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).

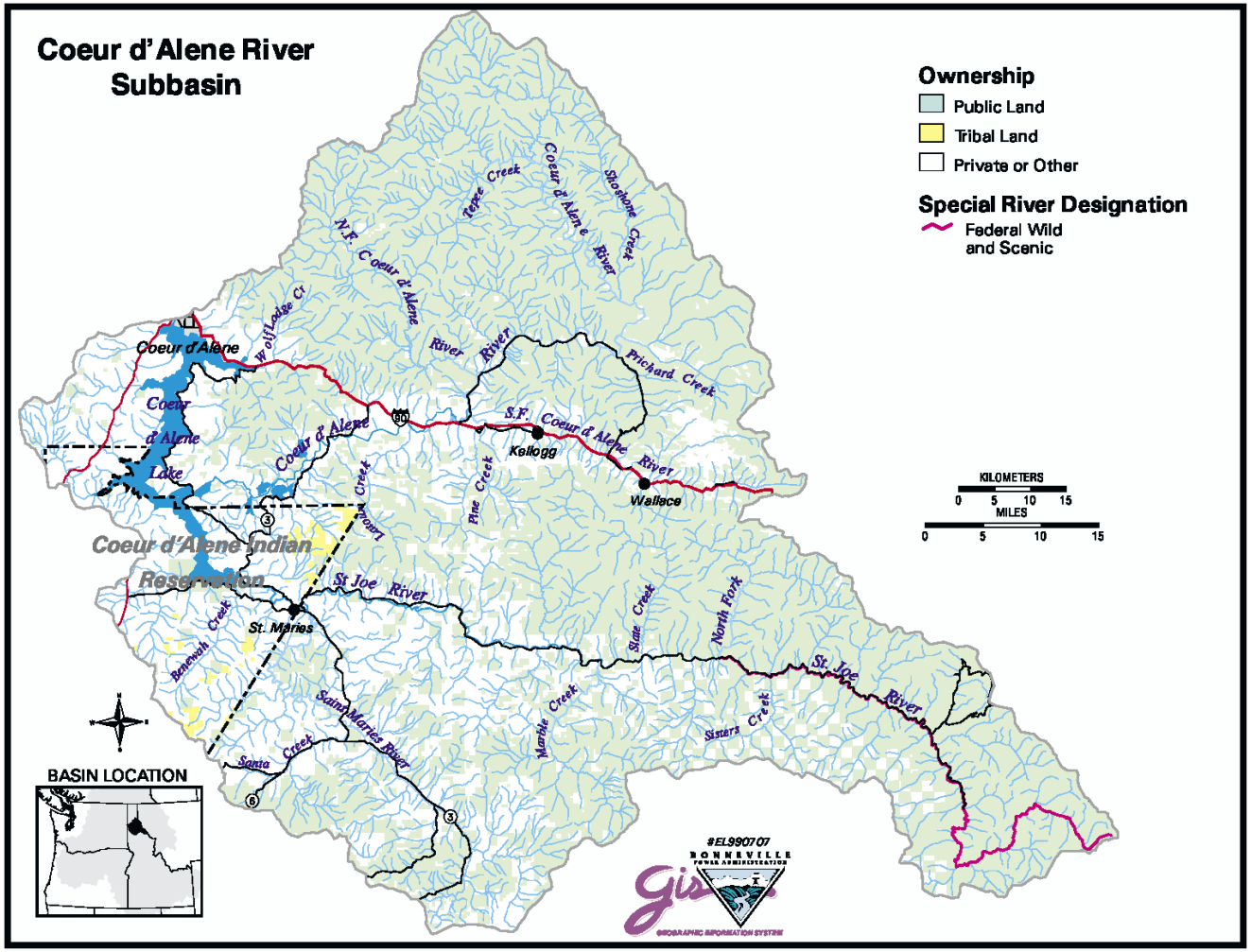

Figure 5.1. Location of the Coeur d' Alene Subbasin within the Columbia River Basin (Available: http://www.cbfwa.org/files/province/mtncol/geography.htm)

