

Final

Programmatic Environmental Impact Statement For Northern Border Activities

Section 4: West of the Rockies Region



July 2012

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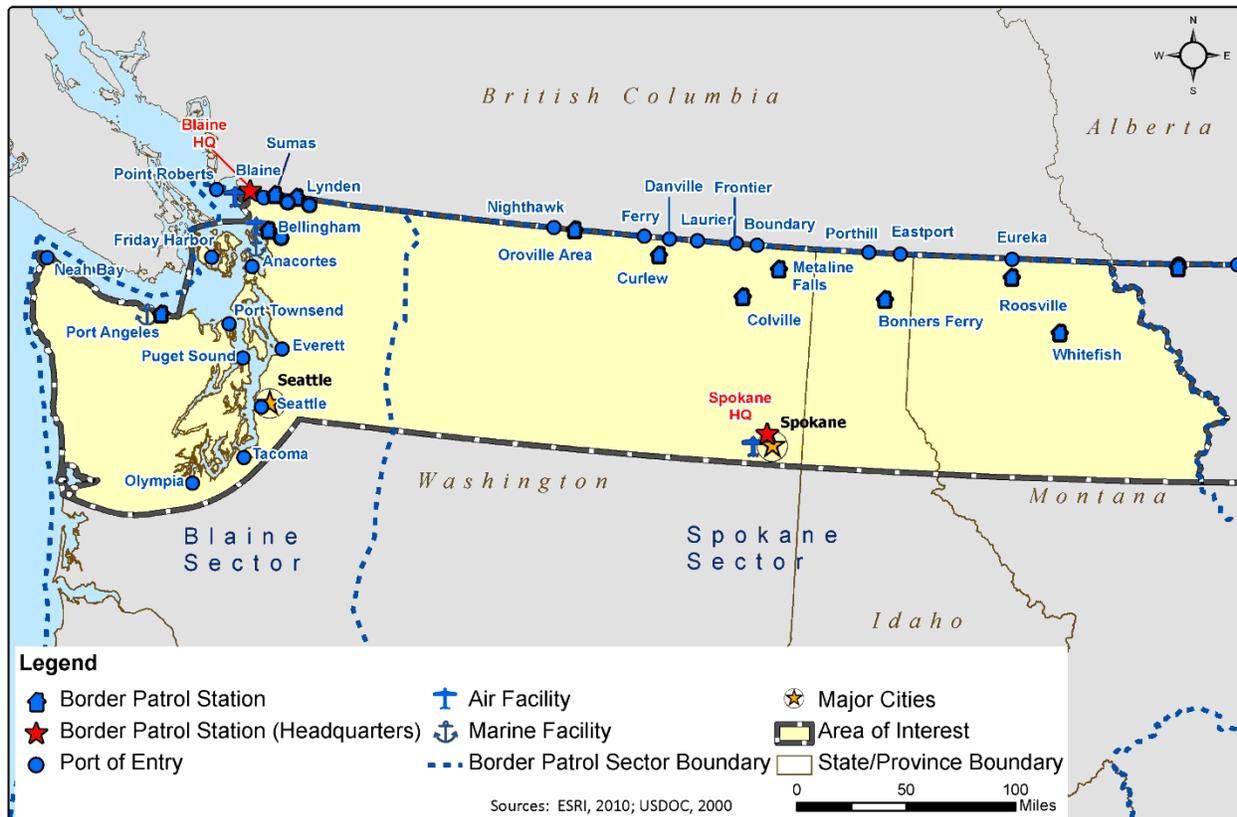
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4 WEST OF THE ROCKIES REGION

4.1 INTRODUCTION

This chapter analyzes the potential environmental effects from U.S. Customs and Border Protection (CBP) actions in the West of the Rockies (WOR) Region within about 100 miles of the northern border. The WOR Region includes Washington, Idaho, and the part of Montana that is west of the Continental Divide (Figure 4.1-1).

Figure 4.1-1. The WOR Region and U.S. Customs and Border Protection Facilities



The northern border environment in the WOR Region has a wide variety of habitats and terrain types. Within Washington state these habitats include grasslands, badlands and coulees, foothills, mountain and alpine habitats, large river valleys and associated watersheds (including Ross Lake, Ososyoos Lake, the Similkameen River, the Kettle River, the Columbia River, and the Pend Oreille River), dense conifer and deciduous forests, wetlands and arid habitats, glacial and coastal habitats, and human developments of various densities.

The habitat within the Idaho portion of the region is mostly a combination of rugged, moist, forest; mountain and alpine habitats; large river valleys and associated watersheds (including the Kootenai River and the Moyie River); and human developments of various densities.

In Montana, habitats include prairie potholes, grasslands, badlands and coulees, foothills, mountain and alpine habitats, large river valleys and associated watersheds (including Lake Kooconusa, North Fork Flathead National Wild and Scenic River, Waterton Lake, Saint Mary

River, and Milk River), dense conifer and deciduous forests, wetlands and arid habitats, glacial and coastal habitats, and human developments of various densities.

Territory within the WOR Region is a combination of privately owned land, state trust property (Crawford State Park), Bureau of Land Management (BLM) land (managed by the BLM Field Offices in Spokane, Washington; Coeur d'Alene, Idaho; and Miles City, Glasgow, and Malta, Montana), national forest area (Mt. Baker Snoqualmie, Okanogan, Idaho Panhandle, Colville, and Kootenai National Forests), wilderness area (Mt. Baker Wilderness, Stephen Mather Wilderness, Pasayten Wilderness, and Salmo-Priest Wilderness), national park area (North Cascades and Glacier/Waterton), Indian reservation (the Kootenai Indian Reservation), and trail (the Pacific Crest and Idaho State Centennial Trails).

U.S. Border Patrol in the WOR Region

The U.S. Border Patrol (USBP) in this region employs several hundred agents, who operate from 11 Border Patrol stations (BPSs) along 600 miles of the northern border. The large swaths of difficult-to-access terrain pose a challenge for surveillance, which leads to use of diverse patrols including on- and off-road-vehicle, snowmobile, pedestrian, horse, aerial, and waterborne patrols. The rough terrain in much of the region also requires heavy reliance on partnerships with Government agencies (Federal law enforcement and land management agencies, state departments of natural resources, and Canadian authorities) and private entities (communities, landowners, and interboundary groups) for both law enforcement and intelligence missions.

The region's 11 BPSs are divided into two sectors: Blaine, Washington and Spokane, Washington (see Figure 4-1-1). Border Patrol's access to roads managed by the U.S. Forest Service (USFS) is important throughout the border area. The following areas pose specific access challenges: national forest areas (Mt. Baker Snoqualmie, Okanogan, Idaho Panhandle, Colville, and Kootenai National Forests) and wilderness areas (Mt. Baker Wilderness, Stephen Mather Wilderness, Pasayten Wilderness, and Salmo-Priest Wilderness). Both CBP and USFS are acting under a Memorandum of Understanding (MOU) signed in 2006 between the Department of Homeland Security (DHS), the U.S. Department of Agriculture (USDA), and the U.S. Department of the Interior (DOI). One area of cooperation provides for DHS to have access to USFS lands for implementing its security mission. Section 4.8 on Land Use describes this MOU in more detail. Access to existing USFS roads will be a continuing concern as additional areas within the Metaline Falls station area are considered for wilderness designation.

USBP sectors within the region deploy a combination of static permanent surveillance, ground radar, and acoustic sensors with repeaters for extended line-of-sight coverage. Forward operating bases are deployed in parts of this region, as are occasional mobile traffic checkpoints, in coordination with each state's department of transportation.

Office of Air and Marine in the WOR Region

The CBP Office of Air and Marine (OAM) in Blaine, Washington deploys aircraft from Bellingham Airport and watercraft from marinas in Bellingham, a U.S. Coast Guard (USCG) facility and Port Angeles. Several dozen pilots conduct airplane and helicopter patrols of land, air, and maritime coastal areas, and a similar number of boat operators conduct day and night patrols to the international border (an average patrol is 12 miles). OAM in Spokane, Washington

operates from Felts Field but plans to move to the Fairchild Air Force Base, which is outside Spokane (Smith, 2010).

Marine patrols are coordinated with the U.S. Coast Guard. Nighttime patrols are conducted using navigational lighting.

Office of Field Operations in the WOR Region

Each CBP Office of Field Operations (OFO) region includes a large regional port of entry (POE) and the smaller POEs within its purview. This region includes the Blaine, Washington large, commercial POE and its associated smaller ports as well as the Great Falls, Montana POE and several ports it manages in Idaho and western Montana. (Note: Since most of the ports under the Great Falls POE are located in the East of the Rockies Region, these ports and the Great Falls POE are evaluated in the East of the Rockies chapter.)

The Blaine POE is a full-service port that oversees several maritime crossings, three medium POEs, and several smaller POEs. The Blaine POE itself processes over 10,000 passenger cars, 1,000 commercial vehicles, and 40-60 buses per day. Blaine is also the largest agriculture port on the northern border, employing several dozen agricultural specialists.

The POEs in Idaho and Montana that are west of the Rockies are generally small “permit” ports catering to specific commodities and are under the management of the Great Falls, Montana service port.

4.2 AIR QUALITY

4.2.1 INTRODUCTION

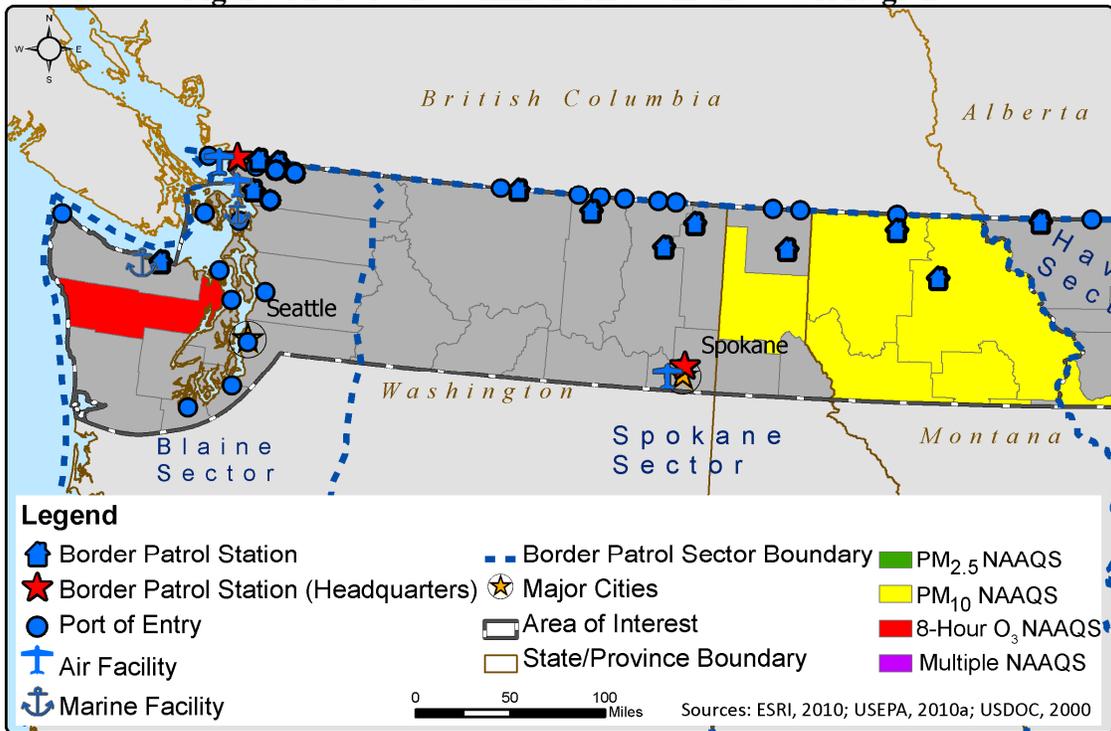
The WOR Region study area contains many air quality control regions (AQCR) and Class I areas that could experience impacts due to the proposed action and alternatives in this Programmatic Environmental Impact Statement (PEIS). However, the mere presence of a sensitive area, such as a nonattainment, maintenance, or Class I areas, does not guarantee that that area would be impacted by CBP activities. (Class I areas are Federal lands, designated by Congress as of August 7, 1977, that have air quality restrictions under Section 162(a) of the Clean Air Act that are more stringent than the standards that apply elsewhere.) Chapter 3, Section 3.2 provides more information on generally applicable national standards and requirements used to describe and determine effects to air quality resources.

4.2.2 AFFECTED ENVIRONMENT

4.2.2.1 National Ambient Air Quality Standards and Attainment Status

Nonattainment areas within 100 miles of the border are shown in Figure 4.2-1. In Montana and part of Idaho, there are large areas of nonattainment for PM₁₀ (particulate matter that is 10 micrometers in diameter and smaller). In these two states, narrow valleys and regional climate often cause temperature inversions that trap pollutants in cold air along valley floors. Federal regulations designate AQCRs that were once classified as nonattainment but have lowered levels of pollutants through the use of regional controls, as maintenance areas. Consistent with the nonattainment areas, Figure 4.2-2 shows maintenance areas in the near Seattle and Spokane. A complete list of nonattainment and maintenance areas organized by state and county is located in Appendix J.

