

Chapter 3: Affected Environment

This chapter describes the existing environment of the area potentially affected by BPA's Wildlife Mitigation Program. The discussion focuses on those features needed to understand the anticipated effects of the proposed action and alternatives (Chapter 4). Because this programmatic EIS addresses the Wildlife Mitigation Program as a whole, and not as specific sites or actions, the affected environment is discussed in general terms.

3.1 SETTING

The area being considered for wildlife mitigation projects is the United States portion of the Columbia River Basin. The area includes lands in Washington, Oregon, Idaho, Montana, Nevada, Utah, and Wyoming (see Figure 3-1).

The broad Columbia River Basin is defined to the west by the Pacific Ocean, the Willamette and southern Puget Sound valleys, and the north/south-oriented Cascade range; to the east by the north/south-oriented Rocky Mountain range; to the south by the Great Basin; and to the north by the Canadian border. The mountainous areas of the Cascades and Rockies are considered part of the affected environment, because the Council's Fish and Wildlife Program includes the tributaries to the Columbia River. The affected environment contains lands within 14 ecoregions defined by similar topography, climate, and vegetation (see Figure 3-2).

Climate consists of cold winters and warm, dry summers. Most precipitation falls in winter or spring, although occasional thunderstorms bring heavy rains during summer and fall. Total precipitation varies greatly, with average annual amounts ranging from 254 cm (100 in.) per year at the Cascade crest to less than 20 cm (8 in.) per year in the low-elevation basins and plains. Precipitation is greatest in the mountain ranges of the Columbia River Basin, which include the Coast Range, Cascades, Blue Mountains, and the Rocky Mountains. Precipitation is lowest in low-elevation valleys and plains, including the central Columbia Basin just east of the Cascades and the Snake River Basin/high desert of eastern Oregon and southern Idaho (Figure 3-2).

3.2 SOILS

Soil plays a critical role in nutrient, water, and atmospheric cycles. Soil is essential for most forms of plant life and associated animal communities, and is likewise essential for crop, forage, and timber production. Many of these cycles and essential roles take place in the upper few feet of the soil.

Major sources for basin soils include glacial till left from the last ice age, basalt erosion, wind-borne loess deposits, and volcanism (e.g. the pumice and ash deposited from the eruption of Mount Mazama 7,000 years ago and from the more recent 1980 eruption of Mt. St. Helens). These sources develop in place, are deposited by wind and rivers, and/or settle in lakes.

Soils are vulnerable to erosion, which can lead to poor soil productivity and water quality and can fill fish spawning gravels with silt. Some soils are more vulnerable than others. Soil surveys prepared by the Natural Resource Conservation Service (NRCS; formerly known as the Soil Conservation Service) identify local soil conditions and vulnerability to erosion. Soil development often takes hundreds or even thousands of years, so the effects of erosion are often long-term.

