

Draft

# Spokane River Subbasin Summary

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# Spokane River Subbasin Summary

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# Spokane River Subbasin Summary

## Fish and Wildlife Resources

### Subbasin Description

#### General Location

The Spokane River Subbasin lies in four Washington counties, Pend Oreille, Stevens, Lincoln and Spokane and two Idaho counties, Benewah and Kootenai (Figure 1). The upstream boundary is in Idaho at Post Falls Dam, which regulates Coeur d'Alene Lake. The Spokane River flows west through the City of Spokane where it is blocked by two dams, Upper Falls Dam at river mile (RM) 80 and the Monroe Street Dam at RM 74. As the river reaches the west side of the City of Spokane, Latah Creek is the first major tributary flowing in from the south. The Spokane continues to flow west to Nine-mile Falls Dam at RM 58. Fluvial habitats change to lacustrine habitats as the river enters the 24-mile long reservoir that is created by Long Lake Dam (RM 34). The Little Spokane River enters Long Lake at river mile 56.5. From Long Lake Dam, the Spokane River continues to Little Falls Dam (RM 29), about 29 miles from the confluence with the Columbia River (Lake Roosevelt). The lower 29 miles of the Spokane River is controlled by hydroelectric operations at Grand Coulee Dam and is considered part of Lake Roosevelt for management purposes. The Spokane Indian Reservation borders the Spokane River on the north shore from Little Falls Dam to the mouth.

#### Drainage Area

The subbasin encompasses an area of approximately 2,400 square miles and incorporates the following three Water Resource Inventory Areas (WRIA) as designated by Washington Department of Ecology (WDOE):

1. WRIA 54, Lower Spokane
2. WRIA 55, Little Spokane
3. WRIA 56, Hangman
4. WRIA 57, Middle Spokane

Primary tributaries of the Spokane River include the Little Spokane River and Latah Creek. The Little Spokane River watershed is 710 square miles and maintains an average annual flow of 303 cubic feet per second (cfs) (EPA 2000). The Little Spokane Watershed drains the northeastern portion of the subbasin and is heavily influenced by human development.

Latah Creek, which originates just to the east of the Idaho-Washington border within the Coeur d' Alene Indian Reservation, covers an area of 705 square miles (EPA 2000). The average annual flow is 87 cfs. Spring flows sometimes exceed 20,000 cfs while summer flows of less than 5 cfs have been recorded (EPA 2000). Approximately 20 miles of the lower creek flows through the northwest corner of the channeled scablands before joining the Spokane River at RM 72.4. This entire region is strongly influenced by dryland agricultural practices.

# Spokane River

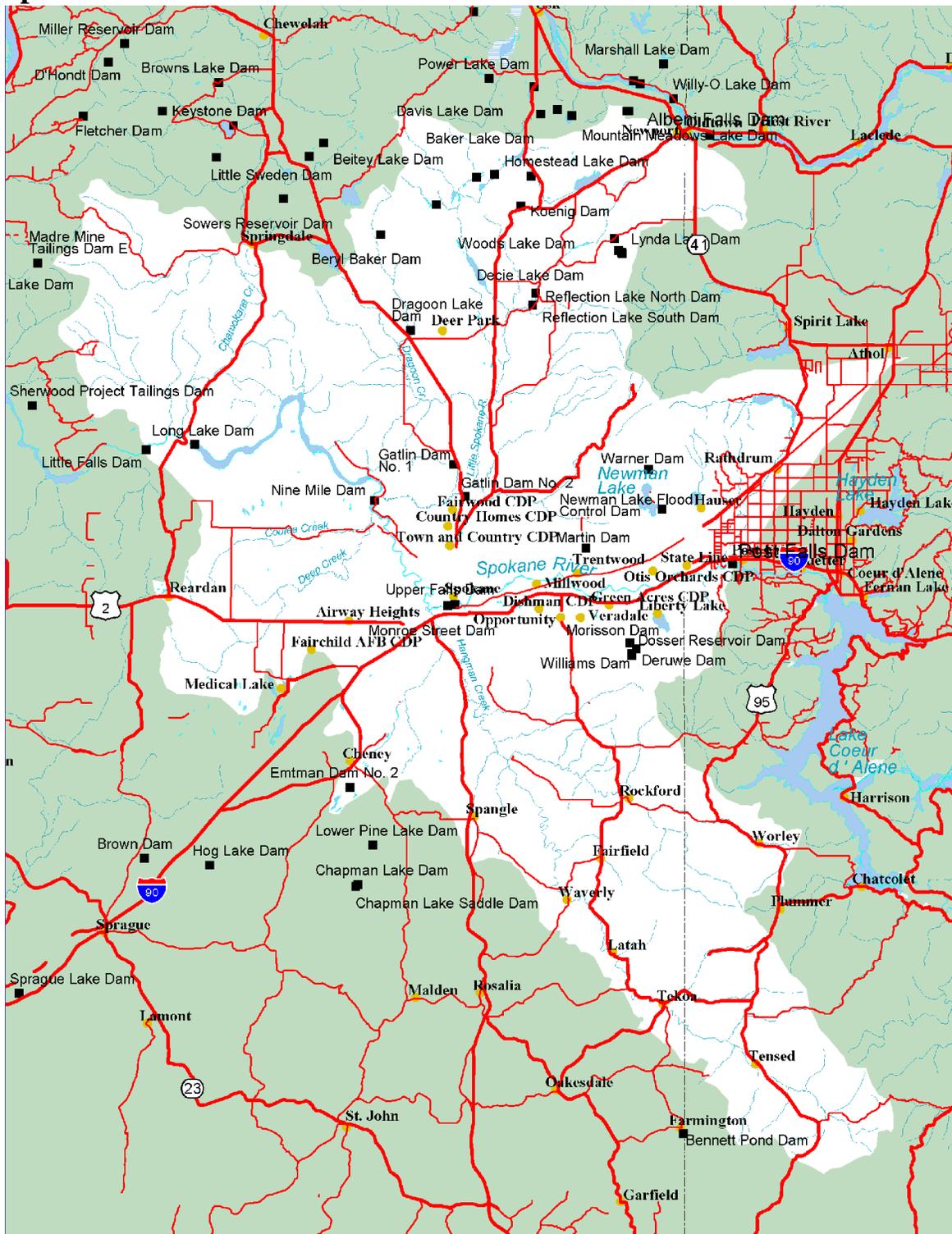


Figure 1. Spokane River Subbasin

## Climate

The Spokane Subbasin is characterized by a continental climate that is influenced by maritime air masses from the Pacific Coast. Average annual temp is 49 F, with July being the warmest month and January being the coldest. Annual precipitation for the area is 17.60 inches with 8.35 inches of snowfall. (Weather Underground 2000)

## Topography/geomorphology

The Spokane River Subbasin lies on two geologic provinces, the old North American Continent, and the Columbia Plateau. The old North American Continent (oldest province) is represented by a small part of the Rocky Mountains in the northeast corner of Washington. The ancient rocks of the continental crust consist of granite, gneiss, and schist. The crust is more than two billion years old. The southern portion of the old continent disappears beneath the Miocene basalt flows of the Columbia Plateau. It lies between the Cascade and Rocky mountains and south of the Okanogan highlands. The lava is made up of fine-grained black basalt. No place on earth in recorded human history has there been basalt eruptions that were comparable in volume (Alt and Hyndman 1984).

The upper Spokane River, between Post Falls and Upriver Dam is a relatively low gradient river characterized by a wide valley and marginal channel entrenchment that likely flooded during spring months prior to hydroelectric development. Channel characteristics consist of unembedded boulder substrate, stable banks and direct connections with the Spokane Valley Aquifer. Spokane Falls marks a nick point and is comprised of Miocene basalt flows. The channel is highly entrenched and bedrock is the dominant substrate. Below Spokane Falls the channel is deeply entrenched, with a relatively narrow valley floor, and dominated by unembedded cobble to boulder substrate in areas that are not affected by reservoir conditions.

The Little Spokane River is a watershed consisting of forests and mountainous terrain. Geology is largely comprised of granitic formations, thus the presence of fines in the channel is increased due to granite decay (grus). Large organic debris, natural lakes, and beaver activity create diverse habitat complexity in the watershed.

Latah Creek watershed is generally lacking habitat complexity due, in large part, to impacts associated with agriculture practices (channelization and large wood removal). This watershed flows through the rolling Palouse Hills. Stream gradients are relatively low; however, natural meander patterns of the stream have largely been eliminated by channelization. Input of fine sediment from surrounding areas has resulted in highly embedded gravel and cobble substrates.

## Soil

The Spokane River basin lies in two separate distinct soil provinces. The first province in the north is the Okanogan Highlands. In this area the soil pattern is closely tied with elevation. Areas of high elevation have soils that are derived from a granite parent material. The texture is usually gravelly sandy loam or silt loam, which has depth of one meter or less. A substantial amount of these high elevation soils has a considerable amount of volcanic ash. Surface layers of these soils usually have a silt loam texture while subsoils are generally gravelly loam. At lower elevations at the margins of river valleys, the most abundant parent material is glacial till. Textures of these soils are usually sandy

loam to loam, and are moderately dark. At the lowest elevations, along major rivers are soils that are coarse in texture and well drained to excessively well drained. Glacial outwash sands and gravels are the most abundant parent materials. The second province is the Columbia Basin. The soils located on the boundaries of the province are best expressed in the Palouse Hills. They are derived from loess and are dark colored. (Dyrness, et al 1988).

### Vegetation

Vegetation in the subbasin ranges from open grass prairies in the rolling Palouse Hills that transition into pine savannas and eventually into mountainous Douglas fir/ponderosa pine/larch coniferous communities. Limited high elevation areas with moist soil conditions exhibit cedar/hemlock communities. Dryland crops such as wheat, grass, alfalfa, and legumes dominate the Palouse soils of the southern portion of the subbasin. The urban setting of much of the subbasin has resulted in displacement of native vegetation with landscaping and ornamental vegetation.

### Land uses

Agricultural land uses are wide spread throughout the subbasin. Cattle graze extensively throughout the subbasin and dryland crops generally dominate the southern portion of the subbasin. Timber harvest is important in the Little Spokane River watershed where private property is managed for wood products. Additionally, the entire basin is affected by residential population growth and associated stresses on natural resources. A large part of the subbasin is affected by urbanization from the City of Spokane and surrounding suburbs.

## Fish and Wildlife Status

### Fish

The historic fish assemblage in the Spokane River Subbasin included resident and anadromous salmonids. Below Spokane Falls, the fish assemblage was dominated by anadromous chinook salmon *Oncorhynchus tshawytscha* and steelhead *O. mykiss* (Scholz et al. 1985). The adult return of anadromous salmonids to the Spokane River system, in its natural condition, was nearly 500,000 fish annually (Scholz et al. 1985). These stocks ascended the Spokane River no higher than Spokane Falls; however, evidence suggests prior to the construction of Monroe Street Dam, steelhead may have passed the Falls in years when water conditions were optimal (Allan T. Scholz, EWU professor of biology, personal communication). Construction of hydroelectric projects within the Columbia River and the Spokane River system that lacked adult passage facilities resulted in the extirpation of these stocks.

### Spokane River

Historically, resident salmonids dominated the fish assemblage above Spokane Falls (Gilbert and Everman 1895). Westslope cutthroat trout *O. clarki lewisi* were present at high densities in both the mainstem and tributaries (Scholz et al. 1985). Bull trout *Salvelinus confluentus* and mountain whitefish *Prosopium williamsoni* were also part of

the natural salmonid assemblage in the upper Spokane River Basin. Additionally, it is likely that a native redband trout *O. mykiss gairdneri* population existed in the upper Spokane River. Behnke (1992) suggests areas historically accessible to steelhead likely had resident redband trout populations associated with them. Passage of steelhead into the Spokane River, to at least the Spokane Falls within present day Spokane, suggests resident rainbow trout populations were present as well.

Currently, the lower Spokane River fish assemblage consists mostly of non-native species including largemouth bass *Micropterus salmoides*, yellow perch *Perca flavescens*, tench *Tinca tinca*, brown trout *Salmo trutta*, and other species well adapted to warm water conditions. Historic stocks of native species that continue to inhabit the Spokane River below Spokane Falls include largescale sucker *Catostomus macrocheilus*, redband shiner *Richardsonius balteatus*, northern pikeminnow *Ptychocheilus oregonensis*, and chiselmouth *Acrocheilus alutaceus*. Data suggests white sturgeon are present in the River based on one captured individual (Allan T. Scholz, EWU professor of biology, personal communication; Robert Peck, district fish biologist, Wash. Dept. of Fish and Wildlife).

