Draft
Clearwater Subbasin Assessment

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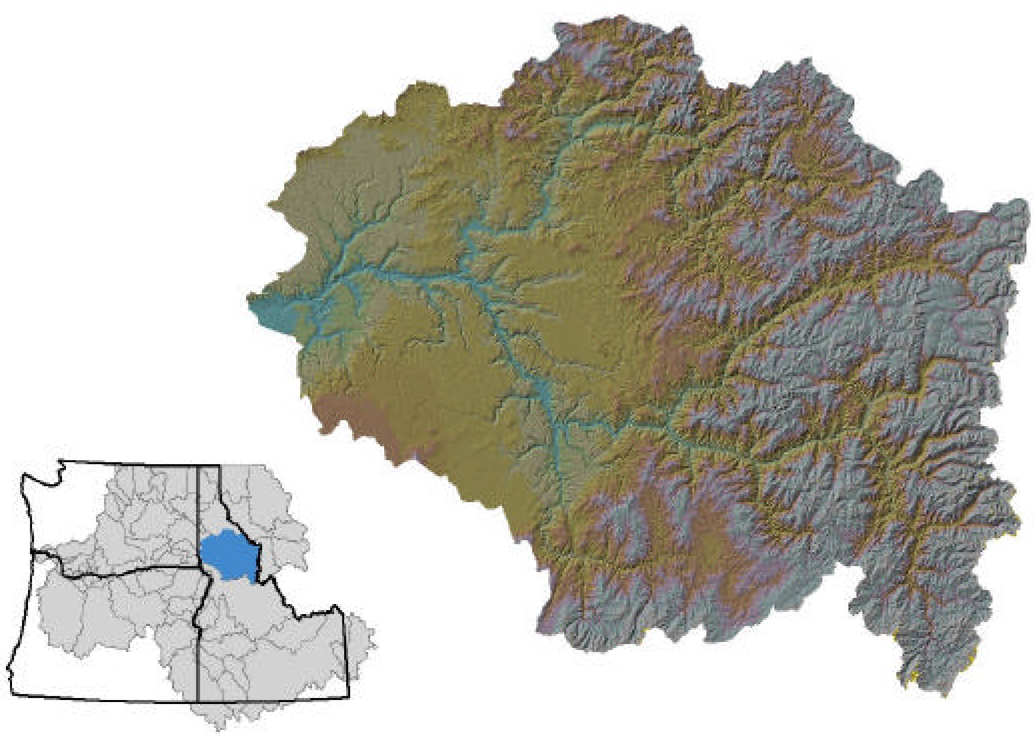

Prepared for

Nez Perce Tribe Watersheds Division
Idaho Soil Conservation Commission

PREAMBLE

In early 2001, the excitement began. Over 147,000 adult spring chinook began to cross Lower Granite Dam; most of them on their way to Idaho from the Pacific Ocean. At least a quarter of these fish were honed in on the Clearwater River Subbasin in Idaho. By the time the season ended in August, over 24,000 fish had been harvested by sportsmen and tribal fishers. Over 61,000 angler trips resulted in 24 million dollars of direct angler expenditures in the Clearwater River Subbasin. Large steelhead runs the following fall and winter provided additional opportunities and memories for recreational fishermen, in addition to important cultural and economic benefits in the subbasin.

Why so many fish following decades of so few? Above average spring flows in 1999 flushed juvenile fish to an ocean with better conditions for salmonid survival, including cooler water temperatures. In addition, hatcheries released full production capacity smolt numbers. Fisheries biologists predicted a large run, but even they could not have realized the memories and experiences that this run would provide the fortunate tribal fishers and sports anglers in the Clearwater subbasin.

The salmon and steelhead run of 2001/2002 provided us a glimpse of what runs were like historically, when thousands of self-sustaining wild fish returned to the Clearwater River every year. Unfortunately, wild fish continue to be much suppressed from historical numbers and the set of conditions that lead to the runs of mostly hatchery fish in 2001/2002 are not expected to persist in the future. In addition, a variety of in-basin and out-of-basin factors continue to negatively impact salmon and steelhead populations.

The future of salmon and steelhead in the Clearwater River will require the protection and expansion of wild fish populations, the continued production of hatchery fish for harvest and other purposes, and an openness by all parties to consider all factors which affect these important resources in the Clearwater. The members of the Clearwater PAC hope that implementation of the Clearwater Subbasin Plan will be a step in the right direction.

Table of Contents

List of Appendices

List of Figures

List of Tables

Table 1. List of acronyms used in the Clearwater Subbasin Assessment and Plan.

Acronym	Definition
Agencies or Groups	
APAC	Artificial Production Advisory Committee
BAG	Clearwater Basin Advisory Group (IDAPA 39-3613)
BLM	U.S. Bureau of Land Management
BoR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration (Bonneville)
CBFWA	Columbia Basin Fish and Wildlife Authority
CNF	Clearwater National Forest
Council	Northwest Power Planning and Conservation Council
CSWCD	Clearwater Soil and Water Conservation District
EDT	Ecosystem Diagnosis and Treatment Method
EPA	U.S. Environmental Protection Agency
FSA	USDA Farm Service Agency
HUC	Hydrologic Unit Code
IASCD	Idaho Association of Soil Conservation Districts
IDFG	Idaho Department of Fish and Game
IDEQ	Idaho Department of Environmental Quality
IDL	Idaho Department of Lands
IDT	Idaho Department of Transportation
IDWR	Idaho Department of Water Resources
IFIM	Instream Flow Incremental Methodology
ISWCD	Idaho Soil and Water Conservation District
LHTAC	Local Highway Technical Assistance Council
LSCD	Lewis Soil Conservation District
LSWCD	Latah Soil and Water Conservation District
NOAA Fisheries	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPNF	Nez Perce National Forest
NPS	National Park Service
NPSWCD	Nez Perce Soil and Water Conservation District
NPT	Nez Perce Tribe
NRCS	USDA Natural Resources Conservation Service
PAC	Clearwater Policy Advisory Committee
SCC	Idaho Soil Conservation Commission
TU	Trout Unlimited
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USACE	U.S. Army Corps of Engineers
WAG	Watershed Advisory Group (IDAPA 39-3615)
Terms	
APRE	Artificial Production Review and Evaluation
BiOp	Biological Opinion
BMP	Best Management Practice
BURP	Beneficial Use Reconnaissance Program
CCRP	Continuous Conservation Reserve Program (FSA)
CRFMP	Columbia River Fish Management Plan
CRP	Conservation Reserve Program (FSA)
CWA	Clean Water Act
EQIP	Envirnmental Quality Incentive Program
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
GAP	Gap Analysis Program
HGMP	Hatchery Genetic Management Plan
HUC	Hydrologic Unit Code
IDAPA	Idaho Administrative Procedures Act

Acronym	Definition
INFISH	Interim strategies for managing fish-producing watersheds in Eastern Oregon and Washington, Idaho, Western Montana and portions of Nevada
LOD	Large Organic Debris
LSRCP	Lower Snake River Compensation Program
PACFISH	Interim Strategies for managing anadromous fish-producing watersheds in Eastern Oregon and Washington, Idaho, and parts of California.
PSSZ	Potential Sediment Source Zone
PMU	Potential Management Unit
RHCA	Riparian Habitat Conservation Area
RRWMA	Red River Wildlife Management Area
SI	Salmon Initiative
SPZ	Streamside Protection Zone
STIP	State Transportation Improvement Program
TMDL	Total Maximum Daily Load
WBAG II	Water Body Assessment Guidance 2002
WQPA	Idaho Water Quality Program for Agriculture (SCC)
WHIP	Wildlife Incentive Program (NRCS)
WRP	Wetland Reserve Program (NRCS)

1 Executive Summary

1.1 Subbasin Overview

The Clearwater subbasin is one of the most biologically rich and diverse drainages in the Columbia Basin. Encompassing more that 9,600 square miles of north-central Idaho (Figure 1), it is home to more than 30 species of fish, 19 of which are native, and is inhabited by as many as 340 terrestrial wildlife species. The Clearwater subbasin is bordered to the north by the St. Joe subbasin, to the south by the Salmon River subbasin, to the east by Montana, and it joins the Snake River in the west. The Lochsa, Selway, South Fork, and North Fork Clearwater rivers represent the primary tributaries in the subbasin. All but the North Fork Clearwater River are unregulated. The mouth of the Clearwater is located on the Washington–Idaho border at the town of Lewiston, Idaho where it enters the Snake River 139 river miles (224 km) upstream of the Columbia River.

Although drier and colder in the high elevation and southernmost portions of the subbasin, the climate is strongly influenced by warm, moist maritime air masses from the Pacific. A general increase in precipitation from west to east across the subbasin occurs coincident with increasing elevations, resulting in greater precipitation in the mountainous terrain in the eastern half of the subbasin compared to the low elevation canyons and plateaus to the west. Mean annual precipitation ranges from 12 inches (310 mm) at the Clearwater River's confluence with the Snake River to greater than 90 inches (2,000 mm) in the higher elevations.

Climate, along with oceanic, tectonic, and volcanic forces, has helped shape the largely erosional character of the granitic batholith, which underlies vast portions of the subbasin. Mass wasting processes of erosion are common throughout the highly precipitous terrain in the central and eastern portions of the subbasin, as are processes of surface, rill, and gully erosion in the fertile loess soils common to the western prairie region.

Unlike many other inland west subbasins, over 70% (more than four million acres) of the Clearwater is comprised of forested communities. The Clearwater also contains several unique or disproportionately important plant communities. Most notable are the prairie grasslands in the western portion, wetland and riparian areas in valley bottoms, and coastal disjunct communities within the North Fork Clearwater and Selway/Lochsa confluence.

