SECTION 5 – Table of Contents

5 Coeur d' Alene Subbasin Overview

5.1 Regional Context for Coeur d' Alene Subbasin

The Coeur d' Alene Subbasin consists of two major tributaries to Coeur d' Alene Lake, the Coeur d' Alene and St. Joe rivers (Figure 5.1). The outlet of Coeur d' Alene Lake is the present day headwater point of the Spokane River, which flows westerly to its confluence with the Columbia River. Water levels in Coeur d' Alene Lake are controlled by operations of Post Falls Dam when the inputs from the Coeur d' Alene and St. Joe rivers and other tributaries are less than the discharge from the lake. During low flow periods, Post Falls Dam regulates discharge into the Spokane River. Post Falls Dam is privately owned and operated by Avista Corporation (Avista). Post Falls Dam is regulated by the Federal Energy Regulatory Commission (FERC) in its license to Avista and is on schedule to be re-licensed in 2005. No federal hydro-dams influence the lakes and streams within the Coeur d' Alene Subbasin.

Prior to hydroelectric development on the Spokane River, Spokane Falls was a natural barrier to anadromous and resident fish migration in the Spokane River (Scholz et al. 1985). However, evidence suggests salmon or steelhead may have passed Spokane Falls in high flow years (Scholz, EWU, personal communication). Post Falls located above Spokane Falls on the Spokane River formed a barrier to the post-glacial dispersal of fishes, such as the Pacific salmon and steelhead trout, from the lower Columbia River to the Coeur d' Alene Subbasin (Simpson and Wallace 1982).

Historically, the Coeur d' Alene Indian Tribe fished on the lower Spokane River and its tributaries for salmon and steelhead. It is estimated that before contact with European men, the Coeur d' Alene Tribe consumed between 71,100 to 124,500 salmon and steelhead annually (Scholz et al. 1985). The construction of Grand Coulee and Chief Joseph dams on the mainstem Columbia River in Washington state eliminated the potential for anadromous fish to migrate to all upriver tributaries including the Spokane River. The Coeur d' Alene Tribe was also ceded land up to and above Lake Pend Oreille, inclusive of Albeni Falls, which lies within the Pend Oreille Subbasin.

After the loss of their traditional salmon fishing grounds on the lower Spokane River as a result of Grand Coulee and Chief Joseph dams, Coeur d' Alene Tribal members placed more emphasis on harvesting big game and resident fish such as westslope cutthroat trout. Adfluvial and fluvial bull trout and cutthroat trout were historically present throughout much of the Subbasin. Historic catch estimates of cutthroat trout by the Coeur d' Alene Tribe were estimated at 42,000 fish per year (Scholz et al. 1985). Subsequent declines in native salmonid fish stocks in the Coeur d' Alene Subbasin, particularly westslope cutthroat trout, lead to the elimination of traditional subsistence fisheries by Coeur d' Alene Tribal members (Peters et al. 1999).

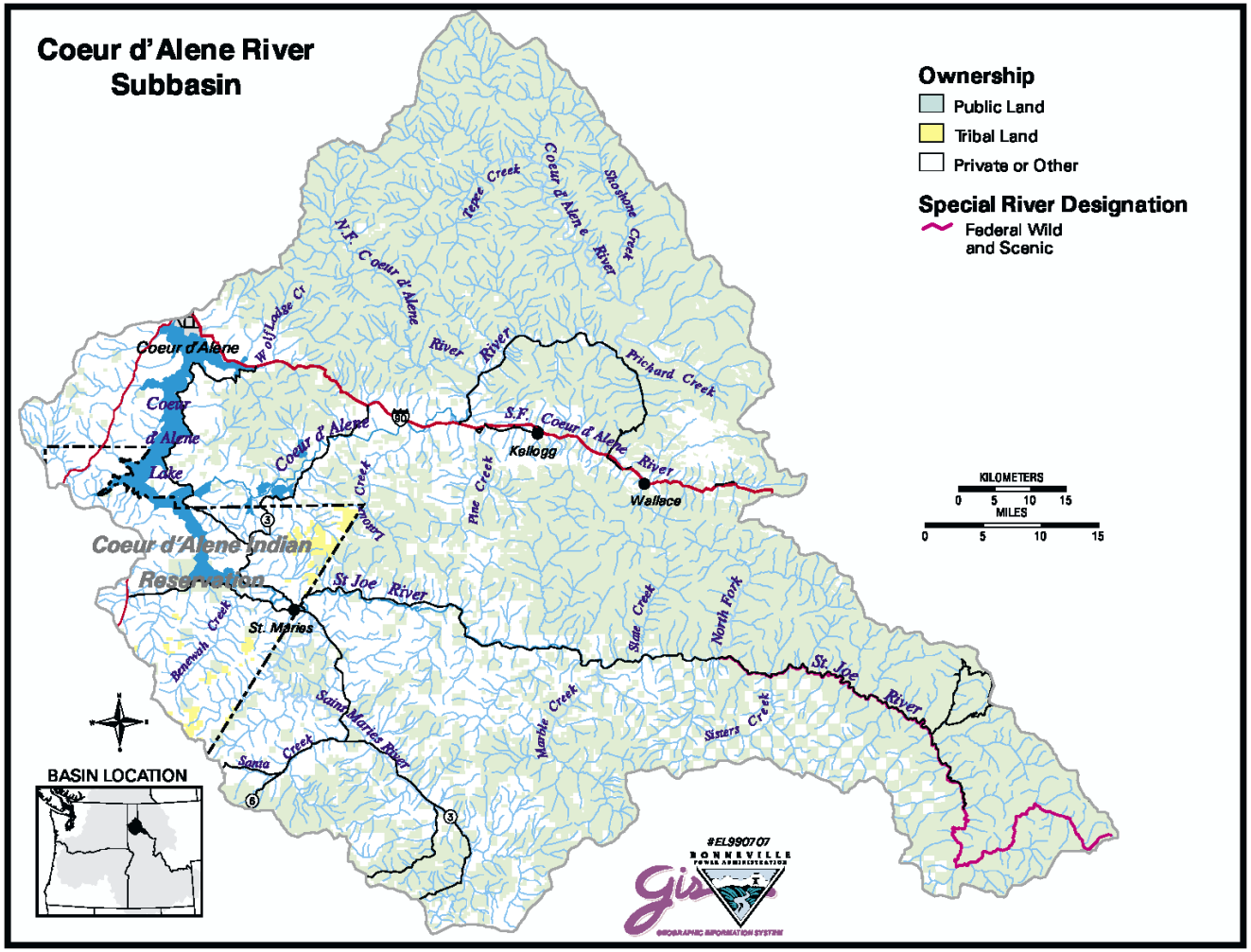

Figure 5.1. Location of the Coeur d' Alene Subbasin within the Columbia River Basin (Available: http://www.cbfwa.org/files/province/mtncol/geography.htm)

Today the populations of westslope cutthroat and bull trout in the Coeur d' Alene Subbasin are seriously depressed from their historic numbers. A combination of habitat alterations, nonnative species interactions, and over-harvesting has contributed to their declines. Currently bull trout are listed as threatened under the Federal Endangered Species Act by the USFWS (1998) and westslope cutthroat trout are a species of special concern in the state of Idaho.

5.2 Coeur d' Alene Subbasin Description[1]

The Coeur d' Alene Subbasin lies in four northern Idaho counties: Shoshone, Kootenai, Benewah, and a small portion of Latah. Coeur d' Alene Lake is the principle water body in the Subbasin and serves as the base elevation for the streams and rivers in the area (Figure 5.1). The lake is the second largest in Idaho. Population centers are located on the northern most shoreline of Coeur d' Alene Lake (Coeur d' Alene) and at the mouth of the Coeur d' Alene River (Harrison). The city of Coeur d' Alene is the largest in Kootenai County and Harrison is the second largest in Kootenai County. St. Maries, the largest town in Benewah County, lies about 19 kilometers (12 miles) upstream of Coeur d' Alene Lake on the St. Joe River. The Spokane River, the only surface outlet of Coeur d' Alene Lake, flows westerly from the northern end of the lake to its confluence with the Columbia River to the west-northwest.

The most significant water resource project within the Subbasin is the Post Falls Dam, which influences water levels in Coeur d' Alene Lake and the lower reaches of the St. Joe and Coeur d' Alene rivers for the summer and fall months. Construction of Post Falls Dam was completed in the early 1900s and is owned and operated by Avista Utilities. Regulation of water levels has significantly influenced habitat conditions along the lake shoreline and the lower reaches of the two principle rivers, Coeur d' Alene and St. Joe rivers, in the Subbasin. In addition, Red Ives Creek, a tributary to the St. Joe River contains portions of a historical dam created for a domestic water supply. This obsolete structure may still be impeding the movement of fish upstream, especially during times of base flow (PBTTAT 1998).

5.2.2 Drainage Area

The Coeur d' Alene Subbasin is approximately 9,946 square kilometers (3,840 square miles) and extends from the outlet of Coeur d' Alene Lake upstream to the Bitterroot Divide along the Idaho-Montana border (Figure 5.1). Elevations range from 646 meters (2,120 feet) at the lake to over 2,134 meters (7,000 feet) along the divide.

The lake lies in a naturally dammed river valley with the outflow currently controlled by Post Falls Dam. Post Falls Dam holds the lake level at higher elevations than would occur under natural conditions for some parts of the year and creates a backwater effect in the lower Coeur d' Alene, St. Joe, and St. Maries rivers. At full pool (lake elevation 648.7 meters) the lake covers 12,900 hectares (31,876 acres); at minimum pool level (lake elevation of 646.2 meters) the lake covers 12,200 hectares (30,146 acres) (Peters et al.

[1] The majority of the following section was taken from the Coeur d' Alene Subbasin Summary (2001) pp. 5-13

1999). The lake is 42 kilometers (26 miles) long and anywhere from 1.6 to 9.6 kilometers (1 to 6 miles) wide. The lake's mean depth is 22 meters (72 feet) with a maximum depth of 63.7 meters (209 feet).

Many tributaries feed Coeur d' Alene Lake. The two principle tributaries that drain the Coeur d' Alene and St. Joe mountains are the Coeur d' Alene and St. Joe rivers, respectively (Figure 5.2). The St. Joe River watershed drains an area of approximately 4,470 sq. kilometers (1,726 sq. miles) and contains more than 1,189 kilometers (739 miles) of streams with over 78 principle tributaries. The Coeur d' Alene River watershed drains an area of approximately 3,858 sq. kilometers (1,489 sq. miles), and contains an estimated 1,052 kilometers (654 miles) of stream with over 78 tributaries. In addition, over 27 tributaries encompassing more than 321 kilometers (> 200 miles) of streams feed directly into Coeur d' Alene Lake.

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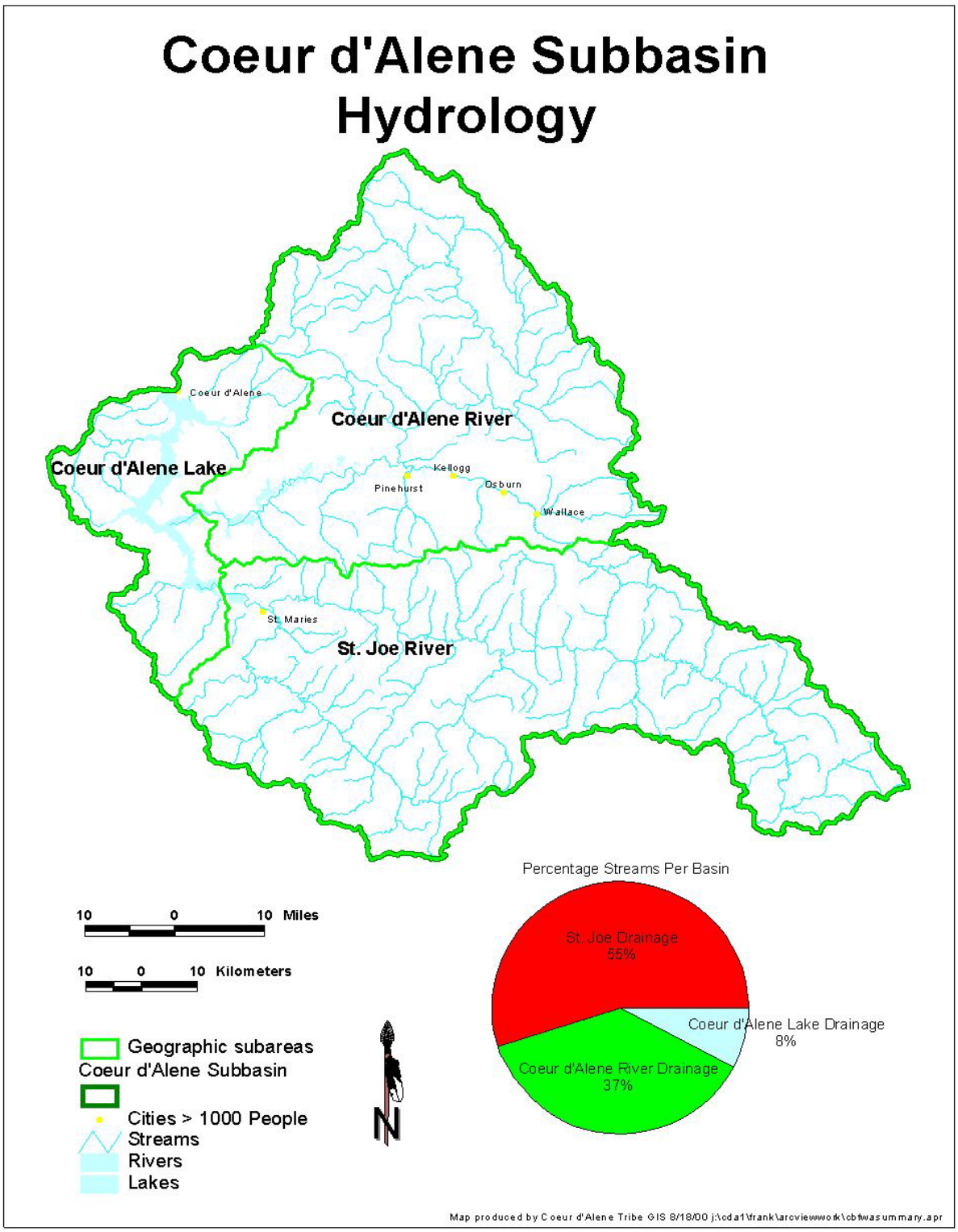

Figure 5.2. The three main geographic areas (drainages) within the Coeur d' Alene Subbasin and the percentage of streams within each geographic area

5.2.3 Climate

The climate and hydrology of the Coeur d' Alene Subbasin are influenced by maritime air masses from the Pacific Coast and prevailing westerly winds, modified by continental air masses from Canada. Summers are mild and relatively dry, while fall, winter, and spring bring abundant moisture as both rain and snow. Precipitation in the Subbasin ranges from about 76 cm to over 254 cm (30 to 100 inches) per year. Cyclonic storms, consisting of a series of frontal systems moving west to east, produce long duration, low intensity precipitation during the fall, winter, and spring. A seasonal snow pack generally covers the landscape at elevations above 1,372 meters (4,500 feet) from late November to May. Snow pack between elevations of 914 and 1,372 meters (3,000 and 4,500 feet) falls within the "rain-on-snow zone" (Figure 5.3) and may accumulate and deplete several times during a given winter due to mild storms (US Forest Service 1998). The precipitation that often accompanies these mild storms can cause significant flooding because the soils are either saturated or frozen and the rain and melting snow is added directly to the runoff.

The runoff period and peak discharge from the lake occur generally between April and June, but the highest recorded discharges from Coeur d' Alene Lake are from mid-winter rain-on-snow events. Peak flows from the St. Joe and Coeur d' Alene rivers have exceeded 1,416 cubic meters per second (cms) (50,000 cubic feet per second, cfs) and 1,982 cms (70,000 cfs), respectively. Average monthly discharges from both the St. Joe and Coeur d' Alene rivers range from September lows between 11 to 14 cms (400-500 cfs) to April-May highs of 198 to 227 cms (7,000 to 8,000 cfs).

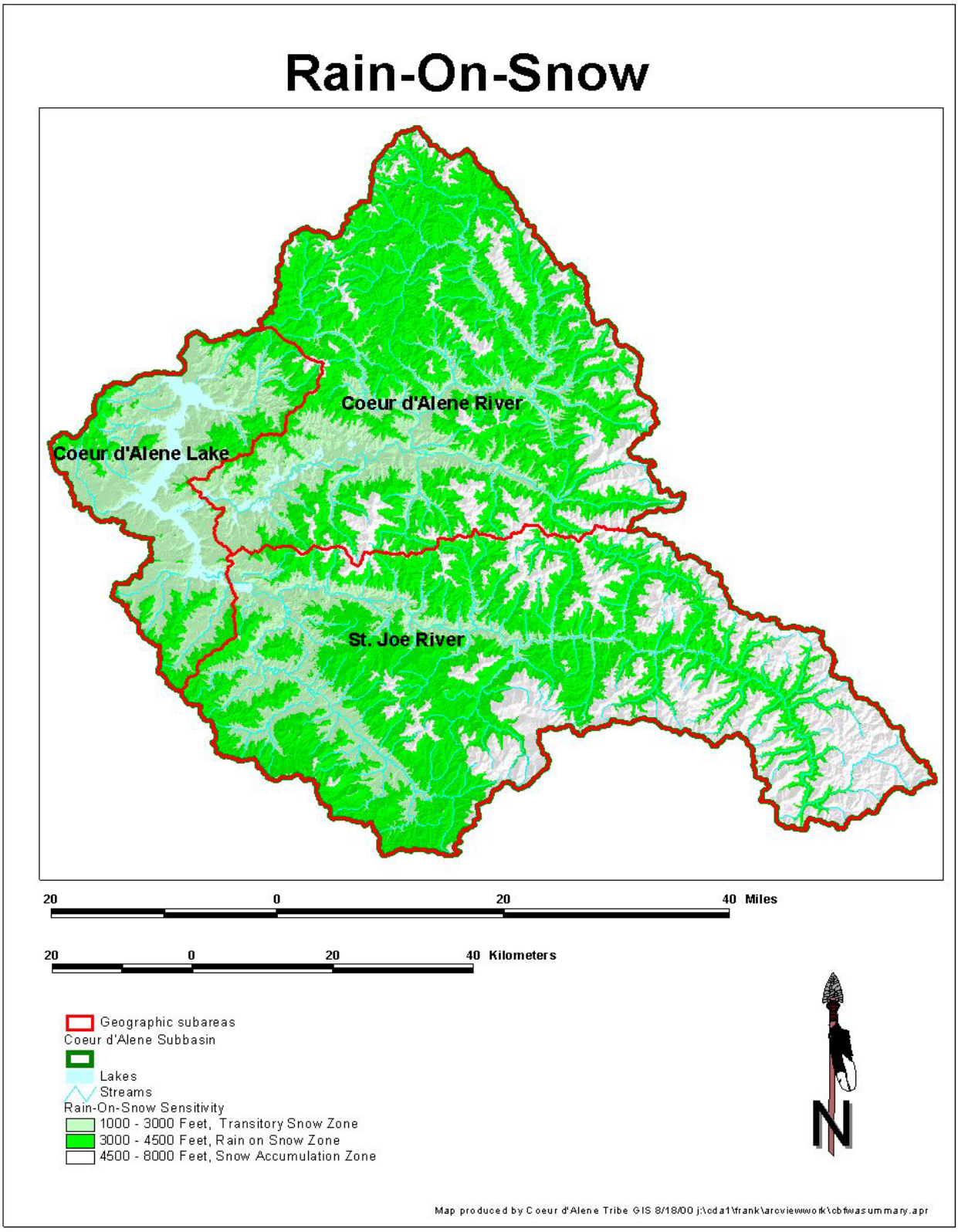

Figure 5.3. Coeur d' Alene Subbasin rain-on-snow sensitivity based on elevation

5.2.4 Topography and Geomorphology

Recently completed geographic assessments of the Coeur d' Alene and St. Joe river basins describe geologic and geomorphic processes affecting the Coeur d' Alene Subbasin (USFS 1998a, 1998b). Pre-Cambrian metasediments underlie most of the Coeur d' Alene Subbasin. Faulting and subsequent mineralization in portions of this area have resulted in deposition of valuable minerals including sulfides of lead, zinc, silver and antimony, and smaller quantities of copper, cobalt, and gold. The lower reaches of the rivers and streams draining into Coeur d' Alene Lake have been eroded in Miocene basalts, which overlie the basement complex. The basalts, in turn, are overlain by glacial alluvium or wind-blown loess deposits of post-glacial origin (Ross and Savage, 1967). The southern portion of the St. Joe River and St. Maries River drainages have been modified or influenced by intrusions of the highly granitic Idaho Batholith. These intrusions have resulted in the formation of re-metamorphosed sedimentary rock that tends to be less stable than landforms based primarily on metasediments.

The relatively rapid rate of mountain-forming uplifting, along with the runoff associated with a moist climate, has resulted in larger streams and rivers adjusting by cutting deep canyons and valleys. Breaklands are a common land type in the St. Joe and Coeur d' Alene rivers geographic areas. Breaklands are typically steep and may be more susceptible to mass erosion in some areas.

Glaciation played a role in the landform development of the Subbasin and formation of Coeur d' Alene Lake during the Pleistocene (Alt 2001). Coeur d' Alene Lake provides the base level for each of the three geographic areas (Coeur d' Alene Lake, Coeur d' Alene River, and St. Joe River) in the Subbasin (Figure 5.2). The river valleys of the lower St. Joe and Coeur d' Alene rivers evolved into broad, widely meandering depositional river channels with extensive, frequently flooded zones and wetlands adjacent to the main channel. These areas are highly productive for aquatic species, and are very sensitive to actions occurring in upstream areas. Alpine glaciation in the upper reaches of the St. Joe and Coeur d' Alene river watersheds resulted in alluvial valleys, which may be important for bull trout. The St. Maries watershed tends to be more rounded with less relief than the majority of the Coeur d' Alene Subbasin. Streams tend to be lower gradient and meandering, with a high percentage of the bed and banks comprised of finer alluvial materials and deposits.

5.2.5 Geology and Soils

The Coeur d' Alene and St. Joe mountains are composed primarily of Belt Supergroup metasedimentary rocks. This geology weathers to predominantly silt size particles with rounded cobbles as the primary transitional material found in the higher gradient streams. The Selkirk Range, from which streams flowing from the northwest drain to the lake, is a granitic formation. These granite substrates weather to sand. The predominant bedload of these streams is sand. The surface soils of the Palouse Hills are largely composed of wind-blown silt. The soil is underlain by Columbia River basalt. The basalt is found at the surface near the lakeshore. The division between granitic sands of the Selkirk Range and the silts of the Palouse Hills occurs at the northern end of the Lake Creek watershed.

Tributaries to the river and lake flowing from the mountains are high gradient streams channels (Rosgen B) until they reach the valley bottoms. As these streams enter the valley of the river or the lake, an abrupt transition to low gradient (Rosgen C) channels occurs in their final half-mile in the case of the river and final few miles in the case of tributaries to the lake. Streams flowing from the Palouse Hills have lower gradients near their headwaters, but have steep channels over basalt deposits as these streams approach the lake.

5.2.6 Vegetation

Vegetation in the Coeur d'Alene Subbasin is dominated by interior mixed conifer forest, with small amounts of montane mixed conifer and lodgepole forests in the highest elevations and interior grasslands along the western boundary. Agriculture is largely confined to the valley bottoms along the lower Coeur d'Alene, St. Joe, and St. Maries rivers, and to the Palouse regions to the southwest of Coeur d'Alene Lake. The largest urban areas present within the Subbasin boundary include the eastern portion of the City of Coeur d'Alene and the towns of Kellogg, Harrison, and St. Maries.

Figure 5.4 shows the current distribution of wildlife-habitat types in the Coeur d' Alene Subbasin based on IBIS (2003). A map of historic habitats in the IMP, including the Coeur d'Alene Subbasin, is presented in Section 4, Terrestrial Resources of the Intermountain Province (Figure 4.1).

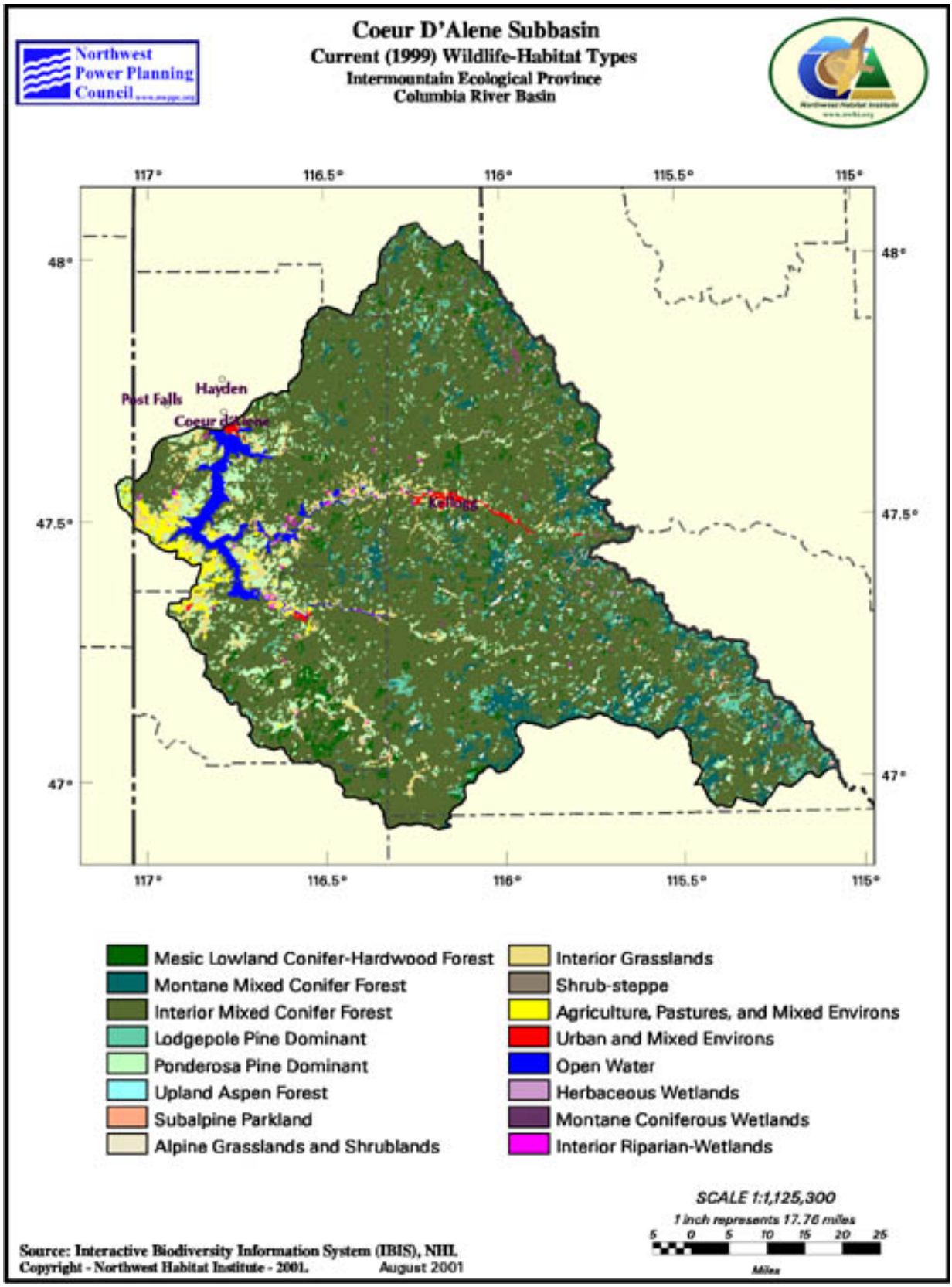

Figure 5.4. Current habitat types present within the Coeur d'Alene Subbasin

5.2.7 Major Land Ownership and Land Uses

Land ownership in the Subbasin is a checkerboard of private, federal, state, and Tribal parcels (Figure 5.5). A portion of the Subbasin (approximately 760 square kilometers) lies within the boundaries of the Coeur d' Alene Indian Reservation and the entire Subbasin lies within the Tribes' aboriginal territory. Major land managers within the Subbasin include the U.S. Forest Service (USFS), State of Idaho including Idaho Department of Lands, Idaho Department Fish and Game (IDFG), and Idaho Parks and Recreation, Coeur d' Alene Tribe, Bureau of Land Management (BLM), Capital Forest Group (acquired Louisiana Pacific Company and Crown Pacific International Corporation in 2001), and Potlatch Corporation. The USFS is the primary land manager in the Subbasin. The IDFG and the Coeur d' Alene Tribe are responsible for managing the fish resources in the Subbasin.

The major land uses within the Subbasin that have occurred historically and continue today include mining, forest management, road construction, and agriculture. Each of these land uses is discussed below. Each land use has had specific impacts to the aquatic and terrestrial resources, which are discussed in sections 6 and 7, respectively.

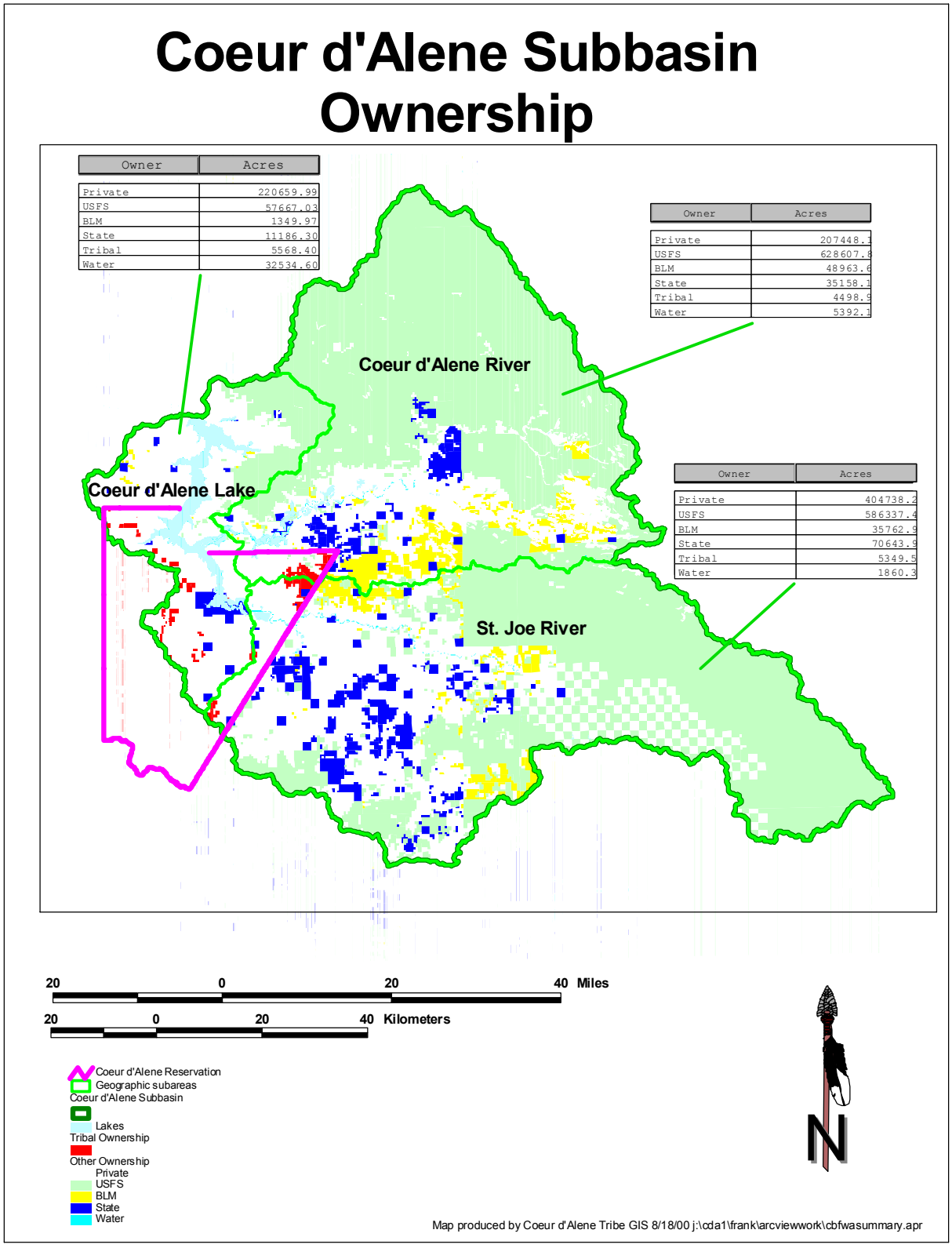

Figure 5.5 Land ownership within the Coeur d' Alene Subbasin

5.2.7.1 Mining

Mining activities in the Coeur d' Alene Subbasin focus on precious metals, gemstones, and aggregate. Development of the Silver Valley mining district in the South Fork Coeur d' Alene River valley began in the 1880s and has brought significant and essentially permanent changes to the South Fork watershed. Silver mining is still active in the valley, but at a much reduced level due to low silver prices and reduced ore bodies.

A large garnet placer mining operation in the St. Maries River watershed that began in the 1940s has resulted in significant alterations to Emerald and Carpenter creeks. Current mining operations in these streams have placed considerable emphasis on reclamation in recent years, resulting in significant improvements to aquatic habitat as compared with conditions between 1950 and 1990. Garnet mining operations still significantly alter stream courses, but reclamation is generally completed within two years of disturbance. New placer mining for garnets is currently being proposed along a 3.2-mile reach of the St. Maries River between the mouths of Emerald and Carpenter creeks.

Early gold placer mining operations in tributaries to the North Fork of the Coeur d' Alene River (Beaver and Prichard creeks) resulted in destruction of stream channels and floodplains, and continue to negatively impact aquatic habitat. To a lesser extent, placer mining also occurred in tributaries to the upper St. Joe River. Many of these tributaries support the last, best bull trout spawning and rearing habitat in the Coeur d' Alene Subbasin. Mining impacts appear to be less severe in the upper St. Joe watershed because mining activity was much less extensive than those in the Coeur d' Alene River watersheds.

Stone, sand, and gravel (aggregates) are mined for local use, primarily for road construction and surfacing. Several aggregate sources are located within the Subbasin, and in some cases aggregate mining is used in conjunction with stream stabilization projects to reduce bedload transport and accumulation in low gradient reaches of streams.

Recreational suction dredging is conducted under permits issued by the Idaho Department of Water Resources with input from the IDFG. Idaho Department of Environmental Quality (IDEQ) certifies permits to meet State water quality standards under section 401 of the Clean Water. Dredging seasons are established to minimize the risk to incubating trout eggs and recently hatched alevins, and are site specific. An applicant must go through a comprehensive permitting process before being allowed to operate a suction dredge outside established seasons. Suction dredging is closed in tributaries known to be important for bull trout and westslope cutthroat trout spawning.

5.2.7.2 Forest Management

Forest management activities occur on National Forest System lands, BLM, State of Idaho lands, Coeur d' Alene Indian Reservation, and private timberland. These activities include road building, harvesting, thinning, fertilizing, and fire suppression.

Early logging in the Coeur d' Alene Subbasin was largely centered on the river valley bottoms where logs could be easily skidded or transported by flume to the river and

ultimately floated to downstream mills. Historically many splash dams were present throughout the Coeur d' Alene Subbasin. Splash dams were used in the North and Little North Forks of the Coeur d' Alene River and tributaries to the St. Joe River, and in particular on Marble Creek. Although splash dams are no longer a part of forestry practices in the Subbasin, Marble Creek is still influenced by the remnants of an old splash dam, which may be a barrier or partial barrier for upstream fish migration.

Railroad logging was also common in portions of the Coeur d' Alene and St. Maries river watersheds. Prior to the establishment of the Idaho Forest Practices Act in 1974 and the National Forest Management Act, streams and riparian areas received little protection from harvesting, skidding, and wood processing activities.

Large openings in the forest canopy that permit free air movement over the snow pack can accelerate the rate of snow pack depletion. Openings from fires, insects and disease, and wind have always existed in the forested watersheds of the Coeur d' Alene Subbasin; however, the relatively recent clearing of forestland for logging, homesteads, pasture, and agriculture can accelerate this phenomenon. In Lake Creek, for example, where nearly 40 percent of the drainage area has been cleared for agriculture, peak discharges have increased by an estimated 55 percent for 100-year events when compared with the pre-settlement period (CDA Tribe 1998). Forest clearing has also occurred in other Coeur d' Alene Subbasin watersheds, and measurable increases in peak discharges for these areas have also been documented (IPNF 1994).

In addition to increases in peak discharge, past forestry practices substantially reduced the riparian flora, which in turn led to increased summer water temperatures and unnatural rates of fine sediment inputs into tributary streams (USFWS 2002). The direct and indirect effects of past forestry practices have had on the native fish populations are largely unknown. Although forest management practices now take into account the possible impacts to the whole stream ecosystem, the legacy of these activities still affects fish habitats in some areas of the Coeur d' Alene Subbasin and should be addressed to protect and restore fish habitat.

5.2.7.3 Road Construction and Railroads

Beginning in the late 1800s, two major railroads served the Silver Valley, resulting in floodplain confinement and dissection of the South Fork Coeur d' Alene River, mainstem Coeur d' Alene River, and some tributaries. In the early 1900s a third major rail line (the Milwaukee) was constructed through the North Fork St. Joe River drainage and then down the mainstem St. Joe River. A spur line was constructed along the St. Maries River. Several short line railroads were constructed around the St. Maries drainage for logging purposes. With the exception of the St. Maries River Railroad, which uses a portion of the Milwaukee line along the St. Maries and lower St. Joe rivers, none of these rail lines are still functional. However, legacy effects of past construction practices are evident and old unmaintained railroad beds continue to pose serious risks of fine sediment inputs to fish habitat in some portions of the Subbasin.

Some of the more profound disturbances the watersheds have been subjected to originate

from road construction. The road network in the Subbasin includes an interstate highway, five state highways, numerous county and municipal roads, and an extensive network of unimproved roads. Figure 5.6 shows road density within the Coeur d' Alene Subbasin (Map provided by Coeur d' Alene Tribe GIS, 2000).

The majority of the road density within the Subbasin is classified as very high (4.7-16.6 miles/square mile) (Figure 5.6). These areas with very high road densities occur on lands managed primarily for timber production. Average road densities on the Coeur d' Alene River District of the Panhandle National Forest exceed 16 km/sq. km (10 miles/sq. mile). The density of unimproved roads exceeds 4 km/sq. km (2.5 miles/sq. mile) representing the majority of the Subbasin.

Some roads initially constructed for timber harvest are still used for land management purposes, while many are now used mainly for recreational access and still others have been abandoned and are no longer maintained. On slopes, roads intercept the downward movement of subsurface water and cause it to flow rapidly on the surface. Road location and construction has increased erosion rates beyond natural levels for which the watersheds and streams evolved. Furthermore, the road systems have been constructed in floodplains and unstable land types, which are considered sensitive locations within the watersheds.

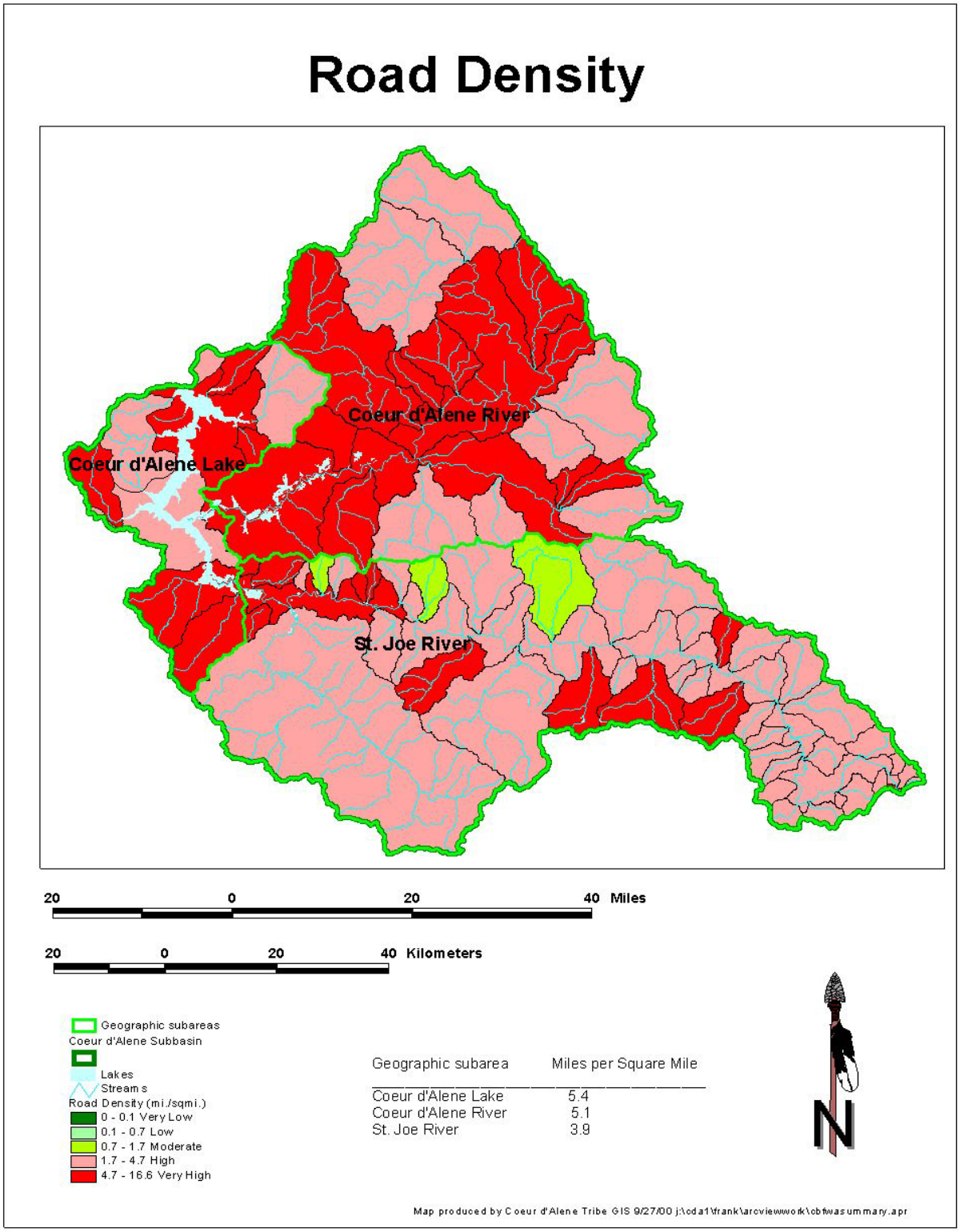

Figure 5.6. Road density within the Coeur d' Alene Subbasin
(*Source*: CDA Tribe 2000)

5.2.7.4 Agriculture

Agricultural activity is largely confined to the valley bottoms along the lower Coeur d' Alene, St. Joe, and St. Maries rivers, and on the Palouse region south and west of Coeur d' Alene Lake. Grazing allotments were established on some National Forest lands following the wildfires of 1910 and the 1930s. Large numbers of sheep were grazed until natural plant succession decreased forage, making grazing infeasible. Some cattle grazing still exists in portions of the Coeur d' Alene and St. Maries rivers watersheds, as private ranches dot the valley bottoms. Current grazing of pack and saddle stock by outfitters and the Forest Service is short-term and site-specific.

Agricultural activity has contributed to stream degradation in portions of the Coeur d' Alene Subbasin through increased sediment delivery, modifications to riparian areas, and the establishment of dikes and drainage districts, which modified floodplains and restricted spawning access to tributary streams. More recently, voluntary implementation of best management practices and participation in programs such as the Conservation Reserve Program has helped to reduce agricultural impacts on water quality and streams in some parts of the Subbasin.

5.3 Logic Path

The logic path starts with an overall physical description of the Subbasin, followed by an assessment of aquatic and terrestrial resources from which a management plan was created with specific strategies and objectives to address limiting factors and management goals. In the next section, Section 6 Coeur d' Alene Subbasin – Aquatic Assessment, aquatic resources regarding the historic and current status of selected focal species are described in detail. An analysis based on the QHA technique (described in Section 3) identifies specific habitat attributes that have been altered the most over time relative to the entire Subbasin and which areas in the Subbasin are categorized as having poor or good habitat for the respective focal species. Based on the current status of the focal species, limiting habitat attributes, and management goals recognized in the Subbasin, strategies and objectives were identified and are presented in Section 10 Coeur d' Alene Subbasin Management Plan. The terrestrial assessment, presented in Section 7, provides a description of the historic and current status of wildlife species and condition of terrestrial habitat types within the Subbasin. Based on the terrestrial assessment and key findings, strategies and objectives were developed and are defined in Section 10 Coeur d' Alene Subbasin Management Plan.

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6 Coeur d' Alene Subbasin Assessment – Aquatic

6.1 Species Characterization and Status[1]

Twelve native fish species and 16 introduced, exotic fish species inhabit the Coeur d' Alene Subbasin (Table 6.1). More detailed descriptions on the status of focal species (bull trout, westslope cutthroat trout, kokanee salmon) and other important species (brook trout, Chinook salmon, mountain whitefish, northern pike, northern pikeminnow, rainbow trout) are given in the sections that follow.

Table 6.1. Fishes of the Coeur d' Alene Subbasin

Common Name	Scientific Name	Location*	Native
Longnose sucker	*Catostomus catostomus*	B	Yes
Bridgelip sucker	*Catostomus columbianus*	L	Yes
Largescale sucker	*Catostomus macrocheilus*	L	Yes
Shorthead sculpin	*Cottus confusus*	Ri	Yes
Torrent sculpin	*Cottus rhotheus*	Ri	Yes
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	B	Yes
Mountain whitefish	*Prosopium williamsoni*	B	Yes
Northern pikeminnow	*Ptychocheilus oregonensis*	B	Yes
Longnose dace	*Rhinichthys cataractae*	Ri	Yes
Speckled dace	*Rhinichthys osculus*	Ri	Yes
Redside shiner	*Richardsonius balteatus*	Ri	Yes
Bull trout	*Salvelinus confluentus*	B	Yes
Lake superior whitefish**	*Coregonis clupeaformis*	L	No
Northern pike	*Esox lucius*	B	No
Tiger muskie	*Esox masquinongy x E. lucius*	B	No
Black bullhead	*Ictalurus melas*	L	No
Brown bullhead	*Ictalurus nebulosus*	L	No
Channel catfish	*Ictalurus punctata*	B	No
Pumpkinseed	*Lepomis gibbosus*	L	No
Smallmouth bass	*Micropterus dolomieui*	L	No
Largemouth bass	*Micropterus salmoides*	L	No
Rainbow trout	*Oncorhynchus mykiss*	Ri	No
Kokanee salmon	*Oncorhynchus nerka*	L	No
Chinook salmon	*Oncorhynchus tshawytscha*	B	No
Yellow perch	*Perca flavescens*	L	No
Black crappie	*Pomoxis nigromaculatus*	L	No
Brook trout	*Salvelinus fontinalis*	Ri	No
Tench	*Tinca tinca*	L	No

*L -Lake, Ri - River, B - Both

**Field observation by Ronald Peters, Coeur d' Alene Tribe Fisheries Manager

Past and present land and fisheries management practices throughout the Coeur d' Alene Subbasin have changed the fish assemblages in many of the watersheds in the Coeur d' Alene Subbasin. Habitat degradation from a multitude of factors has resulted in lower

[1] Large portions of the following section were taken from the Coeur d' Alene Subbasin Summary (2001), pp. 14-19.

quality habitats for native fishes, while in some instances increasing the aquatic habitats for nonnative species. Below is a short description of some of the species found in the Coeur d' Alene Subbasin.

6.1.1 Bull Trout

The Coeur d' Alene Subbasin lies within the native range of bull trout, although historic abundance and trend data are scarce. Historically adfluvial, fluvial, and most likely resident life histories were expressed within the Subbasin. Large migratory bull trout were historically abundant in the Coeur d' Alene Subbasin. Currently, adfluvial and fluvial life histories are present in bull trout populations, however bull trout are absent from much of the Coeur d' Alene Subbasin. Habitat degradation, migration barriers, and nonnative species interactions have all contributed to the species decline in not only the Coeur d' Alene Subbasin, but in most of their historical range. Bull trout were listed as threatened under the Federal Endangered Species Act in 1998.

6.1.2 Westslope Cutthroat Trout

Historically westslope cutthroat were the dominant salmonid in streams of the Coeur d' Alene Subbasin (Behnke and Wallace 1986). Few data describe the historic abundance of westslope cutthroat trout in the Coeur d' Alene Subbasin, but many historic accounts suggest that densities were high throughout the Subbasin. Resident, fluvial, and adfluvial forms of westslope cutthroat trout were all present within the Subbasin historically. Although all three forms still exist today, a combination of habitat degradation, migration barriers, and exotic species interactions have substantially reduced the diversity of the current populations.

Densities of westslope cutthroat trout are thought to have declined throughout much of the Subbasin. Adfluvial populations have declined the most and have been extirpated from many parts of the Subbasin, while resident and fluvial populations in headwater reaches of the St. Joe River remain at near historic levels of abundance. Rainbow trout hybridize with cutthroat trout and some hybrids are found in the lower Coeur d' Alene and St. Joe rivers. The extent of hybridization is unknown at this time, but many pure strain populations with resident or fluvial life histories still exist, especially in headwater reaches.

6.1.3 Kokanee Salmon

Kokanee salmon were introduced from Lake Pend Oreille into Coeur d' Alene Lake in the 1940s (Horner, IDFG, Regional Fisheries Manager, personal communication, July 2003) and have become the most important game fish in the lake. The kokanee salmon population in Coeur d' Alene Lake has been naturally reproducing and self-sustaining since the 1960s when road reconstruction along I-90 enhanced shoreline spawning habitat (Horner, IDFG, Regional Fisheries Manager, personal communication, July 2003). In 1979, the lake provided a harvest of nearly 600,000 kokanee salmon and supported over 250,000 angler hours. However, the kokanee population continued to expand and with no predator to control their abundance, became too numerous and stunted. Fall Chinook salmon were introduced in 1982 to help control kokanee abundance. Chinook are managed with both wild production from spawning in the Coeur d' Alene and St. Joe

rivers and some hatchery supplementation to regulate the kokanee population. Today, kokanee salmon not only provide an important recreational fishery, but they provide a major source of prey for landlocked Chinook salmon and adfluvial bull trout rearing in Coeur d' Alene Lake. Kokanee salmon also provide an important subsistence fishery for the Tribal people of the Coeur d' Alene Tribe, who once relied on anadromous salmon in the Lower Spokane River.