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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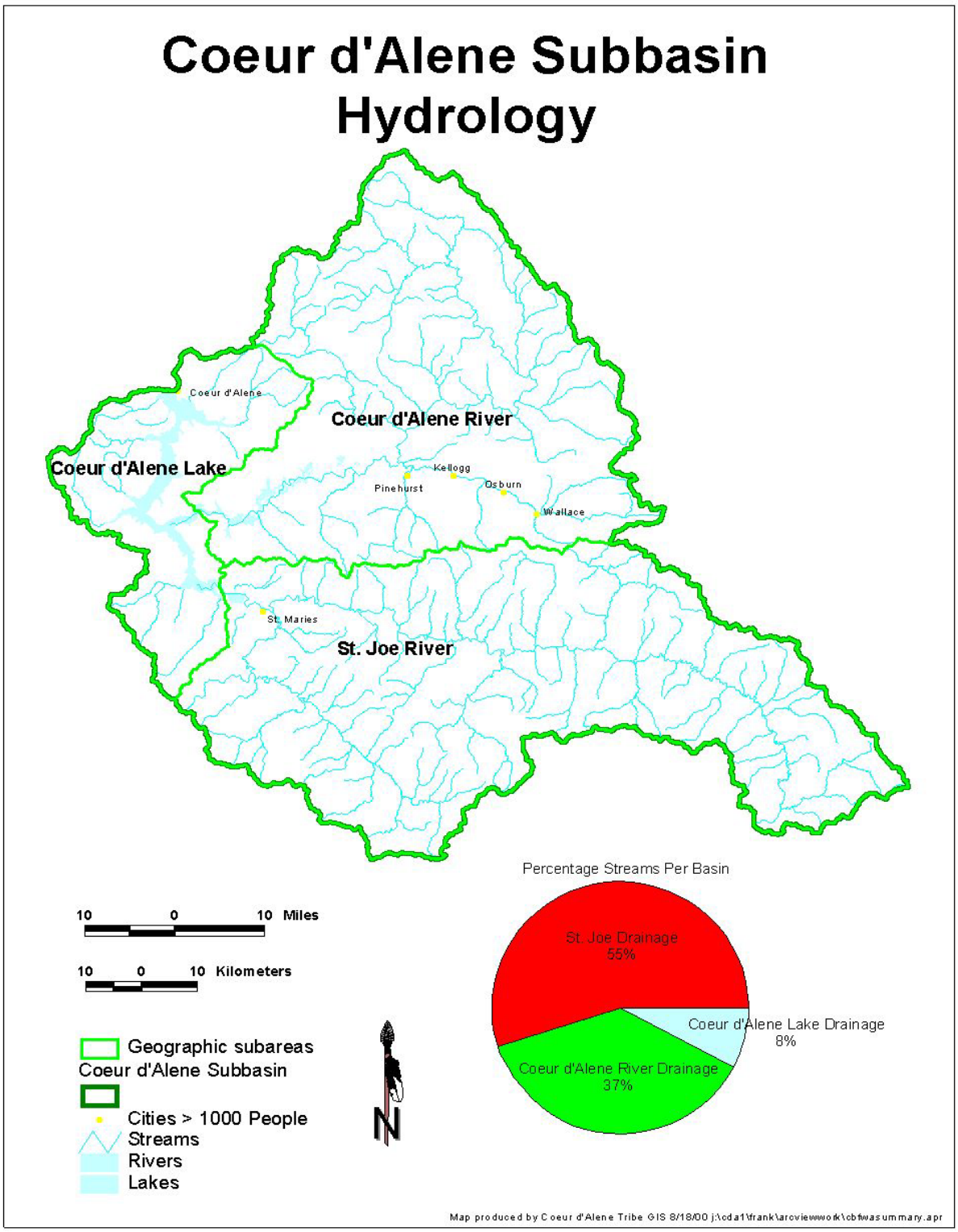

Figure 5.2. The three main geographic areas (drainages) within the Coeur d' Alene Subbasin and the percentage of streams within each geographic area

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).

