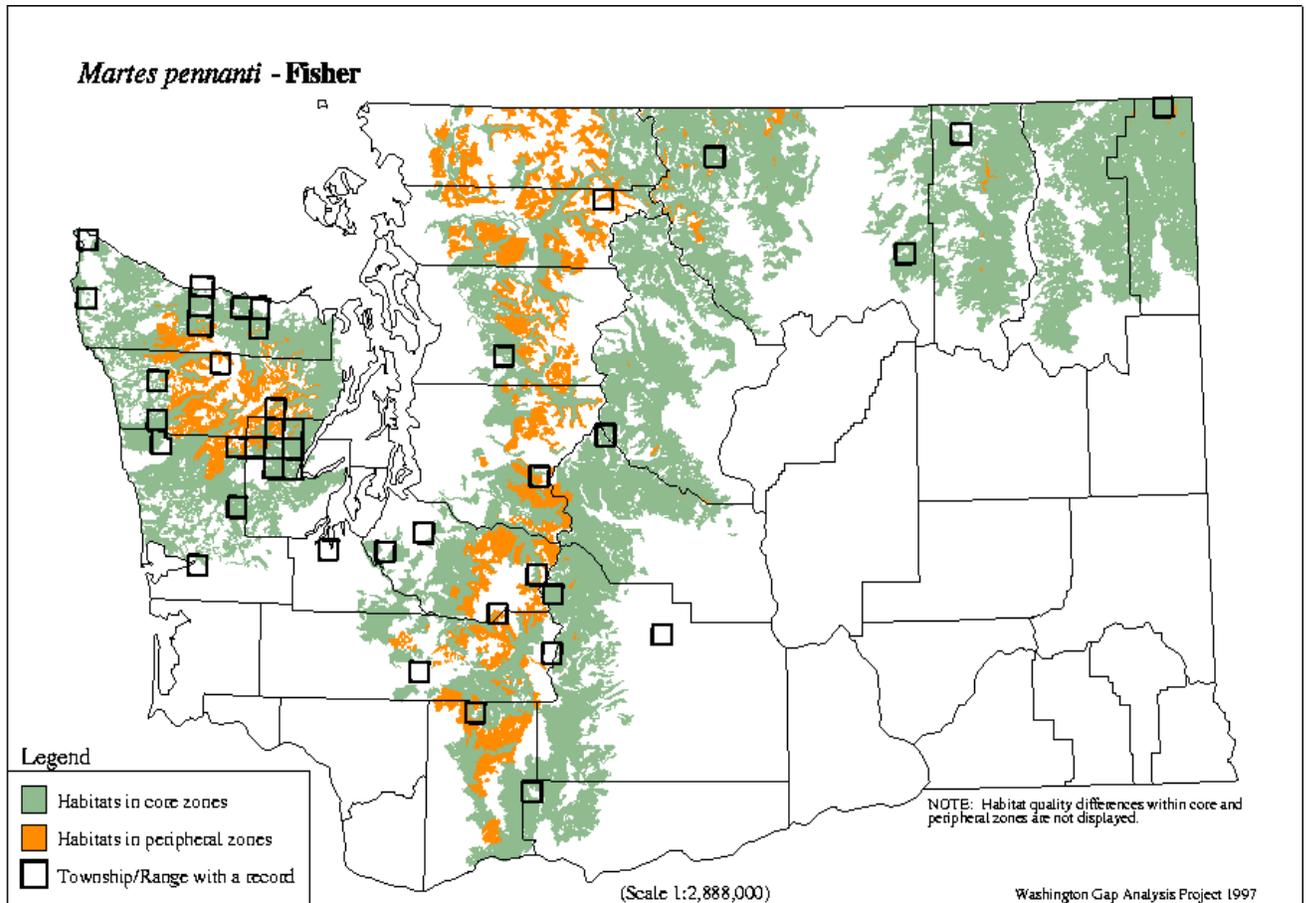


Figure 8. Potential distribution of the fisher in Washington

Larch Mountain Salamander (“Sensitive” in Washington, 1993)

The Larch Mountain Salamander has a restricted range, and is almost entirely endemic to a small area in Washington. Its known distribution includes west-side habitats of the southern Cascades region in Washington and the Columbia Gorge area of Oregon and Washington. This range includes the Little White Salmon River subbasin. The Larch Mountain salamander requires cool, moist environments in upland areas. Nearly all populations of these salamanders have been found on steep talus slopes in forested areas. They are also found in steep slopes in older forests, under woody debris on the forest floor or in detritus at the base of a snag. They are vulnerable to disturbances such as logging, rock extraction, and inundation that can alter these habitats and make them unsuitable. As the Larch Mountain salamander is patchily distributed in the landscape, disturbances at the local level may negatively impact the population as a whole.