3.3 FISH

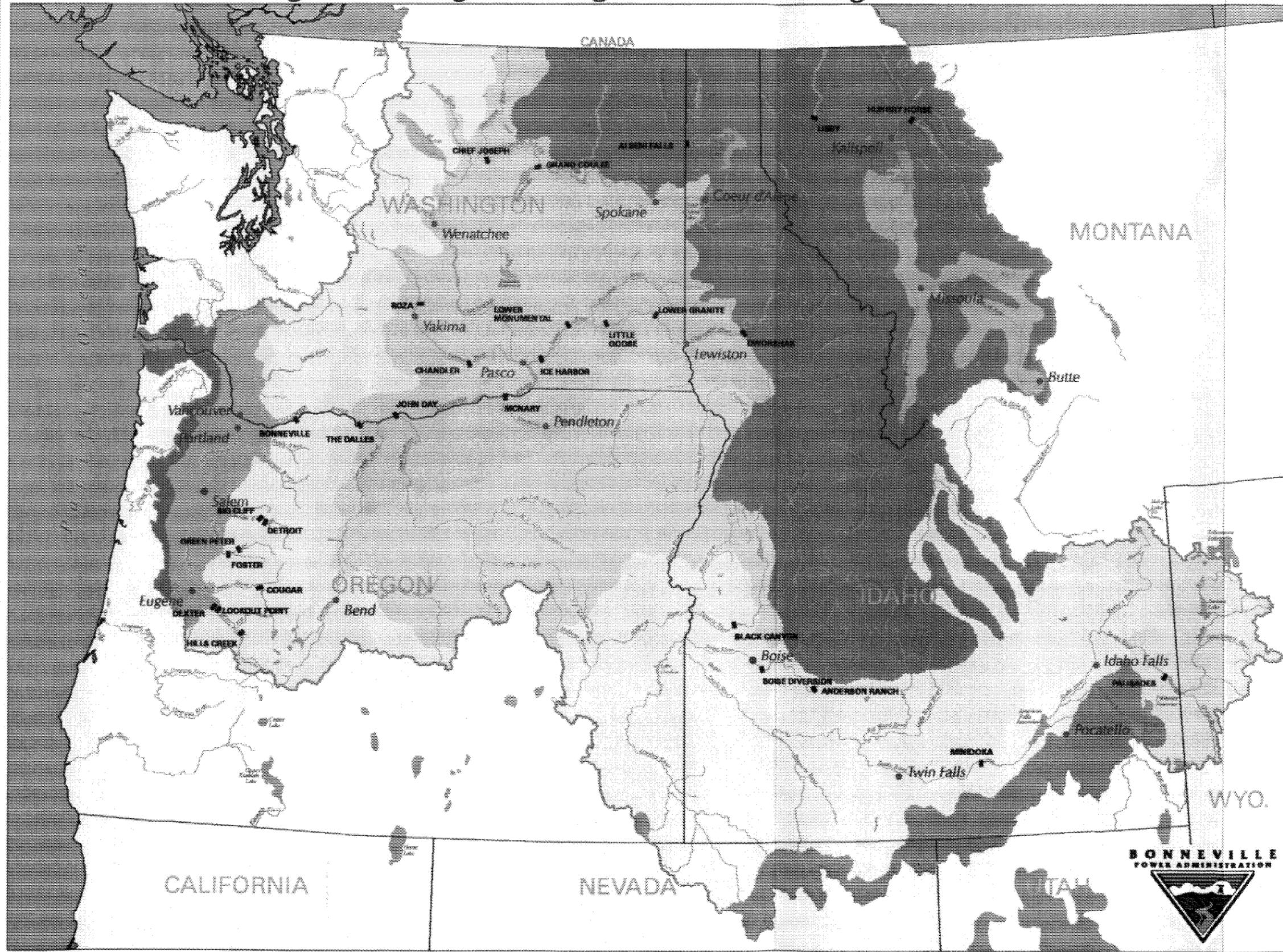
The basin includes a wide variety of relatively common and widely distributed native fish. These include both anadromous fish (sturgeon, several species of salmon, and trout), and resident fish (native trout, squawfish, mountain whitefish, largescale sucker and numerous small fish such as speckled dace, red-side shiner, stickleback, and torrent sculpin). Many other resident fish species have been introduced to provide recreational fishing, including eastern brook trout, hatchery-bred rainbow trout, largemouth bass, yellow perch, catfish, and walleye (Wydoski and Whitney 1979).

Many species of fish in the basin have declined due to habitat degradations, introduction of exotic species, over-fishing, and loss of migratory forms (USDA Forest Service 1995). Fish habitat and migration patterns have been altered by flooding, obstruction, land management activities, and direct mortality associated with dams, irrigation diversion, wetland draining, stream channel alteration, and loss of riparian habitat. Species of concern identified by the USFS (U.S. Forest Service 1995) include the resident bull trout, redband trout, and westslope cutthroat trout, as well as the anadromous steelhead, sockeye, silver, and chinook salmon.