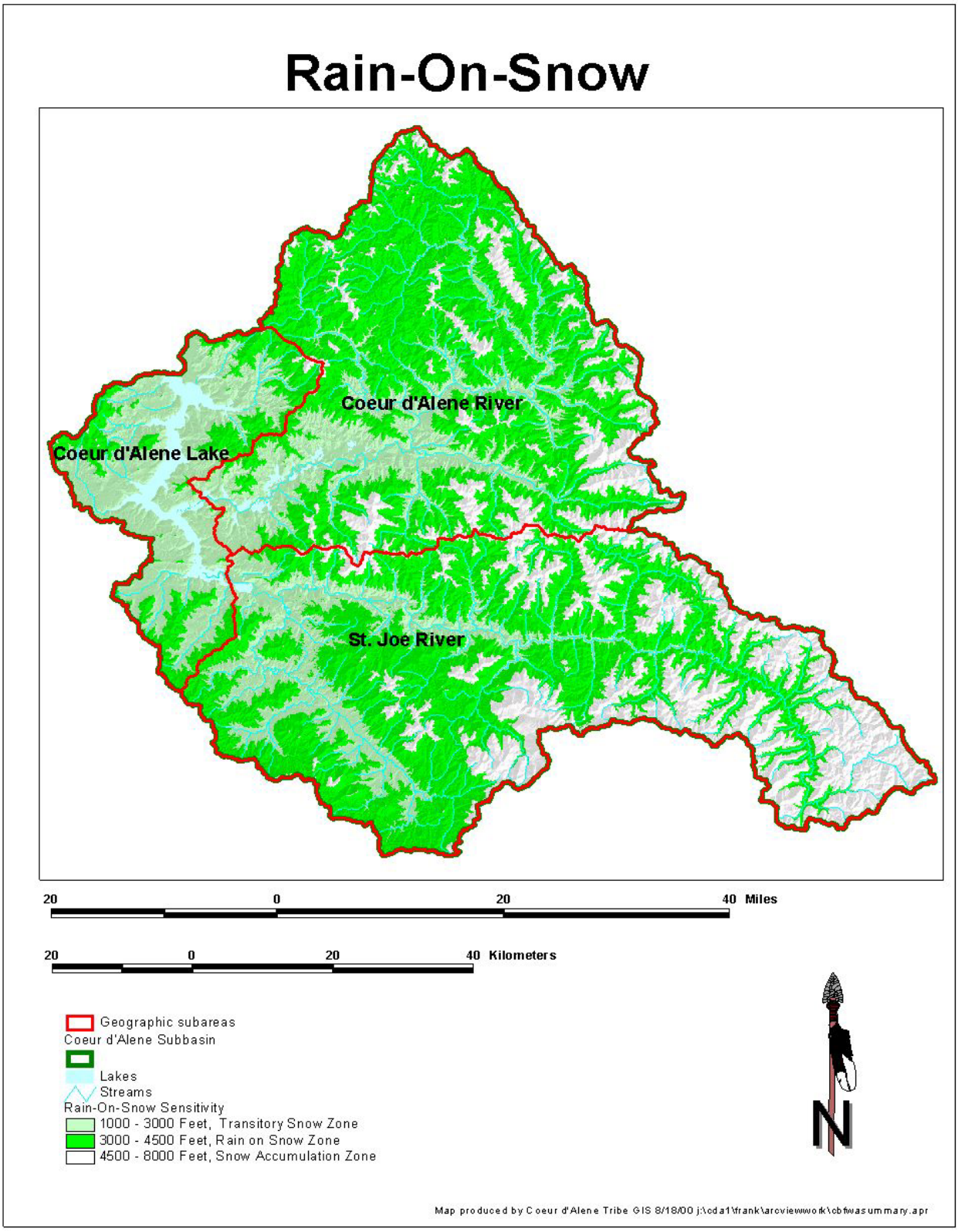

Figure 5.3. Coeur d' Alene Subbasin rain-on-snow sensitivity based on elevation

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).