6.1.4 Mountain Whitefish

Mountain whitefish were one of the most abundant and widely distributed game fish in the Coeur d' Alene Subbasin. Historically, mountain whitefish were a significant species in Coeur d' Alene Lake, but their abundance has declined dramatically. Strong populations are still found in riverine habitats of the Coeur d' Alene, St. Joe, and St. Maries rivers. Recent surveys indicated mountain whitefish were the dominant game fish captured in electrofishing samples from the Coeur d' Alene, St. Joe, and St. Maries rivers (Apperson et al. 1987; Fredericks et. al. 2002). Although mountain whitefish were found primarily in mainstem reaches of large rivers, their presence was also noted in several smaller tributaries to the St. Joe and St. Maries rivers. Strong populations remain of mountain whitefish in parts of the Coeur d' Alene Subbasin, but it is unclear whether these populations are currently stable, decreasing, or increasing. Future surveys may provide valuable insight into the current status of this species in the Subbasin.

6.1.5 Northern Pikeminnow

Northern pikeminnow are a native species and have likely increased from historic levels due to the increase in slackwater habitat resulting from the impoundment by Post Falls Dam. Northern pikeminnow populations in the St. Joe and St. Maries rivers have been intensively researched in past years. The dominant prey of 449 northern pikeminnow collected from the lower St. Joe River (Falter 1969) consisted of sculpins, dace, crayfish, redside shiners, insects, tench, yellow perch, and pumpkinseeds; no trout were found. Falter (1969) attributed the lack of predation on trout by pikeminnow to habitat segregation of the two groups. Despite these findings, social influence and concerns with interspecific competition and predation prompted numerous eradication programs. These programs were discontinued following treatments in the St. Maries and St. Joe rivers in 1973 and 1975, respectively. In surveys conducted in 1986 and 1987, Apperson et al. (1987) found northern pikeminnow numbers were at or near population levels prior to treatment. Gillnetting and electrofishing samples indicated northern pikeminnow were among the dominant species present in slackwater areas of the St. Joe and St. Maries rivers.

6.1.6 Northern Pike

Northern pike were illegally introduced into Coeur d' Alene Lake during the 1970s (PBTTAT 1998). Northern pike inhabit the weedy bays of Coeur d' Alene Lake as well as the Lateral Lakes. In 1989 and 1990, Rich (1992) studied northern pike population dynamics, food habits, movements and habitat use in the Coeur d' Alene Lake system and documented predation on adult and juvenile native westslope cutthroat trout. This study found relatively low densities of northern pike, compared to other areas in their current range, which was attributed to angler exploitation. The current management

direction for northern pike is to maintain a year-round season and liberal limit of six northern pike daily to reduce predation on native westslope cutthroat and bull trout as well as other popular sport fish species.

6.1.7 Brook Trout

Eastern brook trout were stocked into many of the waters in the Coeur d' Alene Subbasin as early as the 1900s (PBTTAT 1998). Currently brook trout are distributed in some of the tributaries, several mountain lakes, and the upper most reaches of the South Fork Coeur d' Alene River. They are present, although to a lesser degree, in some tributaries to the North Fork Coeur d' Alene and St. Joe rivers.

It is still unclear to the extent that brook trout affect bull and westslope cutthroat trout, but it has been shown that eastern brook trout can out-compete and hybridize with bull trout (Gunckel et al.2001; Kanda et al. 2002). Griffith (1988) wrote that westslope cutthroat trout populations are less likely to coexist with brook trout than with other nonnative salmonid. Varley and Gresswell (1988) noted nonnative brook trout are capable of replacing native cutthroat trout populations.

6.1.8 Rainbow Trout

Rainbow trout were widely stocked into waters throughout the Coeur d' Alene Subbasin and can hybridize with westslope cutthroat trout. Today, rainbow/cutthroat hybrids are present in the lower reaches of the mainstem Coeur d' Alene River, and to a lesser extent in the lower St. Joe River, but there is little evidence of past rainbow stocking having resulted in widespread hybridization of native westslope cutthroat trout populations. The Idaho Department of Fish and Game (IDFG) shifted to stocking only sterile triploid rainbow trout statewide in 1998 and in 2003, while all river stocking of rainbow trout ended in the Coeur d' Alene Subbasin (Horner, Regional Fisheries Manager, IDFG, personal communication, December 2003). Put-and-take rainbow trout fisheries are still provided by stocking ponds located along popular river sections.

6.1.8 Chinook Salmon

In 1982, Chinook salmon were first introduced into Coeur d' Alene Lake as a biological control to manage an increasing kokanee population. Chinook salmon abundance is managed through wild escapement in the Coeur d' Alene and St. Joe rivers as well as some supplementation with hatchery fish in the north end of the lake. The management plan for Chinook salmon calls for a total annual stocking level of 70,000 Chinook smolts with wild (approximately 40,000) and hatchery (approximately 30,000) combined. Chinook abundance is controlled to maintain kokanee at a level that maintains a yield fishery for 10-11 inch kokanee and a limited trophy fishery for Chinook salmon in the 3-18 pound range (IDFG Fisheries Management Plan 2001-2006). Chinook salmon provide an important component of the sport fishery of Coeur d' Alene Lake, but may have some detrimental effects on the native sport fishes through direct predation on juvenile westslope cutthroat or bull trout.

6.1.9 Artificial Production

The IDFG historically stocked rainbow trout over much of the watershed to enhance sport-fishing opportunity. Since 1998, all of these fish were sterile triploid rainbow trout produced by heat shocking the eggs. Stocking of rainbow trout has been greatly reduced and is now limited to stocking sterile triploid rainbow trout in a few ponds located adjacent to tributaries, near the river, or in drive to mountain lakes. All stocking of rainbow trout in rivers within the Coeur d' Alene Subbasin was discontinued in 2003 (Horner, IDFG, personal communication, December 2003).

In 1889, the U.S. Fish Commission placed 1.9 million Lake Superior Whitefish fry in Coeur d' Alene Lake (Simpson and Wallace 1982). No evidence was found that any fish from this plant survived. However, the Coeur d' Alene Tribe captured a single specimen off Conkling Point in Coeur d' Alene Lake in 1996 during a deep-water gill net survey. Since the specimen was released, a second confirming identification was not made. This was the only specimen captured in five years of sampling from 1996-2000.

Coeur d' Alene Lake has at least 12 introduced species. Chinook salmon are currently the only species where artificial propagation is used as part of the management program. Chinook salmon abundance is managed through wild escapement in the Coeur d' Alene and St. Joe rivers as well as some supplementation with hatchery fish in the north end of the lake. The management plan for Chinook salmon calls for a total annual stocking level of 70,000 Chinook smolts (wild and hatchery combined). Wild production is managed by allowing up to 100 Chinook redds that produce an estimated 40,000 Chinook smolts. If redd numbers exceed 100, redds are physically removed by blasting them with a fire pump (this has only been done once). Hatchery Chinook are used to bring stocking levels up to 70,000 total. Chinook stocking has ranged from zero to 60,100 smolts annually, with an average of 30,200 stocked annually during the 22-year history of this management program (total of 663,900 hatchery Chinook stocked over the past 22 years) (Horner, IDFG, personal communication, December 2003).

The Coeur d' Alene Tribe fisheries program calls for the construction of a trout production facility to supplement wild stocks of westslope cutthroat trout in four Reservation streams. To date, this facility has not received the support of the Northwest Power and Conservation Council (Council).

6.2 Focal Species Selection

Three fish species were chosen for the aquatic focal species for the Coeur d' Alene Subbasin, bull trout, westslope cutthroat trout, and kokanee salmon. The rationale for choosing these species is described below.

Bull trout are important ecologically since they exhibit two life history strategies within the Coeur d' Alene Subbasin, adfluvial and fluvial. Compared to westslope cutthroat trout, bull trout were most likely not as abundant or widely distributed historically. However, bull trout did provide an important sport and subsistence fisheries historically, and were and are capable of reaching trophy sizes in the unproductive water of the Subbasin. Bull trout have been listed as threatened under the federal Endangered Species

Act since 1998. Since no harvest of bull trout is currently allowed, if recovered, bull trout could contribute to the recreational fisheries of the Subbasin.

Westslope cutthroat trout were chosen as a focal species based on their recreational, cultural, and ecological significance to the Coeur d' Alene Subbasin. Westslope cutthroat trout were once very abundant throughout the Subbasin, and are still present throughout much of their historic range, although many factors are currently threatening their populations. Westslope cutthroat trout exhibit three life history strategies, adfluvial, fluvial, and resident within the Coeur d' Alene Subbasin. In addition, westslope cutthroat trout are recognized as a major sport fish in the Subbasin, thus restoring all three forms of westslope cutthroat trout in the Subbasin would increase angling opportunities.

Kokanee salmon are not native to the Coeur d' Alene Subbasin, but have provided important sport fisheries since the 1940s and an important source of forage for native bull trout and landlocked Chinook salmon. The majority of kokanee spend their entire life in Coeur d' Alene Lake and spawn along the shoreline in the north end of the lake (Horner, IDFG, personal communication, December 2003). Few kokanee utilize tributaries for spawning.

Although kokanee salmon have been introduced to the Subbasin, this species meets the criteria for selecting a focal species, as discussed in Section 3, and was selected in the Coeur d' Alene Subbasin. Kokanee salmon are important to the Subbasin from an ecological perspective. They are known to be one of the primary food resources for threatened adfluvial bull trout in Coeur d' Alene Lake. In addition, kokanee salmon are one of the most sought after species in Coeur d' Alene Lake by recreational anglers. Kokanee have also helped mitigate for the loss of anadromous salmon runs for the people of the Coeur d' Alene Tribe of Indians. Since historical runs of anadromous salmon have ceased to exist after the construction of Chief Joseph and Grand Coulee dams, Tribal members have shifted, at least in part, from traditional subsistence uses to the harvesting of kokanee salmon.

All three focal species chosen in the Coeur d' Alene Subbasin are indicators of ecological health. Bull trout and westslope cutthroat trout overlap in many of their habitat requirements, but are separated temporally in spawning and migration. Bull trout spawn in the fall and westslope cutthroat trout in the spring, thus spawning and rearing habitats need to be evaluated throughout the entire year. Both species use small tributaries, mainstem rivers, and lakes for the various life histories they exhibit. Thus, habitat degradation or restoration in any one of these habitat types could influence populations. Using kokanee salmon as a focal species helps managers evaluate the lentic habitat and the productivity of lentic systems throughout the Subbasin. Changes in kokanee salmon populations can result from a multitude of factors; some possibilities are changes to the productivity or the trophic dynamics of a lake, changes in predation rates, and degradation or restoration of spawning habitat. Kokanee also provide a critical food source for migrating bald eagles in the fall and early winter. Over 100 bald eagles have been counted in the north end of the lake feeding on kokanee during December. However, since most kokanee are beach spawners, spawning along the northern shoreline of the lake, the majority of carcasses decompose in the lake and benefits from these

nutrients are not realized in tributary systems or by terrestrial species associated with those systems.

6.3 Focal Species – Bull Trout

6.3.1 Historic Status

Bull trout were historically found in Coeur d' Alene Lake and its major tributaries, the St. Joe, St. Maries, and North and South Fork of the Coeur d' Alene rivers. Although historic bull trout distribution is not well-known, it is thought bull trout occurred throughout the Subbasin (USFWS 2002). Bull trout likely expressed three life histories within the Coeur d' Alene Subbasin: adfluvial, fluvial, and resident. Currently only fluvial and adfluvial life strategies are known to be present.

Historical data on bull trout distribution is limited and insufficient to provide abundance estimates in the Subbasin as a whole or within any sub-watershed. The very specific habitat requirements for bull trout and the apex predator role they fill in the fish community likely meant bull trout were not as numerous or widely distributed as westslope cutthroat trout. During the 1930s, Maclay (1940) observed bull trout in eight creeks including Grizzly, Brown, Beaver, Lost, Big, Downey, Yellow Dog, and West Fork Eagle creeks, in addition to the North Fork Coeur d' Alene River. During the same time, Fields (1935) and Maclay (1940) also observed bull trout in Santa Creek, a tributary to the St. Maries River. During the 1960s and 1970s, incidental observations of bull trout were made during several studies on westslope cutthroat trout within the Subbasin (Averett 1963; Rankel 1971; Thurow and Bjornn 1978).

Although dolly varden (*Salvelinus malma*), a close relative of bull trout, were stocked in the 1970s in Idaho, there has been no stocking of bull trout or dolly varden in any water that would influence existing bull trout populations. In 1993, two mountain lakes in the Coeur d' Alene Subbasin were stocked once with surplus bull trout. The bull trout were derived from an experimental program to evaluate hatchery spawning, hatching and rearing of bull trout in the Lake Pend Oreille system. Bull trout from two sources from Lake Pend Oreille (Gold Creek and the Clark Fork River) were spawned and the progeny of those fish were stocked into Revett Lake (309) and Upper Gildden Lake (180) to evaluate the potential for stunted brook trout control. Upper Gildden Lake is the upper most headwater of Canyon Creek, one of the most heavily polluted tributaries from mining waste of the South Fork Coeur d' Alene River. Revett Lake is in the headwater of Prichard Creek, a tributary of the North Fork Coeur d' Alene River that has the most extensive dredge mining of any system in the Coeur d' Alene Subbasin (Horner, IDFG, personal communication, December 2003). Limited sampling in Revett and Upper Gildden lakes by the IDFG has indicated these hatchery bull trout did not survive.

6.3.2 Current Status

In general, the current distribution of bull trout in the Subbasin is considered to be "substantially less" than the historical distribution (USFWS 2002). Today, bull trout are found primarily in the small concentrated areas of upper portions of the St. Joe River drainage (PBTTAT 1998). Bull trout use the St. Joe River and Coeur d' Alene Lake for adult rearing, migration, and over-wintering habitat (USFWS 2002). Over 70 percent of

bull trout present in the St. Joe River drainage are found upstream of Heller Creek, with over 50 percent occurring in a 3 km reach in Medicine Creek (PBTTAT 1998). Bull trout populations throughout the rest of the Couer d' Alene Subbasin are either at undetectable levels or have gone locally extinct. Few verified sightings of bull trout have been recorded in recent years.

The following streams (tributaries to either Coeur d' Alene Lake, Lower St. Joe River, St. Maries River, or the lateral lakes) were surveyed by the Coeur d' Alene Tribe for native trout from the mouth to the headwaters: Fighting Creek, Lake Creek, Plummer Creek, Benewah Creek, Cherry Creek, Hells Gulch Creek, Alder Creek, Evans Creek, Pedee Creek, Cottonwood Creek, Squaw Creek (West Side), and all tributaries of these creeks. Additional primary tributaries include Wolf Lodge Creek, Beauty Creek, Carlin Creek, Mica Creek, and Cougar Creek. No bull trout were found in any of the streams except one sub-adult found in Lake Creek in 1993 and one sub-adult found in Fighting Creek in 1998. Adfluvial populations of bull trout, although considered seriously imperiled (USFWS 2002), do reside in Coeur d' Alene Lake, and are believed to spawn above Heller Creek in the upper St. Joe River.

Although there are data showing bull trout present in the Couer d' Alene Subbasin, there is inadequate data to provide a current bull trout abundance estimate in the Subbasin or within any individual watershed. Redd counts conducted in the upper St. Joe River and tributaries provide a minimum estimate ranging from 190 to 264 spawning adults (USFWS 2002). However, annual surveys are not conducted in all tributary or river reaches where spawning activity occurs and some bull trout exhibit alternate year spawning behavior, thus these population estimates may be low (USFWS 2002). During the 12-year survey period from 1992 to 2003, bull trout redd counts in three index streams (Medicine Creek, Wisdom Creek, upper St. Joe River between Heller Creek and St. Joe Lake) have ranged from 15-69 with an average of 42 redds (USFWS 2002, Horner, Regional Fisheries Manager, IDFG, personal communication, December 2003).

The complete absence of bull trout from tributaries to the North Fork Coeur d' Alene River in recently conducted fish population inventories, compared with reported distribution in the watershed historically, suggest bull trout may be now extirpated from the Coeur d' Alene River system. Comparison of historic and current distribution data of bull trout in the St. Joe River system indicate bull trout may have been more widespread, but that hypothesis is only partially supported due to the lack of specificity of the historic data.

It is also important to note that infrequent fish surveys do not demonstrate the absence of bull trout in tributary streams. Many survey methods are not rigorous enough to observe bull trout populations in low densities (USFWS 2002). Although fish surveys may not detect the presence of bull trout, the presence of suitable habitat parameters may be suffice to consider such areas for restoration/protection (USFWS 2002).

There are no data sets of sufficient length to assess current bull trout population trends in the Coeur d' Alene Subbasin. Even where declines in bull trout populations could be

large, detection of trends often require long-term sampling, even longer than ten years of sampling. The only information available to give an indication of long-term trends is a comparison of known current distribution with reported historic distribution. The value of these comparisons is limited due to data limitations, and in particular the historic information. Recovery strategies and objectives for bull trout in the Subbasin are outlined in the management plan presented in Section 10.

6.3.3 Limiting Factors Bull Trout

Based on the QHA analysis, bull trout were recognized as being historically present in 27 of 36 watersheds in the Coeur d' Alene Subbasin. Since historical data is limited, the historical distribution of bull trout remains in dispute for five creeks among local biologists. For example, IDFG biologists do not agree bull trout were historically present in Plummer, Pedee, Fighting, Benewah, or Lake creeks as listed in Table 6.2 or analyzed for Table 6.3. If the historical distribution estimate used in the QHA is accurate, then current distributions have dropped 44 percent to only include 15 watersheds. The reaches no longer supporting bull trout populations (based on QHA results) are listed in Table 6.2.

Table 6.2. List of 12 reaches where bull trout are not currently present, but were historically present. Reach rank refers to the degree of habitat change from reference to present conditions (1 = greatest habitat alteration)

Reach Name	Reach Rank
East Fork Pine Creek	4
Prichard/Beaver Creek	6
Placer/Big Creek	7
Upper St Maries River	9
Latour Creek	12
Mica Creek (Joe)	13
West Fork Pine Creek	15
North Fork St. Joe	18
Marble Creek	18
Tepee	23
Upper North Fork Coeur d' Alene	25
Independence	26

The top five ranked watersheds having experienced the greatest degree of habitat deviation from reference conditions within the Subbasin are Benewah, Plummer/Pedee Creek, mainstem of the South Fork Coeur d' Alene River, Lake Creek, and East Fork Pine Creek (Table 6.3). Among the top five watersheds, almost all habitat attributes were identified as being altered and there does not appear to be one specific limiting habitat attribute common to all watersheds. Riparian condition, channel stability, habitat diversity, and fine sediments were more commonly impacted in the remaining watersheds listed in Table 6.3. IDFG contend that of the top five creeks, Benewah, Plummer/Pedee, and Lake creeks did not historically host bull trout.

Some of the watersheds included in the QHA identifying habitat attributes most similar to reference conditions where bull trout are currently distributed (Table 6.4 and 6.5) also

remain in dispute. At present IDFG biologists contend there is no evidence of bull trout currently present in Fighting Creek, any west side tributaries to Coeur d' Alene Lake, main South Fork Coeur d' Alene River, Lake Creek, Plummer Creek, Pedee Creek, or Benewah Creek. IDFG's position is supported by discussions in Section 6.6.1 Environmental Conditions, under the subheading Coeur d' Alene River Drainage. In addition, water quality data show temperatures are unfavorable for bull trout in the streams previously mentioned located within the Coeur d' Alene Reservation. Furthermore, the physical, biological, and chemical impacts from historical mining and pollutants on the South Fork Coeur d' Alene River still prevent the presence of sensitive aquatic biota including species such as bull trout.

Table 6.4 lists the watersheds currently supporting bull trout populations and ranks them according to how similar current conditions are to reference conditions. Geographically, habitat quality in the St. Joe and Shoshone (North Fork Coeur d' Alene River drainage) watersheds is most representative of reference conditions. As described earlier in section 6.3.2 Current Status, the upper St. Joe River drainage is considered the critical bull trout recovery area within the Coeur d' Alene Subbasin.

Table 6.3. Ranking of reaches with the largest deviation from the reference habitat conditions for bull trout in the Coeur d' Alene Subbasin. A reach rank equal to 1 has the greatest deviation from reference condition in comparison to other reaches. Reach scores range from 0 to 1, with 1 having the greatest deviation from reference. Values associated with each habitat attribute range from 1 to 11, a value of 1 indicates a habitat attribute having the greatest deviation from reference compared to the other attributes within that reach. In some cases multiple habitat attributes have a value of 1 indicating all attributes equally deviate the most from the reference.

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
1	Benewah	1	0.5	4	2	4	6	7	1	9	11	2	10	8
2	Plummer/Pedee Creek	2	0.5	4	4	4	8	10	2	4	11	1	2	9
17.2	Main South Fork Coeur d' Alene River	3	0.5	2	2	2	7	8	8	10	10	5	1	6
3	Lake Creek	4	0.4	7	4	5	1	7	1	9	10	1	5	10
18.1	East Fork Pine Creek	4	0.4	1	1	1	7	7	7	10	10	5	1	6
22.1	Prichard/Beaver Creek	6	0.3	3	4	1	6	8	4	10	10	8	1	7
17.1	Placer/Big Creek	7	0.3	3	4	2	5	9	9	11	5	5	5	1
11	West Shore Coeur d' Alene Lake	8	0.3	3	6	3	2	8	1	10	10	6	3	9
16.1	Upper St Maries River	9	0.3	1	1	4	3	8	5	10	10	5	8	7
14.3	North side Joe	10	0.3	1	1	1	4	9	5	10	5	5	10	8
9	Fighting Creek	11	0.2	2	8	2	1	8	5	10	10	2	5	7
19.1	Latour Creek	12	0.2	1	1	3	4	4	4	9	9	8	9	4
14.6	Mica Creek (Joe)	13	0.2	2	2	2	1	5	7	10	7	7	10	6
15.1	St. Joe Lower	14	0.2	1	4	1	1	6	5	8	8	8	6	8

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
18.2	West Fork Pine Creek	15	0.2	4	1	2	4	4	4	9	9	8	9	3
14.4	Southside Joe	16	0.2	1	3	1	4	6	6	10	6	6	10	5
20.1	Evans Creek & Lateral Lake Tribs	17	0.2	4	1	2	4	7	2	9	9	4	9	7
14.2	North Fork St. Joe	18	0.2	1	1	1	4	6	9	9	6	6	9	5
14.5	Marble Creek	18	0.2	1	3	3	5	9	5	9	5	5	9	2
14.1	Slate/Big Creek	20	0.2	1	3	1	6	8	8	8	3	3	8	7
21.1	Middle North Fork Coeur d' Alene	20	0.2	1	1	1	5	5	8	8	8	4	8	7
21.2	Shoshone	20	0.2	1	1	1	5	5	8	8	8	4	8	7
21.5	Tepee	23	0.1	1	4	1	4	7	7	7	7	1	7	6
12	Upper St Joe inc. Heller Creek	24	0.0	2	2	1	4	4	4	4	4	4	4	4
21.3	Upper North Fork Coeur d' Alene	25	0.0	1	1	4	4	4	4	4	4	4	4	3
13	St. Joe Above Copper Creek	26	0.0	1	1	1	1	1	1	1	1	1	1	1
21.4	Independence	26	0.0	1	1	1	1	1	1	1	1	1	1	1

Table 6.4. Ranking of streams whose habitat is most similar to the reference condition for bull trout in the Coeur d' Alene Subbasin in comparison to other reaches. A reach rank equal to 1 reveals the reach with current conditions most similar to reference conditions in comparison to other reaches. Reach score ranges from 0 to -1, with -1 having the least deviation from reference. Values associated with each habitat attribute range from 1 to 11, a value of 1 indicates a habitat attribute being most similar to the reference compared to the other attributes within that reach. In some cases multiple habitat attributes have a value of 1 indicating all attributes are equally the most similar to the reference.

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
13	St. Joe Above Copper Creek	1	-0.97	1	1	1	1	1	1	1	1	1	1	11
12	Upper St Joe inc. Heller Creek	2	-0.92	8	8	10	1	1	1	1	1	1	1	11
21.2	Shoshone	3	-0.80	8	8	8	5	6	1	1	1	6	1	11
14.4	Southside Joe	4	-0.76	9	8	9	7	3	3	1	3	3	1	9
14.3	North side Joe	5	-0.69	8	8	8	7	3	3	1	3	3	1	8
21.1	Middle North Fork Coeur d' Alene	6	-0.68	6	6	6	4	10	1	1	11	5	1	9
20.1	Evans Creek & Lateral Lake Tribs	7	-0.60	3	8	5	3	9	5	1	11	5	1	9
9	Fighting Creek	8	-0.59	5	2	5	8	9	3	1	11	5	3	10
15.1	St. Joe Lower	9	-0.58	6	5	6	6	10	3	1	11	3	2	6
11	West Shore Coeur d' Alene Lake	10	-0.49	4	2	4	9	7	10	1	11	2	4	8
17.2	Main South Fork Coeur d' Alene River	11	-0.38	6	6	6	3	4	2	1	11	4	10	9
14.1	Slate/Big Creek	12	-0.37	9	5	9	7	7	1	1	11	5	1	4
3	Lake Creek	13	-0.35	2	6	3	8	8	7	1	11	8	3	3

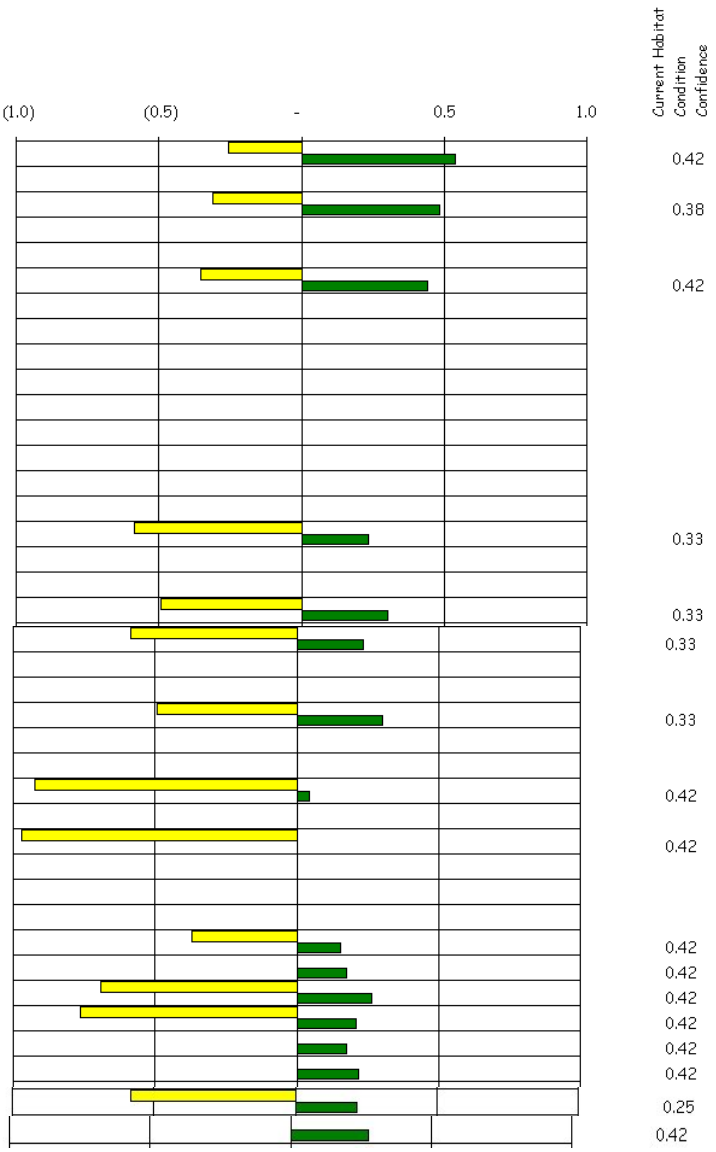
Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
2	Plummer/Pedee Creek	**14**	-0.31	1	1	1	1	6	6	1	10	10	6	9
1	Benewah	**15**	-0.26	3	7	3	3	7	9	2	9	9	1	6

The tornado diagram (Table 6.5) and maps (Map CdA-1, Map CdA-2, located at the end of Section 6) presents the reach scores for both current habitat condition (ranging from zero to positive one, Map CdA-1) and protection (ranging from zero to negative one, Map CdA-2). Scores closest to negative one depict reaches that are most representative of reference habitat conditions. Scores closest to positive one depict reaches with habitat conditions least similar to reference conditions. Confidence scores range from zero to one and are associated with the ratings assigned by local biologists based on documentation or their expert opinion regarding reference and current habitat attributes for each reach.

Table 6.5. Tornado diagram for bull trout in the Coeur d' Alene Subbasin. Degree of confidence for protection and current habitat conditions range from 0.0 to 1.0 with the greatest confidence equal to 1.0. Protection reach scores are presented on the left side and current habitat reach scores are presented on the right. Negative scores are in parentheses.

NP = Not present

Sequence	Reach Name	Protection Confidence	Current Habitat Condition Confidence
1.1	Benewah	0.50	0.42
1.2	0	NP	
2.1	Plummer/Pedee Creek	0.42	0.38
2.2	0	NP	
2.3	0	NP	
3.1	Lake Creek	0.50	0.42
4.1	Wolf Lodge/Alder	NP	
4.2	0	NP	
4.3	0	NP	
5.1	Fernan	NP	
6.1	Blue Creek	NP	
7.1	Beauty Creek	NP	
8.1	E. Side Coeur d' Alene Lake	NP	
8.2	0	NP	
8.3	0	NP	
9.1	Fighting Creek	0.33	0.33
10.1	Cougar/Mica Creek	NP	
10.2	0	NP	
11.1	West Shore Coeur d' Alene Lake	0.33	0.33
9.1	Fighting Creek	0.33	0.33
10.1	Cougar/Mica Creek	NP	
10.2	0	NP	
11.1	West Shore Coeur d' Alene Lake	0.33	0.33
11.2	0	NP	
11.3	0	NP	
12.1	Upper St Joe inc. Heller Creek	0.50	0.42
12.2	0	NP	
13.1	St. Joe Above Copper Creek	0.50	0.42
13.2	0	NP	
13.3	0	NP	
13.4	0	NP	
14.1	Slate/Big Creek	0.50	0.42
14.2	North Fork St. Joe	0.50	0.42
14.3	Northside Joe	0.50	0.42
14.4	Southside Joe	0.50	0.42
14.5	Marble Creek	0.50	0.42
14.6	Mica Creek (Joe)	0.50	0.42
15.1	St. Joe Lower	0.17	0.25
16.1	Upper St Maries River	0.50	0.42



17.1	Placer/Big Creek	0.50		0.42
17.2	Main South Fork Coeur d'Alene River	0.50		0.42
17.3	0	NP		
17.4	0	NP		
17.5	0	NP		
17.6	0	NP		
17.7	0	NP		
18.1	Eastfork Pine Creek	0.50		0.42
18.2	Westfork Pine Creek	0.50		0.42
19.1	Latour Creek	0.50		0.42
19.2	0	NP		
20.1	Evans Creek & Lateral Lake Tribs	0.50		0.42
20.2	0	NP		
20.3	0	NP		
20.4	0	NP		
20.5	0	NP		
20.6	0	NP		
20.7	0	NP		
20.8	0	NP		
21.1	Middle North Fork Coeur d'Alene	0.50		0.42
21.2	Shoshone	0.50		0.42
21.3	Upper North Fork Coeur d'Alene	0.50		0.42
21.4	Independence	0.50		0.42
21.5	Tepee	0.50		0.42
22.1	Prichard/Beaver Creek	0.50		0.42

Although Table 6.4 provides a ranked list for protection of relatively unaltered watersheds currently supporting bull trout, experts of the region are not confident bull trout are present in all of these areas. However, biologists do agree that these watersheds with relatively high-quality habitat are important and critical to bull trout recovery in the Subbasin.

St. Joe watershed is biologically the most important area for bull trout within the Subbasin. Bull trout populations are most abundant in this region, especially in the headwater reaches. The ecological significance of the St. Joe watershed is supported by results from the QHA model, thus biologists agree this area of high habitat quality should be one of the primary areas protected from any disturbance or degradation.

The Middle North Fork of the Coeur d' Alene River provides an important migratory corridor for bull trout and was ranked 6th for protection (Table 6.4). This watershed may be important for the connectivity with the Shoshone Creek watershed. As mentioned earlier, habitat conditions in the Shoshone Creek watershed are also relatively good, however the presence of bull trout is not certain. Local biologists support prioritizing the protection of Shoshone Creek watershed due to its potential to support bull trout.

Fighting Creek watershed is ranked 8th for protection (see Table 6.4) based on similarity of habitat attributes to the reference and 11th for greatest degree of habitat deviation from the reference (see Table 6.3). According to Tribal biologists, this is an example of a drainage that would benefit most from restoration rather than protection. IDFG biologists, however, do not agree that Fighting Creek ever supported, or currently supports bull trout. Evans Creek (ranked 17th for habitat alteration, see Table 6.3) is another area that may benefit from restoration since water temperatures are within the appropriate range to support bull trout.

Graves et al. (1992) surveyed and evaluated current habitat conditions and suitability for salmonids in streams (Fighting Creek, Lake Creek, Plummer Creek, Pedee Creek) within the boundaries of the Coeur d' Alene Reservation (Benewah, Pedee, Plummer, Fighting, and Lake creeks). IDFG biologists contest and believe some of the streams did not historically and do not currently host bull trout. In general, the results of the study show most of these creeks are impacted by land use practices, have man-made barriers, have poor water quality, or are naturally not suitable for salmonids (Graves et al. 1992). Fighting Creek is surrounded by land uses including recreation, residential, agriculture, grazing, and timber harvest. There are manmade barriers (for example concrete embuttment) and water quality issues from a landfill site adjacent to the stream. The upper reaches are steep and "not conducive to a bull or cutthroat trout fishery" (Graves et al. 1992). The land use influencing Lake Creek watershed includes agriculture, grazing, and timber harvest. There are no barriers, however the stream channel is relatively unstable and water quality is moderate to poor as a result of sediment/silt loading (Graves et al. 1992). Land use practices around Plummer Creek include timber harvest and residential development along with in-stream impacts including culverts creating passage barriers and effluent from a sewage treatment facility (Graves et al. 1992). Pedee Creek was in general "not suitable for fish habitat" since it is covered in ice during the winter, has a steep gradient in the headwaters, and possibly some improperly graded culverts (Graves et al. 1992).

6.3.4 Current Management

The IDFG along with the Coeur d' Alene Indian Tribe are managers of the fish resources in the Subbasin. The U.S. Fish and Wildlife Service (USFWS) also manage bull trout populations in the Subbasin, since they are listed as threatened under the Endangered Species Act. The recovery criteria for bull trout in the Coeur d' Alene Recovery Unit (specifically St. Joe River and North Fork Coeur d' Alene River drainages) is available in the Draft Recovery Plan (USFWS 2002) and is also incorporated in the strategies and objectives in Section 10 Coeur d' Alene Subbasin Management Plan.

The legal harvest of bull trout has not been allowed in the Subbasin since 1988. IDFG developed and has updated a fisheries management plan for the basin on a five-year review cycle beginning in 1981. The fisheries management policies of the agency emphasize providing diverse sport fishing opportunities while also conserving wild, native stocks.

Many regulations limit the amount of mortality associated with catching bull trout on hook and line. Portions of the St. Joe River drainage and the North Fork Coeur d' Alene River drainage are managed as catch-and-release fisheries. In these areas, artificial flies and lures with a single barbless hook are allowed. Bait fishing with limited harvest is allowed in much of the Couer d' Alene Subbasin for other species, and three areas, Wolf Lodge Creek, Lake Creek, and Benewah Creek, are closed to all fishing.

Harvest of bull trout occurs through both misidentification and deliberate illegal catch. Spawning bull trout are particularly vulnerable to illegal harvest since the fish are easily observed during fall low flow conditions. Even in cases where an angler releases the fish, incidental mortality of four percent has been documented (Schill and Scarpella 1997).

Harvest and reduced fishing mortality can be further addressed through stricter enforcement of existing fishing regulations, angler education, and road closures where roads readily access native bull trout spawning areas. Fishing in the core bull trout area in the upper St. Joe River system, which encompasses the area upstream of the North Fork St. Joe River where all of the known spawning and early rearing occurs, is regulated with catch-and-release fishing regulations, with no bait allowed. Implementation of long-term angling and harvest regulation most likely will limit the effect they have on the population.

As mentioned in earlier sections, bull trout have had a limited stocking history and the restoration plans do not include artificial propagation. Instead USFWS emphasizes removal of limiting factors affecting bull trout and bull trout habitats (USFWS 2002). Artificial propagation as a restoration strategy is generally regarded as an option of last resort for bull trout recovery due to the genetic concerns and the difficulty with bull trout artificial propagation (Montana Bull Trout Scientific Group 1996). A thorough analysis on the streams that are capable of harboring bull trout and a determination of the factors limiting bull trout will need to be done prior to considering artificial propagation as a recovery tool. Transplanting listed species must be authorized by the USFWS through a 10(a)(1)(A) recovery permit and must meet applicable State fish-handling and disease policies.

Efforts to recover bull trout in the wild may be difficult in the Coeur d' Alene Recovery Unit since some local populations of bull trout within the North Fork Coeur d' Alene River drainage and portions of the St. Joe River Subbasin are thought to be extirpated. In addition, numbers of bull trout in the upper portion of the St. Joe River drainage are limited. While bull trout exhibit a high degree of fidelity to natal streams (Spruell et al. 2000; Hvenegaard and Thera 2001), there are no studies showing any instances of natural refounding occurring for a local population of bull trout after a complete life cycle has been extirpated.

The findings of the Montana Bull Trout Scientific Group (MBTSG) explore the possible use of artificial propagation and transplantation. The MBTSG (1996) identified seven potential strategies for using artificially propagated fish, evaluated the strategies relative to recovery criteria and objectives, and provided recommendations. The group also concluded that transplantation into areas where bull trout have been extirpated should be considered only after the causes of extirpation have been identified and corrected.

Currently, only one known local population in the St. Joe River may meet the level of 100 annual adult spawners suggested by Rieman and Allendorf (2001) to minimize the risk of inbreeding depression. The Coeur d' Alene Recovery Unit Team recommends the following: 1) identify and correct threats in the St. Joe River drainage to increase bull trout densities and allow for natural recolonization to occur within streams that have evidence of recruitment and consider an artificial propagation program only if a feasibility study indicates that such a program is the best option for recovery or to establish a genetic reserve, and 2) recognize that, even if threats are identified and corrected in the North Fork Coeur d' Alene River watershed, the probability of recolonization in the near future is low. A more thorough assessment of potential bull trout habitat is the watershed is warranted. Researchers at the U.S. Forest Service Intermountain Research Station, Boise, Idaho, and others (Watson and

Hillman 1997) have identified factors affecting bull trout distribution and abundance that will likely be applicable in assessing suitable bull trout habitat.

6.4 Focal Species – Westslope Cutthroat Trout

6.4.1 Historic Status

Historically, westslope cutthroat trout were the dominant salmonid in streams of the Coeur d' Alene Subbasin (Behnke and Wallace 1986). There is little data documenting historic abundance of westslope cutthroat trout, but densities were probably high throughout the basin. From 1901 to 1905, the St. Maries Courier reported catches of 7 to 9 pound trout and fishing trips where anglers caught 50 to 100 "speckled trout" averaging 3 to 5 pounds. In 1892, trout were a major source of protein to settlers and were commonly sold in the city of Wallace butcher shops (IDFG, Region 1 Files). Recent efforts to document changes in distribution of westslope cutthroat trout show significant reductions within some watersheds compared with the known historic range (Table 6.6). The pattern of changing distribution found within tributaries located on the Coeur d' Alene Reservation (Figure 6.1) is probably indicative of many other lower elevation tributaries in the Coeur d' Alene Subbasin (C. Corsi, IDFG, personal communication).

Table 6.6. Historical and occupied range for westslope cutthroat trout

Historical Range Occupied	Occupied Range Classed as Strong	Assessment Area	Source
Percentage	Percentage		
65	0	CDA Reservation	Coeur d' Alene Tribe (Unpublished)
82	11	Idaho	Rieman/Apperson (1989)
85	25	Interior Columbia Basin	ICBEMP (USFS/BLM)
96	50	Idaho	Shepard et al. 2003

Although westslope cutthroat trout still occupy a substantial portion of their historic distribution in Idaho and within the Coeur d' Alene Subbasin, the historic habitat quality is not well understood. Land use practices, along with fisheries management (introduction of exotics, take regulations, etc.) along with degraded habitats may have dramatically lowered the carrying capacity for westslope cutthroat trout.

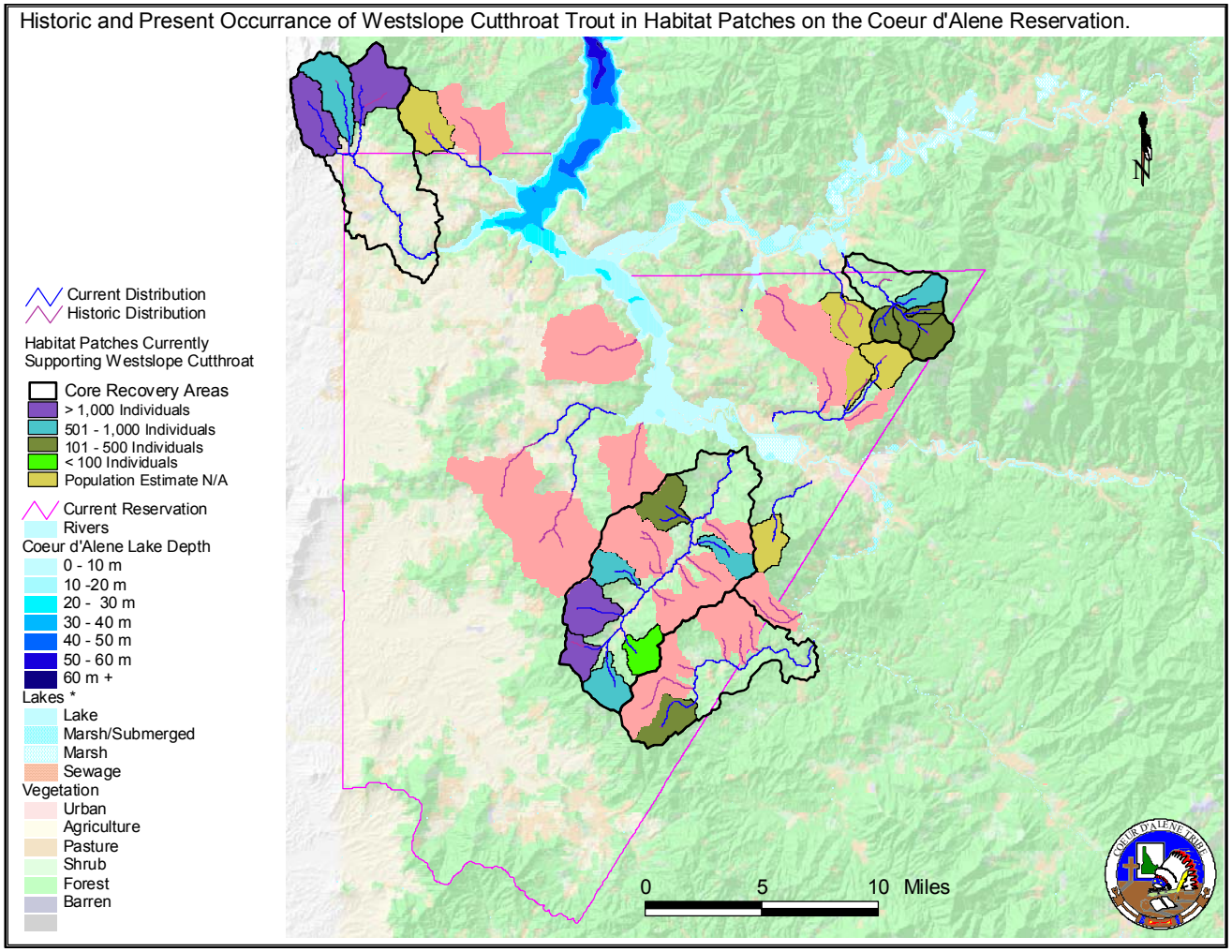


Figure 6.1. Historic versus present occurrence of westslope cutthroat trout in habitat patches on the Coeur d' Alene Reservation. This pattern of habitat loss and fragmentation is characteristic for many lower elevation watersheds in the Subbasin.

6.4.2 Current Status

Westslope cutthroat trout are currently distributed throughout the Coeur d' Alene Subbasin and three life histories are represented: adfluvial, fluvial, and resident. Populations of adfluvial westslope cutthroat trout reside in Coeur d' Alene Lake as adults and sub-adults, and disperse to tributaries lower in the Subbasin to spawn and rear through the juvenile life stage. Populations of fluvial fish reside in the St. Joe, St. Maries, and North Fork Coeur d' Alene rivers with spawning and rearing occurring in smaller tributaries. Strongholds for both adfluvial and fluvial life forms are concentrated in the St. Joe River and its tributaries and the Coeur d' Alene River and its tributaries upstream of Enaville (Bennett and Dunnigan 1997; Apperson et al. 1987; Hunt and Bjornn 1995). Smaller, more isolated adfluvial populations are distributed in many of the lower elevation tributaries to Coeur d' Alene Lake (Lillengreen et al. 1998). In addition, resident populations of westslope cutthroat are widely dispersed throughout many of the same watersheds, typically in headwater reaches or smaller tributaries.

The current patterns of westlsope cutthroat trout abundance and distribution vary among watersheds and among years, but seem to be highly correlated to seasonal changes in water quality and quantity (Peters and Vitale 1998). Downstream displacement has been recognized as a common occurrence and seems to be an adaptation to habitat availability (Chapman and Bjornn 1969; Bjornn 1971). Bennett and Dunnigan (1997) observed that most successful reproduction in the Coeur d' Alene River system occurs in third order and smaller tributaries that generally have watershed areas less than or equal to 60 square kilometers. Population surveys completed on the Coeur d' Alene Reservation also demonstrated that abundance of juvenile cutthroat is greatest in first and second order tributaries, suggesting a close link to the most heavily utilized spawning areas (Lillengreen et al. 1998).

More recent biological evaluations indicate that populations occupying lower elevation watersheds are at risk based on both low population numbers and habitat losses (Lillengreen et al. 1996). In Idaho, habitat loss was identified as the primary cause of decline in streams supporting depressed populations (Rieman and Apperson 1989). Other reasons for the range wide causes of decline include competition and predation by nonnative species, genetic introgression, overfishing, habitat loss and fragmentation, and habitat degradation (Liknes 1984; Liknes and Graham 1988; Rieman and Apperson 1989; McIntyre and Rieman 1995).

The upper St. Joe River (upstream of the North Fork) is currently regarded as one of the strongest westslope cutthroat trout populations in Idaho (Rieman and Apperson 1989) and has been lauded as a successful example of wild westlsope cutthroat trout management (Apperson et al 1987). Following the implementation of special regulations (3 trout, 13-inch minimum size limit), cutthroat trout catch rates increased from 0.2 fish/hour to 2.5 fish/hour, and the percentage of fish in the catch longer than 250 mm increased from 2.5 percent to 18 percent (Thurow and Bjornn 1978). Catch-and-release regulations were implemented in the upper St. Joe River above Prospector Creek in 1988 and the number and size of cutthroat continued to increase. The percentage of fish over 330 mm increased to over 50 percent of the population and densities of cutthroat

increased to 500-750 fish/km. The catch-and-release area on the St. Joe River was expanded down to the North Fork St. Joe River in 2000 and a basin-wide cutthroat slot limit was implemented to provide additional protection for native cutthroat trout (Ned Horner, IDFG Regional Fisheries Manager, personal communication, December 2003).

Westslope cutthroat trout in the lower St. Joe River (downstream of the North Fork) are fairly abundant and widely distributed, although some hybridization with introduced rainbow trout is occasionally seen (Apperson et. al. 1987). The St. Maries River population appears to be somewhat depressed, but westslope cutthroat trout are still widely distributed. Westslope cutthroat trout were present in all tributaries to the Coeur d' Alene River as documented in surveys completed by the IDFG (Apperson et al. 1987). These same surveys reported that rainbow trout and cutthroat-rainbow hybrids comprised less than 25 percent of the salmonids in any given tributary. Understanding why there are differences may be important to future management decisions.

Westslope cutthroat trout populations are believed to be at least moderately damaged resulting from the persistence of adverse conditions in lower elevation tributaries to Coeur d' Alene Lake. Moderately damaged is defined by the Coeur d' Alene Tribe as the average spawning escapements fall between the minimum viable population and the number of adults needed to produce 50 percent of the carrying capacity of the stream environment. Rieman and Apperson (1989) estimated that populations considered as "strong" (greater than or equal to 50 percent of historic potential) by IDFG remained in only 11 percent of the historic range within the state of Idaho. The probability of persistence was calculated for several populations occupying lower elevation watersheds in the Coeur d' Alene Subbasin, using methods described by Rieman and McIntyre (1993) (Table 6.7). All populations in Table 6.7 had a positive but nearly zero rate of population growth, suggesting that each population is maintaining but not robustly growing. The limited time series data used for Table 6.7 (three years) creates a large degree of variance around the population growth rate, leading to uncertainty in the persistence of these populations. Longer time series data is needed to better understand the probability of persistence for these populations.

Table 6.7. Mean annual population estimates, the estimated mean annual variance (95 percent confidence interval is shown in parentheses) in the infinitesimal rate of population growth, and probability of persistence over 100 years for westslope cutthroat trout populations monitored on the Coeur d' Alene Reservation.

Stream	Years	Mean Annual Population Estimate	Population Growth Rate & Variance	Probability of Persistence
Alder Creek	3	808	0.03 (0.02-0.04)	0.58
Benewah Creek	3	5,553	0.16 (0.04-0.36)	0.67
Evans Creek	3	2,675	0.33 (0.05-0.71)	0.45
Lake Creek	3	4,946	0.14 (0.02-0.26)	0.7

(*Source:* Coeur d' Alene Tribe. Methods from Rieman and McIntyre [1993])

Despite the apparent instability of westslope cutthroat trout populations in lower elevation tributaries to Coeur d' Alene Lake, preliminary genetic analyses of 16 populations show that relatively pure stocks exist in Coeur d' Alene Tribal Reservation waters (Spruell et al. 1999). Only minimal amounts of hybridization with rainbow trout have occurred and some populations show no hybridization at all (Spruell et al. 1999). The risk of hybridization may be greater for populations in the Coeur d' Alene and St. Joe rivers, where stocking of rainbow trout has occurred, but only if nonnative rainbow trout survived and reproduced with native cutthroat trout. Stocking of rainbow trout shifted to sterile triploid fish in 1996 and was totally discontinued in 2003 (Ned Horner, IDFG, Regional Fisheries Manager, personal communication, December 2003).