Roughly two-thirds of the subbasin is federally managed, while the remainder is privately owned. The U.S. Forest Service manages most of the forested land within the Clearwater (over 3.5 million acres), but the state of Idaho, Potlatch Corporation and Plum Creek Timber Company also own extensive forested tracts. The western half of the subbasin is generally in the private ownership of small forest landowners and timber companies, as well as farming and ranching families and companies. Nez Perce Tribal lands are located within or adjacent to Lewis, Nez Perce, and Idaho Counties.

Land use activities that have shaped the current Clearwater subbasin include road construction, timber harvest, agriculture, grazing, mining, and impoundments, irrigation projects, and diversions. A general characterization of these activities is presented below.

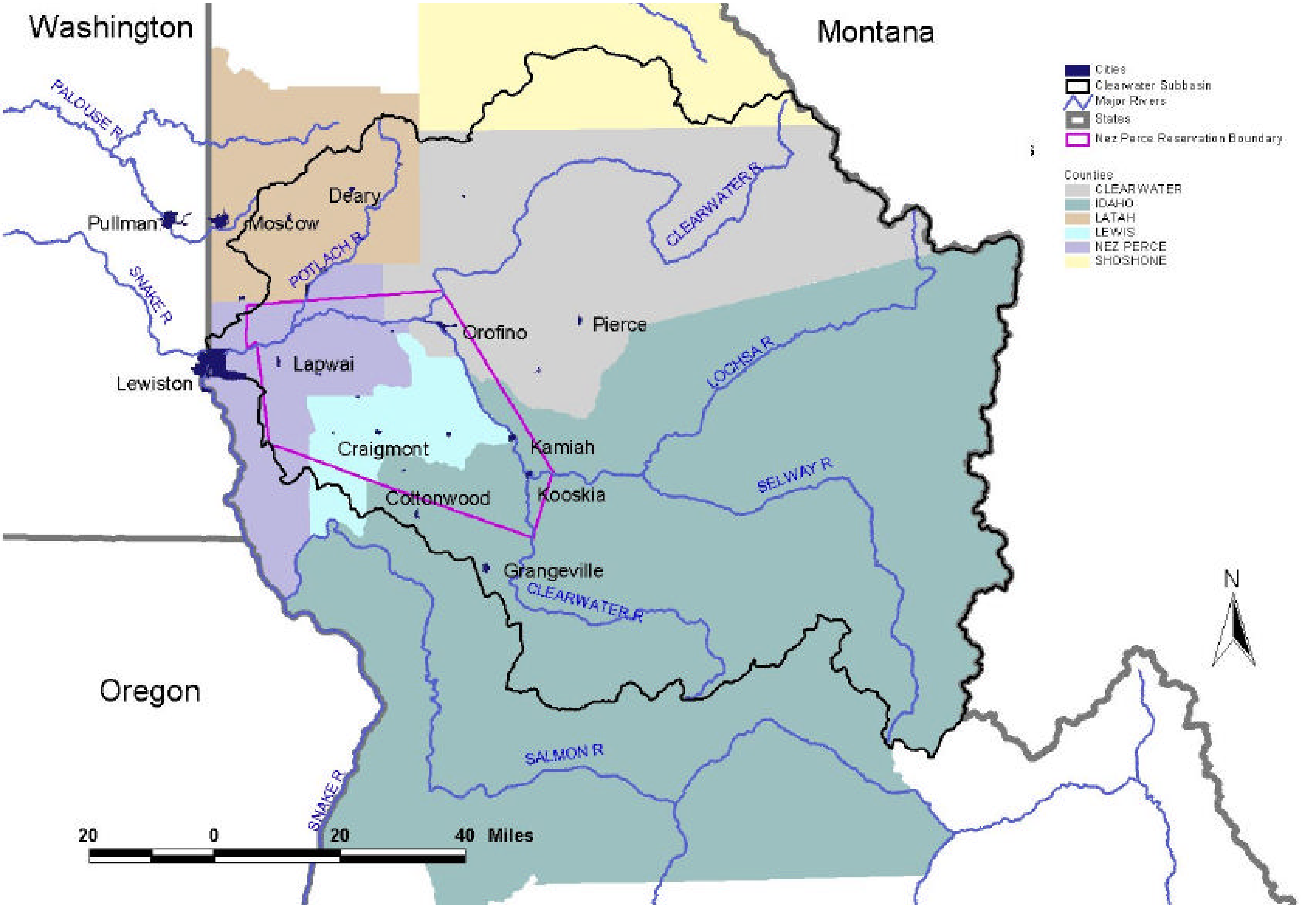

Figure 1. Location of the Clearwater subbasin

- Road densities are greatest in the central portions of the subbasin, commonly exceeding 3 miles/square mile and often exceeding 5 miles/square mile.
- An estimated 760,000 acres of the Clearwater are defined by agricultural activities. Agriculture is most pronounced in the western portion of the subbasin on lands below 2,500 feet elevation, primarily on the Camas Prairie both south and north of the mainstem Clearwater River.
- Grazing occurs throughout much of the subbasin, although available data is only limited to that occurring on federally managed allotments. Subwatersheds with the highest proportion of grazeable area (> 50%) within the Clearwater subbasin are typically associated with USFS grazing allotments in lower elevation portions of their management areas.
- Mining has occurred throughout the entire subbasin, but is most widely and densely distributed within the South Fork drainage. The South Fork Clearwater drainage in particular has a complex mining history that included periods of intense placer, dredge, and hydraulic mining.
- Seventy dams currently exist within the boundaries of the Clearwater subbasin. The majority of dams occur in the lower Clearwater. The seven largest reservoirs in the subbasin include Dworshak, Reservoir A, Soldiers Meadows, Winchester, Spring Valley, Elk River, and Moose Creek.

The Clearwater and Nez Perce National Forests contain some of the last significant spans of roadless terrain and wild fish habitat in the lower forty-eight states, and support a number of threatened and endangered plant and wildlife species. Approximately 47% of the Clearwater subbasin is designated as having some degree of protected status, the majority of which is either inventoried roadless or wilderness area. Portions of the Selway-Bitterroot and Gospel Hump Wilderness exist within the Clearwater subbasin, contributing substantially to the total protected area.

Various 'focal' plant and animal species occur in the subbasin. These organisms often serve as indicators of the biological health of the ecosystem, as their presence, absence, or relative abundance is typically dependent upon the condition of an undisturbed, or in some cases, disturbed environment. The requirements of these focal species are such that if their basic needs are met then most other species will have their requirements met as well. The species with the most demanding requirements are usually selected to define the minimum acceptable values for each landscape parameter. This process was applied to the key habitat attributes in the Clearwater subbasin and a list of focal plant, animal, and fish species developed.

Selected focal plant species include
- Clearwater phlox (*Phlox idahonis*)
- Jessica's Aster (*Aster jessicae*)
- Palouse Goldenweed (*Haplopappus liatriformis*)
- Spacious Monkeyflower (*Mimulus ampliatus*)
- Salmon-flowered Desert Parsley (*Lomatium salmoniflorum*)
- broadfruit mariposa lily (*Calochortus nitidus*)
- Mountain Moonwort (*Botrychium montanum*)
- Crenulate Moonwort (*Botrychium crenulatum*)

Selected focal wildlife species in the Clearwater include

- fisher (*Martes pennanti*)
- wolverine (*Gulo gulo*)
- flammulated owl (*Otus flammeolus*)
- white-headed woodpecker (*Picoides albolarvatus*)
- black-backed woodpecker (*Picoides arcticus*)
- harlequin duck (*Histrionicus histrionicus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- fringed myotis (*Myotis thysanodes*)
- Northern Goshawk (*Accipiter gentilis*)
- peregrine falcon (*Falco peregrinus anatum*)
- boreal toad (*Bufo boreas*)
- Coeur d'Alene salamander (*Plethodon vandykei idahoensis*)

Selected focal fish species in the Clearwater include

- chinook salmon (*Oncorhynchus tshawytscha*)
- steelhead trout (*Oncorhynchus mykiss* subspecies)
- westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
- bull trout (*Salvelinus confluentus*)
- brook trout[1] (*Salvelinus fontinalis*)

A brief summary defines the occurrence of wildlife and plant focal species by assessment unit (AU) rather than by the potential habitat in which they *might* occur.

1.2 Biophysical Assessment

Several methods of assessing relative status, condition, threats, limiting factors, and general trends of wildlife, plant, and fish species are applied in this document. One of the more important approaches, especially in the assessment of Clearwater aquatics, is the stratification of the subbasin's 9,645 square mile area into regions sharing common biophysical properties or themes. Tools used to characterize the subbasin included the use of geospatial data, which enables both visual presentation and summarization of broad-scale data. Geographic Information System software (GIS) allowed for the broad stratification of the subbasin into eight distinct assessment units (AUs). Definition of AUs was based on subjective review of six landscape level characteristics known to influence ecosystem resources at broad landscape scales: lithology, precipitation, elevation, landforms, vegetation and ownership patterns. These six characteristics have impacted both the historic and current status of resources within the subbasin due to their influence on broad-scale ecological function. They can also be expected to influence the applicability and success of future management activities and should be considered during future planning efforts.

Each AU is similar in size to a 4th field Hydrologic Unit Code (HUC) with three AUs sharing boundaries identical to associated 4th code HUCs (upper and lower North Fork and Lochsa AUs; see Figure 2). Landscape attribute combinations are similar within and different between individual AUs (Table 2). Ecological regimes/functions should follow a similar pattern. The various biophysical characteristics of each AU are summarized below. A coarse

[1] Brook trout have the potential to negatively impact other selected species

summarization of key plant, wildlife, and fish species that occur in the unit is included, with their relative status and primary factors limiting persistence.

1.2.1 Lower Clearwater Assessment Unit

The plateau comprising much of Lower Clearwater AU has moderately sloping terrain with local elevations ranging from 2,500 to 3,500 feet, and some isolated buttes reaching as high as 5,000 feet. The plateau is comprised mostly of 0 to 15% slopes with some stream valleys having side slopes exceeding 60%.