Riparian Bird Guild

A great number of bird species are associated with or require riparian habitats in the Wind River subbasin. As a subset of this guild, the neotropical migrants (e.g., willow flycatcher, yellow warbler, yellow-breasted chat, red-eyed vireo, Vaux's swift) continually exhibit declining population trends in this region. Lewis's woodpeckers are closely associated with large cottonwood stands. Historically, they were common in cottonwood habitats of the Columbia River but declines were noted after 1965 and they are now considered extirpated from the Columbia River riparian habitat. The yellow-billed cuckoo is a riparian obligate species that was once common along the Columbia River but has not been reported in this area since 1977. Other species that are marsh obligates include the Virginia rail, sora rail, and marsh wren. Loss of riparian and riparian-marsh habitat for these birds resulted from the inundation and alteration of habitats in the Little White Salmon River subbasin and in the mainstem of the Columbia River.

Western pond turtle (WDFW endangered Species)

The western pond turtle is listed by Washington State as an endangered species. The western pond turtle is declining throughout most of its range and is highly vulnerable to extirpation in Washington. The species requires a continued recovery program to ensure its survival in the state until sources of excessive mortality can be reduced or eliminated.

The western pond turtle has been extirpated from most of its range in Washington. Two populations remain in the Columbia River Gorge (Figure 9). The total number of western pond turtles in known Washington populations is estimated at 250-350 individuals, approximately half of which went through the head-start program at the Woodland Park Zoo. Additional turtles may still occur in wetlands that have not been surveyed in western Washington and the Columbia Gorge. Currently, WDFW is working on Western Pond Turtle recovery in habitat near the mouth of the Klickitat River. The goal of the recovery program is to re-establish self-sustaining populations of western pond turtles in the Columbia Gorge region. The recovery objectives are to establish at least 5 populations of >200 pond turtles, composed of no more than 70% adults, which occupy habitat that is secure from development or major disturbance. It is also necessary that the populations show evidence of being sustained by natural recruitment of juveniles. The core pond turtle sites should be wetland complexes that may be less susceptible to catastrophes than sites of a single water body. The recovery objectives need to be met before the western pond turtle would be considered for downlisting to threatened. Objectives for

