SECTION 40 – Table of Contents

40 San Poil Subbasin Assessment – Terrestrial

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

The San Poil Subbasin is dominated by eastside interior mixed conifer forest, which is distributed broadly across the Subbasin. Eastside interior grassland is the second most abundant habitat type and is also widely distributed across the Subbasin. Ponderosa pine savannah and forest comprise another 10 percent of the habitats, located mainly in the lower elevations of the Subbasin. Shrub-steppe makes up about two percent of the total cover and is located in the southernmost portion of the Subbasin. Wetland habitats are limited to small areas of montane coniferous wetlands, herbaceous wetlands, and interior riparian wetlands associated with the San Poil River and other large streams. Agriculture and related land uses make up less than one percent of the total and affect lands along the San Poil River corridor and the southern portion of the Subbasin. Urbanization is limited within the Subbasin; the town of Republic is the largest urban center.

Figure 37.2 (Section 37) shows the current distribution of wildlife-habitat types in the San Poil Subbasin based on IBIS (2003). Table 40.1 presents the acreages by habitat type and by subbasin focal habitats. Five focal habitats were selected for the IMP: wetlands, riparian, steppe and shrub-steppe, upland forest, and cliff/rock outcrops. The same habitats were selected as focal habitats for the San Poil Subbasin (Ad Hoc Terrestrial Resources Tech Team, May 5, 2003). Focal habitats comprise about 99 percent of the basin, including upland forests (68 percent), steppe and shrub-steppe (29 percent), and wetlands and riparian habitats (just under two percent). Developed habitats, including agricultural and urban lands, currently comprise approximately one percent of the Subbasin and are located primarily along the San Poil River corridor. Cliff/rock outcrop habitats are not mapped in the IBIS system.

The IBIS data is based on satellite imagery at a scale that tends to under-represent habitats that are small in size or narrow in shape. Additional information on habitats and wildlife within the San Poil Subbasin is available for selected ownerships and/or jurisdictions; these sources include the WDFW, WDOE, Colville Confederated Tribes, USFS, and USFWS. Data from these sources has been used where available to provide more specific information on habitat and wildlife species distribution within the Subbasin.

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

Table 40.1. Current Wildlife-Habitat Types in the San Poil Subbasin

Wildlife-Habitat Type	San Poil Current Acres	Percent of Total
Wetlands (Focal Habitat)		
Lakes, Rivers, Ponds, and Reservoirs	4,757	0.7%
Herbaceous Wetlands	219	0.0%
Montane Coniferous Wetlands	6,914	1.0%
Riparian and Riparian Wetlands (Focal Habitat)		
Eastside (Interior) Riparian Wetlands	931	0.1%
Steppe and Shrub-Steppe (Focal Habitat)		
Eastside (Interior) Grasslands	183,039	26.8%
Shrub-Steppe	15,259	2.2%
Upland Forest (Focal Habitat)		
Montane Mixed Conifer Forest	10,287	1.5%
Eastside (Interior) Mixed Conifer Forest	384,653	56.2%
Lodgepole Pine Forest and Woodlands	1,125	0.2%
Ponderosa Pine Forest and Woodland	66,052	9.7%
Upland Aspen Forest	2,306	0.3%
Alpine and Subalpine		
Alpine Grasslands and Shrublands	1,724	0.3%
Developed		
Agriculture, Pasture, and Mixed Environs	5,744	0.8%
Urban and Mixed Environs	981	0.1%
Total	**683,991**	100.0%

(*Source*: IBIS 2003)

40.1.1 Open Water, Wetlands, and Riparian Areas

The IBIS wildlife-habitat map (Figure 37.2) is based in part on National Wetlands Inventory (NWI) mapping, but does not utilize all of the wetland categories or show the full extent of very small mapped areas. The following discussion of open water habitats is based on Figure 37.2 and the corresponding Table 40.1. Figure 40.1 provides a more detailed mapping of wetlands, excluding open water habitats, based on WDOE mapping (WDOE 1999) using aggregated NWI wetland types. Table 40.2 summarizes the acreages of wetlands in the Subbasin by wetland category.

40.1.1.1 Open Water

Open water habitats of natural and human origin comprise 0.7 percent of total area of the San Poil Subbasin (IBIS 2003). The San Poil River, extending 59 miles through the Subbasin, is the largest river, and the San Poil arm of Lake Roosevelt is the largest waterbody. Curlew Lake is the largest lake in the San Poil Subbasin[1]. Other lakes include Gold, Swan, Ferry, Long, Crawfish, and San Poil.

[1] Note that Curlew Lake watershed has been included in the San Poil Subbasin for administrative purposes; hydrologically the Curlew Lake watershed is part of the Upper Columbia Subbasin.