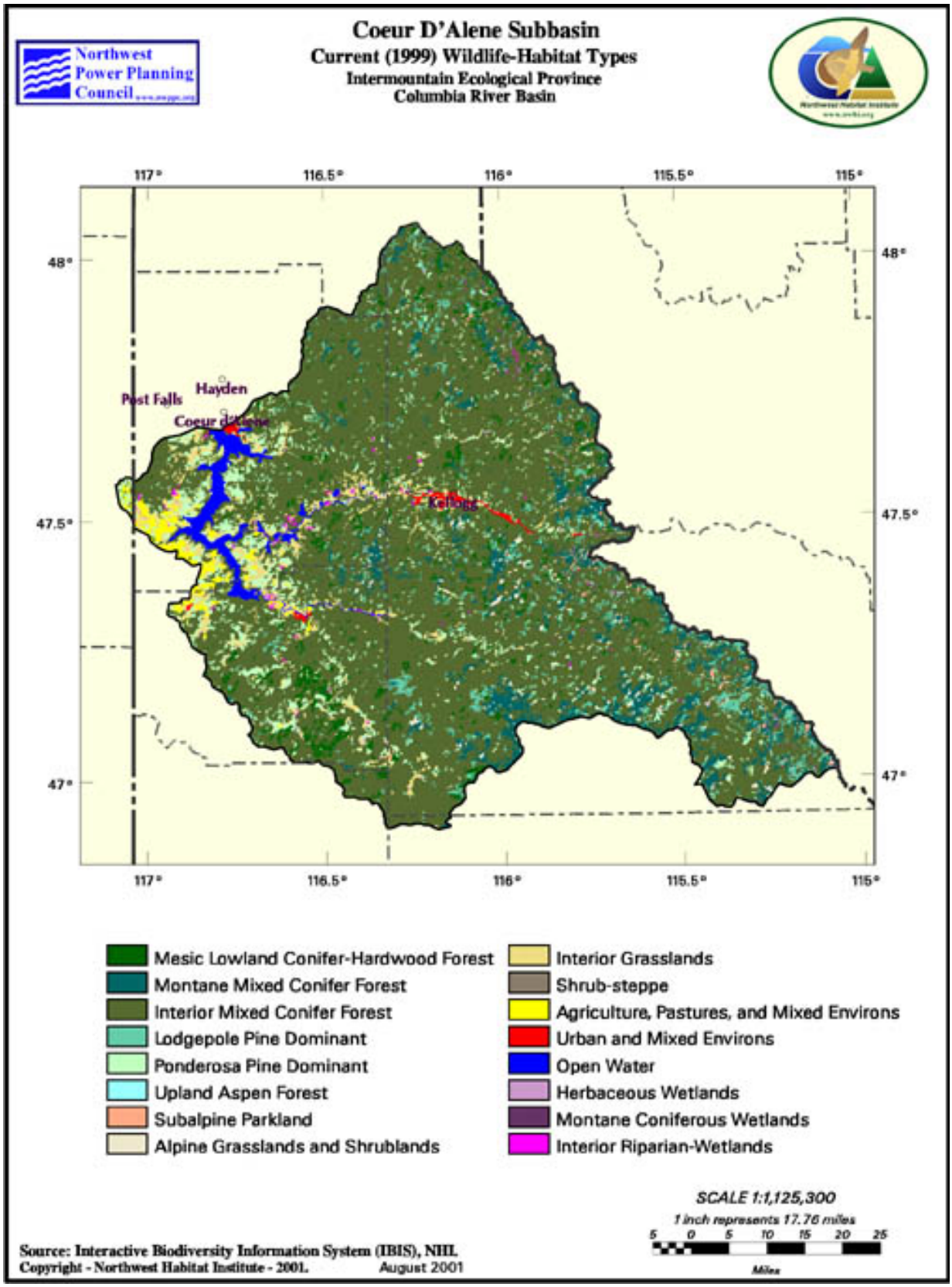

Figure 5.4. Current habitat types present within the Coeur d'Alene Subbasin

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.