Throughout the watershed, the native salmonid assemblage is restricted to three species; kokanee, redband trout and westslope cutthroat trout. Bull trout are a salmonid native to the system, however historical analyses suggest they were present at low densities. Current data suggests that they are undetectable. Recent observations of bull trout below Little Falls Dam have been of individual fish, likely transported through the system, possibly from upper basin Lake Coeur d'Alene tributaries. Native kokanee, redband trout, and westslope cutthroat trout exist at severely depressed levels (Allan T. Scholz, EWU professor of biology, personal communication).

#### **Kokanee**

The kokanee population that exists in the Chain Lakes section of the Little Spokane River System is likely a native stock. In 1999, the Washington Department of Fish and Wildlife (WDFW) collected 25 fish and sent samples to the University of Montana for protein electrophoretic analyses. While the number of samples is not sufficient to provide statistically significant results, data suggested that the stock is unique. This naturally reproducing population has been declining from an estimated 1,500 adult spawners in the early 1990's. The WDFW is responsible for fishing regulations in the Little Spokane Watershed. To ensure that a potentially native stock of a native species does not continue to decline, regulations prohibit all harvest.

#### **Redband and rainbow trout**

The distribution and abundance of native redband trout throughout the watershed is unknown. Rainbow trout from several origins have been introduced throughout the Spokane River Watershed. Further, the genetic profile of the native population has not been described. Therefore, the degree of introgression is unknown throughout the watershed.

Although the rainbow trout population inhabiting the Spokane River between Post Falls Dam and Upriver Dam appears to be genetically unique, the origin of the population is unknown. Stocking records indicate rainbow trout have not been stocked in this section of the Spokane River (Allan T. Scholz, EWU professor of biology, personal

communication). It is likely that stocking occurred in this section of river, however at low levels. It is also possible they immigrated from Lake Coeur d'Alene tributaries that were stocked by IDFG. However, it is likely that at least some genetic material from a native redband trout stock still exists within this population. Regardless of origin, the stock inhabiting this section of river is unique, in that, it has the ability to withstand the concentrations of heavy metals present in the water.

A population estimate of the rainbow trout population between Post Falls Dam and Upriver Dam was completed by Bennett and Underwood (1988). Results indicated a population of  $19,029 \pm 3,243$ . Spawning of the population is known to occur in 18 locations at varying densities, although the vast majority is concentrated at two locations (Johnson 1997). In a two-year spawning and emergence study, Johnson (1997) found that rainbow trout began spawning in early April at temperatures approximately 4 degrees C. Fry emergence was calculated to occur between 750 and 900 days at water temperatures of 13 degrees C in late May and early June (Johnson 1997). This population of rainbow trout in the upper Spokane River is unique in their ability to withstand relatively high water temperatures (Charles Corsi, Idaho Dept. of Fish and Game, personal communication).

Due to extensive stocking of hatchery strain rainbow trout, the rainbow trout population below Spokane Falls, including Latah Creek Watershed and Little Spokane River Watershed, is likely characterized by introgression between hatchery strain and rainbow trout and native redband trout. A resident migratory population of rainbow trout is known to migrate to Dragoon Creek in the spring, however, the genetic profile and other life history information are not known. In addition, there may be a native population of redband rainbow trout in the headwaters of the Hangman/Latah Creek Watershed (Robert Matt, Coeur d' Alene Tribe Wildlife Biologist, and personal communication).

#### **Westslope cutthroat trout**

Historically, westslope cutthroat trout were abundant above Spokane Falls, but are currently present in extremely low numbers below Post Falls. Westslope cutthroat trout are still relatively abundant in the Spokane River system upstream from Post Falls within Idaho (Charles Corsi, Idaho Dept. of Fish and Game, personal communication). Based on supplementation history, the existing cutthroat populations within the Spokane River between Post Falls and the Spokane Falls are likely the remnant population of the native stock. No genetic information has been collected from these populations.

#### **Latah Creek Watershed**

Species present in the Latah Creek Watershed include rainbow trout, brook trout *Salvelinus fontinalis*, chiselmouth chub, brown bullhead *Ameirus nebulosus*, longnose sucker *C. catostomus*, bridgelip sucker *C. columbianus*, largescale sucker, sculpin spp. *Cottus spp.*, northern pikeminnow, longnose dace (*Rhinichthys cataractae*), speckled dace (*R. osculus*), redband shiner and redband pickerel (*E. americanus americanus*) (Edelen and Allen 1998). Edelen and Allen (1998) indicate that species composition in Latah Creek changes in different sections of the creek. In the lower reaches speckled dace and chiselmouth chub dominate the assemblage whereas in the upper reaches redband shiners dominate the assemblage. Throughout the mainstem of Latah Creek, however, salmonids are present at low densities (<1%), likely due to degraded habitat conditions.

**Salmonids**

Tributaries to Latah Creek that exhibit relatively intact natural habitats contain wild populations of salmonids. Rainbow trout and brook trout are reproducing naturally in Marshall Creek and California Creek and comprise most of the fish assemblage (Dr. Allan Scholz, EWU professor of Biology, personal communication).

**Lakes and reservoirs**

**Northern Pike**

In April 1995, Long Lake (Spokane River impoundment) produced a record sport caught northern pike (32.2 pounds). The Long Lake northern pike population likely resulted due to immigration from Lake Coeur d’ Alene.

**Salmonids**

Closed basin lakes located in the Spokane Subbasin are stocked annually with an average of 652,500 brown trout, brook trout, cutthroat trout and rainbow trout (Bob Peck, WDFW Area Biologist, and personal communication). Lakes in the area account for an estimated 132,500 angler trips (Bob Peck, WDFW Area Biologist, personal communication) with an estimated annual economic value of between \$4 and \$5 million dollars.

**Wildlife**

The Spokane Subbasin is home to a diverse assemblage of large and small mammals, amphibians and birds. Since mammalian species are highly mobile, the animals tend to range throughout multiple subbasins. The following table (Table 1) illustrates the target and listed species identified for the Spokane Subbasin by the Washington Department of Fish and Wildlife. This list is not intended to represent all wildlife species present and/or native to the subbasin, nor is it intended to be inclusive of the species that will be targeted or benefit from habitat enhancement projects. Population status/information is also provided for each respective category (large mammals and birds).

Spokane Subbasin is home to a diverse assemblage of large and small mammals, amphibians and birds. Since mammalian species are highly mobile, the animals tend to range throughout multiple subbasins. The following table (Table 1)

Table 1. Target wildlife species in the Spokane River Subbasin (\* denotes Washington State listed/sensitive species).

<b>Large Mammals</b>	<b>Small Mammals</b>	<b>Birds</b>	<b>Amphibians</b>
Mule deer <i>Odocoileus hemionus</i>	Bobcat <i>Lynx rufus</i>	Ruffed grouse <i>Bonasa umbellus</i>	*Columbia spotted frog <i>Rana luteiventris</i>
White-tailed deer <i>Odocoileus virginianus</i>	Weasel <i>Mustela vison</i>	Turkey <i>Meleagris gallopavo</i>	*Western toad <i>Bufo boreas</i>
Moose <i>Alces alces</i>	Marten <i>Martes americana</i>	California quail <i>Colinus spp.</i>	
Elk <i>Cervus elaphus</i>	Badger <i>Taxidea taxus</i>	Ring-necked pheasant <i>Phasianus colchicus</i>	
Black bear <i>Ursus americanus</i>	Beaver <i>Castor canadensis</i>	Gray partridge <i>Perdix perdix</i>	

Large Mammals	Small Mammals	Birds	Amphibians
	Muskrat <i>Ondatra zibethicus</i>	Swans	
*Gray Wolf <i>Canis lupus</i>	Coyote <i>Canis latrans</i>	Mourning dove <i>Senaia macroura</i>	
*Grizzly bear <i>Ursus arctos</i>	Cougar <i>Felis concolor</i>	Ducks	
	*Wolverine <i>Gulo gulo</i>	Geese	
	*Townsend's big-eared bat <i>Plecotus townsendii</i>	*American white pelican <i>Pelecanus erythrorhynchus</i>	
	*Fisher <i>Martes pennanti</i>	*Common loon <i>Gavia immer</i>	
	*Lynx <i>Lynx lynx</i>	*Bald eagle <i>Haliaeetus leucocephalus</i>	
	Pygmy Rabbit <i>Sylvilagus idahoensis</i>		
		*Golden eagle <i>Aquila chrysaetos</i>	
		Sage Grouse <i>Centrocercus urophasianus</i>	
		*Merlin <i>Falco columbarius</i>	
		*Northern goshawk <i>Accipiter gentilis</i>	
		Peregrine Falcon <i>Falco peregrinus</i>	
		Sharp-tailed grouse <i>Tympanuchus phasianellus</i>	
		*Sandhill crane <i>Grus canadensis</i>	
		*Burrowing owl <i>Athene cunicularia</i>	
		*Flammulated owl <i>Otus flammeolus</i>	
		*Vaux's swift <i>Chaetura vauxi</i>	
		*Black-backed woodpecker <i>Picoides articus</i>	
		*Lewis woodpecker <i>Melanerpes lewis</i>	
		*Pileated woodpecker <i>Dryocopus pileatus</i>	
		*Whitehead woodpecker <i>Picoides albolarvatus</i>	
		*Loggerheaded shrike <i>Lanius ludovicianus</i>	
		Western Meadowlark <i>Sturnella neglecta</i>	
		Downy Woodpecker <i>Picoides pubescens</i>	
		Blue Grouse <i>Dendragapus obscurus</i>	
		*Upland sandpiper <i>Calidris himantopus</i>	
		Neotropical Birds	

#### Large Mammal Population Status

Mule and white-tailed deer populations south of the Spokane River have increased since the severe winter of 1992-93. White-tailed deer observed on elk surveys in GMU 127, which includes Latah Creek, and GMU 130, which includes Deep Creek and the Spokane River, have increased from 133 in 1994 to 399 in 1998. Some members of the white-tailed deer population were lost to Epizootic Hemorrhagic Disease (EHD) during September of 1999 in the Chattaroy area in the Little Spokane River drainage.

Elk populations were naturally established in southern Spokane County during the 1970's. Population estimates for the area south of the Spokane River (GMU 127 and 130) is estimated at 179 plus. Estimated calf/cow ratios since 1993 range from 31:100 to 63:100. Due to the limited amount of public land available to hunt on, management emphasis is designed to maintain small herds with a wide distribution. This management strategy is designed to reduce depredation complaints that result from the concentration of large herds. For populations north of the Spokane River, data is very limited. General observations indicate elk populations to be stable to increasing particularly in the Huckleberry Mountains. Moose populations are increasing and expanding their range, including Waits Lake south to Springdale, Mount Spokane and the Latah Creek areas.

Aerial surveys conducted by the Coeur d'Alene Tribe in the winters of 1997-1999 have identified a wintering elk population of approximately 125-150. This population spends the majority of the winter in the mid to lower elevations of the watershed above Tensed, ID (normally ranging from 2600-3300 feet) depending upon snowpack. Moose numbers in the upper Latah Creek area are increasing. Reservation wide harvest closures instituted by the Tribe are believed to be a significant factor in this increase. Whitetail deer in the upper reaches of Hangman Creek are believed to be stable in numbers. The major limiting factors for this population are believed to be a lack of security cover, high road densities, and a lack of available winter food sources.

#### **Bird population status**

Forest grouse (ruffed and blue grouse) are representative species for riparian shrub/tree and forested habitats occurring within the subbasin. Current state-wide population levels are considered healthy and sufficient to meet hunter demand; however, production is influenced by weather (WDFW, 1999) and carrying capacity by habitat availability. Habitat loss has occurred in the subbasin.

The conversion of floodplain, riparian and Palouse prairie areas has greatly reduced the quantity and quality of habitat available to bird populations in the upper portions of Hangman/Latah Creek and its tributaries. For example, 56% of the Latah Creek watershed (252,298 acres) has been converted to cropland that is non-irrigated (Matt and Green, 2000). Fall tilling and other dryland agricultural practices that reduce winter ground vegetation cover decrease the availability and quality of wintering food and security resources in low elevation and floodplain habitats for elk, deer, moose, neotropical birds, song and game birds and migratory waterfowl.