In response to these declines, reservoir drawdowns, flow augmentation, and other actions are being considered as ways to improve anadromous fish runs (BPA 1995), and the USFS and BLM have developed guidelines for management activities that may affect fish on Federal lands. These guidelines are identified in the Decision Notice/Decision Record for Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho and Portions of California (PACFISH), and the Decision Notice for the Inland Native Fish Strategy (INFISH) (USDA 1995). In general, these guidelines identify riparian management objectives, standards and guidelines, and monitoring requirements for USFS and BLM activities. These guidelines may apply to mitigation actions taking place on Federal lands.

Fish are very susceptible to declines in water quality. Timber harvest, road construction, grazing, and intensive agriculture have been identified as factors leading to water quality degradation and associated declines in fish habitat. Major forms of habitat declines include siltation, increased temperatures, and eutrophication (a process that can occur when unnatural amounts of nutrients enter waters, causing algae blooms, aquatic plant growth, reduced oxygen levels in the bottom layers, and the development of organic sludge).

BPA Wildlife Mitigation Program - Figure 3-2: "Ecoregions"



Legend

-  Federal Hydroelectric Dam
-  Coast Range
-  Puget Lowland
-  Willamette Valley
-  Cascades
-  Sierra Nevada
-  Eastern Cascades Slopes and Foothills
-  Columbia Basin
-  Blue Mountains
-  Snake River Basin/High Desert
-  Northern Basin and Range
-  Northern Rockies
-  Montana Valley and Foothill Prairies
-  Middle Rockies
-  Wyoming Basin



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3.4 WATER RESOURCES AND QUALITY

The Columbia River flows 1,930 km (1,200 mi.) from southeastern British Columbia, through northeastern and east-central Washington, and then west as the border between Washington and Oregon, to the Pacific Ocean. The Snake River originates in northwestern Wyoming, travels westward through southern Idaho, then northward as the border between Idaho and Oregon, before turning westward and traveling throughout southeastern Washington, to enter the Columbia River in south-central Washington.

Other tributaries feeding into the Columbia River include the Kootenay, Pend Oreille, Spokane, Okanogan, Wenatchee, Yakima, Walla, John Day, Deschutes, Hood, and Willamette rivers. This river system serves as the drainage for 670,800 km² (259,000 mi²) for seven states, also including northern Utah, northern Nevada, and western Montana (McGinnis and Christensen 1994). Most of the tributaries originate in the headwaters associated with the Cascades, Blue Mountains, central Idaho Mountains, and the Northern Rocky Mountains, primarily located on USFS lands.

The Basin's water resources provide tribal values and use, irrigation, recreation, fish and wildlife habitat, transportation corridors, drainage, flood control, drinking water, and power. The Columbia River Project provides irrigation to large portions of Washington state, and is one of the largest irrigation projects in the Western states. Maintaining the quality and flows of the basin waters is critical to maintaining these functional values.

Soil erosion is one of the most common sources of water quality reductions. Other sources include agricultural chemicals, industrial wastes, human and livestock waste, and petroleum associated with urban runoff and car, truck, and boat traffic.

Water rights are held both privately and by public utilities and resource management agencies. Many ranchers and crop producers depend on their water rights to maintain their operations.

3.5 WILDLIFE

Basin wildlife can be generally discussed in association with the three general vegetation zones: coniferous forest, sagebrush, and grassland.

In coniferous forest, logging has greatly reduced late-successional forest structures. Populations of associated wildlife species have correspondingly declined; these include special-status species such as accipiter hawks, American marten, pygmy nuthatches, and many species of forest owls, bats, and woodpeckers. Both late-successional and younger forests provide habitat for large animals such as mule deer, cougar, bear and elk. Because Basin forests occur where precipitation is highest, they tend to support a higher diversity of amphibian species than do sagebrush and perennial grasslands.

Sagebrush and grassland contain similar wildlife communities and are discussed collectively in this EIS. In the sagebrush and grassland areas (also referred to as shrub-steppe), crop production and livestock grazing has directly removed native habitats or significantly altered them through invasion of exotic species. Populations of associated species have also declined, including loggerhead shrike,

pygmy rabbit, white-tailed antelope squirrel, sage grouse, Columbian sharp-tailed grouse, California bighorn sheep, and Washington and Idaho ground squirrels.