Land ownership in the Lower Clearwater AU is predominantly private, and is reflected in the largely agricultural land use pattern, which has occurred since at least the early 1900s. The Nez Perce Reservation lies primarily within the Lower Clearwater AU and Tribal lands (including Fee lands owned and managed by the Nez Perce Tribe, and properties placed in trust status with the BIA) are located primarily within the current Reservation boundaries. Pockets of timberland exist in the upper portions of the Potlatch Creek and Lapwai Creek drainages, with additional smaller scale timberlands distributed throughout many of the steeply incised canyons of the AU. Grazing activity is widely distributed throughout the Lower Clearwater AU, but often limited to the uncultivated canyons and timberlands.

Although annual precipitation in the Lower Clearwater AU is relatively low (<25”), the low elevation results in susceptibility of much of the area to rain on snow events and resultant flashy flows. In tributaries of the Lower Clearwater AU, timing of annual peak flows is highly variable, ranging from early December through late May. Flow variations in the Lower Clearwater are greatest in tributaries in the Camas Prairie where minimum mean monthly discharge can be expected to comprise less than 10% of the mean annual discharge in some areas.

Lava flows from the Columbia River Basalt Group comprise the geologic foundation in the plateau regions. Deep, clay-rich, fertile soils formed of wind blown silt (loess) and volcanic ash mantle these basalt landscapes. Soil characteristics, coupled with local land use and climatic patterns, make rill and sheet erosion a substantial issue throughout much of the Lower Clearwater AU. However, mass wasting and colluvial processes are cause for concern in areas of bench topography and on over-steepened canyon side slopes.

Road density and distribution is relatively consistent throughout the Lower Clearwater AU, with densities typically less than 3 miles/sq. mile. Localized areas with higher road densities are associated with larger forested areas and with the city of Lewiston, ID. Road distribution is typical of rural-residential areas, with predominantly rural and access roads for modern agriculture easily recognized by their straight north/south and east/west alignment.

Dominant cover types in the lower Clearwater include native bunchgrasses, shrublands, ponderosa pine, Douglas-fir/mixed xeric forest, and western red cedar/mixed mesic forest. A threat common to almost all cover type species in the lower Clearwater AU is habitat loss through construction projects and through grazing. Native bunchgrasses and shrublands in this area are particularly susceptible to grazing pressures, pesticide application, and competition with exotic species. A limiting factor common to ponderosa pine, shrubland, and bunchgrass species in this area is fire suppression. Ponderosa pine, Douglas-fir, and western red cedar production are also considered limited by timber harvest and insect/pathogen outbreak. The loss of ponderosa pine habitat in the AU currently represents a limiting factor to dependent wildlife species such as the flammulated owl. Focal plant species most closely associated with the Lower Clearwater AU are Jessica’s aster, salmon-flower desert parsley, palouse goldenweed and spacious monkeyflower . Factors limiting their persistence include small population size, habitat

Table 2. Characterization of AUs delineated in the Clearwater subbasin

Assessment Unit	Geology	Precipitation	Dominant Land Use	Primary Ownership	Predominant Landform	Elevation
Lower Clearwater	Col. River Basalt (CRB)	Low Gen. < 25”	Crop/Grazing	Private	Mixed	Low
Lower North Fork	Belt	Moderate 25-50”	Forested	Mixed	Mountains	Low - Moderate
Upper North Fork	Mixed 50/50 Belt/Granites	High Gen. >50”	Forested	Federal (USFS)	Mountains/ Breaks	Moderate
Lolo/Middle Fork	Mixed boundary; CRB/ Granites	Moderate 25-50”	Forested	Mixed	Mixed	Low
Lower Selway	Mixed 50/50 Belt/Granites	Moderate 25-50”	Forested Shrub/Brush	Federal (USFS)	Breaks	Moderate
Lochsa	Granites; Some Belt	High Gen. >50”	Forested Shrub/Brush	Federal (USFS)	Mountains/ Breaks	Moderate - High
Upper Selway/ Moose Creek	Granites	Moderate-High 25-65”	Forested Shrub/Brush	Federal (USFS)	Mountains/ Breaks	High
South Fork Clearwater	Mixed Belt/Granites	Moderate 25-50”	Forested	Federal (USFS)	Mountains	Moderate - High

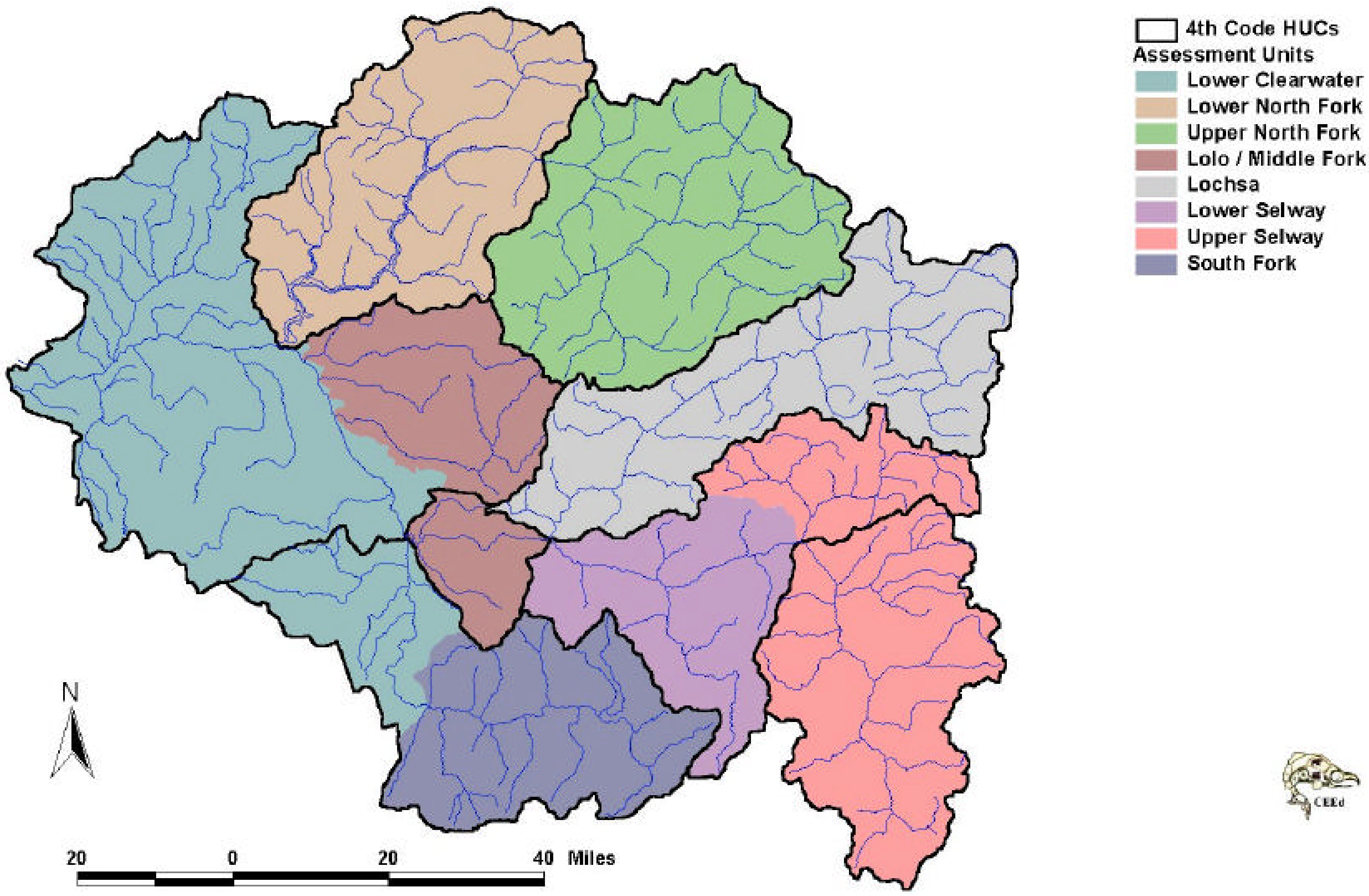

Figure 2. Comparison of assessment units (colored areas) and 4th code HUC boundaries (black outlines) in the Clearwater subbasin

loss through agricultural conversion and grazing, increased competition with nonnative species, and low reproductive capacity due to poor pollen and seed dispersal.

The black-backed woodpecker, white-headed woodpecker, Townsend's bat, fringed myotis, and the western toad may inhabit the lower Clearwater AU. Documentation of these focal species is limited, especially for the black-backed woodpecker, which have only one reported sighting in 1995 up the East Fork Potlatch River. Similarly, the white-headed woodpecker has only one confirmed sighting in the Lapwai drainage. Both woodpecker species are limited by the loss of snags used for roosting and nesting. Common limiting factors to the bat species in the lower Clearwater include human disturbance of roosting sites and subsequent roost abandonment, low reproductive rates and high juvenile mortality, grazing, insecticides that destroy prey, and removal of old buildings. The western toad is limited in this area by disease, habitat loss/fragmentation, trout introductions, livestock grazing, and recreational uses.

Within the Clearwater subbasin, the Lower Clearwater AU is critical for wild A-run steelhead (lower Clearwater tributaries) and fall chinook salmon (mainstem Clearwater River), including all or a substantial majority of their range in the subbasin. With the exception of as a mainstem migration corridor, spring chinook salmon are not known to utilize the Lower Clearwater AU. Bull trout and westslope cutthroat trout have been sporadically noted in tributaries of the Lower Clearwater AU, but their presence is not substantial. These two species do however utilize the mainstem Clearwater River.

Limiting factors to fish in the Lower Clearwater AU tributaries are typically associated with climatic and land use patterns and include temperature, sediment and flow issues (variability and base flow). The lower mainstem Clearwater River is highly influenced by operations at Dworshak Dam, which alters natural temperature and flow regimes.