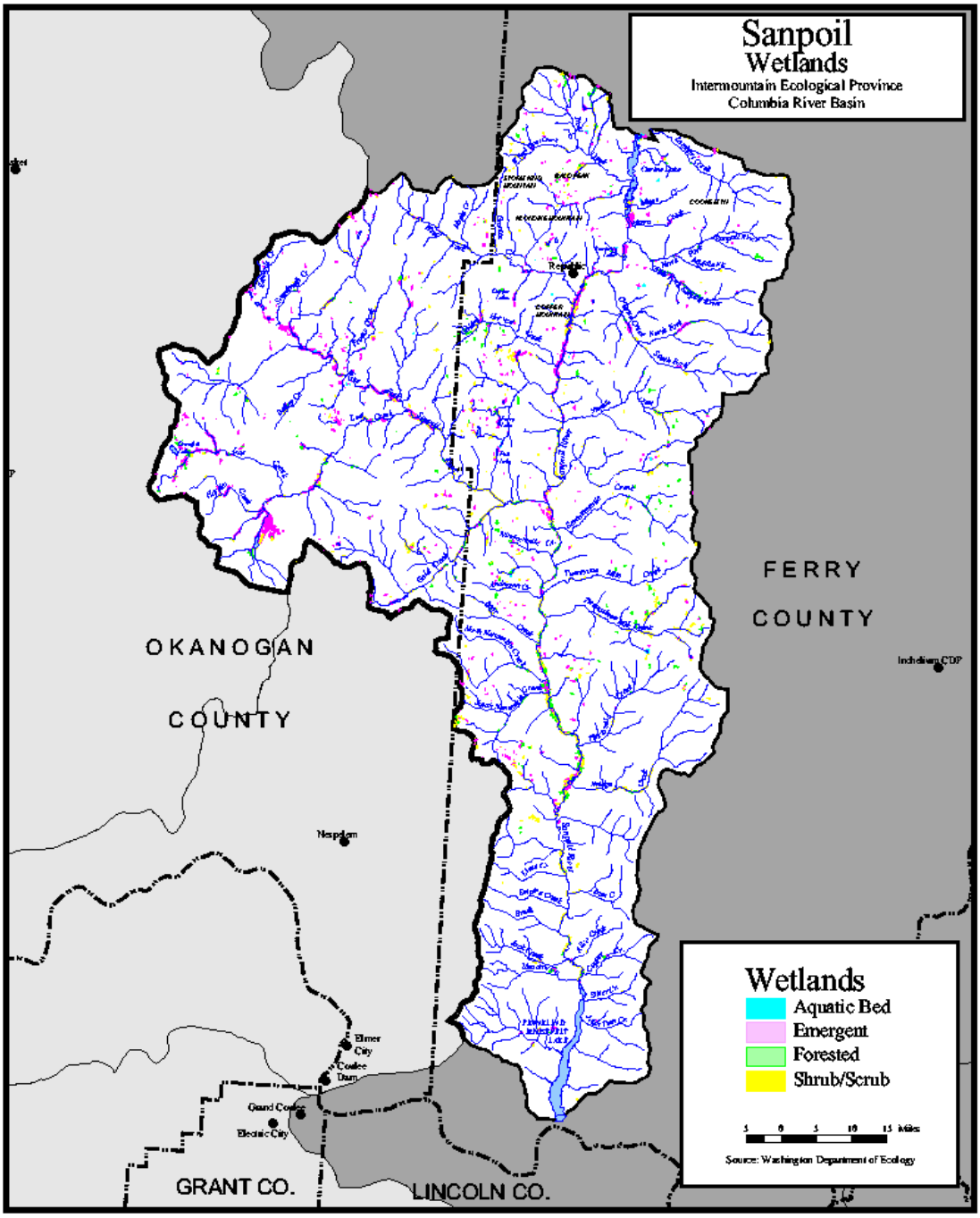

Figure 40.1 Wetland areas within the San Poil Subbasin

The Grand Coulee Project caused the impoundment of approximately 12 miles of the San Poil River and additional reaches of tributary streams (Truscott 2000). The impounded areas fluctuate significantly during the year, with an extended winter drawdown period. Other factors that have influenced the Subbasin's waterbodies include timber management, agriculture, grazing, mining, and residential development.

40.1.1.2 Wetlands and Riparian Areas

Wetlands (excluding open water habitats) comprise approximately one percent of land cover in the San Poil Subbasin (Table 40.2). Wetlands in the Subbasin are dominated by emergent herbaceous habitats (47 percent of total wetland habitat); these wetlands are scattered throughout the Subbasin, with the largest complexes associated with Hayden and Lost creeks, the West Fork and mainstem San Poil rivers, and Curlew Lake. Scrub-shrub wetlands comprise about 36 percent of total wetland habitat and are located in greatest concentration along the West Fork and mainstem San Poil rivers, Gold, Harvest, and Twentythree Mile creeks. Forested wetlands total about 16 percent of all wetlands, and are scattered along the San Poil River, major tributaries, and scattered non-riparian sites in the higher elevations.

Table 40.2. Acres of Wetlands in the San Poil Subbasin by Wetland Type

Wetland Type	Acres
Emergent	3,570
Scrub/shrub	2,691
Forested	1,224
Aquatic bed	69
Total all wetland types	**7,554**

(*Source*: WDOE 1999)

Riparian vegetation along the San Poil arm of Lake Roosevelt is extremely limited, due to the extensive fluctuation zone. During the approximately three-month winter drawdown period, the water surface elevation of portions of Lake Roosevelt is as much as 80 feet below the full pool level. The fluctuation zone along the San Poil arm is largely unvegetated and provides little wildlife value.