Sagebrush and perennial grassland generally support many types of mammals and relatively few types of birds (ODFW 1993), although hawks and owls are often prominent in these areas and some species of birds (e.g., sage grouse, loggerhead shrike) depend on this habitat type. The high desert area of eastern Oregon contains more bird diversity than other sagebrush/perennial grassland areas (ODFW 1993). Small mammal communities can be quite diverse, and include several sensitive species (e.g., pygmy rabbit, Merriam's shrew, and Washington ground squirrel). Large mammals of the sagebrush and perennial grassland areas include mule deer and pronghorn. Bighorn sheep were historically abundant in the desert ranges of the Basin, especially in the southeastern portion, and have been successfully reintroduced in some portions of their former range. Sagebrush and grassland areas include the more arid portions of the basin, which contain relatively few species of amphibians but several species of reptiles. Consequently, any water is a major attraction to wildlife, and water and associated riparian or wetland habitat is often critical to many of the species that occur within the sagebrush and perennial grassland regions. Other special habitat types present in the basin include cliffs, caves, and talus areas (Washington Department of Fish and Wildlife 1995, Oregon Department of Fish and Wildlife 1993).

3.6 VEGETATION

The Columbia River Basin contains diverse vegetation types as a result of different combinations of precipitation, altitude, latitude, slope, aspect, soils, and climate.

The Basin can be divided into three general vegetation zones based on native vegetation: coniferous forest, sagebrush, and perennial grassland. The sagebrush and perennial grassland vegetation types are often described collectively as shrub-steppe (Franklin and Dyness 1973, Daubenmeyer 1970), and include habitats described as dry shrub, cool shrub, and desert salt shrub.

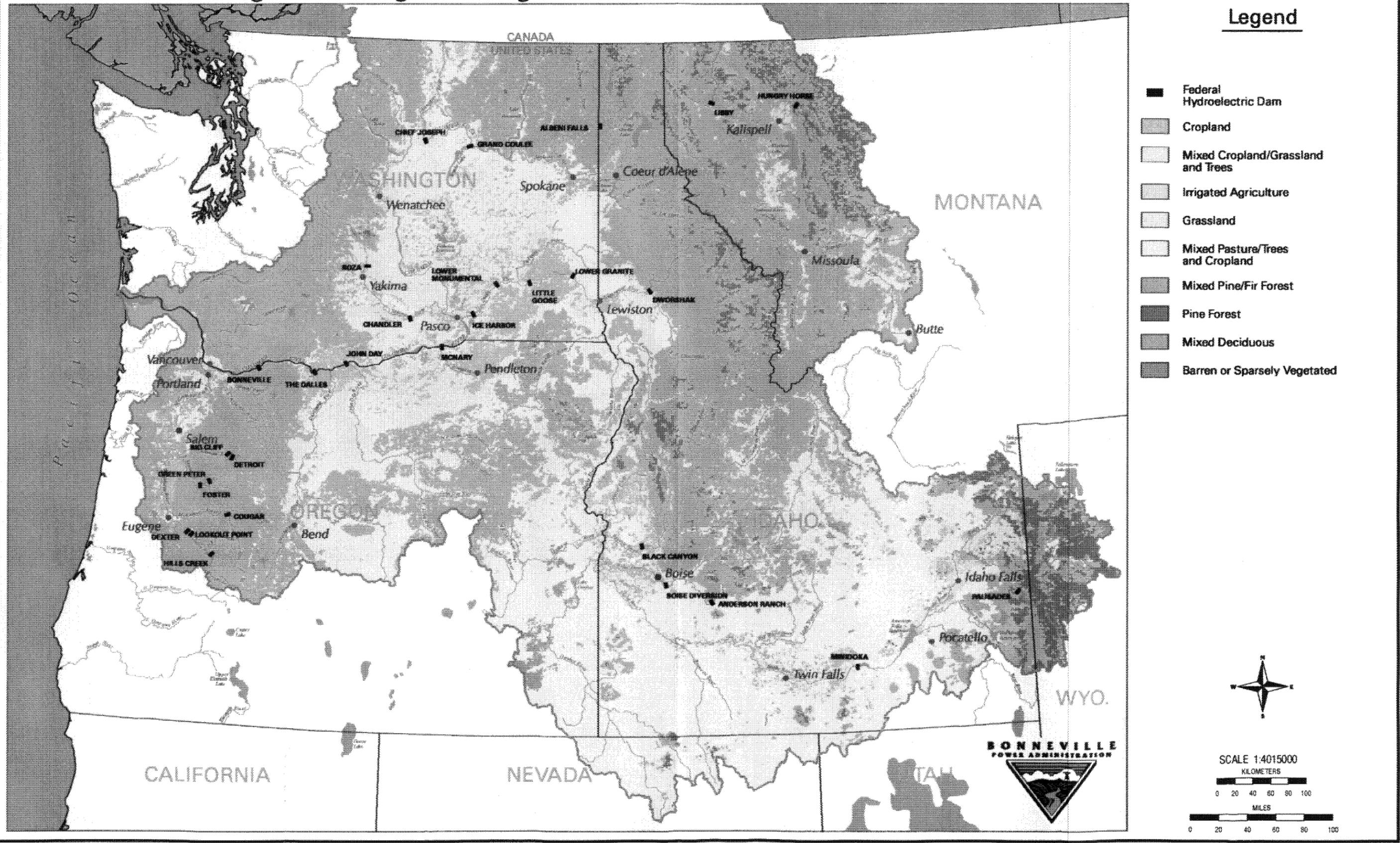
Coniferous forest occurs primarily where precipitation is highest: in the Coast Range, within the Willamette and southern Puget Sounds valleys, along the Cascade mountains, in the Blue Mountains of northeastern Oregon, and in the Rocky Mountains of northern Idaho and western Montana (see Figure 3-2 for the locations of ecoregions referenced in the text).