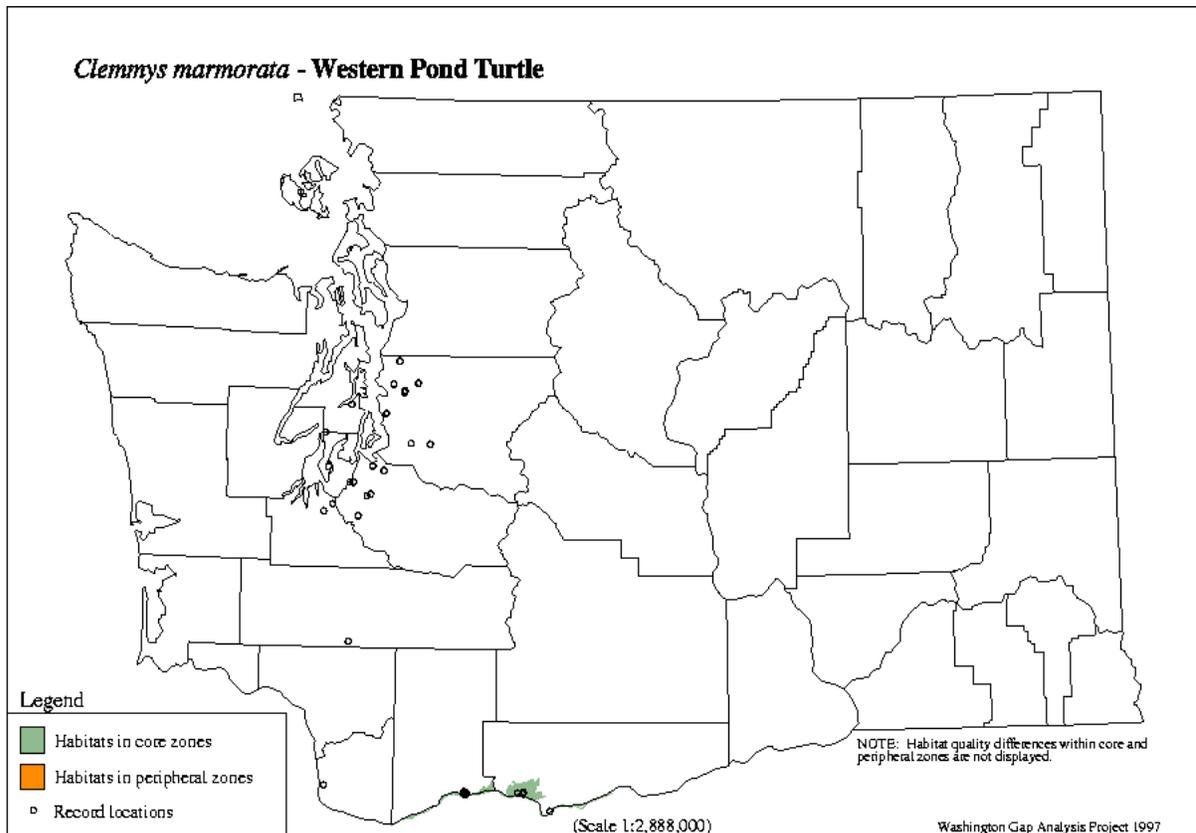


Figure 9. Distribution of Western Pond Turtle in Washington

downlisting to sensitive are similar, except 7 populations of >200 pond turtles will be needed.

Western Gray Squirrel (Threatened in Washington, 1993)

The western gray squirrel was listed as a state threatened species in Washington in 1993, when surveys indicated that the species' distribution was becoming increasingly patchy and disjunct. Small, isolated, populations remain in south Puget Sound, the Lake Chelan area, the southeast slope Cascade region, and the Columbia River Gorge, the latter being the largest in the state. The exact reasons for this decline are unknown; however, changes in the landscape likely play a key role. Many years of fire suppression and selective logging practices have altered Washington's oak-conifer communities and the habitat of the western gray squirrel. On mesic sites, invading Douglas-fir overtops the slow-growing, fire-adapted oak. In drier areas, drought and insects further stress overstocked forests. In some areas this has resulted in a wholesale loss of conifer, leading to intensive logging in remaining conifer stands. Dense pockets of conifer in oak woodlands, which frequently contain clusters of western gray squirrel nests, have been subjected to logging at an increasing rate in southwestern Washington.

The core population of the western gray squirrel is currently found in the lower Klickitat drainage from the southern Yakima Indian Nation boundary to the mouth of the Klickitat River. Western gray squirrels have been documented in the Little White Salmon drainage by the USFS. However, the existence of a population is still in question. Current

threats include loss of habitat from logging, residential development, and invasion of the eastern gray squirrel.

Habitat Areas and Quality

Current habitat conditions are a result of natural and stochastic events. In the Little White Salmon River these events include volcanic eruptions, earthquakes, fire, erosion/sedimentation, stream bank vegetation, large woody debris, and peak flow (USFS 1996). Human activities including riparian and upslope timber harvest, hydro and splash damming, water withdrawal, road building, and rural development have negatively affected fish and wildlife habitat.

Fish

The USFS classified stream channels in the Little White Salmon River based on the Rosgen classification system, which incorporates channel slope, meander width ratio, channel entrenchment, sinuosity, and width to depth ratio (Rosgen 1994). Channels were typed out as A, B, C, or E. Low gradient meandering stream channels (generally Rosgen C and E channels) contain substrate and water velocity that are preferred by salmonids for spawning and early rearing. In addition, coho and chinook salmon prefer these channels for rearing to the smolt stage. Rosgen A and B channels have moderate to low sinuosity, moderate to low width to depth ratio, moderate to high gradient and high to moderate entrenchment. "A" and "B" channels are dominant in this watershed and provide excellent rainbow trout rearing habitat and limited spawning habitat.

The Little White Salmon only supported about 2 miles of anadromous spawning and rearing habitat. Almost all of the anadromous habitat has been eliminated by the construction of Bonneville Dam and the inundation of this habitat. A barrier at the Little White Salmon Hatchery limits fish passage for the short distance between the hatchery barrier and the natural barrier. There is limited potential anadromous habitat above the natural barrier due to the steep gradient and other barrier falls located between the Little White Salmon Hatchery and the Willard Hatchery at RM 6.

Due to the diverse life history movements exhibited by salmonids in the basin, all habitat is important at specific life history stages. Human caused impacts to "B" channels are less than "C" channels because riparian areas of "B" channels are less accessible, the increased stream gradient flushes sediment more efficiently, and the boulder-bedrock substrate maintains channel stability and natural pool/riffle ratios in "B" channels. As a general rule, "C" channels in the Little White Salmon River are more degraded and have poorer habitat quality as compared to "B" and "C" channels have been and will remain the focus of most restoration activities. Blockages for resident fishes occur. The single largest loss of habitat occurred with the flooding of the lower Little White Salmon River after the construction of Bonneville Dam. The dam inundated the primary spawning area for fall chinook salmon and rendered the habitat unusable for this purpose.