Riparian habitats are present along the corridor of the San Poil River and its major tributary streams. Riparian habitats in the Subbasin are limited by a variety of land use activities including hydropower development, timber harvest, mining, grazing, and agriculture. Hydropower development directly affected the lower 12 miles of the San Poil River and the lower reaches of associated tributary streams. Timber harvest has affected riparian habitats through removal of overstory dominant trees, alteration of plant community structure, and increased road density (USFS 2003a). Other effects are increased occurrence of nonnative plant species. Cattle grazing occurs throughout much of the basin and is associated with soil compaction, increased width-to-depth ratio of streams, reduced cover of native species, and increased cover of nonnative plant species in some locations (2003a, Truscott 2000). Mining activities, with associated ground disturbance and road construction, have occurred primarily in the northern portion of the Subbasin.

40.1.2 Steppe and Shrub-Steppe

Interior grasslands are an important land cover in the San Poil Subbasin, occupying 27 percent of the total area; an additional two percent of the Subbasin is classified as shrub-steppe. The extent of grasslands and shrub-steppe has declined from historic conditions due to conversion to agricultural and developed lands. Just under one percent of the Subbasin is currently in agricultural uses, and much of this land was converted from grasslands and shrub-steppe. A secondary effect of agriculture and grazing is the introduction of nonnative noxious weeds through seed sources and via roads and equipment. Remaining grassland and shrub-steppe habitats in the Subbasin are greatly modified from historic conditions by reduction of native plant species and in increases the cover of noxious weeds.

Construction of the Grand Coulee Project resulted in loss of approximately 14,000 acres of shrub-steppe habitat for placement of project facilities and creation of the reservoir (Creveling and Renfrow 1986). A portion of this habitat loss occurred within the San Poil Subbasin.

40.1.3 Upland Forests

Upland forests in the San Poil Subbasin are dominated by interior mixed conifer stands (56 percent of land cover) at higher elevations and ponderosa pine (10 percent) at lower elevations. Timber harvest is a primary land use on the Colville Indian Reservation, Colville and Okanogan National forests, and private lands.

Overall, the amount of forest in late and old-successional stages has been reduced from the historic condition, and is limited from reaching these stages by timber rotation schedules. Managed stands are characterized by their younger seral stage and modified species diversity, typically including species that are less fire tolerant, such as Douglas fir. Timber management has caused increased road densities throughout the Subbasin. Fire control, grazing, and residential development have also influenced the distribution and structure of upland forests in the Subbasin.

Construction of the Grand Coulee Project caused the inundation of ponderosa pine savannah along the southernmost 12-mile reach of the San Poil River.

40.1.4 Other Terrestrial Resource Limiting Factors

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

40.1.4.1 Road Density

Figure 37.4 (Section 37) shows road density, by density class, for each sixth order watershed in the San Poil Subbasin. Nearly the entire Subbasin is ranked as high road density (1.7 to 4.7 miles of road per square mile). One watershed at the southern end of the Subbasin and the Lambert Creek watershed in the northeastern corner of the Subbasin are ranked as moderate road density (0.7 to 1.7 miles of road per square mile). No watersheds in the Subbasin are ranked as low or very low road density.

High road densities are indicative of human land uses and activities. In the San Poil Subbasin, high road densities are associated primarily with managed timberlands. Road density values in excess of 1.5 miles per square mile are considered suboptimal for mule deer and white-tailed deer summer range; values greater than 0.5 miles per square mile are suboptimal for the same species on their winter ranges (WDFW 1991). Most of the San Poil Subbasin currently supports road density levels considered suboptimal for these game species.

40.1.4.2 Loss of Salmonid Nutrient Base

Construction and operation of the Chief Joseph and Grand Coulee dams on the Columbia River prevented salmon and other anadromous fish from returning to the San Poil Subbasin. The loss of anadromous fish affected not only subsistence and recreational use of the resource, but also affected salmon-dependent wildlife and modified nutrient input to the overall ecosystem.

Appendix E of the 1987 Columbia Basin Fish and Wildlife Program (Council 1987) presents the results of several alternative calculations to determine the loss of salmon within the Columbia River system due to hydropower development. Based on the pre-1850 run size, with no dams in place, the number of adults at spawning grounds in reaches above Chief Joseph Dam would total 3,175,000 fish, with sockeye comprising greater than 55 percent, summer Chinook 19 percent, and fall Chinook, spring Chinook, coho, and steelhead the remaining 26 percent.

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

The loss of salmon to focal wildlife is discussed in Section 4.5.2 Key Wildlife Species of the Intermountain Province.

40.1.4.3 Lake Roosevelt Shoreline Erosion

Wave action, combined with fluctuating water surface levels and erosive soils, has contributed to erosion of steep banks along portions of the San Poil Arm of Lake Roosevelt.