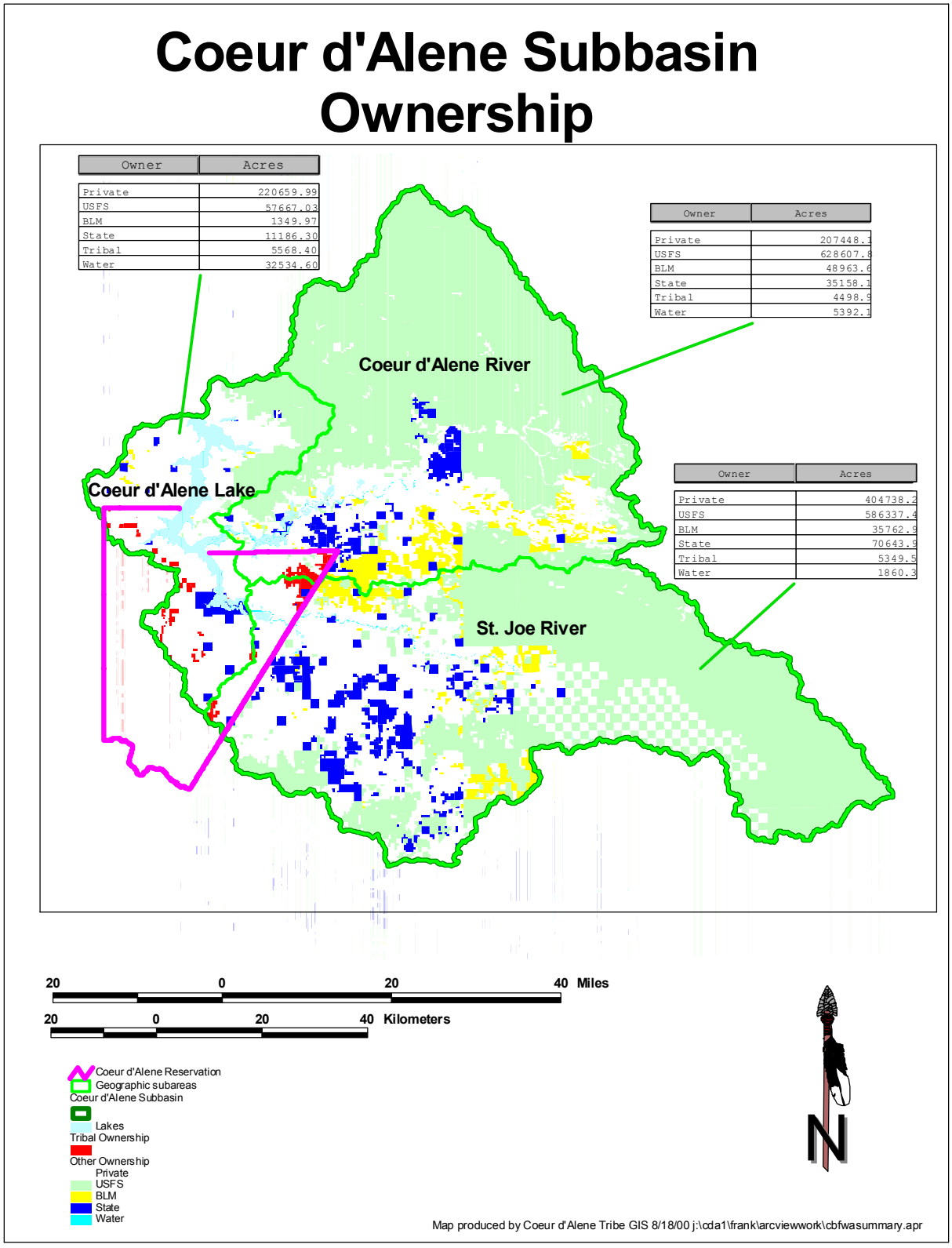

Figure 5.5 Land ownership within the Coeur d' Alene Subbasin

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.

