Vegetation Type

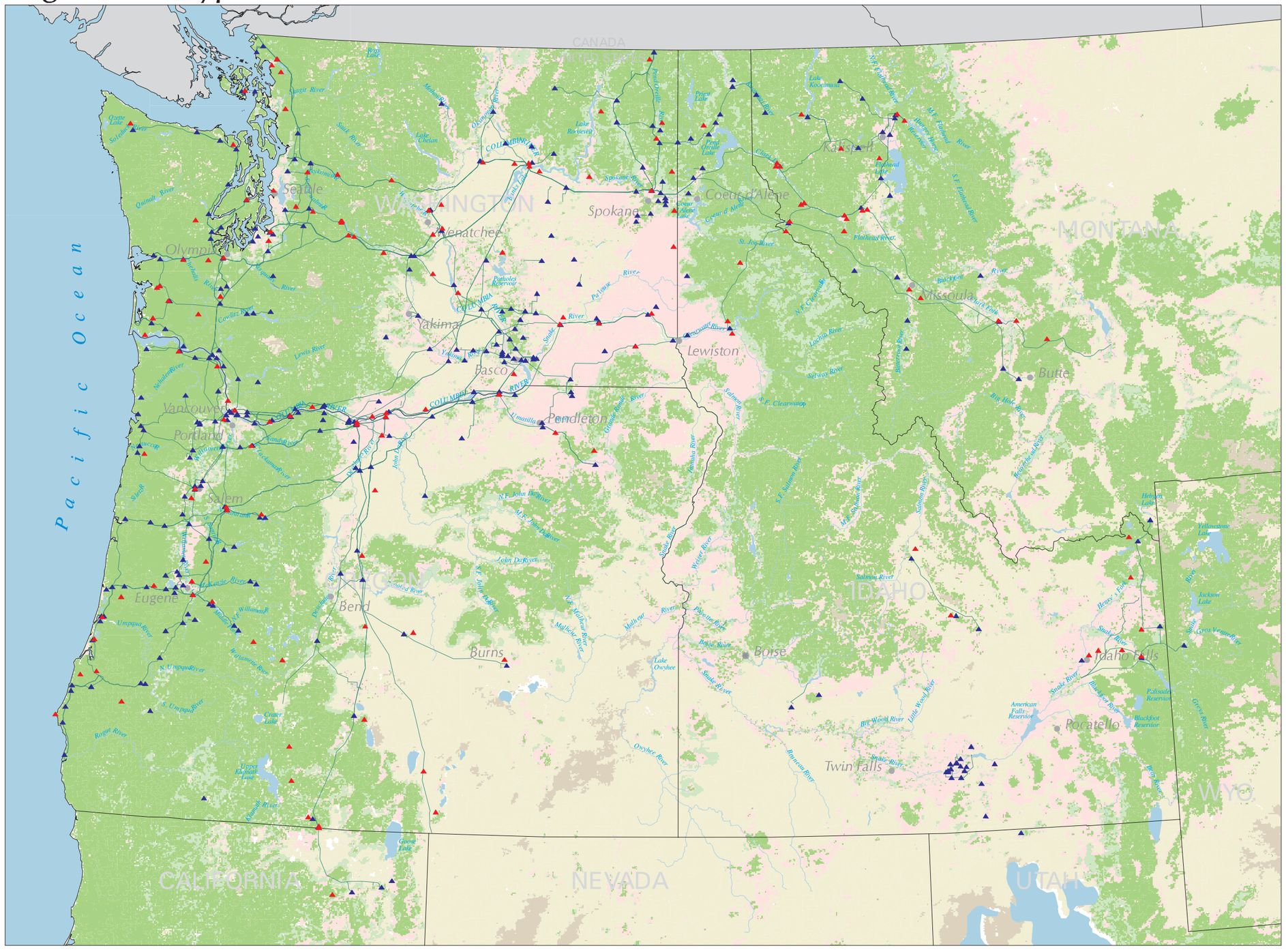

Figure V-2 Vegetation Type

Shrublands

Shrublands are interspersed throughout the region. These include shrubby areas located on mountains and in low-lying areas, rangeland, and shrub-steppe vegetation. Typically, these areas have no trees. Herbaceous plants (i.e., grasses, grass-like plants, and forbs) range from densely abundant to none. Some of these shrubs could include sagebrush, snowberry, bitterbrush, and willows.

Forests

Forested areas occur primarily where precipitation is highest: in the Coast Range; within the Willamette and Puget Sound valleys, along the Cascade Mountains; in the Blue Mountains of northeastern Oregon; and in the Rocky Mountains of Idaho, western Montana, and western Wyoming. These extensive forests include coniferous, deciduous, and mixed tree species.