Figure 4.2-1. Nonattainment Areas in the WOR Region

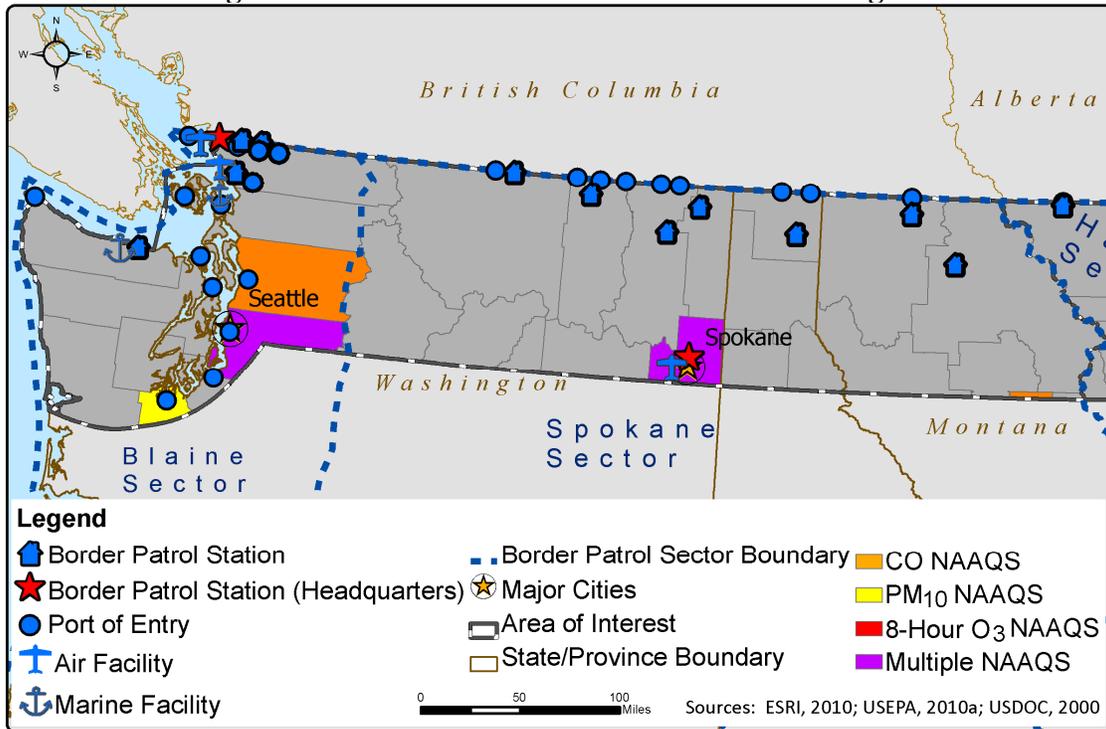


Notes:

NAAQS: National Ambient Air Quality Standards

PM_{2.5}: particulate matter that is 2.5 micrometers in diameter and smaller

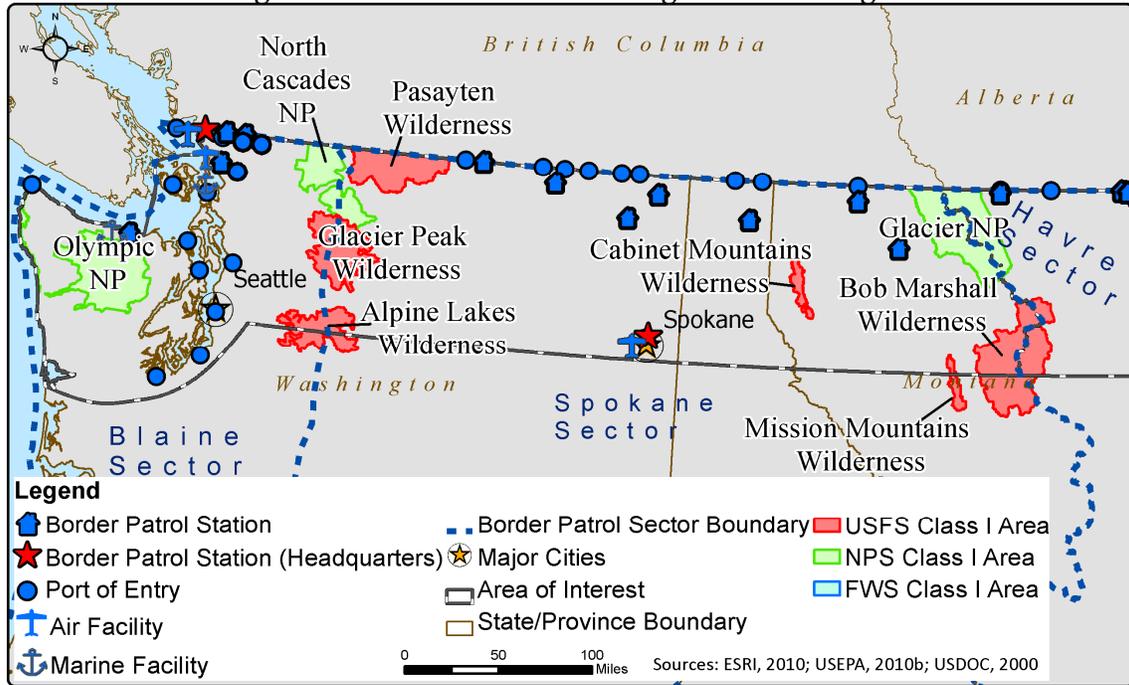
Figure 4.2-2. Maintenance Areas in the WOR Region



4.2.2.2 Class I Areas

The Clean Air Act (CAA) protects areas where air quality exceeds the national standards established by the U.S. Environmental Protection Agency (USEPA). These standards prevent significant deterioration of air quality (PSD). The more stringent restrictions in effect in Class I areas are largely meant to maintain unimpaired visibility in areas such as “national parks, national wilderness areas, national monuments, national seashores, and other areas of special natural, recreational, scenic, or historic value.” In general, "clean air areas" are protected through ceilings on the additional amounts of certain air pollutants over a baseline level. The PSD increment amounts vary based on the area’s classification. Class I areas and major CBP facilities in the WOR Region are shown on the map in Figure 4.2-3.

Figure 4.2-3. Class I Areas along the WOR Region



4.3 BIOLOGICAL RESOURCES

4.3.1 INTRODUCTION

The WOR Region falls within portions of the following states: Montana, Idaho, and Washington. Biologically the region can be divided into five major ecoregions:

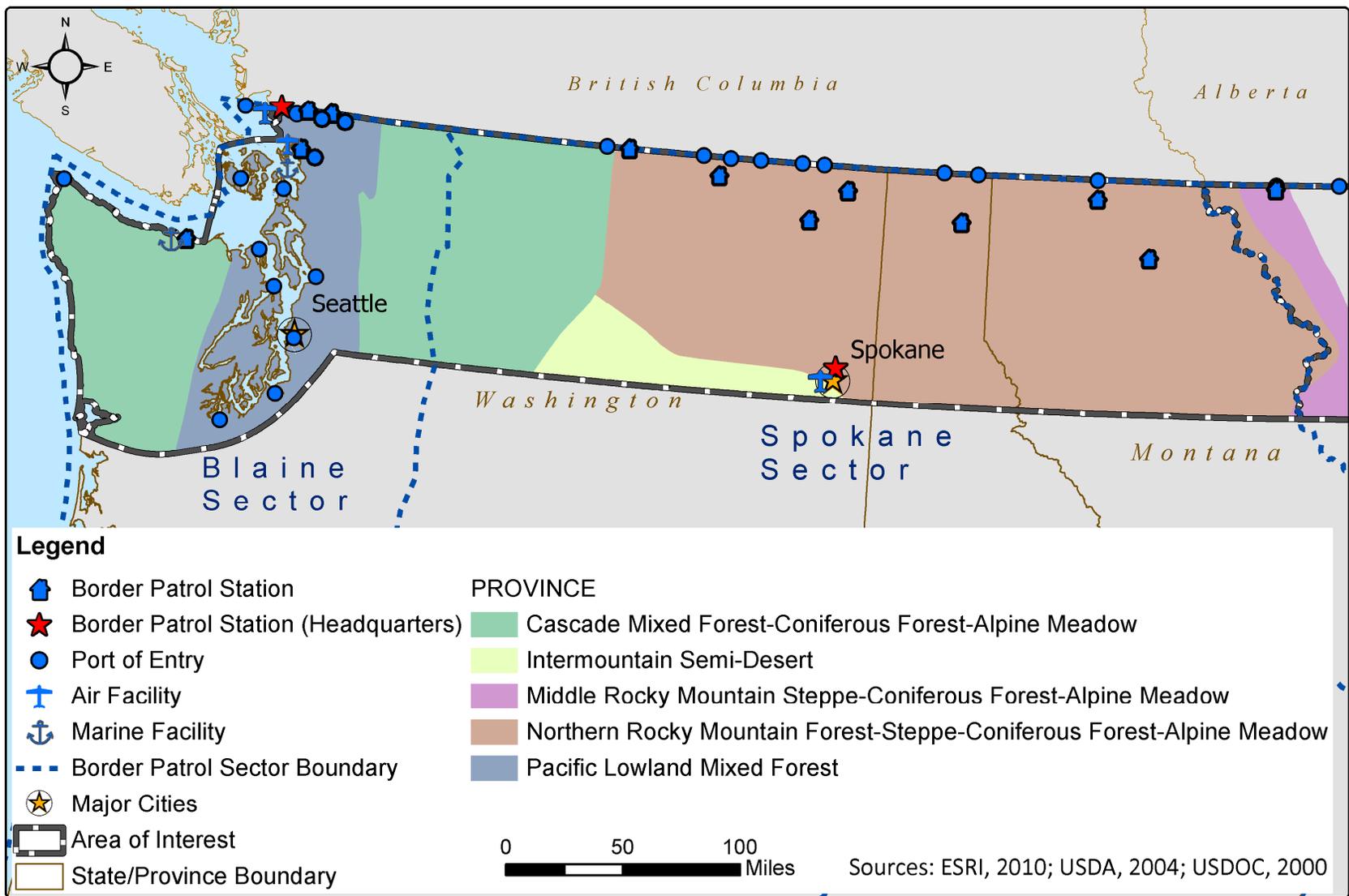
- Northern Rocky Mountain Forest Steppe–Coniferous Forest–Alpine Meadow;
- Middle Rocky Mountain Steppe–Coniferous Forest–Alpine Meadow;
- Intermountain Semi-desert;
- Cascade Mixed Forest–Coniferous Forest–Alpine Meadow; and
- Pacific Lowland Mixed Forest.

Generally, these ecoregions continue north of the U.S.–Canada border (Figure 4.3-1). For a complete description of the above ecoregions, see Appendix L.

Map resources for the ecoregion map in this section were developed from the U.S. Census Bureau (USCB), U.S. Geological Survey (USGS), and ESRI databases.

Each ecoregion has a unique set of biological, climatic, and topographical characteristics along with unique challenges and opportunities for CBP.

Figure 4.3-1. Ecoregions of the WOR Region



4.3.2 AFFECTED ENVIRONMENT

4.3.2.1 Blocks of Regionally Significant Habitat

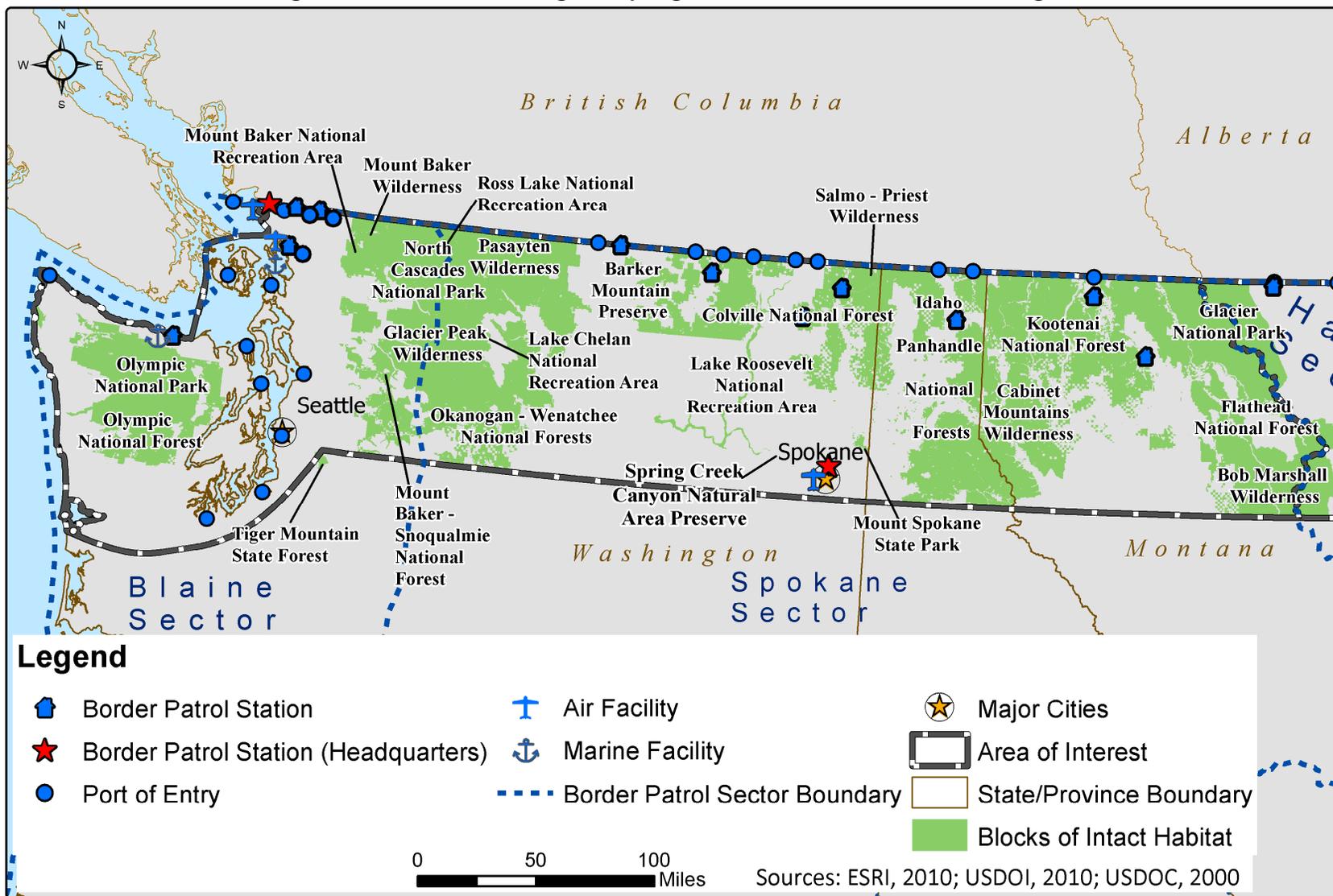
The blocks of regionally significant habitat listed below and shown in Figure 4.3-2 are relatively undeveloped and are intact habitat protected as wilderness, state parks, and state and national forests. Intact habitat refers to areas of largely unfragmented habitat with few alterations or disturbances, such as improved roads or other development. Most areas listed are protected by law (wilderness areas, national parks), while others may occupy private lands and often cross state and country boundaries. Selected regionally significant blocks that represent this region include:

- Barker Mountain Natural Area Preserve (Washington);
- Bob Marshall Wilderness (Montana);
- Cabinet Mountains Wilderness (Montana);
- Coeur d'Alene National Forest (Idaho);
- Colville National Forest (Washington);
- Coulee Dam National Recreation Area (Washington);
- Flathead National Forest (Montana);
- Glacier National Park (Montana, U.S.)/Akamina Kishinena Provincial Park (British Columbia, Canada);
- Glacier Peak Wilderness (Washington);
- Kaniksu National Forest (Washington, Idaho, Montana);
- Kootenai National Forest (Idaho);
- Lake Chelan National Recreation Area (Washington);
- Mount Baker National Recreation Area (Washington);
- Mount Baker Wilderness (Washington);
- Mt. Spokane State Park (Washington);
- North Cascades National Park (Washington, U.S.)/Skagit Valley Provincial Park and EC Manning Provincial Park (British Columbia, Canada);
- Okanogan National Forest (Washington, U.S.)/Cathedral Provincial Park and Protected Area (British Columbia, Canada);
- Olympic National Forest (Washington);
- Olympic National Park (Washington);
- Pasayten Wilderness (Washington);
- Ross Lake National Recreation Area (Washington);
- Salmo-Priest Wilderness (Washington);

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- Snoqualmie National Forest (Washington);
- Spring Creek Canyon Natural Area Preserve (Washington);
- Stephen Mather Wilderness (Washington);
- Tiger Mt. State Forest (Washington) ; and,
- Wenatchee National Forest (Washington).

Figure 4.3-2. Blocks of Regionally Significant Habitat in the WOR Region



4.3.2.2 Sensitive Habitats

Within a 100-mile zone adjacent to the U.S.–Canada border in the WOR Region are several ecological communities representing sensitive habitats. The sensitive habitats described here occur in many of the larger habitat areas listed in Section 4.3.2.1, and are home to many of the threatened and endangered species listed in the next section. For example, alpine meadows exist in many mountainous areas in this broad geographic region, such as Glacier National Park, and house many protected species like the grizzly bear (*Ursus arctos horribilis*) and common plant species like beargrass (*Xerophyllum tenax*). Some descriptive habitats lower down, such as old growth/mature forest, span many regional boundaries and are more general in meaning. Others, such as Great Plains ponderosa pine woodlands (plant communities dominated by ponderosa pines), define more specific ecological associations.