Although westslope cutthroat trout are still widely distributed throughout the Coeur d' Alene Subbasin, it is not well understood to what extent their genetic integrity has been compromised in most of their historic range in the state of Idaho including the Coeur d' Alene Subbasin. Shepard et al. (2003) estimated that westslope cutthroat trout occupy almost 96 percent of their historic range in Idaho, and that stream segments that support westslope cutthroat trout "slightly below" or "near" habitat capacity occupy about 50 percent of the historic range. Although westslope cutthroat trout are still widespread, Shepard et al. (2003) estimated between 8 to 20 percent of all westslope cutthroat trout historic habitat is occupied by genetically unaltered westslope cutthroat trout. It is not known what percent of westslope cutthroat trout in the Coeur d' Alene Subbasin are genetically unaltered, thus it is not well understood what proportion of the historic habitat is occupied by pure westslope cutthroat trout.

The carrying capacity of westslope cutthroat trout in the Coeur d' Alene Subbasin has been lowered from the historical conditions, especially in direct tributaries to Coeur d' Alene Lake and tributaries lower in the Subbasin. Many of the streams throughout the Coeur d' Alene Subbasin have unnatural rates of sedimentation (refer to IDEQ 1998 303(d) list), which has lead to a reduction in the quality of salmonid habitat currently available. Studies on the Coeur d' Alene Indian Reservation have shown that many streams are well below their potential of supporting natural populations of salmonids due to habitat destruction (Graves et al. 1992). Managers of the Coeur d' Alene Indian Reservation attribute timber and agricultural practices to the loss in salmonid habitat on the reservation. Peters and Vitale (1998) used a modified habitat quality index model to model the potential increase in the numbers of juvenile westslope cutthroat trout in some of the streams of the Coeur d' Alene Indian Reservation. Their modeling effort predicted an increase in juvenile cutthroat trout of 117 percent with improved in-stream cover, decreased summer water temperatures, and the reduction of streambank erosion attributes.

6.4.2 Limiting Factors Westslope Cutthroat Trout

According to the QHA results, westslope cutthroat trout were historically present throughout the Subbasin (36 watersheds) and are currently only absent from the Little North Fork drainage, a headwater tributary that drains into the South Fork Coeur d' Alene River (refer to Sequence ID 21.6 in Map CdA-5, refer to protection habitat scores in Map CdA-4, located at the end of Section 6). In addition, a barrier at the mouth of the

Little North Fork prevents trout from entering the stream (Harvey, Waste and Remediation Manager, IDEQ, personal communication, 2004).

All 36 watersheds were included in assessing the degree of habitat deviation from reference to present conditions (Table 6.8). Different habitat attributes appear to have been impacted from reference to present conditions for the first four ranked watersheds (Benewah, Plummer/Pedee Creek, Lake Creek, and the main South Fork Coeur d' Alene River) (Table 6.8). These attributes include low flow, high flow, fine sediment, high temperatures, and pollutants. Mining has historically heavily impacted the main South Fork Coeur d' Alene River, thus pollutants may still persist in the system. The other three watersheds (Benewah, Plummer/Pedee, Lake Creek) are in close proximity to Coeur d' Alene Lake and are heavily impacted by land use practices (agriculture, timber harvest, logging, and/or residential development) (Graves et al. 1992).

According to results from the QHA, the streams in the St. Joe River drainage (western peninsula of the Subbasin) and North Fork Coeur d' Alene River drainage (northern region of the Subbasin) are most representative of reference conditions relative to the other watersheds analyzed within the Subbasin (Table 6.9). These results do not conclude that the creeks within these drainages (St Joe and North Fork Coeur d' Alene rivers) remain uninfluenced or untouched by land use activities. For example, stream habitat conditions do vary among the smaller watersheds such as Independence Creek, Tepee Creek, and Shoshone Creek in the North Fork Coeur d' Alene River. In general, the upper North Fork Coeur d' Alene River (upstream of the confluence with Tepee Creek) is more representative of reference conditions than other tributaries such as Tepee and Shoshone creeks in the North Fork Coeur d' Alene River drainage. Tepee and Shoshone creeks have experienced more alterations to in-stream habitat features through erosion and sedimentation resulting in pool-filling and channel widening (G. Harvey, IDEQ, personal communication, 2004).

The tornado diagram (Table 6.10) and maps (Map CdA-3, Map CdA-4 located at the end of Section 6) presents the reach scores for both current habitat condition (ranging from zero to positive one, Map CdA-3) and protection (ranging from zero to negative one, Map CdA-4). Scores closest to negative one depict reaches that are most representative of reference habitat conditions. Scores closest to positive one depict reaches with habitat conditions least similar to reference conditions. Confidence scores range from zero to one and are associated with the ratings assigned by local biologists based on documentation or their expert opinion regarding reference and current habitat attributes for each reach.

Table 6.8. Ranking of reaches with the largest deviation from the reference habitat conditions for westslope cutthroat trout in the Coeur d' Alene Subbasin. A reach rank equal to 1 has the greatest deviation from reference condition in comparison to other reaches. Reach scores range from 0 to 1, with 1 having the greatest deviation from reference. Values associated with each habitat attribute range from 1 to 11, a value of 1 indicates a habitat attribute having the greatest deviation from reference compared to the other attributes within that reach. In some cases multiple habitat attributes have a value of 1 indicating all attributes equally deviate the most from the reference.

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
1	Benewah	1	0.6	4	2	4	7	4	1	9	9	2	11	8
2	Plummer/Pedee Creek	2	0.5	4	4	4	10	4	2	4	11	1	2	9
3	Lake Creek	3	0.5	8	5	6	1	1	1	9	9	1	6	11
17.2	Main South Fork Coeur d' Alene River	4	0.5	2	2	2	7	8	8	10	10	5	1	6
5	Fernan	5	0.5	1	1	1	5	10	1	8	10	5	8	7
18.1	East Fork Pine Creek	6	0.4	1	1	1	7	7	7	10	10	5	1	6
6	Blue Creek	7	0.4	1	3	1	4	9	4	11	9	8	6	7
16.3	Emerald/Carpenter Creek	8	0.4	3	1	3	1	7	7	11	10	3	6	9
22.1	Prichard/Beaver Creek	9	0.3	3	4	1	6	8	4	10	10	8	1	7
11	West Shore Coeur d' Alene Lake	10	0.3	3	6	3	2	6	1	11	9	6	3	10
17.1	Placer/Big Creek	11	0.3	3	4	2	5	8	8	11	8	5	5	1
8	E. Side Coeur d' Alene Lake	12	0.3	3	1	1	3	7	3	11	10	7	7	6
10	Cougar/Mica Creek	13	0.3	4	4	4	1	4	4	11	10	4	3	2
16.1	Upper St Maries River	14	0.3	1	1	4	3	8	5	10	10	5	8	7
7	Beauty Creek	15	0.3	4	1	1	7	7	1	11	10	7	4	6

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
9	Fighting Creek	16	0.3	3	1	3	8	8	5	10	10	5	2	5
4	Wolf Lodge/Alder	16	0.3	2	9	2	1	5	5	11	9	2	5	5
14.3	North side Joe	18	0.3	1	1	1	4	8	5	10	8	5	10	7
15.1	St. Joe Lower	19	0.2	1	4	1	1	5	5	9	8	9	7	9
19.1	Latour Creek	20	0.2	1	1	3	4	4	4	9	9	8	9	4
20.1	Evans Creek & Lateral Lake Tribs	21	0.2	4	1	2	4	4	2	10	9	4	10	8
16.2	Lower St Maries River	22	0.2	1	3	3	7	7	3	11	7	1	7	6
14.6	Mica Creek (Joe)	23	0.2	2	2	2	1	5	7	10	9	7	10	6
18.2	West Fork Pine Creek	24	0.2	4	1	2	4	4	4	9	9	8	9	3
14.4	Southside Joe	25	0.2	1	3	1	4	6	6	10	9	6	10	5
21.6	Little North Fork	26	0.2	2	1	2	5	7	7	7	7	5	7	4
14.2	North Fork St. Joe	27	0.2	1	1	1	4	6	9	9	8	6	9	5
14.5	Marble Creek	27	0.2	1	3	3	5	9	5	9	8	5	9	2
21.1	Middle North Fork Coeur d' Alene	29	0.2	1	1	1	5	5	8	8	8	4	8	7
21.2	Shoshone	29	0.2	1	1	1	5	5	8	8	8	4	8	7
14.1	Slate/Big Creek	31	0.1	1	3	1	5	8	8	8	5	3	8	7
21.5	Tepee	32	0.1	1	4	1	4	7	7	7	7	1	7	6
12.1	Upper St Joe inc. Heller Creek	33	0.0	2	2	1	4	4	4	4	4	4	4	4
21.3	Upper North Fork Coeur d' Alene	34	0.0	1	1	4	4	4	4	4	4	4	4	3
13.1	St. Joe Above Copper Creek	35	0.0	1	1	1	1	1	1	1	1	1	1	1

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
21.4	Independence	35	0.0	1	1	1	1	1	1	1	1	1	1	1

Table 6.9. Ranking of streams whose habitat is most similar to the reference condition for westslope cutthroat trout in the Coeur d' Alene Subbasin in comparison to other reaches. A reach rank equal to 1 reveals the reach with current conditions most similar to reference conditions in comparison to other reaches. Reach score ranges from 0 to -1, with -1 having the least deviation from reference. Values associated with each habitat attribute range from 1 to 11, a value of 1 indicates a habitat attribute being most similar to the reference compared to the other attributes within that reach. In some cases multiple habitat attributes have a value of 1 indicating all attributes are equally the most similar to the reference.

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
13.1	St. Joe Above Copper Creek	1	-0.92	1	1	1	1	1	1	1	11	1	1	10
21.4	Independence	2	-0.91	1	1	1	1	9	1	1	11	1	1	10
21.3	Upper North Fork Coeur d' Alene	3	-0.89	7	7	1	1	7	1	1	11	1	1	10
12.1	Upper St Joe inc. Heller Creek	4	-0.88	7	7	9	1	1	1	1	11	1	1	10
21.5	Tepee	5	-0.81	7	4	7	4	4	1	1	11	7	1	10
14.1	Slate/Big Creek	6	-0.77	8	6	8	4	4	1	1	11	6	1	10
21.1	Middle North Fork Coeur d' Alene	7	-0.76	7	7	7	4	5	1	1	11	5	1	10
21.2	Shoshone	7	-0.76	7	7	7	4	5	1	1	11	5	1	10
14.2	North Fork St. Joe	9	-0.74	7	7	7	5	5	1	1	11	4	1	10
14.5	Marble Creek	9	-0.74	9	7	7	3	3	3	1	10	3	1	11
14.4	Southside Joe	11	-0.72	8	7	8	6	3	3	1	11	3	1	8
18.2	West Fork Pine Creek	12	-0.71	4	9	8	4	4	4	1	9	3	1	11
1.6	Mica Creek (Joe)	13	-0.71	6	6	6	9	5	3	1	11	3	1	9
19.1	Latour Creek	14	-0.70	8	8	7	4	4	4	1	8	3	1	11
20.1	Evans Creek & Lateral Lake Tribs	15	-0.69	3	9	6	3	3	6	1	11	6	1	9

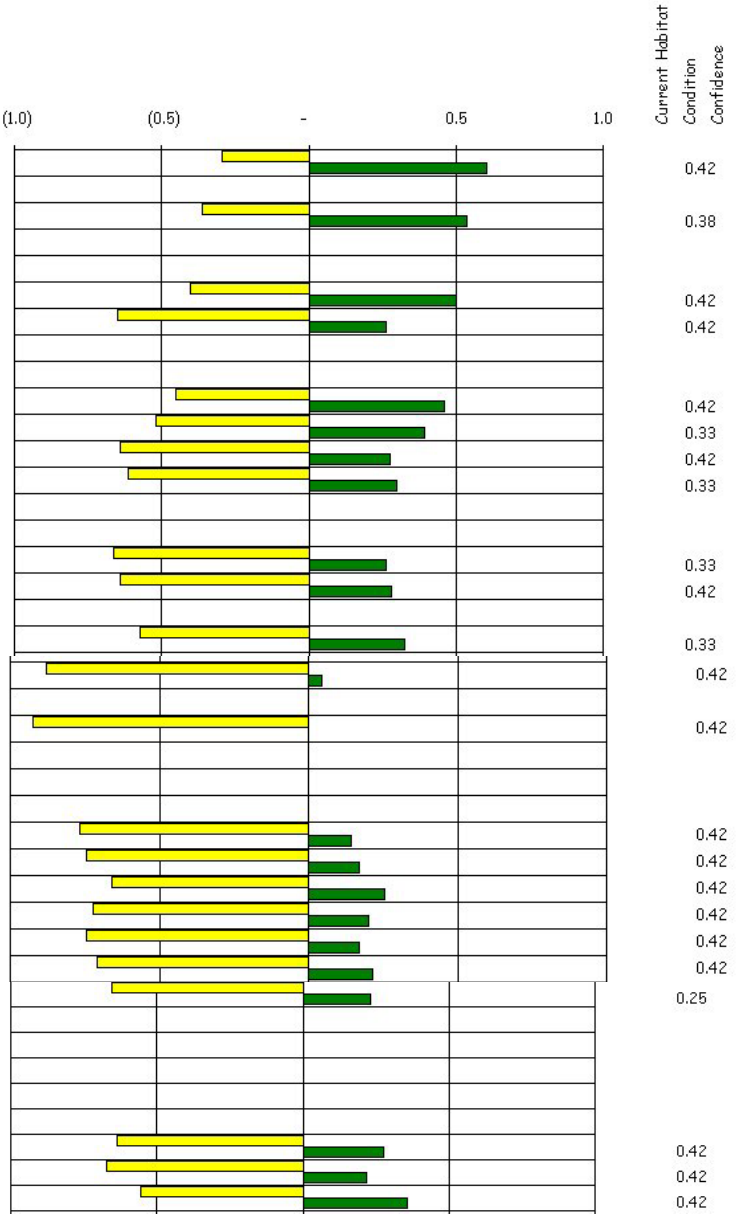
Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
16.2	Lower St Maries River	**16**	-0.67	8	4	4	4	2	4	1	10	11	2	8
9	Fighting Creek	**17**	-0.66	6	2	6	9	3	3	1	11	6	3	10
14.3	North side Joe	**18**	-0.66	7	7	7	6	3	3	1	11	3	1	7
15.1	St. Joe Lower	**19**	-0.65	7	6	7	7	3	3	1	11	3	2	7
4	Wolf Lodge/Alder	**20**	-0.65	6	11	6	2	3	3	1	8	3	8	10
10	Cougar/Mica Creek	**21**	-0.64	2	2	2	10	2	2	1	9	2	8	10
7	Beauty Creek	**22**	-0.64	5	7	7	2	4	7	1	10	2	5	11
16.1	Upper St Maries River	**23**	-0.64	9	9	6	9	2	4	1	7	4	2	7
17.1	Placer/Big Creek	**24**	-0.63	8	7	9	4	2	2	1	9	4	4	11
8	E. Side Coeur d' Alene Lake	**25**	-0.62	4	8	8	4	4	4	1	10	2	2	11
11	West Shore Coeur d' Alene Lake	**26**	-0.57	5	2	5	10	2	11	1	9	2	5	8
22.1	Prichard/Beaver Creek	**27**	-0.57	9	5	10	3	3	5	1	5	2	10	5
16.3	Emerald/Carpenter Creek	**28**	-0.56	5	9	5	11	2	2	1	9	5	4	5
6	Blue Creek	**29**	-0.52	10	7	10	5	2	5	1	7	2	4	9
18.1	East Fork Pine Creek	**30**	-0.48	7	7	7	2	2	2	1	5	6	7	11
17.2	Main South Fork Coeur d' Alene River	**31**	-0.46	7	7	7	4	2	2	1	5	6	11	10
5	Fernan	**32**	-0.45	8	8	8	4	1	8	1	6	4	1	7
3	Lake Creek	**33**	-0.40	3	6	4	10	7	7	1	7	10	4	2
2	Plummer/Pedee Creek	**34**	-0.36	1	1	1	1	1	7	1	7	11	7	7

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
1	Benewah	**35**	-0.30	3	9	3	3	3	10	2	3	10	1	3

Table 6.10. Tornado diagram for westslope cutthroat trout in the Coeur d' Alene Subbasin. Degree of confidence for protection and current habitat conditions range from 0.0 to 1.0 with the greatest confidence equal to 1.0. Protection reach scores are presented on the left side and current habitat reach scores are presented on the right. Negative scores are in parentheses.

NP = Not present

Sequence	Reach Name	Protection Confidence	Current Habitat Condition Confidence
1.1	Benewah	0.50	0.42
1.2	0	NP	
2.1	Plummer/Pedee Creek	0.42	0.38
2.2	0	NP	
2.3	0	NP	
3.1	Lake Creek	0.50	0.42
4.1	Wolf Lodge/Alder	0.50	0.42
4.2	0	NP	
4.3	0	NP	
5.1	Fernan	0.50	0.42
6.1	Blue Creek	0.33	0.33
7.1	Beauty Creek	0.50	0.42
8.1	E. Side Coeur d' Alene Lake	0.33	0.33
8.2	0	NP	
8.3	0	NP	
9.1	Fighting Creek	0.33	0.33
10.1	Cougar/Mica Creek	0.50	0.42
10.2	0	NP	
11.1	West Shore Coeur d' Alene Lake	0.33	0.33
12.1	Upper St Joe inc. Heller Creek	0.50	0.42
12.2	0	NP	
13.1	St. Joe Above Copper Creek	0.50	0.42
13.2	0	NP	
13.3	0	NP	
13.4	0	NP	
14.1	Slate/Big Creek	0.50	0.42
14.2	North Fork St. Joe	0.50	0.42
14.3	Northside Joe	0.50	0.42
14.4	Southside Joe	0.50	0.42
14.5	Marble Creek	0.50	0.42
14.6	Mica Creek (Joe)	0.50	0.42
15.1	St. Joe Lower	0.17	0.25
15.2	0	NP	
15.3	0	NP	
15.4	0	NP	
15.5	0	NP	
15.6	0	NP	
16.1	Upper St Maries River	0.50	0.42
16.2	Lower St Maries River	0.50	0.42
16.3	Emerald/Carpenter Creek	0.50	0.42



18.1	Eastfork Pine Creek	0.50		0.42
18.2	Westfork Pine Creek	0.50		0.42
19.1	Latour Creek	0.50		0.42
19.2	0	NP		
20.1	Evans Creek & Lateral Lake Tribs	0.50		0.42
20.2	0	NP		
20.3	0	NP		
20.4	0	NP		
20.5	0	NP		
20.6	0	NP		
20.7	0	NP		
20.8	0	NP		
21.1	Middle North Fork Coeur d'Alene	0.50		0.42
21.2	Shoshone	0.50		0.42
21.3	Upper North Fork Coeur d'Alene	0.50		0.42
21.4	Independence	0.50		0.42
21.5	Tepee	0.50		0.42
21.6	Little North Fork	0.50		0.42
22.1	Prichard/Beaver Creek	0.50		0.42

Coeur d' Alene Tribe is currently rehabilitating Lake Creek, which is ranked 3rd for greatest deviation in habitat conditions (see Table 6.8, Coeur d' Alene Tribe, personal communication, September 2003). Biologists conclude Lake Creek has more biological potential out of the top three ranked watersheds (Benewah, Plummer, Lake) identified in Table 6.8 that have experience significant habitat alterations based on watershed land use activities (Graves et al. 1992). Lake Creek has shown to provide critical passageway for adfluvial cutthroat trout.

Wolf Lodge Creek drains into Coeur d' Alene Lake and is an important westslope cutthroat trout stream for the lake. In the late 1970s, Wolf Lodge Creek had a spawning run of over 5,000 fish (N. Horner, IDFG, personal communication, September 2003). Currently the spawning run is likely less than 1,000 fish. Biologists feel Wolf Lodge Creek (ranked 16th for habitat alteration, Table 6.8) is more important biologically for protecting and restoring compared to Blue Creek (ranked 7th for habitat alteration, Table 6.8), although cutthroat trout may still have a strong presence in Blue.

If fish passage could be established around an old splash dam, local biologists feel Marble Creek (ranked 27th for habitat alteration) has great potential biologically (Table 6.8). An inspection of the splash dam during December 2003 indicated major flooding in 1996 and 1997 might have breached the dam (Joe DuPont, IDFG, Fisheries Biologist, personal communication, December 2003). A follow-up inspection is intended during the summer of 2004. The riparian condition in the lower reaches of Marble Creek has been degraded by road construction and would need some restoration, but upstream (approximately 20 km in length) of the fish barrier would provide higher quality habitat.

Fernan Creek (ranked 5th in habitat alteration) has been heavily degraded, which may limit feasibility of restoring cutthroat trout. East Fork Pine (ranked 6th) has also been severely degraded in the lower reaches (Table 6.8).

Mica Creek (St. Joe) was ranked 13th for representing conditions most similar to the reference (Table 6.9). Historically, this area had been closed to fishing with the goal to protect adfluvial westslope cutthroat trout.

As for the St. Maries River drainage, the IDEQ contracted the Kootenai-Shoshone Soil and Water Conservation District (KSSWCD) to survey the agricultural portions of the St. Maries River drainage for streambank erosion in order to complete the Total Maximum Daily Load (TMDL). In doing so, the KSSWCD have identified key stream reaches in need of restoration. Bank stabilization via restoring native riparian vegetation is considered a critical component to obtain TMDLs and improve aquatic habitat quality in these reaches. Reducing habitat fragmentation in the St. Maries River drainage would also contribute to increasing biological productivity and habitat function in the watershed.

The St. Joe River (above the North Fork St. Joe River) and especially the roadless portion in the headwaters provide the best opportunity to protect core habitat for westslope cutthroat trout. Habitat conditions above the North Fork St. Joe are close to reference conditions in many reaches and the cutthroat trout population is classified as strong, which is indicated by both numbers and size of fish. This area is managed with catch-and-release fishing regulations, so cutthroat populations receive maximum harvest protection.

6.4.4 Current Management

Fishing regulations for the Coeur d' Alene Subbasin have been modified over the years to enhance populations of native westslope cutthroat trout, while providing a diversity of fishing opportunity. In 1988, with modifications in 2000, the entire Spokane River drainage including Coeur d' Alene Lake and the Spokane River down to Post Falls Dam was placed under a set of regulations that provided harvest protection. A slot limit for cutthroat trout (2 fish, none between 8 and 16 inches) was adopted in 2000 to provide limited harvest opportunity for cutthroat trout while providing harvest protection to 95 percent of the population. In addition, headwater portions of both the Coeur d' Alene and St. Joe rivers have been managed with catch-and-release regulations since 1985 and 1988, respectively (Ned Horner, IDFG, personal communication, December 2003). The general fishing season is open from the Saturday of Memorial Day weekend through 30 November, with a winter stream season running from 1 December through 31 March that allows catch-and-release fishing for trout. Three water bodies, Wolf Lodge, Benewah, and Lake Creek are all closed to fishing year around to provide maximum recruitment of adfluvial cutthroat trout for Coeur d' Alene Lake.

Cutthroat trout fry were stocked into many tributaries in the Coeur d' Alene Subbasin in the late 1960s and early 1970s. Currently there are no westslope cutthroat trout stocking programs in place in the Coeur d' Alene Subbasin.

6.5 Focal Species – Kokanee Salmon

6.5.1 Historic Status

Kokanee salmon are not native to the Coeur d' Alene Subbasin. Historical stocking of kokanee salmon in Coeur d' Alene Lake started in 1937 with fish from Lake Pend Oreille. Periodic stocking continued until the early 1970s. Kokanee salmon have been

naturally reproducing and self-sustaining in Coeur d' Alene Lake since the late 1960s when reconstruction of Interstate 90 created shoreline spawning areas in the north end of the lake between Higgins Point and Beauty Bay. Kokanee spawning habitat was further enhanced along this same shoreline (approximately 3.2 km) in 1990 with the addition of shoreline spawning gravel as mitigation for addition road construction impacts. In 1979, the lake provided a harvest of nearly 600,000 kokanee salmon and supported over 250,000 hours of angler effort.

6.5.2 Current Status

There is a large self-sustaining kokanee salmon population found in the Coeur d' Alene Lake. These kokanee are supported primarily by shoreline spawning beds located in the northeast end of the lake along the 3.2 kilometers (2 miles) of shoreline between Higgins Point and Beauty Bay. A small run of kokanee is found in Mica and Wolf Lodge creeks.

Kokanee salmon remain the dominant species in Coeur d' Alene Lake and are still the most sought after game fish in the region. By 1981, kokanee salmon numbers exceeded their estimated carrying capacity in Coeur d' Alene Lake and the average size declined as densities increased. There were no fish predators capable of maintaining kokanee at the appropriate density and anglers lost interest in harvesting the small fish despite an increase in the limit. Subsequently, fall Chinook salmon were introduced in 1982 to control kokanee salmon abundance. Chinook salmon are managed to maintain kokanee densities at a level that provide a yield fishery (50 age 3 fish per hectare) and to provide a limited trophy fishery for Chinook salmon in the 1.5 to 8 kg size range (Ned Horner, IDFG Regional Fisheries Manager, personal communication, December 2003). A high percentage of Coeur d' Alene Lake's kokanee population was flushed out of the lake during the flood years of 1996 and 1997. Fortunately, kokanee numbers have now rebounded and IDFG is now rebuilding the Chinook salmon fishery in Coeur d' Alene Lake. Chinook salmon abundance is maintained by allowing wild fish to spawn in the mainstem reaches of the lower Coeur d' Alene and St. Joe rivers and limited hatchery supplementation to bring the total annual smolt production to approximately 70,000 fish (Ned Horner, IDFG, personal communication, December 2003).

6.5.3 Limiting Factors Kokanee Salmon

Kokanee are a lake species that often utilize riverine habitat for spawning and rearing, thus were included in the QHA approach to identify potential limiting factors to the life stage, spawning and incubation. Details of the QHA process are provided in Section 3.

Historically, kokanee were not present in the Coeur d' Alene Subbasin. However, for the purposes of analyzing the species with the QHA, it was necessary to rank the "historic" habitat for the species in the reaches where they presently exist. (QHA will not produce output for reaches where the species is rated as not being present historically.)

Kokanee are primarily a lake species using shoreline gravels for spawning. Tributary spawning and rearing is very limited in the Subbasin and there are only two watersheds known with in the Subbasin to support kokanee (Cougar/Mica Creek and Wolf Lodge/Alder). Fine sediment appears to have increased in Cougar/Mica Creek watershed,

which may impact spawning grounds. Channel stability appears to have changed the most in Wolf Lodge/Alder watershed. Of these two watersheds, Wolf Lodge/Alder is considered most similar to reference conditions (Tables 6.11 and 6.12).

The tornado diagram (Table 6.13) presents the reach scores for both protection (ranging from zero to negative one) and current habitat condition (ranging from zero to positive one). Scores closest to negative one depict reaches that are most representative of reference habitat conditions. Scores closest to positive one depict reaches with habitat conditions least similar to reference conditions. Confidence scores range from zero to one and are associated with the ratings assigned by local biologists based on documentation or their expert opinion regarding reference and current habitat attributes for each reach.

Conditions in Coeur d' Alene Lake are discussed in Section 6.6 Environmental Conditions under the subheading Coeur d' Alene Lake Drainage.

Efforts to restore westslope cutthroat trout spawning and rearing habitat in the Wolf Lodge/Alder and Cougar/Mica Creek drainages will likely benefit kokanee. However, since the vast majority of kokanee spawning occurs in shoreline gravels of Coeur d' Alene Lake, benefits to these two tributary spawning stocks of kokanee from habitat improvement efforts are not likely to produce a measurable biological benefit to the kokanee population.

Table 6.11. Ranking of reaches with the largest deviation from the reference habitat conditions for kokanee in the Coeur d' Alene Subbasin. A reach rank equal to 1 has the greatest deviation from reference condition in comparison to other reaches. Reach scores range from 0 to 1, with 1 having the greatest deviation from reference. Values associated with each habitat attribute range from 1 to 11, a value of 1 indicates a habitat attribute having the greatest deviation from reference compared to the other attributes within that reach. In some cases multiple habitat attributes have a value of 1 indicating all attributes equally deviate the most from the reference.

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
10	Cougar/Mica Creek	1	0.2	10	4	7	1	4	4	10	7	9	3	2
4	Wolf Lodge/Alder	2	0.2	9	1	5	6	6	3	9	9	8	2	3

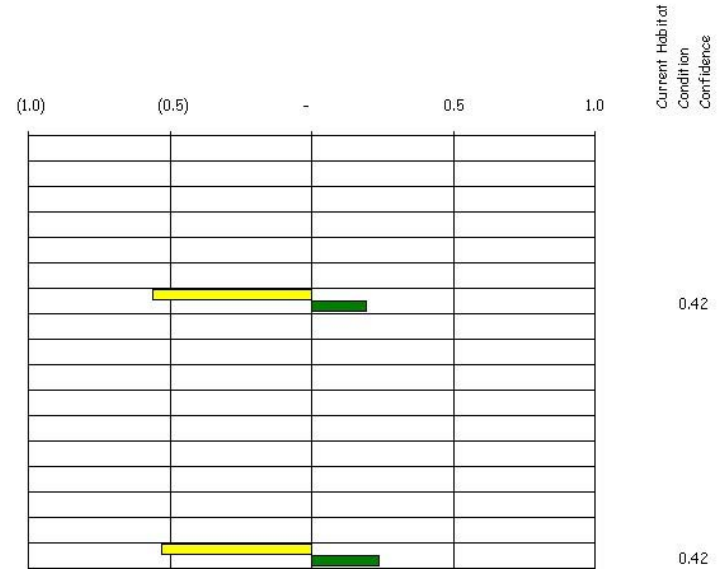
Table 6.12. Ranking of streams whose habitat is most similar to the reference condition for kokanee in the Coeur d' Alene Subbasin in comparison to other reaches. A reach rank equal to 1 reveals the reach with current conditions most similar to reference conditions in comparison to other reaches. Reach score ranges from 0 to -1, with -1 having the least deviation from reference. Values associated with each habitat attribute range from 1 to 11, a value of 1 indicates a habitat attribute being most similar to the reference compared to the other attributes within that reach. In some cases multiple habitat attributes have a value of 1 indicating all attributes are equally the most similar to the reference.

Sequence	Reach Name	Reach Rank	Reach Score	Riparian Condition	Channel stability	Habitat Diversity	Fine sediment	High Flow	Low Flow	Oxygen	Low Temperature	High Temperature	Pollutants	Obstructions
4	Wolf Lodge/Alder	**1**	-0.56	11	8	9	3	4	4	1	1	10	6	7
10	Cougar/Mica Creek	**2**	-0.53	11	3	7	8	3	3	1	2	10	6	8

Table 6.13. Tornado diagram for kokanee salmon in the Coeur d' Alene Subbasin. Degree of confidence for protection and current habitat conditions range from 0.0 to 1.0 with the greatest confidence equal to 1.0. Protection reach scores are presented on the left side and current habitat reach scores are presented on the right. Negative scores are in parentheses.

NP = Not present

Sequence	Reach Name	Protection Confidence
1.1	Benewah	NP
1.2	0	NP
2.1	Plummer/Pedee Creek	NP
2.2	0	NP
2.3	0	NP
3.1	Lake Creek	NP
4.1	Wolf Lodge/Alder	0.50
4.2	0	NP
4.3	0	NP
5.1	Fernan	NP
6.1	Blue Creek	NP
7.1	Beauty Creek	NP
8.1	E. Side Coeur d' Alene Lake	NP
8.2	0	NP
8.3	0	NP
9.1	Fighting Creek	NP
10.1	Cougar/Mica Creek	0.50



6.5.4 Current Management

Current regulations for kokanee salmon in Coeur d' Alene Lake allow anglers to harvest up to 25 fish a day with no minimum size requirements.

6.6 Environmental Conditions[2]

The discussion on environmental conditions within the Coeur d' Alene Subbasin is delineated into four distinct drainages: St. Joe River drainage, St. Maries River drainage, Coeur d' Alene River, and Coeur d' Alene Lake. Figure 6.3 displays all impaired water bodies identified on Idaho's 1998 303(d) list within the entire Coeur d' Alene Subbasin. Water quality issues are identified and discussed for each drainage. The water quality impairments identified in Idaho's 303(d) list and Figure 6.3 often reflect the impacts of land use activities in the watershed and assist in recognizing the physical/chemical limiting factors for aquatic biota in the stream systems. From this assessment of environmental condition and limiting conditions (see section 6.6.2), objectives and strategies were developed to address the limiting conditions for aquatic resources and are presented in the Section 10: Coeur d' Alene Subbasin Management Plan Section.

[2] Large portions of Section 6.6 were contributed to by the Coeur d' Alene Subbasin Summary Report (2001), pp. 29-38.

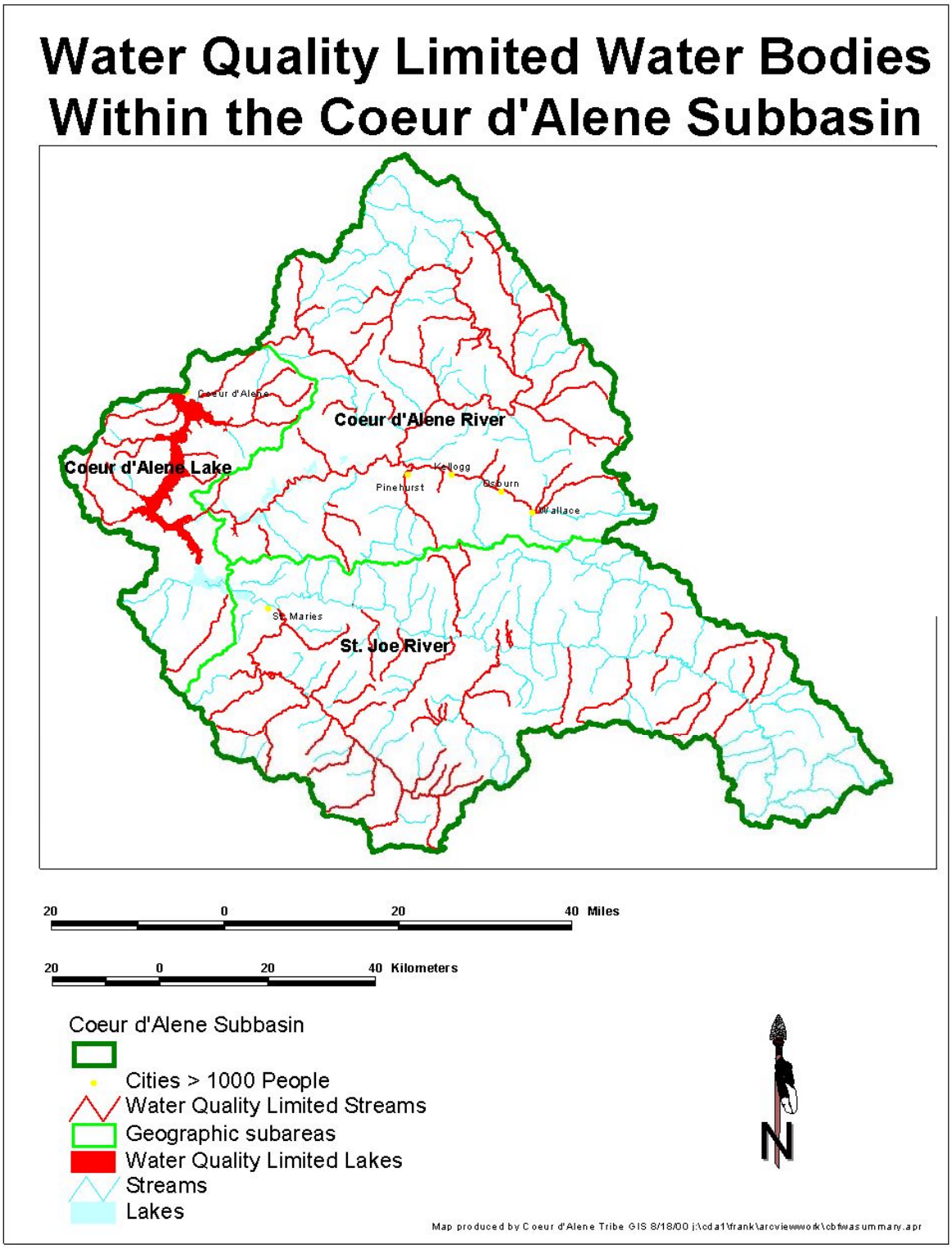


Figure 6.2. Water quality limited water bodies included in the Coeur d' Alene Subbasin (*Source*: IDEQ 1998 303(d) list)

6.6.1 Environmental Conditions within the Subbasin

6.6.1.1 St. Joe River Drainage

The St. Joe River, excluding the St. Maries River, contains an estimated 949 kilometers (590 miles) of streams with over 63 tributaries. The St. Joe River and its tributaries include the core refugia watersheds for native riverine fish and herptofauna. Since the early twentieth century, the St. Joe drainage has been impacted by mining, logging, and agricultural practices, however these activities have impacted the drainage to a lesser degree compared to other areas of the Coeur d' Alene Subbasin (for example South Fork Coeur d' Alene River drainage). The watershed has a history of timber harvest and some grazing, which, in recent years has been restricted to the floodplain area of the lower reaches of the St. Joe River. The U.S. Forest Service (USFS), Idaho Panhandle National Forest owns most of the land (47 percent) within the drainage with some smaller areas designated as BLM, Idaho State, and private lands (refer Section 5, Figure 5.5 for land ownership for the Coeur d' Alene Subbasin).

Currently, there are 27 streams (28 stream segments), 10 streams within the St. Joe drainage (Table 6.14) and 17 streams within the St. Maries drainage (Table 6.15), identified on the Idaho Department of Environmental Quality (IDEQ) 303(d) list of water bodies that are water quality impaired (Available 2004: http://www.deq.state.id.us/water/1998_303d/303dlist.pdf). The mainstem St. Joe River was not included on the 303(d) list, nor was it found to be impaired. The most common water quality impairment within the St. Joe River drainage (excluding St. Maries drainage) is sediment, followed by other impairments such as temperature, bacteria, dissolved oxygen, habitat alteration, and nutrients (Table 6.14).

Table 6.14. Impaired water bodies within the St. Joe River drainage according to Idaho's 303(d) list (1998). Abbreviations for water quality impairment are: BA = bacteria, DO = dissolved oxygen, HAB = habitat alteration, NUT = nutrients, SED = sediment, TEMP = temperature

	Water body	Drainage	# Segments	Impairment
1	Bear Cr	St. Joe	1	BA, SED, TEMP
2	Bird Cr	St. Joe	1	SED
3	Blackjack Cr	St. Joe	1	BA, DO, SED
4	East Fork Bluff Cr	St. Joe	1	SED
5	Fishhook Cr	St. Joe	1	SED
6	Gold Cr	St. Joe	1	HAB, NUT, SED, TEMP
7	Harvey Cr	St. Joe	1	BA, DO, SED, TEMP
8	Little Bear Cr	St. Joe	1	BA, SED, TEMP
9	Loop Cr	St. Joe	1	SED
10	Mica Cr	St. Joe	1	SED

(*Source*: Available 2004: http://www.deq.state.id.us/water/1998_303d/303dlist.pdf)

The Upper St. Joe River Watersheds: Upstream from Heller Creek

This 5,776-hectare (14,272-acre) portion of the St. Joe River drainage includes the upper-most reaches of the St. Joe River and several tributaries. Major river tributaries include (beginning upstream in the headwaters) Wisdom, Medicine, California, and Yankee Bar creeks. The high elevation and cold-water temperatures inherent to this area result in natural conditions favoring the persistence of native species, especially bull trout and westslope cutthroat trout. The upper St. Joe River watershed has been relatively undisturbed compared to other drainages in the Coeur d' Alene Subbasin. Historic mining and naturally occurring events such as fires and floods are the most noteworthy disturbances associated with this portion of the Subbasin. Majority of the upper St. Joe River watershed consists exclusively of National Forest System lands managed by the USFS (refer to Section 5, Figure 5.5). Road density in the upper St. Joe River watershed is classified as high (1.7-4.7 mi/mi^2, refer to Section 5, Figure 5.6).

Aquatic habitat surveys were completed by the USFS for most streams in this portion of the watershed most recently in 1991 and 1992. Snorkel surveys were conducted by the USFS in Medicine Creek in 1993. IDFG has been counting bull trout redds in index streams in upper St. Joe River tributaries since 1992 and has conducted miscellaneous snorkel and electrofishing surveys for juvenile fish. In addition, other tributaries have been surveyed for bull trout redds since 1992 in a cooperative effort among the USFS and other agencies and organizations (data from these surveys are on file at the St. Joe Ranger District office). Plum Creek Timber Company (PCTC) conducted electrofishing surveys during 1994 and IDEQ has also conducted electrofishing (data available in the IDEQ BURP data).

These surveys confirmed that native species, including bull trout and westslope cutthroat trout, currently spawn, rear, and over-winter within this portion of the St. Joe River drainage. Fish populations exhibiting adfluvial, fluvial and resident life history forms utilize this area. Collectively, this watershed area is one of the core native trout refugia watersheds and is, in fact, the most important known source of bull trout within the St. Joe River drainage. More than 70 percent of the bull trout redds located within the entire St. Joe River drainage have been found in this area and over 50 percent of the redds have been found in Medicine Creek alone.

The Middle St. Joe River Watersheds: Copper Creek to Bean Creek

The Middle St. Joe River watersheds consists of approximately 12,100 hectares (29,900 acres) of tributary watersheds in the St. Joe River drainage. Major river tributaries include Bean Creek (3,254 hectares), Bacon Creek (2,303 hectares), Ruby Creek (2,409 hectares), Timber Creek (2,230 hectares), and Copper Creek (1,905 hectares). The high elevation and cold-water temperatures inherent to this area result in natural conditions that favor persistence of native species. As in the upper St. Joe watershed, land use impacts have been primarily associated with historic mining and naturally occurring events such as fires and floods. The majority of the watershed is managed by the USFS.

Aquatic habitat surveys were completed by the USFS in these watersheds most recently in 1992. Bull trout redd surveys have been conducted annually in some tributaries since

1992 in a cooperative effort between numerous agencies and organizations. Snorkel surveys were also conducted in Timber Creek in 1993 and in Bacon Creek in 1997. (Data from these surveys are on file at the St. Joe Ranger District office.) As a result of these surveys, native trout spawning and rearing has been documented in each stream. Fish populations exhibiting adfluvial, fluvial, and resident life history forms likely occur.

The Lower St. Joe River downstream to Mica Creek including all tributaries

The high elevation and cold water temperatures inherent to this area favor the persistence of native trout. However, land management activities have significantly altered many natural processes. Historic activities include road construction, timber harvest as well as some development. Naturally occurring events such as fires and floods also influence natural processes. The USFS, BLM, and private citizens represent the various entities that own and manage the lower reaches of the St. Joe River watershed (refer to Section 5, Figure 5.5). Road densities within the lower reaches range from moderate (0.7-1.7 mi/square mi) to very high (4.7-16.6 mi/square mi) (refer to Section 5, Figure 5.6).

Aquatic habitat surveys were completed by the USFS in the watersheds most recently in 1997. In addition, bull trout redd surveys have occurred nearly annually since 1992 in a cooperative effort between numerous agencies and organizations. Electro-fishing surveys and snorkel surveys were also conducted in 1993. (Data from these surveys are on file at the St. Joe Ranger District office). IDEQ has also conducted electroshocking fish surveys since 1994 (data available in IDEQ BURP data). As a result of these surveys, native trout are currently known to spawn, rear, and over-winter within most of these watersheds. Fish populations that exhibit adfluvial, fluvial and resident life history forms most likely utilize this area.

The Lower Most Reaches of St. Joe River: downstream to the St. Maries River

The lower reach of the St. Joe River downstream of the confluence with the St. Maries River is an obligate migratory corridor for adfluvial fish (bull and westslope cutthroat trout). Westslope cutthroat trout utilize the St. Joe and St. Maries rivers and some of the tributary habitat within these watersheds for spawning and rearing. Spawning and rearing populations of bull trout have not been found in recent surveys, however, individual fish occur in these lower watersheds at various times of the year.

The lower reach of the St. Joe River, downstream of St. Maries River has been heavily impacted by wide-spread land use changes and mixed land ownership (refer to Section 5, Figure 5.5), which impact aquatic habitat and create challenges for coordinated restoration efforts. Water quality issues identified on the 1998 303(d) list (Table 6.14) are associated with elevated temperature and increased sedimentation, which can limit productivity of native fish species. In addition, operations at Post Falls Dam controlling storage and raising Coeur d' Alene Lake summer lake levels has increased the slack water habitat in the lower portions of the St. Joe River. The transition from swift water to slack water occurs at Falls Creek on the St. Joe River. Water quality issues (sediment and temperature) identified in the lower reach of the St. Joe River may be a direct result of land use activities and indirect result of operations at Post Falls Dam.

6.6.1.2 St. Maries River Drainage

The St. Maries River drainage has been impacted by anthropogenic activities since the early 1900s when loggers, ranchers and gold and garnet miners settled the area. Historic and current mining activities are described in more detail in Section 5.2.7 Major Land Ownership and Land Uses under the subheading Mining.

Seventeen water bodies (18 stream segments) in the St. Maries River drainage are listed as impaired on the IDEQ 1998 303(d) list (Table 6.15). Sediment is a common water quality issue in all the streams listed in Table 6.15 except for Thorn Creek. Habitat alteration and temperature were the other two most common water quality issues. Nutrients, dissolved oxygen, and bacteria were also listed as water quality issues but were less frequent.

Table 6.15. Impaired water bodies within the St. Maries River drainage according to Idaho's 303(d) list (1998). Abbreviations for water quality impairment are: BA = bacteria, DO = dissolved oxygen, HAB = habitat alteration, NUT = nutrients, SED = sediment, TEMP = temperature

	Water body	Drainage	# Segments	Impairment
1	Alder Cr	St. Maries	1	NUT, SED
2	Carpenter Cr	St. Maries	1	HAB, SED
3	Charlie Cr	St. Maries	1	HAB, SED
4	Crystal Cr	St. Maries	1	SED
5	Emerald Cr	St. Maries	1	HAB, SED, TEMP
6	Flewsie Cr	St. Maries	1	SED, TEMP
7	Gold Center Cr	St. Maries	1	HAB, SED, TEMP
8	Gramp Cr	St. Maries	1	BA, SED, TEMP
9	John Cr	St. Maries	1	SED
10	Middle Fork St. Maries River	St. Maries	1	HAB, SED
11	Renfro Cr	St. Maries	1	SED
12	Santa Cr	St. Maries	1	DO, HAB, NUT, SED
13	St. Maries River	St. Maries	2	HAB, NUT, SED
14	Tank Cr	St. Maries	1	BA, DO, SED, TEMP
15	Thorn Cr	St. Maries	1	NUT, TEMP
16	Tyson Cr	St. Maries	1	HAB, SED
17	West Fork St. Maries River	St. Maries	1	SED, TEMP

(*Source*: Available 2004: http://www.deq.state.id.us/water/1998_303d/303dlist.pdf)

The St. Maries River contains more than 240 kilometers (150^{+} miles) of streams with over 15 tributaries. In the St. Maries River drainage, there have been only occasional sightings of bull trout in the watershed; westslope cutthroat trout populations are severely depressed. Alder Creek is considered an important resident cutthroat trout fishery and has been prioritized by the Coeur d' Alene Tribe for habitat restoration. Santa and Renfro creeks may also be important as a resident cutthroat trout fishery since cutthroat trout were identified during streambank erosion surveys (Kootenai-Shoshone Soil and Water Conservation District 1991). In addition, Coeur d' Alene Conservation District suggests all of the streams identified on Idaho's 1998 303(d) list (Table 6.15) are equally deserving of priority status for stream restoration relative to their importance to sustaining a cutthroat fishery in the St. Maries River drainage (R. Flagor, Coeur d' Alene Conservation District, personal communication, 2004). Refer to section 6.3, Focal

Species-Bull Trout, for additional information on the historic and current distribution of bull trout in the St. Maries River drainage.

6.6.1.3 Coeur d' Alene River Drainage

The Coeur d' Alene River drainage is approximately 3,858 square kilometers, and contains an estimated 1,052 kilometers of stream (654 miles) with over 78 tributaries. The drainage consists of two watersheds: the South Fork, which drains the Coeur d' Alene mining district, and the North Fork, which is located entirely within the Panhandle National Forest (Funk et al. 1975). The confluence of the North Fork and South Fork at the town of Enaville form the mainstem of the Coeur d' Alene River.

Development of the Silver Valley mining district in the South Fork Coeur d' Alene River Valley since 1883 has brought significant and essentially permanent changes to the South Fork watershed. Silver mining is still active in the valley, but at much reduced levels due to low silver prices and reduce supplies. Early gold placer mining operations in tributaries to the North Fork of the Coeur d' Alene River, Beaver and Prichard creeks, resulted in destruction of stream channels and floodplains, and continue to negatively impact fish habitat. Bull trout spawning and rearing is not currently known to occur in this basin, and westslope cutthroat trout are severely depressed in many reaches.

Refer to Section 5.2.7 under subheading Forest Management for historical description of logging and timber harvest practices with the Coeur d' Alene Subbasin.

North Fork of the Coeur d' Alene River Watershed

The North Fork Coeur d' Alene River (North Fork) watershed has a long history of forest management, with logging, grazing, water resource, and recreation all occurring in the watershed. Grazing is limited mainly to the lower portions of the river valleys. Mining has occurred in a few areas, with intense activities occurring in Prichard and Beaver creeks in the 1880s. The watershed has had a long history of extensive logging. Splash dams were erected for transporting timber, and clear cutting was common practice.

There are over 100 fish-bearing tributary streams present in the North Fork watershed (PBTTAT 1998). Major tributaries included the Little North Fork Coeur d' Alene River, Independence Creek, Tepee Creek, and Shoshone Creek. Additionally, Cougar Gulch and Graham Creek are key streams currently supporting migratory cutthroat trout populations (Apperson et al. 1988). Between 1984 and 1987 bull trout were observed in Brown and Graham creeks by IDFG (Apperson et al. 1988). However, additional surveys in these streams and in 73 other streams in the drainage between 1994 and 1995 did not confirm or document the presence of bull trout (Dunnigan and Bennett 1997, cited in IDEQ 2001). Refer to section 6.3, Focal Species-Bull Trout, for additional information on the historic and current distribution of bull trout in the North Fork Coeur d' Alene River watershed.