Forested areas are a key concern for Bonneville's Vegetation Management Program because trees can resprout/reseed within the right-of-way or grow tall and fall into the line. Within most of our rights-of-way, trees that could interfere with the operation and reliability of the line have been removed. Remaining forested areas on the right-of-way are found within draws or along rivers and streams that the transmission lines span. Forested areas also remain along the edges of about 13,680 km (8500 mi.) of transmission-line corridors. It is in these areas that the greatest changes in vegetation structure and composition have occurred as a result of building and maintaining Bonneville's facilities. See Table V-1 for Forest Types by Regional Distribution and Typical Dominants.

Riparian Areas

Within these major vegetation zones are **riparian areas** where the vegetation may be taller and more lush than the surrounding vegetation because more water is available. Riparian areas refer to the areas around streams, rivers, or other bodies of water. In dry locales, riparian areas and floodplains may support tree belts, where cottonwood and other deciduous trees grow within the area where water is available. Typical plants include willow, cattails, rushes, sedges, grasses and other grass-like plants.

Table V-1: Forest Types by Regional Distribution and Typical Dominants

Regional Distribution	Typical Dominants Without Disturbance	Typical Dominants After Disturbance	Typical on Wet Sites
Coastal Oregon & Washington	Sitka spruce*, western hemlock*	red alder*, salmonberry, elderberry, Douglas-fir*	red alder*, western redcedar*, huckleberry, salal
Coast ranges, western Cascade range, western Columbia Gorge	Douglas-fir*, western hemlock*, incense-cedar* (southern Oregon), western white pine* (Puget Sound area), shore pine* (Puget Sound area)	red alder*, bigleaf maple*, snowbrush ceanothus, Douglas-fir*, vine maple, salmonberry, huckleberry	red alder*, western redcedar*, bigleaf maple*, Oregon ash*, willows
Subalpine areas of Cascade & Olympic ranges	silver fir*, mountain hemlock*, western white pine*, noble fir*	subalpine fir*, lodgepole pine*, huckleberry, salmonberry, elderberry	black cottonwood*, Sitka alder, quaking aspen*, thimbleberry
Eastside Cascade Range, mid-elevations of Blue Mountains & Rocky Mountains (N. Idaho, W. Montana)	grand fir*, Douglas-fir*, western larch*, ponderosa pine*, white fir*, lodgepole pine*, western white pine*	lodgepole pine*, western larch*, mountain maple, huckleberry, ceanothus, elderberry	black cottonwood*, paper birch*, quaking aspen*, Sitka alder, mountain ash*
Lower east side of Cascade Range, lower elevation of Blue Mountains & western Rocky Mountains	ponderosa pine*, bitterbrush, snowbrush, chokecherry, Idaho fescue, Oregon white oak (eastern Cascades)	bunchgrasses, ceanothus, blackhawthorne	quaking aspen*, lodgepole pine*
Rocky Mountains of northern Idaho (mid-elevations)	Western redcedar*, western hemlock*, western white pine*	grand fir*, Douglas-fir*, birches*, western larch*, Sitka alder, thimbleberry	western redcedar*, devil's club, Sitka alder, willows, black cottonwood*
Subalpine areas of northern Rocky Mountains, Blue Mountains & Okanogan Highlands	Englemann spruce*, subalpine fir*, subalpine larch*, mountain hemlock*	lodgepole pine*, Oregon boxwood, Englemann spruce*, rusty menziesia, huckleberry	black cottonwood*, Sitka alder, elderberry, mountain ash*, quaking aspen*, paper birch*
Siskiyou Mountains of southwestern Oregon	Douglas-fir*, incense-cedar*, sugar pine*, white fir*, tanoak, madrone	ceanothus, manzanita, tanoak, Douglas-fir*	Oregon ash*, white alder*, bigleaf maple*
Willamette Valley of western Oregon	Oregon white oak*, Douglas-fir*, grand fir*	Oregon white oak*, poison-oak, blackberry	black cottonwood*, Oregon ash*, red alder*, willows

* Indicates tall-growing species.

Threatened & Endangered Plants

Threatened or endangered plants are those plants that have been Federally listed by the USFWS. Most of these plant species have declining populations due to various ecosystem pressures such as urban development, grazing, and logging. These species are protected by the Endangered Species Act (ESA), which requires Federal agencies to insure that their actions do not jeopardize these species or their critical habitats. Table V-2 lists the Federally listed plants that potentially could occur in the Bonneville service territory. Figure V-3 (after page 124) shows T&E plant observation areas.