Many of these habitats are very fine in scale (they cover small areas in a mosaic of various habitats) and form a patchwork of biologically sensitive and diverse areas. The list of sensitive habitats is based on those enumerated and described by the World Wildlife Fund (2001) ecological system descriptions within the NatureServe.org database, and each state's respective natural resources agency. The habitats are as follows:

- Alpine dwarf-shrubland—dwarf-shrubs or dwarf willows forming a heath-type ground cover;
- Alpine meadows—open meadows at and above the timberline;
- Aspen stands—pure or mixed stands of aspen greater than 0.4 ha (1 acre);
- Biodiversity areas and corridors—biologically diverse cities or urban growth with habitat valuable to fish or wildlife, mostly with native vegetation; corridors are zones of relatively undisturbed and unbroken tracks of vegetation that connect fish and wildlife habitat conservation areas, priority habitats, areas identified as biologically diverse or valuable within city or urban growth areas;
- Coastal nearshore—relatively undisturbed, nearshore estuaries of Washington's outer coast;
- Douglas-fir and ponderosa pine forest, as well as shrub-grassland ecosystems;
- Dry conifer forest—northern Rocky Mountain western larch woodland in mountainous regions at 2,000 to 9,800-foot elevation;
- Eastside steppe—non-forested vegetation dominated by forbs, perennial bunchgrasses, or a combination;
- Freshwater wetlands and fresh deepwater—lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water; deepwater habitats are permanently flooded lands below the deepwater boundary of wetlands;
- Great Plains ponderosa pine woodland and savanna-ponderosa pine woodlands surrounded by grasslands;
- Herbaceous balds—variable-sized patches of grasses and forbs on shallow soils over bedrock, commonly fringed by forest or woodland;

- Inland dunes—sand dunes formed by wind action, not necessarily near water bodies;
- Instream habitats—a combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources;
- Juniper savannah/juniper woodlands—grassland with scattered junipers, grading into a zone with more junipers and less grass cover;
- Northern conifer forest—northern Rocky Mountain hemlock—western red cedar forest;
- Northern Rocky Mountain Douglas—fir forest and woodland—mixed deciduous/coniferous forests;
- Old growth/mature forest—a forest of great age exhibiting unique structural and ecological features;

Douglas-firs in an old-growth forest



Source: (NDL, No Date).

- Open coast nearshore—relatively undisturbed, non-estuarine nearshore areas of Washington’s outer coast;
- Oregon white oak woodlands—stands of oak or oak/conifer associations where canopy coverage of the oak component exceeds 25 percent;
- Palouse prairie (of the Columbia Basin)—gentle, rolling terrain at elevations of 2000 to 3,000 feet;
- Riparian zones—areas adjacent to flowing or standing freshwater aquatic systems;
- Rocky Mountain riparian woodland and shrubland—within the flood zone of rivers, on islands, sand and gravel bars, and adjacent streambanks;
- Rocky Mountain subalpine spruce-fir forest and woodland—spruce-fir forests of the mountainous and subalpine zones of the Rocky Mountains; these systems are a substantial part of the subalpine forests of the Cascades and Rocky Mountains from southern British Columbia east into Alberta and southward;

- Rocky Mountain subalpine—montane fen—mountain wetland fed by mineral-rich surface water or groundwater; below alpine areas in elevation;
- Rocky Mountain wooded vernal pool—temporary pools, usually devoid of fish, that allow development of amphibian and insect species;
- Shrub-grassland ecosystems (shrub-steppe), including antelope bitterbrush/Idaho fescue habitat;
- Shrub-steppe—non-forested vegetation with one or more layers of perennial bunchgrasses and a conspicuous, but discontinuous, layer of shrubs;
- Subalpine forest—northern Rocky Mountain subalpine dry parkland, Rocky Mountain lodgepole pine forest, Rocky Mountain subalpine dry-mesic spruce-fir forest and woodland; and,
- Westside prairie—herbaceous, non-forested plant communities; either dry or wet prairie.

4.3.2.3 Threatened and Endangered Species

Federally listed threatened and endangered species are protected by the Endangered Species Act (ESA) of 1973. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend.

Appendix M lists the threatened or endangered species by county in the WOR Region. Species are listed as threatened or endangered at either the Federal and/or state level. There are six federally listed threatened animal species: chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), bull trout (*Salvelinus confluentus*), marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), and Canada lynx (*Lynx Canadensis*), and one federally listed endangered animal species, the killer whale (*Orcinus orca*), with designated critical habitat in the region.

Some states differ in how they list and protect threatened and endangered species. The following list gives the specific agencies and listing differences (if applicable) in the WOR Region.

- Idaho does not have an endangered species act for animals, but does legally recognize threatened, endangered, and specially protected species in the state per Idaho Administrative Code 13.01.06. In addition, the Idaho Department of Fish and Game (IDFG) maintains a list of species of special concern (NANFA, 2011). Idaho does not list species as state threatened or endangered but defers to Federal listings.
- Montana has an endangered species act that covers animals but not plants. More species are listed as species of concern (NANFA, 2011). Montana Fish, Wildlife, and Parks lists some species as species of concern in place of either threatened, or endangered or threatened listing. The status represents a separate category, described as “potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas” (MT FWP, 2010).
- Washington has an endangered species law that covers animals but not plants. Recovery plans are required, although critical habitat designation and agency consultation are not. The Washington Department of Fish and Wildlife (WDFW) maintains a list of threatened, endangered, special concern, and sensitive species (NANFA, 2011).

The following examples of some of the threatened and endangered species in the WOR Region show the wide range of fauna and flora affected.

The Selkirk Mountains population of woodland caribou (*Rangifer tarandus caribou*) is one of the federally endangered species in the region. The population in the Selkirk recovery zone is estimated at 40 to 50 individuals (USDOI, 2008a).

Woodland Caribou, *Rangifer tarandus caribou*



Source: (NDL, No Date).

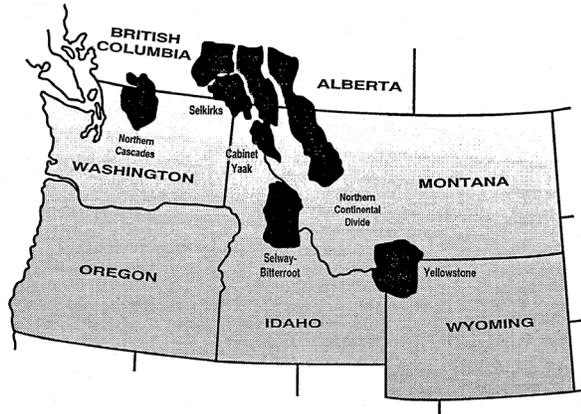
The grizzly bear (*Ursus arctos horribilis*) is an example of a rare species with a large home range, frequently traveling between the United States and Canada. This species is especially sensitive to habitat disturbance. The grizzly bear requires contiguous, relatively undisturbed, mountainous habitat with noteworthy vegetative and topographic diversity. Grizzly bears have a low reproductive rate and are slow to recover from high mortality rates. The U.S. Fish and Wildlife Service (USFWS) identified recovery zones needed for the recovery of the grizzly bear (USDOI, 1993). In Washington, two grizzly bear recovery zones exist: the northern Cascades zone, and the Selkirk recovery zone in northeast Pend Oreille County. The northern Cascades zone currently has a remnant population of fewer than 20 bears (USDOI, 2010a) but is capable of supporting a larger population. The Northern Continental Divide Ecosystem (NCDE) in northwestern Montana straddles the Rocky Mountains encompassing about 9,600 square miles (including Glacier National Park and parts of the Flathead, Helena, Kootenai, Lewis and Clark and Lolo forests) and wilderness areas (Bob Marshall, Mission Mountains, Great bear and Scapegoat), and one wilderness study area (Deep Creek north). It potentially harbors the greatest number of grizzly bears of all domestic recovery zones. The area is currently the subject of Northern Divide Grizzly Bear Project, a study to determine the size of the bear population in the area (USDOI, 2011e).

Grizzly Bear



Source: (NDL, No Date; USDO, 1993).

Recovery Zone Map



Another example is the leatherback turtle (*Dermochelys coriacea*), the only sea turtle capable of surviving in cold waters and lives in the Northwest coastal region. It ranges more widely than other sea turtles and can be found north to the coasts of Washington and British Columbia. Leatherbacks are listed as endangered in both the United States and Canada.

Leatherback Turtle



Source: (NDL, No Date).

The northern spotted owl (*Strix occidentalis*) and marbled murrelet (*Brachyramphus marmoratus*) are both listed as federally threatened species in the region and require old-growth conifer forests for breeding.

Northern Spotted Owl–Left; Marbled Murrelet–Right

Source: (NDL, No Date; NDL, No Date).

4.3.2.4 Wildlife Typically Found in the Region

The alpine meadows, subalpine forests and high-elevation grasslands in this ecoregion are home to numerous wildlife species. Many bird species annually migrate into or out of this region during the spring and fall. Typical avian species include Clark’s nutcracker (*Nucifraga columbiana*), Steller’s jay (*Cyanocitta stelleri*), common raven (*Corvus corax*), Williamson’s sapsucker (*Sphyrapicus thyroideus*), Wilson’s warbler (*Wilsonia pusilla*), blue grouse (*Dendragapus obscurus*), fox sparrow (*Passarella iliaca*), Swainson’s thrush (*Catharus ustulatus*), American pipit (*Anthus rubescens*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), mountain bluebird (*Sialia currucoides*), and western tanager (*Piranga ludoviciana*). These avian species, along with over 200 others, are distributed broadly within the forested and open habitats of the WOR Region, according to their preferred vegetation and ecological niche.

A wide variety of mammals and some “permanent-resident” bird species remain in the region throughout the year. Common large and medium-sized mammal species include elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), mountain goat (*Oreamnos americanus*), moose (*Alces alces*), mountain lion (*Puma concolor*), black bear (*Ursus americanus*), American beaver (*Castor canadensis*), and porcupine (*Erethizon dorsatum*). Many small mammals, including rabbits, ground and arboreal squirrels, and other rodents are also present along with a variety of reptile and amphibian species, including snakes, turtles, lizards, frogs, and salamanders and are distributed by habitat and vegetation type.

Orcas (or killer whales, *Orcinus orca*), seals (Suborder–Pinniped), whales (Order–Cetacean), and sea otters (*Enhydra lutris*) inhabit the region’s coastal area. Chinook (*Oncorhynchus tshawytscha*), pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), and coho salmon (*O. kisutch*) and steelhead trout (or sea-run rainbow trout, *O. mykiss*) move in and out of Puget Sound. All marine mammals are protected under the Marine Mammal Protection Act (MMPA)

of 1972. This act prohibits, with certain exceptions, the take of marine mammals in U.S. waters. The Department of Interior (DOI) oversees protection of the sea otter, walrus, polar bear, dugong, and manatee and the Department of Commerce (DOC) oversees the protection of pinnipeds (other than walrus) and cetaceans (whales) (Bailey, 1995; EOE, 2009; WADFW, no date; Montana Field Guide, 2010; IDFG, 2009).

4.3.2.5 Vegetative Habitat Typically Found in the Region

The region's vegetation is dominated by mixed evergreen-deciduous forests primarily comprising Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). Grasses and sagebrush may cover the lower slopes and valleys of some areas, constituting a "semi-desert" (Bailey, 1995). Alpine meadows, grasslands, wooded riparian stands, and higher-elevation treeline/alpine communities are also common in this ecoregion.

Much of the central area of the WOR Region is made up largely of sagebrush (primarily big sagebrush, *Artemisia tridentata*) and shadscale (*Atriplex confertifolia*), with some short grasses. In many areas, ground-layer vegetation makes up less than 25 percent of the total cover, with a dense shrub layer. Adjacent to streams near the mountains are valleys lined with willows (*Salix* spp.) and sedges (*Carex* spp.), which may be replaced by greasewood and other alkaline-tolerant plants further away from the mountains (McNab and Avers, 1994). Areas in the Columbia River basin that experience more than 10 inches (26 cm) of rainfall per year are vegetated with bunchgrass species. Riparian zones in this ecoregion are often bordered by cottonwoods (*Populus deltoides*) and willows.

Cottonwood Stand



Source: (NDL, No Date).

The Cascade Mixed Forest is the second largest ecoregion west of the Rockies. It is mountainous, with elevations from sea level to above 5,000 feet (1,500 m). It is located along the Pacific Coast of Washington and the Cascade Mountains. Douglas-fir is the most abundant species at low elevations, along with numerous shrub species. In the Olympic Mountains, the shade-tolerant Pacific silver fir (*Abies amabilis*) takes the place of hemlock. A dry forest composed primarily of ponderosa pine (*Pinus ponderosa*) grows on the dry eastern slopes of the Cascade Mountain Range.

The Pacific Lowland Mixed Forest Province is situated primarily between prominent mountain ranges (Cascade and Olympic mountains), varying in elevation from sea level to above 1,500 feet (460 meters). In Washington, this area has been largely modified by human uses and cultivation. At the lowest elevations with native forest cover, dense conifers include western red cedar, western hemlock, and Douglas-fir. In the Puget Sound region and interior valleys, coniferous tree species are less abundant than in coastal areas. In these habitats, deciduous trees, such as big-leaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), and black cottonwood, become more common. Some remaining prairies have oaks, but also include groves of Douglas-fir, Oregon white oak (*Quercus garryana*), and Pacific madrone (*Arbutus menziesii*). Wetlands with swamp or bog plant communities are also present (WWF, 2001).

Invasive (non-native) plant species pose a serious threat to the natural areas in this region. For example, scotch broom (*Cytisus scoparius*), native to Europe and North Africa, is an invasive shrub that is deteriorating the integrity of oak forests. Scotch broom is a competitive species with the capacity to dominate a forest shrub community and form dense monotypic stands. It currently occupies more than 700,000 acres in the northwest coastal regions of the western coastal states and is posing a serious problem for reforestation (Bailey, 1995; EOE, 2009; WADFW, no date; Montana Field Guide, 2010; IDFG, 2010).

4.3.2.6 Wetlands and Waterways

Wetland types in this region include:

- Forested/scrub-shrub wetlands;
- Freshwater emergent wetlands;
- Riverine habitats;
- Deepwater marine and estuarine habitats;
- Marine and estuarine wetlands; and,
- Riverine habitats.

The Puget Sound and its associated habitats represent an important marine resource. As such, the Sound is the focus of multi-agency, multi-disciplinary conservation efforts (Puget Sound Partnership, 2009). Puget Sound is home to a complex estuarine system of interconnected marine waterways and basins, as well as about 3.4 million people (USDOC, 2009). Highly seasonal fresh waters from the Olympic and Cascade Mountains feed this large saltwater system of estuaries. Orcas and seals live throughout the sound and are protected under the MMPA.

Estuaries feature a mixture of salt and fresh water and are extremely biologically productive and important to marine life. The estuaries of Washington state have deltas, mudflats, and salt marshes. Many estuaries contain abundant eelgrass communities, which are highly productive areas for marine life and as well as many birds. Aquatic resources in this region are of great importance and diversity (detailed in the following section and Section 4.5).