Sixteen water bodies (17 stream segments) are currently listed as impaired on the IDEQ 303(d) list (Table 6.16). Prichard Creek appeared to have the greatest degree of quantifiable water quality impairment within the Coeur d' Alene River drainage. All

water bodies except for Lost Creek identified sediment as a common water quality issue. Other water quality issues identified include habitat alteration, flow alterations, bacteria, pH, metals, dissolved oxygen, nutrients, and oil pollution. Flow alteration is sometimes described as the change in the flood magnitude as a result of reduction in vegetation and increase in road densities. Road densities in the Coeur d' Alene Subbasin are classified as high to very high (1.7 to 16.6 miles/square mile, Figure 5.6) (CDA Tribe 2000; IDEQ 2001). Habitat alteration can occur from several actions, including road construction, removal of riparian vegetation, channelization, or excess sedimentation. Sediment input to the mainstem and tributaries from the watershed is a natural process. The estimated natural background sedimentation rate for the entire North Fork watershed is 13,089 tons per year (IDEQ 2001). However, excess sedimentation, both suspended and bedload gravel, in a forested watershed like the North Fork most often has its origin in roads developed for logging or access to a watershed or improper forest harvest practices. Roads may yield sediment directly from their surfaces or beds through mass wasting, location in relation to the stream resulting in cutting of the streambank, or improper harvest practices including skidding logs on steep slopes or in stream corridors. The Beaver and Prichard sub-watersheds have added sedimentation resulting from dredge, hydraulic, and underground mining with its associated development (IDEQ 2001).

Table 6.16. Impaired water bodies within the North Fork Coeur d' Alene River drainage according to Idaho's 303(d) list (1998). Abbreviations for water quality impairment are: BA = bacteria, DO = dissolved oxygen, HAB = habitat alteration, FLOW = flow alteration, NUT = nutrients, OIL = oil pollution, MET = metals, pH = [H^+ ions], SED = sediment, TEMP = temperature

	Water Body	# Segments	Impairments
1	Beaver Cr	1	SED
2	Big Elk Cr	1	SED
3	Burnt Cabin Cr	1	SED
4	Copper Cr	1	SED
5	Cougar Gulch	1	HAB, SED
6	Cub Cr	1	SED
7	Falls Cr	1	SED
8	Little North Fork Coeur d' Alene River	1	FLOW, HAB, SED
9	Lost Cr	1	unknown
10	North Fork Coeur d' Alene River	2	FLOW, HAB, SED
11	Prichard Cr	1	BA, DO, HAB, NUT, OIL, SED, TEMP
12	Shoshone Cr	1	unknown
13	Steamboat Cr	1	FLOW, HAB, SED
14	Tepee Cr	1	HAB, SED
15	West Fork Eagle Cr	1	HAB, MET, pH, SED
16	Yellow Dog Cr	1	SED

(*Source*: Available 2004: http://www.deq.state.id.us/water/1998_303d/303dlist.pdf)

As in many areas of the Coeur 'd Alene Subbasin, mining and logging activities have also impacted the North Fork watershed. The proportions of pool and run habitat types in the

reach of the North Fork between Tepee and Cow creeks and in Trail Creek were lower than in watersheds without roads and extensively logged areas (Hunt and Bjornn 1991). Land use practices and current water quality issues impacting and degrading critical trout habitat along with relatively low compliance with harvest regulations may have attributed to the relatively low trout densities present within the North Fork watershed (IDEQ 2001). Salmonid density for impaired streams within the North Fork drainage range between 0.0015 to 0.2847 fish per square meter per hour of effort electrofishing (fish/m^2/hr) with the range of trout density present in the reference sites between 0.0021 and 0.3314 fish/m^2/hr (IDEQ 2001).

Bennett and Dunnigan (1997) conducted surveys in second and third order tributaries to measure cutthroat trout densities and estimate which physical habitat and watershed characteristics can be used to predict trout density and biomass. Hunt and Bjornn (1991) completed aquatic habitat surveys throughout the North Fork watershed including Little North Fork and its tributaries and Tepee Creek and its tributaries. In 1986-1987 the IDFG studied the North Fork from the confluence of the South Fork up to the Little North Fork by performing creel surveys, electroshocking, installing migration traps and snorkeling. Each of these studies confirmed spawning and rearing activity by westslope cutthroat trout. Cutthroat population trends in the Coeur d' Alene River drainage have been monitored annually by IDFG with snorkeling transects since 1983. Cutthroat trout densities in the Coeur d'Alene River basin have been described as depressed (Lewynsky 1986; Hunt and Bjornn 1993). Recent surveys indicate the population of cutthroat trout is increasing, although it is believed this population is still below its potential (DuPont and Horner, in press). Reasons for this depressed fishery have been attributed to toxic mining wastes (IDEQ 1996), poor habitat (Abbott 2000), over fishing and poaching (Lewynsky 1986), and sediment delivery (IDEQ 1996).

South Fork Coeur d' Alene River Watershed

Large scale and adverse changes have occurred to the South Fork and its tributaries as a result of mining, urbanization, agriculture, logging, and road building (Woods and Beckwith 1997). This most significant impact to aquatic habitat originates from mining. The South Fork Coeur d' Alene River (South Fork) watershed is at the heart of Idaho's Coeur d' Alene Mining District. Major tributaries to the South Fork include Canyon Creek, Nine Mile Creek, Pine Creek, Big Creek and Bear Creek. Lead, zinc, silver, and other metals have been commercially mined since 1883 within what is now referred to as the 21 square mile Bunker Hill Superfund Site (EPA 2000). However, much of the mining and/or milling capacity of the Silver Valley Mining District has declined since the early 1980s. Mills and the smelter facility at Bunker Hill have been cleaned up under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) or are slated for clean up. After removal of the hazardous materials, some of these sites are finding industrial or recreational uses.

Cleanup of heavy metals and other toxic waste related to mining activity began in earnest in the 1990s. Water quality has improved in many reaches of the South Fork and its tributaries, but heavy metals continue to preclude establishment of a fishery in a portion of the South Fork and in several tributaries (Reiser 1999). There are nine water bodies

(total of 15 stream segments) recognized on Idaho State's 303(d) list with metals and/or sediment identified as the principle impairment to water quality (Table 6.17). The unnatural rate of sedimentation originates from mine waste piles, urban land use, road erosion, encroachment on stream channels and floodplains, and the encroachment of towns and mining facilities. Water quality data indicate chronic metal exposure exceeds federal metals criteria for the protection of aquatic life (Ridolfi 1996). Three major pollutants existing throughout the watershed are cadmium, lead, and zinc. The metals that exist in the water column provide a pathway to injury for biota including, macroinvertebrates, plants, phytoplankton, and fish. Hazardous substances have contaminated floodplain and riverine sediments throughout the Coeur d' Alene River drainage (Horowitz et al. 1993; NRDA Report of Injury Determination 2000). Lead concentrations range between 500 to 80,000 parts per million (ppm). Concentrations of this magnitude have been documented to act as a pathway to injury for aquatic and terrestrial biota. Substrate lead concentrations of 80,000 ppm were found in "jig" tailings in Nine Mile and Canyon Creeks, which lead the Silver Valley Natural Resources Trustees to remove 85,000 cubic yards of tailings and mining waste in 1994 and 1995. Approximately 1,500 tons of lead and 100 tons of zinc were removed during the cleanup.

Table 6.17. Impaired water bodies within the South Fork Coeur d' Alene River drainage according to Idaho's 303(d) list (1998). Abbreviations for water quality impairment are: MET = metals, and SED = sediment

	Water Body	# Segments	Impairments
1	Canyon Cr	1	MET, SED
2	East Fork Nine Mile Cr	1	unknown
3	East Fork Pine Cr	2	MET, SED
4	Government Gulch	1	MET, SED
5	Milo Cr	1	MET
6	Moon Cr	1	MET, SED
7	Nine Mile Cr	1	MET, SED
8	Pine Cr	1	MET, SED
9	South Fork Coeur d' Alene River	6	MET, SED

(*Source*: Available 2004: http://www.deq.state.id.us/water/1998_303d/303dlist.pdf)

Tributaries to the South Fork Coeur d' Alene River generally have V-shaped valleys as a result of the deeply dissected nature of the topography. These valleys accommodate primarily Rosgen A and high gradient B channels. There are exceptions at Woodland Park Flats in lower Canyon Creek, a short section of Placer Creek, lower East Fork Pine Creek, and in the valley of Pine Creek below Langlois Creek. These broader valleys accommodate low gradient Rosgen B channels. The tributaries generally have boulder-bedrock control. Their channel morphology is typically Rosgen A and high gradient B channels. The Belt Supergroup bedrock of the Subbasin weathers to soils rich in coarse fragments (60-75 percent) and rather poor in fine materials (25-40 percent). Silts dominate the fine soil materials. As a consequence of the soil composition and the steep tributary gradients, boulders and cobble comprise the majority of the stream sediment particles. Width-to-depth ratios are lower in these streams. The low gradient B channels

of tributaries have cobble as the primary stream sediment particles. The width-to-depth ratio is higher. Floodplains are narrow in most tributary channels. Broader floodplains are found in the wider valleys noted above. Riparian communities correspondingly are narrow in the narrow valleys and broader where valleys and floodplains widen.

The South Fork above the town of Wallace is similar to the other tributary channels in valley shape, stream gradient, channel sediment, floodplain width and riparian communities. At Wallace, Canyon, Nine Mile, and Placer creeks join the South Fork within the distance of a mile reach. The valley slopes remain steep, but the valley floor widens. The channel is a moderate to low gradient Rosgen B channel below Wallace. The channel passes through the "flats" at Osburn, Big Creek, and Smelterville. The channel is at its lowest gradient through these reaches. The "flats" are isolated by narrow reaches, which are characterized by a higher gradient. Width-to-depth ratio is lower in the narrow reaches as compared to the "flats." Cobble particle sizes dominate the stream sediments, but a higher percentage of sand and finer materials are present. The "flats" have correspondingly wider floodplains and would naturally have more extensive riparian communities. The narrow reaches have a narrower floodplain and would naturally have less extensive riparian communities.

Mainstem of Coeur d' Alene River Watershed

The mainstem Coeur d' Alene River extends from the confluence of the North Fork and South Fork downstream to Coeur d' Alene Lake, near the town of Harrison, a distance of approximately 67 kilometers (42 miles). With the exception of the upper 12 kilometers (8 miles), the mainstem is influenced by the operation of Post Falls Dam (operations began in 1906), and is essentially slackwater during much of the year. Nine small lakes, referred to as the Lateral or Chain Lakes, are present in the floodplain between Coeur d' Alene Lake and Cataldo. Important streams that support migratory cutthroat trout populations in the lower Coeur d' Alene River are French Gulch, Skeel Gulch, and Latour Creek. Evans Creek historically had among the highest densities of resident cutthroat trout in the Coeur d' Alene River drainage, as reported by Apperson, et al. (1987) and has been targeted for restoration activities by the Coeur d' Alene Tribe, NRCS, and local soil conservation district offices.

In 1986-1987, IDFG surveyed the mainstem Coeur d' Alene River reach inundated by Post Falls Dam. Results indicate this section serves primarily as a migratory corridor for westslope cutthroat trout (Apperson et al. 1987). More recent surveys of the 12 km stretch of free flowing river show high densities of cutthroat trout, similar in abundance to upper St. Joe River that is managed under catch-and-release regulations (Fredericks et al. 2002).

6.6.1.4 Coeur d' Alene Lake Drainage

Coeur d' Alene Lake drainage contains over 321 kilometers (200^{+} miles) of streams with over 27 tributaries excluding the St. Joe and Coeur d' Alene rivers. The lake is 42 kilometers (26 miles) long and anywhere from 1.6 to 9.6 kilometers (1 to 6 miles) wide. The lake's mean depth is 22 meters (72 feet) with a maximum depth of 63.7 meters (209 feet).

Overall, the water quality of Coeur d' Alene Lake is considered good for nutrients, clarity, and dissolved oxygen (Woods and Harvey 2002). However, there are regions of the lake and some tributaries identified in Table 6.18 according to Idaho State's 1998 303(d) list that do not meet water quality standards. Sediment and habitat alteration appear to be the most common water quality impairment. Other water quality issues include nutrients, dissolved oxygen, metals, bacteria, temperature, and pH (associated with metals).

Table 6.18. Impaired water bodies within the Coeur d' Alene Lake drainage according to Idaho's 303(d) list (1998). Abbreviations for water quality impairment are: BA = bacteria, DO = dissolved oxygen, HAB = habitat alteration, MET = metals, NUT = nutrients, SED = sediment, TEMP = temperature

	Water Body	# Segments	Impairments
1	Baldy Cr	1	BA, HAB, SED, TEMP
2	Black Lake	1	NUT
3	Coeur d' Alene Lake	1	MET
4	Coeur d' Alene River*	10	HAB, MET, pH, SED
5	Cougar Cr	1	HAB, NUT, SED
6	Fernan Cr	1	BA, DO, HAB, NUT, SED
7	Fernan Lake	1	DO, NUT, SED
8	Fourth of July Cr	1	HAB, SED
9	Kid Cr	1	HAB, NUT, SED
10	Lake Cr	1	SED
11	Larch Cr	1	BA, HAB, SED, TEMP
12	Latour Cr	1	BA, HAB, SED, TEMP
13	Marie Cr	1	HAB
14	North Fork Mica Cr	1	BA, HAB, NUT, SED
15	Thompson Cr	1	HAB, SED
16	Willow Cr	1	SED
17	Wolf Lodge Cr	1	HAB, NUT, SED
* one of 10 sediments also had DO, and/or TEMP listed as impairments			

(*Source:* Available 2004: http://www.deq.state.id.us/water/1998_303d/303dlist.pdf)

In 1995, the Coeur d' Alene Lake Management Plan was approved and categorized the lake into four distinct areas: the deep northern pools, the shallow southern pool, backwater sections of the Coeur d' Alene River and the St. Joe rivers, and shallow near-shore zone of variable width that rings much of the lake (Woods and Harvey 2002). The following text describes water quality conditions in the northern pools, southern pool, and near-shore zones from monitoring efforts between 1995 and 2001.

The northern pools are characteristic of oligotrophic conditions having low level of nutrients, average clarity of 10 meters, and total phosphorus concentrations in the euphotic zone 5-7.5 µg/L (Woods and Harvey 2002). Dissolved oxygen has met both State and Tribal standards during the summer months in the northern pools. Average

dissolved oxygen levels declined 52 percent of saturation during a low discharge year (2001), while during normal discharge years, average dissolved oxygen levels declined to 70 percent of saturation with depth (Woods and Harvey 2002).

In the southern pool, water quality conditions are classified as mesotrophic or eutrophic. The poorer conditions in the southern pool are potentially the result of Post Falls impoundment, agricultural sediment, and nutrient sources from adjacent tributaries and other pollution sources (Woods and Harvey 2002). Water clarity ranges 1-9 meters throughout the year, total phosphorus levels range from <5-88 µg/L, and dissolved oxygen concentrations do not meet Tribal water quality standards during the summer months (Woods and Harvey 2002). Dissolved oxygen declines during the summer and early fall to below 30 percent of saturation at depth (Woods and Harvey 2002).

Approximately half of the near-shore areas monitored had similar water quality conditions as areas in the mid-lake sections. Wolf Lodge, Blue Creek, and Squaw bays were the exceptions with total phosphorus levels greater than 8 µg/L and water clarity at about 6 meters (Woods and Harvey 2002).

Coeur d' Alene Lake level is controlled by Post Falls Dam. The operation of Post Falls Dam in maintaining an artificially high and stable summer pool level is one of several factors influencing aquatic habitat in Coeur d' Alene Lake. The lake is held approximately 2.15 meters higher than the "natural" low pool elevation, primarily to provide recreational benefits and some limited benefit to water management for hydropower. At full pool (lake elevation 648.7 meters) Coeur d' Alene Lake covers 12,900 hectares (31,876 acres); at minimum pool level (lake elevation of 646.2 meters) the lake covers 12,200 hectares (30,146 acres) (Peters et al. 1999).

As a result of elevated lake levels, areas that would historically be wet meadows have been transformed into shallow water bays benefiting warmwater fish species. The effects of Post Falls Dam are most prominent in the southern end of the lake. Large expanses of shallow inundated lands typically reach temperatures of over 26 ºC (79 ºF) during the summer (Peters et. al. 1999). Additionally, sediment is transported to the lake from agricultural areas where it is deposited and accumulates in the slackwater portions of the smaller tributaries in the interior bays of the lake. Sediment accumulation creates large mudflats that are quickly colonized by aquatic macrophytes resulting in habitat conditions more suitable for exotic species. A significant portion of the Coeur d' Alene Subbasin, especially in the Coeur d' Alene River drainage, has high forest road densities ranging from 1.7 to 4.7 miles per square mile (refer to Section 5, Figure 5.6). Roads are a significant source of sediment, in addition to other land management activities such as farming, grazing and home development.

Mining and ore processing operations in the South Fork Coeur d' Alene River since the early 1880s have produced extensive trace-element-contaminated sediments in the South Fork Coeur d' Alene River, mainstem Coeur d' Alene River, and the lake bottom of Coeur d' Alene Lake (Woods 2001). An estimated 72 million tons of heavy metal laden sediments have been deposited in the floodplain and bottom of Coeur d' Alene Lake over

the past 100 years. As a result, the benthic invertebrate community has been altered, the riparian plant community has been suppressed or altered in some areas where pollutants (primarily lead) are especially high, and algae production has been suppressed masking the relative productivity of the lake as a result of high heavy metals (primarily zinc) in the water column (Woods and Beckwith 1997). In 2003, the EPA and the Idaho Department of Health and Welfare issued a fish consumption advisory for bass, bullheads, and kokanee for lead, mercury and arsenic.

Recently (1998, 2000, 2002), mobilization of metals from lakebed sediments have been investigated by the USGS and University of Idaho (Woods and Harvey 2002). In the northern pools, results found lake bottom sediments contribute some dissolved nutrients, zinc and arsenic, to the water column by diffusion of the sediment pore water (Woods Harvey 2002). Through a mass-balance calculation, it was demonstrated that Lake Coeur d' Alene may serve as an overall sink rather than source of metals, however the investigations were not able to determine the overall fate and transport of the metals and nutrients (Woods and Harvey 2002).

Lake Creek

The Lake Creek watershed covers 9.3 hectares (ha, 23,117 acres) and has 153 kilometers (95 miles) of stream channel. Unnaturally high fine sediment loads are a problem in Lake Creek due to agricultural activities and poor bank stability (Kootenai-Shoshone Soil Conservation District 1991, Bauer 1998). A sediment budget constructed for the watershed shows agricultural sheet and hill erosion to be the largest contributor to both the total budget and to the stream system. Forest roads are a minor contributor of sediment, but are still an important factor in generating runoff over impervious surface, and converting ground storage to surface flow. Watershed hydrology is strongly influenced by rain-on-snow precipitation events (refer to Figure 5.3), which occur in late winter and early spring. Runoff generation over agricultural land is a substantial proportion of generated runoff. Lake Creek exhibits flashy hydrology, with peak events greater than 1,000 cfs contrasted with low flows less than 1.0 cfs. The removal of the canopy and water budget transfers from the ground storage to the runoff component contributes to this flashy hydrology.

Sediment and temperature limit fisheries production in the watershed. Spawning and rearing areas for westslope cutthroat trout are primarily restricted to second and third order tributaries. Cutthroat trout densities exceed 5.0 fish/100 square meters throughout the upper watershed and densities as high as 42 fish/l00 square meters have also been documented (Vitale et al. 1999). Ongoing restoration efforts are focused on recovering key watershed processes and expanding the current distribution of westslope cutthroat trout.

Benewah Creek

The Benewah Creek watershed covers 15 ha (37,448 acres) and has 219 kilometers (136 miles) of stream channel. The watershed is primarily managed forest (84 percent) with much of the remaining area used for pasture or agriculture. Road density is 5.4 miles/square mile across the entire watershed (refer to Figure 5.6) (Lillengreen et al. 1998). Forest roads and streambank erosion are the primary contributors of sediment to

the stream channel. Watershed hydrology is strongly influenced by rain-on-snow precipitation events, which occur in late winter and early spring.

Temperature is the primary limiting factor for fisheries production in the watershed. Spawning and rearing areas occur in seven principle tributaries. Cutthroat trout densities exceed 10 fish/100 square miles in most of these tributaries. Ongoing restoration efforts are focused on recovering key watershed processes and expanding the current distribution of westslope cutthroat trout by regulating summer water temperatures in the mainstem of Benewah Creek.

6.6.2 Out-of-Subbasin Effects

The complete blockage of anadromous salmon by Grand Coulee and Chief Joseph dams affected the Coeur d' Alene Indians. Although anadromous salmon never entered the Coeur d' Alene Subbasin, the people of the Coeur d' Alene Indian Tribe relied on salmon from the Spokane River for cultural and subsistence uses. After the demise of salmon, the Coeur d' Alene Tribal members placed more emphasis on harvesting westslope cutthroat and bull trout. Over-harvest of native salmonids within the Coeur d' Alene system may be one of many impacts contributing to the loss of resident salmonid populations.

The Coeur d' Alene Subbasin is a headwater Subbasin; no waters within the Subbasin originate outside of the Subbasin boundaries. Post Falls Dam on the Spokane River, located in the Spokane Subbasin, affects water level elevation of Coeur d' Alene Lake. From approximately mid-June through September, the lake is held at a higher and constant level (2128 ft above mean sea level) than would occur naturally (mean lake level in July before and after operations at Post Falls Dam in 1906 is shown in Figure 6.3). This unnatural water management situation has created more warmwater fish habitat by flooding shallow bays that would otherwise be wet meadows. Riverine portions of the Coeur d' Alene, St. Joe, and St. Maries rivers have also been inundated during part of the year. Outside the time frame when Post Falls Dam controls lake elevation, Coeur d' Alene Lake can and does fluctuate as much as 5 meters during winter rain-on-snow flood events (refer to Section 5, Figure 5.3 for rain-on-snow). A natural constriction at the outlet of the lake is the primary flow control affecting lake level fluctuation during most of the year.

Management of water levels in Coeur d' Alene Lake may be negatively impacting westslope cutthroat and bull trout through changes in lake habitat and loss of riverine habitat. Shallow, weedy, warm bays may not provide the same type of habitat adfluvial cutthroat and bull trout evolved in. The increase of shallow water bays has enhanced warmwater fish populations with potential negative impacts to cutthroat and bull trout through predation and competition. Additional warm water leaving the lake and the change from a flowing river to slack water reservoir likely altered the suitability of the upper Spokane River to support a year-round cutthroat and bull trout population. Loss of riverine habitat in tributaries to the lake, especially in the lower Coeur d' Alene River, has also reduced productive resident trout habitat. Changes in the water storage retention time, may also affect the trophic dynamics of Coeur d' Alene Lake. Impacts to the food

chain may then indirectly affect westslope cutthroat trout that migrate to tributaries to spawn and rear as juveniles.

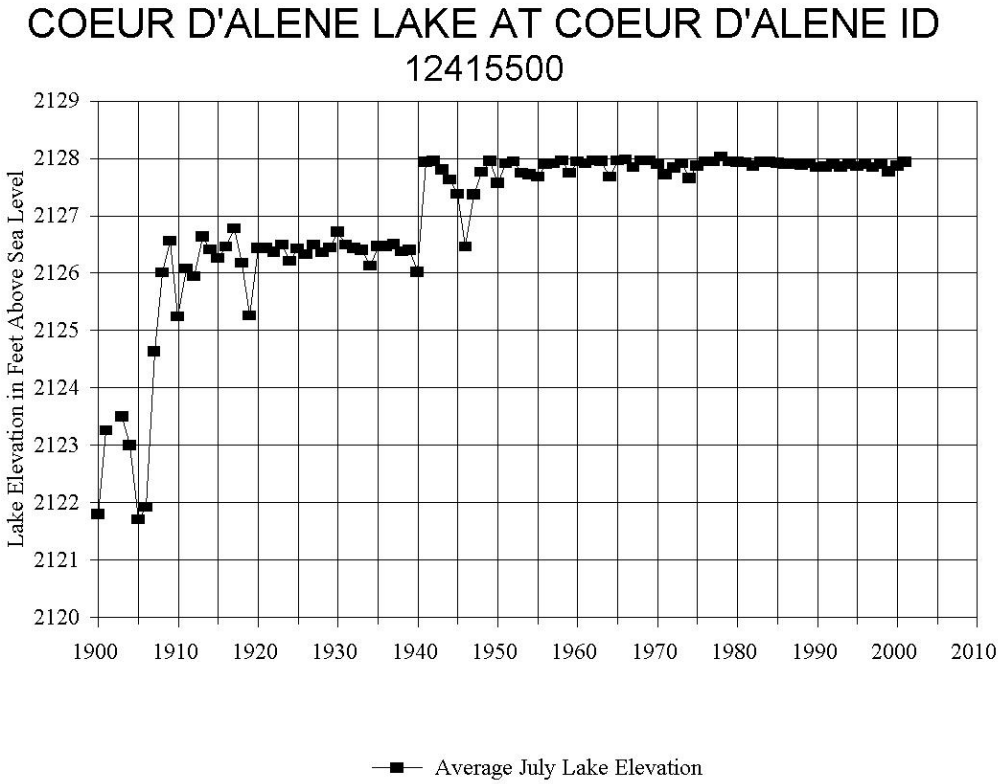


Figure 6.3. Average July Coeur d' Alene Lake elevation in feet above mean sea level from 1900 to 2003 (*Source*: WDOE 2004)

6.7 Limiting Factors and Conditions

It is widely accepted that the persistence of species is linked to the resilience of local populations as well as to the condition, structure, and interaction of populations and habitats at larger scales. There is a substantial amount of literature with examples of habitat disruption and its effects on specific fish and wildlife species (Meehan 1991). Recent research introduces important concepts about the scale, distribution, and connection of habitats and populations, and the associated risks of extinction (Soule 1987; Rieman and McIntyre 1993).

The distribution and abundance of native fish and wildlife species in the Coeur d' Alene Subbasin have been limited by landscape level activities and changes. Limiting factors can be generalized as aquatic and habitat alterations. Aquatic alterations refer to water quality (non-point and point source pollution, Figure 6.4), hydropower, fish barriers, and species interactions resulting from the introduction of nonnative species. Habitat alterations include wildfires, roads, forest management, agriculture, urbanization, and mining.

In many instances, habitat degradation and consequent reduction in native fish and wildlife populations have resulted from the cumulative effects of small changes to terrestrial and aquatic ecosystems. Over time, these cumulative effects may be the most harmful to native fish and wildlife populations because of their potential to alter ecosystem processes, which defined these species existence. Thus, anthropogenic disturbance can significantly alter the productivity of ecosystems by adversely impacting species composition and diversity.

The following sections include narratives describing limiting factors specific to stream habitats that were identified from the QHA results as well as anthropogenic and natural disturbances that have contributed to the degradation of aquatic and terrestrial habitats negatively impacting populations of focal species. Additionally, limiting factors are logically addressed within objectives and strategies as part of Section 10 Coeur d' Alene Subbasin Management Plan.

6.7.1 Physical Habitat Alterations/Limiting Habitat Attributes

QHA was utilized to compare historic versus current physical stream conditions with respect to 11 habitat attributes. Details of the analysis method are provided in Section 3. QHA model does not determine which habitat attributes are most biologically limiting, but does identify which physical attributes have undergone the greatest deviation from the reference stream/reach condition. These results, coupled with knowledge of local biologists and biological status and interactions of the focal species, can assist in identifying key limiting factors. This section provides QHA results on a subbasin level for the Coeur d' Alene Subbasin. Results specific to each focal species are discussed in each focal species section.

The Coeur d' Alene Subbasin was delineated into 36 watersheds (Map CdA-5, located at the end of Section 6). Using the QHA model, habitat conditions were analyzed where bull trout, westslope cutthroat trout, and kokanee were historically and are currently present. Table 6.19 provides a list of reaches with less than optimal (value = 4) reference conditions.

Table 6.19. Reaches that were ranked as containing less than optimal habitat conditions in the reference condition in the QHA

Sequence	Reach Name	Habitat Attributes < optimal
1	Benewah	Fine Sediment, High Temperature
2	Plummer/Pedee Creek	Fine Sediment, High Temperature
3	Lake Creek	Fine Sediment, High Temperature
4	Wolf Lodge/Alder	High Flow
5	Fernan	High Flow
6	Blue Creek	High Flow
7	Beauty Creek	High Flow

Sequence	Reach Name	Habitat Attributes < optimal
8	E. Side Coeur d' Alene Lake	High Flow
11	West Shore Coeur d' Alene Lake	Fine Sediment, Obstructions
14.1	Slate/Big Creek	High Flow
14.2	North Fork St. Joe	High Flow
14.3	North side Joe	High Flow
14.5	Marble Creek	High Flow
15.1	St. Joe Lower	High Temperature, Obstructions
16.1	Upper St Maries River	High Flow
16.2	Lower St Maries River	High Flow, High Temperature
16.3	Emerald/Carpenter Creek	High Flow
20.1	Evans Creek & Lateral Lake Tribs	High Temperature
21.1	Middle North Fork Coeur d' Alene	High Flow
21.2	Shoshone	High Flow
21.3	Upper North Fork Coeur d' Alene	High Flow
21.4	Independence	High Flow
21.5	Tepee	High Flow
21.6	Little North Fork	High Flow
22.1	Prichard/Beaver Creek	High Flow

The habitat parameters with the greatest deviation from reference conditions vary by species and are presented in Table 6.20. This table should be interpreted as an indication of the types of habitat parameters that are problematic for the focal species in the Subbasin as a whole. Some reaches had more than one habitat parameter that was ranked as being equally deviant from the reference, hence the number of reaches listed adds up to more than the total number of reaches ranked. Most reaches had more than one habitat parameter that is currently ranked less than the reference. Table 6.20 only lists those habitat parameters that had the greatest deviation from reference, not all the parameters that could be less than optimal. Kokanee salmon are primarily shoreline spawners and the current habitat conditions most likely only impact a fraction of the kokanee salmon population.

Table 6.20. Habitat conditions with the greatest deviation from reference conditions as presented in the QHA model output for each focal species in Coeur d' Alene Subbasin. In parentheses are the number of reaches or watersheds with the particular habitat attribute exhibiting the largest deviation within that area.

Bull Trout (27)	Cutthroat (36)	Kokanee (2)
Riparian Condition (12)	Riparian Condition (15)	Fine Sediment (1)
Habitat Diversity (10)	Channel Stability (15)	Channel Stability (1)
Channel Stability (9)	Habitat Diversity (15)	
Fine Sediment (4)	Fine Sediment (6)	
Low Flow (3)	Low Flow (5)	
Pollutants (3)	High Temperatures (4)	
High Temperature (3)	Pollutants (3)	
Obstructions (1)	Obstructions (1)	
	High Flow (1)	

The Coeur d' Alene Subbasin has experienced over a century of settlement and anthropogenic disturbances impacting aquatic systems throughout the Subbasin in various degrees. The South Fork of the Coeur d' Alene River watershed has been heavily influenced by past mining activities. In the Coeur d' Alene, lower St. Joe and St. Maries river drainages, high road densities and a long history of timber harvest have been the primary activities impacting fish habitat. Development has also impacted watersheds immediately surrounding Coeur d' Alene Lake. The watershed viewed as least impacted (or having the most potential for recovery from restoration efforts) and most ecologically significant for bull trout and westslope cutthroat trout include the upper St. Joe River watershed, the East Fork Eagle Creek, Shoshone Creek, and few remaining roadless areas in the North Fork of the Coeur d' Alene River.

Local biologists agree the QHA output accurately identified heavily degraded areas in the Subbasin. However, they emphasize that these areas may require laborious and costly restoration projects to restore habitat conditions adequate to support bull trout. In addition, the same effort provided to restore a larger area having somewhat intact habitat might reap greater biological benefits. The experts of the area also believe future projects for restoration and recovery of focal species (for example, bull trout) should work from the headwaters downstream. The focus should also be placed on areas having an abundance of fish and somewhat intact habitat resulting in greater biological benefits from any restoration endeavors. An exception to this would be for managing kokanee, where lake habitat is the first priority.

For a more detailed analysis of limiting habitat attributes identified for each focal species (bull trout, westslope cutthroat trout, and kokanee salmon), refer the sections on focal species where QHA results are discussed.

6.7.2 Description of Historic Factors Leading to Decline of Focal Species[3]

The overall cumulative effects of mining, logging, nonnative species, agriculture, roads, urbanization, over harvesting, and the operations of Post Falls Dam have all contributed to the decline in the salmonid production of the Coeur d' Alene Subbasin. The principle factors leading to the decline or collapse in the native fish population in the Subbasin are water temperature, excess sedimentation, degraded spawning and rearing habitat, and interactions with exotic species. The physical limiting factors have been identified in the QHA (see Table 6.20) and by stream studies conducted over the years by USGS, Coeur d' Alene Tribe, and IDEQ.

Since 1883, the South Fork Coeur d' Alene River drainage has undergone extensive mining pollution, which has decreased the potential for salmonid. During the 1880s mining and milling wastes were discharge directly into the South Fork Coeur d' Alene River, which prevented the existence of almost all aquatic life in the South Fork and the entire mainstem of the Coeur d' Alene River. Since 1981, when mining operations stopped, the conditions in the mainstem Coeur d' Alene River have continued to gradually improve, and westslope cutthroat trout now migrate through the area (Graves et al. 1992).

The southwest portion of Coeur d' Alene Lake, with its rich Palouse soils, has been intensively farmed for at least the past 100 years. Heavy sedimentation, high water temperatures, and increased runoff rates have attributed to a substantial decrease in water quality.

The operations of Post Falls Dam have seriously altered the available habitat for westslope cutthroat trout (Graves et al. 1992). Inundation of riverine portions of the Coeur d' Alene and possibly lower reaches of St. Joe and St. Maries rivers has eliminated productive trout habitat.

6.7.2.1 Aquatic Alterations

Limiting factors affecting native aquatic species include poor water quality (Figure 6.2), habitat degradation, loss of prey species, passage barriers (e.g., culverts, dams), hybridization and competition with exotic species, and over harvest. Any number or combination of these limiting factors present in the Coeur d' Alene Subbasin can be further divided into either legacy or ongoing impacts.

Legacy impacts are results of activities, management actions, or events that occurred in the past, but their effects are still present. In many cases legacy effects continue to pose a risk to native trout. Legacy degradation to native trout habitat has resulted from timber harvest and skidding in and along riparian areas, splash dams, stream crossing structures (passage barriers and/or potential flow blockages), roads, wildfire, mining, grazing, and removal of large organic debris. Legacy effects have diminished, and in many instances

[3] The majority of Section 6.7.2 was taken directly from the Coeur d' Alene Subbasin Summary (2001), pp. 49-57.

continue to diminish, habitats and require restoration efforts. Legacy impacts can influence ongoing or proposed activities.

Legacy impacts directly affecting native trout populations have occurred from fishery management actions such as Tribal subsistence fisheries on spawning cutthroat populations, liberal harvest limits for sport fisheries, and the stocking of exotic fish species.

Ongoing impacts may result from activities or management actions that are legal according to present laws and regulations. Examples include road construction and maintenance, timber harvest, National Pollutant Discharge Elimination System (NPDES) permits (Figure 6.4), clean up and management of CERCLA sites (Figure 6.4), mining, grazing, urbanization, recreation, etc.

Activities such as the management for nonnative species may threaten native trout through competition and/or predation of native fish, while other activities such as unintentional, incidental, or illegal harvest of bull trout or cutthroat trout within the protective slot limit threaten already depressed populations.

Watersheds encompassing both aquatic and terrestrial resources have been negatively impacted as human populations have grown overtime with the concurrent increase in land use activities such as roads, timber harvest, agriculture, and mining in the Subbasin. The effects of both legacy and ongoing problems from land use can be reduced through immediate actions and other actions identified by analysis and monitoring. Watershed analysis provides a comprehensive assessment of watershed and fish habitat conditions within a basin. The analysis includes assessments for roads (refer to Section 5, Figure 5.6), streams, riparian areas, erosion, and fish. The results are applied to improve land management and fishery management actions.

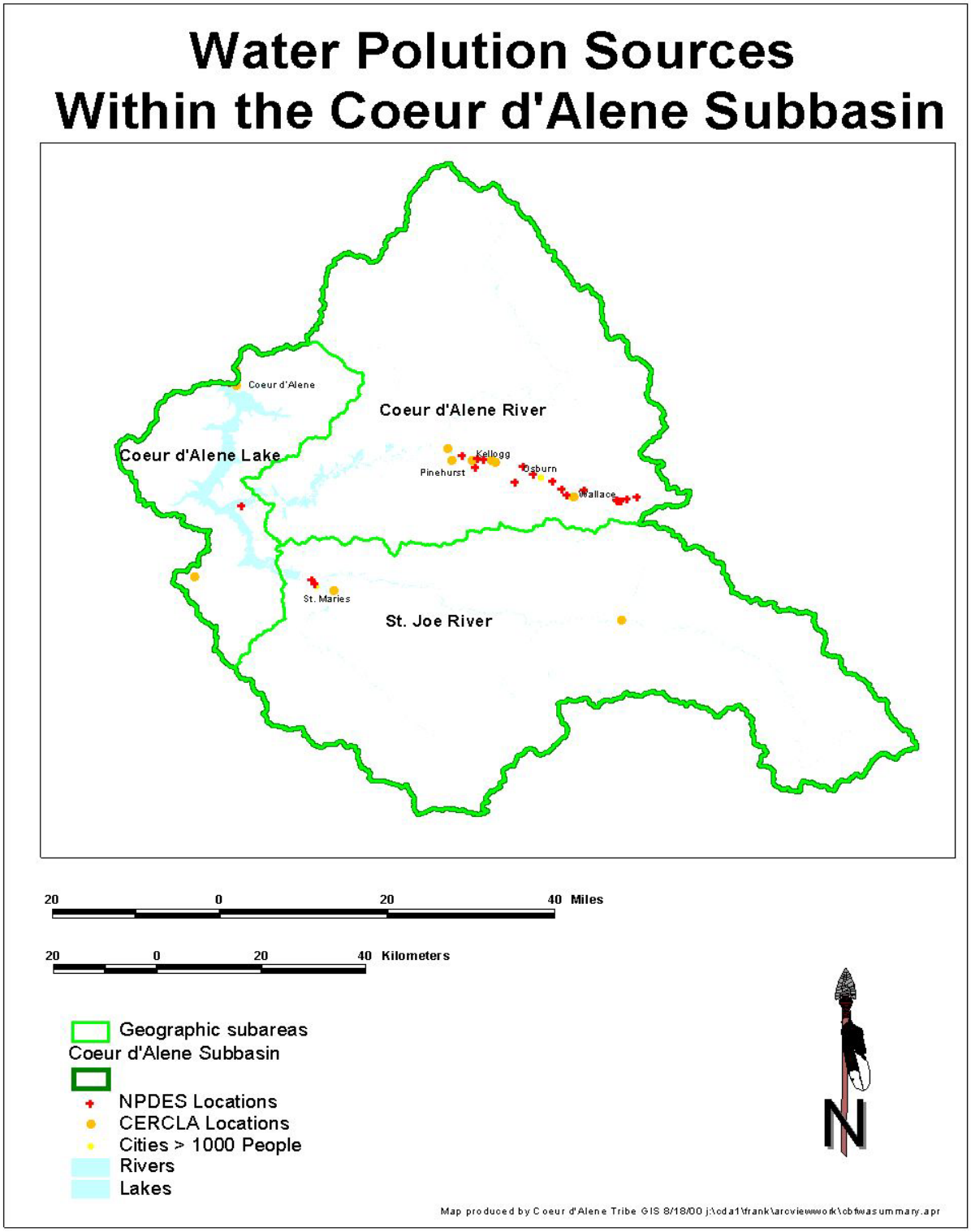


Figure 6.4 Water pollution point sources based on designated NPDES and CERCLA sites within the Coeur d' Alene Subbasin

Hydropower

A historical description of the Spokane River upstream of Spokane Falls and Post Falls prior to impoundment by Monroe Street Dam in 1890 and Post Falls Dam in 1906 is provided in Scholz et al. (1985). McDonald (1978 cited in Scholz et al. 1985) states "…salmon were able to get over the falls [Spokane Falls] at Spokane; at least up until the first dam was constructed [Monroe Street Dam in 1890], and to continue on to Coeur d' Alene Lake and all its tributaries." Scott (1968 cited in Scholz et al. 1985) reported "salmon would congregate by the thousands below Spokane Falls, awaiting an opportunity to push their way over the falls into the river above and from there into Coeur d' Alene Lake and its tributaries. … Some [salmon] got through the seething torrent [of Spokane Falls], others were destined for disappointment." None of these accounts indicate Post Falls was a natural barrier to fish migration. However, the lack of any historic or present data of anadromous fish presence (lack of any mention of anadromous fish by Mullan (1860), lack of other historic accounts of spawning concentrations of salmon in tributaries, presence of native rainbow trout populations any where in the drainage, in the Coeur d' Alene Subbasin above Spokane and Post Falls would suggest that these falls were natural barriers to anadromous fish.

Post Falls Dam was in operation in 1906 on the Spokane River, approximately 15 kilometers (10 miles) downstream from the outlet of Coeur d' Alene Lake and is currently operated by Avista. There is no fish passage facility and resident fish are unable to migrate upstream, however entrainment downstream does occur. Operation of the project has resulted in a modified hydrograph for the lake, with the lake level held artificially high from about mid-June through mid-September (648.6 meters, 2128 ft above sea level). The lake is drafted beginning in early to mid-September and ending six to eight weeks later to 646.2 meters (2120 ft) above sea level. Because of the constriction at the outlet of the lake, large midwinter storms, typically characterized by rain-on-snow events, can result in the lake reaching levels up to 5 meters (16.4 ft) above minimum winter pool elevation. Rain-on-snow events typically occur between November and April with none occurring some winters and multiple events occurring in other winters. Post Falls Dam is operated as a run-of-the river project with little or no influence on Coeur d' Alene Lake levels during the winter months due to the unpredictability and magnitude of winter storm events.

Prior to impoundment (1906), the lake typically filled during spring runoff events (normally occurring sometime between early April and late June) and then gradually drained to a post runoff elevation of two to three meters below the current level maintained during the summer. The lake level then remained low until the next large runoff event. The upper Spokane River above Post Falls, as well as some portion of the lower Coeur d' Alene, St. Joe and St. Maries rivers were characterized as a large flowing rivers rather than slack water reservoir type habitats that exist now during summer impoundment.

Post Falls Dam has also inundated the free flowing portion of the Spokane River below the outlet of Coeur d' Alene Lake. A description of the Spokane River upstream from Post Falls prior to impoundment was provided by Mullan (1860). He described a rocky,

boulder strewn river channel with a swift current, suggesting the habitat conditions suitable for trout. The presence of native trout in the river system elsewhere during that time and high concentrations of cutthroat trout below the outlet of the lake in the spring prior to impoundment suggests the reach provided at least seasonal habitat for native coldwater fish (Horner, IDFG, personal communication, 2004).

By extending the period of time when the lake levels are maintained at higher than historical level through most of the growing season, a significant amount of historically vegetated lowlands and riparian areas have been converted to mudflats and raw exposed river and streambanks when the lake level is dropped during the winter. At the same time, previously dry upland areas have been converted to seasonal wetland habitats. Although many of the previously dry upland areas may have been seasonal wetlands under a natural hydrograph, and today are permanently inundated due to the operation of Post Falls Dam (Cameron Heusser, Wildlife Biologist, Coeur d' Alene Tribe, personal communication). The amount and function of wetland habitat lost and gained by artificially holding the lake up through the summer months has not been quantified, and an assessment of the losses and gains is needed.

Impacts to riverine habitat are somewhat more clearly defined. Approximately 40 km (25 miles) each of the lower St. Joe and Coeur d' Alene rivers are artificially impounded to some extent during the summer months, reducing their value to native species such as westslope cutthroat trout, bull trout, and mountain whitefish as well as important terrestrial wildlife species. Because of the loss of riverine habitat characteristics, and the low retention time in artificially created slackwater areas, these lower reaches appear to have neither the productivity or carrying capacity of adjacent, un-impounded up-river reaches, nor of the lake. Habitat impacts are compounded due to increased temperatures, and to the lack of vegetation in the drawdown zone, which has resulted in unstable banks and a loss of allochthonous inputs into the river system. Unstable banks are also attributed to wave action from watercraft (G. Harvey, IDEQ, personal communication, 2004).

During high flow events, which typically occur when the lake level is drawn down, exposed banks erode at a high rate. The problem is particularly acute in the lower Coeur d' Alene River, where bank sediments include high levels of toxic metals. Densities of trout in the lower Coeur d' Alene River immediately upstream of the artificial water level are high (Fredericks et. al. 2002), suggesting trout populations were historically high through free flowing reaches of the lower river. Anecdotal accounts suggest a good fishery for cutthroat trout and bull trout in the lower St. Joe River existed prior to impoundment by Post Falls Dam. An undetermined length of tributary habitat has been similarly impacted by artificially high water levels. For example, approximately three kilometers of lower Wolf Lodge Creek is described as slackwater habitat during the summer months.

The impacts of Post Falls Dam are most prominent in the southern end of the lake. Large expanses of shallow inundated lands typically reach temperatures of over 26 ºC (80 ºF) during the summer (Peters et. al. 1999). Additionally, sediment delivery to the lake from

agricultural areas is collecting in the slackwater portions of the smaller tributaries in the interior bays of the lake creating large mudflats that are quickly colonized by aquatic macrophytes creating habitat more suitable for exotic species. Whether entrainment of downstream moving fish results in significant mortality is not currently known. However, this question may be addressed in the Avista re-licensing of the Spokane River hydropower projects in 2003-2004.

The effect of Post Falls Dam operations on downstream water temperatures is not currently understood. Given summer flooding of low lying areas and impoundment of free flowing river reaches, it is feasible that surface temperatures of the lake and rivers have been increased, potentially affecting downstream fisheries as well. Data should be available to ascertain the hypothesis from the Avista re-licensing of the Spokane River hydropower projects in 2003-2004.

Passage Barriers

Potential man-made barriers within the Coeur d' Alene Subbasin include Post Falls Dam, remnant splash dams, and culverts. Post Falls Dam is located on the Spokane River downstream from Coeur d' Alene Lake and presents a barrier to upstream migration of resident fishes and entrains some fish downstream. The remnants of a large splash dam on Marble Creek in the St. Joe River drainage that were originally complete barrier is currently only a partial barrier to fish passage due to modifications during the big floods of 1996 and 1997 (Joe DuPont, Fisheries Biologist, IDFG, personal communication, December 2003). Culverts can be barriers to fish movement when the jump into the culvert is too high, the jump pool below the culvert is not adequate, water velocity through the culvert exceed the fishes swimming ability, or inadequate water depths occur through the culvert (especially for spawning adult trout during August and September).

Fish size, season and flows need to be considered for native trout access to habitat. Where culverts prevent invasion of exotic fishes, they may have a positive effect on native trout populations. Barriers should be evaluated for their effect on native fishes and amphibians in the drainage before they are removed. Culvert barriers with negative effects on native trout should be removed or modified to provide for fish passage. The Idaho Forest Practices Act (enforced by IDL), the stream channel Protection Act (enforced by IDWR) and Idaho Code 36-906 (enforced by IDFG) require stream crossing on fish-bearing streams to provide unrestricted fish passage. Migration barriers created by culverts are common in the Coeur d' Alene Subbasin. However, a complete inventory of existing fish passage barriers has not been completed in the Coeur d' Alene Subbasin.

Restoring and maintaining connectivity between remaining populations of native trout is believed to be important for the persistence of the species (Rieman and McIntyre 1993). Migration and spawning between populations increases genetic variability and strengthens population viability (Rieman and McIntyre 1993). Barriers caused by human activities limit population interactions and may eliminate life history forms of native trout. Where isolation has occurred, the risk of local extinction due to natural events such as flood and drought increase.

Native trout that migrate downstream of fish passage barriers are unable to contribute to the trout population upstream. In systems with dams, this loss can be quite significant. Research on Arrow Rock reservoir (Boise River) found that about 20 percent of the bull trout in the reservoir migrated past Arrow Rock Dam (Brian Flatter, IDFG, personal communication). Swanberg (1997) also found that a significant portion of bull trout in the Blackfoot River (Clark Fork River drainage, Montana) migrated downstream of Milltown Dam.

Hybridization, Competition, and Predation

Brook trout were widely stocked in the early 1900s, and there are currently established populations in the Coeur d' Alene Subbasin, although they are not widely distributed. Brook trout populations are present in several tributaries, lakes and reaches of the South Fork Coeur d' Alene River, the North Fork Coeur d' Alene River drainage, St. Maries River drainage, and the St. Joe River drainage. However, brook trout were more common in the tributaries in the lower St. Joe River versus the North Fork St. Joe River and its tributaries (Apperson et al. 1989).

Bull trout did not evolve with brook trout; therefore, mechanisms that promote coexistence and resource partitioning have likely not developed in the Coeur d' Alene Subbasin. One of the consequences of introducing brook trout is hybridization with native bull trout (Dambacher et al. 1992). Bull-brook trout hybrids have a low egg to adult survival and are sterile in most cases. In some cases, brook trout competition and hybridization have resulted in complete displacement of bull trout in some resident populations (Dambacher et al 1992; Leary and Allendorf 1989; Leary et al. 1991). Currently, brook trout and bull trout do not co-exist in the core bull trout spawning and rearing habitats in the upper St. Joe River drainage.

IDFG has a statewide brook trout limit that allows an angler to keep 25 brook trout (any size). The brook trout limit applies on all waters open to fishing, including catch-and-release waters, unless specifically excluded in the regulations. However, because brook trout often mature at sizes smaller than what anglers will normally catch or keep, angling is not likely to significantly reduce brook trout populations.

Westslope cutthroat trout can hybridize with rainbow trout and other cutthroat subspecies. Fortunately, evidence of hybridization of cutthroat trout with rainbow trout is low in the Coeur d' Alene Subbasin. After nearly 30 years of monitoring cutthroat populations via snorkeling and electrofishing in the St. Joe and Coeur d' Alene river drainages, only fish in the lower reaches of both rivers show phenotypic signs of hybridization (Ned Horner, IDFG, personal communication, December 2003). Genetic analyses of cutthroat trout further up in the drainage and in tributaries to Coeur d' Alene Lake indicate pure strain populations. Although the hybrid trout are viable, introgression results in the progressive loss of genetic variability in westslope cutthroat trout populations (Allendorf and Leary 1988). Lost variation may lead to poorer performance (growth, survival, fertility, development) of individual stocks and greater susceptibility to epizootics, environmental change, or catastrophic events (Allendorf and Leary 1988).

