

## **CHAPTER 3: AFFECTED ENVIRONMENT**

This chapter describes the existing environment of the area potentially affected by BPA's Watershed Management 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 Watershed Management 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 watershed projects is the United States portion of the Columbia River Basin. The area includes lands in Washington, Oregon, Idaho, Montana, Nevada, Utah, and Wyoming.

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.

Climate consists of cold winters and warm, dry summers east of the Cascade Mountains, with a more temperate climate west of the mountains. Most precipitation falls in winter or spring, although occasional thunderstorms east of the Cascades bring heavy rains during summer and fall. Total precipitation varies greatly, with average annual amounts ranging from 254 centimeters (cm) (100 inches (in.)) per year at the Cascade crest to less than 20 cm (8 in.) per year in the low-elevation basins and plains east of the Cascades. 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 River Basin just east of the Cascades and the Snake River Basin/High Desert of eastern Oregon and southern Idaho.

### **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, and then 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 WATER RESOURCES AND QUALITY**

The Columbia River flows 1,930 kilometers (km) (1,200 miles (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 Walla, John Day, Deschutes, Hood, and Willamette rivers. This river system serves as the drainage for 670,800 km<sup>2</sup> (259,000 mi<sup>2</sup>) 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, located primarily on USFS lands.

The Columbia River Basin's water resources provide tribal values and use, irrigation, recreation, fish and wildlife habitat, transportation corridors, drinking water, and power. The Columbia River Project provides irrigation to large portions of Washington state; it 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.

### **3.4 FISH**

The Columbia River Basin provides habitat for a wide variety of native and introduced fish species. These include anadromous fish (which migrate from fresh waters to the ocean, returning after several years to spawn), and resident fish species (which remain in fresh waters throughout their life cycle).

Resident fish species (trout, squawfish, whitefish, suckers, chubs, dace, shiners, sculpins, sticklebacks, and other lesser known species) occupy most of the Columbia River Basin. The status of numerous native resident fish species is a concern. These include several isolated populations of trout, white sturgeon, burbot, sandrollers, and sculpin, many of which are currently protected as Federal or state Threatened or Endangered species, or species of concern. Habitat degradation and alteration, barriers that isolate populations, water withdrawals, species introductions, pollution, and fishing have played significant roles in the decline of many of these stocks.

Several anadromous stocks are present in the basin, including spring/summer and fall chinook salmon; coho, chum, and sockeye salmon; summer and winter steelhead trout; sea-run cutthroat trout; American shad; white sturgeon; and Pacific lamprey. Pacific salmon and steelhead trout are of particular importance due to their commercial, sport, and cultural values.

Many salmon and trout stocks in the basin are severely depleted. Consequently, there is much concern for their recovery and continued survival. Several factors have affected and continue to affect anadromous salmonid stocks. Loss of freshwater spawning and rearing habitat, hatcheries, interference with downstream and upstream migration by dams on the river system, harvest practices, and oceanic conditions are all factors.

Salmon and steelhead have four characteristic life history phases: spawning and rearing in fresh water, juvenile migration to the ocean, ocean rearing, and adult upriver spawning migration. Within the context of this EIS, watershed conservation and restoration projects primarily affect the freshwater adult migration, holding, spawning, rearing, and smolt out-migration phases of these stocks in tributary streams to the mainstem Columbia River.

In response to the declines in salmonid abundance, several actions (including reservoir drawdowns and flow augmentation) are being considered as ways to improve anadromous fish runs (BPA 1995). Additionally, the USFS and BLM have developed guidelines for management activities that may affect both anadromous and resident 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, USFS and BLM 1995a, 1995b, and 1995c); the Decision Notice for the Inland Native Fish Strategy (INFISH, USFS 1995); and the Aquatic Conservation Strategies in the Northwest Forest Plan (USFS and BLM 1994a and 1994b).

### **3.5 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 (Daubenmeyer 1970, Franklin and Dyrness 1973), 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 Sound valleys, along the Cascade Mountains, in the Blue Mountains of northeastern Oregon, and in the Rocky Mountains of northern Idaho and western Montana.

Shrub-steppe occurs in the Columbia River 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 3-1 shows the extent of cropland.) Because of these disturbances, native, late-successional plant communities (e.g., old-growth forest and native shrub-steppe) generally are rare in the Columbia River 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 toad-flax, 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 number 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).

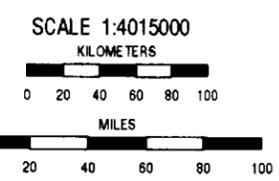
Fire management has also created forest stands different in composition and structure than would have occurred naturally. Forest-fire suppression has increased the intervals between fires, so that

BPA Watershed Management Program - Fig. 3-1: "Land Cover Characteristics"



**Legend**

- Federal Hydroelectric Dam
- Cropland
- Mixed Cropland/Grassland and Trees
- Irrigated Agriculture
- Grassland
- Mixed Pasture/Trees and Cropland
- Mixed Pine/Fir Forest
- Pine Forest
- Mixed Deciduous
- Barren or Sparsely Vegetated



fire-sensitive species have survived and forest stands 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 the original shoreline and floodplain riparian vegetation.

### **3.6 WILDLIFE**

Basin wildlife can be 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 Columbia River 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 have 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 (Oregon Department of Fish and Wildlife 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 (Oregon Department of Fish and Wildlife 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 Columbia River 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 are 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 (Oregon Department of Fish and Wildlife 1993, Washington Department of Fish and Wildlife 1995).

### **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 BOR.

Local governments provide the driving force shaping land-use management and regulation outside public lands. Local residents are often able and willing to participate in government and public decisions through local governments. Because most of the Columbia River 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 their vulnerability to erosion, the proximity of riparian areas, their critical role in the protection of water quality, high-value fish and wildlife habitat, and important public use.

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 (see Chapter 5).

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

Tribal Reservations are located throughout the study area. 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 vary, depending upon the tribe, and can 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, real estate, recreation/tourism, retail, services, and government. The agricultural, forestry, and fishing industries provided 9 percent 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 (e.g., Quincy and Palouse, Washington; McCall, Rigby, and Hollister, Idaho; and Weston and Heppner, Oregon), to small cities (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. 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. The Interior Basin Washington counties comprise 38 percent of the population; southern Idaho counties 27 percent; Oregon counties 12 percent; Montana counties 11 percent; and northern Idaho counties 7 percent. Counties in the Interior Columbia River Basin in Wyoming, Utah, and Nevada comprise the remaining 5 percent 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 km<sup>2</sup> (10 people per mi<sup>2</sup>). 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 km<sup>2</sup> (0.4 per mi<sup>2</sup>) in Clark County, Idaho, to 79 people per km<sup>2</sup> (205 per mi<sup>2</sup>) 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 Columbia River Basin provides a variety of outdoor recreational opportunities, including snow and water skiing, river rafting and kayaking, wind surfing, 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, wood smoke, 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 produce 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 foster air inversions (e.g., Spokane).

Those areas that do not meet Federal standards ("nonattainment 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 (BPA 1995)

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