#### **Habitat Areas and Quality**

##### **Fish**

Historically, the Spokane River was ideal salmonid production habitat. Habitats were characterized by cold, clean water, diverse habitat complexity, and unembedded substrates (Gilbert and Everman 1895). Habitat conditions were also well suited for an abundant and diverse community of aquatic invertebrates (Gilbert and Everman 1895). Invertebrate communities supported juvenile anadromous salmonids and entire life histories of resident salmonids.

Aquatic habitats were, in part, the result of intact riparian and upland habitats. Mature coniferous forests, dense riparian communities, and rolling grasslands provided

shade for rivers and streams. Shading by the terrestrial botanical community caused snow to melt off gradually throughout the spring and summer. Gradual melting contributed to cool water conditions in the warm summer months. Further, water from snow melt and precipitation was filtered by stable soils, thus soil erosion from adjacent hill slopes was uncommon.

#### **Spokane River**

The Spokane River is a part of the Spokane Aquifer of the Spokane Valley. Below Post Falls Dam, water from the Spokane River is lost to the aquifer due to high transmissivity of river substrate and the depth of the static water level. Below Up River Dam, water is gained from the aquifer to the surface water, thus providing a direct connection between the river and aquifer.

The operation of Post Falls Dam regulates, in part, the level of Lake Coeur d' Alene and the water retention time. Increased water retention time allows increased evaporation and lack of mixing, resulting in elevated summer water temperatures. The Spokane River was listed on the Washington State 303(d) list for water temperatures that exceeded Washington State Criterion for maximum summer temperatures. Increased summer water temperatures create enormous metabolic demand for native salmonid species that have adapted to cool water conditions. Exacerbating the increased metabolic demands is the reduced invertebrate diversity in the mainstem of the Spokane. The Spokane River is also becoming a victim of cultural eutrophication and nutrient loading. Three municipal sewage treatment plans deliver treated water to the river in Idaho, and lands adjacent to the river are exhibiting expanding residential and commercial development growth.

In the Spokane River between Post Falls and Upriver Dam substrate remains relatively unembedded; however, the presence of Post Falls Dam has reduced the entrainment of larger gravel and cobble size substrates. Historically, and presently, Lake Coeur d' Alene has intercepted significant amounts of bedload origination within the upper Spokane River watershed (Charles Corsi, Idaho Dept. of Fish and Game, personal communication). These types of bedload movement impediments contribute to reduced entrainment of smaller gravel and cobble and allowed a relatively homogeneous substrate composition dominated by large cobble through boulder size substrate. This large substrate limits the native salmonid spawning habitat. In this section of river, there are only two major spawning locations for rainbow trout (Johnson 1997), and they continue to be degraded.

Flow conditions on the Spokane River fluctuate greatly due to adjacent land use practices. The Spokane River hydrograph is characterized by unusually high flows in May and June ( 22,000 cfs) resulting from rapid snowmelt and unusually low late summer base flows ( 1,550 cfs). Low base flow conditions contribute to elevated water temperatures, decreased habitat complexity, decreased habitat area and low dissolved oxygen levels.

Toxic levels of trace heavy metals including arsenic, cadmium, mercury, lead, and zinc occur in the Spokane River. Occurrences of these trace metals causes asphyxiation in fish (Leland and Kuwabara 1985). Fish are most sensitive to effects of trace metals in embryo-larval and early juvenile stages (Leland and Kuwabara 1985) exacerbating the limited amount of rearing habitat available. Toxic effects of trace metals also impact

invertebrate populations (Leland and Kuwabara 1985) and are likely a contributing factor in the reduction of invertebrate diversity in the mainstem of the Spokane River.

#### **Little Spokane River**

Habitat conditions in the Little Spokane River Watershed are degraded, relative to historic conditions. The average summertime low flow over the last 10 years is less than half of the summertime low flow exhibited 100 years ago (Al Scholz, EWU Professor of Biology, personal communication). Minimum base flows were established in 1976 from the headwaters to the confluence with the Spokane River (Dames and Moore and Cosmopolitan Engineering Group 1995). Annual flow data dating back to 1929 indicates that the numbers of days that base flow minimums were not met have increased significantly. Between 1948 and 1978, eight days/year, on the average, did not meet minimum flow targets; however, the annual daily average of not achieving minimum base flows between 1970 and 1995 is 53 days (Dames & Moore and Cosmopolitan Engineering Group 1995). Despite WAC 173-555 seasonal closures of consumptive appropriation in the Little Spokane River Watershed (1980), minimum flows have continued to decline due to the rapid increase in domestic water use.

Throughout the watershed, water quality parameters such as water temperature, pH, dissolved oxygen, fecal coliform, and PCB's have exceeded clean water standards resulting in listing on the 1996 and/or 1998 Washington State 303(d) list.

#### **Latah Creek**

Habitat conditions in Latah Creek have been degraded physically and biologically relative to the fisheries community. This watershed has been subjected to intensive farming practices in the upper and middle reaches. Channelization and vegetation removal (upland and riparian) combined with steep slopes, fine silt and clay soils, and high runoff events have made the watershed susceptible to streambed and upland agricultural erosion (Edelen and Allen 1998). These physical characteristics have reduced the quantity and quality of instream habitat complexity, such as natural meander patterns and large woody debris (LWD) recruitment. Increased sediment load has resulted in embedded substrate and unsuitable spawning habitat for salmonids. In an invertebrate inventory conducted throughout the Latah Creek Watershed, Celto et al. (1998) found very few intolerant taxa. The intolerant taxa that were found were only found in two sites on Marshall and Rock creeks and only found in one year. These data support that the physical habitat conditions have been degraded throughout the watershed.

In the Latah Creek Watershed, water quality parameters exceeding WDOE and EPA water quality criteria include turbidity, fecal coliform, nitrate, nitrite, ammonia, total phosphorus, pH, dissolved oxygen, and temperature (Spokane County Conservation District 1999).

Upper Hangman/Latah Creek is listed on the Idaho 303(d) list as impaired with respect to sediment, nutrients, and pathogens. High temperatures, low dissolved oxygen, and severe habitat alterations also impair it. Agriculture, in the form of dryland farming and grazing, is prevalent throughout this portion of the watershed. Most croplands are plowed to the edge of the streams. Riparian zones have been severely impacted causing increased width to depth ratios from increased bank erosion. Forestry practices have cleared much of the upper watershed, contributing to increased flooding frequency as well

as increases in sediment inputs and decreased base flows. High road densities in the upper portions of the watershed also contribute significantly to sediment inputs into the mainstem and tributaries.

The cumulative effects of these factors have severely altered the natural hydrograph for the watershed with an increased capacity to carry sediment. When coupled with the absence of ground cover for much of the water cycle and the loss of wetland and riparian habitats throughout the area, the upper reaches of Latah Creek contribute to the overall impairment of the downstream water quality as well as fish and wildlife habitat.

### Wildlife

Current habitat conditions throughout the Washington portion of the subbasin will support increased deer population growth until a severe winter or a significant drought occurs (WDFW, 1999). North of the Spokane River, mule deer populations seem to be suffering long-term declines attributed to changes and fragmentation of the habitat, including loss of winter/spring habitat due to human occupation, fire suppression and timber practices. Forage habitat for elk has increased, however, mature timber cover areas are declining and thermal cover on summer and winter ranges may be a limiting factor in the future. High road densities in some portions of the subbasin increase fragmentation of habitat and susceptibility to disturbance and mortality.

The intensity of logging on public and private lands in the 1980s resulted in forage production favorable to moose. Heavily logged private lands in the early to mid-1990s will continue to provide foraging opportunities, although mature stands of timber which intercept snow and are used by wintering moose, are declining and may eventually end up as a depressant on moose populations.

Although upland sandpipers have not been documented within the subbasin since 1993 (Dinah Demers, WDFW Region 1 Wildlife Biologist), the single known upland sandpiper nesting area, estimated at 300 acres, exists in the east Spokane Valley. "Preferred habitats include a wide variety of croplands, pastures, wet meadows and native prairie types"; however, habitat degradation and human encroachment have resulted in an endangered listing of the upland sandpiper in Washington (WDFW, 1995).

Terrestrial habitats in the Latah Creek Watershed have been drastically impacted by conversion to agricultural lands. These terrestrial changes have profound effects on the riparian and aquatic habitats as well. Matt and Green (2000) analyzed 147,008 acres of the Latah Creek Watershed on the Coeur d' Alene Reservation. Development and agricultural conversion displaced 55.8% of coniferous riparian habitat, 11% of heavy forest, 61.5% of transition forest, 98.6% of Palouse-influence habitat, 78.3% broken forest, 85.4% transition prairie, 59.1% of wetland habitat and 86.9% of wet prairie bottomland habitat. Results of this analysis show that 95,702 acres (65.1%) of the terrestrial area in the reservation portion of the watershed have been converted to agriculture uses based on original land survey notes from 1901-1907. The headwaters of the Hangman/Latah Creek watershed provide valuable winter range to populations of elk, moose and deer. Road densities averaging 5.26 miles/mile<sup>2</sup> contribute to the fragmenting and disturbance of key wintering areas as well as increase the susceptibility of game populations to harvest.

## **Watershed Assessments**

Following is a list of assessments that have been completed in the Spokane River Subbasin:

- Dames & Moore, Inc. and Cosmopolitan Engineering Group. 1995. Initial watershed assessment water resources inventory area 55 Little Spokane River Watershed. Washington State Department of Ecology Open-File Technical Report 95-15.
- Celto, E., L.S. Fore, and M. Cather. 1998. Biological Assessment of Latah Creek Watershed. 1995-1997 Report to Washington State Conservation Commission. Water Quality Implementation Grant # 95-40-IM. Project Sponsor: Spokane County Conservation District.
- Edelen, W., and D. Allen. 1998. A chronicle of Latah (Hangman) Creek: Fisheries and land use. 1995-1997 Report to Washington State Conservation Commission. Water Quality Implementation Grant # 95-40-IM. Project Sponsor: Spokane County Conservation District.
- Yake, W.E. 1979. Water quality trends analysis - the Spokane River Basin. WA Dept. of Ecology. DOE-PR-6.
- Funk, W. H., et al. 1983. Water quality of the upper Spokane River and evaluation of methods for measurement of the effect of effluent upon primary and secondary producers. Wash. State Water Research Center, WSU, Pullman, WA.

## **Limiting Factors**

### **Fish**

#### **Spokane River**

Rainbow trout year-class strengths vary annually and are associated with flows between spawning and post emergence (Bennett and Underwood 1988). A substantial proportion of spawning substrate is dewatered when mainstem flows drop below 6,000 cfs, resulting in decreased spawning success (Edelen and Allen 1998).

In the Spokane River above Spokane Falls, most of the habitat degradations are related to water quality conditions. Increased water temperature, low dissolved oxygen concentrations and toxic levels of arsenic, cadmium, mercury, lead and zinc all are parameters of Spokane River watershed listed on the Washington State 303(d) list. These factors impact fish populations and invertebrate populations creating a negative synergistic effect on the aquatic community.

Low base flows are the product of poor land use practices in headwater areas. Land uses over the last 100 years has resulted in a spring freshet that occurs relatively rapidly rather than the natural condition of gradual run off. This situation creates low late summer base flows, limiting habitat area and complexity. Additionally, low base flows contribute to degraded water quality conditions such as increased water temperature and reduced dissolved oxygen.

Limiting factors in the Spokane River below Spokane Falls are generally related to reservoir inundation. Warm water conditions and low dissolved oxygen levels from upstream are exacerbated by reservoirs. Past and present wastewater practices contributed nutrients to the system and allowed aquatic vegetation to thrive in low velocity habitats. Accumulation of decaying aquatic vegetation creates enormous biological oxygen

demands, thus exacerbating the already low dissolved oxygen concentrations and has exhibited anaerobic conditions in some areas.

Introduced non-native species are maximizing available habitats and in some cases providing recreational opportunities; however, it is likely that the native assemblage was displaced by the presence of exotic species better adapted for the available habitats. Knowledge regarding the status of native stocks and distributions throughout the mainstem is limited. The genetic profile, distribution and life history strategies of native stocks are largely unknown.

#### **Little Spokane River**

Throughout the Little Spokane River watershed, 51% (over 400 miles) is limited by water quality throughout the year (Dames & Moore and Cosmopolitan Engineering Group 1995). Eight percent (61 miles) of the watershed is known to be limiting during only part of the year or are only mildly limiting (Dames & Moore and Cosmopolitan Engineering Group 1995). There are no water quality parameters known to be limiting factors in 16% (126 miles) of the watershed and insufficient data in 26% (205 miles) (Dames & Moore and Cosmopolitan Engineering Group 1995).