The USFS manages 79% of the land within the Wind River subbasin. The President's Forest Plan (ROD) categorizes the Wind River Basin as a Tier 2, Key Watershed that provides habitat for salmonids. The quality of habitat in the Little White Salmon River subbasin will be largely be determined by federal management. Currently, habitat is considered fair to excellent depending on the location. Most habitat in the subbasin is degraded compared to historic conditions. Habitat problems noted in the subbasin plan are mainly related to timber harvesting practices and rural development. This

is evidenced by increased peak flows, increased sedimentation, lack of large woody debris, increased width-to-depth ratios, and lack of riparian vegetation (USFS 1995). Throughout the subbasin there continues to be a need to restore riparian vegetation, reduce sediment delivery to streams, enhance channel complexity, and ensure adequate recruitment of large woody debris into the system. The Washington Department of Ecology has designated stream segments of the Little White Salmon River subbasin as water quality impaired. The 303(d) list identifies segments that do not meet the standards of the federal Clean Water Act. This basin had pH below 6.5 on a number of occasions. The USFS believes this data may be suspect to equipment or operator error.

Wildlife

Riparian Habitat

The majority of terrestrial vertebrate species use riparian habitat for essential life activities and the density of wildlife in riparian areas is comparatively high. Forested riparian habitat has an abundance of snags and downed logs that are critical to many cavity birds, mammals, reptiles, and amphibians. This habitat is often characterized by relatively dense understory and overstory vegetation; cottonwood, alder, and willow are commonly dominant tree species in riparian areas. Riparian habitats are often forested, however they may contain important habitat subcomponents such as marshes and ponds that provide critical habitat for a number of species (e.g., Virginia rails, sora rails, marsh wren). Riparian habitats also function as travel corridors between and connectivity to essential habitats (e.g., breeding, feeding, season ranges). Inundation of the lower reaches of the subbasin resulted in the loss of riparian habitat but also the loss of connectivity provided by that habitat along the Little White Salmon River to the Columbia River, and along the Columbia River to other subbasins.

Watershed Assessment

State and federal agencies, and tribes have completed various watershed assessments. In 1990, the Columbia Basin System Planning Salmon and Steelhead Production Plan was developed to identify options and strategies for increasing steelhead and salmon production in the Columbia River basin (WDFW 1990). The Little White Salmon River subbasin plan was one of 31 developed under the Columbia Basin Fish and Wildlife Authority. This plan documented the existing and potential production for winter and summer steelhead, spring and fall chinook, and coho salmon, summarized current management goals and objectives, documented existing management efforts, identified problems and opportunities associated with increasing steelhead and salmon production, and presented preferred and alternative management strategies.

The USFS completed a federal watershed analysis for the Little White Salmon River in 1995 using the methods described in *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2* (USDA-FS et al. 1995). This process responds to the President's Northwest Forest Plan, which specifies watershed analysis as an integral component of its Aquatic Conservation Strategy. The standard six-step process includes: 1) Characterization of the watershed, 2) Identification of issues and key questions, 3) Definition of current conditions, 4) Definition of historic conditions, 5) Synthesis and interpretation of data, and 6) Recommendations. The watershed analysis is an interdisciplinary exercise, which incorporates the physical, biological, environmental, and social sciences. Resources covered in the analysis include: 1) Geological and physical

processes, 2) Vegetation, 3) Terrestrial wildlife, 4) Hydrology, 5) Stream channels, 6) Water quality, 7) Fisheries, and 8) Human uses.

In 1999, the Washington Conservation Commission completed a watershed assessment of salmon and steelhead habitat limiting factors in WRIA 29 (WCC 1999). Limiting factors for salmon production in this basin were inundation of spawning habitat and turbidity.

Limiting Factors

Fish

Stream surveys, sub-basin assessments, and watershed analysis were used to evaluate limiting factors in the Little White Salmon River. The watershed assessments indicated fish production is primarily limited by habitat and water quality. Past riparian timber harvest, stream clean-outs, road building, and regeneration harvest within the rain on snow zone all have contributed to a decline in fish production. Alluvial reaches within the mainstem and tributaries, have been significantly impacted. Many of the disturbed reaches have not recovered and in some cases are getting worse. Habitat problems noted in the subbasin plan are mainly related to timber harvesting practices. Throughout the subbasin, there continues to be a need to restore riparian vegetation to reduce water temperature and peak flows, reduce sediment delivery to streams, and ensure continuous recruitment of large woody debris. Since only 500 feet of anadromous habitat remains in the basin, restoration projects would provide most benefits to resident fish. The one exception is that actions, which maintain or reduce summer water temperatures would assist all upriver anadromous fish that pause in Drano Lake before continuing their upriver journey.

Wildlife

For most species, there is a lack of essential historical data to adequately evaluate the impacts of inundation due impoundment of the Columbia River. For the Larch Mountain Salamander, surveys are needed in areas where management may disturb potential habitats as well as surveys in the periphery of its known range to better define its distribution. For the fisher, it is unknown if there is adequate habitat in the southern Cascades to support a viable population should individuals successfully disperse from Oregon or if individuals are reintroduced from another population. In addition, information is lacking on how to effectively mitigate for the loss of riparian habitats and the connectivity they provide. Further information is needed to evaluate current loss of deer winter range from timber harvest and residential development.