Westslope cutthroat trout are also negatively impacted by brook trout. Cutthroat trout did not evolve with brook trout; therefore, mechanisms that promote coexistence and resource partitioning have likely not developed in the Coeur d' Alene Subbasin. Griffith (1972) demonstrated that cutthroat trout fry emerge from the gravel later in the year than brook trout and, thus, age-0 cutthroat trout acquire a statistically significant length disadvantage that may continue throughout their lifetime. Such a size discrepancy may enhance resource partitioning, but in times of habitat shortage cutthroat trout may be at a disadvantage if they cannot hold territories against larger competitors. Competitive exclusion is a likely cause of decline for cutthroat trout in some subbasin watersheds. Replacement of this kind, at least in stream environments, may be an irreversible process (Moyle and Vondracek 1985). This was found to be the case in Yellowstone National Park where the introduction of brook trout has nearly always resulted in the disappearance of the cutthroat trout (Varley and Gresswell 1988). Implications are that cutthroat trout may have a difficult time recovering given continued water quality degradation and the persistence of brook trout.

Chinook salmon feed on kokanee salmon (both introduced species) in Coeur d' Alene Lake. Kokanee are likely an important forage item for adfluvial bull trout. Chinook salmon may occasionally feed on westslope cutthroat trout as well, but habitat preferences of both species limit their direct interaction.

Illegally introduced northern pike are found in bays, smaller lakes, and slow moving river reaches and may consume trout as they migrate to Coeur d' Alene Lake. Northern pike were documented to consume large numbers of migratory cutthroat trout in bays of Coeur d' Alene Lake (Rich 1992), thus it is logical to suspect them to also prey on bull trout that migrate into Coeur d' Alene Lake (USFWS 2002). However, it is unknown how much of a threat northern pike pose for other trout species migrating into the lake. Northern pike have been in the Coeur d' Alene system since at least the early 1970s. Native northern pikeminnow (formerly northern squawfish) may also occasionally prey on juvenile trout migrants in the lower St. Joe River and Coeur d' Alene Lake.

Harvest and Fishing Mortality

Current harvest regulations allow a limited harvest fishery on westslope cutthroat trout with a slot limit of two fish, none between 8 to 16 inches. This regulation applies to all waters above Post Falls Dam outside the catch-and-release waters in the headwaters of the St. Joe and Coeur d' Alene rivers. Bull trout harvest has been closed since 1988. A limited harvest of bull trout may occur through both misidentification and poaching. Spawning bull trout are particularly vulnerable to illegal harvest since the fish are easily observed during fall low flow conditions. Even in cases where an angler releases the fish, incidental mortality of four percent has been documented for other species of trout (Schill and Scarpella 1997). Harvest and reduced fishing mortality can be further addressed through fishing regulations, angler education, enforcement, and road closures where roads readily access native trout spawning areas. Fishing in the core bull trout area (the area upstream from the North Fork St. Joe River where all of the known spawning and early rearing occurs) of the upper St. Joe River system is regulated with catch-and-release fishing regulations, with single barbless hooks and no bait allowed.

Beaver Activity and Impacts to Fish[4]

There is no specific literature describing native trout use of beaver dams in the IMP. However, as in other watersheds native trout must have co-evolved with beaver. Beaver dams are known to have a variety of positive and negative impacts on salmonid production including reduced spawning habitat and barriers to migration (Churchill 1980, Call 1966), increased rearing and over-wintering habitat (Gard 1961, Bustard and Narver 1975), sediment trapping (Smith 1980) and increased bottom fauna (Gard 1961) via addition of large woody debris. Beaver ponds may positively or negatively influence stream temperatures. In stream systems where beaver ponds elevate water tables and saturate the adjacent floodplain, stored water released from the floodplain during the warm summer months may serve to cool stream temperatures. Large shallow ponds with significant exposure to the sun and a low turnover rate may warm stream temperatures. In exceptionally low flow years, beaver ponds have been observed to provide refuge areas for salmonids in otherwise intermittent reaches of stream (Corsi and Elle 1989).

A potential impact of beaver activity on native trout in the Coeur d' Alene Subbasin may be the value of ponds as brook trout habitat. MacPhee (1966), Platts (1974) and Griffith (1971) observed that brook trout in Idaho streams were more likely to occupy low gradient habitat. Call (1966) and Huey and Wolfrum (1956) observed that brook trout growth and biomass was favored by the presence of beaver ponds in Rocky Mountain streams.

Beavers and beaver activity are relatively common in the Coeur d' Alene Subbasin, with most of the activity occurring on lower gradient stream reaches where stream energy is less likely to remove dams. Brook trout distribution in the watershed is very limited and does not appear to be strongly correlated with the occurrence of beaver activity. Beaver dams are present in reaches of the upper St. Joe River drainage, which native trout are known to pass through on their way to spawning areas. In Wisconsin and Michigan, the removal of beaver dams led to reduction of native brook trout, an unintentional outcome that was designed to improve fish passage and enhance populations. The intended management action had the exact opposite effect intended by Michigan Department of Natural Resources.

6.7.2.2 Habitat Alterations

Habitat degradation may generally result from two sources: natural and human-caused disturbances. Wildfire is an example of a natural habitat disturbance to terrestrial and aquatic systems. Poor construction or design of roads is an example of a management-related disturbance that can degrade aquatic habitat and lead to surface or mass wasting erosion. Other anthropogenic activities such as timber harvest, mining, and agriculture are also included as having potential for negatively impacting aquatic systems through habitat disturbance and degradation.

[4] This Section was taken directly from the Coeur d' Alene Subbasin Summary (2001), p. 57.

Wildfire

Fire ignition may be either natural or man-caused. Man-caused fire ignition may be intentional (either legally for management purposes, or illegally in cases of arson) or accidental. Recent evidence suggests that successful fire suppression since the 1930s may be currently resulting in more intense, catastrophic fires. Catastrophic fire is associated with increased sediment delivery to streams, more rapid water delivery to stream channels, increased temperatures (due to burning of stream side vegetation), lack of large woody debris (in extreme cases the existing woody debris is consumed by the fire, in other cases the fire consumes trees that would contribute to woody debris in the future) and lack of habitat complexity (due to increased sediment and reduction in woody debris). Less intense fires can actually increase the complexity and diversity of the aquatic and terrestrial habitat mosaic. If the fire is not extremely hot, woody debris recruitment may increase. Woody debris acts in the stream channel to provide cover, pool habitat complexity, and sediment storage.

Past management activities and successful wildfire control have caused a shift in forest species composition and stocking levels, predisposing forests to large scale mortality. Drought conditions can further dispose these forests to increased wildfire incidence and intensity, with the potential for significant negative impacts on water quality and fish habitat. During 1910 and the 1930s, large wildfires and numerous smaller fires burned in the Coeur d' Alene Subbasin. Large fires have often left riparian vegetation intact along larger streams, but accounts of the 1910 fire from the St. Joe River drainage documented significant burning of riparian areas along some streams. Intense fires may increase natural sediment delivery to streams, when hydrophobic soils are created. At the same time, fires can significantly increase recruitment of large woody debris to stream channels. Where post-fire salvage operations have removed woody debris from stream-side areas, or created other disturbances such as roads and fire breaks, impacts to fish may be increased (Rieman and Clayton 1997). Although stream habitat in the most severely burned drainages is recovering from past fires, legacy effects from these fires may continue to lower overall productivity for native trout in some stream reaches.

Wildfire may result in short- or long-term loss of, or reductions in, bull trout use of specific streams or stream reaches. Rieman and McIntyre (1995) document a case where a catastrophic (using the definition above) fire extirpated bull trout from a small watershed, and within two years bull trout returned. The large stand replacing fires of 1910 burned through a considerable portion of the upper St. Joe watershed, including riparian areas, yet the upper St. Joe watershed is the remaining stronghold for bull trout in the Coeur d' Alene Subbasin.

Roads

Road and railroad construction has resulted in significant changes on the Coeur d' Alene Subbasin landscape since the 19th century. Roads may cause elevated sediment delivery to streams in two ways: land slides and/or road surface run-off (Edwards and Burns 1986, Weaver and Fraley 1991, Shepard et al. 1984). Roads can also reduce subsurface flow and contribute to increased rates of overland flow delivery to streams, changing the way

rain events impact stream channels (Jones and Grant 1996, Rothacher 1970, Peck and Williamson 1987, Troendle and King 1987).

During the nineteenth, twentieth, and twenty-first century, road and railroad construction has been developed for hauling goods to markets, extraction of timber and other natural resources, and for general transportation. Roads and railroads have had significant impacts on stream habitats through channelization of streams, encroachment on floodplains, destruction of riparian zones, creation of migration barriers for fish, sediment delivery associated with construction and failures, and altered runoff patterns. Those areas with the highest density of roads occur in areas managed primarily for timber production and center of urban development (refer to Section 5, Figure 5.6). Land management and access roads paralleling tributary streams are common and along with the problems cited above are typically more prone to failure and sediment delivery to streams.

Roads (and old railroad beds) paralleling streams typically constrain channel meanders, reduce floodplain capacity, and reduce or eliminate riparian areas and large woody debris recruitment. Streamside roads are vulnerable to failure during high flows and are significant sources of sediment to stream channels. Stream crossings may result in channel constrictions and impede water movement through floodplains, and can increase deposition on the upstream side and erosion on the downstream side of a crossing. Over 50 percent of the tributaries (second order and larger) to the St. Joe, St. Maries, and Coeur d' Alene rivers have reaches that are significantly affected by roads constructed in the floodplain or adjacent to the stream channel.

Although some areas remain roadless, overall road density in the Coeur d' Alene Subbasin is categorized as high (1.7 to 4.7 mile/square mile) or very high (4.7 to 16.6 mile/square mile) based on data gathered at a scale of 1:24,000 from the USFS, BLM, University of Idaho, IDL, and Coeur d' Alene Tribe (refer to Section 5, Figure 5.6, CDA Tribe 2000). The most significant problems are primarily associated with "legacy" roads and roads for which there are insufficient funds to conduct routine maintenance. Legacy roads are those roads that were constructed prior to the advent of best management practices (BMPs), or were constructed without using best management practices, and pose a significant threat to fish and fish habitat. Legacy roads impact, or pose risks to, fish habitat from failure and sediment delivery, actual loss of stream area and length, modified hydrology, loss of woody debris recruitment, and/or obstruction of fish habitat.

Legacy effects of past construction practices are evident and old, unmaintained road and railroad beds continue to pose serious risks to fish habitat in some portions of the basin. Construction of the Milwaukee rail line and Forest Highway 50 resulted in channelization of the mainstem St. Joe and numerous stream crossings became fish migration barriers. Rail grades and more recently Interstate 90 have also resulted in channelization of the South Fork Coeur d' Alene River. Fill failures associated with old and unmaintained rail beds and timber roads are relatively common, particularly during years with flood events. Forest Highways 9 and 208 up the North Fork Coeur d' Alene River have had similar

impacts and in particular isolation of much of the floodplain from main channel of the river.

Newer timber roads constructed in the 1980s and 1990s (following the advent of the Forest Practices Act) are generally considered to be less likely to contribute sediment to streams than older roads. There are a large number of old roads in the Coeur d' Alene Subbasin, many of which are no longer maintained and have essentially been abandoned. Some old roads have stabilized and may not pose a significant risk to stream habitat, but many are in an unstable condition, and/or have undersized and inadequately maintained culverts which may plug and fail, resulting in landslides and massive sediment inputs to streams. Regular inspection and maintenance of all roads in the road network can help reduce road-related landslides.

Timber Harvest

Timber harvesting activities in the Subbasin have included clear cutting, partial cutting, thinning, fertilization and prescribed burning. The yarding or skidding of trees varies from ground-based operations and cable systems to aerial approaches such as helicopters. The road building aspects of timber harvesting management are discussed above.

Legacy impacts of timber harvest include: changes in watershed hydrology through changes in canopy cover, which reduces infiltration leading to an increase in flood frequency and magnitude; decrease in channel stability resulting in an increase of bedload sediment movement and scouring of fish habitat; a decrease in available and potential for large woody debris recruitment in streams; and an increase in water temperatures as a consequence of degraded or elimination of riparian forests. Splash dams were used in several streams (most notably Marble Creek in the St. Joe River drainage) and created significant changes to stream channels and fish habitat by creating migration barriers and scouring channels with regular releases of large flows of water and logs.

Current impacts of timber harvest on native trout have been reduced with implementation of forest practice rules that require riparian trees are not removed, prohibiting equipment in or near streams, and controlling erosion from roads, trails and landings. However, the current practices to leave riparian forests untouched may not adequately protect temperature in all cases (Sullivan et al. 1990).

Zaroban et al. (1997) found forest practice rules were implemented 97 percent of the time, and when applied, they were 99 percent effective at preventing pollutants from reaching a stream. However, half of the timber sales reviewed had sediment being delivered to streams or streams channels and the impact of this sediment delivery was not assessed. These findings illustrate the need to adequately implement all applicable rules as the misapplication of one rule, out of many, can result in sediment delivery. Recently, federal lands have adopted PACFISH and INFISH management guidelines that exceed Idaho Forest Practice Act rules and were designed to protect native fish populations.

Other impacts of timber harvesting may include decreased slope stability and hydrologic alteration. Clear-cutting on steep, unstable slopes has been associated with decreased slope stability in other northern Idaho watersheds (McClelland 1998, Cacek 1989).

Hydrologic alteration, such as increased water yields, increased summer low flows, shifting of snowmelt timing, and increased peak flows have been associated with timber harvesting (Brooks et al 1991; Grant and Jones 1996). While increased summer low flows may be of benefit to native trout, the principal concern is on increases in peak flows during egg incubation and prior to emergence from the gravel. Increased peak flows may result in increased scour and deposition on redds. The combination of high road densities and large canopy openings from clear-cut logging has resulted in significant degradation of fish habitat in the Coeur d' Alene Subbasin. Increased frequency and intensity of floods, especially associated with winter rain-on-snow events, has destabilized many headwater streams. Erosion of bedload sediment from headwater reaches and deposition in fish bearing streams downstream has resulted in the loss of pool and pocket water habitat important for the rearing and over-wintering of native trout and char (Idaho Panhandle National Forests).

Mining

Placer mining in streams and valley bottoms can have serious negative effects on native trout. This type of mining is associated with increased sediment load, substrate disturbances, re-suspension of fine sediments, channelization, bank destabilization, and removal of large woody debris. Streams that have been mined usually lack habitat complexity, large woody debris, and suitable spawning and wintering habitat (Nelson et al. 1991). Revegetation of dredge piles may be slow and sparse, creating a long-term potential for sedimentation (Levell et al. 1987; Nelson et al. 1991). Griffith (1981) found that entrainment of salmonid eggs and sac fry by suction dredges resulted in 100 percent mortality of un-eyed eggs, 35 percent mortality of eyed eggs, and 42 percent mortality of sac fry. These particular developmental stages are considered to be more vulnerable due to sensitive soft tissues.

Placer mining has significantly impacted streams in the Beaver and Prichard Creek drainages in the North Fork Coeur d' Alene watershed, and the Emerald and Carpenter creeks in the St. Maries River drainage. Some placer mining has occurred in upper St. Joe River tributaries, including Heller and Sherlock creeks, but impacts appear to be less severe in those streams.

Tailings dams, waste dumps and diversions can provide barriers to bull trout migratory corridors and spawning sites. Toxic constituents (such as heavy metals) arising from historical activities can block migratory corridors or kill life stages of native trout. Prior to establishment of the Clean Water Act, the entire South Fork of the Coeur d' Alene River from Wallace downstream to the mainstem Coeur d' Alene River, and the mainstem downstream to Coeur d' Alene Lake, were so polluted from mining and other wastes that resident fish were unable to survive (Ellis 1932). Portions of the South Fork still do not support coldwater biota due to metals contamination, and the Bunker Hill Superfund Site centered at Kellogg is one of the largest in the nation. As discussed in

environmental conditions, some tributaries to the South Fork remain impaired by heavy metals such that conditions do not support fish (Reiser 1999). Clean-up projects and the cessation of much of the mining and all of the smelting operations have allowed recovery of several stream reaches to the point where at least some fish and other coldwater biota are supported. Waste dumps and tailings placed in stream channels have also contributed to channel instability and intermittency problems in some stream reaches.

In Idaho, the Idaho Department of Lands (IDL) regulates all mining except underground mining and place mining covering less than half a surface acre. The Idaho Department of Water Resources (IDWR) also jointly regulates any mining that occurs within a stream's bed or banks. Recreational dredge mining has regulations establishing locations and seasons throughout the state. Recreational suction dredge operators must get a "One Stop" permit from the IDWR and comply with these regulations. If they choose to operate outside of the One Stop regulations, they are required to obtain a stream channel alteration permit. Commercial dredge mining requires special permits. Recreational suction dredging regulations and management is discussed in Section 5.2.7 Major Land Ownership and Land Uses under the subheading Minerals.

Agriculture

Grazing represents the majority of the agricultural practices within the Coeur d' Alene Subbasin along with some hay and grain production. Agriculture activities such as livestock grazing and crop production can result in increased nutrient levels from fertilizers and wastes, increased chemicals from pesticides, increased sediment from bank and channel alteration, and riparian damage. In the Coeur d' Alene Subbasin, livestock grazing is generally confined to the lower river valley bottoms, and is a significant factor affecting native trout distribution only in a few watersheds. Livestock grazing along the St. Maries River and some of its tributaries is likely reducing riparian vegetation resulting in a loss in riparian cover, shade, and streambank stability. Similarly, grazing in Benewah Creek and other lower elevation watersheds has contributed to degradation of the channel within the historic floodplain.

Establishment of drainage districts along the lower St. Joe and Coeur d' Alene rivers has resulted in reduced floodplain capacity, channel alterations, and migration barriers. Grazing can result in decreased water quality, increased temperatures, lack of habitat complexity, stream widening, decreased stream depth, and bank sloughing (Amour et al, 1991; Chaney et al, 1993; Platts 1991).

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7 Coeur d' Alene Subbasin Inventory of Existing Programs – Aquatic

7.1 Current Management Directions

State and Federal agencies and Tribal governments that have management authority over fish and wildlife resources in the Coeur d' Alene Subbasin include the U.S. Fish and Wildlife Service, U.S. Forest Service, Idaho Fish and Game, and the Coeur d' Alene Tribe. Other agencies, including, but not limited to, the Environmental Protection Agency, the Natural Resources Conservation Service, and the Idaho Department of Environmental Quality are involved in programs that affect the land or water that provide habitat for fish and wildlife. A complete list of state, federal, and Tribal entities that are involved in management of fish and wildlife or their habitats is included in Section 2.4.1, along with a description of the agency's management direction.

The following section describes the local government entities that are involved in natural resources management in the Coeur d' Alene Subbasin.

7.1.1 Local Government

7.1.1.1 Kootenai-Shoshone Soil and Water Conservation District

The current management strategies of Kootenai-Shoshone Soil and Water Conservation District (KSSWCD) can be summarized from excerpts of the District's current five-year plan. The goals and objectives include:

Water Quality

Goal: Improve water quality in streams and lakes that do not meet state water quality standards.

Objective: Administer programs and projects that accelerate Best Management Practice (BMP) implementation.

Objective: Represent private land interests on local committees and groups.

Information and Education

Goal: Increase public awareness of KSSWCD activities.

Objective: Provide conservation information to youth and adults.

Urban

Goal: Maintain agricultural base within District.

Objective: Protect farmland from urban encroachment.

Woodland

Goal: Insure healthy, productive woodlands within the district

Objective: Assist producers with woodland planning and implementation of forestland BMPs, including forest road remediation.

Objective: Strengthen partnerships with other agencies and groups working on forestland issues.

Objective: Stimulate reforestation with private landowners on large- and small-scales by providing low-cost tree stock through the District's tree sales program.

District Operations
Goal: Maintain an active and effective KSSWCD board.
Objective: Seek training for KSSWCD members and staff.
Objective: Insure adequate funding for KSSWCD operations.

Although not specifically addressed with goals and objectives within the five-year plan, other important resource concerns are mentioned in the introduction. These concerns include riparian, recreation, rangeland, and fish and wildlife.

Much, if not most of the focus in the fairly recent past has been water quality. The KSSWCD has been working toward achieving Total Maximum Daily Loads (TMDLs) compliance in local streams. Lake Creek has been a high priority in that regard; consequently, much of the work listed in the following report summaries is in the Lake Creek area. A significant sediment load has been prevented from entering Lake Creek, an important trout spawning stream. More sediment-reduction work is planned in this watershed. Very preliminary plans are presently in progress to combine efforts with the Coeur d' Alene Tribe to continue to reduce sediment loads in the Lake Creek watershed.

The KSSWCD has been involved in several significant streambank stabilization projects on the Coeur d' Alene River and Wolf Lodge Creek. These stabilization projects contain important habitat components, both instream and riparian. Stabilization, and consequent sediment reduction, requires a habitat component.

In conjunction with the TMDL focus, KSSWCD contracted with Idaho Department of Environmental Quality (IDEQ) to complete a streambank erosion inventory for the 303(d) listed streams in the region. KSSWCD has detailed reports on streambank erosion on streams throughout the region. These reports include observations of habitat, presence or absence of floodplains, wildlife, and more. KSSWCD has identified an important segment of TMDL and habitat concerns in the region, with underlying causes and some suggested remedies.

7.2 Existing and Imminent Protections

In 1992, the Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for the Bunker Hill Mining and Metallurgical Complex located in Shoshone County, Idaho. As part of the 1992 ROD, the EPA determined federal water quality criteria under the Clean Water Act for human health and ecological health protection were applicable for on-site surface waters. Goals for maximum contaminant levels as identified in the Safe Drinking Water Act were applicable for site-wide groundwater. The general objectives identified in the ROD include: (1) minimize direct human contact with contaminants, (2) reduce erosion of the hillsides, (3) minimize windblown dust from contaminated areas, (4) reduce suspended sediment and contaminant loading in surface water run-off to the South Fork Coeur d' Alene River, (4) minimize migration of contaminants to groundwater, (5) consolidate contaminated

material removed during remedial actions in on-site repositories and close these areas with engineered covers to reduce infiltration (EPA 2000).

In 1994, the EPA Region 10 and State of Idaho entered a cost-sharing agreement specific to areas of the Non-Populated Areas of the 21-square mile Bunker Hill Superfund Site for remedial actions. The cost-share agreement is specific for the following areas: hillsides, gulches (Grouse, Government, Magnet, and Deadwood), Smelterville Flats (north and south of I-90), Central Impoundment Area, Industrial Complex, Boulevard Area and Railroad Gulch, Mine Operations Area, Central Treatment Plant, Bunker and Milo creeks, and Reed Landing. The *First 5-year Review of the Non-Populated Area Operable Unit Bunker Hill Mining and Metallurgical Complex Shoshone County, Idaho* (EPA 2000) provides a more detailed summary of remedial actions implemented by the EPA Region 10 and State of Idaho during the initial five-year review (Available February, 2004 at: http://www.epa.gov/superfund/sites/fiveyear/f00-10003.pdf).

7.3 Inventory of Recent Restoration and Conservation Projects[1]

Refer to Appendix H for a comprehensive list of BPA and non-BPA funded projects within the IMP.

7.3.1 BPA Funded Projects

BPA funded mitigation within the Subbasin has occurred primarily through implementation efforts by the Coeur d' Alene Tribe as off-site protection, mitigation, enhancement and compensation activities called for under Section 4(h) of the Pacific Northwest Electric Power Planning and Conservation Act and the Northwest Power Planning Council Fish and Wildlife Program. These activities provide partial mitigation for the extirpation of anadromous fish resources from usual and accustomed harvest areas and Reservation lands. Additional mitigation is also occurring to address impacts to resident fish and wildlife populations and habitats attributable to development of the Federal Columbia River Power System. This includes the implementation of wildlife mitigation efforts, via the Albeni Falls Interagency Work Group, through off-site mitigation intended to address the wildlife construction and inundation ledger for Albeni Falls Dam.

7.3.1.1 Fish Enhancement on the Coeur d' Alene Reservation

This project began in 1987, when the Northwest Power and Conservation Council (Council) amended the Columbia River Basin Fish and Wildlife Program as to conduct baseline stream surveys of tributaries located on the Coeur d' Alene Indian Reservation. An ongoing resident fish substitution project, this project is funded through the Bonneville Power Administration Project #9004400 to mitigate for lost anadromous fishing opportunities resulting from the construction and operation of Grand Coulee Dam. Initial work used a modified Missouri method (Fajen and Wehnes 1981) to rank Reservation streams according to their potential for habitat development for westslope cutthroat trout and bull trout. Four streams (Alder, Benewah, Evans, and Lake creeks) were identified as having the best potential for restoration and targeted for further study.

[1] This section was taken directly from the Coeur d' Alene Subbasin Summary, 2001 pp. 68-90.

Between 1992 and 1994, the Tribe described watershed processes and resource conditions in the four target drainages. Channel types delineated a framework to predict channel response and to identify areas best suited for improvement projects (Rosgen 1991). Channel stability evaluations provided a quantitative determination of existing channel stability (Kappesser 1992; Pfancuch 1975). Riparian stand conditions identified potential LOD recruitment and channel shading problems. Biological assessments included physical aquatic habitat evaluation, trout population estimates, biomass estimates, individual stock assessments, and quantification of benthic macroinvertebrates.

In 1994, the Council adopted and in 1995 funded the recommendations for: 1) habitat restoration in Lake, Benewah, Evans, and Alder creeks; 2) purchase of critical watershed areas; 3) an educational/outreach program to facilitate a "holistic" watershed protection process; 4) an interim hatchery production fishery for Tribal and non-Tribal members of the Reservation through construction, operation and maintenance of five trout ponds; 5) design, construct, operate and maintain a trout production facility; and 5) a five-year monitoring program to evaluate the effectiveness of the production and habitat improvement projects.

A complete list of Coeur d' Alene Tribal accomplishments is provided below. Accomplishments include continuing: 1) data collection efforts for an adaptive management strategy in this project; 2) limiting factor analysis to prioritize restoration activities; and 3) active and passive restoration treatments in the target tributaries since 1995 under the direction of community-based watershed councils and with the support of private landowners. These are sustainable projects, ensured by a combination of landowner agreements, conservation easements, cost-share initiatives, and continuing purchase of critical habitats. Ongoing monitoring efforts examining trout migration patterns, habitat use and incubation success, and overall population structure are providing data used to refine treatment priorities.

Implement Fisheries Enhancement Opportunities, Project #9004400

1987 Baseline stream surveys.
1990 Additional streams surveys on Reservation lands.
1990 Annual Report of enhancement potential for westslope cutthroat and bull trout.
1991 Physical and biological surveys of ten key tributaries.
1991 Selected target tributaries for restoration and enhancement using Missouri method.
1992 Watershed assessment techniques began on the Coeur d' Alene Indian Reservation.
1993 Baseline population estimates for westslope cutthroat trout and macroinvertebrates in target tributaries.
1993 Limiting factor analyses for westslope cutthroat and bull trout in target tributaries.
1994 Habitat recommendations to protect and increase numbers of westslope cutthroat and bull trout adopted by the Council.
1995 Identified priority areas for restoration were in four target watersheds.
1995 Initiated the first demonstration projects. Erected 2.8 km of exclusion fencing, installed bank protection structures, constructed pool habitat, and reestablished connections with historic floodplain channels at two locations.
1995 Implemented the first compensatory harvest project by planting 1,000 rainbow trout into Worley Pond.

1996 Implemented additional demonstration projects. Erected 1.9 km of exclusion fencing, placed large woody debris (LWD) in a 300 meter test reach, installed two current deflectors, and planted more than 9,000 trees and shrubs.
1996 Maintained and stocked Worley Trout Pond with over 3,000 rainbow trout.
1997 Completed 5-year Tribal Fisheries Management Plan.
1997 Constructed and enhanced 4 acres of wetland habitat, constructed a side-channel rearing pond, built a bio-revetment to protect 100 meters of streambank, and planted more than 9,000 trees and shrubs.
1997 Stocked Worley Pond with 2,200 rainbow trout.
1998 Constructed and enhanced 2 acres of wetland habitat and planted more than 9,000 trees and shrubs.
1998 Stocked Worley Pond with 1,400 rainbow trout.
1998 Compiled comprehensive lists of landowner contacts in the four target watersheds.
1998 Studied the quality and quantity of gravel in known spawning tributaries.
1998 Genetic analysis of 400 fish in 13 locations to determine stock purity and relatedness of westslope cutthroat trout stocks.
1998 Completed supplementation feasibility report for westslope cutthroat trout.
1998 Rehabilitated more than 20 acres of riparian habitat and planted more than 11,000 trees and shrubs. Substantially reduced non-point source sediment pollution from over 300 acres of farmland.
1998 Initiated a bathymetric survey of Coeur d' Alene Lake to quantify near shore habitat.
1998 Completed a biological assessment for bull trout in waters of the Coeur d' Alene Reservation. Obtained an incidental take permit from the USFWS to authorize restoration and monitoring/evaluation activities and ensure compliance with Endangered Species Act (ESA).
1998 Completed a National Environmental Policy Act (NEPA) compliance checklist and supplemental analysis for watershed projects under the watershed management program Environmental Impact Statement (EIS). Completed a stock assessment for westslope cutthroat trout in waters of the Coeur d' Alene Reservation.
1999 Completed a stock assessment for westslope cutthroat trout in waters of the Coeur d' Alene Reservation.
1999 Completed a four-year water quality study on Lake Coeur d'Alene.
1999 Monitored fish populations at 101 index sites in 4 watersheds.
1999 Developed Management Plan to guide fisheries enhancement efforts.
1999 Completed water storage structures in the Lake Creek drainage.
1999 Prepared, stocked, and maintained put and take fish pond.
1999 Prepared annual reports and supplemental analyses.
2000 Planted more than 12,000 trees and shrubs.
2000 Established a native plant nursery.
2000 Engaged in advanced scoping of restoration projects with landowners in the target watersheds, targeting high priority areas outlined in the Fisheries Project Management Plan.
2000 Developed sites in target watersheds to restore elements of floodplain function, provide high quality rearing areas for juvenile trout, or improve available spawning habitat for adult trout.
2000 Completed water storage structures in the Lake Creek drainage.

2000 Prepared, stocked, and maintained put and take fish pond.
2000 Completed population estimates of remaining fish in put and take pond.
2000 Monitored fish populations at 101 index sites in 4 watersheds.
2001 Completed NEPA requirements for all planned enhancement projects.
2001 Engaged in advanced scoping of restoration projects with landowners in the target watersheds, targeting high priority areas outlined in the Fisheries Project Management Plan.
2001 Developed the provisions of a long-term easement process for application on private lands within the target watersheds.
2001 Updated Tribal standards for riparian buffer management and incorporated new standards into the Tribal Forest Management Plan.
2001 Coordinated restoration and management activities with other Tribal programs involved in Natural Resource Management.
2001 Planted more than 14,000 trees and shrubs.
2001 Developed sites in target watersheds to restore elements of floodplain function, provide high quality rearing areas for juvenile trout, or improve available spawning habitat for adult trout.
2001 Completed construction of new stream channel and associated floodplain habitat in Benewah Creek to restore 2000 feet of entrenched channel.
2001 Completed water storage structures in the Lake Creek drainage.
2001 Implemented the fish stocking strategy at additional put and take fishing sites on the Reservation.
2001 Prepared, stocked, and maintained put and take fish ponds.
2001 Completed population estimates of remaining fish in put and take pond.
2001 Monitored fish populations at 101 index sites in 4 watersheds.
2002 Reviewed the existing management plan and made adaptive changes, as necessary, to ensure that fishing pressure on wild stocks remains at acceptable levels.
2002 Planted more than 12,000 trees and shrubs.
2002 Completed population estimates of remaining fish in put and take pond.
2002 Monitored fish populations at 101 index sites in 4 watersheds.
2002 Finalized a Habitat Protection Plan to prioritize properties for restoration/enhancement measures in 4 target watersheds.
2002 Completed a Research, Monitoring and Evaluation Plan and Technician Training Manual.
2002 Prepared a comprehensive annual report to evaluate all project activities from 1995 through 2001.

Lake Creek Land Acquisition and Enhancement, Project #9004401

1990 Completion of appraisal and other pre-acquisition requirements.
2003 Purchase one fee-title property: 155 acres located on Lake Coeur d'Alene.
2004 Will be rolled into the Coeur d' Alene Wetlands project in fiscal year 2004; funding will be additive.

Coeur d' Alene Tribe Trout Production Facility, Project #9004402

1998 Completed supplementation feasibility report for westslope cutthroat trout on the Coeur d' Alene Indian Reservation.

1998 Compiled comprehensive lists of landowner contacts in each of the target watersheds.
1999 Completed hatchery Master Plan.
1999 Completed hatchery NEPA process.
1999 Completed genetic analysis of cutthroat trout in reservation waters.
1999 Completed 4 additional trout ponds for stocking.

Coeur d' Alene Tribe Trout Production Facility
A trout production facility is planned for the Coeur d' Alene Reservation to supplement native fish stocks in tributaries located on the Reservation, as well as, provide fish for an interim fishery in trout ponds. The Coeur d' Alene Tribe Trout Production Facility is intended to rear and release westslope cutthroat trout into rivers and streams with the express purpose of increasing the numbers of fish spawning, incubating and rearing in the natural environment. It will use the modern technology that hatcheries offer to overcome the mortality occurring in lakes, rivers, and streams after eggs are laid in the gravel. Supplementation of native fish stocks in conjunction with effective habitat restoration will be the primary means of achieving these biological goals.

7.3.2 Non-BPA Funded Projects

7.3.2.1 Santa Creek Streambank Project

Santa Creek Streambank Protection and Stability Project
The project is to stabilize 1 mile of severely eroding banks of Santa Creek, a tributary to St. Maries River. Monitoring is conducted by regular maintenance by landowner and Bonner Soil and Water Conservation District (BSWCD) with annual inspection by IDEQ. Accomplishments consist of 2 miles of exclusion fencing, riparian buffer, and bank stabilization (1 mile on both sides). Thousands of willows, trees and shrubs were planted. Raptor roosts were installed to control rodents. Four hard crossings were installed for cattle management.

Special Notes
A freeze in July 2002 caused significant willow and dogwood mortality. It was replanted in May 2003 and the vegetation has shown improvement. A new 319 grant has been approved for adjacent 1.5 miles of stream to begin work in 2004.

7.3.2.2 Kootenai-Shoshone Soil and Water Conservation District Projects

WQPA 98-10 (Dryland Crops on Erodible Soils)
Growing dryland crops on erodible soils to reduce the amount of sediment input into Lake Creek. Monitoring includes annual inspections by KSSWCD and/or Natural Resources Conservation Service (NRCS). Accomplishments consist of 211 acres no-till oats, 36 acres permanent cover crops, 3 grade stabilizations, 5 gully plugs, 1 sediment basin, 3621 feet diversions (waterbars on firebreaks), 340 feet grassed waterway, 1 sediment retention pond, and 1 sediment retention/wildlife-habitat pond. This project is funded by the Idaho Soils Conservation Council (ISCC) and the Coeur d' Alene Indian Tribe. The project will continue through 2007.

WQPA 94-4 (Dryland Crops on Erodible Soils)
Growing dryland crops on erodible soils to reduce the amount of sediment input to Lake Creek.

To date 248 acres no-till oats and winter wheat, 8 gully plugs, and 3 sediment basins have been implemented. This project is funded by the ISCC and ends in 2003.

WQPA 97-7 (Dryland Crops on Erodible Soils)
Reduce sediment inputs to Lake Creek with dryland crops. To date 64 acres no-till, 2 gully plugs, 251 acres permanent cover crops, 2950 feet diversions (waterbars on firebreaks), have been implemented. The project, funded by the ISCC, began in 1993 and ended in 2002.

WQPA 00-15 (Sediment/storage Ponds on Upper Lake Creek)
Sediment storage ponds with fish passage were constructed to reduce the input of sediment to Lake Creek. In addition, 2.5 acres of foliage was planted in critical areas. Funding was provided by ISCC. The project began in 2000 and ends in December of 2003.

WQPA 01-16 (Sediment Retention Pond)
A sediment retention pond at the lowest point of very erodible dryland farm was built to reduce sediment input into Lake Creek. Area surrounding pond was planted to wildlife cover. Site will be monitored over years to assess sediment collection and wildlife use. The project is funded by ISCC and will continue through 2009.

WQPA 01-1 (Mica Creek Ranch Improvements)
A cattle and horse ranch on Mica Creek is 303(d) listed for sediment and bacteria. Ranch was implicated for bacteria since it was the only ranch on the creek. The project constructed 11,018 feet of exclusion and cross fence, 3 spring developments with pumps and troughs, and 3.3 acres of riparian use exclusion. Cross-fencing was included to help manage stock after access to stream watering was lost. IDEQ supplemented cost-share when costs exceeded allowable amounts. The project is funded by the Water Quality Program for Agriculture (WQPA) and IDEQ and will continue through 2005.

WQPA 98-9 (Dryland Crops on Erodible Soils)
An area 133-acres designated for no-till wheat and oats, 3 gully plugs, 1 sediment basin, 69 acres permanent cover crop, and 2515 feet diversions (waterbars on firebreak) were created to reduce sediment into Lake Creek. Funding is provided by ISCC and will continue through 2007.

WQPA 97-8 (Dryland Crops on Erodible Soils)
To reduce sediment into Lake Creek 547 feet of diversions (waterbars on firebreak), 9 gully plugs, 1 sediment basin, and 1 pond were constructed. Funding was provided by ISCC and the project will continue through 2006.

WQPA 00-14 (Dryland Crops on Erodible Soils)
To reduce sediment inputs to Lake Creek one sediment trap pond was constructed. An island was created in middle of the pond for waterfowl nesting, surrounding area was planted to wildlife habitat. The project was funded by ISCC and ended in 2001.

WQPA 00-11 (Dryland Crops on Erodible Soils)
A one acre riparian forest buffer, 764 feet of diversions (waterbars on firebreak), 3.5 acres critical area plantings, 2 ponds, and 14 gully plugs were constructed to reduce sediment inputs

into Lake Creek. The project is funded by the ISCC and will continue through 2003.

SAWQP 95-6 (Dryland Crops on Erodible Soils)
To reduce sediment inputs into Lake Creek, 568 acres no-till oats and wheat, 1440 feet grassed waterway, 5 sediment basins, and 126 acres permanent cover crop were created. The project was funded by ISCC and ended in 2002.

SAWQP 93-2 (Dryland Crops on Erodible Soils)
To reduce sediment inputs to Lake Creek, 114 acres permanent cover crop, 5300 feet grassed waterway, 1 gully plug, and 1 sediment basin were constructed. The project was funded by the ISCC and ended in 2002.

KC 319 MN (Sediment Retention Pond)
One sediment retention pond was constructed to reduce sediment inputs to Kidd Creek. Pond was designed to trap sediment from erosion coming from pasture/hay/crop lands. Surrounding area planted to riparian buffer/wildlife habitat. The project is funded by the IDEQ and ends in 2003.

CDALMP-DW (Streambank Restoration)
A portion of Wolf Lodge Creek's streambank was eroding more than 7 feet annually. Bank was armored and revegetated. Project consisted of 579 feet streambank stabilization, and 75 feet headcut from ephemeral stream stabilized. Adjoining riparian buffer planted. The project is jointly funded by IDEQ and Idaho Department of Fish and Game (IDFG), and ends in 2003.

WHIP-GM (Dryland Crops on Erodible Soils)
To reduce sediment inputs to streams and increase wildlife habitat, 160-acres were converted into dryland farming and 108 acres enrolled into the Conservation Reserve Program (CRP). The project was funded by the NRCS and ended in 1999.

CRP-HM (Dryland Crops on Erodible Soils)
To reduce sediment inputs into Lake Creek and improve wildlife habitat, 90.5 acres of CRP permanent conservation cover were established. The project is funded by the NRCS and ends in 2003.

WQPA-CR (Dryland Crops on Erodible Soils)
To evaluate the use of gully plugs, one badly erodible gully was plugged and one was not. Monitoring will evaluate the difference in sedimentation rates between the two gullies. This project is near Lake Creek. Funding is provided by the ISCC and KSSWCD and ends in 2003.

CDAR DEMO-MS (Streambank Stabilization)
Streambanks on both side of a 3000 ft reach of the Lower Coeur d' Alene River in Kootenai County were stabilized using rock armour and extensive riparian planting. Monitoring included seven cross sectional transects to model the sedimentation rate. The project was funded by IDEQ and ended in 2001.

2000-UNI-DM (Sediment Retention Pond)
A sediment retention pond to trap sediment from gully through pasture was created in the Lake

Creek Watershed. This project was funded by the private landowner and ended in 2000.

CRP-RB (Dryland Crops on Erodible Soils)
To reduce sediment inputs to Lake Creek and improve wildlife-habitat, 320 acres of highly erodible soils were enrolled into CRP. The project is funded by NRCS and ends in 2003.

EQIP-CR (Streambank Stabilization)
An 800 ft section of the North Fork Coeur d' Alene River banks were stabilized. The project was funded by the NRCS and ends in 2003.

Lake Creek Monitoring
Water quality and quantity monitoring on Lake Creek consists of two gauging stations collecting data on temperature and velocity. Data was analyzed at the University of Idaho. Seven years of data were collected; the project ended in 2001.

7.4 Strategies Currently Being Implemented Through Existing Projects

7.4.1 Limiting Factors and Strategies Currently Being Implemented

As described in Section 2.4.2, a database was developed listing the recent projects that have been implemented in the subbasin. Each project was coded for the limiting factors that were addressed, and the strategies that were employed.

In the Coeur d' Alene Subbasin, 63 recent restoration and conservation projects were identified. Of the projects identified, 10 were focused on resident fish, 19 primarily benefited wildlife, and 34 benefited both fish and wildlife.

Most of the recent projects in the Coeur d' Alene Subbasin (87 percent) have focused on addressing habitat-related limiting factors, particularly habitat quality and water quality or quantity, with less emphasis on habitat quantity or barriers (Figure 7.1). The lack of information was addressed by nine percent of the recent projects. Other limiting factors such as disease, competition, predation, and hybridization have been addressed by four percent of the recent projects. No recent projects have addressed indirect mitigation.

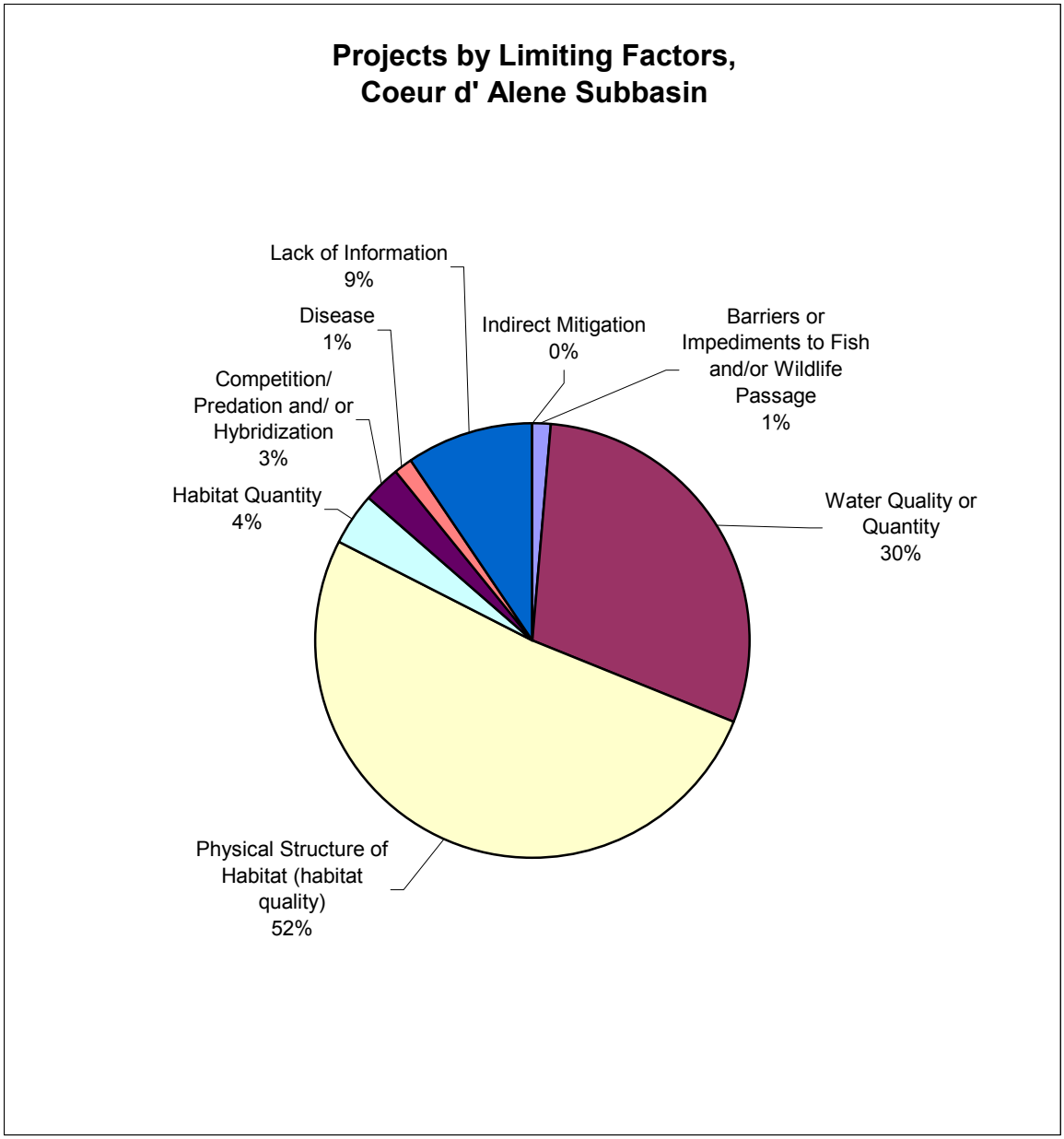

Figure 7.1. The percentage of the 63 recent restoration and conservation projects that addressed various limiting factors within the Coeur d' Alene Subbasin

Given the focus on habitat limitations in the Coeur d' Alene, it is not surprising that 71 percent of the projects implemented employed the strategies of improving, restoring, protecting, or acquiring habitat (Figure 7.2).

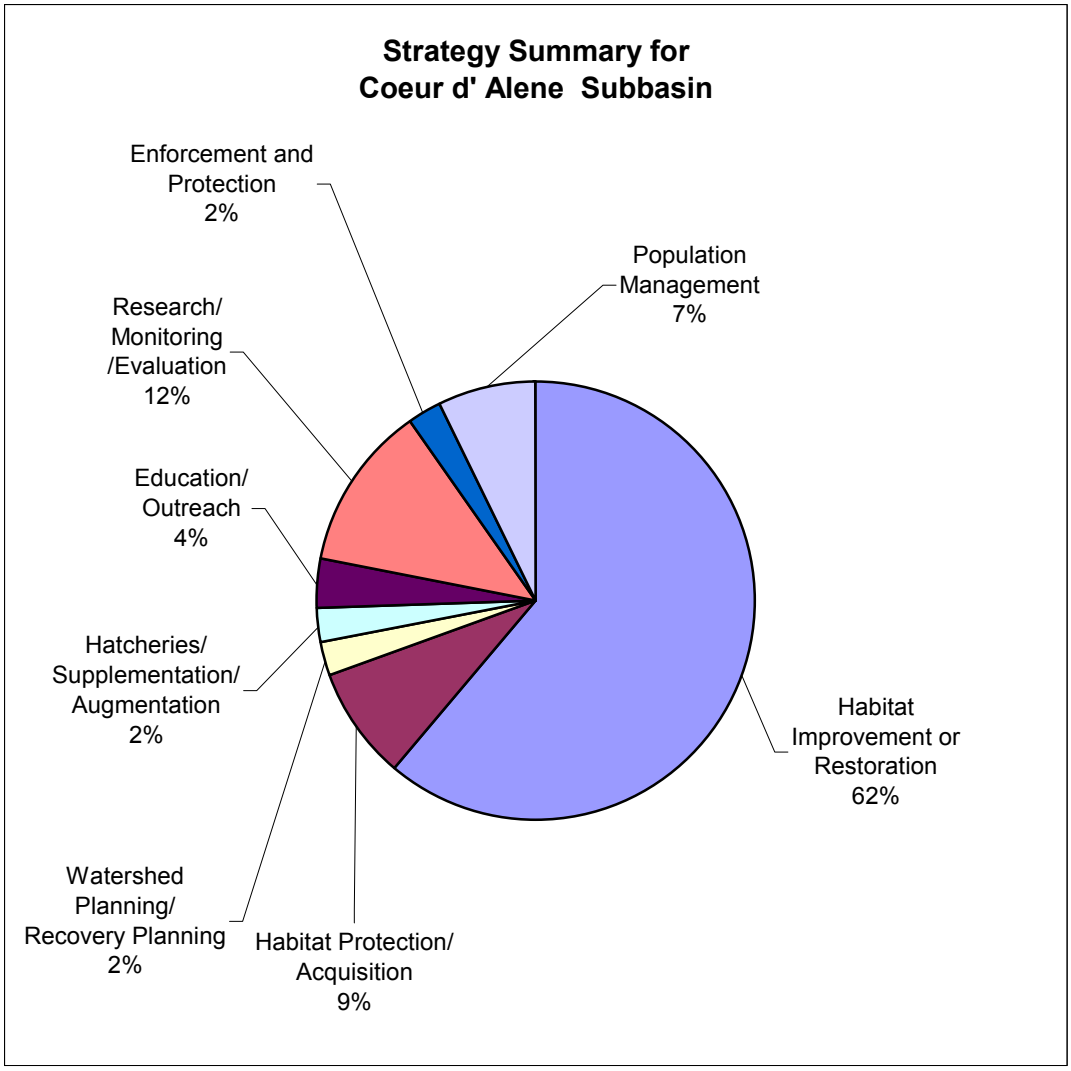

Figure 7.2. The percentage of the 63 recent restoration and conservation projects that addressed various strategies within the Coeur d' Alene Subbasin

7.4.2 Gaps Between Actions Taken and Actions Needed

The Technical Guide for Subbasin Planners requires that gaps between actions taken and actions needed be identified. This perspective will help determine whether ongoing activities are appropriate or should be modified and lead to new management activity considerations.