1.2.2 Lower North Fork Assessment Unit

The terrain of the Lower North Fork Assessment Unit is predominantly mountainous, with side slopes commonly steeper than 60%. Elevation ranges from roughly 2,000 to 5,600 feet. Land cover is almost entirely forest, and land use has relied heavily on timber harvest activities. Due to the mixed ownership, little information on grazing intensity was available: known allotments and other grazeable lands have been defined only in approximately the western one third of the AU.

Mining activities have occurred throughout the Lower North Fork Assessment Unit. Mining activity was widely dispersed and variable by area, and a variety of methods were historically employed included dredging, hydraulics, draglines, drag shovels, and hand operations. Some mining activities have focused on the Little North Fork River drainage where a conglomeration of mining claims have been located.

The Lower North Fork AU contains the most widely and densely distributed forest road network of any AU in the Clearwater subbasin. Subwatershed road densities commonly exceed 5 miles/sq. mile and, in some portions of the AU, exceed 7.5 miles/sq. mile. Exceptions to this pattern are predominantly located in the federally owned portions of the Little North Fork Clearwater River drainage, which contain both inventoried roadless areas and a wild and scenic river corridor. Other areas of protected status within the Lower North Fork AU are minimal in both size and distribution.

Land ownership within the Lower North Fork AU is highly mixed and comprised of private, state and federal holdings. Private timber company holdings (Potlatch Corp. and Plum Creek Timber Co.) make up a substantial percentage of the land area and the state of Idaho owns more property in the Lower North Fork AU than any other area of the Clearwater subbasin. The U.S. Army Corp of Engineers manages property around Dworshak Reservoir.

Annual rainfall in the Lower North Fork AU is moderate for the Clearwater subbasin, ranging from 25-50 inches. With the exception of the highest elevation areas in the northern half of the AU, much of the AU is subject to potential rain-on-snow events. Meta-sedimentary rocks, granites and lava basalts are the dominant geologic parent materials in the AU. These various bedrock types are mantled by ashy soils in the lower elevations and by forest soils at higher elevations. The moist, cool to cold environment common throughout the AU limits soil development and may contribute to slope instability.

Western red cedar/mixed mesic forest and Douglas-fir/mixed xeric forest are the dominant cover types of the lower North Fork AU. Shrublands, which delineate transition areas in vegetative communities, and grand fir represent other important cover types in this area. Cover type habitat loss has resulted from construction projects, logging, and grazing. Herbivory and/or damage from insects has also been a problem. Grand fir communities are especially susceptible to pathogens and may be dominated by dead, suppressed or diseased late-successional stands. Clearwater phlox, Jessica's aster, crenulate moonwort, broadfruit mariposa, and Palouse goldenweed represent focal plant species associated with the lower North Fork. A factor limiting each species is habitat loss, destruction, or modification.

The lower North Fork AU is home to numerous terrestrial vertebrates and has been inhabited by the North American wolverine, fisher, Townsend's big-eared bat, western toad, and Coeur d'Alene salamander. Innundation of habitat following the construction of Dworshak Dam has reduced the occurrence of many terrestrial focal species in this area. Migratory corridors used by the wide-ranging North American wolverine have likely been compromised by the creation of Dworshak reservoir, as have structurally complex riparian areas used by the fisher. Both Townsend's big-eared bat and the western toad are rare and are threatened by loss or fragmentation of habitat. The Coeur d'Alene salamander has been documented throughout several portions of the AU. Based on surveys conducted in the 1980s, the North Fork Clearwater drainage represented the core distribution area for Coeur d'Alene salamanders in the Clearwater subbasin. Recent surveys, however, have been unable to confirm the occurrence of the Coeur d'Alene salamander in many of the previously occupied locations, suggesting the possibility of localized population extirpation.

With the exception of the lower 1.9 miles of the mainstem North Fork Clearwater River, passage of anadromous species into the Lower North Fork AU is completely blocked by Dworshak Dam. Dworshak Reservoir is located entirely within the Lower North Fork AU and provides a substantial fishery for kokanee, smallmouth bass, rainbow trout, and other native salmonids. Limitations to the Dworshak Reservoir fishery are primarily related to dam operations resulting in highly variable flows and fluctuating water levels.

Bull trout distribution is restricted to the highest elevation tributaries of the Lower North Fork AU, and to Dworshak Reservoir. Although westslope cutthroat trout are known to be widely distributed throughout most of the AU, limited information is available on the status of populations. Strong populations of both bull trout and westslope cutthroat trout exist in the Little North Fork Clearwater River drainage. Resident salmonids throughout the AU tributary systems are impacted by sediment and temperature issues associated with land use activities, as well as by introductions of exotic species. Brook trout are widely distributed throughout the AU, however little is known about their population status in most areas.

1.2.3 Upper North Fork Assessment Unit

Like much of the Clearwater subbasin, the terrain of the Upper North Fork Assessment Unit is predominantly mountainous, with side slopes commonly exceeding 60% slope. Elevation ranges from roughly 3,600 to 6,000 feet. Land cover is primarily forested with shrub and brush rangelands intermixed. Ownership is roughly 90% federal (managed by USFS) with the remaining 10% divided among the State of Idaho, Potlatch Corporation, and other private holdings. Non-federal holdings are clustered in the western most portion of the AU.

Approximately 75% of the Upper North Fork AU is included in inventoried roadless areas. Where roads do exist, densities are relatively high for the Clearwater subbasin, ranging from 5 to 7.5 miles/sq. mile at the subwatershed scale. Historic mining activities occurred throughout the North Fork Clearwater drainage, although activities were widely dispersed. A variety of mining methods were historically employed including dredging, hydraulics, draglines, drag shovels, and hand operations, and legacy impacts of past mining is still noted today.

Precipitation in the Upper North Fork AU is higher than any other AU in the subbasin, averaging about 59 inches annually. Portions of the AU receive nearly 100 inches of annual precipitation, more than any other area in the Clearwater subbasin. Winter precipitation falls mainly as snow, although lower elevation canyons along mainstem tributaries may be susceptible to rain-on-snow events.

Geologic parent materials are dominated by granitic batholith, with meta-sedimentary rocks also commonly occurring, particularly in the northernmost portions of the AU. Ash-derived soils are common in the upper North Fork AU, and, when combined with topographic and climatic features, contribute to high levels of vegetative productivity. Landslides on steep canyon slopes are common, and based on the relatively undisturbed nature of much of the area, may be the predominant sediment source to streams.

Western red cedar/mixed mesic forest, Douglas-fir/mixed xeric forest, and shrublands make up the dominant cover types in the Upper North Fork. Subalpine fir and lodgepole pine are also common. Western red cedar/devils club, and/or western red cedar/maidenhair fern habitat types may occur in moist, warm portions of the assessment unit. These sites are known to support disjunct, relict populations of coastal plant species due to the persistent locally intensified expression of a maritime environment. The only focal plant species known to occur in the Upper North Fork AU is spacious monkeyflower. Spacious monkeyflower is threatened by livestock trampling.

Focal wildlife species documented in the Upper North Fork Clearwater AU include the Harlequin duck, the Coeur d'Alene salamander, fisher, and possibly woverines. Each of these terrestrial focal species have limited doumentation, which may be related to their affinity for undeveloped andr remote habitats. Small breeding populations, habitat fragmentation, and displacement by humans represent factors limiting species persistence and abundance in the Upper North Fork AU. The harlequin duck, Coeur d'Alene salamander, and fisher are closely associated with riparian areas and lotic environments. Changes to habitat components such as woody debris jams, vegetation, and/or hydrology are most likely to affect these species.

The Upper North Fork Clearwater AU fishery is predominantly managed for native resident species, with bull trout and westslope cutthroat trout as aquatic focal species. The tributary systems also provide important spawning areas for some Dworshak Reservoir salmonids including bull trout and kokanee. Limited information is available on the status of bull trout population(s) in the Upper North Fork AU, but indicate a depressed condition where available. In contrast, the status of westslope cutthroat trout population(s) is strong throughout the majority of the AU. Recent studies have suggested that introgression of westslope cutthroat trout and introduced rainbow trout may be occurring in the Upper North Fork AU. Information on the distribution and status of brook trout is limited, although they are known to be present and relatively strong in some areas where they may compete with bull trout.

Major factors limiting fish populations in the Upper North Fork AU include sedimentation and localized watershed disturbances. Introduction of exotic species and related competition/introgression is also a major factor influencing native salmonid populations in the Upper North Fork AU.

1.2.4 Lolo/Middle Fork Assessment Unit

The Lolo/Middle Fork AU in many ways represents a transitional area in the Clearwater subbasin. Elevations range from about 2,300 feet in the western portions of this AU along the mainstem Clearwater River to about 4,300 feet in the easternmost portions. The change in elevation follows a change in topography from west to east, progressing from plateau to foothills to mountainous terrain.

Climatic conditions vary with changes in elevation and terrain, with annual precipitation increasing from roughly 25-75 inches on a west to east gradient through the Lolo/Middle Fork AU. Average annual precipitation of approximately 40 inches for the AU as a whole is moderate for the Clearwater subbasin. The vast majority of the Lolo/Middle Fork AU lies below 4,000 feet in elevation, making it subject to mixed winter precipitation and the possibility of rain-on-snow events.

Land ownership in this AU is highly mixed and comprised of private, state, federal and tribal holdings. Potlatch Corporation and the Idaho Department of Lands manage substantial portions of the land within the AU, and properties managed by these two entities are highly intermixed. The eastern-most portion of the Lolo/Middle Fork AU is federally owned and managed by the U.S. Forest Service. Private holdings are an important component in the western half of the AU, which are also interspersed by Nez Perce Tribal lands. Less than 10 percent of the land area is afforded any protected status, with the majority of that being inventoried roadless area.