Washington state identifies more than 300 rivers, creeks, and other waterways protected under its Shoreline Management Act. The Washington Administrative Code (WAC) Chapter 173-18 defines protected reaches of these waterways. Washington also has 127 marine protected areas that cover 6 million feet of coastline (Van Cleve et al., 2009).

The inland wetlands and waterways of Idaho and Montana are of high natural value. Alpine lakes, streams, bogs, fens, wet meadows, marshes, and other wetlands provide wildlife habitat. Non-alpine wetlands have become increasingly valued due to their importance in water quality protection, stormwater control, and role in maintaining groundwater levels.

4.3.2.7 Aquatic Resources in the Region

Fisheries and aquatic resources are of great importance in this region. This area is rich with rivers, lakes, reservoirs, ponds and has considerable coastline along the Pacific Ocean. Alpine lakes and streams are of critical importance to fish and aquatic wildlife; any available surface waters are especially important in the arid intermountain semi-desert regions.

The marine and coastal region of Washington forms a complex marine border with the Canadian Province of British Columbia. It stretches along the Olympic Peninsula, the Strait of Juan de Fuca, Haro Strait, Boundary Pass, the Strait of Georgia, and the Salt Spring Islands of Canada. The area from the outer Pacific Coast to the Strait of Georgia (also called Georgia Basin) is a rich, productive cold-water environment for many marine and coastal organisms. Much of it is also an area of considerable human use with extensive shipping channels, commercial and sport fisheries, and ferryboats. Steep cliffs border many areas. Much of this outer rocky shore is home to thick kelp beds, which form key habitat for many marine organisms, including sea otters and abalone. Rocky intertidal areas—shallow areas exposed at some time between high and low tides—along the Pacific coast also provide important habitat for many marine organisms.

Fast-flowing major rivers are important habitat for various salmon and trout species. Chum salmon (*Oncorhynchus keta*), coho salmon (*O. kisutch*), pink salmon (*O. gorbuscha*), sockeye salmon (*O. nerka*), and Chinook salmon and steelhead are among the Pacific Northwest's most sought-after species. Rivers, such as the Skagit and Skykomish, are of great economic importance to the human population of the region and remain important for native salmon.

Other major rivers in this region include: a portion of the Clarke Fork, Moyie River (which flows south from Canada), Kootenai, Similkameen, Coeur d'Alene, Pack, and Priest rivers. The Clark Fork River drains into Lake Pend Oreille; the Pend Oreille River drains out of Lake Pend Oreille.

The Flathead, Skagit, and Missouri river systems are designated as National Wild and Scenic Rivers. Protected by the Wild & Scenic Rivers act of 1968, these rivers and their immediate environments possess outstandingly remarkable and various scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar attributes.

Major lakes in the region include but are not limited to, Lake Pend Oreille, Rufus Wood, Banks, Long, Palmer, Osoyoos, Kalispell, Sullivan, Priest, and Hayden lakes, Boundary Reservoir, a portion of Coeur d'Alene Lake, and Little Bitterroot, Swan, Flathead, Whitefish, and Medicine lakes.

Many lakes and major rivers are connected by smaller waterways and wetland complexes, making aquatic resources in the WOR Region of considerable importance economically and ecologically (Bailey, 1995; EOE, 2009).

4.4 GEOLOGY AND SOILS

4.4.1 INTRODUCTION

The geology and soils in the WOR Region in the northern border study area vary widely throughout the region. Geology is the study of the earth's history through rock formations. These rocks often serve as the parent rock for soils present at and below the surface. Topography is considered to be the physical expression of geologic or man-made conditions of a region taken collectively. Topographically, the WOR Region ranges from mountains and volcanoes to low valleys and shorelines to relatively flat plains.

This section addresses the geologic conditions in the WOR Region and describes the potential impacts of CBP program alternatives on geologic resources. The study area contains significantly different topographic features ranging from the bay-type features of the Puget Sound and Cascade Mountains or volcanoes in Washington to relatively flat plains in Montana. Geologic formations including glacial deposits, lava from volcanoes or fissure flows, intruded granitic rocks, and soil conditions are all present within the WOR Region and have been shaped over thousands of years by glacial, water, and wind mechanisms.

4.4.2 AFFECTED ENVIRONMENT

4.4.2.1 Physiographic Provinces

Three physiographic divisions span the WOR Region in the northern border area. These divisions are subdivided into provinces as well as some sections (Figure 4.4-1, Table 4.4-1).

The Pacific Mountain System forms the westernmost physiographic division of the WOR Region. In the area of study, this division is divided into two provinces: the Pacific Border Province and the Cascade-Sierra Range. The Pacific Border Province in the study area is further divided into the Olympic Mountain section, Puget Trough section, and Oregon Coast range. The Cascade-Sierra Range division of the study area includes the Northern Cascade section.

The Intermontane Plateaus make up the physiographic region east of the Pacific Mountain System. The Columbia Plateau is a province of the Intermontane Plateaus and is divided into sections. The Walla Walla Plateau is the section of focus within the study area.

The final physiographic division is the Rocky Mountain System (Rockies). The northern Rockies form the province of interest and are not further divided into sections. Table 4.4-1 provides details on the geology of these areas. Appendix N features a geologic time scale showing the ages of the geologic time periods with which rock formations are dated.

Figure 4.4-1. Physiographic Provinces, Divisions, and Sections of the WOR Region

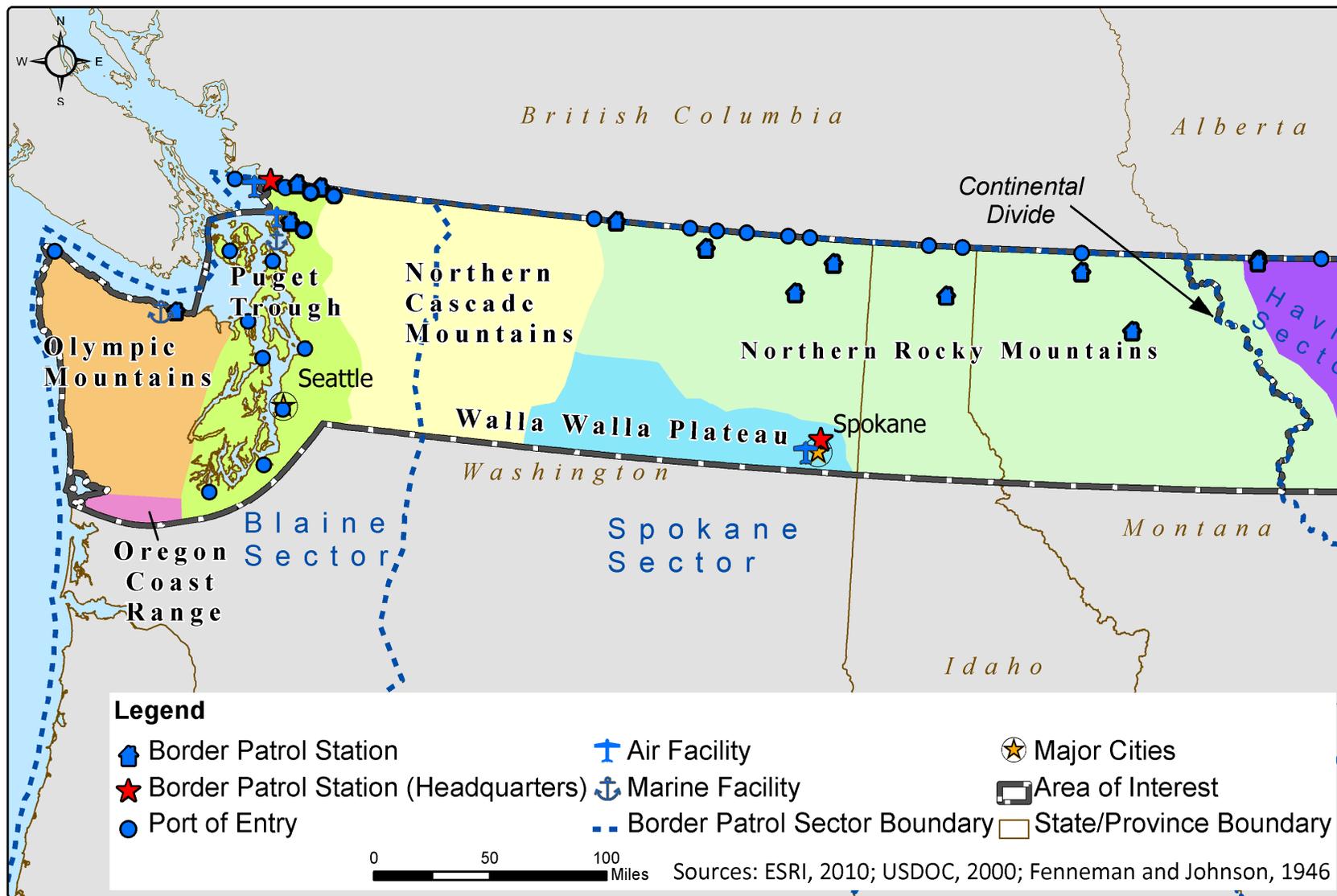


Table 4.4-1. Physiographic Provinces in the WOR Region

Division	Province	Section	Terrain Texture including Topography	Geologic Structure and History	Generalized Rock Types
Pacific Mountain System	Pacific Border Province	Olympic Mountains	Elevations in the Olympic Mountains range around 5,000 ft (1,524 m) but top 7,965 ft (2,448 m) on Mount Olympus. The range is circular with a 46 mi (74 km) average diameter (USDOI, 2004b).	Mountains formed during the middle to late Miocene (Figure 4.4-1, Figure 4.4-2) due to subduction of the Juan de Fuca tectonic plate under the North American plate. On the northern and eastern flanks, Pleistocene erosion and deposition occurred from glacier advance and retreat.	Basement rocks are mainly basalts, manganese deposits, marine sediments, and limestones. Glacial deposits of sand and gravel in the valleys and coastal plains (WSDNR, 2011a).
Pacific Mountain System	Pacific Border Province	Puget Trough	Low-lying area between the Olympic Mountains and the Cascade Range.	Tectonically active zone created by the subduction of the Juan de Fuca plate under the North American Plate. Unconsolidated early Quaternary sediments overlay Tertiary sedimentary rock. As many as four glaciations here, evidenced by Quaternary glacial deposits.	Thick (3,700 ft, 1,130 m) unconsolidated glacial sediments cover sedimentary bedrock, which is up to 10,000 ft (3,050 m) thick (CEC, 2007).
Pacific Mountain System	Pacific Border Province	Oregon Coast Range	Range is 200 miles long with average elevations of 1,500 ft (457.5 m) and a maximum elevation at Mary's Peak of 4,097 ft (1249 m). Slopes are steep, nearing 50 degrees in some areas.	Oregon Coast Range created during subduction of the Juan de Fuca plate under the Pacific plate. East of the Cascadia Subduction Zone; called a forearc (region closest to the sea in an area of volcanic activity). Forearc contains rocks from the subducting plate, scraped off during subduction.	Rocks originated as oceanic sediment with the oldest from the Paleocene to middle Eocene. Uplift and deposition produced sandstone and siltstone (University of Oregon, 2008).

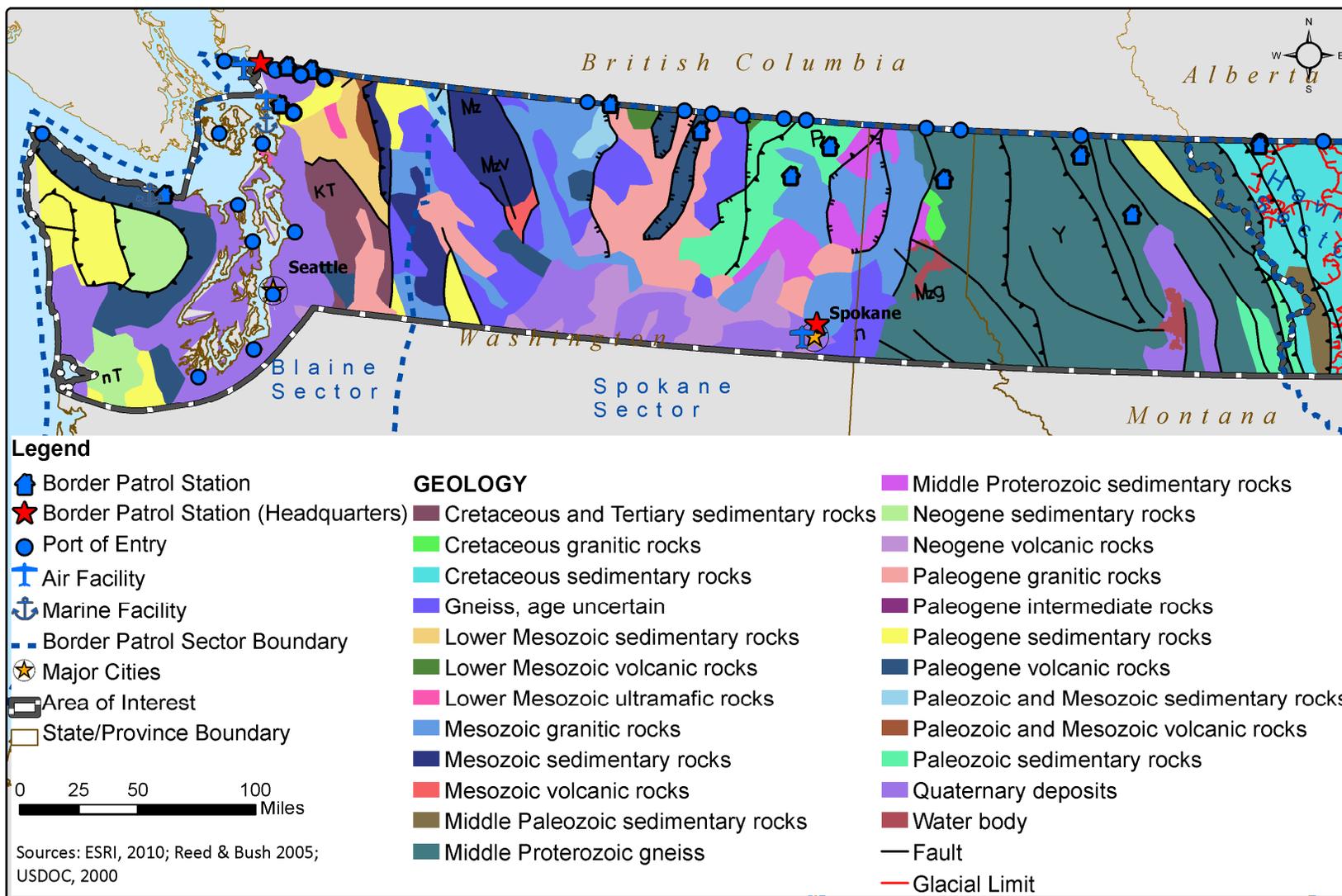
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Division	Province	Section	Terrain Texture including Topography	Geologic Structure and History	Generalized Rock Types
Pacific Mountain System	Cascade-Sierra Range	Northern Cascade Mountains	Mountain chain of high peaks and U-shaped valleys carved by Holocene glaciers. Highest peak is Mt. Baker at 10,781 ft. (3286 m).	Still tectonically active, range developed by subduction of the oceanic northeast Pacific plate under the North American plate during the Mesozoic. Ages of rocks vary from the Permian to the Tertiary. Geology is extremely complicated and not fully understood.	The section is mainly comprised of crystalline and metamorphic rock, mylonite, and unconsolidated rare rocks called <i>mélange</i> , formed from sedimentary parent rock (WSDNR, 2011b). Some locations have thick beds (up to 60,000 ft, 18,000 m) of sedimentary rock.
Intermontaine Plateaus	Columbia Plateau	Walla Walla Plateau	Topography of the plateau varies, including areas of high and low relief, rolling hills, narrow valleys, and entrenched streams.	Plateau had series of major lava flows, up to two miles (3.2 km) thick, due to fissures in the surface of the land throughout the Miocene. Later, tectonic movement caused extensive folding, faulting, and uplift. Pleistocene glaciation shaped the landscape by scouring the surface and depositing loess (windblown silt). Ice dam failure after glaciation caused a huge flood, depositing alluvium onto the Pleistocene sediments (WWBWC, 2004).	Basin base rock is of layers of basalt (Columbia River basalts) topped off with unconsolidated gravels and clays. Loess and alluvial deposits cover much of these gravels and clays (WWBWC, 2004).
Rocky Mountain System	Northern Rocky Mountains	N/A	Steep, glaciated mountains and peaked alpine ridges. Elevations from 3,000 to 10,000 ft (920 to 3,100 m)	Northern Rockies formed during Laramide Orogeny, about 70 to 40 million years ago. Likely cause of Rocky Mountains development is an unusual oceanic subduction under the North American Plate. Most plates subduct at a high angle; the subduction that formed the Rockies occurred at a lower angle (USDOI, 2000).	Rock types include Precambrian sedimentary deposits (partially metamorphosed), upper Tertiary sedimentary deposits, and glacial deposits (USDOI, No Date).