The information for this section was gathered at a meeting of the IMP Technical Coordination Group. The group was asked for their input on the degree to which past projects have addressed fish and wildlife issues in the Coeur d' Alene Subbasin. In addition, they were asked what needs the subbasin has for future projects. Table 7.1 provides a summary of the needs that were identified through the inventory, with corresponding objectives and strategies from the management plan that address these needs.

The main focus in the Coeur d' Alene Subbasin at this time should be on habitat improvement work. Many projects have already been implemented, many by the conservation districts. While these projects have been beneficial for fish and wildlife, they have been mostly small projects. A large unmet need for habitat restoration continues. Funding is needed for habitat restoration efforts to conserve and enhance vulnerable populations. There are numerous objectives and strategies in the management plan that address the need for habitat evaluation, protection, and restoration.

Table 7.1. Summary of objectives and strategies from the management plan that address unmet needs that were highlighted in the inventory

Identified Needs	Examples of management plan objectives and strategies that address needs
Barrier reduction	**Objective 1B1 Strategy h:** Inventory and ground truth all potential fish passage barriers in the Coeur d' Alene Subbasin by 2010; prioritize by determining the amount of usable fish habitat above barriers and determine if barrier is important in isolating a pure strain of native species before identifying it for removal. **Objective 1B1 Strategy i:** Have each land management agency and large private landowner, identify known culverts in their ownership and identify potential barriers by gradient and/or size of culvert installed. **Objective 1B1 Strategy j**: Where appropriate, remove passage barriers and improve passage impediments, with a goal of correcting 10 percent of barriers per year with full implementation by 2020.
Coeur d' Alene Lake co-management plan	**Objective 2Ad:** Increase cooperation and coordination among stakeholders throughout the province.
Increased enforcement	**Subbasin Objective 2B1**: Protect, restore, and enhance existing aquatic and terrestrial resources in order to meet the increased demands (i.e., cultural, subsistence, and recreation) on these resources associated with the extirpation of anadromous fisheries.
Research	**Subbasin Objective 1A1:** Fully quantify lost fish resources and opportunities historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015. **Objective 2A2 Strategy h:** Evaluate native resident fish distribution and abundance and assess need for conservation aquaculture facilities to assist with enhancing or reestablishing healthy, self-sustaining native fish populations for reproduction, recreation, and subsistence by year 2010.
Implementation of identified projects	**Subbasin Objective 2B1**: Protect, restore, and enhance existing aquatic and terrestrial resources in order to meet the increased demands (i.e., cultural, subsistence, and recreation) on these resources associated with the extirpation of anadromous fisheries.

As shown in Figure 7.1, only one percent of the recent projects in the Coeur d' Alene Subbasin addressed barriers. The Forest Service has done some barrier analysis work on their lands within the subbasin. The Coeur d' Alene Tribe has also done some barrier analysis as well as some limited culvert replacement in at least one watershed on the Coeur d' Alene Reservation. However, there is a need for a comprehensive evaluation of fish passage barriers in this Subbasin. The Coeur d' Alene Subbasin management plan addresses this need in Objective 1B, Strategies h, i, and j.

Watershed planning and recovery planning are strategies that have been implemented by only one percent of the recent projects (Figure 7.2). The subbasin needs an Idaho Fish and Game and Coeur d' Alene Tribe Fisheries co-management plan for the Coeur d' Alene Lake and

River system. This plan would allow for a coordinated effort to manage this valuable resource. A co-management plan could lead to more collaboration between managers and ultimately some direct fish population management. The provincial management plan addresses this need through a proposed strategy that says, "develop technical and policy working groups that meet regularly to identify problems and implement solutions."

Illegal harvest may be a problem that is causing depressed adfluvial bull and westslope cutthroat trout populations in the Coeur d' Alene Subbasin. Only three percent of current projects involve education and outreach and three percent involve enforcement and protection. The managers believe that the current fishing regulations are adequate as long as compliance is high. Education and outreach are needed to increase compliance with fishing regulations and eliminate illegal harvest.

One of the most serious fish and wildlife management issues in the Coeur d' Alene Subbasin is the lack of information. Only 10 percent of recent projects have been research oriented, such as Avista's research for their re-licensing. A comprehensive evaluation of adfluvial westslope cutthroat trout in the subbasin is needed. The study should include an evaluation of population abundance and habitat conditions in off-reservation streams, identification of limiting factors, and a prioritized list of habitat restoration projects. Another research need is a bull trout life history and population status evaluation in Coeur d' Alene Lake. Presently, biologists have some knowledge of bull trout spawning habitats, but they have little other information about the species in this subbasin. The research, monitoring, and evaluation (R, M, & E) plan for the Coeur d' Alene Subbasin presents the R, M, & E needs for the subbasin in more detail in Section 11.

Once information is gathered, projects can be developed and then implemented. At present, there is a gap between project development and implementation. That is, worthwhile project proposals have been developed that have not been funded. In general, the fish and wildlife managers in the Coeur d' Alene Subbasin feel that there is a need for funding existing projects, not new projects.

The management plan reflects the concern about lack of information in the objectives and strategies. The management plan adopts a step-wise process where losses to native fish and wildlife would be quantified, then the losses restored by addressing the identified limiting factors.

As described in the Coeur d' Alene Management Plan, the Coeur d' Alene Subbasin offers opportunities for species recovery and mitigation of hydropower impacts that have and are occurring in other subbasins throughout the IMP. It is hoped that on-the-ground mitigation work for Avista's re-licensing will begin in a year or two. However, there are also opportunities in the Coeur d' Alene Subbasin for mitigating losses caused by the federal hydropower system through enhancement of resident species.

SECTION 8 – Table of Contents

8 Coeur d' Alene Subbasin Assessment – Terrestrial

8.1 Focal Habitats: Current Distribution, Limiting Factors, and Condition

Vegetation in the Coeur d' Alene Subbasin is dominated by interior mixed conifer forest, with small amounts of montane mixed conifer and lodgepole forests in the highest elevations and interior grasslands along the western boundary. Timber management is a primary land use in the Subbasin on National Forest System, Bureau of Land Management, State of Idaho, Coeur d' Alene Reservation, and private timberlands. Agriculture is largely confined to the valley bottoms along the lower Coeur d' Alene, St. Joe, and St. Maries rivers, and to the Palouse regions to the southwest of Coeur d' Alene Lake. The largest urban areas included within the Subbasin boundary include the eastern portion of the City of Coeur d' Alene and the towns of Kellogg, Harrison, and St. Maries.

Figure 5.4 (Section 5) shows the current distribution of wildlife-habitat types in the Coeur d' Alene Subbasin based on IBIS (2003). Table 8.1 presents the acres of habitats by wildlife-habitat type and by subbasin focal habitat. Five focal habitats were selected for the IMP: wetlands, riparian, steppe and shrub-steppe, upland forest, and cliff/rock outcrops. Three of the province-level focal habitats were selected as focal habitats for the Coeur d' Alene Subbasin: wetlands, riparian, and upland forest (Ad Hoc Terrestrial Resources Tech Team May 5, 2003). Focal habitats comprise about 93 percent of the Subbasin, including upland forests (91 percent) and wetlands and riparian habitats (2 percent, excluding open water). Developed habitats, including agricultural and urban lands, currently comprise approximately 1.5 percent of the Subbasin.

The IBIS data is based on satellite imagery at a scale that tends to under-represent habitats that are small in size or narrow in shape. Additional information on habitats within the Coeur d' Alene Subbasin is available for selected ownerships and/or jurisdictions within the Subbasin; these sources include the Coeur d' Alene Tribe, WDFW, NRCS, USFWS, and IDFG. Data from these sources has been used where available to provide more specific information on habitat distribution within the Subbasin.

Historical vegetation data for the Subbasin is not available at a scale similar to the current condition IBIS data. Native vegetated habitats in the Subbasin have been converted to developed habitats and have also been modified through changes to vegetation type and structure. Refer to the Section 4 for a discussion of historic vs. current wildlife-habitat types in the IMP and factors influencing the distribution and quality of those habitats.

Table 8.1. Current Wildlife-Habitat Types in the Coeur d' Alene Subbasin

Wildlife-Habitat Type	Coeur d'Alene Current Acres	Percent of Total
Wetlands (Focal Habitat)		
Lakes, Rivers, Ponds, and Reservoirs	42,443	1.8%
Herbaceous Wetlands	3,975	0.2%
Montane Coniferous Wetlands	29	0.0%
Riparian and Riparian Wetlands (Focal Habitat)		
Eastside (Interior) Riparian Wetlands	6,187	0.3%
Steppe and Shrub-Steppe		
Eastside (Interior) Grasslands	86,352	3.7%
Shrub-Steppe	78	0.0%
Upland Forest (Focal Habitat)		
Westside Lowland Conifer-Hardwood Forest	79,369	3.4%
Montane Mixed Conifer Forest	153,208	6.5%
Eastside (Interior) Mixed Conifer Forest	1,687,760	71.5%
Lodgepole Pine Forest and Woodlands	98,742	4.2%
Ponderosa Pine Forest and Woodlands	128,472	5.4%
Upland Aspen Forest	852	0.0%
Alpine and Subalpine		
Subalpine Parklands	11,219	0.5%
Alpine Grasslands and Shrublands	27,031	1.1%
Developed		
Agriculture, Pasture, and Mixed Environs	25,375	1.1%
Urban and Mixed Environs	8,604	0.4%
Total	**2,359,696**	100.0%

(*Source*: IBIS 2003)

8.1.1 Open Water, Wetlands, and Riparian Areas

The IBIS wildlife-habitat map (Figure 5.4) is based in part on National Wetland Inventory (NWI) mapping, but does not represent all of the wetland categories or show the full extent of very small mapped areas. Information provided below on wetlands and riparian areas in the Subbasin is based on the Coeur d' Alene Subbasin Summary (2001) unless otherwise noted. Additional sources of information include a report on wetland habitats of the Spokane River system by Jankovsky-Jones (1999) and re-licensing reports by Avista (2003).

8.1.1.1 Open Water

Coeur d' Alene Lake is the largest lake in the Subbasin, formed by a natural constriction along the Spokane River but currently controlled by the Post Falls Dam nine miles downstream of the natural dam. Other large lakes include Rose Lake and other lateral lakes along the Coeur d' Alene River. Major tributaries to Coeur d' Alene Lake include the Coeur d' Alene and St. Joe rivers, and the St. Maries River, a major tributary to the St. Joe.

Coeur d' Alene Lake has been affected by the Post Falls Dam hydropower development which raised the lake level 7.5 feet and modified the seasonal hydrology of the lake and its shoreline. The current surface area of the lake is approximately 48,000 acres at full pool. The lake is typically maintained at or near full pool during the summer months and drawdown beginning in September dependent upon precipitation, energy production, and flood control needs (Avista 2003). Commercial and residential development, shoreline development, timber and agricultural practices, and livestock grazing have also influenced the lake and its tributaries.

The Coeur d' Alene River subwatershed has been severely affected by mining and timber harvest practices. Construction of roads and railroads on steep slopes and adjacent to waterways has resulted in erosion and habitat degradation. Increased concentrations of heavy metals from mining activities have been detected in floodplain and riparian soils throughout a large portion of the subwatershed.

The St. Joe River subwatershed has also experienced a high degree of disturbance and alteration due to timber harvest and associated road and railroad construction. Residential development and agricultural land uses also affect this subwatershed.

8.1.1.2 Wetlands and Riparian Areas

Jankovsky-Jones (1999) evaluated wetland habitats within a large portion of the Coeur d' Alene Subbasin in Kootenai, Shoshone, and Benewah counties. The analysis is based on NWI mapping for about 1.9 million acres in the Subbasin (about 460,000 acres of the Subbasin were not analyzed, primarily in the far eastern portion). Information on land ownership and management direction to retain natural resource values was used to identify lands with "protected" status. Table 8.2 shows the wetland habitats by NWI category and protected status.

Table 8.2. Coeur d' Alene Subbasin Wetland Summary

Coeur d' Alene Subbasin: Wetland and Deepwater Habitat and Protected Status				
System Classification		**Acres Protected**	**Total Acres**	**% of Type Protected**
Palustrine				
	Emergent	2,496	20,658	12.1%
	Scrub-Shrub	281	8,373	3.4%
	Forested	181	5,577	3.2%
	Aquatic Bed	85	436	19.5%
	Open Water	5	370	1.4%
	Unconsolidated Bottom	3	166	1.8%
	Unconsolidated Shore	0	6	0.0%
	Total Palustrine	**3,051**	**35,586**	**8.6%**
Lacustrine				
	Limnetic	246	41,302	0.6%
	Littoral	599	2099	28.5%
	Total Lacustrine	**845**	**43,401**	**1.9%**
Riverine				
	Lower Perennial	68	226	30.1%
	Upper Perennial	35	2,501	1.4%
	Total Riverine	**103**	**2,727**	**3.8%**
Total All Types		**3,999**	**81,714**	**4.9%**

(*Source*: Coeur d' Alene Tribe (2001), as modified from Jankovsky-Jones 1999)

Approximately four percent of the land in the study area is classified as wetlands; lacustrine systems (primarily deepwater habitats) make up over half of this area. The dominant vegetated wetland types in the Subbasin include palustrine emergent (25 percent), palustrine scrub-shrub (10 percent), and palustrine forested (7 percent). Approximately 3,999 acres of wetland habitats are protected in the study area, representing less than 5 percent of all wetland types. Most of the protected wetlands are located on National Forest System lands. About 62 percent of the protected wetlands are palustrine emergent.

Wetlands occur intermittently along the shoreline of Coeur d' Alene Lake, primarily at the outlets of tributary streams and rivers. Black cottonwood, willow, Douglas spirea, and red-osier dogwood are the dominant tree and shrub species. Extensive wetlands occur where broad floodplains are present. Shoreline and floodplain zones, as well as emergent wetlands, along Coeur d' Alene Lake were affected by the construction of Post Falls Dam and continue to be influenced by its ongoing operation. Operation of the Post Falls Project currently maintains full pool during the summer months, preventing the summer exposure of shoreline soils as would occur under natural hydrologic conditions. Significant amounts of historically vegetated lowlands and riparian areas have been converted to mudflats and other unvegetated habitats due to the extended summer inundation period. This operational pattern also may inhibit establishment of cottonwood, willow, and other native floodplain/shoreline species along the margins of the lake (Avista 2003). Docks, boat launches, and recreation sites have caused the removal of shoreline vegetation along many portions of Coeur d' Alene Lake.

Riparian habitats along streams in the Coeur d' Alene Lake subwatershed have been altered by development, agriculture, timber harvest, and livestock grazing. The Coeur d' Alene Tribe analyzed riparian habitats on Coeur d' Alene Indian Reservation lands within the Coeur d' Alene Lake subwatershed (Coeur d' Alene Tribe 2001). Almost 50 percent of Reservation riparian zones are currently in agricultural land uses and another 4 percent are developed. Riparian zones with the highest level of conversion to agricultural habitats include those along the St. Joe River (75 percent), Little Plummer Creek (61 percent), Lake Creek (60 percent), and Cottonwood Creek (47 percent).

The Coeur d' Alene River subwatershed includes an estimated 654 miles of streams which have been greatly affected by mining and timber harvest for over 100 years. Although altered by human activity, the riparian zones along the lower Coeur d' Alene River support extensive wetlands at several locations. The shallow area at the outlet of the river at Coeur d' Alene Lake supports aquatic vegetation, emergent vegetation in Harrison Slough, and forested wetlands in the uppermost floodplain zone. Upstream at the confluence of Fourth of July Creek emergent wetlands line both sides of the river. Rose Lake and other lateral lakes adjacent to the river support emergent and scrub-shrub wetlands. Narrow, higher gradient tributary streams with limited floodplains generally do not support extensive wetlands. Post Falls Dam causes impoundment of as much as 25 miles of the Coeur d' Alene River during the summer months, which has resulted in some unvegetated "drawdown" zones along the shoreline.

Within the St. Joe River subwatershed, riparian wetlands are located primarily along the lower St. Joe and St. Maries rivers. The subwatershed includes an estimated 740 miles of stream, many of which have been subjected to timber harvest, road building, agriculture, grazing, and development. The lower reaches of the St. Joe River support extensive pasturelands and hayfields. The riverbanks are vegetated with black cottonwood, quaking aspen, and willow, with shrubs and emergent vegetation along broader floodplains and in backwater sloughs. Along the lower St. Maries River, riparian deciduous forests, scrub-shrub, and occasional emergent wetland communities are also present. Post Falls Dam causes impoundment of as much as 25 miles of the lower St. Joe River, including a few miles of the St. Maries River, during the full pool summer months. Avista (2003) describes individual wetland communities along these two rivers.

8.1.2 Upland Forests

Upland forests in the Coeur d' Alene Subbasin are dominated by interior mixed conifer forests (72 percent; Table 8.1). Ponderosa pine occurs at lower elevations in the Subbasin, primarily in the western portion. Montane mixed conifer (7 percent) and lodgepole pine (4 percent) forests occur at higher elevations, primarily in the mountainous terrain of the central and eastern portions of the Subbasin. Lodgepole, along with western hemlock, western red cedar, western white pine, and western larch, tend to occur more often on north and east facing slopes, which are cooler and more moist. South and west-facing slopes tend to be dominated by more open forests of Douglas fir, grand fir, and ponderosa pine with significant understory shrub and grass/forb components.

Timber harvest has been a primary land use in the Coeur d' Alene Subbasin for over 100 years. Early logging was conducted primarily in the major river valleys, using the river to transport the logs to downstream mills. Rail logging was used in both the Coeur d' Alene River and St. Maries watersheds. Effects of timber management include changes in seral stages and species composition of the forest stands, with resultant changes in the drought and fire tolerance of current stands. In general, early seral white pine, larch, and ponderosa pine forests have decreased in area while Douglas fir and grand fir/western hemlock dominated stands have increased in area. Mature and old-growth stands have been largely replaced by younger seral, single aged stands.

8.1.3 Other Terrestrial Resource Limiting Factors

As noted in Section 4, numerous specific habitat elements (called key environmental correlates, or KECs, in IBIS terminology) influence the value of wildlife-habitat types to individual wildlife species. Habitat elements may include natural attributes, such as snags, downed wood, soil types, and also include anthropogenic features such as buildings, chemical contaminants, and roads. Information on site-specific habitat elements is critical to determination of habitat suitability for wildlife; however, data is not available at a subbasin-wide level for most habitat elements. Information on selected habitat elements that have important influences on habitat quality and wildlife use has been compiled for this assessment, including road density, chemical contaminants, and salmonid nutrients lost to the IMP.

8.1.3.1 Road Density

Refer to Section 5, Figure 5.6 Road Density in the Coeur d' Alene Subbasin for a map of road density by density class. Most of the Subbasin is ranked as high (1.7 to 4.7 miles of road per square mile) or very high (4.7 to 16.6 miles of road per square mile). A few areas in the St. Joe subwatershed were ranked as moderate (0.7 to 1.7 miles per square mile), and no areas were ranked as low or very low road density.

High road densities are indicative of human land uses and activities, and in the Coeur d' Alene Subbasin are often associated with heavily managed timberlands. Road density values in excess of 1.5 miles per square mile are considered suboptimal for mule deer and Rocky Mountain elk summer range; values greater than 0.5 miles per square mile (mule deer) and 1.0 miles per square mile (elk) are suboptimal for the same species on their winter ranges (WDFW 1991). Most of the Coeur d' Alene Subbasin currently supports road density levels considered suboptimal for these game species.

8.1.3.2 Chemical Contaminants

The lower Coeur d' Alene River basin is of special concern in the IMP due to high chemical contaminant levels resulting from mining operations. The lower Coeur d' Alene River shows significantly elevated concentrations of metals; lead, zinc and cadmium are of particular concern due to their high levels of toxicity to animals (Avista 2003). Contaminants are located in bank and bed sediments and are transported as sediment to the lower river valley, its floodplains and wetlands, and into Coeur d' Alene Lake. Avista (2003) provides a summary of contaminant studies performed to date on soils, water, wildlife, and plants in the lower Coeur d' Alene River and Coeur d' Alene Lake. Birds,

mammals, amphibians, and plants have been shown to be at risk from contaminants in portions of the lower Coeur d' Alene River basin.

8.1.3.3 Loss of Salmonid Nutrient Base

Construction and operation of the Chief Joseph and Grand Coulee dams on the Columbia River eliminated the potential for salmon to return to areas traditionally and culturally used by the Spokane, Coeur d' Alene, and other native American Tribes, including portions of the Spokane and Pend Oreille subbasins. The loss of anadromous fish affected not only Tribal and recreational use of the fisheries resource, but also affected salmon-dependent wildlife and modified the nutrient input to the overall ecosystem.

Appendix E of the 1987 Columbia Basin Fish and Wildlife Program (Council 1987) presents the results of several alternative calculations to determine the loss of salmon within the Columbia River system due to hydropower development. Based on the pre-1850 run size, with no dams in place, the number of adults at spawning grounds in reaches above Chief Joseph Dam would total 3,175,000 fish, with sockeye comprising greater than 55 percent, summer Chinook 19 percent, and fall Chinook, spring Chinook, coho, and steelhead the remaining 26 percent. Although the analysis does not break out the returns by major river and stream systems, it can be assumed that a significant number of fish would have returned to accessible portions of the Spokane River.

Scholz, et al. (1985) compiled information on salmon and steelhead run size and harvest above Grand Coulee Dam. The results of four different techniques to estimate adult run size of the total Columbia River were summarized, showing a range of 1.2 to 35 million fish. The authors selected the catch-based estimation technique as the most reasonable estimate of total Columbia River run size, equaling 13.1 million fish. The percentage of the total run migrating to the Upper Columbia River was estimated at 5 percent Chinook, 8 percent sockeye, 3 percent coho, and 41 percent steelhead. Using the catch based total run size, an estimate of run size into the Upper Columbia Basin, prior to major development, was calculated at 1.1 million fish. Minimum annual catch was estimated at 644,000 fish.

8.1.4 Land Ownership and GAP Status

Land ownership in the Coeur d' Alene Subbasin is summarized in Table 8.3 (IBIS 2003). A map of ownership categories across the IMP is presented in Section 4, Figure 4.3. Due to the scale of mapping, small parcels of Tribal lands within the Coeur d' Alene Reservation appear to be incorrectly categorized in the IBIS analysis. The Coeur d' Alene Subbasin Summary (2001) presents land ownership information by subwatershed. The total acreages and distribution by ownership type are similar to the IBIS figures with the exception of state lands, which are reduced by about one percent, and Tribal lands, which are increased to just under one percent in the Subbasin Summary analysis. The following discussion reflects consideration of the more detailed mapping of state and Tribal lands provided in the Coeur d' Alene Subbasin Summary.

Greater than half of the Coeur d' Alene Subbasin is in federal ownership (58 percent), with the majority of that in National Forest System lands. Private lands comprise about

35 percent of the Subbasin, state lands just under 5 percent, and water about 1.6 percent. Tribal lands total about 15,417 acres, or 0.7 percent of the total Subbasin (Coeur d' Alene Subbasin Summary). A large portion of the Coeur d' Alene Reservation is located within the Subbasin (approximately 187,793 acres), including private, state, federal, and Tribal ownership.

Relative protection levels of native habitats in the Coeur d' Alene Subbasin based on the Gap Analysis Program (GAP) are shown in Table 8.4. A map displaying GAP Status for the IMP is presented in Section 4, Figure 4.4. Less than 4,000 acres of lands are categorized as GAP Status 4, High Protection. These lands are located primarily on National Forest System lands in the northeastern portion of the Coeur d' Alene River subwatershed. Approximately 23,480 acres (1 percent) are Status 3, Medium Protection, including various parcels along the lower Coeur d' Alene River, state lands south of St. Maries, and federal lands in the uppermost St. Joe River watershed. The majority of land within the basin is categorized as Status 2, Low Protection, reflecting the multiple use mandate of the USFS allowing both resource extraction and wildlife-habitat protection. Private lands, which receive the lowest protection status, comprise about 35 percent of the Subbasin.

Of the lands under Status 4 protection, the majority are the focal habitats upland forest (95 percent) and herbaceous and riparian wetlands (2 percent). Focal habitats under Status 3 protection include upland forests (91 percent), interior grasslands (3 percent), and herbaceous and riparian wetlands (2 percent).

Table 8.3. Land ownership in the Coeur d' Alene Subbasin by Wildlife-Habitat Type

Wildlife-Habitat Type (acres)	Federal Lands	Native American Lands	State Lands	Local Gov't. Lands	Non-Gov't. Org. Lands	Private Lands	Water	Total
Wetlands (Focal Habitat)								
Lakes, Rivers, Ponds, and Reservoirs	358	0	2,013	0	0	7,979	38,240	48,589
Herbaceous Wetlands	521	0	92	0	0	2,898	99	3,610
Montane Coniferous Wetlands	0	0	15	0	0	7	0	21
Riparian and Riparian Wetlands (Focal Habitat)								
Interior Riparian Wetlands	6,396	0	512	0	0	3,294	155	10,357
Steppe and Shrub-Steppe								
Interior Grasslands	4,106	0	2,436	0	0	80,709	0	87,252
Shrub-steppe	0	0	117	0	0	119	0	235
Upland Forest (Focal Habitat)								
Mesic Lowland Conifer-Hardwood Forest	47,142	0	9,853	0	0	22,329	0	79,324
Montane Mixed Conifer Forest	125,874	0	2,230	0	0	24,944	0	153,049
Interior Mixed Conifer Forest	1,043,861	0	98,989	74	0	532,510	0	1,675,434
Lodgepole Pine Forest & Woodlands	79,388	0	3,045	0	0	17,571	0	100,005
Ponderosa Pine Forest & Woodlands	33,983	0	4,074	71	0	91,688	0	129,816
Upland Aspen Forest	990	0	0	0	0	1	0	991
Alpine and Subalpine								
Subalpine Parkland	11,283	0	0	0	0	1,024	0	12,307
Alpine Grasslands and Shrublands	20,071	0	348	0	0	7,499	0	27,918
Developed								
Agriculture, Pasture, and Mixed Environs	0	0	259	56	0	22,674	0	22,989
Urban and Mixed Environs	249	0	0	0	0	7,551	0	7,800
Total Acres	**1,374,223**	**0**	**123,984**	**201**	**0**	**822,796**	**38,494**	**2,359,698**

(*Source*: IBIS 2003)

Table 8.4. GAP Status of Lands in the Coeur d' Alene Subbasin by Wildlife-Habitat Type

Wildlife-Habitat Type (acres)	1 - High Protection	2 - Medium Protection	3 - Low Protection	4 - No Protection	Water	Total
Wetlands (Focal Habitat)						
Lakes, Rivers, Ponds, and Reservoirs	0	778	870	7,979	39,613	49,240
Herbaceous Wetlands	23	34	557	2,898	103	3,616
Montane Coniferous Wetlands	0	0	15	2	4	21
Riparian and Riparian Wetlands (Focal Habitat)						
Interior Riparian Wetlands	40	350	6,493	3,291	185	10,358
Steppe and Shrub-Steppe						
Interior Grasslands	0	771	5,692	80,702	0	87,165
Shrub-steppe	0	0	119	116	0	235
Upland Forest (Focal Habitat)						
Mesic Lowland Conifer-Hardwood Forest	204	1,882	55,020	22,333	0	79,438
Montane Mixed Conifer Forest	1,236	335	126,529	24,938	0	153,038
Interior Mixed Conifer Forest	2,016	17,941	1,122,331	532,562	0	1,674,850
Lodgepole Pine Forest & Woodlands	148	313	81,988	17,571	0	100,020
Ponderosa Pine Forest & Woodlands	96	708	37,412	91,547	0	129,764
Upland Aspen Forest	0	70	920	1	0	991
Alpine and Subalpine						
Subalpine Parkland	0	61	11,225	1,022	0	12,307
Alpine Grasslands and Shrublands	126	157	20,125	7,496	0	27,904
Developed						
Agriculture, Pasture, and Mixed Environs	0	82	323	22,545	0	22,951
Urban and Mixed Environs	0	0	249	7,551	0	7,800
Total Acres	**3,890**	**23,481**	**1,469,868**	**822,554**	**39,905**	**2,359,697**

(*Source*: IBIS 2003)

GAP Status Definitions (Source: USGS 2000):
Status 1 – High Protection: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management.
Status 2 – Medium Protection: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance.
Status 3 – Low Protection: An area having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low-intensity type (e.g., logging) or localized intense type (e.g., mining). It also confers protection to federally-listed endangered and threatened species throughout the area.
Status 4 – No or Unknown Protection: There are no known public or private institutional mandates or legally recognized easements or deed restrictions held by the managing entity to prevent conversion of natural habitat types to anthropogenic habitat types. The area generally allows conversion to unnatural land cover throughout.

8.2 Wildlife of the Coeur d' Alene Subbasin

8.2.1 Wildlife Occurring in the Coeur d' Alene Subbasin

The Coeur d' Alene River Subbasin provides a wide range of wildlife-habitat types dominated by interior mixed conifer forest, with small amounts of montane mixed conifer and lodgepole forests in the highest elevations, and interior grasslands along the western boundary. There are approximately 376 terrestrial vertebrate wildlife species using these habitats, many of which are important for ecological, cultural, and/or economic reasons. Table 8.5 presents the terrestrial vertebrate wildlife species occurring within the Coeur d' Alene Subbasin (IBIS 2003). Due to the large number of wildlife species in the Subbasin, the following discussion focuses on wildlife species that are important indicators of habitat quality, those that represent other wildlife species, and those with special management status. For further information on the broader spectrum of wildlife species in the Subbasin, refer to the Coeur d' Alene Subbasin Summary (Coeur d' Alene Tribe 2001).

Table 8.5. Number of wildlife species (and percent of Province total) in the Coeur d' Alene Subbasin

	Occurring Species (Percent of Province Total)	HEP / Priority Species	HEP / Priority Species Closely Associated With Herbaceous Wetlands	HEP / Priority Species Closely Associated With Riparian Wetlands	HEP / Priority Species That Feed Upon Salmon	Occurring Species That Feed Upon Salmon
Amphibians	13 (76%)	0	0	0	0	1
Birds	268 (97%)	9	3	3	4	63
Mammals	81 (80%)	10	1	1	4	22
Reptiles	14 (78%)	0	0	0	0	3
Total	376 (91%)	19	4	4	8	89

(*Source*: IBIS 2003)

8.2.2 HEP and Priority Species of the Coeur d' Alene Subbasin

Subbasin planners selected a group of wildlife species to represent the focal habitats and wildlife of the Coeur d' Alene Subbasin. Species used in the Albeni Falls Habitat Evaluation Procedures (HEP) study (Martin et al. 1988) were selected because they were used in the construction and inundation loss assessment for the federal hydrosystem project, and because they will be used in the future to evaluate mitigation for the project. Additional wildlife species were selected due to their management, cultural, and or economic values in the Subbasin; these species also represent specific focal habitats. The list of HEP and priority species for the Subbasin, as well as federal and state-listed threatened and endangered species, is presented in Table 8.6. The Coeur d' Alene Subbasin also identified four wildlife guilds as high priority for their ecological, cultural, and/or game value: bats, cavity nesters, neo-tropical migratory birds, and waterfowl.

Table 8.6. Federal and state Endangered/Threatened, HEP, and Priority Wildlife Species of the Coeur d' Alene Subbasin and Degree of Association[1] with focal habitats during breeding

Common & Scientific Names	Federal/ ID / WA Listing Status [2]	HEP/ Priority Status[3]	Focal Habitats				
			Cliff/ Rock Outcrop	Wetland	Riparian	Steppe/ Shrub-Steppe	Upland Forest
Bald eagle *Haliaeetus leucocephalus*	T / e / t	HEP	-	-	General	-	General
Black bear *Ursus americanus*	-	P(1,2)	-	General	General	-	General
Black-capped chickadee *Poecile atricapillus*	-	HEP	-	-	General	-	General
Canada goose *Branta canadensis*	-	HEP	General	Close	-	General	-
Canada lynx *Lynx canadensis*	T / - / t	P(1,4)	-	-	-	-	Close
Gray wolf *Canis lupus*	T / e / e	P(1,3,4)	-	-	General	General	General
Grizzly bear *Ursus arctos*	T / t / e	P(1,3,4)	-	-	-	-	General
Harlequin duck *Histrionicus histrionicus*	-	P(1)	-	-	Close	-	-
Mallard *Anas platyrhyncos*	-	HEP	-	Close	Close	General	-
Mule deer *Odocoileus hemionus hemionus*	-	P(1,2,3)	-	General	General	General	General
Muskrat *Ondatra zibethica*	-	HEP	-	Close	Close	-	-
Northern goshawk *Accipiter gentilis*	-	P(1)	-	General	General	-	Close
Peregrine falcon *Falco peregrinus*	- / e / -	P(1)	Close	-	General	General	General
Redhead *Aythya americana*	-	HEP	-	Close	-	-	-
Rocky Mountain elk *Cervus elaphus nelsoni*	-	P(1,2,3)	-	General	General	General	General
White-tailed deer *Odocoileus virginianus*	-	HEP	-	-	Close	General	General
Wolverine *Gulo gulo*	-	P(1)	General	General	-	-	General
Woodland caribou *Rangifer tarandus*	E / e / e	P(1,3,4)	-	General	General	-	General
Yellow warbler *Dendroica petechia*	-	P(1)	-	-	Close	-	-
Bat guild	-	P(1)	Close	General	General	General	General
Cavity-nester guild	-	P(1)	-	General	General	-	Close
Neo-tropical migrant bird guild	-	P(1)	-	General	General	General	General
Waterfowl guild	-	P(1,2)	-	Close	General	-	-

(*Sources:* IBIS 2003 and Coeur d'Alene Subbasin Work Team)

[1] **Close** = Animal dependent on the habitat for part or all of its life history requirements.
General = Animal adaptive and supported by numerous habitats.

[2] **E** = Federal Endangered. **T** = Federal Threatened. **e** = State Endangered. **t** = State Threatened. State listings for Idaho and Washington shown in that order.

[3] **HEP** = Species evaluated via Habitat Evaluation Procedures loss assessment for Albeni Falls (Martin et al. 1988)
P = Priority species designated as important because it is **(1)** ecological indicator for habitat or other animals, **(2)** game animal, **(3)** highly culturally prized, or **(4)** special status for management. Many priority species were selected to represent one or more focal habitat types; the habitat(s) a species represents is(are) indicated by underlined degree of association (e.g., close).

The province-wide status and trends of federal and state threatened and endangered species are discussed in Section 4, Terrestrial Resources in the Intermountain Province. Subbasin-level information on occurrence and special management programs for these species is provided in this section. The occurrence of HEP and priority species in the Subbasin is described, based on available data. Some species were selected primarily as indicators of wildlife guilds or of a focal habitat; for many of these species detailed information on occurrence is not recorded.

8.2.3 Federal and State Threatened and Endangered Species

Bald eagle. Wintering bald eagles are known to use the Coeur d' Alene River, St. Joe River, Coeur d' Alene Lake, and Hayden Lake areas. Peak wintering use in the Subbasin is believed to coincide with the peak of kokanee spawning in mid-November (Coeur d' Alene Tribe 2001). Nine historic nest sites and three wintering areas are located along the St. Joe River and Coeur d' Alene Lake (IDFG 2003).

Canada lynx. Lynx have been reported in many locations within the Subbasin, including all major drainages except the North Fork Coeur d' Alene River (IDFG 2003). Several lynx analysis units are located within the Subbasin. Lynx hair snagging surveys and habitat mapping are currently underway in the Subbasin (Coeur d' Alene Tribe 2001; Rust 2002).

Gray wolf. The Idaho Conservation Data Center does not monitor or report on this species; however, wolves are known to use portions of the Coeur d' Alene Subbasin (Coeur d' Alene Tribe 2001). The Central Idaho Non-essential Experimental Population Area includes the portion of the Coeur d' Alene Subbasin located south of Interstate Highway 90. The Rocky Mountain Wolf Recovery 1999 Annual Report (USFWS 1999) documented a pack of eight individual wolves at Snow Peak; the home range of this pack includes portions of the upper St. Joe River Basin. Since 1999, a second wolf pack, the Marble Mountain pack, has been documented in the St. Joe basin on the central border between Benewah and Shoshone counties (Mack and Holyan 2003).

Grizzly bear. The Idaho Conservation Data Center does not monitor or report on this species. The Subbasin is located within the northwestern portion of the Bitterroot Ecosystem. U.S. Fish and Wildlife Service (2000b) determined that there were no grizzly bears remaining in the Bitterroot Ecosystem, and proposed several alternatives for recovery. The preferred alternative is to reintroduce a non-essential experimental

population into a recovery area; each of the recovery area alternatives include portions of the Coeur d' Alene Subbasin.

Peregrine falcon. No sightings are known in the Idaho or Washington portions of this Subbasin (IDFG 2003; WDFW 2003b).

Woodland caribou. Anecdotal accounts suggest that woodland caribou may have once inhabited the Coeur d' Alene Subbasin (Coeur d' Alene Tribe 2001). Since the 1960s, woodland caribou have been restricted to the Selkirk Mountains in northern Idaho, northeastern Washington, and southeastern British Columbia (USFWS 1994). Their specific distribution in Idaho is not reported by the Idaho Conservation Data Center.

8.2.4 Albeni Falls HEP Species

Bald eagle. Refer to preceding section describing federal and state threatened and endangered species.

Black-capped chickadee. General references such as Sibley (2003) show year-round presence for this species in the Idaho and Washington portions of the Subbasin.

Canada goose. General references such as Sibley (2003) show that Canada geese breed throughout the Subbasin. Winter presence depends on mild temperatures that limit ice cover on larger water bodies.

Mallard. Mallard ducks breed throughout the Subbasin (Sibley 2003). Winter presence depends on mild temperatures that limit ice cover on larger water bodies.

Muskrat. The extensive river system of the Coeur d' Alene Subbasin has allowed the muskrat to become a widespread resident. Although muskrat are trapped throughout the Subbasin, the majority are taken in Kootenai County (IDFG 2003).

Redhead. General references such as Sibley (2003) show that breeding occurs in the Subbasin, but this species of duck normally migrates to warmer latitudes in winter.

White-tailed deer and mule deer. The IDFG white-tailed deer management objective is to maintain a harvest of at least 30 percent bucks with 4 or more antler points per side, and at least 7 percent bucks with 5 or more antler points per side. The most recent data (years 2000-02) varied by agency analysis area from 53 to 59 percent bucks with 4 or more points per side, and from 23 to 24 percent bucks with 5 or more points per side, both criteria far exceeding the management minimums (Appendix G). In Big Game Units 2, 3, and 4A, human development has decreased critical winter range. In Units 4, 5, 6, and 7, timber harvest has diminished low elevation, closed canopy forests that are critically important during deep-snow winters.

The IDFG mule deer management objective is to maintain a harvest of at least 30 percent bucks with 4 antler points or better for a 3-year running average. The most recent data

(years 2000-02) averaged 43 percent (range 42 to 45) with 4 points or better, significantly exceeding the minimum (Appendix G).

Agency data on deer hunting harvest and recreation is combined for mule deer and white-tailed deer. An estimate of deer hunting harvest and recreation within the Subbasin is presented in Table 8.7. The Idaho portion of the Subbasin produces about eight percent of the state's deer harvest and 13 percent of its deer hunting recreation. The Washington side, being very limited in area, contributes very little to Washington's deer harvest or recreation.

Table 8.7. White-tailed deer and mule deer hunting harvest and recreation within the Coeur d' Alene Subbasin[1]

	Harvest						Hunter-Days					
	Quantity			% of State Total			Quantity			% of State Total		
Year	ID	WA	Total	ID	WA	Total	ID	WA	Total	ID	WA	Total
1999	3,296	36	3,332	9.1	0.1	4.9	113,399	1,139	114,538	13.8	0.1	5.0
2000	2,997	51	3,048	8.2	0.1	4.1	n.d.	833	-	-	0.1	-
2001	3,623	36	3,659	8.6	0.1	4.7	66,348	663	67,011	12.0	0.1	4.8
2002	2,683	35	2,717	7.1	0.1	3.8	97,310	671	97,981	12.7	0.1	6.1
Ave.	3,150	39	3,189	8.3	0.1	4.4	92,352[2]	826	93,177[2]	12.8[2]	0.1	5.3[2]

(*Source*: Appendix G)

[1] Includes all or portions of Idaho Big Game Units 2, 3, 4, 4A, 5, 6, and 7, plus a tiny fraction of Washington Game Management Unit 124.
[2] Average of 3 years instead of 4.
n.d.= No data

8.2.5 Other Priority Species

Bat guild. Little detailed information exists regarding the distribution and occurrence of bats in the Coeur d' Alene Subbasin, but as many as eight species may be present (Coeur d' Alene Tribe 2001). The species' life histories and their habitat associations are diverse, further complicating study of their occurrence and distribution.

Black bear. The IDFG estimates black bear population trends via mandatory harvest check and report systems. The state's management goal is to ensure the long-term viability of the population while providing recreational opportunity for hunters and non-hunters. The state is addressing bear depredation on private forestland by striving for at least 40 percent female bears within the total harvest, while the male harvest has less than 25 percent males aged 5 years or older. Black bear harvest in the last reporting years (1999-2002) included females averaging about 30 percent of the total harvest, and males older than 5 years averaging about 9 percent of the male component (IDFG 2003). Neither criterion was satisfied despite efforts to expand the hunting season.

Cavity nester guild. The cavity nester guild consists of a large number of species of birds and other animals. Many of these species depend on primary excavators, such as the pileated woodpecker, to create suitable cavities in decaying trees. These species are indicative of forested habitats providing a range of sizes of cavities for reproduction and

roosting. Nearly all cavity-nesting birds contribute a valuable ecological function by consuming forest insects, thereby contributing to the control of insect populations. Little detailed information is available on the occurrence and distribution of these species.

Harlequin duck. General references such as Sibley (2003) indicate that breeding occurs within the Coeur d' Alene Subbasin.

Neo-tropical migratory bird guild. The neo-tropical migratory bird guild includes a large number of species with diverse habitat associations and life histories. These species breed within the Coeur d' Alene Subbasin, but migrate south to winter at warmer latitudes in the United States, Mexico, or Central America. Migratory birds are of concern due to recent declines in breeding populations of many species. Many of these species perform an important ecological function by feeding primarily on insects, thereby contributing to control of insect populations.

Northern goshawk. General references such as Sibley (2003) indicate yearlong presence of goshawk in this Subbasin. The Idaho Department of Fish and Game (2003) does not monitor or report this species, so detailed information concerning distribution and abundance is not known.

Rocky Mountain elk. The objective for the Idaho Panhandle Elk Management Zone, which incorporates the Coeur d' Alene and Pend Oreille subbasins, is to establish an elk population of 2,900-3,900 cows and 600-800 bulls, including 350-475 adult bulls (IDFG 2003). In survey year 2002, the management zone population was estimated to be 3,025 cows, 438 bulls, and 318 adult bulls. Until the 1980s and 1990s, habitat conditions in core elk areas had declined from their optimum of 30 years earlier. Since then, however, timber harvest, prescribed fire, and pioneering of elk into new areas have increased elk numbers. Conversely, the accompanying high road densities and loss of large areas for elk security are threats to continued population growth.

Table 8.8 presents an estimate of elk hunting harvest and recreation in the Coeur d' Alene Subbasin. The Idaho portion produces almost 11 percent of that state's elk harvest and nearly 17 percent of its elk hunting recreation. The Washington side, being small in area, contributes very little to Washington's elk harvest or recreation.

Table 8.8. Rocky Mountain elk hunting harvest and recreation within the Coeur d' Alene Subbasin[1]

	Harvest						Hunter-Days					
	Quantity			% of State Total			Quantity			% of State Total		
Year	ID	WA	Total	ID	WA	Total	ID	WA	Total	ID	WA	Total
1999	1,177	1	1,178	10.8	<0.1	7.1	89,480	135	89,615	16.4	<0.1	7.5
2000	1,147	1	1,147	9.6	<0.1	6.1	n.d.	134	-	-	<0.1	-
2001	1,287	0	1,287	11.3	<0.1	7.6	61,575	85	61,660	16.7	<0.1	7.8
2002	1,293	1	1,294	11.3	<0.1	7.3	82,881	81	82,962	17.1	<0.1	8.9
Average	1,226	1	1,227	10.7	<0.1	7.0	77,979[2]	109	78,079[2]	16.7[2]	<0.1	8.1[2]

(*Source*: Appendix G)

[1] Includes all or portions of Idaho Big Game Units 2, 3, 4, 4A, 5, 6, and 7, plus a tiny fraction of Washington Game Management Unit 124.
[2] Average of 3 years instead of 4.
n.d. = No data

Waterfowl guild. Waterfowl are important game and cultural species, and are closely tied to emergent wetlands and open water habitats in the Coeur d' Alene Subbasin. There are approximately 39 species in this guild, including loons, grebes, cormorants, mergansers, ducks, geese, and swans.

Wolverine. Idaho Conservation Data Center records show wolverine observations in Kootenai and Shoshone counties, portions of which are within the Coeur d' Alene Subbasin. Anecdotal information suggests the wolverine is present yearlong and throughout the Subbasin, but their large home range and solitary nature limit interaction with humans.

Yellow warbler. This neo-tropical migrant species is presumed to breed throughout the Subbasin, primarily in interior riparian habitats with a significant component of deciduous trees or shrubs.

8.3 Summary of Terrestrial Resource Limiting Factors

None of the three federal hydrosystem projects of the IMP is located within the Coeur d' Alene Subbasin. However, the Albeni Falls Project is located on lands within the ceded areas of the Coeur d' Alene Tribe, which extend above Lake Pend Oreille. Mitigation for the hydroelectric project construction and subsequent inundation of wildlife-habitats is required to offset effects to terrestrial resources traditionally used by the Coeur d' Alene Tribes in the Pend Oreille Subbasin. In addition, the federal hydropower projects had a number of secondary effects to terrestrial resources within the Pend Oreille, Coeur d' Alene, and adjacent subbasins. Secondary effects include accelerated rates of industrial, agricultural, and residential development leading to loss of habitat, and increased hunting pressure on wildlife through increased population due to extirpation of anadromous salmon in adjacent subbasins.

8.3.1 Direct Effects of Federal Hydrosystem Projects

Development of the Albeni Falls Hydroelectric Project resulted in direct loss of wildlife and wildlife-habitats in the Pend Oreille Subbasin, north of the Coeur d' Alene Subbasin. The habitat losses associated with construction of project facilities and inundation of project reservoirs were assessed in the Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan Final Report (Martin et al. 1988) through a Habitat Evaluation Procedures (HEP) study. The HEP evaluation species were selected based on their use of specific habitat types and structural elements, and to represent other wildlife species that use those habitats. The HEP study results are provided in terms of Habitat Units (HUs), which are units of value based on both quality and quantity of habitat.

The results of this study provide the number of habitat units as compensation for the construction losses (Council's 2000 Fish and Wildlife Program) and identifies potential mitigation areas. Mitigation for the construction of Albeni Falls Dam and the subsequent

inundation of habitats is implemented by the Albeni Falls Interagency Work Group, which includes the Coeur d' Alene Tribe, Kalispel Tribe, Kootenai Tribe of Idaho, IDFG, USFWS, USACOE, NRCS, and USFS. Priority mitigation focus areas were established with consideration for in-place and in-kind opportunities, threat to wetland habitats in primary impact areas, location relative to other management areas, and availability of protection opportunities (Albeni Falls Interagency Work Group Operating Guidelines and Guiding Principles for Mitigation Implementation 1998).

Habitat losses due to construction of the Albeni Falls Project are summarized in Table 8.9 (Martin et al. 1988).

Table 8.9. Acres of Habitat Types affected by Albeni Falls Project construction and inundation

Project	Habitat Type	Acres of Habitat Inundated
Albeni Falls		
	Herbaceous wetland	4,376
	Deciduous forested wetland	2,314
Total		**6,690**

(*Source*: Martin et al. 1988)

The loss of wildlife-habitat value for individual species, as determined through the HEP study and expressed in Habitat Units (HUs), is summarized in Table 8.10. Acquisition of mitigation habitat parcels began in earnest in 1992. To date, over 5,000 acres have been acquired and are under management by the Kalispel Tribe, IDFG, or the Coeur d' Alene Tribe (Terra-Burns 2002). These projects are described in the Province Inventory, Section 2, and the Coeur d'Alene Subbasin Inventory, Section 9. The current status of completed mitigation for the Albeni Falls Project also is shown in Table 8.10; approximately 83 percent of the mitigation remains to be implemented. Habitat Units by species were not available at the time of publication for recently acquired parcels.

Table 8.10. Status of nitigation for construction and inundation wildlife-habitat losses, Albeni Falls Project[1]

Project	Species	Habitat Units lost	Habitat Units acquired	Percent complete
Albeni Falls				
	Bald eagle (breeding)	4,508	313	6.9
	Bald eagle (wintering)	4,365	329	7.5
	Black-capped chickadee	2,286	318	13.9
	Canada goose	4,699	1,229	26.2
	Mallard	5,985	465	7.8
	Muskrat	1,756	138	7.9
	Redhead duck	3,379		0
	White-tailed deer	1,680	147	8.8
	Yellow warbler	-	93	
	HU estimates other parcels		**1,790**	
Total		**28,658**	**4,822**	**16.8%**

(*Source:* BPA 2002; KT 2004; HUs by species not available for all parcels)

[1] Note: This table shows the total HUs lost at the Albeni Falls Project; mitigation of this loss may occur in part within the Coeur d' Alene Subbasin, with the approval of the Albeni Falls Interagency Work Group.

Mitigation required for the Albeni Falls Project will occur largely within the Pend Oreille Subbasin. However, with the approval of the Albeni Falls Interagency Work Group, mitigation may be provided, in part, within the Coeur d' Alene Subbasin (refer to Section 16, Terrestrial Resources of the Pend Oreille Subbasin). The total number of HUs to be acquired as mitigation for the Albeni Falls Project (28,658) is presented in corresponding tables in both subbasin chapters. However, note that this figure represents a single target for the Albeni Falls Project, rather than independent subbasin targets.