Shrub-steppe occurs in the Columbia Basin, Snake River Basin/High Desert, Northern Basin and Range, and portions of the Blue Mountains and eastern Cascade slopes and foothills. This vegetation zone is highly variable and includes sagebrush, grassland, sand dunes, basalt cliffs and outcrops, juniper woodlands, and riparian areas.

Riparian vegetation (vegetation associated with water, such as rivers, streams and wetlands) covers a relatively small portion of the Basin, but provides many functional values, including fish and wildlife habitat, erosion protection, and water temperature moderation.

Crop production, livestock grazing, logging, and hydroelectric projects have greatly altered basin vegetation types from their natural conditions. (Figure 3-3 shows the extent of cropland.) Because

BPA Wildlife Mitigation Program - Figure 3-3: "Land Cover Characteristics"



of these disturbances, native, late-successional plant communities (e.g., old-growth forest and native shrub-steppe) generally are rare in the Columbia Basin. In general, the higher elevation forests have been less altered.

Crop production has removed native shrub-steppe vegetation. A variety of crops is produced, including wheat, potatoes, mint, peas, and apples. Hay for winter feeding of cattle is produced in many of the valleys and basins.

On less arable lands, livestock grazing has greatly reduced native perennials and encouraged the invasion of aggressive exotic annuals (e.g., cheatgrass, mustards, and Russian thistle) that now take the place of native species in most heavily grazed areas (Tisdale and Hironaka 1981). Cheatgrass, the most pervasive annual exotic, has increased fire frequency in some shrub-steppe stands, further altering the native vegetation communities. Some exotic species are legally designated as noxious weeds: species that are expanding their range and pose an increasing threat to native plant communities and range and crop production. Examples include bull thistle, Canada thistle, dalmatian toadflax, and diffuse knapweed (Sheley 1995).

Some low-productivity lands have been placed within the Federally run Conservation Reserve Program (CRP), which compensates landowners for protecting crop lands vulnerable to erosion. CRP lands are taken out of crop production and planted with perennial species, most commonly the exotic crested wheatgrass and cultivars of the native western wheatgrass.

Extensive logging and silvicultural treatments have altered forests by greatly increasing the amount of young stands and by selectively removing large trees of desirable species. For example, mature ponderosa pine has been selectively removed from much of the forested areas of the basin, leaving fire-, insect-, and disease-susceptible Douglas-fir, grand fir, and white fir (Johnson et al. 1994).