Erosion of the Lake Roosevelt shoreline has the potential to affect terrestrial resources through loss of habitats, including shrub-steppe, grasslands, wetlands, and riparian shrubs and trees. Direct loss of wildlife could occur through effects to active nesting, denning, and burrow sites. Figure 37.3 (Section 37) shows the portion of Lake Roosevelt located within the San Poil Subbasin and highlights the areas of high erosion potential along the shoreline (USBR 1984). Analysis of a 300-foot wide band, extending upslope from the average reservoir elevation of 1,290 feet, shows that 38 percent of the area within the band is classified as high erosion potential, while about 8 percent of the area is bedrock. To date, site-specific assessment of the effects of shoreline erosion on terrestrial resources has not been conducted.

40.1.5 Land Ownership and Gap Status

Land ownership in the San Poil Subbasin is summarized in Table 40.3. A map of ownership categories in the Province is presented in Section 4, Figure 4.3. The San Poil Subbasin is dominated by Tribal lands of the Colville Indian Reservation, which occupy the southern half of the Subbasin (49 percent of total). Federal lands comprise about 31 percent of the total, consisting primarily of National Forest System lands of the Colville and Okanogan National forests. Private ownership makes up about 18 percent, and state ownership two percent of the Subbasin total.

Relative protection levels of native habitats in the San Poil Subbasin are shown in Table 40.4. No lands within the Subbasin are categorized as Status 1, High Protection. Habitats protected under Status 2, Medium Protection, comprise less than one percent of the total and are confined to a single parcel of state-owned lands at Curlew Lake State Park. Approximately 33 percent of lands in the Subbasin are ranked as low protection, primarily National Forest System lands which provide habitat protection combined with resource extraction. The Low Protection category includes U.S. Forest Service inventoried roadless areas. Lands with no specified protection total 67 percent of the Subbasin and represent both private and Tribal ownership.

Due to the scale of the IBIS and GAP mapping, small parcels may be incorrectly categorized in this analysis. The 3,417-acre Moses Mountain Natural Area is located on the Colville Indian Reservation (Truscott 2000). This highly protected area is not shown in the GAP analysis, but occurs in part within the San Poil Subbasin. No commercial timber harvest is allowed within this area.

Table 40.3. Land Ownership in the San Poil Subbasin by Wildlife-Habitat Types

Wildlife-Habitat Type (acres)	Federal Lands	Native American Lands	State Lands	Local Gov't. Lands	Non-Gov't. Org.Lands	Private Lands	Water	Total
Wetlands (Focal Habitat)								
Lakes, Rivers, Ponds, and Reservoirs	456	2,741	71	0	0	1,584	0	4,853
Herbaceous Wetlands	0	4	2	0	0	250	0	256
Montane Coniferous Wetlands	993	3,927	77	0	0	2,382	0	7,379
Riparian and Riparian Wetlands (Focal Habitat)								
Interior Riparian Wetlands	58	1,179	23	0	0	389	0	1,649
Steppe and Shrub-Steppe (Focal Habitat)								
Interior Grasslands	44,015	72,714	7,910	0	0	60,460	0	185,098
Shrub-steppe	313	15,166	0	0	0	0	0	15,479
Upland Forest (Focal Habitat)								
Montane Mixed Conifer Forest	7,745	3,032	63	0	0	54	0	10,894
Interior Mixed Conifer Forest	139,541	166,100	9,172	0	0	41,937	0	356,750
Lodgepole Pine Forest & Woodlands	4,924	2,709	289	0	0	1,541	0	9,464
Ponderosa Pine Forest & Woodlands	6,238	55,505	1,335	0	0	8,220	0	71,297
Upland Aspen Forest	3,089	4,343	200	0	0	2,938	0	10,570
Alpine and Subalpine								
Subalpine Parkland	68	4	0	0	0	0	0	71
Alpine Grasslands and Shrublands	1,645	33	0	0	0	0	0	1,678
Developed								
Agriculture, Pasture, and Mixed Environs	184	6,352	44	0	0	1,050	0	7,630
Urban and Mixed Environs	11	0	1	0	0	918	0	930
Total Acres	**209,278**	**333,809**	**19,187**	**0**	**0**	**121,725**	**0**	**683,999**

(*Source*: IBIS 2003)

Table 40.4. GAP Status of Lands in the San Poil Subbasin by Wildlife-Habitat Type

Wildlife-Habitat Type (acres)	1 - High Protection	2 - Medium Protection	3 - Low Protection	4 - No Protection	Water	Total
Wetlands (Focal Habitat)						
Lakes, Rivers, Ponds, and Reservoirs	0	291	312	4,272	0	4,875
Herbaceous Wetlands	0	0	0	256	0	256
Montane Coniferous Wetlands	0	13	1,076	6,286	0	7,375
Riparian and Riparian Wetlands (Focal Habitat)						
Interior Riparian Wetlands	0	6	81	1,557	0	1,644
Steppe and Shrub-Steppe (Focal Habitat)						
Westside Grasslands	0	0	0	0	0	0
Interior Grasslands	0	257	51,073	133,837	0	185,167
Shrub-steppe	0	0	23	15,445	0	15,468
Upland Forest (Focal Habitat)						
Mesic Lowland Conifer-Hardwood Forest	0	0	0	0	0	0
Montane Mixed Conifer Forest	0	0	7,807	3,084	0	10,891
Interior Mixed Conifer Forest	0	0	146,234	210,488	0	356,722
Lodgepole Pine Forest & Woodlands	0	1	5,197	4,270	0	9,469
Ponderosa Pine and Interior Forest & Woodlands	0	40	7,328	63,900	0	71,268
Upland Aspen Forest	0	1	3,269	7,295	0	10,565
Alpine and Subalpine						
Subalpine Parkland	0	0	68	4	0	71
Alpine Grasslands and Shrublands	0	0	1,645	33	0	1,678