Base flow of the River has been declining and continues to decline. Consumptive water use by domestic well installation in the Little Spokane River Watershed continues to increase. Increased consumption of ground water in the watershed is reducing river flows resulting in below minimum flow criteria an average of 53 days annually (Dames & Moore and Cosmopolitan Engineering Group 1995).

Water quality parameters listed on the Washington State 303(d) list for waters in the watershed include temperature, pH, dissolved oxygen, fecal coliform, and PCB's. These degraded water quality conditions negatively impact the entire aquatic community.

Lack of information regarding species distribution and stock composition of rainbow trout and kokanee creates problems with regulating sport anglers, harvest, seasons, and size restrictions that are consistent with native fish conservation.

#### **Wildlife**

Limiting factor information for wildlife is described for species within the broad categories of large and small mammals, and birds throughout the subbasin.

Conversion of native habitats is the most limiting factor for wildlife populations in the Latah Creek Watershed. The wide scale loss of riparian, wetland, and low to mid elevation transition habitats and associated corridors negatively impacts wildlife in this portion of the subbasin. Additionally, until restored to a natural state, the elimination of the Palouse prairie and Palouse transition habitats will continue to contribute to the extirpation of species dependent upon this habitat type. Large blocks of ownership and the headwater orientation of the areas contribute to the capabilities of this system to recover given the deviation from current land management practices. The upper reaches of the watershed should be characterized as a limiting factor to the over quality and productivity of the entire watershed and Spokane Subbasin.

#### **Large mammal limiting factors**

Seasonal deer ranges south of the Spokane River are not capable of supporting significant population increases when severe winter or significant drought conditions occur (WDFW, 1999). Urban/rural development and growth continues to encroach on seasonal deer ranges. The potential exists for outbreaks EHD and some members of the white-tailed deer population were lost to EHD during September 1999. Vehicle collisions with white-tailed deer may be a significant mortality factor within localized areas.

Either cover (thermal/security) or forage may be limiting to elk and moose, particularly on winter ranges or calving habitats. Proper size and spacing of forage areas permits full utilization, assuming disturbance is minimal. Open road densities that exceed 1.5 miles per square mile will reduce elk and moose habitat utilization. Moose are also highly susceptible to poaching.

#### **Bird limiting factors**

Ruffed and blue grouse are affected by forest practices that use regeneration techniques which include extensive broad leaf tree and shrub control, reduced stocking rates and cover density through thinning, pruning, and replanting with tree species that provide less habitat benefit (WDFW, 1999). They are affected by intensive grazing of open lowland forests that reduces the quantity and quality of breeding and brood rearing habitat (Roderick and Milner, 1991). They are affected by conversions of riparian shrub and forestland habitats to croplands and pastures (Matt and Green, 2000) and rural/urban subdivision.

Declining populations and habitats of upland sandpiper can be attributed to residential development, wetland drainage, over-grazing, gravel-mining and the spread of noxious weeds such as spotted knapweed.

#### **Artificial Production**

A subbasin hatchery facility HGMP for the Ford Hatchery is provided as an attachment to Part II of the Spokane Subbasin assessment. This HGMP is presently incomplete and will be finalized prior to project submission affecting this facility during August of 2000.

#### **Existing and Past Efforts**

The Avista Corporation, formally the Washington Waterpower Company (WWP), is in the initial stages of applying for a new FERC (Federal Energy Regulatory Commission) license for the Spokane River Hydro-electric Project (license number 2545). The existing FERC license for the Spokane River Project expires in 2007. Work by Avista to obtain a new license for this hydro-electric project will likely require fishery assessment and future enhancement and restoration work as terms of any new license.

The Spokane River Hydro-electric Project is comprised of five separate hydro-electric developments (HEDs) along approximately 70 miles of the Spokane River (Woodworth 1988). These five HEDs include Long Lake (105,080 acre-feet reservoir storage), Nine-mile (4,600 acre-feet reservoir storage), Monroe Street (30 acre-feet reservoir storage), Upper Falls (800 acre-feet reservoir storage) and Post Falls (Idaho) 225,000 acre-feet reservoir storage (Coeur d'Alene Lake). A sixth HED, Little Falls, owned and operated by WWP, is located approximately five miles downstream from Long Lake Dam and is not part of the Spokane River Project.

Average annual flow in the Spokane River, measured at the Post Falls HED (drainage area 3840 square miles) is 6328 cubic feet per second (cfs). The drainage area above the Long Lake HED is 5920 square miles and produces an average annual flow of 7949 cfs. Extreme flows for the Spokane River were recorded in 1974 and 1956 at 49,700 cfs and 114 cfs, respectively (Zentz 1986; USGS 1985, as noted in Woodward 1988).

#### Coeur d'Alene Tribe work in Upper Hangman and Tributaries

1. Past monitoring of big game populations including population distribution and abundance, population dynamics (age, sex ratios, productivity ratios, etc).
2. Reservation wide inventory and analysis of wildlife habitat areas and condition.
3. Implementation of stream and wetland restoration efforts on mainstem Hangmen and Little Hangman creeks.
4. Design and implementation of forest management BMPs and agricultural BMPs.
5. Non-point source pollution abatement efforts in upper hangman and tributaries.
6. Water quality monitoring efforts.
7. Construction of closed basin rainbow trout catch-out ponds.

#### WDFW work within the Spokane Subbasin

1. Annual monitoring of wildlife populations (game and non-game).
2. State regulation enforcement of fish and wildlife laws.
3. Habitat enhancement and protection through the WA State Hydraulics Code and other applicable regulations, for wetland, riparian, instream, and other habitat types.
4. Fish population assessments within regional lowland lakes and streams for fish management purposes.
5. Sport fishing and recreational hunting regulation development.
6. Water quality monitoring.
7. Coordination with federal, state, tribal, and local government entities for land use land application and development for protection of fish and wildlife resources.
8. Out reach educational efforts for fish, wildlife, and habitat issues.

## **Subbasin Management**

### **Institutional Considerations**

The following goals and objectives have been provided by the main fish and wildlife managers in the Spokane subbasin.

#### Upper Columbia United Tribes (UCUT)

The overall Goal of the Upper Columbia United Tribes for the Upper Columbia Blocked Area: Effective management of Tribal natural resources in the Upper Columbia Blocked Area - water, fish, wildlife, and cultural resources - for the benefit of Tribal peoples and society as a whole.

Functionally intact aquatic and terrestrial habitat in the rivers and tributaries would be protected, while potentially functional habitats would be restored and enhanced through improved land use practices and management. These integrated fish and wildlife habitats

would support functional aquatic and terrestrial communities characterized by productive populations of key fish and wildlife species.

#### **Terrestrial Vision**

The vision of the UCUT Tribes as relevant wildlife managers is: “A healthy Columbia River ecosystem supporting diverse and self-sustaining wildlife populations and habitats into perpetuity - for the benefit of current and future generations.

#### **Aquatic Vision**

1. For areas below artificial barriers to anadromous fish passage, mitigate for the loss of capacity for specific fish species using species and stocks that closely match those lost.
2. For areas above artificial barriers to anadromous fish passage, restore and enhance conditions to provide viable native fish and wildlife communities and ecosystems.
  - 2.1. Discourage proliferation of non-native species, recognizing that in many cases, non-native species have been introduced and will be part of biological system.
    - In instances where habitats can be enhanced/restored to support native species, native species re-introductions and management should be pursued;
    - In instances where native species management is not feasible or habitats can no longer feasibly support native species, non-native species may be used to provide consumptive and non-consumptive needs based upon resource demands.
  - 2.2. Provide mitigation in the form of actions to develop and enhance viable and productive native habitats, ecological functions and biological communities.
3. Acquire and develop terrestrial habitats to mitigate for wildlife lost to hydro-power development.
4. Prioritize acquisition and protection of identified terrestrial habitats permanently lost to development and operation of hydro-power projects.
5. Prioritize protection, mitigation, and enhancement activities that benefit multiple resources (e.g., cultural resources, water quality and botanical).

#### **State Of Washington**

The Washington Department of Fish and Wildlife (WDFW) has identified general fish and wildlife goals and strategies for eastern Washington, including areas encompassed by the Inter-Mountain Province and its associated subbasins. The WDFW strives to preserve, protect, and perpetuate the fish and wildlife species of the State.

The Wild Salmonid Policy (WSP) (State of WA 1997) is one of the guidance documents used to review and modify current management goals, objectives, and strategies related to wild stocks within the Spokane subbasin. Under the WSP, the goal of the WDFW is to protect, restore, and enhance the productivity, production, and diversity of wild salmonids and their ecosystems to sustain ceremonial, subsistence, commercial, and recreational fisheries, non-consumptive fish benefits, and other related cultural and ecological values. It will serve as the primary basis for review of Washington State agency hatchery and harvest programs, as well as development of watershed-based plans that insure adequate habitat protection. The re-establishment of anadromous fish passage into blocked areas is supported in principle through the WSP. Feasibility analysis to identify

corrective measures necessary to provide passage, and habitat improvements needed to promote successful re-introduction and sustainable establishment of appropriate anadromous stocks, is warranted prior to such a major management action.

### **Goals, Objectives and Strategies**

#### **Fish Goal**

Restore and maintain the health and diversity of native fish stocks within the Spokane subbasin and their habitats, and pursue harvest utilization of these stocks, as well as other desirable resident and/or non-native fish stocks in appropriate habitats and within sound resource protection guidelines, which will not cause detrimental impacts upon native fish stock restoration efforts.

Note: Quantitative objective values for subbasin goals will be fully developed within the evolving planning process for the Spokane subbasin.

#### **Fish Objective 1**

Evaluate 50 miles of Spokane River tributary stream(s) per year through 2005 to assess resident fish stocks composition and relative abundance - with primary emphasis on assessment of sensitive native salmonid stocks, and assess stream habitat conditions.

#### **Strategies**

1. Conduct fish stock assessments and population inventories to estimate population strength and population dynamics.
2. Evaluate in-stream habitat and riparian habitat conditions in Spokane River tributaries, with emphasis on Little Spokane River and Latah/Hangman Creek, to identify beneficial habitat and fish passage improvements.
3. Pursue funding for fish passage, in-stream, and riparian habitat improvement projects.
4. Monitor the effectiveness of in-stream habitat improvements, passage improvements, and riparian enhancement efforts, in improving native fish species relative abundance and distribution.

#### **Fish Objective 2**

Protect and enhance wild salmonid populations in the Spokane River and its tributaries, with primary emphasis on conservation of sensitive wild stocks, by identifying native stocks through DNA analysis, and mapping native / wild salmonid stock distributions.

#### **Strategies**

1. Conduct genetic DNA evaluation of potentially distinct stocks of resident redband rainbow trout within the Little Spokane River watershed and kokanee salmon within the Little Spokane River Chain Lakes to assist with development of appropriate management plans
2. Conduct genetic DNA evaluation of potentially distinct stocks of resident redband rainbow trout within the upper headwaters of the Hangman/Latah Creek watershed to assist with development of appropriate management plans.

3. Within the mainstem Spokane River concentrate habitat protection/management efforts on protecting remaining suitable salmonid habitats, with specific emphasis on spawning habitat and juvenile rearing habitat in the upper Spokane River. Long-term management should focus on enhancement in the Spokane River, with emphasis in the Spokane River a) above Up River Dam, b) below Monroe Street.
4. Coordinate watershed management activities with federal, state, tribal and local government entities to complement stream habitat restoration/improvement activities.
5. Monitor and evaluate water quality within the Spokane River system and its potential impacts upon resident fish populations. Coordinate and promote enforcement of water quality regulations with appropriate regulatory agencies.
6. Conduct an IFIM study on the upper Spokane River below Post Falls to assist in developing fish management and river flow management plans to enhance and preserve an established wild resident rainbow trout population.
7. Monitor the effect of river flow and water quality conditions and hydroelectric development operations on reservoir water elevations, water temperature, and water retention time on rainbow trout populations within the Spokane River below Post Falls Dam.
8. Conduct stream and reservoir assessment surveys to determine stock status of main stem Spokane River resident fish species and potential impacts from downstream migration of fish stocks from Idaho.
9. Work to reduce the extent of riparian and wetland habitat loss in the upper Latah / Hangman Creek watershed to assist in expansion of target fish populations and reduce sediment contributions to Latah Creek and the Spokane River.

### Fish Objective 3

Create fisheries that support and maintain traditional harvest needs (including tribal subsistence and ceremonial) and quality recreational fisheries as partial substitution for lost anadromous fishing opportunity above Chief Joseph and Grand Coulee dams within the Spokane Subbasin.