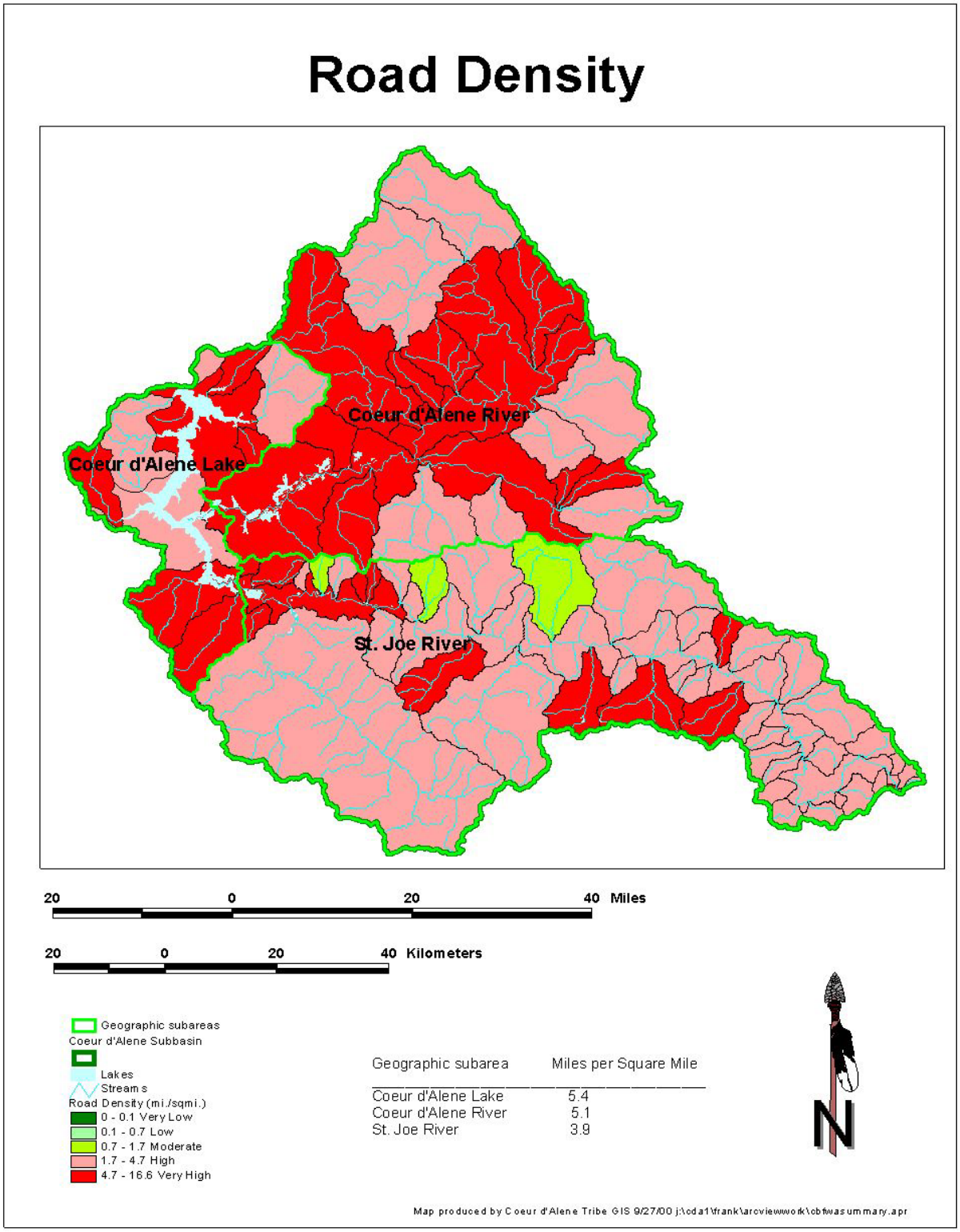

Figure 5.6. Road density within the Coeur d' Alene Subbasin
(*Source*: CDA Tribe 2000)

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.