Table V-2: Current Federally Listed Plants

Common Name	Scientific Name	Status	State
Ute ladies' tresses	*Spiranthes diluvialis*	T	MT, ID
Water howellia	*Howellia aquatilis*	T	MT, ID, OR, WA
Nelson's checker-mallow	*Sidalcea nelsoniana*	T	OR, WA
Applegate's milk-vetch	*Astragalus applegatei*	E	OR
Golden paintbrush	*Castilleja levisecta*	T	OR, WA
Western lily	*Lilium occidentale*	E	OR
Bradshaw's desert parsley	*Lomatium bradshawii*	E	OR, WA
Malheur wire-lettuce	*Stephanomeria malheurensis*	E	OR
Marsh sandwort	*Arenaria paludicola*	E	OR, WA
Macfarlane's four-o'clock	*Mirabilis macfarlanei*	T	OR

T = Threatened E = Endangered

The USFS and BLM have also designated as *sensitive* those plants that need protecting on the lands the agencies manage. These plants are protected to insure that they do not decline further in population.

Even though we routinely clear and control vegetation, TES plant species can grow within Bonneville's rights-of-ways and near electric yards.

Noxious Weeds

Noxious weeds are plant species designated by Federal or state law. These plant species have been found to harm to crops, livestock,

public health, and/or property. Some noxious weeds are native to the Northwest, but most are introduced from Europe or Asia. Disturbed areas such as transmission corridors often become infested with noxious weeds. These species take advantage of disturbed soils and the lack of competing vegetation in areas recently cleared. The weeds can be introduced and transported by vehicles, livestock, and natural elements such as wind, water, and wildlife. Bonneville works with local and state weed control districts and boards to combat noxious weed infestations. Common noxious weeds at which control programs are aimed include tansy ragwort, Canadian thistle, leafy spurge, bull thistle, dalmation toadflax, diffuse knapweed, gorse, scotch broom and musk thistle.

Soils

The soil in which vegetation grows is a complex system of physical and biological elements and processes. It is essential for plant life, and has a major role in defining local ecosystems. It is vital for crop, forage, and timber production.

Soils form as weather and minute organisms act on mineral and organic materials over time, on particular landscapes. Because there is a wide variety of landforms and climates, soils are quite diverse throughout the program area. There is a total of eleven major soil categories (known as *soil orders)*. Six of these are found within Bonneville's service territory (see Table V-3.)

Table V-3: Soil Types in Bonneville's Service Territory

Type	Description
Mollisols	Soils of grassland ecosystems that are important, productive agricultural soils; they occur in eastern Washington and Oregon, the Willamette Valley, and intermountain valleys of Idaho and western Montana.
Inceptisols	Soils of productive forestland that are often "young" (less developed) and found on fairly steep slopes, recent geomorphic surfaces and in material resistant to weathering. These soils occur in Puget Sound and in mountainous areas.
Ardisols	Soils of very dry regions. These soils are prevalent in central Washington and southern Idaho along the Snake River Plain.
Andisols	Formed in volcanic ash. These soils can store large volumes of water and are among the most productive forest soils in the Pacific Northwest. The soils often occur at higher elevations in the mountains of Washington, Oregon, and northern Idaho.

Type	Description
Entisols	Soils are of relatively recent origins and are characterized by great diversity. These soils predominate on the pumice-mantled forested plateaus of central Oregon and floodplains and terraces.
Alfisols	Well-developed soils formed primarily in cool wet regions, usually under forest vegetation. They are productive for both commercial timber and agriculture. These soils occur in the mountains of western Montana and western Wyoming.

Water

Water is one of the most important resources present within Bonneville's service area. Water resources provide:

- irrigation,
- recreation,
- fish and wildlife habitat,
- transportation corridors,
- drainage and flood control,
- drinking water,
- power, and
- social and Tribal values and use.

Because water is so important, many local, state, regional, and Federal groups and agencies have strongly emphasized the protection and restoration of water resources, including many watershed-based planning efforts. The Clean Water Act provides some protection of Waters of the United States. This protection includes requiring permits for discharging dredge or fill material into rivers, streams, or wetlands. Downed trees or cut brush would be considered fill material if left in a stream, river, or wetland.

Bonneville transmission lines, access roads and microwave beam paths often must cross water resources, including wetlands, rivers and streams and their associated floodplains. Substations and other electric yard facilities are sometimes found near these water resources.

Bonneville's transmission system also crosses 10 sole-source aquifers: the Cedar Valley, Central Pierce County, Cross Valley, Eastern Columbia Plateau, Lewiston Basin, Missoula Valley,

Newberg Area, North Florence Dunal, and Spokane Valley Rathdrum Prairie aquifers.

Because trees and shrubs often grow faster near water, these areas often need extra attention by Bonneville maintenance crews to make sure that vegetation does not grow into our lines. In other cases, transmission lines span well above deeply cut stream channels, leaving the channel and associated vegetation unchanged.

Water resources and the actions that affect them are closely related to **soils**, and **fish**.