Use of hatcheries will be critical to the success of providing recreational and applicable subsistence resources and conservation of native species. Artificial production is a useful tool for entities managing fish resources within the blocked area.

Spokane Tribal objectives for the impoundment behind Little Falls dam include: 2,000 Chinook salmon to Tshimikain Creek (1,000 escapement and 1,000 harvest) by 2025.

WDFW and IDFG include a sport catch objective for the upper Spokane River between Post Falls Dam and Up-River Dam, of 0.5 to 0.7 fish per hour within the next ten years.

Additional Numeric objective performance standards for stocking rates for Spokane River Hydroelectric reservoirs will be developed pending completion of management plans for Spokane River complex.

### Strategies

1. Stock appropriate trout stocks into the lower Spokane River (below Up-River Dam), Long Lake reservoir, and selected lowland lakes within the Spokane Subbasin.

2. Conduct angler surveys to estimate fishery utilization, and fishery quality over time (catch per unit of effort, angler days of utilization).
3. Create and / or maintain quality warm water sport fisheries in appropriate habitats which will not cause detrimental impacts upon native salmonid populations.
4. Monitor the effect of reservoir elevation and water retention time on warm water fish populations within the Long Lake and Little Falls impoundments (e.g. over winter survival of juvenile fish).
5. Monitor and evaluate the effects of fish management actions.
6. Model the effect(s) of reservoir operations on primary productivity and the food chain within Spokane River reservoir impoundments.
7. Assess the feasibility of establishing habitat enhancement structures within the Long Lake draw-down zone to enhance the production of several resident fish species through increased forage production, and juvenile rearing habitat for some species.
8. Test aquatic vegetation control methods upon exotic nuisance aquatic vegetation in selected areas to improve fish habitat.
9. Create and / or maintain quality catch-out pond tribal fisheries in the Hangman/Latah Creek watershed headwaters in Idaho within CDA tribal controlled lands.

#### Wildlife Goals

1. Maintain or enhance existing priority (WDFW target) habitat, including structural attributes and ecological functions, needed to perpetually support healthy wildlife populations within the Spokane Subbasin.
2. Maintain or enhance populations of priority species, and other native and desirable non-native wildlife species, within their present and/or historical range in order to prevent future declines and restore species that have suffered declines.
3. Identify all priority habitats including migration corridors and habitat links within the Spokane subbasin.
4. Restore degraded priority habitats, including riparian zones, wetlands and floodplain habitat, upland forests and connectivity habitats to promote healthy self-sustaining wildlife populations.
5. Fully mitigate for all hydro-power losses in-kind and in-place when possible. Complete all mitigation requirements consistent with approved and active guidelines, agreements, and applicable federal licenses.
6. Coeur d'Alene Tribal goal - specific: As a priority, protect and enhance priority habitat areas as a means of offsetting the biological and cultural impacts of anadromous fish extirpation to the subbasin. Activities will focus on providing alternative subsistence opportunities via an increase in wildlife habitat and the re-introduction of native or other priority wildlife species.

Meeting or exceeding the needs of wildlife within the Spokane Subbasin is, and will remain, a major component of any management plan development process. Of particular interest are the needs of priority habitats and species. An overarching concern for current wildlife resource needs within the subbasin is the loss or degradation of habitat. The protection of "priority habitats, and priority area" is necessary to meet the above identified wildlife goals.

The State of Washington Priority Habitats and Species (PHS) program was developed by WDFW to provide management recommendations for species and habitats that are of concern in Washington State. Priority species are wildlife species requiring protective measures for their perpetuation as a result of their population status, sensitivity to habitat alteration, and/or recreational importance.

Priority Habitats are habitat types with unique or significant value to many species. An area classified and mapped as "priority habitat" must have one or more of the following attributes: comparatively high wildlife density, high wildlife species diversity, important wildlife breeding habitat, important wildlife seasonal ranges, important wildlife movement corridors, limited availability, high vulnerability to habitat alteration, and unique or dependent species.

WDFW PHS management recommendations are designed as guidelines to direct, rather than to dictate site-specific activities. They cannot incorporate the wide diversity of habitats, existing land uses, landowner/manger objectives, or social-political factors which exist across the state. Because the recommendations are generalized to cover the entire state, site-specific plans are generally necessary to adapt them to best meet local conditions. In applying PHS management recommendations under any regionally adapted coordinated approach for the Spokane subbasin, consultation with applicable resource management agencies will be necessary for coordinated site-specific applications of these recommendations which would reflect regional goals and objectives.

Within the Spokane Subbasin a subset of these priority habitats and priority areas are of focused importance and concern, particularly for fish and wildlife habitat adjacent to the Spokane River and/or fish and wildlife habitat resources associated with its major tributaries, including riparian areas; cave habitat; in-stream habitat; cliff/talus habitat; snag habitat; wetlands and deep water habitats; old-growth/mature forests; big game (deer, elk, moose) winter range (concentration areas); and migration corridors.

Habitat features which are not classified as priority habitats, but which are critical to the diversity, abundance and distribution of wildlife include roadless or restricted access areas and refuge, or island, habitats in developing landscapes. These are often woodlots, contiguous stands of younger forest, deciduous and mixed-deciduous forest, shrublands, grasslands, ravines, and fallow fields; small springs and seeps. These entities contribute to water quality downstream and provide habitat for resident amphibians, reptiles, and other aquatic and terrestrial wildlife. Large blocks of contiguous forest provide habitat for forest-interior avifauna and other species requiring relatively unfragmented habitat.

#### Wildlife Objective 1

Protect and enhance big game winter range habitat along, and associated with, Long Lake reservoir, Little Falls reservoir, upper Latah Creek watershed, and the lower Little Spokane River.

#### Strategy

Adequate enhancement and protection will likely entail use of a combination of activities including land acquisition, habitat improvement efforts, cooperative conservation agreements with landowners, continued education on the values of these habitats, protection acquisition of lands and protection through land use ordinances such as county critical areas ordinances enacted through the Washington State Growth Management Act.

#### Wildlife Objective 2

Protect and enhance big game travel and migration corridors. Winter range and winter mortality surveys conducted by WDFW in Stevens County (Steve Zender, WDFW personal communication) have identified Cummings Canyon and Whitney Canyon drainages as important white-tailed deer travel corridors and winter range. Spokane Tribe objectives include attaining a minimum of 1000 habitat units in the Tshimikain Creek drainage. Coeur d'Alene Tribe objectives include the protection and enhancement of identified winter range in the Upper Hangman / Latah Creek watersheds.

#### Strategy

Adequate enhancement and protection will entail cooperative agreements with land owners and/or acquisition of sensitive lands.

#### Wildlife Objective 3

Incorporate wildlife considerations into the design and implementation of forest practices to better meet the needs of fish and wildlife and protect sensitive species.

#### Strategy

Considerations include leaving adequate riparian buffers along all water courses to ensure water quality protection, erosion control, and fish and wildlife habitat needs; providing buffers and screens between adjacent regeneration type harvest units; facilitating snag recruitment; promoting downed log recruitment; and reducing road densities.

#### Wildlife Objective 4

Protect old-growth/mature forest habitat used by Vaux's swift, goshawks, bald eagles, and other species of concern.

#### Strategy

Considerations include: leaving adequate riparian buffers along all water courses to ensure water quality protection, erosion control, and fish and wildlife habitat needs; providing buffers and screens between adjacent regeneration type timber harvest units; facilitating snag recruitment; promoting downed log recruitment; and reducing road densities.

#### Wildlife Objective 5

Protect eagle and other raptor nesting, perching, and roost sites.

#### Strategy

Promote protection of sites with current or potential use including forested shorelines along the Nine Mile, Long Lake Little Falls reservoirs, and the river corridor below Little Falls Dam; individual large diameter and spike-topped trees found along reservoir shorelines, free flowing sections, and the floodplains along the Spokane River, lower and

upper Latah Creek, the lower Little Spokane River and other major Spokane River tributaries; mature riparian habitats; and old-growth/mature forests.

#### Wildlife Objective 6

Reduce the loss of, and adverse impacts to, riparian and emergent wetland habitat along Long Lake and Nine Mile reservoirs, due to accelerated shoreline development.

#### Strategy

Adequate enhancement and protection will likely entail use of a combination of activities including cooperative conservation agreements with land owners, continued public education on the values of these habitats, protection acquisition of sensitive habitat lands, and protection through land use ordinances such as county critical areas ordinances enacted through the Washington State Growth Management Act.

#### Wildlife Objective 7.

Minimize or prevent the loss of, and adverse impacts to, riparian, emergent wetland, and in-stream habitat along Nine-mile Reservoir due to possible reservoir water elevation increase associated with future hydroelectric development at the Nine-mile Dam.

#### Strategy

Adequate enhancement and protection will likely entail use of a combination of activities including cooperative conservation agreements with land owners; continued public education on the values of these habitats; protection acquisition of sensitive habitat lands; protection through land use ordinances such as county critical areas ordinances enacted through the Washington State Growth Management Act; and actions taken to prevent this hydro-operation expansion during up-coming FERC re-licensing activities.

#### Wildlife Objective 8

Minimize or prevent the loss of, and adverse impacts to, riparian habitat along the Little Spokane River down stream of Chattaroy, along upper Chamokane Creek, and Latah Creek due to accelerated flood plain and riparian habitat development.

#### Strategy

Adequate enhancement and protection will likely entail use of a combination of activities including cooperative conservation agreements with land owners; continued public education on the values of these habitats; and protection acquisition of sensitive habitat lands. Continue involvement in Partners in Flight neo-tropical migrant monitoring program.

#### Wildlife Objective 9

Minimize or prevent soil erosion and sediment impacts to the Spokane River from water run off from agricultural lands within the Hangman/Latah Creek drainage.

### Strategy

Future improvements in sediment runoff from the Latah Creek drainage may be achieved by participation in, and facilitation of, proactive measures to reduce sediment generation and transport within the Hangman Creek drainage through work on the Spokane County Conservation District Hangman Creek Restoration Project, and through the development of TMDLs for the portions of the drainage that extend into Idaho by the Coeur d'Alene Tribe.

### Wildlife Objective 10

Minimize impacts of habitat loss due to development and urbanization within Spokane County and adjacent counties in Idaho.

### Strategy

Continue involvement with Spokane County in development of Comprehensive Plan. Complete GIS project which will allow documentation and quantify the impacts of development on wildlife in Spokane County and neighboring Idaho counties.

### Wildlife Objective 11

Determine distribution of species of concern e.g., lynx, wolverine, Townsend's big-eared bat, etc., within the Spokane River Subbasin by 2004.

### Strategy

Conduct population surveys of species of concern.  
Identify and map (GIS) species' distributions in the Spokane Subbasin.  
Coordinate efforts with other agencies, citizens, and NGOs.

### Wildlife Objective 12

Protect, restore, and enhance riparian, wetland, and transition habitat in the Upper Hangman / Latah Creek watersheds. A Coeur d'Alene Tribe specific objective: A five year target to restore 15 miles of riparian (and associated floodplain / wetland) habitat and increase connectivity to uplands by 25%.

### Strategy

Successful restoration of riparian, floodplain, wetland, and transition habitat will depend upon long term land protection activities. the securing of land management rights will be accomplished through land acquisition, conservation easements, BMP incentive programs, and voluntary agreements with willing landowners. Restoration will include both passive and active techniques to be identified in specific management plans.

### **Research, Monitoring, and Evaluation Activities**

Research, monitoring and evaluation objectives will continue to evolve due to continued impacts on fish and wildlife resources. The monitoring and evaluation objectives that are most relevant now are measuring water quality and quantity, the habitats associated with these parameters, and the loss of terrestrial habitats due to development associated with residential and commercial development. New research, monitoring and/or evaluation

activities listed below have been identified to address continuing fish and wildlife resource needs which will support development of necessary management plans and implementation of those plans.