4.4.2.2 Geologic Conditions

The geologic conditions within the WOR Region are extremely complex, resulting from tectonic and related activities (e.g., faulting, volcanic activities, and seismic sea waves) and glacial activities along with erosive actions of wind and water. The WOR Region contains consolidated geologic formations consisting of sedimentary, igneous, and metamorphic rocks. The WOR Region also contains unconsolidated geologic formations consisting of: alluvium; terrace deposits; glacial deposits and other mixtures of sands, silts, and clays with various mixtures of rocks. The geologic formations are shown on Figure 4.4-2.

Figure 4.4-2. Geologic Conditions of the WOR Region



Regional Glaciation

During the last ice age, two ice sheets extended over the Canadian border into the United States. One was the Cordilleran Ice Sheet, which flowed into the United States from western Canada and covered the northern reaches of Washington, Idaho, and Montana between the Pacific Ocean and the Continental Divide (USDOI, 2002) (Figure 4.4-3). In addition to the ice sheets, mountain glaciers also expanded at high elevations.

The effects of glacial advances are readily apparent in the northern United States. Polished and striated outcroppings, rounded hills, moraines, valley fills of glacial till and outwash, and other typical glacial features are evidence of Pleistocene glaciation. All along the northern border, till deposits, erratics, and moraines are common (Nelson, 2003). Till, a sedimentary deposit derived from glacial erosion, was deposited throughout the northern United States as the ice sheets receded.

Figure 4.4-3. Expanse of the Cordilleran Ice Sheet



Seismicity and Tectonics

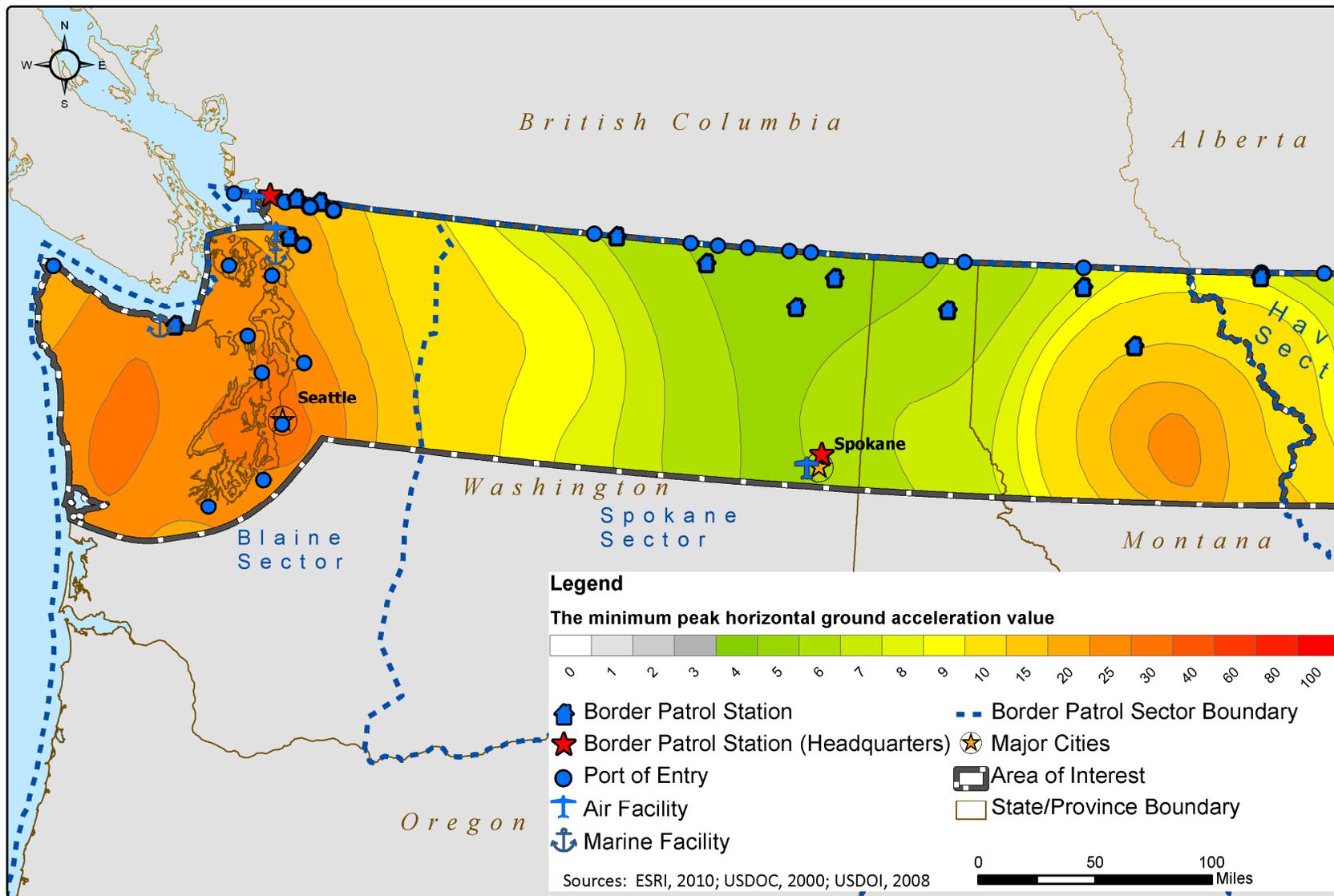
Seismic activity in the WOR Region occurs in the Cascadia Subduction Zone as well as the Intermountain Seismic Belt (Figure 4.4-4). Seismic hazards are described in terms of minimum peak horizontal ground acceleration values. The U.S. Geological Survey (USGS) describes this value as the fastest speed of horizontal particle movement at ground level due to an earthquake. Appendix N, Geology and Soils, describes the Cascadia Subduction Zone and the Intermountain Seismic Belt in greater detail.

Tsunamis or seismic sea waves pose a risk to coastal areas related to regional seismic activity along the Cascadia Subduction Zone or from other areas within the “Ring of Fire.” The Cascadia Subduction Zone ranges from British Columbia, Canada to northern California. Earthquakes along this zone have the potential to generate large seismic sea waves. Research by the Washington State Department of Natural Resources suggests that locally generated tsunamis would not allow much response time for residents. Communities within tsunami hazard zones do have emergency management plans in place if a tsunami occurs (WSDNR, 2004).

Volcanic Hazards

One primary location in the WOR Region study area contains areas of volcanic hazard. In the Pacific Mountain Region, the Cascade Range is a growing and tectonically active mountain system. It forms the boundary of two plates: the Juan de Fuca and the North American. The subduction of the Juan de Fuca plate under the North American plate takes place as the two plates converge, creating high pressure and temperatures that deform and melt rock along the plate boundaries. Magma created during this process sometimes rises to the surface as volcanic eruptions. The Cascade Range is the volcanic chain that developed as a long-term result of these processes (USDOI, 2007).

Figure 4.4-4. Seismicity in the WOR Region



Landslides

A landslide is the sudden downward movement of rock, soil, mud, or debris on a slope. Landslide is a general term; there are many different types and causes of landslides. Along the northern border of the United States, most landslides occur along the steep slopes of the many mountain ranges in the region (Figure 4.4-5). Much of the Cascade region and the northern Rockies are susceptible to landslides due to their steep slopes. The Cascades, in particular, are at risk due to the large amounts of precipitation common to the region.

Landslides can be triggered by various mechanisms, including seismicity, rainfall, snowmelt, volcanic events, and human activities (e.g., site development, mining, and deforestation). In the Cascades area, most landslides occur due to rainfall, along with seismic and volcanic activity (Nyborg, 2003). Landslide hazards in Montana result from seismic and human activities (State of Montana, 2004).

Karst Topography

In the WOR Region, karst landscapes occur in small areas (Figure 4.4-6) scattered through Washington, Idaho, and Montana. Long, short, and pseudokarst karst types all exist in these areas. Appendix N provides details on these pockets of karst terrain.

Figure 4.4-5. Incidence of Landslides in the WOR Region

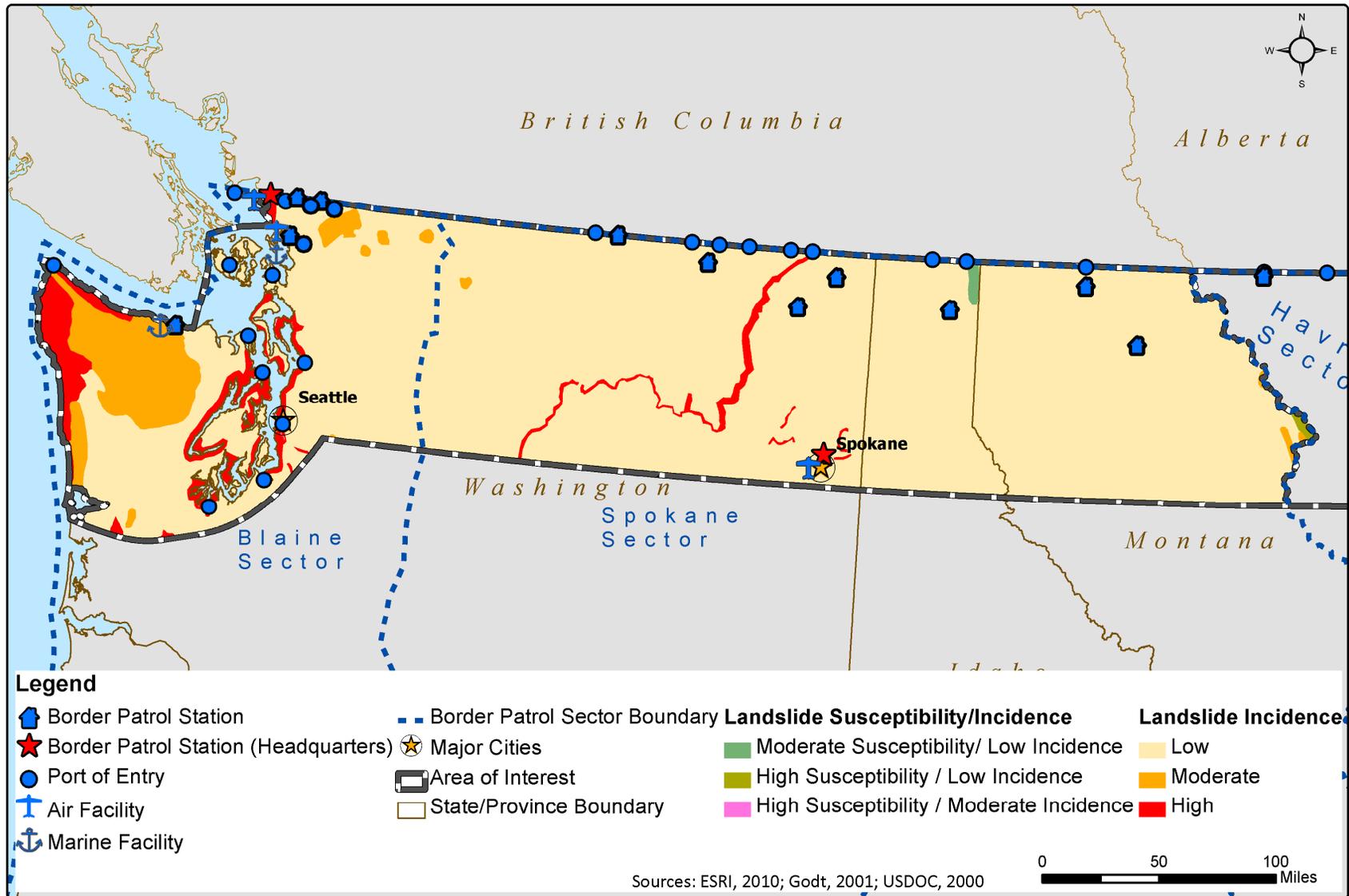
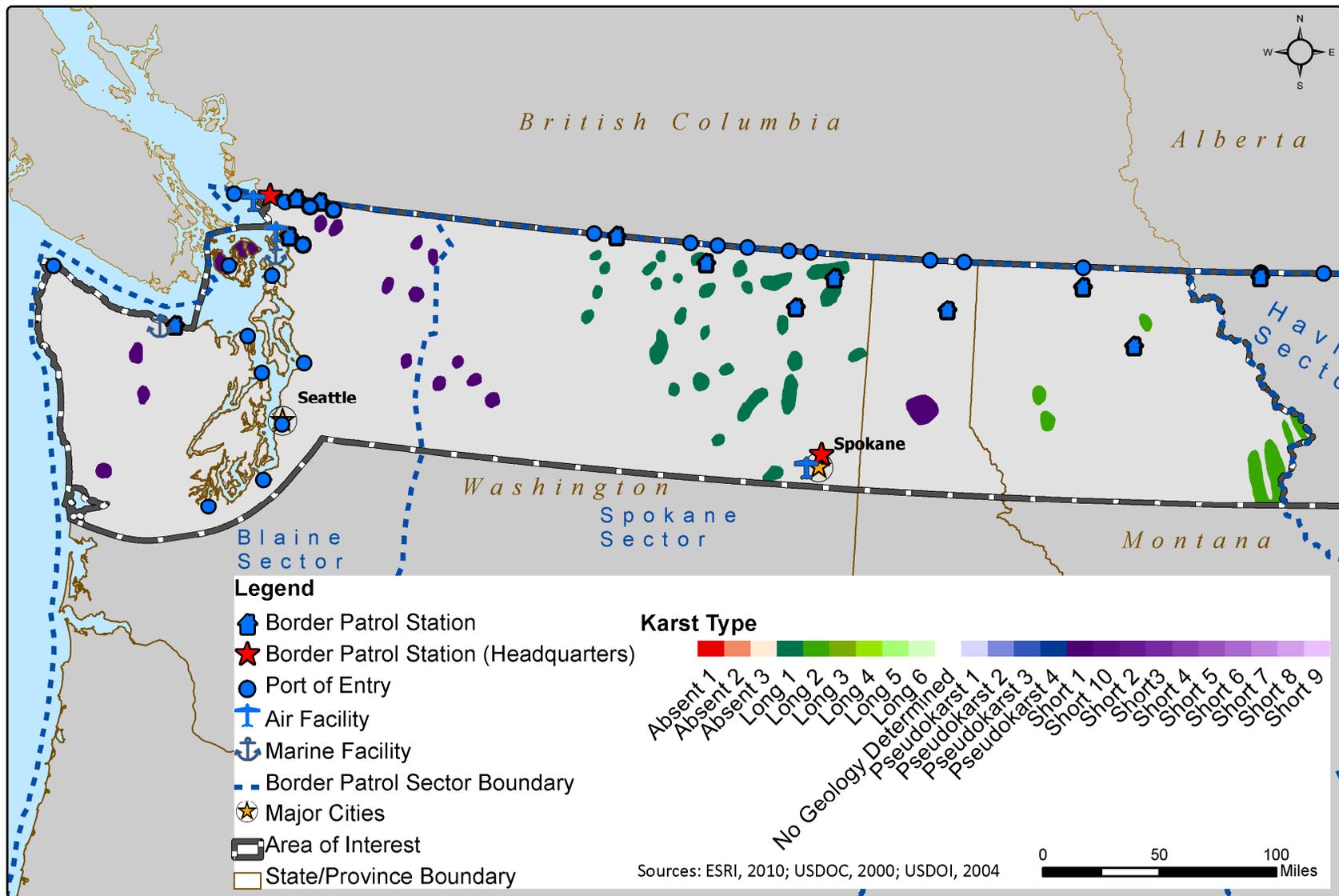


Figure 4.4-6. Karst Topography in the WOR Region



4.4.2.3 Soils

In the WOR Region, nine major soil groups, or “orders,” occur (Figure 4.4-7).