Artificial Production

The Little White Salmon National Fish Hatchery (CNFH) has operated since 1898 and is funded as a Mitchell Act facility to mitigate for losses caused by the construction of Bonneville and other dams. Willard National Fish Hatchery is located at RM 6 and is operated as a satellite of the Little White Salmon Hatchery. Current production from these facilities includes 500,000 juvenile spring chinook, 1.7 million bright fall chinook juveniles released on station, 1.8 million bright fall chinook juvenile for acclimation in the Yakima River, and 2.8 million coho salmon smolts.

In 1997, the WDFW terminated the Wind River summer steelhead releases due to genetic and ecological risks to a severely declining wild summer steelhead population and moved them to the Little White Salmon in 1998. Releases of hatchery summer steelhead was initiated in 1998. Releases ranged from approximately 20,000 to 40,000 fish. The USFWS Hatchery and Genetic Management Plans for coho and upriver bright fall chinook salmon are included in Appendix 1 and 2, respectively.

Existing and Past Efforts

Due to the lack of historic access for anadromous fish and potential anadromous fish habitat, past and ongoing effort for fish populations have centered around the USFWS hatchery program funded through Mitchell Act. The USFS has also prioritized this basin lower than the adjacent Wind River basin due to the limited distribution of anadromous fish. Recently, habitat protection has become a priority. The USFS has implemented the President Forest Plan and the State of Washington has increased habitat protection through the Timber, Fish, and Wildlife process.

Subbasin Management

Goals, Objectives, and Strategies

Participants in this planning process identified goals, objectives, and strategies for the subbasin. The objectives may not be quantifiable or include a time period. This is due in part to the watershed assessments not being finalized, and the lack of consensus on the desired future condition of fish and wildlife populations and their habitat. In addition, recent data from the Wind River and other Columbia River tributaries indicates that salmon and steelhead populations have experienced wide swings in abundance making it difficult to establish meaningful quantifiable objectives without taking into account natural environmental variability. The participants hope to use the assessments and other data to fully develop the objectives, strategies, and actions in the coming years. Listed below is the general goal agreed upon by all participants as well as individual agency/tribal goals.

Cornerstone Goal (all participants)

Restore wildlife and fish populations and habitat to levels that support ecosystem benefits and harvest, sustain and/or restore water quality, and maintain long-term economic and community sustainability.

Fish Goals

Yakama Tribe

1. Restore/reclaim anadromous fishes to the rivers and streams that support the historic cultural and economic practices of the tribes for future generations.
2. Protect tribal sovereignty and treaty rights.

State of Washington (Washington's Statewide Salmon Strategy)

1. Restore salmon, steelhead, and trout populations to healthy harvestable levels and improve the habitat on which fish rely on.

Washington Department of Fish and Wildlife

1. Sound stewardship of fish and wildlife (mission statement)
2. Protect, restore, and enhance the productivity, production, and diversity of wild salmonids and their ecosystems to sustain ceremonial, subsistence, commercial, and recreational fisheries; non-consumptive fish benefits; and other related cultural and ecological values (Wild Salmonid Policy).

Washington Department of Ecology (Water Quality Program)

To protect, preserve, and enhance Washington surface and ground water quality, and to promote the wise management of our water for the benefit of current and future generations.

Wind River Watershed Council

Develop partnerships which encourage the use of land management which sustains and improves water quality, fish habitat, and other natural resources, while contributing to long-term economic and community sustainability within the Wind River watershed.

Columbia River Inter-Tribal Fisheries Enforcement

The overall goal is to continue to protect and restore the health and function of the watershed. Specific goals, objectives, and strategies are listed below.

Protect, enhance and restore wild and natural anadromous and resident fish populations within this watershed of the Columbia Gorge Province.

Fish Objectives

Washington Department of Ecology (in conjunction with Skamania County and WDFW)

Develop a plan within a 4 years that will address water quantity, water quality, habitat and instream flow.

Columbia River Inter-Tribal Fisheries Enforcement

Maintain natural populations of anadromous and resident salmonids at levels that promote increased utilization of available habitat and that contribute to tribal and non-tribal fisheries as measured by an increasing trend in population abundance and distribution by the year 2012.

Fish Strategies

Yakama Tribe

1. Improve adult pre-spawning survival;
2. Improve juvenile rearing survival;
3. Improve adult and juvenile passage survival

US Forest Service

1. Reduce water temperatures in Trout Creek and the upper Wind River.
2. Restore riparian area
3. Reduce road densities
4. Increase the quality of pools through recruitment of large woody debris.