Developed						
Agriculture, Pasture, and Mixed Environs	0	35	138	7,448	0	7,622
Urban and Mixed Environs	0	0	1	927	0	928
Total Acres	**0**	**646**	**224,251**	**459,101**	**0**	**683,999**

(*Source*: IBIS 2003)

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

40.2 Wildlife of the San Poil Subbasin

40.2.1 Wildlife Occurring in the San Poil Subbasin

Wildlife-habitat types in the San Poil Subbasin range from low elevation grasslands to montane coniferous forests; wildlife using the habitats are correspondingly numerous and diverse. There are approximately 330 species of terrestrial vertebrate wildlife that occur within the San Poil Subbasin, many of which are important for ecological, cultural, and/or economic reasons. Table 40.5 presents the terrestrial vertebrate wildlife species occurring within the Subbasin. Due to the large number of wildlife species in the Subbasin, the following discussion focuses on wildlife species that are important indicators of habitat quality, those that represent other wildlife species, and those with special management status. Refer to the San Poil Subbasin Summary (Truscott 2000) for more detailed information on general wildlife of the Subbasin. The San Poil Subbasin is located largely within the Colville Reservation (about 49 percent of the subbasin) and the Colville National Forest (about 31 percent). Data on the presence of focal wildlife species comes from several sources, but it should be noted that the Washington Priority Habitats and Species database contains only limited information from the extensive area of the Colville Indian Reservation and the Colville National Forest.

Table 40.5. Number of Wildlife Species (and percent of Province Total) in the San Poil Subbasin

	Occurring Species (Percent of Province Total)	HEP/Priority Species	HEP/Priority Species Closely Associated With Herbaceous Wetlands	HEP/Priority Species Closely Associated With Riparian Wetlands	HEP/Priority Species That Feed Upon Salmon	Occurring Species That Feed Upon Salmon
Amphibians	9 (53%)	0	0	0	0	0
Birds	222 (80%)	10	1	4	2	48
Mammals	86 (85%)	6	1	1	2	22
Reptiles	13 (72%)	0	0	0	0	2
Total	330 (80%)	16	2	5	4	72

(*Source*: IBIS 2003)

40.2.2 HEP and Priority Species of the San Poil Subbasin

Subbasin planners selected a group of wildlife species to represent the focal habitats and wildlife of the San Poil Subbasin. Species used in the Grand Coulee Project Habitat Evaluation Procedures (HEP) study (Creveling and Renfrow 1986) were selected because they were used to assess the construction and inundation losses for the federal hydrosystem project, and because they will be used in the future to evaluate mitigation for the project. Additional wildlife species were selected due to their management, cultural, and or economic values in the Subbasin; these species also represent specific focal habitats. The list of HEP and priority species for the Subbasin, as well as federal and state-listed threatened and endangered species, is presented in Table 40.6.

Table 40.6. Federal and State Endangered/Threatened, HEP, and Priority Wildlife Species of the San Poil Subbasin and Degree of Association[1] with Focal Habitats During Breeding

Common & Scientific Names	Federal/ State Listing Status [2]	HEP/ Priority Status [3]	Focal Habitats				
			Cliff/ Rock Outcrop	Wetland	Riparian	Steppe/ Shrub-Steppe	Upland Forest
American beaver *Castor canadensis*	-	P(1,2,3)	-	Close	Close	-	-
Bald eagle *Haliaeetus leucocephalus*	T / t	P(1,2,3)	-	-	General	-	General
Canada goose *Branta canadensis*	-	HEP	General	Close	-	General	-
Canada lynx *Lynx canadensis*	T / t	P(4)	-	-	-	-	Close
Golden eagle *Aquila chrysaetos*	-	P(1,3)	Close	-	General	General	General
Gray wolf *Canis lupus*	T / e	P(4)	-	-	General	General	General
Grizzly bear *Ursus arctos*	T / e	P(4)-	-	-	-	-	General
Long-eared owl *Asio otus*	-	P(1)	-	-	Close	Close	Close
Mourning dove *Zenaida macroura*	-	HEP	-	-	Close	General	General
Mule deer *Odocoileus hemionus hemionus*	-	HEP	-	General	General	General	General
Northern flicker *Colaptes auratus*	-	P(1)	-	General	General	General	General
Ruffed grouse *Bonasa umbellatus*	-	HEP	-	General	Close	-	Close
Sage grouse *Centrocercus urophasianus*	- / t	HEP	-	-	-	Close	-
Sharp-tailed grouse *Tympanuchus phasianellus Columbianus*	- / t	HEP	-	-	-	Close	General
White-tailed deer *Odocoileus virginianus*	-	HEP	-	-	Close	General	General
Yellow warbler *Dendroica petechia*	-	P(1)	-	-	Close	-	-

(*Source*: IBIS 2003 and San Poil Subbasin Work Team)

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

[2] **E** = Federal Endangered. **T** = Federal Threatened. **e** = State Endangered. **t** = State Threatened.