Fire management has also created forest stands different in composition and structure than would have occurred naturally. Forest fire suppression has increased the intervals between fires, so that fire-sensitive species have survived and forest stands have grown dense. Once ignited, these forests undergo more intense and damaging fires than would have occurred under a more natural regime. Hydroelectric projects have altered native vegetation through flooding, which submerged shoreline and floodplain vegetation.

3.7 LAND AND SHORELINE USE

The Columbia River Basin is dominated by commercial land uses, including range, crop, and timber production.

Land ownership includes large areas of private crop- and forest land; private residential, recreational, and industrial properties; state ownership; Tribal ownership; and Federal ownership. Private ownership is composed mostly of large family farms and forest lands, as well as even larger industry farm and forestry lands. Major federal land managers in the basin include the USFS, BLM, and the Bureau of Reclamation (BOR).

Local governments provide the driving force shaping land use management and regulation outside public lands. Local residents are often more able and willing to participate in government and public decisions through local governments. Because most of the Basin is rural, counties provide most of the primary regulatory and management authority over land use.

The shorelines of lakes, rivers, and coastal zones are considered sensitive areas for many reasons, including vulnerability to erosion, importance of public use, relatively high level of wildlife use, and critical role in protection of water quality.

On non-Federal lands, shorelines are generally regulated at the state or local level through State shoreline management acts and through county and city ordinances. On Federal lands, shorelines are protected under NEPA, as well as under the Clean Water Act and the Rivers and Harbors Act.

Because of the importance of water to wildlife habitat, many wildlife mitigation projects may occur within or near the shorelines of lakes and rivers or within their associated floodplains or wetlands.

3.8 CULTURAL AND HISTORIC RESOURCES

Cultural and historic resources can be generally categorized into three groups: historic sites, including historic architecture, engineering, and archeological sites; Native American archeological sites; and traditional cultural properties. Most identified cultural resources in the Columbia River Basin are archeological sites such as campsites, housepit villages, rockshelters, rock art (petroglyphs and pictographs), lithic (stone) quarries and workshops, burial grounds and cemeteries, and isolated rock cairns, pits, and alignments. Archeological sites are valued for the information they contribute to understanding past events and cultures, for public recreational and educational interest, and as the heritage of contemporary Native American cultures. Sites of historic significance relate to early Euro-American exploration, the fur trade, military history, mining, navigation, agriculture, and early settlement.

Native American traditional cultural properties include a broad range of features from the natural environment and the sacred world, such as distinctive shapes in the landscape, traditional use plants and animals (including game animals, livestock, and food and medicinal plants), ceremonial sites, and places of spiritual renewal and guidance. Today, there are 13 Federally recognized Native American tribes with interests and/or Reservations in the Columbia River Basin within the United States. In several cases, the Tribal organizations function as confederations of multiple tribes. The 13 Tribal organizations are as follows:

Kootenai Tribe of Idaho	Confederated Tribes of the Umatilla Indian
Shoshone-Bannock Tribes	Reservation
Coeur d'Alene Tribe	Confederated Tribes of the Warm Springs
Kalispel Tribe	Reservation
Burns Paiute Tribe	Shoshone-Paiute Tribes of the Duck Valley
Nez Perce Tribe	Valley Indian Reservation
Colville Confederated Tribes	Confederated Tribes and Bands of the Yakama
Confederated Salish and Kootenai	Nation
Tribes of the Flathead Reservation	Spokane Tribe

Figure 3-4 shows where the Reservations are located. However, tribal interests extend beyond the Reservations. Native American Tribes hold and exercise legal rights to activities and resources both within and beyond Reservation boundaries. These rights notably include fishing, hunting, gathering wild plant materials, and religious practices.

See SOR EIS (Section 2.2 and Appendix D) for more detailed information on cultural resources in the Columbia River Basin.