Columbia River Inter-Tribal Fisheries Enforcement

1. Integrate conservation law enforcement protection into fish, wildlife and habitat management.
2. Identify and enforce laws and rules pertaining to fish passage, riparian habitat, and water quality protection. Provide information on enforcement actions to the system-wide conservation enforcement monitoring and evaluation project.
3. Identify and enforce laws and rules pertaining to exotic fish transfers.
4. Identify violations of laws and rules pertaining to habitat protection and provide information to appropriate state, federal or tribal law enforcement entity.
5. Increase enforcement of laws and fishing regulations pertaining to illegal take of fish (all life stages).
6. Continue enforcement of wildlife laws and regulations affecting wildlife species and habitat.

Specific action items on the restoration of native anadromous fishes through habitat restoration are listed in Tables 8 and 9 in the following section. These are the outcome of watershed assessments and limiting factors analysis. There may not be consensus on the priority of these actions but there is agreement that they would improve anadromous fish habitat. Differences still exist on the use of hatchery salmon and steelhead within the basin. Specific action items for hatchery production can be found in the Carson National Fish Hatchery HGMP (Appendix 1), Tribal Fish Restoration Plan, Lower Columbia Steelhead Conservation Initiative, and WDFW's Wild Salmonid Policy.

Minor differences still exist on the use of hatchery salmon and steelhead within the basin. Specific action items for hatchery production can be found in the Little White Salmon River National Fish Hatchery and Willard National Fish Hatchery HGMPs for spring chinook, fall chinook and coho (Appendices 1, 2 and 3), Tribal Fish Restoration Plan, Lower Columbia Steelhead Conservation Initiative, and WDFW's Wild Salmonid Policy.

Research, Monitoring, and Evaluation Activities

Hatchery research, monitoring, and evaluation activities are ongoing at USFWS hatcheries. In addition, the USFWS is conducting chinook salmon supplementation studies in the upper watershed. The USFS is also monitoring fish and wildlife habitat.

The Columbia Basin Law Enforcement Council (CBLEC) coordinates state, federal and tribal conservation law enforcement efforts throughout the Columbia Basin. Currently, a consultant for Columbia River Inter-Tribal Fisheries Enforcement is conducting monitoring and evaluation of conservation enforcement in the mainstem Columbia River between Bonneville and McNary Dams, including cooperative enforcement actions in the tributaries.

Fish and Wildlife Needs

- Determine abundance, distribution, survival by life-stage, and status of fish and wildlife native to the watershed.

Rationale: Abundance and survival estimates will be needed to determine if habitat restoration programs are working and to determine if these fish populations are rebuilding. Determining the status, and abundance for listed fish populations including steelhead, chinook salmon, chum salmon, and bull trout are needed to recover these listed fish. Coastal cutthroat trout have been proposed for listing under ESA and coho salmon are considered a candidate for listing under ESA because of possible lowered status across their distributional range. Little is known about historical and current distribution and status of these fish in this watershed. The abundance of pacific lamprey has declined above Bonneville Dam. In addition, recent observations during fish sampling efforts and comparison of these observations with historical observations suggest crayfish have disappeared from some of their former range. Crayfish and lamprey are likely an important part of the food chain. Thus, documenting their distribution and status is an important factor for assessment of the health of the Wind River ecosystem.

- Determine genetic and life history types of native fish and wildlife and the strength of their current expression relative to historical and desired future conditions.
Rationale: Maintaining life history and genetic diversity allow fish to be productive under the current and a wide variety of future conditions. Determining these levels of diversity will help develop successful recovery strategies.
- Assess effect of natural escapement of hatchery salmon and trout on the natural production of salmon and trout.
Rationale: Brook trout are not native to the Little White Salmon River and coho salmon are not endemic to the area above River Mile 2. High brook trout abundance in parts of the watershed and juvenile coho abundance during hatchery released may present an ecological risk to native salmonids. If restoring wild salmonid populations is a high priority in this watershed, these interactions should be evaluated.
- Determine the effectiveness of habitat restoration projects on achieving the desired physical change and measure the response of wild steelhead populations to these changes.
Rationale: As agencies request funds habitat restoration in the Little White Salmon River, a large-scale monitoring and site-specific monitoring projects are needed to evaluate the effectiveness of these actions to rebuild fish populations.
- Assess effect of operations of Bonneville and The Dalles dams on the fish and wildlife production capacity and migration corridor of the portion of Little White Salmon River that is inundated with the impounded waters.
Rationale: Creation of Bonneville Reservoir. The inundation of the Bonneville Pool has permanently flooded and created Drano Lake. Fish production and wildlife may be negatively impacted by large-scale ecosystem changes including sedimentation, water temperature, turbidity, and predator access.
- Implement restoration actions identified in the watershed assessments that are consistent with recovery of fish and wildlife populations and their habitat.
Rationale: Restoration projects that are the outcome of watershed assessments and have gone through a review process have addressed factors that limit the recovery of

fish and wildlife populations. These projects should have a high probability for success. The above or modified monitoring and evaluation programs should be funded as part of these restoration activities.