[3] **HEP** = Species evaluated via Habitat Evaluation Procedures loss assessment for Grand Coulee Dam (Creveling and Renfrow 1986).

P = Priority species designated as important because it is **(1)** ecological indicator for habitat or other animals, **(2)** game animal, **(3)** highly culturally prized, or **(4)** special status for management. Many priority species were selected to represent one or more focal habitat types; the habitat(s) a species represents is(are) indicated by underlined degree of association (e.g., close).

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

40.2.2.1 Federal and State Threatened and Endangered Species

Bald eagle. Two nesting territories occur along the San Poil River and a third territory is located near Curlew Lake (WDFW 2003b).

Canada lynx. Between 1980 and 1994, four lynx sightings occurred near the Subbasin's northeastern and northern boundary (WDFW 2003b). The portion of the Kettle Crest area above 4,000 feet elevation is designated as a lynx analysis unit. The Kettle Range and Vulcan-Tunk areas at elevations generally above 4,000 feet are lynx management zones (LMZs) located partially within the subbasin (Stinson 2001).

Gray wolf. Each of three records during 1991 and 1992 report a single animal sighting in tributary drainages west and east of the San Poil River (WDFW 2003b).

Grizzly bear. A single record in 1982 reported two adult bears in the Harvest Creek drainage of the San Poil River (WDFW 2003b).

Sage grouse. No sage grouse sightings are reported by WDFW (2003b) for this Subbasin. Sage grouse habitat was inundated by the construction of Lake Roosevelt, resulting in a loss of 893 Habitat Units on the Colville Reservation; a small portion of this loss may have occurred in the San Poil Subbasin.

Sharp-tailed grouse. The WDFW (2003b) has no current records of sharp-tailed grouse occurrence in this Subbasin. A substantial quantity of sharp-tailed grouse habitat was inundated by Lake Roosevelt, resulting in a loss of 8,833 Habitat Units on the Colville Reservation. An undetermined portion of this loss occurred within the San Poil Subbasin. Sharp-tailed grouse are present on Colville Reservation lands within the San Poil Subbasin; the overall population on the Reservation is estimated at 300 to 600 birds (CCT 2000). The Tribe's Integrated Resource Management Plan contains objectives for restoring grassland and shrub-steppe rangeland habitat and increasing the population size west of the San Poil River.

40.2.2.2 Grand Coulee HEP Species

Canada goose. Data from the WDFW (2004a) shows that the San Poil Subbasin accounts for less than one percent of the state's total goose hunting harvest and recreation (Appendix G). That statistic combines all species of goose (Canada goose, snow goose, Brandt, etc.). A total of 74 goose nesting islands were inundated from the construction of Grand Coulee Project (Creveling and Renfrow 1986). Ten of the nesting sites were lost from Colville Reservation lands; however, the study does not indicate whether any of the sites were located within the San Poil Subbasin.

Mourning dove. The mourning dove is widespread in the Subbasin during the breeding season. Dove hunting harvest and recreation in the Subbasin accounts for less than one percent of the state's totals for those measures (Appendix G). The Grand Coulee Project resulted in the loss of 9,316 mourning dove HUs, of which 1,001 HUs (about 11 percent) have been replaced. The amount attributed to this Subbasin is undetermined.

Mule deer and white-tailed deer. Mule and white-tailed deer are both native to the Subbasin. White-tailed deer populations are relatively stable, while mule deer populations in northeastern Washington are below historic levels. The WDFW's management goal is to preserve, protect, perpetuate, and manage deer and their habitat to ensure healthy, productive populations (WDFW 2003c). The population goal for white-tailed deer is to maintain relatively stable population growth. The population goal for mule deer is an increase in populations within limitations of available mule deer habitat. The Department's recreation management objective for deer is to maintain or increase hunting opportunity and improve hunting quality. The current general, post-hunt minimum goal for buck:doe ratios in Washington is greater than 15 bucks per 100 does for most populations. Deer winter range continues to be lost to human development. Irrigated land important as deer forage in lower elevations has been negatively affected by water restrictions for salmon recovery. Invasion by noxious weeds is a potential problem, and bitterbrush on winter range is aging and under-productive.

An estimate of mule and white-tailed deer hunting harvest and recreation in the Subbasin is presented in Table 40.7. The Subbasin contributes about one percent of Washington State's total deer harvest and hunting recreation.