8.3.2 Operational Effects of Federal Hydrosystem Projects

Assessment and mitigation of operational impacts of the Albeni Falls Project are required under the Northwest Power Act. These effects occur within the Pend Oreille Subbasin. An assessment of operational impacts has not been undertaken for the Albeni Falls Project. Terrestrial resources issues related to operation of the Albeni Falls Project and downstream FCRPS projects include:

1) reduction in area of wetland habitats, and associated loss of primary productivity, wildlife-habitat, and wildlife forage, within the fluctuation zone of Lake Pend Oreille and associated rivers;
2) reduction of species diversity in emergent and aquatic bed wetlands within Lake Pend Oreille;
3) loss of wildlife-habitat due to erosion of lake and river shorelines;

4) loss of wildlife through disturbance/inundation/desiccation of breeding sites within and adjacent to fluctuation zone of Lake Pend Oreille and associated rivers;
5) lack of recruitment of black cottonwood and other woody species along the Pend Oreille River, Lake Pend Oreille, and lower Clark Fork River; and
6) loss of key food source for wildlife and reduction of nutrient input to the ecosystem due to extirpation of salmon and other anadromous species from the Lower Pend Oreille watershed via downstream FCRPS projects.

8.3.3 Secondary Effects of Federal Hydrosystem Projects and Other Limiting Factors

Human impacts on wildlife have been accelerated in the Coeur d' Alene Subbasin as a result of development of federal hydropower projects in the region. A reliable and affordable power source, irrigation water supply, and employment opportunities provided impetus for development of agriculture and other industry, particularly in the adjacent Spokane Subbasin. This development has led to increased human disturbance of wildlife populations and increased human use of wildlife. Extirpation of anadromous fishes in adjacent subbasins has led to increased harvest pressure on wildlife for subsistence, cultural, and recreational uses. Factors that currently limit terrestrial resources in the Coeur d' Alene Subbasin are dominated by modification of forested stands through timber management, plus the combined effects of mining, grazing, agriculture, and residential development, including roads. Development, including agriculture, has converted a total of 1.5 percent of lands in the basin to non-vegetated habitats.

8.4 Interpretation and Synthesis

The Coeur d' Alene Subbasin has supported timber harvest and mining for over 100 years, with substantial effects to riparian habitats and upland forest structure and composition. Agriculture and urban/residential development have occurred in the major river valleys and surrounding Coeur d' Alene Lake, converting approximately 1.5 percent of the land area (Table 8.1). Road densities throughout most of the subbasin exceed the densities optimal for big game summer and winter habitat security. Only one percent of all lands in the Subbasin are protected at the high or medium levels; over half are at low protection levels.

Direct wildlife-habitat loss did not occur within the Subbasin as a result of the federal hydrosystem development; however, the Albeni Falls Project directly affected ceded lands of the Coeur d' Alene Tribe. Construction of the federal hydrosystem project at Albeni Falls resulted in loss of 6,690 acres of wetland habitats, including emergent herbaceous and forested wetlands, and also modified the hydrology of more than 26 miles of river. In the lowermost portions of the Pend Oreille Subbasin, anadromous fish were extirpated by construction of downstream FCRPS projects lacking fish passage facilities. Operational and secondary effects of the FCRPS projects continue to affect wildlife and wildlife-habitats traditionally used by the Coeur d'Alene Tribe.

Wildlife mitigation related to the federal hydropower project at Albeni Falls is approximately 17 percent complete. Completion of the wildlife mitigation for

construction of the FCRPS project is the highest terrestrial resources priority of the Coeur d'Alene Subbasin Work Team, followed by assessment and mitigation of operational impacts of the project.

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9 Coeur d' Alene Subbasin Inventory of Existing Programs – Terrestrial[1]

9.1 Current Management Directions

State and Federal agencies and Tribal governments that have management authority over wildlife resources in the Coeur d'Alene Subbasin include the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Idaho Fish and Game (IDFG), Washington Department of Fish and Wildlife (WDFW), and the Coeur d'Alene Tribe (CDAT). Only a very small portion of the Subbasin is located within Washington state. Other state and federal agencies, including, but not limited to, the U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), the Natural Resources Conservation Service (NRCS), Idaho Department of Environmental Quality (IDEQ), and Washington Department of Ecology (WDOE) are involved in programs that affect the land or water that provide habitat for fish and wildlife. A complete list of state, federal, and Tribal entities that are involved in management of fish and wildlife or their habitats is included in section 2.4.1, along with a description of each agency's management direction.

9.1.1 Local Government

9.1.1.1 Kootenai-Shoshone Soil and Water Conservation District

The current management strategies of Kootenai-Shoshone Soil and Water Conservation District (KSSWCD) can be summarized from excerpts of the District's current five-year plan. The goals and objectives include:

Water Quality

Goal: Improve water quality in streams and lakes that do not meet state water quality standards.

Objective: Administer programs and projects that accelerate Best Management Practice (BMP) implementation.

Objective: Represent private land interests on local committees and groups.

Information and Education

Goal: Increase public awareness of KSSWCD activities.

Objective: Provide conservation information to youth and adults.

Urban

Goal: Maintain agricultural base within District.

Objective: Protect farmland from urban encroachment.

Woodland

Goal: Insure healthy, productive woodlands within the district

Objective: Assist producers with woodland planning and implementation of forestland BMPs, including forest road remediation.

[1] Much of this section was taken directly from the Coeur d' Alene Subbasin Summary, 2001 pp. 63-68.

Objective: Strengthen partnerships with other agencies and groups working on forestland issues.
Objective: Stimulate reforestation with private landowners on large- and small-scales by providing low-cost tree stock through the District's tree sales program.

District Operations
Goal: Maintain an active and effective KSSWCD board.
Objective: Seek training for KSSWCD members and staff.
Objective: Insure adequate funding for KSSWCD operations.

Although not specifically addressed with goals and objectives within the five-year plan, other important resource concerns are mentioned in the introduction. These concerns include riparian, recreation, rangeland, and fish and wildlife.

9.1.2 Coeur d' Alene Tribe

The Coeur d' Alene Tribe's Natural Resources Department is dedicated to the management of all natural resources within the historical and cultural territories of the Tribe. The Tribal fish and wildlife programs operate under a mission to restore, protect, expand, and re-establish native fish and wildlife populations to sustainable levels to provide harvest opportunities. The CDAT is responsible for the management and enforcement of all Tribal member harvest within the Subbasin. The Tribe also serves as a core member of the Albeni Falls Interagency Work Group and uses this forum as the mechanism for mitigating the impacts of construction and operation of Albeni Falls Dam on wildlife resources throughout the ceded and usual and accustomed lands of the Coeur d' Alene peoples.

Section 11.3E.1 of the Council 1995 Program directed the states and Tribes to form long-term agreements within three years following the adoption of the program for all wildlife mitigation. In response, IDFG, KT, CDAT, Kootenai Tribe of Idaho, USFWS, USACE, NRCS, and USFS formalized the Work Group and signed an agreement. The *Albeni Falls Interagency Work Group Operating Guidelines and Guiding Principles for Mitigation Implementation* (1998) guides the implementation of wildlife mitigation projects. The impetus for the agreement was provided not only by the members' desire to meet the Program directive, but more importantly, the members wanted to implement the Program at a local level by providing the mechanism for non-profit organizations, watershed groups, and other members of the public to propose projects directly to the fish and wildlife managers.

9.2 Existing and Imminent Protections

Refer to Section 2.4 for a description of the natural resources management agencies and organizations and their primary authorities at the federal, state, and regional levels. Many State and Federal laws and regulations protect natural resources within the IMP. Tribal governments and local governments also have regulations that protect specific areas or locations within the IMP. The following section summarizes the existing and imminent protections for federal and state threatened and endangered wildlife species known or potentially occurring in the Coeur d'Alene Subbasin.

9.2.1 Endangered Species

Bald Eagle

Bald eagles are currently listed as threatened under the federal Endangered Species Act (ESA). This provides protection from "take" (i.e., harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect…). Bald eagles were proposed for removal from the endangered species list in 1999. That action has not been taken, in part because one prerequisite for delisting, a nationwide monitoring plan, has not yet been met. If a development project occurs on federal land or involves federal funding (i.e., nexus), an endangered species consultation may be required by the USFWS.

Bald eagles are classified as threatened in Washington and endangered in Idaho.

In 1984, Chapter 77.12.655 RCW was adopted by the Washington State Legislature, requiring the establishment of rules defining buffer zones around bald eagle nests and roost sites. The law states that the rules shall take into account the need for variation of the extent of the buffer zone on a case-by-case basis.

In 1986, the Bald Eagle Protection Rules (WAC 232-12-292) were adopted by the Washington Wildlife Commission. The rules require permitting agencies (i.e., Department of Natural Resources, counties, cities) to review the database of bald eagle nest and communal roost locations prior to issuing permits for timber harvest, clearing land, residential development, etc. If the activity is within ½ mile of an eagle nest, the permitting agency notifies WDFW, who works with the applicant to develop a Bald Eagle Management Plan (see WAC 232-12-292 (4.4)).

Deliberate harassment of eagles is prohibited by state and federal law (Chapter 77.15.130 RCW; Bald Eagle Protection Act; Endangered Species Act; and, Migratory Bird Treaty Act).

Canada Lynx

The lynx was listed as a state threatened species in Washington in 1993 and was listed as a federally threatened species under ESA in April 2000. Lynx is not given special management status in Idaho.

Canada lynx has been reported in many locations within the Subbasin, including all major drainages except the North Fork Coeur d' Alene River (IDFG 2003). Several lynx analysis units are located within the Subbasin.

Legal take of lynx in Washington ceased in 1991 and consequent designation as a threatened species presently provides complete protection from hunting or trapping at both the state (Chapter 77.16.120 RCW) and federal level.

Fisher

The fisher is will become a candidate for federal listing under the ESA in the near future (USFWS 2004). Fisher is a state endangered species in Washington; it is not given special management designation in Idaho.

In Washington, fisher is managed based on the findings of the WDFW status report (Lewis and Stinson 1998). Protection of fisher in Washington from hunting, possession, or control is provided under Chapter 77.16.120 RCW. Washington further charges those convicted of illegal take of state endangered species with a $2,000 reimbursement for each animal taken or possessed (Chapter 77.21.070 RCW).

Gray Wolf
The gray wolf is listed as a federally threatened species under the ESA. Washington classifies the species as endangered.

The gray wolf is state designated as endangered in Kootenai, Shoshone, Bonner, and Boundary counties of Idaho. Elsewhere in Idaho, the State considers the species an experimental non-essential population. The Central Idaho Non-essential Experimental Population Area includes the portion of the Coeur d' Alene Subbasin located south of Interstate Highway 90. No portions of federally designated wolf recovery areas are located within the Subbasin.

In Washington, protection of gray wolf from hunting, possession, or control is provided under Chapter 77.16.120 RCW. Washington further charges those convicted of illegal take of state endangered species with a $2,000 reimbursement for each animal taken or possessed (Chapter 77.21.070 RCW).

Grizzly Bear
The grizzly bear listed as a threatened species under ESA, as a threatened species in the State of Idaho, and as an endangered species in the State of Washington.

The Coeur d' Alene Subbasin is located within the northwestern portion of the Bitterroot Ecosystem. The USFWS (2000b) determined that there were no grizzly bears remaining in the Bitterroot Ecosystem, and proposed several alternatives for recovery. The preferred alternative is to reintroduce a non-essential experimental population into a recovery area; each of the recovery area alternatives includes portions of the Coeur d' Alene Subbasin.

Peregrine Falcon
Peregrine falcon is classified as an endangered species in Idaho. No recent sightings are reported for the Coeur d'Alene Subbasin in the state of Idaho database (IDFG 2003).

Refer to the Coeur d'Alene Subbasin Terrestrial Resources Assessment, Section 8, for additional information on the occurrence and status of federal and state threatened and endangered species in the Subbasin.

9.3 Inventory of Recent Restoration and Conservation Projects

Below is a summary of some BPA and non-BPA funded projects identified within the Subbasin. Projects that are relevant to both terrestrial and aquatic resources may be presented in the aquatic inventory section for this Subbasin (see Section 7). Refer to Section 2.4, Inventory of Projects in the IMP, for description of projects involving more than one subbasin. Major Grand Coulee Dam wildlife mitigation projects are located and managed in more than one subbasin. Refer to

Appendix H for a more comprehensive list of the BPA and non-BPA funded projects conducted in this Subbasin and the entire IMP.

9.3.1 BPA Funded Projects

Project #9004401: Lake Creek Land Acquisition and Enhancement

This project is part of an ongoing effort by the Coeur d' Alene Tribe and the Bonneville Power Administration (BPA) to protect, enhance, and maintain high value fish and wildlife habitat in the Lake Creek Watershed. The project involves the enhancement and long-term operation and maintenance of approximately 155 acres of emergent wetlands at the mouth of Lake Creek and 180 acres of associated forested/riparian wetlands. This area is one component of a recent 2,100 acre acquisition that was funded by BPA to partially mitigate for resident fish and wildlife losses attributed to the Grand Coulee and Albeni Falls hydroelectric facilities. All activities on the project site complement ongoing habitat restoration work in the Lake Creek Watershed and help to establish a precedent for watershed management efforts on the Reservation. The enhancement and protection of wetland, riparian, and upland areas will provide measurable improvements in channel stability, sediment abatement, water quality, habitat availability, and suitability for wildlife and fish.

The Lake Creek Watershed provides valuable habitat for populations of black bear, moose, elk, white-tailed deer, muskrat, Canada geese, mallards, bald eagles, black-capped chickadees, westslope cutthroat trout, bull trout, and many species of song birds and other non-target wildlife species.

Project # 200204500 Wetland / Riparian Protection, Restoration, Enhancement, and Maintenance in the Coeur d' Alene Subbasin

This project is funded by BPA and sponsored by IDFG with collaboration from the CDAT, Kalispel Tribe, and Kootenai Tribe of Idaho. The project's goals are to protect wetland and riparian habitats within the Coeur d' Alene Subbasin through management rights acquisitions. Restoring, enhancing, and maintaining wetland and riparian habitats will benefit native fish and wildlife in perpetuity. The project will consist of baseline evaluations of project site, with continued monitoring of water quality, vegetation and coverage parameters, and wildlife populations. Baseline maps will be developed to illustrate the location, acreage, and percent cover of noxious weeds within the project sites.

9.3.2 Non-BPA Funded Projects

Plummer Creek SAWQP 95-5

Project Description:

1,600 acres of dryland crop: bluegrass/winter wheat. Many gullies treated.

Associated Monitoring:

≥ annual inspections by Benewah Soil and Water Conservation (BSWCD) and NRCS

Accomplishments:

Years 99-03: 237 acres no-till, 7 gully plugs, 1 sediment basin, 1,335 feet grassed waterway.

Notes:
Much more conservation work is in order. Landowners willing to participate if more cost-sharing can be secured. Some land is in Conservation Reserve Program (CRP). Landowner suggests that some soil conservation practices can easily be combined with habitat improvement.

Plummer Creek SAWQP 95-6

Project Description:
129 acre grass/grain farm draining to Plummer Creek. Soil erosion contributes to sediment load in Plummer Creek. This project ended in 2002 and was sponsored by the BSWCD.

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
90.5 acres were planted using no-till during grain rotations.

Plummer Creek SAWQP 93-2

Project Description:
141 acre dry cropland with 2.5 acre grassed waterway and 9 acre wildlife area

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
Installed 1,698 foot terrace, 4 gully plugs, 1,200 feet subsurface drain, and 1 sediment basin. 92 acres planted using no-till during grain rotation.

Plummer Creek SAWQP 93-1

Project Description:
614 acre cropland draining to Plummer Creek. Erosion contributing sediment load to creek.

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
Installed 5 gully plugs and 557 feet of subsurface drain. 196 acres put into permanent cover crop, 203 acres no-till grain

Plummer Creek SAWQP 97-8

Project Description:
2,000 acre crop/hay/grazing. Erosion contributing sediment load to Little Plummer Creek.

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
Installed 2 spring developments, 1 corral, 4046 feet of fencing, 2 hard crossings, and 309 feet of access road to better manage the cattle and keep the cattle out of the creek and riparian area. Planted 51.5 acres no-till oats.

Notes:
Property has been sold. Have not been able to determine the new owner's intentions. Good possibility for wildlife habitat enhancement.

Plummer Creek SAWQP
Project Description:
76 dryland crop

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
76 acres no-till permanent cover crop, 1,975 feet subsurface drain, 1 sediment basin, 500 feet grassed waterway.

Plummer Creek SAWQP 97-11
Project Description:
255 acres dry cropland, 73 acres hay/pasture

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
Installed 1,660 feet subsurface drain, 328 acres crop and hay put into permanent cover crops.

Plummer Creek SAWQP 96-7
Project Description:
105 acre dryland cropping. Soil erosion contributing sediment load to Plummer Creek

Associated Monitoring:
≥ annual inspections by BSWCD and NRCS

Accomplishments:
Installed 2 gully plugs and 270 feet subsurface drain with terrace and diversion. Reduced erosion, no new gullies.

9.4 Strategies Currently Being Implemented Through Existing Projects

9.4.1 Limiting Factors and Strategies

Refer to Figure 7.1 of the Aquatic Inventory section for a graph displaying the percent of all fish and wildlife mitigation projects in the Subbasin that respond to specific limiting factors. Wildlife mitigation projects in the Subbasin respond primarily to the limiting factors of habitat quantity and quality through land acquisition, protection, restoration, and enhancement activities. In addition, lack of information is addressed by projects involving research and data collection.

Figure 7.2 of the Aquatic Inventory section shows the types of management strategies used in the fish and wildlife mitigation projects in the Subbasin. Wildlife mitigation projects in the Subbasin rely heavily on habitat acquisition and habitat protection, improvement, and restoration strategies. Other strategies widely used in the Subbasin include watershed planning/recovery planning, and RM&E.

9.4.2 Gaps Between Actions Taken and Actions Needed

The primary terrestrial resources mitigation need in the Coeur d'Alene Subbasin, with respect to the FCRPS, is completion of the construction loss mitigation for the Albeni Falls Project. Although this project is located outside of the Subbasin, its construction affected lands traditionally used by the CDAT. The construction loss assessment for the project was completed in 1988 (Martin et al. 1988); acquisition of mitigation parcels through the Albeni Falls Interagency Work Group began in earnest in 1992. As noted above, some of the acquisitions have occurred in the Coeur d'Alene Subbasin. A total of 5,248 acres had been acquired on a total of 18 parcels as of the 2002 Albeni Falls Wildlife Mitigation Project Annual Report (Terra-Burns 2002). Currently, the mitigation for the construction wildlife losses in terms of wildlife HUs is about 17 percent complete (refer to Section 8). Acquisition of HUs for the federally threatened bald eagle is less than 10 percent complete for breeding and wintering HUs.

Additional funding for habitat acquisitions, enhancement and/or restoration measures, and maintenance will be necessary to meet the existing construction loss mitigation obligation.

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10 Coeur d' Alene Subbasin Management Plan

The Coeur d' Alene Subbasin Management Plan was developed by the Coeur d' Alene Subbasin Work Team. Detailed information describing the membership and formation of the Subbasin Work Teams and the process used to develop and adopt the management plan can be found in Section 1.2. In general, the components of the management plan, including the subbasin vision, guiding principles, and prioritized biological objectives and strategies were developed in a series of six meetings between June 2003 and March 2004.

The Oversight Committee (OC), Technical Coordination Group, and the Coeur d' Alene Subbasin Work Team worked collaboratively to establish technically sound objectives and strategies that respond to the limiting factors identified in the subbasin assessment. The management plan was developed in several iterations between the OC and Subbasin Work Teams and the Technical Coordination Group.

Biological objectives were developed using a tiered approach. The Council developed the Columbia River Basin biological goals based on the scientific principles identified in the 2000 Fish and Wildlife Plan. The OC established the province level objectives under the Columbia River Basin level goals by responding to recommendations from the GEI Team, the Technical Coordination Group, and the Subbasin Work Teams. The Subbasin Work Teams developed the subbasin level biological objectives and strategies under the Province objectives, with assistance from the Technical Coordination Group and the GEI Team.

10.1 Summary of Coeur d' Alene Assessment and Limiting Factors

The vision and biological objectives of the management plan reflect what is learned in the assessment and inventory work. In the Coeur d' Alene Subbasin, the aquatic and terrestrial assessments and inventories are described in detail in Sections 5 to 9 of this document. A brief overview of the key limiting factors that are addressed in this management plan is included below.

10.1.1 Coeur d' Alene Aquatic Assessment and Limiting Factors

Focal species selected for the Coeur d' Alene Subbasin were bull trout, westslope cutthroat trout, and kokanee salmon. Historically, large migratory bull trout and westslope cutthroat trout were abundant in the Coeur d' Alene Subbasin. The Coeur d' Alene Tribe still uses westslope cutthroat trout for subsistence and cultural purposes. Westslope cutthroat trout remain a major contributor to the recreational fishery within the subbasin. However, data demonstrate that both westslope cutthroat trout and bull trout populations have been significantly reduced in numbers and distribution from historic conditions. Kokanee salmon are not native to the Coeur d' Alene Subbasin, but are currently the dominant fish in Coeur d' Alene Lake and are the most sought after game fish in the Subbasin.

We used QHA modeling to help us assess the limiting factors in the rivers and streams of the Subbasin. The most significant stream habitat limiting factors for the focal species are listed in Tables 10.1-1, 10.1-2, and 10.1-3. In parentheses is the number of reaches or watersheds within the Coeur d' Alene Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the objective column correspond to the subbasin objectives that were developed in this management plan to address this limiting factor. Aquatic objectives for the Coeur d' Alene Subbasin are described in more detail in section 10.3.

Within the Coeur d' Alene Subbasin, riparian condition had the highest frequency of being in the most deteriorated variable for bull trout streams, while riparian condition, habitat diversity, and channel stability were the most deteriorated habitat variables for westslope cutthroat trout streams. Only two streams in the Coeur d' Alene Subbasin were analyzed for kokanee salmon. Fine sediment and channel stability were each rated as the habitat variable most problematic for kokanee salmon streams.

Table 10.1-1. Stream habitat conditions that currently most deviate from the reference for bull trout, Coeur d' Alene Subbasin. The number in parenthesis is the number of reaches or watersheds within the Coeur d' Alene Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objective that was developed to address this limiting factor in Section 10.3.

Bull Trout	
Habitat Condition	**Objective**
Riparian Condition (12)	1B1, strategies a, c, d, e, g
Habitat Diversity (10)	1B1, strategies a, f
Channel Stability (9)	1B1, strategies a, f
Fine Sediment (4)	1B1, strategies f, k; 1B2
Low Flow (3)	1B1, strategy c
Pollutants (3)	1B1, strategy b; 1B2
High Temperature (3)	1B2
Obstructions (1)	1B1, strategies h, i, j

Table 10.1-2. Stream habitat conditions that currently most deviate from the reference for kokanee, Coeur d' Alene Subbasin. The number in parenthesis is the number of reaches or watersheds within the Coeur d' Alene Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objective that was developed to address this limiting factor in Section 10.3.

Kokanee	
Habitat Condition	**Objective**
Fine Sediment (1)	1B1, strategies f, k; 1B2
Channel Stability (1)	1B1, strategies a, f

Table 10.1-3. Stream habitat conditions that currently most deviate from the reference for westslope cutthroat trout, Coeur d' Alene Subbasin. The number in parenthesis is the number of reaches or watersheds within the Coeur d' Alene Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objective that was developed to address this limiting factor in Section 10.3.

Westslope cutthroat	
Habitat Condition	**Objective**
Riparian Condition (15)	1B1, strategies a, c,d,e,g
Channel Stability (15)	1B1, strategies a, f
Habitat Diversity (15)	1B1, strategies a, f
Fine Sediment (6)	1B1, strategies f, k; 1B2
Low Flow (5)	1B1, strategy c
High Temperatures (4)	1B2
Pollutants (3)	1B1, strategy b; 1B2
Obstructions (1)	1B1, strategies h, i, j
High Flow (1)	1B1, strategy c

Although habitat degradation is one of the most influential factors that limits bull trout and westslope cutthroat trout populations within the Coeur d' Alene Subbasin, other factors have also contributed to the declines in some populations. In addition to habitat degradation, historical over harvesting and nonnative species introductions have contributed to the reduced numbers, size, and genetic integrity of native salmonid populations in the Coeur d' Alene Subbasin. Management plan objectives designed to address these limiting factors include 2A2, 2C1, 2A1, 2C2, 1C1, and 1C2.

Although lack of information is not, scientifically, a limiting factor, it is one of the concerns that have been identified in this Subbasin that constrains effective fish and wildlife management. Objectives that will assist in filling data gaps include 1A1 and 1B1.

10.1.2 Coeur d' Alene Terrestrial Assessment and Limiting Factors

Wildlife in the Coeur d' Alene Subbasin are limited by habitat quantity and quality. Although none of the three federal hydrosystem projects of the IMP is located within the Coeur d' Alene Subbasin, construction of the Albeni Falls Project affected lands within areas historically used by the Coeur d' Alene Tribe, which extend above Lake Pend Oreille. Mitigation for the hydroelectric project construction and subsequent inundation of wildlife habitats is required to offset effects to terrestrial resources traditionally used by the Coeur d' Alene Tribes in the Pend Oreille Subbasin. In addition, the FCRPS projects had a number of secondary effects to terrestrial resources within the Pend Oreille, Coeur d' Alene, and adjacent subbasins. Secondary effects include accelerated rates of industrial, agricultural, and residential development. This led to loss of habitat and increased hunting pressure on wildlife through increased population. Increased use of wildlife for subsistence is also partly due to extirpation of anadromous salmon in adjacent subbasins.

Factors that currently limit terrestrial resources in the Coeur d' Alene Subbasin are dominated by modification of forested stands through timber management and the combined effects of mining, grazing, agriculture, and residential development, including roads. Development, including agriculture, has converted a total of 1.5 percent of native habitats in the Subbasin to other cover types.

Management plan objectives that address the losses from the construction of and inundation from the FCRPS are objectives 1A, with sub-objectives. Management plan objectives that address the operational impacts to terrestrial species and habitats are objectives 1B, with sub-objectives. Objectives 2A through 2D address secondary impacts of the hydropower system, as well as other impacts to terrestrial resources that have affected the Subbasin.

10.2 Subbasin Vision

The Coeur d' Alene Subbasin vision is:

> *The Coeur d' Alene Subbasin Plan is part of a holistic approach to fish and wildlife recovery from hydropower impacts in the Intermountain Province. The Coeur d' Alene Subbasin represents mitigative opportunities to address fish and wildlife objectives across the Province and help alleviate and mitigate impacts to social, economic, cultural, and recreation systems and activities. Although fish and wildlife in the Coeur d' Alene Subbasin may not have been directly impacted by the construction of the hydrosystem, it did affect the way of life of native peoples that utilized areas outside current subbasin boundaries. Consequently, the Coeur d' Alene Subbasin provides opportunities for mitigating those losses through enhancement of resident species.*

In addition to the vision statement, Coeur d' Alene Subbasin Work Team members drafted the following guiding principles:

1. We believe in supporting the goals and objectives of the Intermountain Province by protecting and enhancing native populations of fish and wildlife.
2. As part of a holistic approach, we believe that the Coeur d' Alene Subbasin offers opportunities for species recovery and mitigation of hydropower impacts that have and are occurring in other subbasins throughout the Intermountain Province.
3. We recognize the importance of water quality and water quantity in the Coeur d' Alene Subbasin to subbasins downstream.
4. We believe that quality habitat enhancements, including connectivity of habitat components across the Province, should be a priority of subbasin planning.
5. We recognize the importance of subsistence species for native peoples and believe in mitigating their losses by enhancing residence species.
6. We believe that multi-agency partnerships are critical to accomplishing Province and subbasin objectives.
7. We recognize the importance of coordinating with other local, state, federal, and Tribal plans and mitigative strategies affecting the Coeur d' Alene Subbasin.

10.3 Aquatic Objectives and Strategies

The Columbia River Basin and Province objectives for aquatic resources presented below were not assigned priorities by the OC. The Coeur d' Alene Subbasin objectives that follow were prioritized by the Work Team. The ranking of the objectives are given in parenthesis after the objective. The strategies are presented in order of priority beneath each objective. Objectives and strategies also included in the research, monitoring, and evaluation plan are marked with an asterisk.

Columbia River Basin Level Category 1: Mitigate for resident fish losses.

Columbia River Basin Level Goal 1A:
Complete assessments of resident fish losses throughout the Columbia River Basin resulting from the federal and federally licensed hydrosystem, expressed in terms of the various critical population characteristics of key resident fish species.

Province Level Objective 1A:
Fully mitigate fish losses related to construction and operation of federally licensed and federally operated hydropower projects.

Subbasin Objective 1A1: Fully quantify lost fish resources and opportunities historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015. (Sixth priority)

Strategy a*: Conduct comprehensive loss assessment. This could be done in the following steps:

- Determine free flowing river reaches flooded by projects.
- Determine impact from footprint of dam on river channel and fish habitat.
- Determine former habitat from aerial photos.
- Determine historic fish use by looking at use in existing habitat of similar type.
- Link fish population to lost habitat.

Strategy b*: Quantify cultural value by interviewing Tribal elders and looking in historic records.

Subbasin Objective 1A2: Mitigate impacts of Albeni Falls Dam on resident fish by off-site/in-kind opportunities in the Coeur d' Alene Subbasin. (Sixth priority)

Strategy a: Define the impact of water management above the Post Falls Dam and how fish populations have changed as a result of changes in water management.

Strategy b: Develop mitigation treatments to address these impacts to be implemented as off-site/in-kind opportunities.

Strategy c: Ensure mitigation and maintenance of fisheries for the life of the project through adequate long-term Operations and Maintenance (O&M) funding.

Columbia River Basin Level Goal 1B:
Maintain and restore healthy ecosystems and watersheds, which preserve functional links among ecosystem elements to ensure the continued persistence, health and diversity of all species including game fish species, non-game fish species, and other organisms. Protect and expand habitat and ecosystem functions as the means to significantly increase the abundance, productivity, and life history diversity of resident fish at least to the extent that they have been affected by the development and operation of the federal and federally licensed hydrosystem.

Province Level Objective 1B:
Protect and restore instream and riparian habitat to maintain functional ecosystems for resident fish, including addressing the chemical, biological, and physical factors influencing aquatic productivity.

Subbasin Objective 1B: Fully quantify lost fish habitat historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015.

Objective 1B1: Identify, restore, protect, and mitigate impacts of Albeni Falls Dam on resident fish in areas historically used by the Coeur d' Alene Tribe by off-site/in-kind opportunities in the Coeur d' Alene Subbasin. (Sixth priority)

Strategy a: Work with land management agencies to protect existing roadless areas and maintain existing roads.

Strategy b (priority equal to c): Identify opportunities for cooperative habitat protection efforts with private landowners and conduct an outreach program to make landowners aware of opportunities.

Strategy c (priority equal to b): Identify opportunities on federal, state, and tribal lands for protection of existing habitats.

Strategy d: Inventory and ground truth all potential fish passage barriers in the Coeur d' Alene Subbasin by 2010; prioritize by determining the amount of usable fish habitat above barriers and determine if barrier is important in isolating a pure strain of native species before identifying it for removal.

Strategy e: Review existing habitat data and complete habitat assessments, including pool, riffle, run, channel stability, etc., for native resident fish species within the Coeur d' Alene Subbasin by 2015.

Strategy f: Have each land management agency and large private landowner identify known culverts in their ownership, and identify potential barriers by gradient and/or size of culvert installed.
Strategy g: Complete water quality assessments (to include temperature, DO, water chemistry, etc.) and comprehensive watershed assessments in key watersheds to define the existing condition, why it's that way, and how to fix problem areas.

Strategy h: Where appropriate, remove passage barriers and improve passage impediments, with a goal of correcting 10 percent of barriers per year with full implementation by 2020.

Strategy i: Based on priorities cited in watershed assessments and other processes, secure management control on those identified lands through strategies such as conservation easements, land acquisition, land exchanges, etc.

Strategy j: Enforce existing EPA guidelines for timber harvest in riparian areas.

Strategy k: Consult hydrologists to address downstream impacts to fish habitat from fine sediment and bedload gravel movement.

Objective 1B2*: Complete TMDL subbasin assessments, pollutant reduction allocations, and Implementation Plans for impaired water bodies by 2010, and carry out actions identified in TMDL Implementation Plans within 10 years of adoption to mitigate off-site, in-kind for native resident fish losses. (Sixth priority)

Strategy a: Monitor progress toward completion of TMDL assessments.

Strategy b (priority equal to c): Look to DEQ, Tribe and EPA relative to their strategies and the Clean Water Act.

Strategy c (priority equal to b): Implement TMDL plans to restore native fish.

Columbia River Basin Level Goal 1C:
Restore **resident fish** species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be restored.

Province Level Objective 1C1:
Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks.

Province Level Objective 1C2:
Maintain and enhance self-sustaining, wild populations of native game fish, and subsistence species, to provide for harvestable surplus.

Province Level Objective 1C3:
Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks.

Province Level Objective 1C4:
Increase cooperation and coordination among stakeholders throughout the province.

In the Coeur d' Alene Subbasin, objectives that address the topics listed in Province level objectives 1C1 – 1C4 are covered in Columbia River Basin Level Category 2, below.

Province Level Objective 1C5:
Meet and exceed the recovery plan goals for federally-listed threatened and endangered fish species.

Coeur d' Alene Subbasin Objective 1C: In the Coeur d' Alene Subbasin, mitigate for impacts to resident fish historically used by the Coeur d' Alene Tribe by meeting the recovery plan goals for federally-listed threatened and endangered fish species to provide an annual harvestable surplus.

Objective 1C1: Pursue the objectives in the U.S Fish and Wildlife Service Bull Trout Recovery Plan. The goal of the bull trout recovery plan is to ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed throughout the species' native range, so that the species can be de-listed. The current draft goals and objectives for the Coeur d' Alene Recovery Unit (USFWS, 2003) are listed in an appendix to this section, and the complete recovery plan is available at http://pacific.fws.gov/bulltrout/recovery/Chapter_15.htm. If these objectives should change in the future, the subbasin plan should be adjusted accordingly. (Sixth priority)

Strategy a: Implement strategies from U.S. Fish and Wildlife Service Bull Trout Recovery Plan.

Objective 1C2: Protect and restore native, locally adapted, reproducing bull trout that will support an annual harvestable surplus of bull trout in the Coeur d' Alene Subbasin by 2020. (Sixth priority)

Strategy a (priority equal to b): Implement strategies from U.S. Fish and Wildlife Service Bull Trout Recovery Plan.

Strategy b (priority equal to a): Protect existing roadless areas in the upper St. Joe.

Strategy c: Fund watershed improvement projects in National Forest area in the Coeur d' Alene drainage (e.g., road obliteration, channel restoration, watershed hydrological restoration, culvert removal).

Strategy d*: Do formal genetic analyses of existing populations and determine the appropriateness/usefulness of infusing other genes from other populations.

Province Level Objective 1C6:
Restore **resident fish** species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be restored.

In the Coeur d' Alene Subbasin, objectives that address the topics listed in Province Level Objective 1C6 are covered in Columbia River Basin Level Category 2, below.

Columbia River Basin Level Category 2: Substitute for anadromous fish losses.

Columbia River Basin Level Goal 2A:
Restore **resident fish** species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be feasibly restored.

Province Level Objective 2A1:
Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks.

Province Level Objective 2A2:
Maintain and enhance self-sustaining, wild populations of native game fish, and subsistence species, to provide for harvestable surplus.

Province Level Objective 2A3:
Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks.

Province Level Objective 2A4:
Increase cooperation and coordination among stakeholders throughout the province.

The following subbasin objectives address province objectives 2A1 – 2A4:

Coeur d' Alene Subbasin Objective 2A:

a. Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the Coeur d' Alene Subbasin with primary emphasis on sensitive, native salmonid stocks.
b. Maintain and enhance self-sustaining, wild populations of native game fish to provide for harvestable surplus in the Coeur d' Alene Subbasin.
c. Minimize negative impacts (e.g., competition, predation, introgression) to native species and nonnative species and stocks in the Coeur d' Alene Subbasin.
d. Increase cooperation and coordination among stakeholders throughout the Coeur d' Alene Subbasin.

Objective 2A1: Protect and restore native, locally adapted, naturally reproducing bull trout to a level that will support annual harvest in the Coeur d' Alene Subbasin by 2020. (Third priority)

Strategy a (priority equal to b): Improve riparian conditions.

Strategy b (priority equal to a): Increase channel stability; reduce fine sediment.

Strategy c: Increase instream habitat diversity.

Strategy d (priority equal to e): Remove passage obstructions.

Strategy e (priority equal to d): Apply strategies that are consistent with the Bull Trout Recovery Plan.

Strategy f: Reduce stream temperatures.

Strategy g: Increase flows where appropriate.

Strategy h: Reduce pollutants.

Objective 2A2: By 2015, protect and restore remaining stocks of native resident westslope cutthroat trout to ensure their continued existence in the basin and to provide catch rates of over 1.0 fish per hour in the St. Joe, Coeur d' Alene, and St. Maries rivers; an annual catch of over 1,000 fish in Coeur d' Alene Lake; and harvestable surpluses of naturally reproducing adfluvial adult fish from Lake, Benewah, Evans, and Alder creeks and other populations well-distributed in tributaries throughout the basin. (First priority)

Strategy a: Improve riparian conditions; increase channel stability.

Strategy b: Increase habitat diversity.

Strategy c (priority equal to d): Reduce fine sediment.

Strategy d (priority equal to c): Increase flows where appropriate.

Strategy e: Remove passage obstructions.

Strategy f: Reduce stream temperatures.

Strategy g: Decrease pollutants.

Strategy h: Evaluate native resident fish distribution and abundance and assess need for conservation aquaculture facilities to assist with enhancing or reestablishing healthy, self-sustaining native fish populations for reproduction, recreation, and subsistence by year 2010.

Columbia River Basin Level Goal 2B:
Provide sufficient populations of fish and wildlife for abundant opportunities for Tribal trust and treaty right harvest and for non-Tribal harvest.

Province Level Objective 2B:
Focus restoration efforts on habitats and ecosystem conditions and functions that will allow for expanding and maintaining diversity within, and among, species in order to sustain a system of robust populations in the face of environmental variation.

Coeur d' Alene Subbasin Objective 2B: Until anadromous fisheries are restored within their historic range to the Coeur d' Alene Tribe, mitigate and compensate for salmon and steelhead in the Upper Columbia River using a multiple resource approach. Within the Coeur d' Alene Subbasin, focus restoration efforts on habitats and ecosystem conditions and functions that will allow for expanding and maintaining a diversity within, and among, species in order to sustain a system of robust populations of fish and wildlife in the face of environmental variation and provide for subsistence species of wildlife and fish.

Subbasin Objective 2B1: Protect, restore, and enhance existing aquatic and terrestrial resources in order to meet the increased demands (cultural, subsistence, and recreation) on these resources associated with the extirpation of anadromous fisheries. (Fifth priority)

Strategy a (priority equal to b): Where possible, acquire management rights to priority properties that can be protected,

restored or enhanced to support native ecosystem/watershed function through title acquisition, conservation easements, and/or long-term leases in perpetuity.

Strategy b (priority equal to a): Create or use existing incentives and outreach programs for private landowners to protect and/or restore habitats to support native ecosystem/watershed functions.
Strategy c: Where management rights are acquired, identify the current condition and biological potential of the habitat, and then protect or restore and enhance those properties to the extent that their condition is consistent with the Biological Objectives of the 2000 Fish and Wildlife Program.

Columbia River Basin Level Goal 2C:
Administer and increase opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild, and hatchery reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near historic abundance (includes intensive fisheries within closed or isolated systems).

Province Level Objective 2C1:
Artificially produce sufficient salmonids to supplement consistent harvest to meet management objectives.

Province Level Objective 2C2:
Provide both short and long-term harvest opportunities that support both subsistence activities and sport-angler harvest.

The following subbasin objective address province objectives 2C1 – 2C2:

Coeur d' Alene Subbasin Objective 2C:
As the highest priority, protect, restore, and enhance existing aquatic resources in order to meet the increased demands (cultural, subsistence, and recreational) on these resources associated with the extirpation of traditional anadromous fisheries from previously occupied areas of the Upper Columbia River basin. Provide both short and long-term harvest opportunities that support Tribal subsistence activities and sport angler harvest until self-sustaining populations of wild fish are present.

Objective 2C1: Establish put-and-take fisheries for westslope cutthroat trout in waters that currently do not, or likely will not, support native cutthroat trout populations by 2010. (Second priority)

Strategy a (priority equal to b): Construct a total of 5 ponds in the Coeur d' Alene Watershed to function as put-and-take westslope cutthroat trout fisheries by 2012.

Strategy b (priority equal to a): Identify stream reaches that do not, and likely will not, support westslope cutthroat trout by 2010 for establishment of put and take fisheries.

Strategy c: Supplement pond and streams identified in strategies a and b with sufficient numbers of hatchery raised westslope cutthroat from locally adapted stocks to meet subsistence and harvest goals.

Objective 2C2*:* Reduce pressure on native resident fish populations by maintaining fisheries for introduced species at an annual harvest of greater than 500,000 kokanee, greater than 5,000 Chinook salmon, greater than 20,000 rainbow trout in Tribal catch-out ponds, and average catch rates of greater than 0.5 fish/hour for largemouth bass. (Fourth priority)

Strategy a: Manage angler harvest through fishing regulations to achieve harvest and catch rate goals.

Strategy b: Increase hatchery capabilities to produce sufficient quantities and quality of gamefish for harvest and subsistence oriented fisheries by year 2015.

Columbia River Basin Level Goal 2D:
Re-introduce **anadromous fish** into blocked areas where feasible[1].

Province Level Objective 2D1:
Develop an anadromous fish re-introduction feasibility analysis by 2006 for Chief Joseph and by 2015 for Grand Coulee.

Province Level Objective 2D2:
Develop an implementation plan within five years of feasibility determination for each facility.

The Coeur d' Alene Subbasin is upstream of the natural range of anadromous salmon and so, at this time, does not have objectives or strategies related to anadromous salmon re-introduction. Therefore, this objective is the lowest priority for the Coeur d' Alene Subbasin.

10.3.1 Prioritization of aquatic objectives

A detailed discussion of the methods used to prioritize the objectives and strategies is found in Section 1.2. In the Coeur d' Alene Subbasin, the members of the Subbasin Work Team evaluated and ranked the objectives at the fifth and sixth Subbasin Work Team

[1] OC notes that "where feasible" is actual language from Council's Program.

meeting. Strategies were prioritized as a homework exercise after the sixth meeting; the prioritization presented here represents the averaged rankings of three respondents.

The final prioritization of the aquatic objectives and strategies for the Coeur d' Alene Subbasin is displayed in Table 10.3-1. Section 2 also has a summary table that is easy to read, but does not list strategies.

Table 10.3-1. Summary of objectives and strategies in priority order for the Coeur d' Alene Subbasin

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
(1) By 2015, protect and restore remaining stocks of native resident westslope cutthroat trout to ensure their continued existence in the basin and to provide catch rates of over 1.0 fish per hour in the St. Joe, Coeur d' Alene, and St. Maries rivers; an annual catch of over 1,000 fish in Coeur d' Alene Lake; and harvestable surpluses of naturally reproducing adfluvial adult fish from Lake, Benewah, Evans, and Alder creeks and other populations well-distributed in tributaries throughout the basin. **Objective 2A2**	**Strategy a:** Improve riparian conditions; increase channel stability. **Strategy b:** Increase habitat diversity. **Strategy c (priority equal to d):** Reduce fine sediment. **Strategy d (priority equal to c):** Increase flows where appropriate. **Strategy e:** Remove passage obstructions. **Strategy f:** Reduce stream temperatures. **Strategy g:** Decrease pollutants. **Strategy h:** Evaluate native resident fish distribution and abundance and assess need for conservation aquaculture facilities to assist with enhancing or reestablishing healthy, self-sustaining native fish populations for reproduction, recreation, and subsistence by year 2010.	Loss of native westslope cutthroat trout, habitat degradation.
(2) Establish put-and take fisheries for westslope cutthroat trout in waters that currently do not, or likely will not, support native cutthroat trout populations by 2010. **Objective 2C1**	**Strategy a (priority equal to b):** Construct a total of 5 ponds in the Coeur d' Alene Watershed to function as put-and-take westslope cutthroat trout fisheries by 2012. **Strategy b (priority equal to a)**: Identify stream reaches that do not, and likely will not, support westslope cutthroat trout by 2010 for establishment of put and take fisheries. **Strategy c**: Supplement pond and streams identified in	Loss of native westslope cutthroat trout, habitat degradation.

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
	strategies a and b with sufficient numbers of hatchery raised westslope cutthroat from locally adapted stocks to meet subsistence and harvest goals.	
(3) Protect and restore native, locally adapted, naturally reproducing bull trout to a level that will support annual harvest in the Coeur d' Alene Subbasin by 2020. **Objective 2A1**	**Strategy a (priority equal to b)**: Improve riparian conditions. **Strategy b (priority equal to a)**: Increase channel stability; reduce fine sediment **Strategy c**: Increase instream habitat diversity. . **Strategy d (priority equal to e)**: Remove passage obstructions. **Strategy e** (priority equal to d): Apply strategies that are consistent with the Bull Trout Recovery Plan. **Strategy f**: Reduce stream temperatures. **Strategy g**: Increase flows where appropriate. **Strategy h**: Reduce pollutants.	Loss of native bull trout, habitat degradation.
(4) Reduce pressure on native resident fish populations by maintaining fisheries for introduced species at an annual harvest of greater than 500,000 kokanee, greater than 5,000 Chinook salmon, greater than 20,000 rainbow trout in Tribal catch-out ponds, and average catch rates of greater than 0.5 fish/hour for largemouth bass. **Objective 2C2**	**Strategy a:** Manage angler harvest through fishing regulations to achieve harvest and catch rate goals. **Strategy b:** Increase hatchery capabilities to produce sufficient quantities and quality of gamefish for harvest and subsistence oriented fisheries by year 2015.	Loss of fishing opportunities, habitat degradation.
(5) Protect, restore, and enhance existing aquatic and terrestrial resources in order to meet the increased demands (i.e., cultural,	**Strategy a (priority equal to b):** Where possible, acquire	Loss of anadromous life history.

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
subsistence, and recreation) on these resources associated with the extirpation of anadromous fisheries. **Subbasin Objective 2B1**	management rights to priority properties that can be protected, restored or enhanced to support native ecosystem/watershed function through title acquisition, conservation easements, and/or long-term leases in perpetuity. **Strategy b (priority equal to a):** Create or use existing incentives and outreach programs for private landowners to protect and/or restore habitats to support native ecosystem/watershed functions.. **Strategy c:** Where management rights are acquired, identify the current condition and biological potential of the habitat, and then protect or restore and enhance those properties to the extent that their condition is consistent with the Biological Objectives of the 2000 Fish and Wildlife Program.	
(6) **Objective 1A1:** Fully quantify lost fish resources and opportunities historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015. **Objective 1A2**: Mitigate impacts of Albeni Falls Dam on resident fish by off-site/in-kind opportunities in the Coeur d' Alene Subbasin. **Objective 1B1:** Identify, restore, protect, and mitigate impacts of Albeni Falls Dam on resident fish in areas historically used by the CDA Tribe by off-site/in-kind opportunities in the Coeur d' Alene Subbasin. **Objective 1B2*:** Complete TMDL Subbasin Assessments, pollutant reduction allocations, and Implementation Plans for impaired water bodies by 2010 and carry out actions identified in TMDL Implementation Plans within 10 years of adoption to mitigate off-site, in-kind for native resident fish losses.	**Objective 1A1: Strategy a*:** Conduct comprehensive loss assessment. This could be done in the following steps: Determine free flowing river reaches flooded by projects. Determine impact from footprint of dam on river channel and fish habitat. Determine former habitat from aerial photos. Determine historic fish use by looking at use in existing habitat of similar type. Link fish population to lost	Lack of information, habitat degradation, water quality, bull trout recovery, lack of fishing opportunity.

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
Objective 1C1: Pursue the objectives in the U.S Fish and Wildlife Service Bull Trout Recovery Plan. The goal of the bull trout recovery plan is to ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed throughout the species' native range, so that the species can be de-listed**.** If these objectives should change in the future, the subbasin plan should be adjusted accordingly. **Objective 1C2**: Protect and restore native, locally adapted, reproducing bull trout that will support an annual harvestable surplus of bull trout in the Coeur d' Alene Subbasin by 2020.	habitat. **Objective 1A1: Strategy b*:** Quantify cultural value by interviewing Tribal elders and looking in historic records. **Objective 1A2**: **Strategy a**: Define the impact of water management above the Post Falls Dam and how fish populations have changed as a result of changes in water management. **Objective 1A2: Strategy b:** Develop mitigation treatments to address these impacts to be implemented as off-site/in-kind opportunities. **Objective 1A2: Strategy c:** Ensure mitigation and maintenance of fisheries for the life of the project through adequate long-term Operations and Maintenance (O&M) funding **Objective 1B1: Strategy a**: Work with land management agencies to protect existing roadless areas and maintain existing roads. **Objective 1B1: Strategy b (priority equal to c):** Identify opportunities on federal, state, and Tribal lands for protection of existing habitats. **Objective 1B1: Strategy c (priority equal to b):** Identify opportunities for cooperative habitat protection efforts with private landowners and conduct an outreach program to make landowners aware of	

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
	opportunities. **Objective 1B1: Strategy d:** Inventory and ground truth all potential fish passage barriers in the Coeur d' Alene Subbasin by 2010; prioritize by determining the amount of usable fish habitat above barriers and determine if barrier is important in isolating a pure strain of native species before identifying it for removal. **Objective 1B1: Strategy e:** Review existing habitat data and complete habitat assessments, including pool, riffle, run, channel stability, etc., for native resident fish species within the Coeur d' Alene Subbasin by 2015. **Objective 1B1: Strategy f:** Have each land management agency and large private landowner, identify known culverts in their ownership and identify potential barriers by gradient and/or size of culvert installed. **Objective 1B1: Strategy g:** Complete water quality assessments (to include temperature, DO, water chemistry, etc.) and comprehensive watershed assessments in key watersheds to define the existing condition, why it's that way, and how to fix problem areas. **Objective 1B1: Strategy h**: Where appropriate, remove passage barriers and improve passage impediments, with a goal of correcting 10 percent of	

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
	barriers per year with full implementation by 2020. **Objective 1B1: Strategy i**: Based on priorities cited in watershed assessments and other processes, secure management control on those identified lands through strategies such as conservation easements, land acquisition, land exchanges, etc. **Objective 1B1: Strategy j**: Enforce existing EPA guidelines for timber harvest in riparian areas. **Objective 1B1: Strategy k:** Consult hydrologists to address downstream impacts to fish habitat from fine sediment and bedload gravel movement. **Objective 1B2*: Strategy a**: Monitor progress toward completion of TMDL assessments. **Objective 1B2*: Strategy b (priority equal to c):** Look to DEQ, Tribe and EPA relative to their strategies and the Clean Water Act. **Objective 1B2*: Strategy c (priority equal to b):** Implement TMDL plans to restore native fish. **Objective 1C1: Strategy a:** Implement strategies from U.S. Fish and Wildlife Service Bull Trout Recovery Plan. **Objective 1C2: Strategy a (priority equal to b):** Implement strategies from U.S. Fish and	

Objectives in Priority Order	Strategies	Limiting Factor(s) Addressed
	Wildlife Service Bull Trout Recovery Plan. **Objective 1C2: Strategy b (priority equal to a):** Protect existing roadless areas in the upper St. Joe. **Objective 1C2: Strategy c:** Fund watershed improvement projects in National Forest area in the Coeur d' Alene drainage (e.g., road obliteration, channel restoration, watershed hydrological restoration, culvert removal). **Objective 1C2: Strategy d***: Do formal genetic analyses of existing populations and determine the appropriateness/usefulness of infusing other genes from other populations.	
(7) Reintroduce anadromous fish into blocked areas where feasible. **Objective 2D**	No strategies proposed for this objective.	Loss of anadromous life history, pertinent to Coeur d' Alene Tribe in traditional use areas outside Subbasin.