Land cover is primarily forest, with agricultural use limited to portions of the western plateaus. Western red cedar/mixed mesic forest and Douglas fir/mixed xeric forest cover types are dominant in the AU. Much of the forested area has been intensively harvested in the past, a fact reflected in the high densities of forest roads through much of the AU. Subwatershed-scale road densities exceed 5 miles/sq. mile through most of the AU, and in some areas exceed 7.5 miles/sq. mile.

The Lolo/Middle Fork AU has a rich mining history, the impacts of which are still notable today. Substantial numbers of mining claims are present on federal and state lands throughout the AU. Mines have been located throughout the AU, and the headwaters of Orofino Creek contain numerous mines with relatively high ecological hazard ratings.

Geology and soils also vary considerably throughout the Lolo/Middle Fork AU. Low relief hills lead up into the Clearwater Mountains as the lava basalt from the west interfingers with a series of metamorphic and sedimentary rocks that eventually change into the granite of the Idaho Batholith in the east. Clay-rich grassland soils follow the progression in elevation and grade into clay-rich forest soils in the higher, cooler climates. Landslide hazard potential is high in the southern portion of this AU.

Palouse goldenweed, salmon-flowered desert parsley, Jessica's aster, and broadfruit mariposa lily are focal plant species documented in the Lolo/Middle Fork AU. Competition with nonnative species, pathogens, conversion of habitat to agriculture and herbivory represent common factors limiting their abundance, distribution, and persistence.

Although specific documentation of focal wildlife species in the Lolo/Middle Fork AU is limited, fisher, wolverine, flamulated owl, and northern goshawk have been documented. Road construction, urban development, timber harvest, and other means of habitat loss/conversion represent common factors limiting the persistence of these rare species. The loss of mature or old growth timber and decline in multi-stage forests has probably reduced the suitability of the assessment unit for ponderosa pine dependents such as flammulated owls and northern goshawks.

Steelhead trout and westslope cutthroat trout utilize all major stream systems in the Lolo/Middle Fork AU. Spring chinook salmon and bull trout are found in the Lolo Creek system and tributaries to the Middle Fork Clearwater River. Populations of all four species are depressed throughout their known range in this AU, and current management practices incorporate substantial outplanting of both spring chinook salmon and steelhead trout. Pacific lamprey are thought to occupy portions of the AU, but no information is available on their distribution or status. Brook trout distribution includes all areas where bull trout are known to occur, with potentially important management consequences. Major factors limiting fish populations within the Lolo/Middle Fork AU include temperature, sediment, and upland and instream habitat disturbance or degradation.

1.2.5 Lochsa Assessment Unit

Topography of the Lochsa Assessment Unit is dominated by mountainous terrain and breaklands, with side slopes commonly exceeding 60%. Elevations range from about 3,200 feet near the mouth of the drainage to roughly 7,000 feet in the headwaters.

Due to differing climatic regimes in the Clearwater subbasin, the Lochsa AU represents the southern-most area in which the climate is predominantly influenced by maritime conditions. This, coupled with relatively high elevation results in a high level of mean annual precipitation relative to other AUs in the subbasin. Average annual precipitation for the entire AU is about 53 inches, with some areas receiving over 80 inches of annual precipitation. Winter precipitation falls mainly as snow although lower elevation canyons along the Lochsa River and some tributaries may be susceptible to rain-on-snow events.

Land ownership in the Lochsa AU is predominantly federal (managed by USFS) with Plum Creek Timber Company having intermixed holdings in the Crooked and Brushy Forks. Nearly 80 percent of the Lochsa AU is included in either wilderness or inventoried roadless areas. Road densities related primarily to timber harvest activities in remaining areas are moderate to high, typically ranging from about 3 to greater than 7.5 miles per square mile.

Granitic batholith is the dominant bedrock through much of the AU, with schist common in portions of headwater areas. Where granite is the dominant parent material, soils tend to be weakly developed, vary in depth, and maintain porous surface and subsurface textures. Soils occurring on metasedimentary landscapes are typically fine textured, consisting of silt loam on the surface and silty clay loam in the subsurface. The potential hazard for mass wasting is most pronounced in the western portion of the AU.

A diversity of vegetative cover types occur in the Lochsa AU. Western red cedar/mixed mesic forest, subalpine fir, Douglas-fir/mixed xeric forest, lodgepole pine, and shrublands comprise the dominant types. A common limiting factor to all but the subalpine fir cover type is habitat loss,destruction or modification through the effects of logging. The loss of late and early seral habitats in the Lochsa AU represents a limiting factor to focal wildlife species such as fisher and black-backed woodpecker (respectively). Focal plant species occurring in the Lochsa AU are not defined. However, at the confluence of the Selway and Lochsa Rivers are areas containing many plant species more typically found in the Oregon and Washington coastal rainforests. These communities have been referred to as a "refugium ecosystem" because of their unique distribution and species composition. Elements from the moist coastal area intermingle with more typical Rocky Mountain species. Many species associated with this community are considered rare or sensitive.

Fisher, wolverine, flammulated owl, black-backed woodpecker, harlequin ducks, and Coeur d'Alene salamander have been documented in the Lochsa AU, although most species are considered to be uncommon or rare. Fisher and wolverine populations are likely suppressed by the presence of Highway 12, clearcuts, and logging roads. Black-backed woodpecker habitat is limited by fire suppression and post-fire logging that reduces the number of decaying snags. The distribution and habitat of harlequin ducks is limited by logging, road construction, destruction of riparian areas, disturbance by recreational anglers and hikers, and flooding.

The Lochsa AU provides important habitat areas for steelhead trout, spring chinook salmon, bull trout, and westslope cutthroat trout. Management of anadromous species focuses on maintenance of wild/natural steelhead trout populations, and naturally reproducing chinook salmon populations. Chinook salmon are influenced through active hatchery practices. Bull trout populations are depressed in most areas where they exist in the Lochsa AU, as are chinook salmon. The Fish and Hungery Creek system maintains one of the strongest steelhead runs in the Clearwater subbasin. Westslope cutthroat trout populations are strong throughout most of the Lochsa AU. Information regarding brook trout distribution is limited, but suggests that they are typically widespread where they are known to occur.

Major factors limiting fish populations in the Lochsa AU include sedimentation, poor instream cover and impacts from upland disturbances. Introgression or competition with exotic species is a concern for resident species. High mainstem temperature conditions are a concern for all species, but are presumed to result primarily from natural conditions.

1.2.6 Lower Selway Assessment Unit

Topography of the Lower Selway AU is dominated by breaklands and glaciated mountains, with land slopes commonly exceeding 60%. Elevation ranges from about 3,200 feet to over 6,000 feet. Land ownership is almost entirely federal and managed by the U.S. Forest Service.

Nearly 90 percent of the Lower Selway AU is afforded some level of protected status, primarily as inventoried roadless or wilderness area. This status limits land use activities in the area and results in minimal road densities (<1 mile/sq. mile) in most areas. At the subwatershed scale, the highest road densities in the AU are less than 3 miles/sq. mile.

The climate of the Selway River drainage shows a marked difference from much of the remainder of the Clearwater subbasin, and is dominated by dryer Rocky Mountain climatic regimes. Relative to other AUs in the Clearwater subbasin, the Lower Selway AU experiences a moderate average annual precipitation (approx. 42 inches) despite its moderate to high elevation. Winter precipitation falls mainly as snow although lower elevation canyons along the Selway River and some tributaries may be susceptible to rain-on-snow events.

Western red cedar/mixed mesic forest, Douglas fir/mixed xeric forest, subalpine fir, shrublands, and lodgepole pine comprise the dominant cover types in the lower Selway AU. Douglas-fir, which is adapted to the drier climate of the lower Selway, is well established throughout the AU and in some areas may occur as dense thickets, which provide a continuous fuel ladder to the crown of overstory trees. In the upper montane zone, Douglas fir is less shade tolerant and is replaced by, among other species, western redcedar. Documentation of focal plant species is not available.

North American wolverine, fisher, northern goshawk, and Coeur d'Alene salamander have been documented as occurring within the lower Selway AU. Because of the comparative amount of undeveloped habitat, the lower Selway AU is more likely than other portions of the subbasin to contain species requiring solitude or connectivity with other undisturbed habitats (i.e. wolverine and fisher). The focal wildlife species documented in this area are commonly associated with tributary or mainstem stream or river corridors. Natural disturbance, such as fire, flooding, and drought, are factors most likely to limit species' distribution, abundance, and persistence.

Parent material is dominated by schist throughout much of the lower Selway AU, with granitic batholith dominating the northeastern one third of the AU. Soils on breakland landforms tend to be unconsolidated and mobile. High-elevation soils are fine textured, consisting of silt loam on the surface and silty clay loam in the subsurface. Landslides on steep slopes are common.

Management of anadromous species focuses on maintenance of wild/natural steelhead trout populations in the Selway River system. Spring chinook salmon have been re-introduced and although naturally reproducing runs exist, hatchery influences to chinook stocks continue. Where status information is available, spring chinook salmon, steelhead trout, and bull trout populations in the Lower Selway AU are generally depressed. However, strong populations of both bull trout and steelhead trout do exist in the Meadow Creek drainage. Westslope cutthroat trout populations are considered strong in much of the Lower Selway AU where status information is available. Brook trout are widely distributed throughout the Lower Selway AU.

Due to the predominance of wilderness and roadless area in the Lower Selway AU, limiting factors are closely tied to natural regimes with one primary exception. Introduced species are a threat to resident salmonid populations. Natural temperature and sediment regimes may impact all fish species. High stream gradient is known to limit both steelhead trout and chinook salmon access to some areas, and likely has similar impacts to resident salmonids.

1.2.7 Upper Selway Assessment Unit

Topography of the Upper Selway AU is dominated by high elevation breaklands and glaciated mountains, with steep slopes that commonly exceed 60%. Elevation ranges from about 3,800 feet to over 8,000 feet on the highest peaks. Land cover is mostly evergreen forest, interspersed with shrub and brush rangeland and exposed rocky peaks. Land ownership is almost entirely federal and managed by the U.S. Forest Service.