#### Fish

- Conduct fish stock assessments and population inventories to estimate population strength and population dynamics within the Little Spokane River system and Seven-mile, Long Lake and Little Falls reservoirs on the Spokane River.
- Evaluate in-stream habitat and riparian habitat conditions along the Spokane River and its tributaries to identify beneficial habitat and fish passage improvements.
- Monitor the effectiveness of in-stream habitat improvements, passage improvements, and riparian enhancement efforts.
- Conduct genetic evaluation of potentially distinct stocks of resident redband rainbow trout and kokanee salmon within the Little Spokane River watershed.
- Conduct evaluations of tributary streams that may have potential for wild redband rainbow and possibly cutthroat and bull trout production.
- Conduct an IFIM study on the upper Spokane River below Post Falls to assist in developing fish management and river flow management plans to enhance and preserve an established wild resident rainbow trout population.
- Examine recreational usage of salmonid stocks in the Spokane River, in both Idaho and Washington, to determine the best management approaches for a wild fish populations which straddles the Washington/Idaho state boundary.
- Continued examination of fish species composition and relative abundance in Spokane River reservoirs and affected stream reaches within Washington to help identify best management approaches for sustaining recreational fisheries, healthy fish stocks, and wild fish populations.
- Additional evaluation of late winter reservoir water draw downs within the Long Lake Reservoir, and potential adverse impacts to over winter survival of juvenile warm water fish species such as largemouth bass, smallmouth bass, and black crappie.
- Continue monitoring Spokane River water quality, including heavy metal contamination levels, dissolved oxygen, temperature, and dissolved gas saturation levels below hydro-electric dam facilities.
- Assess soil erosion and sediment impacts to the Spokane River from water run off from agricultural lands within the Latah / Hangman Creek drainage. Future improvements in sediment runoff from the Latah / Hangman Creek drainage may be achieved by participation in, and facilitation of, proactive measures to reduce sediment generation and transport within the Hangman Creek drainage through work on such projects as the Spokane County Conservation District Hangman Creek Restoration Project, and work undertaken by the Coeur d'Alene Tribe.

#### **Statement of Fish and Wildlife Needs**

A functioning aquatic system requires a certain level of water quality and quantity, and associated habitats that satisfy the needs of specific aquatic life forms. Unfortunately because of dam construction, permanent blockages and reservoirs have been formed which have changed fish and wildlife species assemblages from known past

species and habitat complexes. These blockages on the Columbia and Spokane Rivers have eliminated anadromous species and impacted, and in some cases eliminated native resident fish species. Objectives and strategies for fish and wildlife management will be dependent on protecting and enhancing species of fish and wildlife by priority based on such aspects as species status (endangered, threatened, sensitive), recreational significance, historical familiarity and species bio-diversity.

The following lists are not intended to be all-inclusive and will be further refined through the subbasin planning process.

#### Fish Needs

1. Continue Joint Stock Assessment Project work funded through BPA on the Little Spokane River system and the major reservoirs on the Spokane River (Seven-mile, Long Lake and Little Falls), for fish stock assessments and population inventories to estimate population strength and population dynamics, such that fish management plans can be developed which will guide future enhancement and management activities.
2. Evaluate In-stream habitat and riparian habitat conditions along the Spokane River and in Spokane River tributaries to identify beneficial habitat and fish passage improvements, such that future funding for fish passage and habitat improvement work can be focused at addressing point location fish habitat deficiencies.
3. Conduct genetic evaluation of potentially distinct stocks of resident redband rainbow trout and kokanee salmon within the Little Spokane River watershed; and genetic evaluation of potentially distinct stocks of resident redband rainbow trout in the hangman / Latah Creek watersheds.
4. Conduct an IFIM study on the upper Spokane River below Post Falls to assist in developing fish management and river flow management plans to enhance and preserve an established wild resident rainbow trout population.
5. Review artificial fish habitat structures previously placed in Long Lake Reservoir (Long Lake) to determine: physical viability, seasonal fish utilization, and the potential benefits of additional placement of artificial habitat structures within the reservoir.
6. Additional evaluation of late winter reservoir water draw downs within the Long Lake Reservoir, and potential adverse impacts to over winter survival of juvenile warm water fish species such as largemouth bass, smallmouth bass and black crappie.
7. Provide financial assistance for the maintenance and operation of the Ford Hatchery to maintain quality sport salmonid fisheries as partial substitution for lost anadromous fish angling opportunity above Chief Joseph and Grand Coulee dams in Lake Roosevelt, the lower Spokane River, Long Lake reservoir, and selected lowland lakes within the Spokane Subbasin.
8. Provide financial assistance for the maintenance and operation of potential tribal hatchery facilities to maintain quality sport fisheries and subsistence fisheries as partial substitution for lost anadromous fishing opportunity above Chief Joseph and Grand Coulee dams in Lake Roosevelt, the lower Spokane River, Long Lake reservoir, hangman / Latah Creek, and selected lowland lakes within the Spokane Subbasin.

### Wildlife Needs

1. Provide and protect habitats that support life requisites for all native and desired wildlife and botanical species.
2. Protect and enhance wildlife and botanical populations/communities to optimum levels relative to available habitat.
3. Maximize ecosystem connectivity to promote natural levels of genetic interchange.
4. Completion of population status assessment for non-game wildlife species that are candidates for protective listing (e.g. lynx, wolverine, bats, etc.).
5. Completion of Recovery plans for listed wildlife species.
6. Identify, map, acquire, and manage-habitat areas, corridors, and linkages valuable to wildlife.
7. Protect existing and newly acquired habitat through adequate long-term Operations and Maintenance (O&M) funding.
8. Enhance existing and available habitat to optimize conditions required to increase overall wildlife and botanical productivity of desired species assemblages.
9. Provide annual monitoring and evaluation of projects and apply adaptive management principles as necessary to meet terrestrial resource goals.
10. Coordinate efforts with other resource managers to maximize benefits to habitat and associated wildlife and botanical populations/communities for the benefit of the human community.
11. Establish a habitat protection trust fund that can be used to secure management rights to priority habitat areas with emphasis on riparian, wetland, floodplain, Palouse transition / grassland, and winter range areas.

## Present BPA Projects Within the Subbasin

### Projects Associated With Current BPA Funding

There are no projects within the Washington State portion of the Spokane subbasin currently receiving BPA funding. BPA projects identified below within an asterisk are indirectly associated with the Spokane Subbasin.

1. 5521800: Lake Roosevelt kokanee net pens (potential utilization of a unique native stock of kokanee which would originate from the Little Spokane River Chain Lakes located within the Spokane Subbasin)\*
2. 9104600: Spokane Tribal Hatchery O&M (kokanee rearing for FDR fishery) - potential utilization of a unique native stock of kokanee which would originate from the Little Spokane River Chain Lake located within the Spokane Subbasin)\*
3. 9104700: Sherman Creek Hatchery O&M (rainbow and kokanee net pen program for FDR fishery - potential utilization of a unique native stock of kokanee which would originate from the Little Spokane River Chain Lake located within the Spokane Subbasin.)\*
4. 9404300: Lake Roosevelt Monitoring / Data Collection Project (FDR fishery assessment and habitat quality assessment)\*
5. 9700400: Joint Stock Assessment Project. The Joint Stock Assessment Project (JSAP) area (blocked area) is composed of 32 unique water bodies covering 9.3 million acres. The project boundary is defined as all water bodies upstream of Chief Joseph Dam within the State of Washington. Prior to hydropower development, the area was a productive, stable ecosystem (Scholz et al. 1985) which contained healthy, native, self-sustaining populations of resident fish, wildlife, and anadromous fish. The present the fish assemblage is drastically different than pre-dam development. Anadromous fish have been extirpated due to the construction of Grand Coulee Dam. Thirty-nine resident fish species are known to exist in the blocked area, the majority of which are not native. This largely non-native assemblage is, in part, the product of authorized and unauthorized introductions. Dynamics of the current system have been developing over the last five decades, and have not reached equilibrium. Managers today are unclear of simple ecological aspects of the system such as distribution and range of the 39 fish species. The JSAP has been designed to function as a tool for fish managers in the blocked area. This tool will focus on understanding the dynamics of fish and their habitats throughout the area and recommend management actions based on the best available science and the condition of the entire areas' ecosystem. The JSAP allows managers to view the Blocked Area as a system by compiling previously collected data, organizing available data, identifying areas needing data, performing necessary research, and recommending management actions. Managers acknowledge that to effectively manage the fisheries, information such as species present and relative densities are required at a minimum. It is important to realize that this project has been set up to centrally accommodate all managers avoiding effort duplication, and ensuring Area wide coordination at achieving the stated vision. In 1993, managers identified a need for a coordinated approach to fish management in the blocked area. This coordinated approach included a baseline stock inventory of the resident fish species inhabiting the area and is the basis for measure 10.8B.26. This need was also recognized by the Independent Science Review Panel (ISRP) in their 1998 report. Recommendations made by the ISRP are very similar to the way in which the JSAP has been set up. The

JSAP is centered around the concept in the Council's program that management actions should be based upon and supported by the best available scientific knowledge [Section 4.(h)(6)(B)] and the stated vision of the Blocked Area Management Plan (in press). By integrating information the JSAP uses information collected by all blocked area projects and other sources to identify data gaps and fill necessary voids. The information collected by the JSAP combined with information collected by other projects and sources increases the scientific knowledge of the whole system. This increased knowledge allows for more educated decisions on fish management actions, greatly increasing the chances for native fish recovery and providing successful subsistence and recreational fisheries. Because blocked area managers implementing projects addressing specific Council Program measures will use this information, success of the JSAP increases the likelihood of other project success.

6. 9206100: Albeni Falls Wildlife Mitigation Project.

A cooperative, multi-agency wildlife mitigation project developed and coordinated through the Albeni Falls Interagency Workgroup. Implementation efforts are oriented in providing in-kind mitigation for habitat types impacted through the construction and inundation of Albeni Falls Dam. Target habitats identified for protection, restoration, and enhancement efforts include riparian corridors, wetlands, floodplains and scrub-shrub habitats.

7. 199004402: Coeur d'Alene Trout Production Facility

A component of this project includes the provision of alternative subsistence fisheries for partial substitution of lost anadromous fisheries.

8. 199004400: Implement Fisheries Enhancement Opportunities

Coeur d'Alene Indian Reservation A component of this project includes the construction, operation and monitoring of compensatory subsistence fishery projects for partial mitigation of extirpated anadromous fisheries.

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## Subbasin Recommendations

### FY 2001 Projects Proposals Review

#### Projects and Budgets

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Project: 21017 - Implement Wildlife Habitat Protection and Restoration on the Coeur d'Alene Indian Reservation: Hangman Watershed

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**Sponsor:** Coeur d'Alene

**Short Description:**

Protect and/or restore riparian, wetland and priority upland wildlife habitats within the Hangman Watershed on the Coeur d'Alene Indian Reservation as part of implementation efforts in the Spokane River Subbasin.

**Abbreviated Abstract**

Construction of hydroelectric facilities in the Columbia Basin resulted in the extirpation of anadromous fish stocks in Hangman Creek and its tributaries within the Coeur d'Alene Reservation. As a result, the Coeur d'Alene Indian Tribe was forced to convert prime riparian habitat into agricultural lands to supply sustenance for their changed needs.

Wildlife habitats within the portion of the Hangman Creek Watershed that lies within the Coeur d'Alene Indian Reservation have been degraded from a century of land management practice inclusive of widespread conversion to agriculture and intensive silvicultural practices. Currently, wildlife and fish populations have been marginalized and water quality is significantly impaired. The Coeur d'Alene Tribe proposes to protect, restore and/or enhance priority riparian, wetland and upland areas within the headwaters of Hangman Creek and its tributaries in order to promote healthy self-sustaining fish and wildlife populations. A goal of this project is implementation of wildlife habitat protection efforts that secure stream reaches targeted by the Tribal Fisheries Program for stream channel restoration activities. Proposed activities will be conducted in the headwaters of the system and are expected to prove beneficial in efforts to address water quality problems within the entire Hangman Creek system.

**Relationship to Other Projects**

<b>Project ID</b>	<b>Title</b>	<b>Nature of Relationship</b>
199004400	Implement Fisheries Enhancement on the Coeur d'Alene Reservation	One of the five focus watersheds is Rock Creek, the northern most drainage in the Hangman/Latah Watershed. This project also includes the construction and maintenance of five trout ponds in the Watershed.
199004401	Lake Creek Land Acquisition	The majority of the target property lies adjacent to the Rock Creek Watershed, and the southwestern most corner extends into the Rock Creek Watershed.
199004402	Coeur d'Alene Tribe Trout Production Facility	The trout production facility lies within the Rock Creek Drainage. This facility will produce westslope cutthroat trout and rainbow trout to supplement the local fishery in the Hangman Creek Watershed.
9206100	Albeni Falls Wildlife Mitigation Project	A cooperative, multi-agency wildlife mitigation project coordinated through the Albeni Falls Interagency Workgroup that provides for the protection and enhancement of riparian, wetland and other priority habitat types in the Idaho Panhandle.