3.9 ECONOMICS

Major sources of employment include agriculture, forestry, recreation/tourism, real estate, retail, services, and government. The agricultural, forestry, and fishing industries provided 9% of the employment in the Interior Columbia River Basin in 1990 (McGinnis and Christensen 1994, citing U.S. Bureau of Economic Analysis 1993).

Most of the study area is rural and sparsely populated. Population centers range from small rural communities (Quincy and Palouse, Washington; McCall, Rigby, and Hollister, Idaho; and Weston and Heppner, Oregon), to small towns (Longview/Kelso and Astoria), and major metropolitan areas (e.g., Portland, Boise, and Vancouver). Eastern Washington and Oregon are typified by expansive agricultural lands (range and crop) and widely dispersed population centers such as The Dalles, the Tri-Cities (Kennewick, Pasco, and Richland), Wenatchee, Spokane, and Clarkston/Lewiston. Primary industries of Idaho are agriculture and forestry. Major population centers in Idaho include Boise, Twin Falls, Pocatello, and Idaho Falls (U.S. Army Corps of Engineers 1992). This area is strongly oriented towards the river as a source of irrigation water for crops, a transportation route for agricultural and forestry products, and recreation.

McGinnis and Christensen (1994, citing U.S. Bureau of Census 1990 data, 1991) report that counties in the Interior Columbia River Basin had a 1990 population of 2.9 million. As a comparison, 6.3 million people reside in western Oregon and Washington. Washington counties comprise 38% of the population; southern Idaho counties 27%; Oregon counties 12%; Montana counties 11%; and northern Idaho counties 7%. Counties in the Interior Columbia River Basin in Wyoming, Utah, and Nevada comprise the remaining 5% of the study area population. The most populated county in 1990 was Spokane, Washington (361,364); the least was Camas, Idaho (727) (McGinnis and Christensen 1994).

The overall population density in the Interior Columbia River Basin in 1990 was about 4 people per km² (11 people per mi²). Eastern Washington, the Snake River Plain of southern Idaho, and western Montana had the most densely populated counties; those in eastern Oregon, central Idaho, northern Nevada, and northwest Wyoming were very sparsely populated. Population densities ranged from 0.15 people per km² (0.4 per mi²) in Clark County, Idaho, to 79 people per km² (205 per mi²) in Spokane County, Washington (McGinnis and Christensen 1994).

The local populations and economies support a large part of county government operations. County governments rely on taxes collected from private lands, as well as on funds shared from the sale of timber on federal lands.

3.10 RECREATION/VISUAL

The basin provides a variety of outdoor recreational opportunities, including snow and water skiing, river rafting and kayaking, resort and ranch visitation, photography, birdwatching, camping, hiking, horseback riding, hunting, and fishing. Much of this activity takes place on public land.

Many people from the more populated and urbanized western Oregon and Washington travel to the relatively less populated Columbia River Basin for outdoor-oriented outings. The presence of natural and scenic settings is important to many recreationists that use the area.