One hundred percent of the Upper Selway AU is afforded some level of protected status, with the majority of the AU established as wilderness area. This status limits consumptive land use activities in the area. A few roads exist within the wilderness boundary, but densities are minimal (<1 mile/sq. mile) where they do exist.

The climate of the Selway River drainage shows a marked difference from much of the remainder of the Clearwater subbasin, and is dominated by dryer Rocky Mountain climatic regimes. Similar to the Lower Selway AU, the Upper Selway AU experiences a moderate average annual precipitation (approx. 44 inches) despite its high elevation and mountainous terrain. Winter precipitation falls mainly as snow although some portions of lower elevation canyons along the Selway River and some tributaries susceptible to rain-on-snow events.

Parent material is almost entirely composed of granitic batholith. The granite is primarily covered by submature soils containing noncohesive particles of sand and gravel intermixed with volcanic ash. Grus is a common soil type throughout the AU, contributing to the erosivity of the landscape.

The dominant vegetative cover types in the Upper Selway AU include Douglas-fir/mixed xeric forest, subalpine fir, western red cedar/mixed mesic forest, and lodgepole pine. The dry climate of the AU favors the establishment of drought tolerant species, although hydrophyllic species are commonly associated with moist areas such as toeslopes, riparian areas, seeps, or springs. Common limiting factors to vegetative cover types include natural disturbance processes such as fire, flooding, drought, or insect outbreaks. Documentation of focal plant species in the Upper Selway AU was not available.

North American wolverine, fisher, harlequin duck, and Coeur d'Alene salamander have confirmed sightings in the Upper Selway AU. TheUpper Selway is likely used by wolverine as a migratory corridor, connecting the Salmon River subbasin to northern habitats. The Selway drainage represents the southern range of distribution for the Coeur d'Alene salamander. Because of its protected status, focal populations are most likely limited by natural disturbance processes including wildfire, drought, and flooding.

Management of anadromous species focuses on maintenance of wild/natural steelhead trout population(s) in the Selway River system. Spring chinook salmon have been re-introduced and although naturally reproducing runs exist, hatchery influences to chinook stock(s) continue. Steelhead trout population(s) are strong in the Moose Creek and Bear Creek drainages, and depressed throughout the remainder of the AU where status information is available. Chinook salmon, like elsewhere in the Clearwater subbasin, are depressed throughout their distribution in the Upper Selway AU.

Bull trout and westslope cutthroat trout are widely distributed throughout the Upper Selway AU. Westslope cutthroat trout population(s) are strong through the majority of their range. Status information on bull trout populations is sporadic, but strong and depressed areas appear to be somewhat evenly divided. Information on distribution and status of brook trout is limited in the Upper Selway AU, but they are known to exist.

Due to the predominance of wilderness and roadless area in the Upper Selway AU, limiting factors are closely tied to natural regimes with one primary exception. Introduced species, particularly brook trout, are a threat to resident salmonid populations. Natural sediment regimes may impact some fish species, and high stream gradients and other natural barriers are known to limit the distributions of multiple species.

1.2.8 South Fork Assessment Unit

The South Fork AU differs dramatically in character from most other AUs in the Clearwater subbasin. Elevation is relatively high, ranging from about 4,000 to over 7,000 feet. However, the general topography differs from much of other high elevation topography in the subbasin in that it is comprised, to a large degree, of rolling hills rather than the more jagged mountainous peaks commonly associated with the Bitterroot Mountain range.

The South Fork AU is strongly influenced by the dry Rocky Mountain climatic patterns rather than maritime patterns which influence much of the northern and western portions of the subbasin. Mean annual precipitation throughout the AU is only about 36 inches. Most precipitation falls as snow, with very little of the area potentially subject to rain-on-snow events. Only about 10-15 percent of the precipitation falls in the summer months.

The Clearwater Mountains in this area are composed of a variety of bedrock types including basalt, granite, metamorphic and some sedimentary rocks. The geology in this area has been exposed to varying climatic conditions and erosional processes, creating an assortment of landforms. Ashy soils are the dominant soil in the area and have greatly varying characteristics making erodibility highly variable and difficult to predict.

The dominant cover types in the South Fork AU include western red cedar/mixed mesic forest, Douglas fir/mixed xeric forest, grand fir, subalpine fir, and lodgepole pine. The grand fir mosaic is a unique community type found only in the Clearwater River drainage of northern Idaho and in the Blue Mountains of northeast Oregon. Within the Clearwater, this community type occupies approximately 500,000 acres between the Selway and South Fork Clearwater rivers. It occurs on all aspects in all topographic positions between 4,200 feet and 6,000 feet elevation. Factors limiting the persistence of the primary vegetative cover types in this area include timber harvest, insect infestation, wildfire/fire suppression, pathogens, herbivory, and competition. The only focal plant species documented as occurring in the South Fork AU is salmon-flowered desert parsley. Salmon-flowered desert parsley exhibits an affinity for canyon bottoms and stabilized talus, both of which occur in the South Fork AU. The species is threatened by road maintenance and gravel quarry operations.

There have been confirmed sightings of focal wildife species in the South Fork AU, including North American wolverine, fisher, white-headed woodpecker, black-backed woodpecker, and flammulated owl. The South Fork Clearwater AU represents a key habitat unit for black-backed woodpeckers. The loss of mature pine trees and snags at varying degrees of decay is considered a limiting factor to the persistence of both woodpecker species and the flammulated owl. Habitat losses have occurred through timber harvest, road construction, mining, and grazing.

Ownership is primarily federal (managed by USFS and BLM) with a small percentage held by the state of Idaho or private landowners. Approximately 25 percent of the South Fork AU is designated as either wilderness or inventoried roadless area. Forestry activities are represented in both past and present land use patterns. Forest road densities are unevenly distributed as a result of interspersed wilderness or inventoried roadless areas ranging to over 5 miles/sq. mile in some roaded areas, and commonly exceeding 3 miles/sq. mile in others.

The South Fork AU has the most diverse and extensive mining histories of any area in the Clearwater subbasin. A large number of the historic mines have high ecological hazard ratings, and many of the major tributary systems have been historically dredged. In addition, hydraulic mining was commonly used throughout the South Fork AU, leaving glory holes which continue to produce high sediment loads.

Both chinook salmon and steelhead trout populations in the South Fork AU are widely distributed and currently influenced by hatchery practices. Populations of both species are considered depressed throughout their known range in the South Fork Clearwater drainage. Westslope cutthroat trout are widespread but depressed through much of their range, with strong populations in southern tributaries originating in the wilderness area. Bull trout follow a similar pattern of distribution and status to westslope cutthroat trout. Known strong populations of bull trout are located in tributaries originating in wilderness areas although a strong population is known to exist in the Newsome Creek drainage as well. Brook trout are widely distributed throughout the South Fork drainage, and may compete with resident salmonids.
Sedimentation is a principal factor limiting fish populations within much of the South Fork AU. Upland and instream habitat disturbances are also important, and temperature limits the use or distribution of some species, particularly in the mainstem South Fork Clearwater River. Steep stream gradients are known to limit use of some areas by anadromous species, and similar impacts probably impact resident species as well.

2 Introduction

The Clearwater Subbasin Plan has been developed as part of the Northwest Power and Conservation Council's (Council; See Table 1 for a complete list of acronyms used in this document) Columbia River Basin Fish and Wildlife Program. Subbasin plans will be reviewed and eventually adopted into the Council's Fish and Wildlife Program to help direct Bonneville Power Administration (Bonneville) funding of projects that protect, mitigate and enhance fish and wildlife habitats adversely impacted by the development and operation of the Columbia River hydropower system. The, National Marine Fisheries Service (NMFS, also referred to as NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) intend to use subbasin plans as building blocks in recovery planning to meet the some of their requirements of the 2000 Federal Columbia River Power System Biological Opinion. Subbasin planning through the Council's program will also assist Bonneville with some of the requirements they have under the 2000 BiOp.

The Clearwater Policy Advisory Committee and the Nez Perce Tribe intend the Clearwater Subbasin Plan to serve multiple purposes. They intend the plan to meet the Council's call for subbasin plans as part of its Columbia Basin wide program and to provide a resource for federal agencies involved with Endangered Species planning efforts. But equally important this plan is a locally organized and implemented effort involving the major resource managers and local governments in the subbasin to develop the best possible approach to protecting, enhancing and restoring fish and wildlife in the Clearwater Subbasin. This plan is intended to provide resources necessary to develop activities forwarding the vision of the Clearwater Policy Advisory Committee at both subbasin/programmatic scales and to provide the context and information for developing site specific projects. The Clearwater Subbasin Plan is comprised of three volumes that are interdependent, but each provides a unique way in understanding the characteristics, management, and goals for the future of the Clearwater subbasin. The three volumes generally conform to the guidance set forth in the Council's *Technical Guide for Subbasin Planners* (2001), which became available during the middle of the project.

Assessment-- The assessment develops the scientific and technical foundation for the subbasin plan. The assessment provides an overview, a discussion of focal species and habitats, including environmental conditions and ecological relationships, limiting factors and synthesis and interpretation. The Clearwater Subbasin Assessment provides the analysis and background information to support the recommendations made in the Clearwater Subbasin Management Plan.

Inventory-- The inventory includes information on existing fish and wildlife programs, projects and activities past (last 5 years) and future. This information provides an overview of the management context, including existing resources for protection and restoration in the subbasin.

Management plan-- The management plan includes a vision for the future of the Clearwater subbasin, biological objectives, and strategies for reaching management goals.

The initial planning and cooperation building efforts that culminated in the development of the Clearwater Subbasin Plan began with the designation of the Clearwater subbasin as a Council Focus Program in late 1996. The purpose of the Clearwater Focus Program is to coordinate projects to enhance and restore fish and wildlife habitats in the Clearwater River subbasin to meet the goals of the Council's program. Idaho Soil Conservation Commission (SCC) and the Nez Perce Tribal Watershed Division (one of 6 divisions within the NPT Fisheries Department) co-coordinate the Focus Program on behalf of Idaho State and the Nez Perce Tribe (NPT).