Rivers and Streams

The Columbia River is the predominant river within Bonneville's service area. This river flows from British Columbia south through east and central Washington, and then west between Washington and Oregon, to the Pacific Ocean. Tributaries include the Snake River, which originates in Wyoming and flows through Idaho into Oregon, as well as the Kootenay, Pend Oreille, Spokane, Okanogan, Wenatchee, Yakima, Walla Walla, John Day, Deschutes, Hood, and Willamette rivers.

Other rivers not part of the Columbia River system but within Bonneville's service area include the Skagit, Skykomish, Snoqualmie, Nisqually, Chehalis, Nestucca, Flathead, Bitterroot, and Umpqua rivers.

At one or more points, Bonneville's transmission system crosses all of these rivers, as well as many smaller perennial and intermittent drainages. Rivers and streams are important not only as habitat for fish and other aquatic organisms, but also for transporting water, nutrients, minerals, and organic materials. Rivers also can transport pollutants and sediments, allowing negative elements to have far-reaching effects.

Precipitation in the Pacific Northwest ranges from 254 cm (100 in.) per year at the Cascade crest to less than 20 cm (8 in.) per year in low-elevation basins and plains east of the Cascades. The amount of sediment in rivers and streams varies with the season. In some areas, sediment is high during snowmelts in May and June; in other areas, sediment is high during heavy winter rains.

The water quality of rivers and streams is threatened by many sources and actions, including the following:

- soil disturbance (erosion from roads, timber harvest, development, agricultural production, and grazing),
- vegetation cover loss (crop production, commercial timber harvest, and grazing), and

- chemical pollution (agricultural chemicals, industrial wastes, human and livestock waste, and petroleum associated with urban runoff and car, truck, and boat traffic).

These actions affect water quality by depositing silt in the bottoms of streams, rivers, and lakes (sedimentation); by muddying the water (turbidity); by polluting the water; and by increasing water temperatures. Waters affected by point and/or non-point source pollution and not currently in compliance with or expected to satisfy applicable water quality standards are listed with the EPA as "water quality limited." General surface water runoff from places such as parking lots and farmlands can also be called non-point pollution. (Point pollution comes from a defined place like the end of a pipe.)

Wetlands

Wetlands are important because they provide wildlife habitat and help to control flooding and protect water quality. They are also protected under Federal, state, and local laws and policies.

Wetlands are defined as follows:

> *areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3, 40 CFR 230.3).*

Wetlands are often found within transmission-line rights-of-way; along Bonneville-maintained access roads; and next to substations, electric yards, and other Bonneville facilities. In the past, wetlands were considered wastelands, and Federal agencies were encouraged to build facilities in them so as not to compete with the public for more usable profitable lands. Therefore, many older Bonneville facilities are found located near wetlands.

Floodplains

Floodplains are low-lying areas associated with streams, rivers, and/or wetlands that have at least a one-percent chance of flooding each year. Under 10 CFR 1022 and Executive Order 11988, Federal agencies are required to avoid or minimize adverse impacts that might result from changing or occupying floodplains.

Many of Bonneville's transmission-line rights-of-way and access roads cross floodplains, while some substations and maintenance facilities are located next to floodplains.

Fish and Other Aquatic Species

Water supports fish and other aquatic species. Fish are an important resource to the Pacific Northwest, both for their economic value to the sport and commercial fisheries, and for their cultural and religious value to the region's Native American Tribes and others.

Rivers and streams in this region support a large number of anadromous fish (species that migrate downriver to the ocean to mature, then return upstream to spawn), as well as varied populations of resident fish (fish that live and migrate in fresh water).

The main anadromous fish runs in the Columbia Basin are Chinook, coho, chum, and sockeye salmon; steelhead and searun cutthroat trout; and American shad, white sturgeon, and Pacific lamprey. Pacific salmon and steelhead trout are especially important due to their commercial, sport, and cultural values. Popular resident game fish in the region include western cutthroat trout, rainbow trout, Dolly Varden (bull trout), sturgeon, and Kokanee salmon.

Other aquatic species include salamanders, turtles, frogs and invertebrates (insects, crayfish, snails, etc.).

Threatened and Endangered Species

Many fish, as well as other aquatic species, are presently listed under the ESA as threatened or endangered. Many other species of fish are candidate species. Currently, fish and wildlife agencies throughout the Pacific Northwest are engaged in recovery efforts for listed and other dwindling salmon stocks. Tables V-4 and V-5 show currently listed threatened or endangered fish and snails. Figure V-3 shows watersheds with T&E species.

Sensitive Fish Species

The USFS and BLM have designated as sensitive those populations of fish that are in decline or that are considered likely to become threatened or endangered should current trends continue. Sensitive fish presently found in areas of Bonneville's facilities include white sturgeon; five species of lampreys; sockeye, chum, and coho salmon; coastal, Lohontan, and various other races of cutthroat trout; and pygmy whitefish, burbot, several species of minnows, suckers, and sculpins.