*Objectives and strategies also included in the research, monitoring, and evaluation plan.

10.3.1 Discussion of aquatic prioritization

The Coeur d' Alene Subbasin Work Team prioritized objectives in Category 2 over objectives in Category 1 because substitution for anadromous fish losses was a higher priority for the Coeur d' Alene Tribe. This reflects the fact that the losses of anadromous fish resources due to FCRPS (which occurred in traditionally used areas outside the Subbasin) were more extensive than losses of resident fish resources. Within Category 2, westslope cutthroat trout objectives were prioritized as the most important objectives because they are a species of cultural importance with a high potential for restoration. There is a strong interest in increasing opportunities for harvest in this subbasin, and westslope cutthroat trout would be a likely species for providing harvest opportunities. In addition, westslope cutthroat trout have broader habitat requirements than bull trout, so habitat restoration that targets westslope cutthroat would affect more areas within the Subbasin and may benefit other species.

Bull trout objective 2A1 was ranked third. Bull trout are a federally-listed threatened species and are therefore important in the Subbasin. However, the subbasin assessment indicates that bull trout are rare in many parts of the subbasin and there are relatively few opportunities to restore this species outside of the St. Joe portion of the Subbasin. In addition, it will be difficult to restore this species to a level that would allow for harvest.

Fourth priority for the Coeur d' Alene Subbasin is to maintain or increase nonnative fisheries in this Subbasin. It is believed that by increasing fishing opportunities for nonnative species, there will be less fishing pressure on native species.

The fifth priority for the Coeur d' Alene Subbasin is to protect, restore, and enhance existing terrestrial and aquatic resources to meet the increased demands associated with the loss of anadromous fisheries. This objective would allow for the possibility of mitigating for the loss of anadromous fish with terrestrial habitats or species. The Work Team placed this as a lower priority because their preference is for in-kind mitigation.

The objectives in Category 1 are all of equal priority, below the objectives in Category 2. The lowest priority objective is the re-introduction of anadromous fish. This objective is of little relevance to the Coeur d' Alene Subbasin because there were several natural barriers that limited the presence of anadromous fish in this Subbasin historically.

The USFWS noted that, from their perspective, all of the objectives addressing bull trout recovery (1C1, 1C2, and 2A1) are of equal priority (personal communication, J. Flory, USFWS, May 6, 2004). The distinction between Category 1 (resident fish mitigation) and Category 2 (substitution for anadromous fish) reflects the Coeur d'Alene Tribe's priorities, but does not necessarily align with the USFWS priorities for bull trout recovery.

The Subbasin Work Team members ranked the strategies in order of priority within each objective as a homework assignment following Work Team meeting six. Three responses were received from the Work Team members (Coeur d'Alene Tribe, U.S. Fish and

Wildlife Service, and Idaho Department of Fish and Game). These rankings were averaged and the resulting order of priorities for strategies is displayed in the preceding sections.

10.4 Terrestrial Objectives and Strategies

The Columbia River Basin and Province level objectives for terrestrial resources are presented below. These objectives were prioritized by the OC at the Province level, and are presented in order of priority. The Subbasin objectives were prioritized by the Subbasin Work Team and the ranking is given in parenthesis after each objective. Refer to Section 10.4.2, below, for additional discussion of the Work Team prioritization of objectives.

Prioritization of strategies was accomplished through a homework assignment after Work Team Meeting 6: only one response was received from the Work Team participants (U.S. Fish and Wildlife Service). Strategies are presented beneath the objectives in order of priority, based on the single Work Team response. Objectives and strategies also included in the research, monitoring, and evaluation plan are marked with an asterisk.

Columbia River Basin Level Category 1:

A primary overarching objective of the Columbia River Basin 2000 Fish and Wildlife Program is the completion of mitigation for the adverse effects to wildlife caused by the development and operation of the hydrosystem.

Provincial Priority 1: **Columbia River Basin Level Goal 1A:**
Complete the current Wildlife Mitigation Program for construction and inundation losses of federal hydrosystem as identified in Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program.

> **Province Level Objective 1A**:
> Fully mitigate for construction and inundation losses incurred from the Chief Joseph Dam, Grand Coulee Dam, and Albeni Falls projects per the requirements of the Northwest Power Act and the current Wildlife Mitigation Program (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) by **2015.** This includes developing and implementing projects within the Intermountain Province that protect, enhance, or restore Habitat Units for HEP evaluation species and habitats as specified in the construction loss assessments for Chief Joseph, Grand Coulee, and Albeni Falls dams (Kuehn and Berger 1992; Creveling and Renfrow 1986; Martin et al. 1988); coordinated planning; provision of adequate funding for long-term Operations and Maintenance (O&M); and effectiveness monitoring of projects.
>
> > **Coeur d' Alene Subbasin Objective 1A**: Fully mitigate for terrestrial resource losses incurred from construction and inundation of the Albeni Falls Project per the requirements of the Northwest Power Act. Complete the compensation mitigation consistent with the HEP loss assessment (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and

Wildlife Program) and the Albeni Falls Dam Wildlife Mitigation Project Operating Guidelines by year 2015. Meet these requirements in conjunction with the Pend Oreille Subbasin.

Refer to Section 10.4.2, below, for additional discussion of prioritization of objectives under Province Objective 1A.

Strategies a through d apply to subbasin objectives 1A1 through 1A8, and are presented in order of priority.

Strategy a (**for Objectives 1A1-1A8):** Protect habitat through fee title acquisition, conservation easements, lease, or management plans.

Strategy b (**for Objectives 1A1-1A8)*:** Identify and evaluate sites for potential use in mitigation, including opportunities for enhancement and restoration on federal, state, and Tribal lands, and opportunities for cooperative restoration and enhancement efforts with private landowners. In collaboration with the Pend Oreille and Spokane subbasins, identify at least five opportunities for mutually beneficial mitigation efforts within the Coeur d' Alene Subbasin by 2006 and actively seek funding together.

Strategy c (**for Objectives 1A1-1A8):** Work to establish connectivity between management units.

Strategy d (for Objectives 1A1-1A8)*: Develop management plans that restore degraded habitat to meet specific objectives and address road closure, cattle, soil, vegetation enhancement and management of unwanted species, fire and fuels, nonnative wildlife, etc., in accordance with the Albeni Falls Interagency Work Group Operating Guidelines and Guiding Principles for Mitigation Implementation (1998).

Objective 1A1: Protect, enhance, or restore bald eagle breeding Habitat Units to address coniferous and deciduous forest and forested wetland habitat losses resulting from construction of Albeni Falls Project.

Objective 1A2: Protect, enhance, or restore bald eagle wintering Habitat Units to address coniferous and deciduous forest habitat losses resulting from construction of Albeni Falls Project.

Strategy e: Identify, map, and provide long term protection to current and potential bald eagle wintering, perching and foraging

habitat within 250 feet of the high water mark of waters within the Coeur d' Alene Subbasin.

Objective 1A3: Protect, enhance, or restore black-capped chickadee Habitat Units to address deciduous forest habitat losses resulting from construction of Albeni Falls Project.

Objective 1A4: Protect, enhance, or restore Canada goose Habitat Units to address floodplain meadow, shoreline, open water and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project.

Objective 1A5: Protect, enhance, or restore mallard Habitat Units to address floodplain meadow, scrub-shrub, open water, and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project.

Objective 1A6: Protect, enhance, or restore muskrat Habitat Units to address herbaceous wetland and open water habitat losses resulting from construction of Albeni Falls Project.

Objective 1A7: Protect, enhance, or restore white-tailed deer Habitat Units to address scrub-shrub wetland habitat losses resulting from construction of Albeni Falls Project.

Objective 1A8: Protect, enhance, or restore redhead Habitat Units to address open water and near-shore floating aquatic weed bed habitat losses resulting from construction of Albeni Falls project.

Objective 1A9: Maintain wildlife values (Habitat Units) for the life of the project on existing and newly acquired mitigation lands through adequate long-term Operations and Maintenance (O&M) funding. (Second Priority)

Strategy a: Ensure long-term protection of habitat units through secured funding for Operations and Maintenance.

Provincial Priority 2: **Columbia River Basin Level Goal 1B:**
Quantify the operational effects of federal hydrosystem projects on terrestrial resources, develop mitigation plan in coordination with other resource mitigation and resource planning efforts, and implement projects to mitigate the impacts, including maintenance and monitoring.

Province Level Objective 1B:
Quantitatively assess and mitigate operational impacts of the Chief Joseph Dam, Grand Coulee Dam, and Albeni Falls projects per the requirements of the Northwest Power Act and the current Wildlife Mitigation Program. Complete assessment of operational impacts by 2008; develop mitigation plan by 2010; implement initial mitigation by 2015; incorporate formal methods for review and

update of effects assessment and mitigation plan on a three-year cycle, to respond to changes in operation and to effectiveness of mitigation actions.

Coeur d' Alene Subbasin Objective 1B1*: Quantitatively assess and mitigate operational impacts of Albeni Falls Project on terrestrial resources in the Pend Oreille Subbasin by year 2015; include evaluation of potential mitigation sites and opportunities within the Coeur d' Alene Subbasin.

Objective 1B1*: Conduct an operational loss assessment associated with Albeni Falls Project and identify the suite of impacts to wildlife and wildlife habitat in quantitative terms; begin assessment by year 2005; complete assessment and development of mitigation proposal by year 2008.

Strategy a*: Assure the assessment includes consideration of fluctuation zone, recreational effects to terrestrial resources, BPA transmission lines, connectivity, and erosion.

Columbia River Basin Level Category 2:

In consideration of the primary overarching objectives of the Columbia River Basin 2000 Fish and Wildlife Program, provide: 1) sufficient populations of wildlife for abundant opportunities for Tribal trust and treaty right harvest and for non-Tribal harvest; 2) recovery of wildlife species affected by the development and operation of the hydrosystem that are listed under the Endangered Species Act; and 3) a Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife.

Provincial Priority 3: **Columbia River Basin Level Goal 2**:
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development, including assessment, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring.

Province Level Objective 2A:
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development by protecting, enhancing, restoring, and sustaining populations of wildlife for aesthetic, cultural, ecological, and recreational values. Objective includes assessment of secondary impacts, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring. Because the secondary effects of hydrosystem development are tightly intermingled with the effects of other activities in the province, this objective also incorporates other actions to maintain or enhance populations of federal, state, and Tribal species of special concern, and other native and desirable nonnative wildlife species, within their present and/or historical ranges in order to prevent future declines and restore populations that have suffered declines or been extirpated.

Objective 2A1: To address secondary effects of hydrosystem projects and other development in the Subbasin on wildlife populations, restore and maintain special status species, including state threatened and endangered species, tribal and state species of special concern, federal candidate species, BLM and USFS sensitive species, and USFS indicator species, in accordance with established agency plans and decisions. Include the following target species: wolverine, fisher, otter, northern flying squirrels, northern bog lemmings, pygmy shrew, Townsend's big-eared bat (and other members of the bat guild), common loons, pygmy nuthatch, peregrine falcon, northern goshawk, flammulated owls, boreal owls, great gray owls, northern pygmy owls, three-toed woodpeckers, upland sandpipers, northern alligator lizard, ring-necked snake, rough skinned newts, wood frog and Coeur d' Alene salamanders. [Note: federally listed species addressed under Subbasin Objective 2A2.]
(Second priority)

Strategy a: Protect, restore, enhance, and sustain populations of big game species to support traditional levels of cultural, subsistence, and recreations use through:

- Developing, prioritizing, and implementing projects and/or research to identify additional big game limiting factors by 2010, and
- Monitoring current populations to assess survival, fecundity, sex ratios, and post wintering recruitment.

Target species include black bear, elk, moose, mountain lion, mule deer, and white-tailed deer.

Strategy b: Maintain or enhance neo-tropical migrant bird populations relative to current levels within present use areas and identify limiting factors for these populations within the Subbasin.

Strategy c: Maintain or enhance populations of cavity nesting species relative to current levels within present use areas and identify limiting factors within the Subbasin.

Strategy d: Protect, restore, enhance, and sustain populations of waterfowl, upland game, and furbearers under traditional levels of recreation and subsistence use.

Strategy e: Maintain or enhance amphibian and reptiles populations relative to current levels within present use areas and identify limiting factors within the Subbasin.

Strategy f: Maintain or enhance invertebrate populations relative to current levels within present use areas and identify limiting factors for these populations within the Subbasin.

Objective 2A2: Based on established agency plans and decisions, restore and maintain viable populations of federally-listed wildlife species in the subbasin. (Highest priority)

Strategy a: Maintain bald eagle populations at or above current levels (2004) in the Coeur d' Alene Subbasin by:

- Identifying, mapping, and providing long term protection to current and potential wintering, breeding, perching and foraging habitat within 250 feet of the high water mark of waters within the Coeur d' Alene Subbasin, and
- Continuing and increasing monitoring of nesting and wintering bald eagles.

Strategy b: Review and ensure consistency with existing agency and Tribal management plans.

Objective 2A3*: Identify secondary losses and superimpose Coeur d' Alene aboriginal claims to secondary losses. (Third Priority)

In light of identifying secondary losses, address the following, listed in sequential order:

Strategy a*: Conduct historical and current inventories of wildlife populations to determine current distribution and population status by year 2008.

Strategy b*: Identify limiting factors to wildlife populations due to secondary impacts.

Strategy c*: Mitigate secondary impacts to wildlife populations by protecting, enhancing, restoring and sustaining wildlife populations to support cultural, subsistence, ecological, aesthetic and recreational values.

Province Level Objective 2B:
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development by protecting, enhancing, restoring, and sustaining native wildlife habitat function to maintain or enhance ecological diversity and security for native and desirable nonnative wildlife species. Objective includes assessment of secondary impacts, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring. Because the secondary effects of hydrosystem development are tightly intermingled with the effects of other activities in the province, this objective also incorporates other actions to identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and

shrub-steppe, cliffs and rock outcrops, caves, grasslands, and other priority habitats) including their structural attributes, ecological functions, and distribution and connectivity across the landscape to optimize conditions required to increase overall wildlife productivity of desired species assemblages. Strategies may include land acquisition, conservation easements, management contracts, and/or partnerships with other landowners.

Province Level Objective 2B1: Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels.

Province Level Objective 2B2: Restore the connectivity of habitat types needed to sustain wildlife populations at the landscape level. Encourage and support the implementation of all forest practices, including road building and maintenance, as specified in the Washington Department of Natural Resources and Idaho Department of Lands Forest Practices Rules and Subbasin Forest Plans for all National Forests within the Subbasin.

Objective 2B1*: To address secondary effects of hydrosystem projects and other development in the subbasin on wildlife habitats, identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops) within the Coeur d' Alene Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape. (Fourth priority)

Objective 2B2*: Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels. (Fourth priority)

10.4.1 Prioritization of terrestrial objectives

A detailed discussion of the methods used to prioritize the objectives and strategies is found in Section 1.2. In the Coeur d' Alene Subbasin, the members of the Subbasin Work Team evaluated and ranked the objectives at the fifth and sixth Subbasin Work Team meeting. The team members ranked the strategies as a homework assignment following the sixth meeting.

The final prioritization of the terrestrial objectives for the Coeur d' Alene Subbasin is displayed in Table 10.4-1.

TABLE 10.4-1. Summary of prioritized terrestrial objectives and strategies for Coeur d' Alene Subbasin

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
Provincial Priority 1 – Province Objective 1A: Mitigate for construction and inundation losses		
Coeur d'Alene Objective 1A: Fully mitigate for terrestrial resource losses incurred from construction and inundation of the Albeni Falls Project per the requirements of the Northwest Power Act. Complete the compensation mitigation consistent with the HEP loss assessment (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) and the Albeni Falls Dam Wildlife Mitigation Project Operating Guidelines by year 2015. Meet these requirements in conjunction with the Pend Oreille Subbasin.		Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam.

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
(Highest Priority) **Objective 1A1:** Protect, enhance, or restore bald eagle breeding Habitat Units to address coniferous and deciduous forest and forested wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A3:** Protect, enhance, or restore black-capped chickadee Habitat Units to address deciduous forest habitat losses resulting from construction of Albeni Falls Project. **Objective 1A5:** Protect, enhance, or restore mallard Habitat Units to address floodplain meadow, scrub-shrub, open water, and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A8** Protect, enhance, or restore redhead Habitat Units to address open water and near-shore floating aquatic weed bed habitat losses resulting from construction of Albeni Falls project. **Objective 1A2:** Protect, enhance, or restore bald eagle wintering Habitat Units to address coniferous and deciduous forest habitat losses resulting from construction of Albeni Falls Project. **Objective 1A4:** Protect, enhance, or restore Canada goose Habitat Units to address floodplain meadow, shoreline, open water and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A6:** Protect, enhance, or restore muskrat Habitat Units to address herbaceous wetland and open water habitat losses resulting from construction of Albeni Falls Project. **Objective 1A7:** Protect, enhance, or restore white-tailed deer Habitat Units to address scrub-shrub wetland habitat losses resulting from construction of Albeni Falls Project.	**Strategy a** (for Objectives 1A1-1A8): Protect habitat through fee title acquisition, conservation easements, lease, or management plans. **Strategy b** (for Objectives 1A1-1A8)*: Identify and evaluate sites for potential use in mitigation, including opportunities for enhancement and restoration on federal, state, and tribal lands, and opportunities for cooperative restoration and enhancement efforts with private landowners. In collaboration with the Pend Oreille and Spokane subbasins, identify at least five opportunities for mutually beneficial mitigation efforts within the Coeur d'Alene Subbasin by 2006 and actively seek funding together. **Strategy c** (for Objectives 1A1-1A8): Work to establish connectivity between management units. **Strategy d** (for Objectives 1A1-1A8)*: Develop management plans that restore degraded habitat to meet specific objectives and address road closure, cattle, soil, vegetation enhancement and management of unwanted species, fire and fuels, nonnative wildlife, etc., in accordance with the Albeni Falls Interagency Work Group Operating Guidelines and Guiding Principles for Mitigation Implementation (1998). **Strategy e** (for Objective 1A2 only): Identify, map, and provide long term protection to current and potential bald eagle wintering, perching and foraging habitat within 250 feet of the high water mark of waters within the Coeur d'Alene Subbasin.	Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam.
Objective 1A9 (Second Priority): Maintain wildlife values (Habitat Units) for the life of the project on existing and newly acquired mitigation lands through adequate long-term Operations and Maintenance (O&M) funding.	**Strategy a:** Ensure long-term protection of habitat units through secured funding for Operations and Maintenance.	Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam.
Provincial Priority 2 – Province Objective 1B: Quantify and mitigate for operational impacts		

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
Coeur d'Alene Subbasin Objective 1B: Quantitatively assess and mitigate operational impacts of Albeni Falls Project on terrestrial resources in the Pend Oreille Subbasin by year 2015; include evaluation of potential mitigation sites and opportunities within the Coeur d'Alene Subbasin.		
Objective 1B1*: Conduct an operational loss assessment associated with Albeni Falls Project and identify the suite of impacts to wildlife and wildlife habitat in quantitative terms; begin assessment by year 2005; complete assessment and development of mitigation proposal by year 2008.	**Strategy a***: Assure the assessment includes consideration of fluctuation zone, recreational effects to terrestrial resources, BPA transmission lines, connectivity, and erosion.	Lack of data on operational impacts. Need to mitigate operational impacts
Provincial Priority 3 – Province Objective 2A: Mitigate for secondary effects of FCRPS and other subbasin effects on wildlife populations – Province Objective 2B: Mitigate for secondary effects of FCRPS and other subbasin effects on wildlife habitats		
Objective 2A2 (Highest Priority): Based on established agency plans and decisions, restore and maintain viable populations of federally-listed wildlife species in the Subbasin.	**Strategy a**: Maintain bald eagle populations at or above current levels (2004) in the Coeur d'Alene Subbasin by: • Identifying, mapping, and providing long-term protection to current and potential wintering, breeding, perching and foraging habitat within 250 feet of the high water mark of waters within the Coeur d'Alene Subbasin, and • continuing and increasing monitoring of nesting and wintering bald eagles. **Strategy b**: Review and ensure consistency with existing agency and Tribal management plans. •	Secondary effects of FCRPS and other subbasin effects to federally-listed wildlife species
Objective 2A1 (Second Priority): To address secondary effects of hydrosystem projects and other development in the Subbasin on wildlife populations, restore and maintain special status species, including state threatened and endangered species, tribal and state species of special concern, federal candidate species, BLM and USFS sensitive species, and USFS indicator species, in accordance with established agency plans and decisions.	**Strategy a**: Protect, restore, enhance, and sustain populations of big game species to support traditional levels of cultural, subsistence, and recreations use through: • Developing, prioritizing, and implementing projects and/or research to identify additional big game limiting factors by 2010, and • Monitoring current populations to assess survival, fecundity, sex ratios, and post wintering recruitment. • Target species include black bear, elk, moose, mountain lion, mule deer, and white-tailed deer. **Strategy b**: Maintain or enhance neo-tropical migrant bird populations relative to current levels within present use areas and identify limiting factors for these populations within the subbasin. **Strategy c**: Maintain or enhance populations of cavity nesting species relative to current levels within present use areas and identify limiting factors within the Subbasin. **Strategy d**: Protect, restore, enhance, and sustain populations of	Secondary effects of FCRPS and other subbasin effects to special status species

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
	waterfowl, upland game, and furbearers under traditional levels of recreation and subsistence use. **Strategy e**: Maintain or enhance amphibian and reptiles populations relative to current levels within present use areas and identify limiting factors within the subbasin. **Strategy f**: Maintain or enhance invertebrate populations relative to current levels within present use areas and identify limiting factors for these populations within the Subbasin.	
Objective 2A3 (Third Priority)*: Identify secondary losses and superimpose Coeur d'Alene aboriginal claims to secondary losses.	**Strategy a** *: Conduct historical and current inventories of wildlife populations to determine current distribution and population status by year 2008. **Strategy b** *: Identify limiting factors to wildlife populations due to secondary impacts. **Strategy c** *: Mitigate secondary impacts to wildlife populations by protecting, enhancing, restoring and sustaining wildlife populations to support cultural, subsistence, ecological, aesthetic and recreational values.	Lack of information, Tribal losses
Objective 2B1 (Fourth Priority): Identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops) within the Coeur d'Alene Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape.	(no strategies identified)	Secondary effects of FCRPS and other subbasin effects on priority habitats
Objective 2B2 (Fourth Priority): Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels.	(no strategies identified)	Secondary effects of FCRPS and other subbasin effects on wildlife habitats

*Objectives and strategies also included in the research, monitoring, and evaluation plan.

10.4.2 Discussion of terrestrial prioritization

The prioritization of the terrestrial objectives is directly linked to the priorities established in the Council's 2000 Fish and Wildlife Program. Participants of the Work Team agreed that the highest priority in the Subbasin is the completion of habitat acquisition required under the Program for construction and inundation effects. Because the loss of habitat due to construction of the Albeni Falls project was substantial and the losses have been in effect for many decades, the Work Team ranked the construction mitigation as the highest priority. Therefore, the eight objectives under Province and Subbasin Objective 1A are the highest priority.

The second priority is to conduct an assessment of operational effects, and to develop and implement mitigation for those effects. Finally, the secondary effects of the FCRPS and effects of other actions in the Subbasin that have affected wildlife and wildlife habitats should be pursued.

Prioritization of strategies focused on those strategies that identify and secure habitat to be protected and enhanced for wildlife.

10.5 Appendix – Recovery Goals, Objectives and Criteria from the Draft Bull Trout Recovery Plan

The following information is taken from the USFWS (2002) Draft Bull Trout Recovery Plan. The entire Coeur d' Alene chapter of the draft recovery plan (including objectives and strategies) can be viewed at:
http://pacific.fws.gov/bulltrout/recovery/Chapter_15.htm.

Objective 1C1 of this Subbasin plan says, "Pursue the objectives in the U.S Fish and Wildlife Service Bull Trout Recovery Plan. If the draft recovery plan objectives should change in the future, this subbasin plan should be adjusted accordingly." The Draft Recovery Plan objectives are as follows:

Recovery Goals and Objectives

The goal of the Bull Trout Recovery Plan is to ensure the long-term persistence of self-sustaining, complex interacting groups of bull trout distributed throughout the species' native range, so that the species can be de-listed. To achieve this goal, the following objectives have been identified for the Coeur d' Alene Recovery Unit:

- Maintain current distribution of bull trout and restore distribution in previously occupied or depressed areas within the Coeur d' Alene Recovery Unit.
- Maintain stable or increasing trends in bull trout abundance.
- Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.
- Conserve genetic diversity and provide opportunity for genetic exchange.

Recovery Criteria

Recovery criteria for bull trout in the Coeur d' Alene Recovery Unit are the following:

1. Distribution criteria will be met when the total number of stable local populations has been increased to 11 and these populations are broadly distributed throughout the core area.

Within the core area, population levels of migratory bull trout representing a recovered status have been established for two subbasins: the St. Joe River and Coeur d' Alene River subbasins. Subbasins were developed to ensure that recovered local populations are well distributed within the Coeur d' Alene Recovery Unit and to improve management efficiency within each subbasin and throughout the Coeur d' Alene Recovery Unit. Annual adult spawner levels for each subunit and for each local population within the subunits will be based on trend data using contemporary monitoring standards and will be based on at least 10 years of monitoring data.

The subunits are as follows:

- St. Joe River: Consisting of at least 8 local populations contributing to a total of an average of 800 annual adult spawners.
    - However, within this subunit, 5 local populations with an average of 500 annual adult spawners will occur above and/or in Red Ives Creek, and 3 local populations with an average of 300 annual adult spawners will occur from Red Ives Creek downstream to Big Creek.
- Coeur d' Alene River (North Fork Coeur d' Alene River drainage):
    - Consisting of at least 3 local populations contributing to an average of 300 annual adult spawners.

2. Trend criteria will be met when the overall bull trout population in the Coeur d' Alene Recovery Unit is accepted, under contemporary standards of the time, as stable or increasing, based on at least 10 years of monitoring data.

3. Abundance criteria will be met when the core area hosts at least 11 stable local populations (a minimum of 8 in the St. Joe River subbasin and 3 in the North Fork Coeur d' Alene River watershed), contributing to an average of 1,100 adult spawners per year.

4. Connectivity criteria will be met when migratory forms are present in all local populations and when intact migratory corridors among all local populations in the core area provide opportunity for genetic exchange and diversity.

Recovery criteria for the Coeur d' Alene Recovery Unit were established to assess whether recovery actions are resulting in the recovery of bull trout. The Coeur d' Alene Recovery Unit Team expects that the recovery process will be dynamic and will be defined as more information becomes available. While removal of bull trout as a listed species under the Endangered Species Act (delisting) can only occur for the entity that was listed (Columbia River distinct population segment), the criteria listed above will be used to determine when the Coeur d' Alene Recovery Unit is fully contributing to recovery of the population segment.

SECTION 11 – Table of Contents

11 Coeur d' Alene Subbasin Research, Monitoring and Evaluation Plan

In light of the various ongoing efforts to develop a regional monitoring plan, subbasin planners in the Intermountain Province (IMP) chose to develop a monitoring plan based on existing monitoring methods described in the scientific literature. The IMP approach to the Research, Monitoring and Evaluation (RM&E) is as follows:

- Research is handled separately from the M&E design. A wish list of research needs is identified based on the biological objectives, strategies and critical uncertainties identified in the subbasin management plans and subbasin assessments. Many of the subbasin work teams developed preliminary research needs lists. Although there is an extensive "wish list" of research questions in the IMP, the limitations of available funding made it important to prioritize the research questions into two categories: "need to know" and "would like to know."

- For the M&E component, planners in the IMP developed a framework to link specific objectives and strategies identified in the IMP subbasin management plans to a suite of M&E protocols and existing programs (an M&E "tool box"). To do this a subcommittee of the OC identified a broad list of existing M&E protocols and existing M&E programs which represent: peer reviewed, scientifically validated approaches to M&E; are appropriate to range of geographic scales; and, include the range of the Independent Science Review Panel's (ISRP) three tiers of RM&E. Specific M&E objectives and strategies from each of the subbasin management plans, and from the province level, were then linked in Table 11.1 to:

    - The type of generic approach to addressing limiting factors that is addressed by the strategy or objective (same list used to categorize the inventory of projects)
    - The type of M&E protocol that would be most appropriate
    - Which ISRP M&E tier level of RM&E would be appropriate
    - Which of the "tool box" tools would be used.

The complete tool box bibliography is found in Appendix I. More detailed information on the process for developing the RM&E plan is found in Section 2.

Table 11.1. Research, monitoring, and evaluation plan for the Coeur d' Alene Subbasin

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Columbia River Basin Level Category 1: Mitigate for resident fish losses.					
Columbia River Basin Level Goal 1A: Complete **assessments of resident fish losses** throughout the basin resulting from the hydrosystem, expressed in terms of the various critical population characteristics of key resident fish species.					
Province Level Objective 1A: Fully mitigate fish losses related to construction and operation of federally licensed and federally operated hydropower projects as it relates to the Coeur d' Alene Subbasin.					
Coeur d' Alene Subbasin Objective 1A1: Fully quantify lost fish resources and opportunities historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015.					
Strategy a: Conduct comprehensive loss assessment. This could be done in the following steps: Determine free flowing river reaches flooded by projects. Determine impact from footprint of dam on river channel and fish habitat. Determine former habitat from aerial photos. Determine historic fish use by looking at use in existing habitat of similar type. Link fish population to lost habitat	1, 2, 5	Physical habitat measurements at stratified randomly selected sites. Population estimates and trap counts of native and nonnative salmonids.	1	1, 2	47
Strategy b: Quantify cultural value by interviewing Tribal elders and looking in historic records.		Personal interviews, review historical documents		2, 3	
Coeur d' Alene Subbasin Objective 1A2: Mitigate impacts of Albeni Falls Dam on resident fish by off-site/in-kind opportunities in the Coeur d' Alene Subbasin.				1, 2, 3	
Strategy a: Define the impact of water management above the Post Falls dam and how fish populations have changed as a result of changes in water management.	1, 2, 4, 10	Population estimates and trap counts of native and nonnative salmonids.	1	1, 2	47

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Strategy b: Develop mitigation treatments to address these impacts to be implemented as off-site/in-kind opportunities.	1, 2, 4, 5, 6, 7, 9, 10			1, 2	
Strategy c: Ensure mitigation and maintenance of fisheries for the life of the project through adequate long-term Operations and Maintenance (O&M) funding.	8			1, 2, 3	
Columbia River Basin Level Goal 1B: Maintain and restore **healthy ecosystems and watersheds**, which preserve functional links among ecosystem elements to ensure the continued persistence, health and diversity of all species including game fish species, non-game fish species, and other organisms. Protect and expand habitat and ecosystem functions as the means to significantly increase the abundance, productivity, and life history diversity of resident fish at least to the extent that they have been affected by the development and operation of the hydrosystem.					
Province Level Objective 1B: Protect and restore instream and riparian habitat to maintain functional ecosystems for resident fish, including addressing the chemical, biological, and physical factors influencing aquatic productivity.					
Coeur d' Alene Subbasin Objective 1B: Fully quantify lost fish habitat historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015.	1, 2, 4, 5, 6, 7, 10	Physical habitat measurements at stratified randomly selected sites. Population estimates and trap counts of native and nonnative salmonids	1	1, 2	47
Coeur d' Alene Subbasin Objective 1B1: Mitigate impacts of Albeni Falls Dam on resident fish by off-site/in-kind opportunities in the Coeur d' Alene Subbasin.					

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Strategy a: Review existing habitat data and complete habitat assessments, including pool, riffle, run, channel stability, etc., for native resident fish species within the Coeur d' Alene Subbasin by 2015.	1	Physical habitat measurements at stratified randomly selected sites. Population estimates and trap counts of native and nonnative salmonids	1	1, 2	47
Strategy b: Complete water quality assessments (to include temperature, DO, water chemistry, etc.) and comprehensive watershed assessments in key watersheds to define the existing condition, why it's that way, and how to fix problem areas.	1	Water quality sampling, physical habitat measurements and GIS analysis of road density and land use.	1	1, 2	47
Strategy c: Identify opportunities on federal, state, and Tribal lands for protection of existing habitats.	1, 2, 8	Habitat Protection Plan. Prioritization based on limiting factors analysis		1, 2	48
Strategy d: Identify opportunities for cooperative habitat protection efforts with private landowners and conduct an outreach program to make landowners aware of opportunities.	1, 2, 8	Same as above		1, 2	48
Strategy e: Based on priorities cited in watershed assessments and other processes, secure management control on those identified lands through strategies such as conservation easements, land acquisition, land exchanges, etc.	1, 2, 8	Same as above		1, 2	48
Strategy f: Work with land management agencies to protect existing roadless areas and maintain existing roads.	8			2	
Strategy g: Enforce existing EPA guidelines for timber harvest in riparian areas.	8			2	
Strategy h: Inventory and ground truth all potential fish passage barriers in the Coeur d' Alene Subbasin by 2010; prioritize by determining the amount of usable fish habitat above barriers and determine if barrier is important in isolating a pure strain of native species before identifying it for removal.	1, 2, 4, 8	Survey	1	2	

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Strategy i: Have each land management agency and large private landowner identify known culverts in their ownership and identify potential barriers by gradient and/or size of culvert installed.	8	Survey	1	2	
Strategy j: Where appropriate, remove passage barriers and improve passage impediments, with a goal of correcting 10% of barriers per year with full implementation by 2020.	1, 2, 4, 8				
Strategy k: Consult hydrologists to address downstream impacts to fish habitat from fine sediment and bedload gravel movement.	1, 2, 8			1, 2	
Coeur d' Alene Subbasin Objective 1B2: Complete TMDL Subbasin Assessments, pollutant reduction allocations, and Implementation Plans for impaired water bodies by 2010 and carry out actions identified in TMDL Implementation Plans within 10 years of adoption to restore aquatic life beneficial uses.	1, 2, 5, 6, 8, 10	Water quality sampling, TMDL.	1	1, 2	
Strategy a: Monitor progress toward completion of TMDL assessments.	1, 2, 5, 6, 8, 10	Same as above	1	1, 2	
Strategy b: Integrate DEQ, Tribe and EPA strategies to implement Clean Water Act.	8	Same as above	1	1, 2	
Strategy c: Implement TMDL plans to restore native fish.	1, 2, 8	Population estimates and trap counts of native and nonnative salmonids	1	1, 2	47
Columbia River Basin Level Goal 1C: Restore **resident fish** species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be feasibly restored.					
Province Level Objective 1C: Meet and exceed the recovery plan goals for federally listed **threatened and endangered fish species**.					

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Coeur d' Alene Subbasin Objective 1C: In the Coeur d' Alene Subbasin, mitigate for impacts to resident fish historically used by the Coeur d' Alene Tribe by meeting the recovery plan goals for federally-listed threatened and endangered fish species to provide an annual harvestable surplus.	2, 8	Population estimates and trap counts of native and nonnative salmonids	1	1, 2	47
Coeur d' Alene Subbasin Objective 1C1: Pursue the objectives in the U.S Fish and Wildlife Service Bull Trout Recovery Plan. The goal of the bull trout recovery plan is to **ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed throughout the species' native range, so that the species can be de-listed.** The current draft goals and objectives for the Coeur d' Alene Recovery Unit (USFWS, 2003) are listed in Appendix A. If these objectives should change in the future, the subbasin plan should be adjusted accordingly.	8			1, 2, 3	USFWS Bull Trout Recovery Plan: Coeur d' Alene Lake Basin
Coeur d' Alene Subbasin Objective 1C2: Protect and restore native, locally adapted, reproducing bull trout that will support an annual harvestable surplus of bull trout in the Coeur d' Alene Subbasin by 2020.					
Strategy a: Implement USFWS Bull Trout Recovery Plan.	1, 2, 5, 6, 7, 8, 9, 10		1	1, 2	USFWS Bull Trout Recovery Plan: Coeur d' Alene Lake Basin. : 47, 48
Strategy b: Protect existing roadless areas in the upper St. Joe.	8	GIS analysis	1	1, 2	USFS GIS road database
Strategy c: Fund watershed improvement projects in National Forest area in the Coeur d' Alene drainage (e.g., road obliteration, channel restoration, watershed hydrological restoration, culvert removal).					
Strategy d: Do formal genetic analyses of existing populations and determine the appropriateness/usefulness of infusing other genes from other populations.	2, 8	Random selected sites for fin-clip collection	1	2	50

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Columbia River Basin Level Category 2: Substitute for anadromous fish losses					
Columbia River Basin Level Goal 2A: Restore **resident fish** species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be feasibly restored.					
Province Level Objectives 2A:					
a: Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks.					
b: Maintain and enhance self-sustaining, wild populations of native game fish, and subsistence species, to provide for harvestable surplus.					
c: Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks.					
d: Increase cooperation and coordination among stakeholders throughout the province.					
Coeur d' Alene Subbasin Objective 2A:					
a. Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the Coeur d' Alene Subbasin with primary emphasis on sensitive, native salmonid stocks.	1 through 10		1, 2	1, 2	47, 48, 49
b. Maintain and enhance self-sustaining, wild populations of native game fish to provide for harvestable surplus in the Coeur d' Alene Subbasin.	1 through 10		1, 2	1, 2	

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
c. Minimize negative impacts (e.g., competition, predation, introgression) to native species and nonnative species and stocks in the Coeur d' Alene Subbasin.				1, 2	USFWS Bull Trout Recovery Plan, IDFG Management Plan, Coeur d' Alene Lake Basin. : 47, 48
d. Increase cooperation and coordination among stakeholders throughout the Coeur d' Alene Subbasin.	8			2	
Coeur d' Alene Subbasin Objective 2A1: Protect and restore native, locally adapted, naturally reproducing bull trout to a level that will support annual harvest in the Coeur d' Alene Subbasin by 2020.					
Strategy a: Apply strategies that are consistent with the Bull Trout Recover Plan.	1, 2, 5, 6, 7, 8, 9, 10		1, 2	1, 2	USFWS Bull Trout Recovery Plan, IDFG Management Plan, Coeur d' Alene Lake Basin. : 47, 48
Coeur d' Alene Subbasin Objective 2A2: By 2015, protect and restore remaining stocks of native resident westslope cutthroat trout to ensure their continued existence in the basin and to provide catch rates of over 1.0 fish per hour in the St. Joe, Coeur d' Alene, and St. Maries rivers; an annual catch of over 1,000 fish in Coeur d' Alene Lake; and harvestable surpluses of naturally reproducing adfluvial adult fish from Lake, Benewah, Evans, and Alder Creeks and other populations well-distributed in tributaries throughout the basin.					
Strategy a: Improve riparian conditions; increase channel stability.	1, 2, 5, 6	Physical habitat measurements at stratified randomly selected sites.	1, 2, 3	1, 2	Vitale et al. 2003
Strategy b: Increase habitat diversity.	Same as above	Same as above	1, 2, 3	1, 2	47
Strategy c: Reduce fine sediment.			1, 2, 3	1, 2	47

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Strategy d: Increase flows where appropriate.			1, 2, 3	1, 2	47
Strategy e: Reduce stream temperatures.			1, 2, 3	1, 2	47
Strategy f: Decrease pollutants.					
Strategy g: Remove passage obstructions.					
Strategy h: Evaluate native resident fish distribution and abundance and assess need for conservation aquaculture facilities to assist with enhancing or reestablishing healthy, self-sustaining native fish populations for reproduction, recreation, and subsistence by year 2010.	1, 2, 8, 10	Population estimates and trap counts of native and nonnative salmonids	2		USFWS Bull Trout Recovery Plan, IDFG Management Plan, Coeur d' Alene Lake Basin. : 47
Columbia River Basin Level Goal 2B: Provide sufficient populations of fish and wildlife for abundant opportunities for tribal trust and treaty right harvest and for non-tribal harvest.					
Province Level Objective 2B: Focus restoration efforts on habitats and ecosystem conditions and functions that will allow for expanding and maintaining a diversity within, and among, species in order to sustain a system of robust populations in the face of environmental variation.					
Coeur d' Alene Subbasin Objective 2B: Until anadromous fisheries are restored within their historic range to the Coeur d' Alene Tribe, mitigate and compensate for salmon and steelhead in the Upper Columbia River using a multiple resource approach. Within the Coeur d' Alene Subbasin, focus restoration efforts on habitats and ecosystem conditions and functions that will allow for expanding and maintaining a diversity within, and among, species in order to sustain a system of robust populations of fish and wildlife in the face of environmental variation and provide for subsistence species of wildlife and fish.	8				

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Coeur d' Alene Subbasin Objective 2B1: Protect, restore, and enhance existing aquatic and terrestrial resources in order to meet the increased demands (i.e., cultural, subsistence, and recreation) on these resources associated with the extirpation of anadromous fisheries.	8				
Strategy a: Where possible, acquire management rights to priority properties that can be protected, restored or enhanced to support native ecosystem/watershed function through title acquisition, conservation easements, and/or long term leases in perpetuity.	1, 2, 8	Habitat Protection Plan. Prioritization based on limiting factors analysis		1, 2	48
Strategy b: Where management rights are acquired, identify the current condition and biological potential of the habitat, and then protect or restore and enhance those properties to the extent that their condition is consistent with the Biological Objectives of the 2000 Fish and Wildlife Program. (2000 Program; Basinwide Provisions; D. Strategies; 3. Habitat Strategies; Primary Strategy).	1, 2, 8	Same as above		1, 2	48
Strategy c: Create or use existing incentives and outreach programs for private landowners to protect and/or restore habitats to support native ecosystem/watershed functions.	1, 2, 8	Habitat Protection Plan. Prioritization based on limiting factors analysis		1, 2	48
Columbia River Basin Level Goal 2C: Administer and increase opportunities for **consumptive and non-consumptive resident fisheries** for native, introduced, wild, and hatchery reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near historic abundance (includes intensive fisheries within closed or isolated systems).					
Province Level Objectives 2C:					
a: Artificially produce sufficient salmonids to supplement consistent harvest to meet management objectives.					

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
b: Provide both short and long-term harvest opportunities that support both subsistence activities and sport-angler harvest.					
Coeur d' Alene Subbasin Objective 2C: As the highest priority, protect, restore, and enhance existing aquatic resources in order to meet the increased demands (i.e., cultural, subsistence, and recreational) on these resources associated with the extirpation of traditional anadromous fisheries from previously occupied areas of the Upper Columbia River basin. Provide both short and long-term harvest opportunities that support Tribal subsistence activities and sport angler harvest until self-sustaining populations of wild fish are present.				2	Coeur d' Alene Tribe Trout Production Facility Master Plan. : 47
Coeur d' Alene Subbasin Objective 2C1: Establish put-and-take fisheries for westslope cutthroat trout in waters that currently do not, or likely will not, support native cutthroat trout populations by 2010.				2	51
Strategy a: Construct a total of 5 ponds in the Coeur d' Alene Watershed to function as put-and-take trout fisheries by 2012.				2	51
Strategy b: Identify locally adapted westslope cutthroat to provide put and take fish in streams that currently don't support native fish.				2	51
Strategy c: Supplement pond and streams with sufficient numbers of fish to meet subsistence and harvest goals.				2	51
Coeur d' Alene Subbasin Objective 2C2: Reduce pressure on native resident fish populations by maintaining fisheries for introduced species at an annual harvest of greater than 500,000 kokanee, greater than 5,000 Chinook salmon, greater than 20,000 rainbow trout in Tribal catch-out ponds, and average catch rates of greater than 0.5 fish/hour for largemouth bass.				2	51

AQUATIC					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box-tool[5]**
Strategy a: Increase hatchery capabilities to produce sufficient quantities and quality of gamefish for harvest and subsistence oriented fisheries by year 2015.				2	51
Strategy b: Manage angler harvest through fishing regulations to achieve harvest and catch rate goals.				2	51
Columbia River Basin Level Goal 2D: Reintroduce anadromous fish into blocked areas.					
Province Level Objectives 2C:					
a: Develop an anadromous fish re-introduction feasibility analysis by 2006 for Chief Joseph Dam and by 2015 for Grand Coulee Dam.					
b: Develop an implementation plan within 5 years of feasibility determination for each facility.					
Note: The Coeur d' Alene Subbasin is upstream of the natural range of anadromous salmon and so, at this time, does not have objectives or strategies related to anadromous salmon re-introduction.					

[1] ***Strategy types***:

1 Habitat Assessments
2 Population Assessments
3 Instream Diversion
4 Instream Passage
5 Instream Habitat
6 Riparian Habitat
7 Upland Habitat
8 Education/Coordination
9 Population Management
10 Reservoir Operations

[2] ***Monitoring Protocol e.g. type of monitoring protocol [note: the specific reference to detailed monitoring protocol is identified in the "tool box"]):***

- TMDL
- Survey

- Survey and mapping
- HEP
- P/A and trend surveys
- All habitat

[3] ***ISRP Tier Level:***

1) Tier 1: trend or routine monitoring
2) Tier 2: statistical (status) monitoring
3) Tier 3: experimental research (effectiveness) monitoring

[4] ***Scale of Monitoring and Evaluation:***

1) Project
2) Subbasin
3) Province
4) Columbia Basin

[5] **Tool Box Tool**

The Tool Box is found in Appendix I.

TERRESTRIAL					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box Tool[5]**
Develop management plans that restore degraded habitat to meet specific objectives and address road closure, cattle, soil, vegetation enhancement and management of unwanted species, fire and fuels, nonnative wildlife, etc.	6	?	2	1	
Identify and evaluate sites for potential use in mitigation.	1	?	1	1 and 2	
Identify opportunities for enhancement and restoration on federal, state, and Tribal lands.	1	?	1	1 and 2	
Identify opportunities for cooperative restoration and enhancement efforts with private landowners.	1	?	1	1 and 2	
Quantify the operational effects of federal hydrosystem projects on terrestrial resources, develop mitigation plan in coordination with other resource mitigation and resource planning efforts, and implement projects to mitigate the impacts, including maintenance and monitoring.	1 and 6 and 7 and 10	HEP	1 and 2	1 and 2	32,33,34
Quantitatively assess and mitigate operational impacts of the Chief Joseph Dam, Grand Coulee Dam, and Albeni Falls projects per the requirements of the Northwest Power Act and the current Wildlife Mitigation Program. Complete assessment of operational impacts by 2008; develop mitigation plan by 2010; implement initial mitigation by 2015; incorporate formal methods for review and update of effects assessment and mitigation plan on a three-year cycle to respond to changes in operation and to effectiveness of mitigation actions.	1 and 10	HEP	1 and 2	1 and 2	32,33,34
Quantitatively assess and mitigate operational impacts of Albeni Falls Project on terrestrial resources in the Pend Oreille Subbasin by year 2015 including opportunities where the Coeur d' Alene Subbasin might be able to assist with mitigation efforts.	1 and 10	HEP	1 and 2	1 and 2	30,31,32,33,34

TERRESTRIAL					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box Tool[5]**
Conduct an operational loss assessment associated with Albeni Falls Project and identify the suite of impacts to wildlife and wildlife habitat in quantitative terms; begin assessment by year 2005.	1 and 10	HEP +	1 and 2	1 and 2	30,31,32,33,34
Have a third party impartial contractor conduct the assessment and consider fluctuation zone, loss of nutrients in watershed from loss of salmon, identify recreational effects to terrestrial resources, BPA transmission lines, connectivity, and erosion.	2, 5, 6, and 7		1 and 2	2 and 3	
Complete the assessment of operational effects and development of mitigation proposal by year 2008.	1 and 10	HEP+	1 and 2	1 and 2	32,33,34
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development, including assessment, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring.	1, 2, 6, 7, and 8	HEP+	1 and 2	1 and 2	32,33,34
Identify secondary losses and superimpose Coeur d' Alene aboriginal claims to secondary losses.	1 and 2	HEP+	1 and 2	2 and 3	32,33,34
Conduct inventory to determine current distribution and population status of species/guild.	2	Presence/Absence and trend surveys	1 and 2	2 and 3	
Identify limiting factors for species/guilds.	1 and 2		2 and 3	2, 3, and 4	
Develop and implement mitigation to address limiting factors for species/guilds.	1 and 2		1 and 2	1,2, and 3	
Continue and increase monitoring of nesting and wintering bald eagles.	2	Survey	1	2 and 3	30
Monitor current populations to assess survival, fecundity, sex ratios, and post wintering recruitment.	2	?	2 and 3	2 and 3	

TERRESTRIAL					
Strategy & Objective	**Strategy Type[1]**	**Monitoring Type[2]**	**Tier[3]**	**Scale[4]**	**Tool Box Tool[5]**
Identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops) within the Coeur d' Alene Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape.	1	HEP+	1 and 2	2 and 3	32,33,34
Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels.	1, 5, 6, and 7	?	2 and 3	2 and 3	
Identify specific factors limiting/affecting mule deer populations in the Coeur d' Alene Subbasin.	1 and 2	?	2 and 3	2 and 3	

[1] ***Strategy types:***

1) Habitat Assessments
2) Population Assessments
3) Instream Diversion
4) Instream Passage
5) Instream Habitat
6) Riparian Habitat
7) Upland Habitat
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10) Reservoir Operations

[2] ***Monitoring Protocol e.g. type of monitoring protocol [note: the specific reference to detailed monitoring protocol is identified in the "tool box"]):***

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[4]***Scale of Monitoring and Evaluation:***

1) Project
2) Subbasin
3) Province
4) Columbia Basin

[5] ***Tool Box Tool***

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SECTION – 12 Coeur d'Alene Subbasin Tables and Figures

Tables and figures are embedded within the text for sections 5 through 11.