- Continue watershed coordination and local stewardship programs.
Rationale: The land and resource management decision needed to recover fish and wildlife populations and their habitat will impact local residents. Many of these people are knowledgeable about these resources and should be part of the decision process. Their involvement is very important to the outcome of management decisions and address local concerns about long-term community and economic sustainability.
- Preservation of viable fish & wildlife populations through improved habitat protection, habitat enhancement and law enforcement

Enhanced fish, wildlife & habitat law enforcement was conducted throughout the Columbia Basin by federal, state and tribal entities during 1991-1998. Beginning in May 2000, the Columbia River Fisheries Enforcement Department is implementing increased conservation enforcement efforts in the mainstem Columbia, and its tributaries -- in cooperation with adjoining jurisdictions.

Subbasin Recommendations

FY 2001 Projects Proposals Review

The Columbia Gorge Province Technical Team, composed of representatives from ODFW, WDFW, CRITFC, CTWSRO and YN met to review FY 2001 project funding proposals on October 10 and 11, 2000. The team reviewed one subbasin proposal which addresses needs across multiple subbasins including the Little White Salmon River Subbasin. Each project proposal and team funding recommendation is discussed below. Table 1 presents a summary with the project's relationship to identified subbasin resource protection /restoration strategies, and the subbasin team's funding recommendation.

Projects and Budgets

Project: 21012 - Evaluate Status of Coastal Cutthroat Trout in the Columbia River Basin above Bonneville Dam

Sponsor: USGS-CRRL

Short Description:

Survey Columbia River tributaries above Bonneville Dam for coastal cutthroat trout to determine population status, to identify limiting factors, and to understand the role of current and past human and natural disturbances affecting status.

Abbreviated Abstract

The goal of the proposed study is to provide vital information on the current status of cutthroat trout populations in the lower Columbia River basin as a necessary prerequisite to

future recovery efforts. Study objectives are to 1) document existing data on historical and current distribution and describe management practices that affect the coastal form of cutthroat trout in the Columbia River basin above Bonneville Dam, and 2) determine status of naturally reproducing populations of cutthroat trout above Bonneville Dam. Objective 1 will be conducted from 2001-02 using a combination of questionnaires and a review of existing biological data and land-use, production, and harvest management practices. Objective 2 will be conducted from 2001-03 by conducting fish and habitat surveys.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
9304000	Fifteenmile Creek Habitat Restoration Project	We will contact project biologists for their help in identifying potential populations of cutthroat trout populations and we will survey this watershed. Habitat improvements for steelhead could help cutthroat trout.
9405400	Bull Trout Life History Project -- NE Oregon	We will contact project biologists for their help in identifying potential populations of cutthroat trout populations in the Hood River watershed, a watershed that we will survey for the proposed project.
8805304	Hood River Production Program	We will contact project biologists for their help in identifying potential populations of cutthroat trout populations in the Hood River watershed, a watershed that we will survey for the proposed project.
9204101	Fish Passage Evaluations - Lower Columbia River	This project may well have data on passage of sea-run cutthroat trout to the Hood, White Salmon, Little White Salmon, Klickitat, and Wind rivers, all of which we plan to survey during the proposed project.
8812000	Yakima Natural Production and Enhancement Program	This project's activities and findings in the Klickitat watershed may help us locate populations of cutthroat trout.
9801900	Wind River Watershed Project	We will contact project biologists for their help in identifying potential populations of cutthroat trout populations in the Wind River watershed, a watershed that we will survey for the proposed project.
9033	Document Native Trout Populations	We will contact project biologist to see what they have found in some of the upper reaches of watersheds that we intend to sample. Our surveys will be more extensive (covering the Gorge Province) and in some areas more intensive (population estimates).

Relationship to Existing Goals, Objectives and Strategies

Project Proposal 21012 is a request for funding a project to evaluate the status of coastal cutthroat in the province. This project addresses several needs identified in the Wind River Subbasin Summary including “Determine abundance, distribution, survival by life-stage, and status of fish and wildlife native to the watershed”, “Determine genetic and life history types of native fish and wildlife and the strength of their current expression relative to historical and desired future conditions”, and “Assess effect of natural escapement of non-native hatchery fish on natural production of native fish.”

Review Comments

Many projects within the basin are finding cutthroat information. An organized accumulation of this information is needed. This project should first accumulate all available information from all fish and wildlife agencies and tribes in the basin. Fieldwork should then focus on subbasins and areas where data is missing.