Beginning in the fall of 1999, the NPT Watershed Division contracted with Washington State University, Center for Environmental Education (CEEd) to produce the Clearwater Subbasin Assessment. NPT provided funding for the assessment and planning via contracts with the Bonneville Power Administration. Idaho Soil Conservation Commission provided supplemental funding and staff resources. Early assessment work focused on anadromous and resident fish populations, available habitat quantity and quality, and land management implications to fish populations.

The Clearwater Focus Program convened the Clearwater Policy Advisory Committee (PAC) to coordinate a multi-agency, ecosystem-based approach to protection and restoration of fish and wildlife habitat and to oversee the Clearwater subbasin planning process. PAC membership includes representatives from the major resource management agencies, private landowners, and local governments in the Clearwater subbasin. Current PAC members include:

George Enneking*, Idaho Association of Counties, Chairman
Cal Groen, IDFG, Vice Chairman
Bruce Bernhardt, Nez Perce National Forest
Dale Brege, U.S. National Marine Fisheries Service
Kerby Cole, Idaho Department of Environmental Quality
Terry Cundy, Potlatch Corporation
Larry Dawson, Clearwater National Forests
Allen Slickpoo, Jr.*, Nez Perce Tribe Executive Committee
Kyle Hawley*, Idaho Assoc. of Soil Conservation Districts
Bob McKnight, Idaho Department of Lands
Bill Miller, U.S. Fish and Wildlife Service
*Elected officials of local or tribal government

In response to the more complete ecosystem view of subbasin planning emerging in the Council, a terrestrial subcommittee was formed by the PAC in mid-2000 to guide the development of the Clearwater Terrestrial Subbasin Assessment. The NPT's Wildlife Department was contracted to produce the terrestrial portion of the assessment in early 2001. Terrestrial subcommittee members included representatives from the NPT, Idaho Department of Fish and Game, U.S. Bureau of Land Management, Clearwater National Forest, U.S. Army Corps of Engineers and Potlatch Corporation.

Ecovista, a private company started by the original project staff from Washington State University, produced the Draft Clearwater Aquatic Assessment in September of 2001. The NPT Wildlife Department completed the Draft Clearwater Terrestrial Assessment in October of 2001. Ecovista integrated the two assessments into one document, addressed comments and integrated the collaborative efforts of subbasin resource managers into the Clearwater Subbasin Plan during 2002. Writing team members for these efforts include the following

Aquatic Assessment and Subbasin Management Plan

Thomas Cichosz,	fisheries biologist
Craig Rabe,	aquatic ecologist
Anne Davidson,	spatial ecologist
Darin Saul, Ph.D. ,	project manager/editor

Terrestrial Assessment

Angela Sondenaa, Ph.D.	botanist, wildlife biologist
Gail Morgan,	wildlife biologist, GIS analyst
Shana Chandler,	wildlife ecologist
Blair McClarin,	field biologist
Jeff Cronce,	GIS Analyst
Marcie Carter,	wildlife biologist
Carl Hruska,	wildlife biologist

The aquatics portion of the assessment was disseminated for review throughout the development phase using email lists compiled by Focus Program staff and as an entire draft in August 2001. Large portions of the aquatic assessment were also incorporated into the Clearwater Subbasin Summary, released May 2001 (Cichosz et al. 2001) and reviewed accordingly as part of the development process for that document. The terrestrial portion of the assessment was first disseminated for review as described for the aquatic assessment and as an entire draft in January 2002 and then again in a merged document March 2002. Through these review processes, hundreds of comments, suggestions and clarifications were received from local, state, tribal, and federal representatives with relevant professional expertise (Individual reviewers and contributors are listed in Table 3). Data, comments, and working knowledge of these individuals as it relates to the Clearwater subbasin have been integrated into the document to improve its accuracy and utility. There were 14 PAC and 10 subcommittee technical meetings, six Focus Program contracting meetings, and 2 meetings with NOAA Fisheries, Focus Program, and CEEd staffs during development of the Clearwater Subbasin Assessment (September 1999 – August 2001).

Subbasin planning began January 2002. The Clearwater PAC had functioned as the aquatic technical review subcommittee during the assessment phase, calling on respective staff for participation. The PAC decided for the planning phase an Aquatic Subcommittee should be formed to complement the Terrestrial Subcommittee, to provide technical direction to the contract writers of the subbasin plan. Membership on the subcommittees included Clearwater PAC members and staff representatives from fish and wildlife agencies in the subbasin. The subcommittees reviewed and worked on components of the subbasin plan as they were developed prior to each Clearwater PAC review. E-mail announcement of component re-writes were distributed to the technical contact list developed by the Focus Program staff (also used during the assessment phase). These reviews were prior to and independent of the July, August, September, and October (2002) releases of the subbasin plan drafts, which included the subbasin assessment, for comment. There were 13 PAC and nine technical subcommittee meetings, one conference call with NOAA Fisheries staff, and 11 public meetings held during development of the Clearwater Subbasin Management Plan and Inventory (January 2002 – October 2002). See Appendix C of the Subbasin Plan for a complete description of the Public and Government Participation Plan and overview of its implementation during the planning process. Individuals who participated in meetings, provided comment, or drafted portions during the planning phase of the Clearwater Subbasin Plan are listed in Table 3.

The Nez Perce Tribe Executive Committee passed a resolution on October 8, 2002 approving the motion to forward the Clearwater Assessment and Plan to the Council for review. The members of the Clearwater PAC endorsed the Final Draft Clearwater Subbasin Plan on October 8, 2002.[2]

The *Final Draft Clearwater Subbasin Plan* was presented to the full Council on November 14, 2002; a workshop was held later in November 2002 for the Independent Scientific Review Panel (ISRP) and a number of federal agencies in November 2002. The ISRP review of the Clearwater Subbasin Plan became available in February (Council Document 2003-3). NOAA Fisheries provided informal comments on the plan in February 2003 as well. The Clearwater PAC decided to go through a revision phase prior to submitting the subbasin plan for adoption into the Council's program.

Revision of the *Final Draft Clearwater Subbasin Plan* began April 2003 and was completed October 31, 2003 with the Clearwater PAC having held six meetings and the technical subcommittees four to complete revisions. Clearwater PAC representatives, Ecovista staff, and Council staff (Idaho) meet with NOAA fisheries staff from Idaho and Portland on May 8, 2003 to discuss the ESU population delineations made by the Interior Columbia Technical Recovery Team and again in a more regional meeting in July 2003. After each technical subcommittee meeting another draft of the subbasin management plan was prepared and announced for review using email lists compiled throughout the process. Individuals who participated in meetings, provided comment, or drafted portions during the revision phase of the Clearwater Subbasin Plan are listed in Table 3.

The Clearwater PAC endorsed the Clearwater Subbasin Plan and recommended it be submitted to the Council for adoption by motion on October 31, 2003.

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[2] The Clearwater PAC (referred to hereafter as the Parties)understand that this Plan shall be presented to the Northwest Power and Conservation Council (Council), as a proposed amendment to the Fish and Wildlife Program, for its review and appropriate action under the authority of the Northwest Power Planning Act. The Parties, except where specifically noted therein, support the Plan as an amendment to the Council's Fish and Wildlife Program, and its implementation if adopted as an amendment by the Council. The Parties believe that the Plan represents many areas of agreement, reached through a broadly collaborative process. However, the Parties recognize that the Plan does not resolve all differing legal, scientific and/or policy perspectives of the Parties, and that each Party may, at its own discretion, continue to advance their unique perspectives in the many fora dealing with the subject matter of the Plan. The Parties to this Plan specifically recognize that each Party reserves all legal rights, powers, and remedies now or hereafter existing in law or in equity, by statute, treaty, or otherwise. Nothing in this Plan is nor shall be construed to be a waiver, denial, or admission of any current or future legal claim or defense.

The Clearwater PAC will continue under the 2000 Columbia Fish and Wildlife Program and the Clearwater Subbasin Plan. The Clearwater Subbasin Plan will be reviewed and amended as necessary at least every five years after adoption into the Council's program.

The Clearwater Focus Program created by the 1994 Columbia Basin Fish and Wildlife Program will continue under the 2000 Columbia Basin Fish and Wildlife Program and the Clearwater Subbasin Plan. Proposals for appropriate operational funding will be made during provincial reviews or whatever other funding cycle the program endorses after subbasin planning. See Section 2 of the Clearwater Subbasin Inventory for a description of the subbasin plan review process and the functions of the Focus Program and PAC.

Table 3. Individuals who participated in the development of the Clearwater Subbasin Plan. Present and former Clearwater PAC members and alternates are shown in bold print.