In the WOR Region, soils contain a wide range of particle sizes. One of the most dominant soil types—inceptisols—spans all three states and has a high potential for erosion. These soils develop on surfaces that have not had adequate time to develop soil profiles, thus they do not have extensive soil horizons. Both the lack of horizon development, as well their locations on steep slopes, contributes to their high erosion potential (University of Idaho, No Date). Soils with high glass content (andisols), such as those in areas of volcanic activity, tend to have lower erosion rates (Busacca, et al., No Date).

Western Washington state also has spodosols throughout. This soil order is acidic and can be found in forested areas. They are not agriculturally productive without management because of the high acid content, but have sub layers of humus, or stable organic matter (University of Idaho, No Date). To a lesser degree, ultisols and entisols are present in western Washington. Ultisols are soils with a high acid content, low fertility, and have been leached of minerals by the processes of weathering. Low soil fertility is due to a lack of nutrients in the soil resulting in the decreased ability to support plant life. While not productive as agricultural lands, ultisols are often found in highly productive forested areas (University of Idaho, No Date). Entisols are soils that do not fit into any of the other 12 soil orders. These are young soils and have only an A Horizon. Entisols are the most extensive soils in the world and can be very diverse based on the parent material from which they develop (University of Idaho, No Date). This soil order is often the transition layer between other soil orders and non-soil parent rock.

In addition to inceptisols, andisols, and entisols, eastern Washington and Idaho contain mollisols and a small amount of aridisols and histosols. These soils are common in grassland regions and are extremely agriculturally productive. In the United States, this is the most common soil order. The thick upper horizon (or layer) is a result of the decayed organic materials (University of Idaho, No Date). The development of this order is most often related to the weathering of sedimentary parent rock, and in some cases, the weathering of glacial deposits. Mollisol soil texture can vary to a great degree from sandy to fine loams (See table 3.4.2-1). This soil order is prone to erosion, especially by water in cultivated areas (University of Wisconsin, 1999). Aridisols are not agriculturally productive due to their location in arid regions. A major component of these soils is calcium carbonate in addition to clays, silica, and other soluble salts (University of Idaho, No Date). They tend to have low permeability and low nutrient content (University of Wisconsin, 1999). Histosols in this region are mainly found in areas of poor drainage. This water accumulation decomposes organic materials and creates peaty and mucky conditions. They have a low weight-bearing capacity and if drained of water, land subsidence may occur (University of Idaho, No Date).

Western Montana has alfisols, which is a soil order that is not present in the other parts of the region. Alfisols are often found in forested areas but can also be found in prairies and grasslands. Most often located in temperate climates, they can develop in sub-tropical

and tropical areas as well (University of Idaho, No Date). The primary component of this soil order is clay as a result of mineral weathering (University of Wisconsin, 1999).

4.4.2.4 Prime and Unique Farmland

In the WOR Region, Prime and Unique Farmland is most concentrated in Idaho where it ranges from six to ten percent of state land (Figure 4.4-8). In Washington, the percent is lower at four to six percent. Montana has the lowest percentage, with only zero to two percent of state land designated. As a whole, the region contains a low percentage of designated Prime and Unique Farmland.

Figure 4.4-7. Soil Orders in the WOR Region

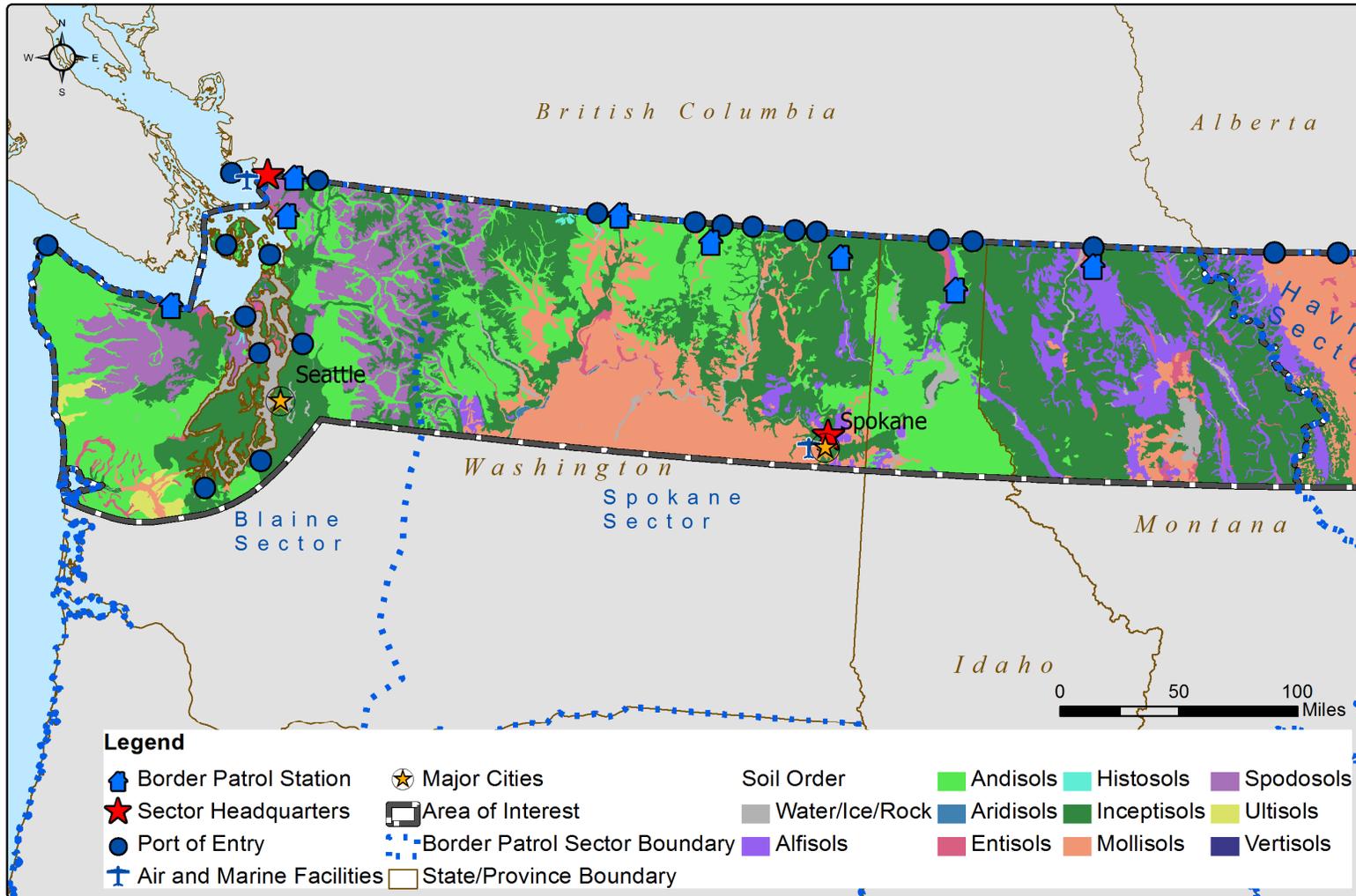
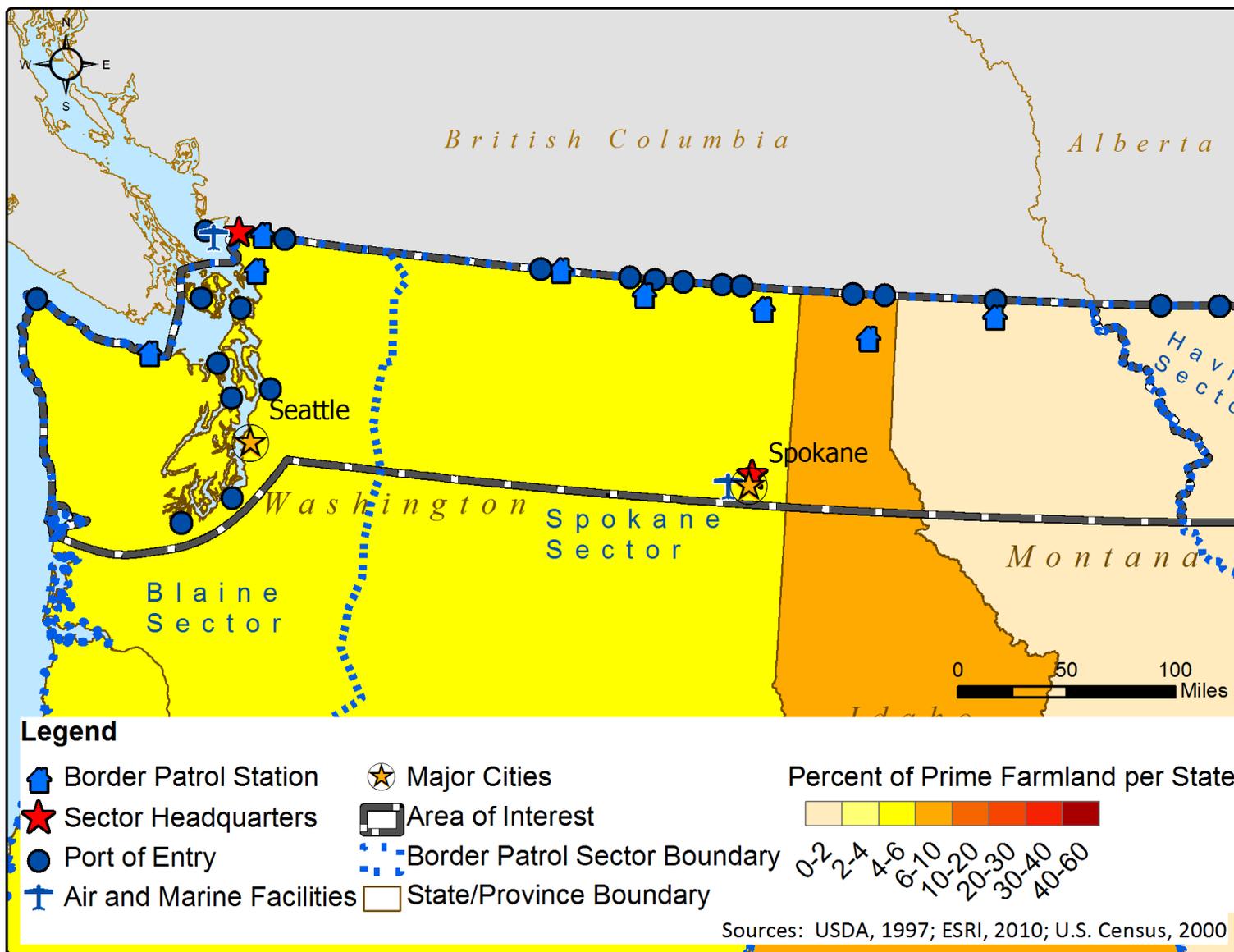


Figure 4.4-8. Prime Farmland in the WOR Region



4.5 WATER RESOURCES

4.5.1 INTRODUCTION

Water resources are distributed widely throughout the 100-mile PEIS study corridor in the states of Washington, Idaho, and Montana west of the Continental Divide. For the purposes of this study, this resource area consists of hydrologic and groundwater resources (aquifers, subterranean watercourses, and recharge areas), surface water and waters of the United States (lakes, ponds, rivers, streams, and channels), and floodplains. Water resources include several beneficial elements, such as water supply quantity and quality, habitat for aquatic organisms, recreation, and flood storage capacity, which are subject to effects from proposed activities.

4.5.2 AFFECTED ENVIRONMENT

4.5.2.1 Groundwater

Groundwater resources are sources of water that result from precipitation infiltrating the ground surface. Groundwater is contained in either confined or unconfined aquifers. When the water table or piezometric surface reaches the ground surface, groundwater will reappear as either streams, surface bodies of water, or wetlands. This exchange between surface water and groundwater is an important feature of the hydrologic cycle.

Groundwater has a variety of beneficial uses. In the WOR Region, as in the rest of the country, groundwater is a primary source for a wide variety of water uses including irrigation, domestic water supply, fish propagation, commercial water supply, industrial uses, and livestock. Table 4.5-1 shows the categories of groundwater use for states within the WOR Region.