Table 40.7. Mule Deer and White-Tailed Deer Hunting Harvest and Recreation Within the San Poil Subbasin[1]

	Harvest		Hunter-Days	
Year	Quantity	% of State Total	Quantity	% of State Total
1999	313	1.0	15,856	1.1
2000	474	1.3	10,775	1.1
2001	370	1.0	8,078	1.0
2002	351	1.0	8,713	1.0
Average	377	1.1	10,855	1.1

(*Source*: Appendix G)

[1] Includes portions of Washington Game Management Units 101 and 204.

The Grand Coulee Project resulted in loss of 27,133 mule deer Habitat Units and 21,632 white-tailed deer Habitat Units. Only a small portion of this loss occurred within the San Poil Subbasin.

Ruffed grouse. Data from the WDFW show that forest grouse hunting (ruffed grouse, blue grouse, and spruce grouse) occurs in both counties of this Subbasin (Appendix G). Grouse harvest in the Subbasin accounts for approximately three percent of the state's total and three percent of its grouse hunting recreation (Table 40.8).

Table 40.8. Forest Grouse (Ruffed, Blue, and Spruce Grouse) Hunting Harvest and Recreation Within the San Poil Subbasin[1]

	Harvest		Hunter-Days	
Year	Quantity	% of State Total	Quantity	% of State Total
1999	2,239	3.0	4,952	2.6
2000	5,666	3.8	12,280	3.1
2001	3,692	3.3	8,885	3.0
2002	4,963	3.6	10,064	3.0
Average	4,140	3.4	9,045	2.9

(*Source*: Appendix G)

[1] Includes portions of Ferry and Okanogan counties.

Construction of the Grand Coulee Project resulted in a loss of 16,502 Habitat Units for ruffed grouse; an undetermined number of these Habitat Units were located in San Poil Subbasin.

Sage grouse. Refer to preceding section describing Federal and State Threatened and Endangered Species.

Sharp-tailed grouse. Refer to preceding section describing Federal and State Threatened and Endangered Species.

40.2.2.3 Other Priority Species

American beaver. Beaver are present throughout the San Poil Subbasin. Trapping harvest is several times greater in Okanogan County than in Ferry County. The Subbasin harvest during 1999-2002 averaged approximately eight beaver per year, a number that is under one percent of the state total (Appendix G). Harvest declined during those reporting years, but it is not clear whether this was due to a population decline, the passing of State Initiative 713 in 2000 (which banned the use of leg or body gripping traps), or other reasons such as a weak fur market, or drop in nuisance complaints.

Golden eagle. Since 1983, at least 18 nests representing an estimated 10 territories have been found across the Subbasin (WDFW 2003b). Many are located along the San Poil River, but tributary drainages are occupied as well.

Long-eared owl. General references such as Sibley (2003) show the species as breeding in the Subbasin, with the possibility of it being a year-long resident. However, Smith et al. (1997) report no evidence of breeding in the Subbasin and the WDFW (2003b) has no records of sightings there.

Northern flicker. This woodpecker is a year-round resident of the San Poil Subbasin. No specific occurrence data are recorded by wildlife managers in the Subbasin.

Yellow warbler. Smith et al. (1997) has not confirmed breeding in the San Poil Subbasin, but that finding is probably due to insufficient sampling. However, habitat is limited; there is less than 1,000 acres of interior riparian wetland in the Subbasin.

40.3 Summary of Terrestrial Resource Limiting Factors

40.3.1 Direct Effects of Federal Hydrosystem Projects

Development of the Grand Coulee Project resulted in direct loss of wildlife and wildlife habitats along the southernmost 12 miles of the San Poil River. Habitat losses associated with inundation of project reservoirs were assessed in the Final Report on Wildlife Protection, Mitigation and Enhancement Planning for Grand Coulee Dam (Creveling and Renfrow 1986) through a Habitat Evaluation Procedures (HEP) study. The HEP evaluation species were selected based on their use of specific habitat types and structural elements, and to represent other wildlife species that use those habitats. The HEP study results are provided in terms of Habitat Units (HUs), which are units of value based on both quality and quantity of habitat. The study provides the number of habitat units to be provided in compensation for the construction losses and identifies potential mitigation areas.

Table 40.9 summarizes the loss of habitats as determined by Creveling and Renfrow (1986). The loss of habitat value for individual wildlife species, as determined through the HEP study and expressed in HUs, is summarized in Table 40.10. The majority of habitat losses occurred in the Upper Columbia Subbasin; the San Poil and Spokane subbasins contain relatively small proportions total lands inundated by Lake Roosevelt. Progress made to date toward implementing the recommended mitigation strategies is summarized below in terms of HUs by species; approximately 49 percent of the mitigation remains to be implemented.

Table 40.9. Acres of Habitat Types Affected by Grand Coulee Dam Project Construction and Inundation

Project	Habitat Type	Acres of Habitat Inundated
Grand Coulee		
	Islands	1,000
	Riparian lands	2,000
	Shrub-steppe uplands	14,000
	Forested uplands	25,000
	Agricultural lands	15,000
	Barren lands	13,000
Total		**70,000**[1]

(*Source*: Creveling and Renfrow 1986)

[1] This figure includes the rivers' shorelines between the high and low water levels. USBR revised its figure for lands inundated by Roosevelt Reservoir to include only lands above the mean high water level. This revised figure is approximately 56,000 acres (Creveling and Renfrow 1986).