Name	Agency	Specialty
Althouse, Scott	NPT	Law
Ballou, Erv	IDWR	Mining/Water Resources
Beach, Ted	Rocky Mtn Elk Foundation	
Bellatty, Jim	**IDEQ**	**Management**
Bennett, David	UI	Biology Fish
Blair, Steve	NPNF	Biology Wildlife
Blew, David	IDWR	Biology Aquatic
Bowler, Bert	IDFG	Biology Fish
Brege, Dale	**NOAA**	**Biology Fish**
Brostrom, Jody	IDFG	Biology Fish
Burge, Howard	USFWS	Biology Fish
Butterfield, Bart	IDFG	Biology Fish
Carter, Marcie	NPT	Biology Wildlife
Caswell, Jim	**IOSC**	**Management**
Cichosz, Tom	Ecovista	Biology Fish
Cochanauer, Tim	IDFG	Biology Fish
Cronce, Jeff	NPT	Biology Wildlife
Cundy, Terry	**Potlatch Corp**	**Hydrology**
Dansart, Bill	**ISCC**	**Geology/Hydrology/GIS**
Davidson, Anne	Ecovista	Biology Wildlife
Davis, Dan	CNF	Biology Wildlife
Davis, Russ	ACOE	Biology Wildlife
Dawson, Larry	**CNF**	**Management**
Dupont, Joe	**IDL**	**Biology Fish**
Eichert, Joe	**IDL**	**Management**
Eichstaedt, Rick	NPT	Law
Enneking, George	**Idaho County Commissioner**	**Local Government**
Espinoza, Al	Consultant	Biology Fish
Falter, Michael	UI	Limnology
Funkhouser, Zachary	ITD	Planner
Garcia, Steve	USGS	Hydrology
Gerhardt, Nick	NPNF	Hydrology

Name	Agency	Specialty
Gould, Justin	**Nez Perce Tribe Executive Committee**	**Local Government**
Graham, Bill	IDWR	Planning
Gray, Karen	Idaho Native Plant Society/Palouse Prairie Foundation	Biology Botany
Green, Dave	NPNF	GIS/database
Groen, Cal	**IDFG**	**Management**
Haagen, Ed	NRCS	Soils
Hansen, Jerome	**IDFG**	**Biology Wildlife**
Hansen, Richard	IDWR	Water Rights
Hassemer, Pete	IDFG	Biology Fish
Hawley, Kyle	**Farmer**	**Local Government**
Henderson, Kent	Idaho Wildlife Federation	
Hesse, Jay	NPT	Biology Fish
Hohle, Janet	SCC – Focus Program	Management
Hood, Ric	Clearwater County Commissioner	Local Government
Hornbeck, Twila		State Legislator
Huntington, Chuck	Clearwater Biostudies	Biology Fish
Iverson, Tom	CBFWA	Biology Fish
Jackson, Bob		Rancher/Houndhunter
Jahn, Phil	**NPNF**	**Management**
Johnson, Craig	BLM	Biology Fish
Johnson, Dave	NPT	Biology Fish
Jones, Dick	CNF	Hydrology
Jones, Ira	**NPT – Focus Program**	**Management**
Keen, Shelly	IDWR	Water Rights Coordinator
Keersemaker, John	**CNF**	**Management**
Kendrick, John	NRCS	Planning
Kiefer, Sharon	IDFG	Biology Fish
Klein, Linda	LRK Communications	Soils
Kozakiewicz, Vince	**NOAA**	**Biology Fish**
Koziol, Deb	NPSWCD	Biology Wildlife
Krakker, Joe	USFWS	Biology Fish
Kronemann, Loren	NPT	Biology Wildlife
Kucera, Paul	NPT	Biology Fish
Larson, Ed	NPT	Biology Fish
Larson, Jessica	IDWR	GIS / Water Planning
Lawrence, Keith	NPT	Biology Wildlife
Leitch, Joe	Lewis County Commissioner	Local Government
Lewis, Reed	Idaho Geological Survey	Geology
Lloyd, Rebecca	NPT	Engineer Environmental
Lozar, Ed	CNF	GIS/database
Macfarlane, Gary	Friends of the Clearwater	Range Ecology
Maiolie, Melo	IDFG	Biology Fish
McCool, Don	USDA Research	Agriculture
McGowan, Felix	NPT	Biology

Name	Agency	Specialty
McKnight, Bob	**IDL**	**Management**
McRoberts, Heidi	NPT	Biology Aquatic
Miles, Aaron	NPT	Forestry
Miller, Bill	**USFWS**	**Biology Fish**
Mitchell, Victoria	USGS	Geology
Morgan, Gail	NPT	Biology Wildlife
Morse, Tony	IDWR	Geology/GIS
Moser, Brian	**Potlatch Corp**	**Biology Wildlife**
Murphy, Pat	CNF	Biology Fish
Papanicolaou, Thanos	WSU	Hydrology
Paradis, Wayne	NPNF	Biology Fish
Parsons, Russ	UI Landscape Dynamics Lab	GIS
Peppersack, Jeff	IDWR	Water Rights
Rabe, Craig	Ecovista	Biology Aquatic
Rabe, Fred	Consultant	Biology Aquatic
Rasmussen, Lynn	NRCS	Agriculture
Rieman, Bruce	USFS-RMRS	Biology Fish
Ries, Bob	NOAA	Biology Aquatic
Russell, Scott	NPNT	Biology Fish
Saul, Darin	Ecovista	Ecology
Schriever, Ed	IDFG	Biology Fish
Scott, Mike	UI Landscape Dynamics Lab	Spatial Ecology
Servheen, Gregg	**IDFG**	**Biology Wildlife**
Somma, Angela	NOAA	Biology Fish
Sondenaa, Angela	NPT	Biology Wildlife/Botany
Spinazola, Joe	Bureau of Reclamation	Planner
Sprague, Sherman	NPT	Biology Fish
Statler, Dave	NPT	Biology Fish
Stinson, Ken	**LSWCD**	**Management**
Storrar, Ann	NPT	Water Resources
Svancara, Leona	UI Landscape Dynamics Lab	GIS
Taylor, Emmit	NPT	Engineer
Ulmer, Lewis	**Idaho County Commissioner**	**County Government**
Villavicencio, Adam	NPT	Conservation Enforcement
Weigel, Dana	BoR	Biology Fish
Yetter, Dick	NRCS	Biology Fish

3 Overview of Data Collection, Analysis, and Synthesis

3.1 Data and Information Gathering

Data and information presented in this series of documents (Assessment, Inventory, Plan) was gathered from a substantial variety of sources familiar with the ecological recources of the Clearwater subbasin (See Table 3 for a complete list of contributors). Initial data gathering was conducted through review of regional databases (i.e. ICBEMP, Streamnet, etc.) and through in-person, phone, and mail requests to the land and resource management agencies with responsibilities in the subbasin. In addition, representatives of those agencies were queried for other potentially relevant information sources. Subsequent data and information gathering was done through a chain referral type of process; As draft documents were presented for review and comment, all individuals involved in the review process were invited to supply additional information or relevant data not yet represented in the draft document(s). Since new information is constantly being collected and compiled, the data/information utilized in this series of documents can not be considered truly "complete". However, it is believed to represent the most complete and up-to-date information available (relevant to the subbasin scale) at the time each of the documents in this set were compiled.

3.2 Use and Processing of Spatial (GIS) Data

Availability and use of spatial (GIS) data in this series of documents provides a substantial progression beyond prior subbasin planning efforts in that it allows for visual presentation of information, in many cases making that information more easily understood and applied by users. In numerous instances, GIS was the primary tool used for data presentation, analysis, and synthesis (Tabular data was however, readily used to supplement GIS information or where no GIS information was available). A list of GIS data layers and their associate sources and scales is provided in Appendix A.

Although most GIS data layers used were not modified from their original state prior to use, processing steps were commonly necessary to allow for data summarization and/or analysis and the overlay of layers for presentation. Common data processing steps included reprojection, clipping layers to fit subbasin boundaries, joining layers from multiple data sources to form a single subbasin-wide layer (e.g. ownership), and summarizing data by HUC, AU, etc. When necessary, data processing was performed using basic database management tools available in (or supplemental to) ArcView software.

The projection chosen for presentation of GIS information throughout this series of documents is Universal Transverse Mercator Zone 11, North American Datum 1927. This projection was chosen due to its common use by land and resource management agencies within the Columbia Basin and, particularly, within the Clearwater subbasin. Spatial data obtained in other projections was reprojected to UTM Zone 11, NAD27 prior to analysis or presentation. Following reprojection of data layers, recalculation of relevant information (e.g. line lengths, polygon areas or perimeters, etc.) was performed as necessary to ensure consistency of data sets prior to any data analysis.

3.3 Information Development

Although this series of documents relied primarily on existing data sources, in a limited number of instances, it was practical and/or necessary to develop new information to aid in the subbasin assessment and planning process. Most commonly, development of new information involved basic modeling or synthesis of existing data to provide a useful tool for current and future planning efforts (e.g. uniform prediction of landslide hazard ratings across the subbasin). For cases when new information was developed, specific methods used to do so are described in the corresponding sections of this assessment. Table 4 provides an overview of new information developed for use in this assessment, including relevant section and figure numbers where readers can find additional details on the methods used for development of each item.

Table 4. Overview of new information developed during the Clearwater subbasin planning and assessment process.

Assessment Section	General Topic	New Information	Relevant Figures	Overview
4.6	Sedimentation	Potential Sediment Source Zone (PSSZ)	Figure 14, Figure 15	Variable width buffer around streams, based on topography. Subbasin wide surrogate for sediment transport efficiency.
4.6	Sedimentation	Landslide Hazard	Figure 13	Uniform application of an existing landslide hazard model across the subbasin.
4.8	Water Use	Max. Allowable Water Use	Figure 19, Figure 20	Defines maximum allowable potential use of groundwater or surface water by land section; derived from existing water rights and adjudication claims databases.
4.10.7	Land Uses	Index of Grazeable Lands	Figure 37	Uniform overview of the distribution of probable grazing activities for each 6^{th} field HUC within the subbasin.
7.2	Aquatic Productivity	Modeled results–Aquatic Production Potential.	Figure 98, Figure 99	Applies an experimental approach to estimate relative production potential (productivity) by 5^{th} field HUC across the subbasin.
8.3.5	Aquatic Limiting Factors	Road Culvert Index	Figure 110	Index of road culvert abundance, by 6^{th} field HUC, across the subbasin.
8.3.6	Aquatic Limiting Factors	Mean Weekly Maximum Temperature (MWMT)	Figure 111, Figure 112	Uniform application of an existing water temperature model across the subbasin. Results are compared to requirements of focal aquatic species.
Chapter 9	Resource Synthesis	Potential Management Units (PMUs)	Figure 113, Figure 114, Figure 115, Figure 116,	PMUs are derived to assist in data synthesis and interpretation, spatial prioritization of protection and/or restoration, and identification and prioritization of primary issues to be addressed to restore fish and wildlife resources.