Table 4.5-1. Water Use in the WOR Region in 2005

State	Irrigation Use (%)	Public Water Supply (%)	Industrial Use (%)	Rural Domestic, Livestock (%)
Montana	95.7	1.4	1.9	1.0
Idaho	85.0	1.2	0.5	13.3
Washington	62.8	17.7	16.7	2.8

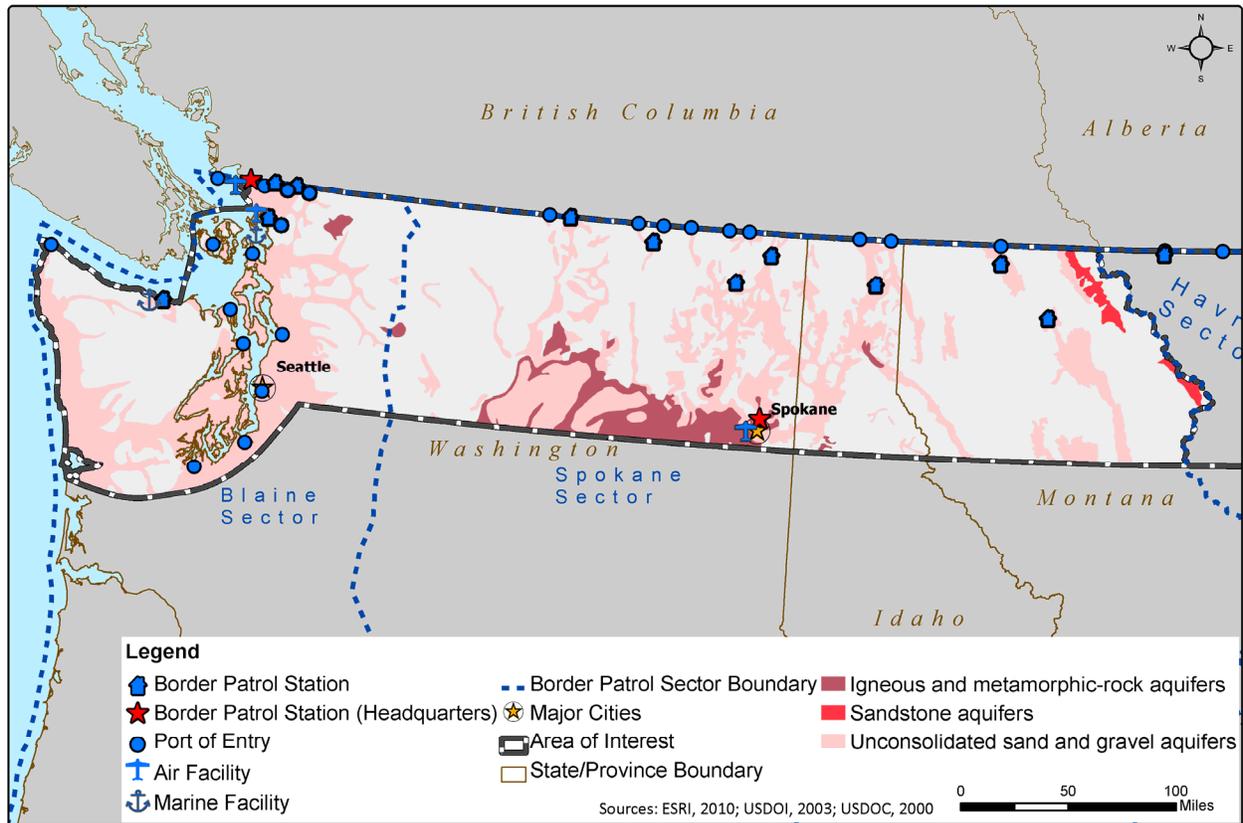
Source: (Kenny et al., 2009).

Groundwater occurs in porous geologic formations called aquifers, which may be large and regional, such as the Ogallala Aquifer that underlies many states in the Great Plains. Aquifers may also be very small and localized.

In the WOR Region, there is a large regional aquifer known as the Columbia River Basalt Aquifer. Although this aquifer is large, only a small amount of its northern portion underlies the 100-mile corridor that is the basis of this PEIS. The aquifers underlying the area within the corridor are glacial drift aquifers, valley-fill aquifers, or smaller localized aquifers. Glacial drift aquifers are formed from glacial outwash and the more permeable materials within glacial till. It has mostly unconsolidated sand and gravel but also has silt, clay, and consolidated till (hardpan). Valley-fill aquifers have mostly sand and gravel, providing yields of only a few gallons per

minute, which is enough for single-family domestic use. Figure 4.5-1 shows principal aquifers in the WOR Region.

Figure 4.5-1. WOR Region Groundwater Aquifers



4.5.2.2 Surface Waters and Waters of the United States

Surface water is water found in lakes, rivers, ponds, wetlands, and oceans. It is the most abundant and visible form of water resource, with the greatest variety of uses. In addition to irrigation, domestic water supply, fish propagation, commercial water supply, industrial uses, and livestock, surface water supports recreation, fish and wildlife habitat, hydropower, and transportation. Section 4.3.2.7 provides a discussion of the regional affected environment for aquatic resources. Surface water is often identified by the basin or watershed in which it is found. A watershed is simply the topographic area defined by the drainage of a single body of water.

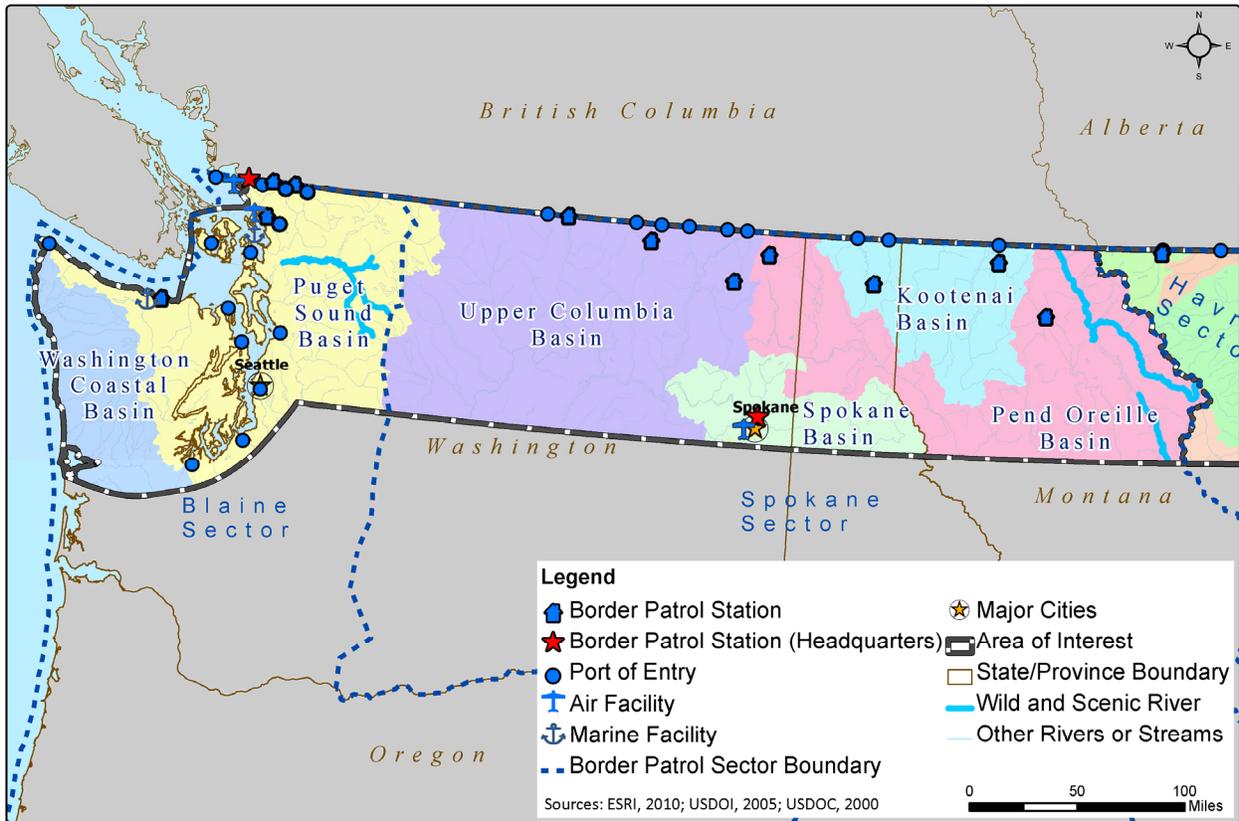
There are two designated Wild and Scenic Rivers within the WOR Region: the Skagit River in Washington and the Flathead River in Montana. Figure 4.5-2 shows Wild and Scenic Rivers as well as the river basins found within the 100-mile corridor for the WOR Region.

The Flathead River has a mean annual discharge of nine million acre-feet. It’s North Fork flows from southeast British Columbia into northwest Montana forming the western boundary of Glacier National Park. The Flathead empties into the Clark Fork River at Paradise, Montana. The nearly 10,000 square mile Flathead Subbasin extends roughly 90 miles east to and around 200 miles north to south, providing northereastern drainage of the Columbia River. Just over

600 square miles (7 percent) of the subbasin are in British Columbia mostly as land administered by the BC Ministry of Forests. The remainder in the United States is mostly on Forest Service, National Park Service (NPS), and Confederated Salish and Kootenai Tribes' land with smaller amounts owned by the State of Montana and private landholders.¹

¹ Confederated Salish and Kootenai Tribes and Montana Fish, Wildlife & Parks. 2004. Flathead Subbasin, Plan: Executive Summary. A report prepared for the Northwest Power and Conservation Council. Portland, OR.

Figure 4.5-2. River Basins in the WOR Region



The Columbia River Basin is the dominant watershed in the WOR Region, covering areas that include western Montana, northern Idaho, and the eastern two-thirds of Washington. The basin also extends across the border northward into Canada. Major watersheds in western Washington include the Puget Sound and coastal drainage basins.

Figure 4.5-3. Basalt cliffs and crescent bar on Columbia River



The Columbia River Basin is the second largest basin in North America, draining more than 260,000 square miles into a river with a length of 1,200 miles. The average flow of 7,785 cubic meters per second is second in the United States only to that of the Mississippi-Missouri River.

The system of dams in the basin has resulted in 250 large reservoirs and more than 100 large hydroelectric projects, making it one of the most developed river systems in the world.

Federal dams on the river generate an average of 8,664 megawatts (MW) of electricity. Non-Federal dams generate 5,368 MW. Combined, these dams produce enough power for eight million homes, or 13 cities the size of Seattle (NPCC, 2010). Hydroelectric plants at dams on the Columbia River within the 100-mile PEIS corridor include the Grand Coulee Dam operated by U.S. Bureau of Reclamation at Grand Coulee, Washington; the Chief Joseph Dam operated by the U.S. Army Corps of Engineers (USACE) near Bridgeport, Washington; and the Wells Dam operated by the Douglas County Public Utilities District south of Pateros, Washington.

The river is vital to fisheries of the region with salmon and steelhead runs that are among the largest in the world. Washington legislation passed in 2006 enables access to water resources while at the same time helping to restore salmon and other species (WSDE, 2009).

4.5.2.3 Floodplains

Floodplain management seeks to preserve the flood storage capacity for the river corridor. This may be achieved in several ways. Local communities often have floodplain management or zoning ordinances that restrict development within the floodplain. The Federal Emergency Management Agency (FEMA) manages the National Flood Insurance Program (NFIP). FEMA also provides floodplain management assistance, including mapping of 100-year floodplain limits, to over 20,000 communities. The information provided by FEMA's flood management program is useful to CBP planners who seek to avoid effects from flooding conditions. This is most relevant for CBP border facilities, such as POEs that are planned at locations where rivers define the northern border. While there are rivers of this type in other regions along the northern border with existing nearby CBP facilities, there are no rivers of this type in the WOR Region.

4.5.2.4 TRANSBOUNDARY WATER AGREEMENTS

Boundary Waters Treaty

This treaty provides the basis for resolving disputes involving diverting or obstructing projects impacting water quantity and water across the boundary between Canada and the United States. It establishes an International Joint Commission with authority to approve projects on either side of the border that would alter transboundary water levels. The treaty was initiated between the United States and Great Britain in 1909 to settle issues of distribution of waters of the St. Mary and Milk Rivers for irrigation purposes between Canada and the United States.

Flathead Watershed Agreement with British Columbia

Montana and British Columbia have an agreement on policies and practices that protect the water environmental values of the Flathead River Basin and promote more sustainable energy practices and actions to lessen contributions to climate change. The agreement seeks to increase sharing of environmental information, enhance fish and wildlife management cooperation, and initiate collaboration assessing environmental impacts of significant cross-border projects with potential to degrade land or water qualities. It also seeks to discourage mining, oil and gas, and coal development as allowed land uses in the basin. The State of Montana and the Province of British Columbia signed the agreement in February of 2010 with the Ktunaza Nation and the Confederated Salish and Kootenai Tribes witnessing.

This treaty provides the basis for resolving disputes involving diverting or obstructing projects impacting water quantity and water across the boundary between Canada and the United States. It establishes an International Joint Commission with authority to approve projects on either side of the border that would alter transboundary water levels. The treaty was initiated between the United States and Great Britain in 1909 to settle issues of distribution of waters of the St. Mary and Milk Rivers for irrigation purposes between Canada and the United States.

Columbia River Treaty

This treaty provides for the cooperative development of hydropower resources in the Columbia River Basin.

High Ross Treaty

This treaty was established to forestall (until 2065) Seattle City Light raising the Ross Dam within the Ross Lake National Recreation Area (ROLA) in Washington, which would flood the upper Skagit River Valley in British Columbia, Canada. The treaty also established the Skagit Environmental Endowment Fund and Commission to enhance recreational opportunities and to conserve and protect wilderness and fish and wildlife habitat in the Upper Skagit Watershed until 2065 through mechanisms such as acquisition of timber and mineral rights and execution of projects such as trail system development.

4.6 NOISE

4.6.1 INTRODUCTION

The study area contains many soundscapes and noise-sensitive receptors that could experience impacts due to the alternatives that CBP is considering. However, the mere presence of a noise-sensitive area, such as a national park, residence, or school, does not guarantee that it would be significantly impacted by CBP’s activities or that the overall impacts would be major under the National Environmental Policy Act (NEPA). As with other topics in this Programmatic PEIS, the programmatic approach to describing noise is driven by the planning objective of the document and the potential for actual impacts.

4.6.2 AFFECTED ENVIRONMENT

Sound is a physical phenomenon consisting of vibrations that travel through a medium like air and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities essential to a community’s quality of life, such as construction or vehicular traffic.

Sound varies by both intensity and frequency. Sound pressure level, in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Because the human ear responds differently to different frequencies, “A-weighting” was developed to approximate the frequency response of the human ear. The A-weighting curve has been widely adopted for environmental noise measurement and is standard in many sound level meters. The dBA levels of common sounds of daily life are provided in Table 4.6-1.

Table 4.6-1. Common Sound Levels

Outdoor	Sound level (dBA)	Indoor
Snowmobile	100	Subway train
Tractor	90	Garbage disposal
Downtown (large city)	80	Ringling telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Notes: dBA = A-weighted decibel. Sound level provided is as generally perceived by an operator or a close observer of the equipment or situation listed.

Source: Harris, 1998.

The dBA noise metric describes steady noise levels, although very few noises are, in fact, constant. Therefore, the measurement day-night sound level (DNL) has been developed. DNL is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime levels (10 p.m. to 7 a.m.). DNL is a useful descriptor for noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. In addition, Equivalent Sound Level (L_{eq}) is often used to describe the overall noise environment. L_{eq} is the average sound level in dB.

4.6.2.1 Regulatory Review

The Noise Control Act of 1972 (PL 92-574) directs Federal agencies to comply with applicable Federal, state, interstate, and local noise control regulations. In 1974, the USEPA provided information suggesting continuous and long-term noise levels in excess of DNL 65 dBA are normally unacceptable for noise-sensitive land uses such as residences, schools, churches, and hospitals.

State and local governments have the opportunity to regulate noise in their jurisdictions. These regulations are typically guidelines for activities that generate noise and the hours that such activities may be performed. Noise is typically regulated at the local level. A municipal noise ordinance might address the hours that heavy equipment can be operated, the distance heavy equipment can be operated in proximity of noise-sensitive receptors (i.e., schools, hospitals, churches, and residences), and the duration of operation of a single noise source considered to be annoying to the public, such as a diesel-powered generator. Some set specific not-to-exceed noise levels, and others are simple nuisance noise ordinances.