**Relationship to Existing Goals, Objectives and Strategies**

Project 21017 requests funding to protect and/or restore riparian, wetland and priority upland wildlife habitats within the Hangman Watershed on the Coeur d'Alene Indian Reservation. This proposal addresses Wildlife Needs 1, 2, 8, 9, 10, and 11, Wildlife Goal 6, Objectives 1, 2, 5, 8, 9, and 12, and their associated strategies as identified in the Spokane River Subbasin Summary.

**Review Comments**

The team's recommendation was fund - Urgent/High Priority. Land acquisition should be funded separately through current processes or new process. Land trust issues should be resolved in a regional forum.

**Budget**

<b>FY01</b>	<b>FY02</b>	<b>FY03</b>
\$158,252	\$1,725,500	\$1,855,000

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Project: 21018 - Implement Fisheries Enhancement on the Coeur d'Alene Indian Reservation: Hangman Creek

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**Sponsor:** Coeur d'Alene

**Short Description:**

Determine the distribution and enhancement opportunities for redband trout in Hangman Creek and its tributaries within the Coeur d'Alene Reservation.

**Abbreviated Abstract**

Construction of hydroelectric facilities in the Columbia Basin resulted in the extirpation of anadromous fish stocks in Hangman Creek and its tributaries within the Coeur d'Alene Reservation. As a result, the Coeur d'Alene Indian Tribe was forced to rely more heavily on native fish stocks such as redband trout *Oncorhynchus mykiss garideini*, westslope cutthroat trout *O. clarki lewisii*, and bull trout *Salvelinus confluentus*, subsequently exhausting the resources. The Coeur d'Alene Tribe proposes to assess the fisheries enhancement opportunities for redband trout and other native fish species in the portion of Hangman Creek that lies within the Coeur d'Alene Reservation. Objectives are to: 1) determine if naturally reproducing rainbow trout in Hangman Creek and tributaries within the Coeur d'Alene Reservation are redband trout; 2) determine areas that are in need of restoration to supply spawning and rearing habitat for redband and other naturally reproducing trout; 3) develop an education outreach program to facilitate a "holistic" watershed protection process; 4) implement a habitat/in-stream restoration strategy that will provide self-sustaining, naturally reproducing, and harvestable populations of native trout in the Hangman Creek watershed; and 5) implement a monitoring and evaluation program to determine the effectiveness of habitat/in-stream restoration projects.

**Relationship to Other Projects**

Project ID	Title	Nature of Relationship
199004400	Implement Fisheries Enhancement on the Coeur d'Alene Reservation	The focus of the Fish and Wildlife Habitat Protection Plan includes Rock Creek, which is the northern most drainage in the Hangman Creek Watershed. This project also includes the construction and maintenance of five trout ponds in the Watershed.
199004401	Lake Creek Land Acquisition	The majority of the target property lies adjacent to the Rock Creek Watershed, and the southwestern most corner extends into the Rock Creek Watershed.
199004402	Coeur d'Alene Tribe Trout Production Facility	The trout production facility lies within the Rock Creek Drainage. This facility will produce westslope cutthroat trout and rainbow trout to supplement the local fishery in the Hangman Creek Watershed.

Project ID	Title	Nature of Relationship
9206100	Albeni Falls Wildlife Mitigation Project	This project focuses at providing in-kind mitigation for habitat types impacted through the construction and inundation of Albeni Falls Dam.

**Relationship to Existing Goals, Objectives and Strategies**

Project 21018 requests funding to determine the distribution and enhancement opportunities for redband trout in Hangman Creek and its tributaries within the Coeur d'Alene Reservation. The Proposal addresses Fish Need 3, the Fish Goal to restore and maintain the health diversity of native fish stocks in the Spokane subbasin....., Fish Objective 1/Strategy 2, Fish Objective 2/Strategies 2 and 9, and Fish Objective 3/Strategy 9 as identified in the Spokane River Subbasin Summary.

**Review Comments**

The team's recommendation was fund assessment work - Urgent/High Priority. Implementation activities should be reviewed by CBFWA/RFC prior to future funding using the within-year budget modification process.

**Budget**

FY01	FY02	FY03
\$179,482.70	\$291,705	\$268,500

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**Project: 21022 - Evaluate Fish Habitat on the Middle Spokane/Little Spokane Rivers**

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**Sponsor:** Spokane County Public Works Departement, Utilities Division

**Short Description:**

Identify target reaches on the Middle Spokane and Little Spokane rivers. Use Instream Flow Incremental Methodology to characterize the amount of available habitat for target reaches.

**Abbreviated Abstract**

The Little Spokane River is a major tributary to the Spokane, which drains parts of Spokane, Pend Oreille, and Stevens Counties in Washington and empties into the Spokane River at River Mile 56.3 Though these stream basins cover a large geographic area, there is only a general understanding of the extent and quality of potential fish habitat in them.

In the work proposed, Spokane County will augment existing data and information gathered as part of the Watershed Plan for WRIA 55 and WRIA 57. The additional information will provide a technical basis for defining the potential for fisheries production within the study areas.

This body of information will be used to develop PHABSIM models for assessing changes in habitat availability under different flow regimes. The models, combined with existing scientific and empirical information, will help quantify minimum and target flows that

provide adequate habitat to sustain or increase resident populations of target salmonids, including redband and rainbow trout, kokanee, westslope cutthroat trout, and bull trout.

**Relationship to Other Projects**

<b>Project ID</b>	<b>Title</b>	<b>Nature of Relationship</b>
	USGS / USEPA Studies on Metals Contamination in the Upper Spokane River Basin	The work performed here will help identify river reaches critical to fish survival on the Upper Spokane. This will allow focused remediation efforts to improve fisheries.
	USGS Northern Rocky Mountain Water Quality Assessment	Water quality work conducted by NAWQA will be useful in assessing the water quality factors related to fish habitat.
	Little Spokane River Watershed Initial Assessment	This WDOE work provides baseline information on fish distribution in LSR that will aid in identifying target reaches.
	Population Dynamics and Factors Affecting Rainbow Trout in the Spokane River, Idaho	Information from this baseline habitat study by Washington Water Power (Avista) will help identify target reaches and provide baseline data. on the Spokane River.
	Upper Spokane River Rainbow Trout Spawning and Emergence Study for 1995 and 1996	This study by Avista Utilities identifies major spawning sites for one target species.
	1997-1999 Upper Spokane River Rainbow Trout Spawning and Fry Emergence Study	This work expands on the assessment of sites identified in 1995-1996 report. These studies will form the basis for identifying target reaches on the Middle Spokane River.

**Relationship to Existing Goals, Objectives and Strategies**

Project 21022 requests funding to identify target reaches on the Middle Spokane and Little Spokane Rivers. The proposal addresses Fish Need 4, the Fish Goal to restore and maintain the health diversity of native fish stocks in the Spokane subbasin....., and Fish Objective 2/Strategy 6 as identified in the Spokane River Subbasin Summary.

**Review Comments**

The team’s recommendation was do not fund based on the belief that this is an AVISTA responsibility.

**Budget**

<b>FY01</b>	<b>FY02</b>	<b>FY03</b>
\$93,000	\$59,000	\$4,000

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Project: 21030 - Forest Carnivore Surveys for Spokane Subbasin

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**Sponsor:** Washington Department of Fish and Wildlife (WDFW)

**Short Description:**

Conduct surveys to verify reported sightings of the lynx, wolverine, marten and fisher in the Spokane Subbasin.

**Abbreviated Abstract**

This project will survey Mt. Spokane State Park in Spokane County. Over the past few years, WDFW has received reports regarding sightings of forest carnivores (i.e., lynx, wolverine, marten, and fisher) in and around Mt. Spokane State Park. Presently, the lynx is listed by the state and federal government as Threatened, the wolverine as a State Candidate and a Species of Concern by the Federal government, and the fisher as Endangered by the State and as a Species of Concern by the Federal government.

**Relationship to Other Projects**

Project ID	Title	Nature of Relationship
(none)		

**Relationship to Existing Goals, Objectives and Strategies**

Project 21030 requests funding to conduct surveys to verify reported sightings of the lynx, wolverine, marten and fisher in the Spokane Subbasin. This proposal addresses Wildlife Need 4, Wildlife Object 11 and associated strategies as identified in the Spokane River Subbasin Summary.

**Review Comments**

The team's recommendation was do not fund on the basis that this is not a BPA responsibility, but instead is the State's or ski resort's responsibility due to the planned expansion of the resort.

**Budget**

FY01	FY02	FY03
\$70,000	\$70,000	\$0

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**Project: 21031 - Land Use Analyses of Spokane County**

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**Sponsor:** Washington Department of Fish and Wildlife (WDFW)

**Short Description:**

Analyze and compare past and current vegetation types and land uses in order to determine and predict the impacts different land uses and human development has had and will have on wildlife in Spokane County.

**Abbreviated Abstract**

This project will analyze current digital aerial photos and the oldest available aerial photos of Spokane County identifying and mapping all of the vegetation types and land use types

onto a Geographical Information System (GIS). Data entered into GIS system will be ground-truthed and an estimate for accuracy will be derived. With this data, total number of acreage and % of total acreage will be calculated for both the current and historic land-use/land-coverage. This data will then be analyzed to determine and rank the threat to each habitat as evidenced from the difference of these two coverages. This data is a reflection of the habitat conversion and loss occurring in Spokane County as a result of human development. WDFW and the Spokane County Planning Department will use the information to determine the suitability of proposed development in the county. This information can also be used to develop an “alternative futures” model for Spokane County, which would allow a review of different alternative development approaches. It could predict the amount and type of habitat that would be lost and the associated wildlife species.

**Relationship to Other Projects**

Project ID	Title	Nature of Relationship
(none)		

**Relationship to Existing Goals, Objectives and Strategies**

Project 21031 requests funding to analyze and compare past and current vegetation types and land uses in order to determine and predict the impacts different land uses and human development has had and will have on wildlife in Spokane County. This proposal addresses Wildlife Need 6, Wildlife Goal 3, and Wildlife Objective 10 and associated strategies as identified in the Spokane River Subbasin Summary.

**Review Comments**

The team’s recommendation was do not fund. Reviewers suggested funding would be more appropriate through the EDT process.

**Budget**

FY01	FY02	FY03
\$47,000	\$47,000	\$0

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Project: 21006 - Characterize and Assess Wildlife Habitat Types and Structural Conditions for Subbasins Within the Intermountain Ecoprovince

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**Sponsor:** NHI

**Short Description:**

Fine-scale wildlife habitat assessment for the Inter-Mountain Ecoprovince will produce critical baseline data for planning and monitoring efforts that is consistent within the NWPPC Framework wildlife-habitat relationships process.

#### **Abbreviated Abstract**

As ecological assessments of the Columbia River Basin step down in geographic scale to the subbasin level, the need for fine-scale wildlife habitat depiction and assessment rises markedly. The NHI proposed that the same mapping methodology and wildlife-habitat types be reviewed and mapped at a finer level of resolution (4 ha minimum mapping unit, (mmu) --- 10 acres) for all sub-basins within the Inter Mountain Ecoprovince. Objectives of the study are to 1) map wildlife-habitat types at a refined resolution (4 ha mmu); 2) map wildlife habitat structural conditions (4 ha mmu); 3) validate the mapping effort by field visits; and 4) evaluate the current conditions for wildlife using the wildlife-habitat relationships data set in conjunction with the wildlife-habitat types and structural conditions mapping information. To be successful with conservation actions, strategies, habitat restoration, and mitigation projects which have the ability to predict species associations, map wildlife-habitat types and structural conditions, and put that information into context with existing landscapes, will allow for a more comprehensive assessment of individual sub-basins and successful design.

**Relationship to Other Projects**

<b>Project ID</b>	<b>Title</b>	<b>Nature of Relationship</b>
2000742	Establishing Baseline Key Ecological Functions of Fish & Wildlife for Sub-Basin Planning	A refined map would depict with greater accuracy those areas where ecological functions are thought to have increased or decreased. Maintaining ecological functions is identified as a wildlife goal #1 for the Spokane River Sub-basin Summary.

**Relationship to Existing Goals, Objectives and Strategies**

Project 21006 is a request for funding to perform a fine-scale wildlife habitat assessment for the Inter-Mountain Province that would result in critical baseline data for planning and monitoring efforts that is consistent within the NWPPC Framework wildlife-habitat relationships process. The review team suggested that this project is linked to the EDT process and thus should be funded through a different budget.