Table 40.10. Status of Mitigation for Construction and Inundation Wildlife-Habitat Losses, Grand Coulee Project[1]

Grand Coulee Project	Species	Habitat Units lost	Habitat Units acquired	Percent complete
	Mourning dove	9,316	1,001	10.7%
	Mule deer	27,133	19,056	70.2%
	Riparian forest	1,632	234	14.3%
	Riparian shrub	27	131	100.0%
	Ruffed grouse	16,502	2,908	17.6%
	Sage grouse	2,746	7,432	100.0%
	Sharp-tailed grouse	32,723	16,854	51.5%
	White-tailed deer	21,632	9,064	41.9%
	Canada goose (nesting)	74 (islands)	-	0.0%
Total all species		**111,785**	**56,680**	**50.7%**

(*Sources*: BPA 2002; WDFW 2004b, CCT 2004a)

[1] Note: This table shows the total HUs lost at the Grand Coulee Project; mitigation of this loss is to be coordinated between the San Poil, Spokane, and Upper Columbia subbasins. Most of the direct effects occurred to habitats located in the Upper Columbia Subbasin.

The majority of habitat losses associated with the Grand Coulee Project occurred within the Upper Columbia Subbasin; portions of the San Poil and Spokane subbasins (as delineated for this plan) were also affected by creation of Lake Roosevelt. Terrestrial resources mitigation required for the Grand Coulee Project in the San Poil Subbasin is to be coordinated between the three wildlife management jurisdictions in these three subbasins: the Colville Confederated Tribes, Spokane Tribe, and WDFW. The total number of HUs to be acquired as mitigation for the Grand Coulee Project (111,785) is presented in corresponding tables in each of the three subbasin chapters. Note that this is a single, coordinated mitigation target rather than three independent subbasin targets.

The Grand Coulee construction losses for terrestrial resources were apportioned between the three wildlife management jurisdictions in these subbasins: the Colville Tribe, Spokane Tribe, and WDFW (Creveling and Renfrow 1986). To date, WDFW has acquired the greatest number of HUs (50,678 HUs acquired, approximately 89 percent complete per WDFW 2004b); the Colville and Spokane tribes each have a substantial number of HUs remaining to be acquired.

40.3.2 Operational Effects of Federal Hydrosystem Projects

Ongoing operation of the Grand Coulee Project affects terrestrial resources of the San Poil Subbasin through:

1) ongoing erosion of shoreline habitats along the San Poil arm of Lake Roosevelt;
2) ongoing absence of riparian vegetation, particularly woody species, along portions of the reservoir subjected to sustained drawdowns;
3) ongoing disturbance of wildlife and wildlife-habitats (for example, nest sites, amphibian breeding sites) within the fluctuation zone of the reservoir; and

4) ongoing absence of anadromous fish in the Subbasin, resulting in loss of key food item for numerous wildlife species and important nutrient input for the riverine ecosystem.

Erosion sites along Lake Roosevelt have been in inventoried and described by USBR (1984). The effects of erosion on wildlife and other terrestrial resources have not been determined. Other ongoing effects of operation of the Grand Coulee Project have not been assessed. Assessment and mitigation of the operational effects of the project are required under the Northwest Power Act, and these activities are considered a high priority by the San Poil Subbasin Planning Team.

40.3.3 Secondary Effects of Federal Hydrosystem Projects and Other Limiting Factors

The federal hydropower system contributed to development in the San Poil Subbasin primarily by providing an inexpensive source of power. The Subbasin supports high levels of timber management; grazing, agriculture, and residential land uses also occur throughout much of the Subbasin. Factors that currently limit terrestrial resources in the Subbasin are dominated by loss of habitat through conversion and modification, disturbance of wildlife species by humans and human activities, and interactions with nonnative plant and animal species.

40.4 Interpretation and Synthesis

The San Poil Subbasin has been highly modified from historic conditions due primarily to timber harvest, increased road densities, agriculture and grazing. An estimated one percent of native habitats have been converted to agriculture and developed land uses. The majority of the remaining habitats have been modified through land use practices.

Construction of the Grand Coulee Dam directly affected the San Poil River and adjacent habitats for 12 miles upstream of the mouth. Grand Coulee, and the downstream Chief Joseph Project, currently prevent all anadromous fish from accessing the San Poil Subbasin. Reservoir fluctuations, in combination with wind and wave action and unstable soils, cause erosion along portions of the Lake Roosevelt shoreline within the Subbasin. Road densities are high throughout the majority of the Subbasin and highly protected lands are relatively low in acreage. Secondary effects of the FCRPS projects on development of the Subbasin are wide-reaching, including timber management, agriculture, grazing, and residential development.

Terrestrial resources mitigation related to the Grand Coulee Project is approximately 51 percent complete. Completion of the mitigation is the highest terrestrial resources priority for the Subbasin Work Team, followed by assessment and mitigation of operational impacts of the hydrosystem projects.