Budget

FY01	FY02	FY03
Rec: \$39,770 Category: Urgent/High Priority Notes: Funding for Objective 1 should be considered a high priority. The other objectives should be considered high priority in FY 02 and 03 if warranted based on the results from FY 01. We recommend funding only Objective 1 during FY 2001.	Rec: \$240,926 Category: Urgent/High Priority	Rec: \$253,038 Category: Urgent/High Priority

Research, Monitoring and Evaluation Activities

Currently the Little White Salmon River has very little anadromous fish habitat (less than 0.5 miles) due to a natural barrier. The most productive habitat was inudated in 1938 with the construction of Bonneville Dam. To mitigate for losses caused by the construction of Bonneville Dam, the USFWS operates two hatcheries in this subbasin. The Little White Salmon Hatchery is located at the mouth of the Little White Salmon River and Willard Hatchery is located above the natural falls approximately 5 miles upstream. These fish produce fall and spring chinook salmon, and coho salmon and are funded under the Mitchell Act program. This small basin is primarily managed for hatchery production. WDFW conducts Chinook salmon spawning ground surveys and in 2000 initiated surveys to determine if bull trout are present. The USFS completed a Watershed Analysis.

Needed Future Actions

One of the highest priorities for BPA funding is to identify bull trout populations in the Columbia Gorge Province. Fisheries agencies have identified only three bull trout populations in the Lower Columbia and Columbia Gorge. Identifying if other populations exist and identifying potential areas where these fish could exist is needed to develop a comprehensive plan for these fish. When the region's federally listed salmon, steelhead, and bull trout stocks have recovered, funding should be prioritized in this watershed to restore ecosystem function and public outreach. The USFS Watershed Analysis identified

temperature, sedimentation, poor width to depth ratios, lack of LDW, and bank instability especially in degraded Rosgen “C” channels as factors that limit fish production. These factors should be addressed with a comprehensive monitoring. An integral part of rebuilding fish populations and their habitat is an outreach program. The outreach program should be designed to educate and build support for recovering salmon and steelhead and restoring healthy processes to the watershed through the establishment and running of a watershed council and community outreach to landowner and schools.

Actions by Others

The USFS, USFWS, USGS, WDFW, UCD, and YIN have assisted with or funded fish restoration or monitoring activities in this subbasin. The USFS is the major landowner in the basin (over 50%) and they will continue to protect and restore streams. UCD will continue to reach out to the community to build support for restoring ecosystem function and rebuild salmon and steelhead runs. They will also continue to work with private landowners to restore fish habitat as opportunities arise. WDFW, USGS, USFWS, and YIN will continue to monitor fish populations and work with others to restore habitat and rebuild wild salmon and steelhead runs. Klickitat County is the lead entity for salmon and steelhead recovery for the State of Washington in this watershed. The fisheries agencies and tribes have coordinated salmon recovery actions with the LCFRB.

Table 1. Little White Salmon River Subbasin Summary FY 2001 BPA Funding Proposal Matrix

Project Proposal ID	21012								
Provincial Team Funding Recommendation	Urgent/ High Priority								
Washington Department of Ecology (in conjunction with Skamania County and WDFW) Objectives Develop a plan within a four year timeframe that will address water quantity, water quality, habitat and instream flow.									
Columbia River Inter-Tribal Fisheries Enforcement Objective Maintain natural populations of anadromous and resident salmonids at levels that promote increased utilization of available habitat and that contribute to tribal and non-tribal fisheries as measured by an increasing trend in population abundance and distribution by the year 2012.	+								
Yakama Tribe Strategies 1) Improve adult pre-spawning survival; 2) Improve juvenile rearing survival; and 3) Improve adult and juvenile passage survival.									
US Forest Service Strategies 1) Reduce water temperatures; 2) Restore riparian areas; 3) Reduce road densities; 4) Increase the quality of pools through recruitment of large woody debris.									
Columbia River Inter-Tribal Fisheries Enforcement Strategies Integrate conservation law enforcement protection into fish, wildlife and habitat management; 2) Identify and enforce laws and rules pertaining to fish passage, riparian habitat, and water quality protection. Provide information on enforcement actions to the system-wide conservation enforcement monitoring and evaluation project; 3) Identify and enforce laws and rules pertaining to exotic fish transfers; 4) Identify violations of laws and rules pertaining to habitat protection and provide information to appropriate state, federal or tribal law enforcement entity; 5) Increase enforcement of laws and fishing regulations pertaining to illegal take of fish (all life stages); 6) Continue enforcement of wildlife laws and regulations affecting wildlife species and habitat.									
This project title is referenced by ID above: 21012 - Evaluate status of coastal cutthroat trout in the Columbia River Basin above Bonneville Dam									

Note: + = Potential or anticipated affect on subbasin objectives and strategies.