**Review Comments**

The team’s recommendation was do not fund.

**Budget**

<b>FY01</b>	<b>FY02</b>	<b>FY03</b>
\$84,571	\$0	\$0

**Project: 21032 - Eastern Washington Survey for Townsend's Big-Eared Bat**

**Sponsor:** Washington Department of Fish and Wildlife (WDFW)

**Short Description:**

An in-depth search and inspection of all appropriate old cabins, barns, and buildings is essential to identify the existence/distribution of maternal colonies of Townsend's big-eared bats in the Inter-mountain Province.

**Abbreviated Abstract**

The Townsend’s bat is one of the rarest mammals in Washington State. Little is known of this bat, including its summer distribution, summer life cycle and requirements, and hibernacula (winter roosts). This project will survey human structures in eastern Washington for possible Townsend’s big-eared bat maternity colonies. Once a colony is found, data will be gathered on the structure to help identify other colonies. In addition, the location will be entered into the WDFW central GIS and database system, which will bring any threat to the colony to the attention of WDFW or other state agencies, and the threat will be reviewed. In addition, in some of these colonies, at the end of summer a small number of bats will be fitted with radio transmitters in an attempt to discover their winter roosts. The threat to each site will be ranked and appropriate conservation or protection action will be initiated.

**Relationship to Other Projects**

Project ID	Title	Nature of Relationship
(none)		

**Relationship to Existing Goals, Objectives and Strategies**

Project 21032 is a request to perform an in-depth search and inspection of all appropriate old cabins, barns, and buildings to identify the existence/distribution of maternal colonies of Townsend's big-eared bats in the Inter-mountain Province. These data will not only significantly add to the current body of knowledge concerning Townsend's big-eared bats, but will also supplement existing data. Ultimately this will aid State and Federal agencies in designing management plans better suited to ensure the survival of this sensitive species, and thereby possibly avoid the formal federal listing of this species as endangered or threatened. The project addresses Wildlife Needs 4, Wildlife Goal 2, Objective 11 and associated strategies listed in the Spokane River Subbasin Summary. However, reviewers suggested that it is not a BPA responsibility.

**Review Comments**

The team's recommendation was do not fund.

**Budget**

FY01	FY02	FY03
\$73,000	\$70,500	\$0

**Research, Monitoring and Evaluation Activities**

I. Spokane County Conservation District – completed projects

- Thompson Creek Watershed Analysis
- Newman Lake Restoration Feasibility Study
- Chester Creek Watershed Plan

II. Spokane County Conservation District (SCCD) – continuing projects

Hangman (Latah) Creek Suspended Sediment/Bedload Monitoring Study:  
 This study is funded by a 1997 Washington State Conservation Commission Implementation Grant. The Conservation District is working cooperatively with the United States Geological Survey (USGS) to determine daily suspended sediment load and estimate bedload leaving the watershed at the mouth of Hangman Creek during the 1998 and 1999 water years. Bedload quantity and particle size distribution during runoff events will be estimated.

Status: Suspended sediment data for the 1998 water year have been analyzed and published. Hangman Creek delivered over 35,000 tons of sediment to the Spokane River. Samples for the 1999 water year are still being collected. A final report will be complete and available by June 30, 2000.

#### Hangman (Latah) Creek Comprehensive Flood Hazard Management Plan:

This plan is funded through a 1997 Flood Control Assistance Account Program (FCAAP) managed by the Department of Ecology. The intent of the plan is to develop a document that will serve the community in the Lower Hangman Valley in a variety of ways.

Foremost, the document identifies problem reaches and sites along the lower reaches of the stream. Management and structure alternatives have been designed for each problem area. Completion of this plan provides a framework for these projects to be funded by future FCAAP grant cycles. The document also describes other funding sources. The plan further provides information about the permits and the process necessary for developers, and citizens to follow if they would like to pursue any type of project within the floodplain and stream. Adoption of the plan by the City of Spokane and Spokane County would provide additional technical strength to local ordinances that address development and planning within the Hangman Valley.

Status: The document is finished and will be available in June 2000.

Avista Utilities Restoration Fund: Hangman Creek has been identified by the USGS, Avista, and the SCCD as the main sediment source to the Nine Mile Reservoir. Stream bank erosion with the lower 18.3 miles of Hangman Creek is believed to be generating a majority of these sediments. Avista has developed an agreement with the Conservation District to stabilize these banks and address the sediment in the uplands. An annual sum of \$10,000 is awarded to the District. The District then works with other funding sources and agencies to address selected projects.

Status: The 1998 bank stabilization project is complete and has gone through its first water year with mixed results. The bio-engineered stabilization project has accumulated silts, but is in need of repairs and more tree revetments to continue protection of the channel banks. A new project is currently being prepared for the spring of 2000.

Hangman (Latah) Creek Sediment/Bedload Monitoring Study – Water Quality Network: This project is a continuation of the 1997 sediment study. An additional project component is the installation of multiple water-level recorders. Water quality auto-samplers may be installed next water year.

Status: The sediment sampling has continued with the assistance of the USGS. The USGS National Water-Quality Assessment Program (NAWQA), is also collecting samples for analysis of pesticides in the watershed.

HB2514 Watershed Panning Grant: The Conservation District has received the first of the three-phased grant to begin watershed planning in the Hangman (Latah) Creek watershed. This process is designed to allow local citizens and governments to join with the other stakeholders to form a central “Planning Unit” in effort to address the water resources issues in Hangman Creek. The planning Unit will discuss the following elements: quantity, quality, instream flows and habitat. State agencies provide technical assistance if requested to serve on the planning unit.

Status: The initiating governments (Spokane County, Whitman County, The City of Spokane, and the Hangman Hills Water District) have met three times since March with the rest of the Planning Unit. They are currently working on a Memorandum of Agreement, ground rules, a mission statement, and goals.

Little Spokane River Watershed Plan Development Grant: The Conservation District received a Centennial Clean Water Fund Grant from the Department of Ecology to continue on-going efforts in the watershed. A Technical Advisory Committee will be formed to help evaluate current issues and watershed needs. A work plan will be developed for monitoring and education.

Status: A meeting for the Technical Advisory Committee will be held in May or June. We are currently reviewing and researching existing data and reports relating to the Little Spokane River Watershed.

III. Washington Department of Fish and Wildlife – on-going monitoring activities  
Monitoring of wildlife populations (game and non-game).  
Limited fish population assessments within regional lowland lakes and streams.  
Water quality monitoring on lowland lakes stocked with hatchery fish.

IV. Coeur d’Alene Tribe – work in Upper Hangman Creek  
Water quality monitoring.  
Reservation lands inventory and analysis of wildlife habitat areas and condition.  
Past monitoring of big game populations, including distribution and abundance.

### **Needed Future Actions**

Bonneville Power Administration funding should be used in the future to restore the condition and functionality of streams within the subbasin. These efforts can compliment other programs, such as Washington HB2514 watershed planning efforts, which are intended to encourage landowner participation in restoration and the improved functionality of floodplains and watercourses. Future BPA funding will be needed to insure that fish and wildlife habitat restoration, fish passage, and monitoring and evaluation efforts initiated within the subbasin continue to address identified fish and wildlife limiting factors and needs, as identified under the summary of Fish and Wildlife Needs within this document. Data on red-band rainbow trout distribution and relative abundance within the subbasin is needed to address management needs for sensitive stocks. Evaluation of, and establishment of appropriate in-stream flows for resident fish within the Spokane and Little Spokane rivers is crucial to sustainability and future success of the resident salmonid and native fish species assemblages.

Riparian habitat protection and restoration toward fully functioning floodplains is also critical to resident salmonids, native fish species assemblages, and riparian associated wildlife species.

### **Actions by Others**

Rapid implementation of forthcoming HB2514 watershed recommendations from technical and citizen groups working within the Latah/Hangman Creek and Little Spokane River watershed would significantly aid in the overall restoration of stream habitat and ultimately fish populations within the subbasin. Landowners have been, and should continue to be, encouraged to participate in identified restoration programs through monetary, as well as regulatory incentives.

The NRCS and SCCD's will continue to work with private landowners to reduce erosion from the upland portions of the watershed.

Future FERC re-licensing work by Avista Utilities, in association with appropriate regulatory agencies and citizen working groups, will need to be incorporated into on-going and future fish and wildlife evaluation activities and habitat enhancement/restoration strategies.

**Table 1. Spokane Subbasin Summary FY 2001 BPA Funding Proposal Matrix**

Project Proposal ID	21017	21018	21022	21030	21031	21032	21006			
<b>Provincial Team Funding Recommendation</b>	Urgent/High Priority	Urgent/High Priority for assessment work	Do Not Fund							
<b>Wildlife Objective 1:</b> Protect and enhance big game winter range habitat along and associated with Long Lake Reservoir, Little Falls Reservoir, upper Latah Creek watershed, and Lower Little Spokane River	+									
<b>Wildlife Objective 2:</b> Protect and enhance big game travel and migration corridors	+									
<b>Wildlife Objective 5:</b> Protect eagle and other raptor nesting, perching, and roost sites	+									
<b>Wildlife Objective 8:</b> Minimize or prevent the loss of and adverse impacts to riparian habitat along Little Spokane River downstream of Chatteroy, along upper Chamokane Creek, and Latah Creek due to accelerated flood plain and riparian development	+		+							
<b>Wildlife Objective 9:</b> Minimize or prevent soil erosion and sediment impacts to the Spokane River from water runoff from agriculture lands and within the Hangman/Latah Creek drainage	+									
<b>Wildlife Objective 10:</b> Minimize impacts of habitat loss due to development and urbanization within Spokane County and adjacent counties in Idaho					+					
<b>Wildlife Objective 11:</b> Determine distribution of species of concern (lynx, wolverine, Townsend's big-eared bat, etc.) within Spokane River subbasin by 2004				+		+				
<b>Wildlife Objective 12:</b> Protect, restore, enhance riparian, wetland, and transition habitat in the Upper Hangman/Latah Creek watersheds	+									
<b>Fish Objective 1:</b> Evaluate 50 miles of Spokane River tributary stream(s) per year through 2005 to assess resident fish stocks composition and relative abundance, with primary emphasis on assessment of sensitive native salmonid stocks, and assess stream habitat conditions.		+								
<b>Strategy 2:</b> Evaluate in-stream habitat and riparian habitat conditions in Spokane River tributaries, with emphasis on Little Spokane River and Latah/Hangman Creek, to identify beneficial habitat and fish passage improvements.		+								
<b>Fish Objective 2 :</b> Protect and enhance wild salmonid populations in the Spokane River and its tributaries, with primary emphasis on conservation of sensitive wild stocks, by identifying native stocks through DNA analysis, and mapping native / wild salmonid stock distributions.		+								
<b>Strategy 2:</b> Conduct genetic DNA evaluation of potentially distinct stocks of resident redband rainbow trout within the upper headwaters of the Hangman/Latah Creek watershed to assist with development of appropriate management plans.		+								
<b>Strategy 6:</b> Conduct an IFIM study on the upper Spokane River below Post Falls to assist in developing fish management and river flow management plans to enhance and preserve an established wild resident rainbow trout population.		+								
<b>Strategy 9:</b> Work to reduce the extent of riparian and wetland habitat loss in the upper Latah/Hangman Creek watershed to assist in expansion of		+								

target fish populations and reduce sediment contributions to Latah Creek and the Spokane River.										
<b>Fish Objective 3:</b> Create fisheries that support and maintain traditional harvest needs (including tribal subsistence and ceremonial) and quality recreational fisheries as partial substitution for lost anadromous fishing opportunity above Chief Joseph and Grand Coulee dams within the Spokane Subbasin.		+								
<b>Strategy 9:</b> Create and / or maintain quality catch-out pond tribal fisheries in the Hangman/Latah Creek watershed headwaters in Idaho within CDA tribal controlled lands.		+								
<p><b>These project titles are referenced by ID above:</b>  21017 - Implement Wildlife Habitat Protection and Restoration on the Coeur d'Alene Indian Reservation, Hangman Watershed  21018 - Implement fisheries enhancement on the Coeur d'Alene Indian Reservation, Hangman Creek  21022 - Evaluate fish habitat on the Middle Spokane/Little Spokane rivers  21030 - Forest carnivore surveys for Spokane Subbasin  21031 - Land use analyses of Spokane County  21032 - Eastern Washington survey for Townsend's big-eared bat  21006 - Characterize and assess wildlife habitat types and structural conditions for subbasins within the Intermountain Province</p>										

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