3.11 AIR QUALITY

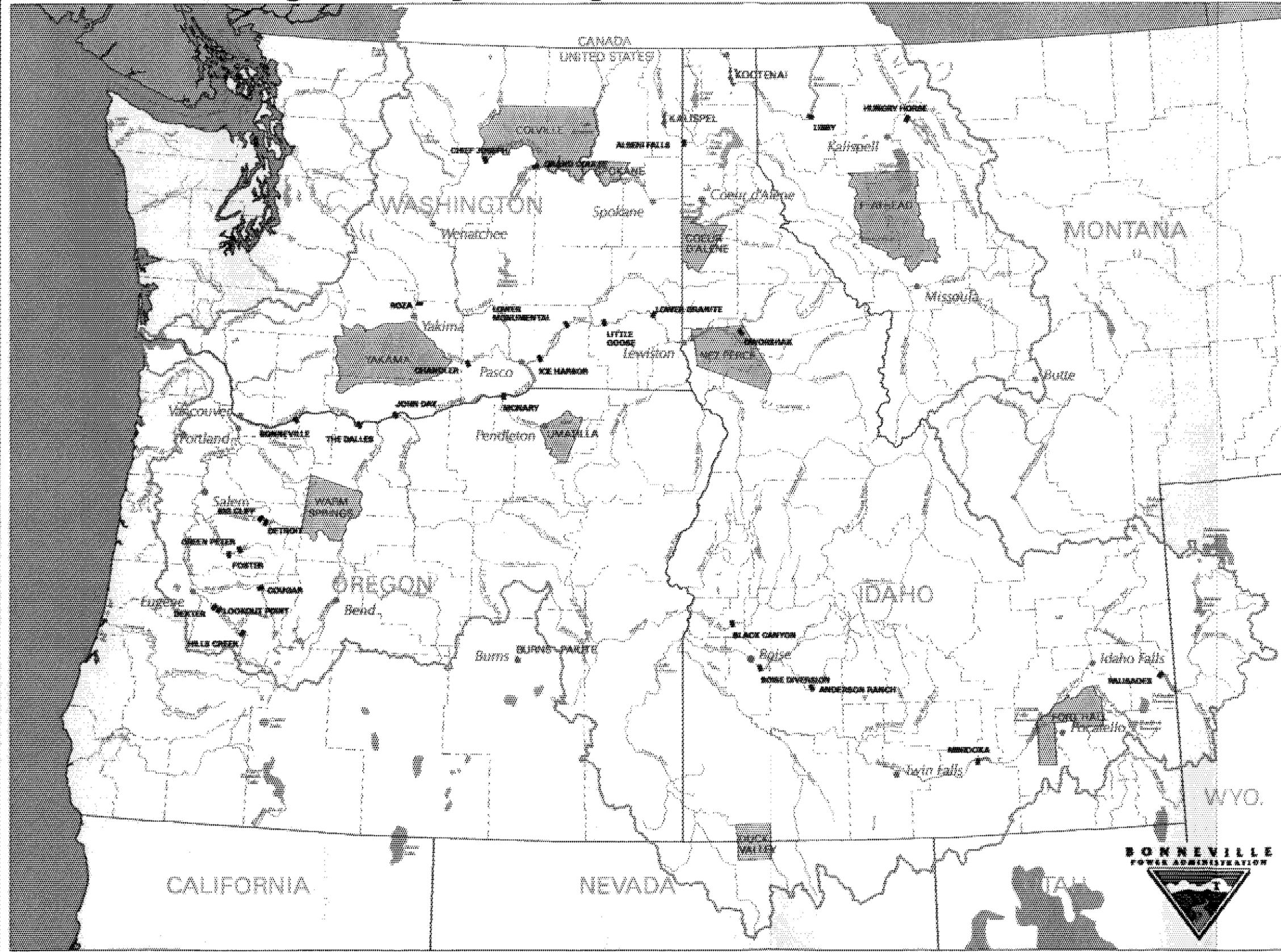
Most of the Columbia River Basin is rural; such areas generally have fewer air quality problems than do industrialized areas around large cities. In the rural areas of the Basin, particulates from blowing dust, woodsmoke, or field burning cause temporary, short-term air quality problems, but not at sufficient levels to be classified as "non-attainment" areas, as defined by the National Ambient Air Quality Standards (NAAQS).

Most air pollution problems in the Columbia River Basin occur near urban centers where large traffic volumes and congestion can result in high levels of carbon monoxide. Similarly, the presence of major industrial facilities (e.g., coal-fired power plants) can be significant sources of particulates, especially in those areas where local topography can result in air inversions (e.g., Spokane).

Those areas that do not meet Federal standards ("non-attainment areas") are associated with urban population centers, including Bonner (Sandpoint) and Kootenai (Coeur d'Alene) counties in Idaho; Missoula, Columbia Falls, and Kalispell in Montana; Eugene-Springfield, LaGrande, and several other cities in Oregon; and parts of Spokane and Yakima (Bonneville Power Administration 1994).



BPA Wildlife Mitigation Program - Figure 3-4: "Reservations"

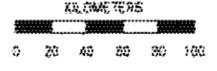


Legend

-  Federal Hydroelectric Dam
-  County Boundary
-  Native American Reservation



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