A number of sources of noise may be addressed for rural areas, such as parades, vendors, social engagements with music, and animal noises. Construction noise is typically exempt from noise ordinances in rural areas. In addition, noise regulations in an urban setting take into account the constant noise sources of urban living, such as large heating, ventilation, and air conditioning (HVAC) units, public transportation (trains and buses), emergency vehicles, and heavy traffic. Because urban noise levels are already relatively high, adding a source for an extended period can be highly annoying to some people, hours of construction and operation of heavy equipment are often limited. A typical ordinance in a major city will restrict construction related noise sources between the hours of 10:00 p.m. and 7:00 a.m.

4.6.2.2 CBP Noise Sources

The CBP operates 24 hours a day and 7 days a week. The level of operation can be determined by the measures required to secure the border or necessary for normal facility activities. Table 4.6-2 lists CBP's operations and describes of the noise levels of these activities.

Table 4.6-2. CBP Noise Sources

Operation	Description
Use of mobile surveillance systems (MSS) and surveillance towers	Very little noise is generated by the motor. In remote areas, standby generators may be used to supplement electric power.
Firing ranges and armories	CBP conducts small-arms training at many of its POEs and BPS. Small-arms weapon fire is clearly audible in areas surrounding these ranges during training activities. Usually these activities are limited to daytime hours.
Maritime patrols	Boating noise is typically audible during marine patrols near the shoreline. This noise is widespread and at most locations only sporadic. The watercraft used are generally selected for their noise-suppression features because of the nature of their mission.
Patrols by foot, horse, off-road vehicle (ORV), and snowmobile	Foot and horse patrols are typically quiet. Noise from ORVs and snowmobiles is audible for a mile or more in remote, quiet areas. This noise is widespread and at most locations only sporadic. Areas near POEs and BPSs may have more concentrated noise associated with these activities.
Added and expanded POEs and checkpoints	This action may require construction, which would end at the completion of the project.
Operation of expanded BPS	Additional personnel would be required for addition or expansion of newly constructed facilities. The possibility of canine facilities, firing ranges, and patrol vehicles may be required for operations at some new/expanded facilities.
Aircraft operations	Air operations at CBP are diverse: Helicopters, fixed-wing aircraft, and unmanned aerial systems (UAS) may be used regularly at some locations, although not all aircraft are used simultaneously. Along with regular operations, training exercises are also a source of aircraft noise at some facilities.
Construction activities	CBP conducts both large and small construction projects. Each has some level of heavy equipment and truck transport noise.
Maintenance activities	Maintenance operations at CBP are as diverse as the facilities themselves. The noise associated with these actions can involve training to maintain each category listed above. These noise sources may be one major repair using heavy equipment, monthly routine maintenance, or daily maintenance in the case of dogs, horses, and vehicles.

Source: USDHS, 2010.

4.6.2.3 Non-CBP Noise Sources

The sources of noise along the WOR border vary greatly, although most of the region is rural or remote. Sounds dominating the rural areas are aircraft overflights, bird and animal vocalizations, and very light traffic. Farming is a major activity in some of the rural areas identified with the project area. Farming is seasonal in this region and may create major sources of noise during planting, and even more during harvest in August through October when several large combines may operate concurrently. Although the majority of land is remote, the city of Seattle is in this region with significantly higher levels of noise. A complete list of counties with their population and current background noise levels can be found in Appendix O. Notably, these levels are estimated average background levels based on population. Actual site-specific levels may vary base on location.

4.6.2.4 Background Noise Levels

Estimated background noise levels for areas within 100 miles of the border are shown in Figure 4.6-1 and described in Table 4.6-3. The majority of areas within 100 miles of the border would be classified as remote or rural residential and are isolated, far from significant sources of sound. Townships and small cities are scattered throughout the 100-mile buffer area; however, more remote land areas cover most of the project area. These smaller cities can be described as rural-residential and quiet-commercial.

Figure 4.6-1. Background Noise Levels in the WOR Region

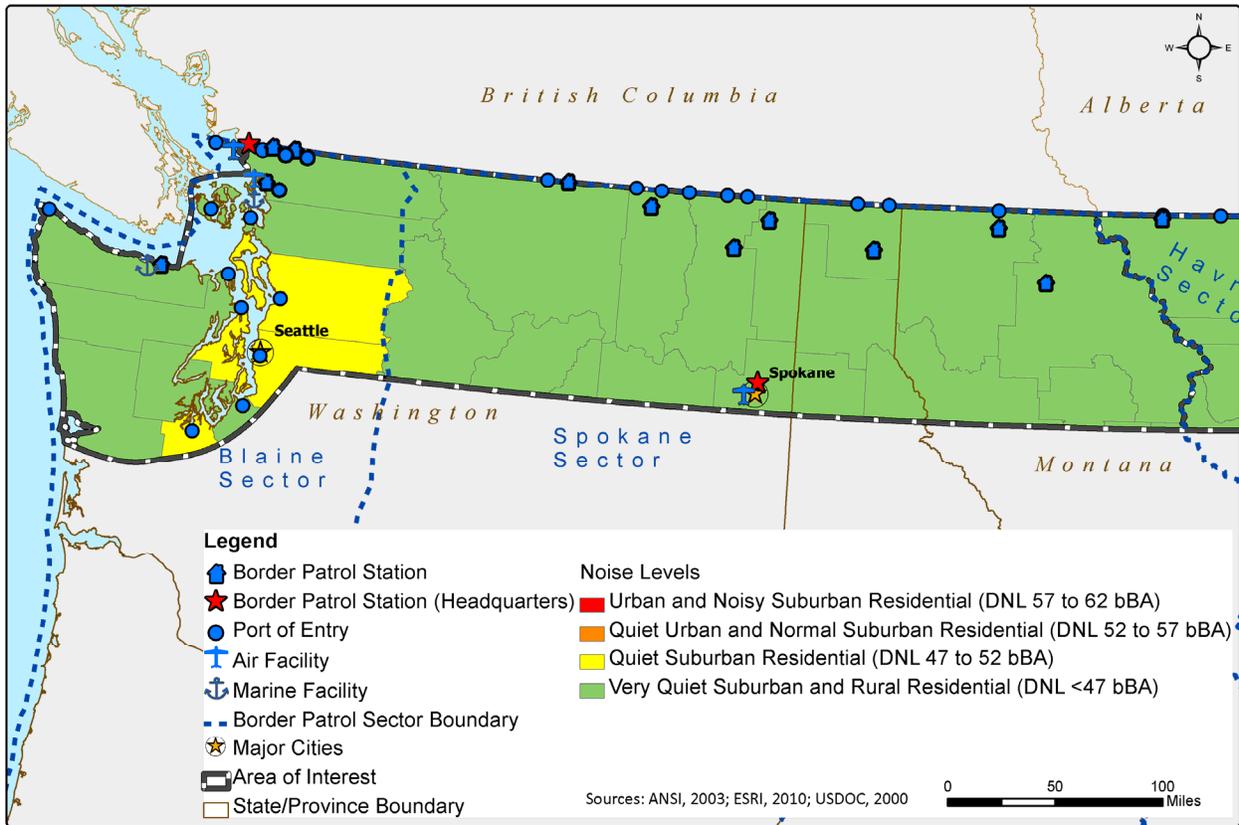


Table 4.6-3. Description of Background Noise Levels

Intensity Level	Example Land Use Category	Average Residential Intensity (people per acre)	Leq (dBA)		
			DNL	Daytime	Nighttime
Low	Quiet suburban residential	2	49	48	42
Medium-low		4	52	53	47
Medium	Quiet urban residential	9	55	56	50
Medium-high	Quiet commercial, industrial, and normal urban residential	16	58	58	52
High		20	59	60	54

Source: ANSI, 2003.

Notes: Leq = equivalent sound pressure level
dBA = A-weighted decibels

4.6.2.5 National Parks

NPS recognizes the natural soundscape of each national park unit as an inherent resource, and manages this resource in order to “restore degraded soundscapes to the natural conditions wherever possible, and protect natural soundscapes from degradation due to noise” (USDO, 2000). Non-impairment of natural soundscapes is mandated by the Organic Act of 1916 and is part of the NPS management goals and objectives. Each region of the project area has locations

of special interest such as national parks. The national parks within 100 miles of the border in the WOR Region are listed in Table 4.6-4 and shown in Section 4.2 Air Quality, Figure 4.2-3.

Table 4.6-4. National Parks in the WOR Region

State	National Park	Acres
Montana	Glacier National Park	1,012,599
Washington	Mount Rainier National Park	235,239
Washington	North Cascades National Park	503,277
Washington	Olympic National Park	892,578

Source: (USEPA, 2010).

4.7 CLIMATE CHANGE AND SUSTAINABILITY

4.7.1 INTRODUCTION

According to the 2009 U.S. Global Change Research Program (USGCRP) report, “Global Climate Change Impacts in the United States,” documented impacts to the Nation from climate change include increased average temperatures, more frequent heat waves, high-intensity precipitation events, sea-level rise, more prolonged droughts, and more acidic ocean waters, among others. Global and national temperature changes are not distributed evenly. Greater increases occur at high, northern latitudes (CEQ, 2010). In 2010, DHS identified global climate change as a long-term trend and global challenge that threatens America’s national-security interests (USDHS, 2010).

Sustainability and smart growth are approaches to human activity that aim to meet the needs of the present without compromising the ability of future generations to meet their own needs. For CBP, the concepts of sustainability and smart growth include the ability to adjust to changing geopolitical realities while preserving the environment and working to improve the quality of life for American residents and visitors.

To reduce environmental impacts and address the challenge of limited resources, the DHS prepared a “Strategic Sustainability Performance Plan” to promote sustainable planning, design, development, and operations. The guidelines aim to decrease energy use, minimize reliance on traditional fossil fuels, protect and conserve water, and reduce the environmental impact of materials use and disposal. CBP’s overarching goal is to size, plan, and carry out proposed development in a manner that is sustainable and that works to preserve and protect limited resources.

4.7.2 AFFECTED ENVIRONMENT

4.7.2.1 Climate Regions of the Northern Border—Overview

The climate along the northern border is characterized by mild summers and very cold to extremely cold winters. January is the coldest month. July is the warmest month throughout the entire project area, and its temperature can fluctuate 20-30 degrees Fahrenheit between day and evening (Idcide, 2010). Precipitation is evenly distributed throughout the year. The average annual precipitation across the entire northern border is approximately 31 inches. There are three recognized climatic zones within the WOR Region: Midlatitude Steppe Climate, Highland (Alpine) Climate, and Marine West Coast Climate. A discussion of these zones is provided in the following subsection.

4.7.2.2 Climate in the WOR Region

Midlatitude Steppe Climate

The Midlatitude Steppe Climate is found within temperate regions of the midlatitudes in the interior regions of continents and where air masses are forced to lift up over higher elevations. In the United States, these climates are found in the Great Plains and western states in the rain shadow of major interior mountain ranges at great distances from sources of moisture.

Temperatures in these regions vary with latitude, elevation, and position within the continent. Thus, the northern Great Plains experiences some of the lowest temperatures in this region. Average temperatures increase at the southern limits of this climate region.

The region is classified as semi-arid. Peak precipitation occurs during the summer months (Ritter, 2006).

Highland (Alpine) Climate

The Highland (Alpine) Climate is found in mountainous regions of the western United States that are above timberline. It is one of the coldest climates found in the United States due to its high altitude. It is similar to tundra and Arctic climate zones in that it is cold and dry throughout the year. Growing seasons are short—about 180 days—and night temperatures are almost always below freezing. Thinner atmospheres can allow often dangerous exposure to ultraviolet radiation.

Marine West Coast Climate

The Marine West Coast Climate is found along coastal Oregon, Washington, British Columbia, and southern Alaska. Climate characteristics are controlled by the coastal location in the midlatitudes. Maritime polar air masses bring ashore mild temperatures and high humidity. The orientation of mountains has a large effect on the geographic distribution of the climate. In North and South America, mountains tend to be north-south oriented and act as a barrier to oceanic air masses from the westerly winds, forcing them to rise and cool, producing cloudy, rainy conditions along the coast. The dry summer at the northern border near Vancouver is due in part to subsiding, subtropical high pressure lying to the south.

This climate has mild summers and winters and a small annual temperature range. Its West-Coast location in the midlatitudes means the climate receives a constant influx of oceanic air throughout the year from the westerlies. The mild air temperatures result from the moderating influence of ocean bodies. Temperature ranges increase as one moves inland.

The climate also features heavy cloud cover and high humidity through much of the year. This is especially true in the Pacific Northwest, where uplift of air masses crossing mountain ranges is an important climate control. Maritime polar air masses forced to rise up windward, western slopes create significant cloud cover and precipitation. The climate is dominated by cyclonic activity embedded in the westerlies. Frequent cyclonic storms bring prolonged periods of rain, drizzle, and fog to these west coast locations.

4.7.2.3 Climate Change in the United States—Pacific Northwest Regional Assessment

The Pacific Northwest Region became warmer and wetter during the course of the twentieth century. Average annual temperature warmed by 1 degree Fahrenheit to 3 degrees Fahrenheit (0.5 degree Celsius to 1.7 degrees Celsius) with the warming spread equally across the region and the summer and winter seasons. During the same period, precipitation has increased by 10 percent.

There are recurrent patterns of year-to-year variability in the climate. Warm years are dry with low streamflow and light snowpack. Cool years are wet with high streamflow and heavy snowpack. The variability has an apparent effect on regional resources, such as summer water

shortages in warmer, drier years that result in less-abundant salmon and increased risk of forest fires.

The variations are closely correlated with two large-scale climate variation patterns over the Pacific Ocean: the El Nino/Southern Oscillation every few years and the Pacific Decadal Oscillation every few decades (USGCRP, 2010).

4.8 LAND USE

4.8.1 INTRODUCTION

This section characterizes land uses in the WOR Region and describes some land uses on the Canadian side of the border that could be affected by some CBP activities. For example, construction projects that introduce noise and light pollution along the border could affect the suitability of land to support its current or planned use on both sides of the border. Other actions, however, such as direct removal of land from existing uses for CBP-related infrastructure construction, would not affect the Canadian side. The USGS and Natural Resources Canada (NRC) define land cover and land use classifications.

4.8.2 AFFECTED ENVIRONMENT

This section describes land use and cover for the WOR Region. The summary tables characterize land use and cover according to the USGS Multi-Resolution Land Characteristics Consortium (MRLC) National Land Cover Database (NLCD) and USGS's Gap Analysis Program (USDOI, 2001; USDOI, 2010). The summary tables for Canada synthesize land use and cover according to NRC's Advanced Very High Resolution Radiometer (AVHRR) land-cover data and NRC's protected areas data on regions of ten square kilometers or larger, as compiled by the Canadian Council on Ecological Areas (CCEA) (NRC, 2009; NRC, 2007).

4.8.2.1 Land Cover and Related Land Uses in the WOR Region

The WOR Region covers 32.6 million acres—approximately 16.8 percent of the land area in the region's states, Washington, Idaho, and Montana. The most prevalent land cover within the study area is forested (62.6 percent), followed by snow/ice/barren land (18.4 percent) (Table 4.8-1). Agricultural land covers 5.5 percent of the total study area (3.8 percent in cultivated crops and 1.7 percent in pasture/hay). Each of the remaining types account for less than five percent of land area with herbaceous at 4.9 percent, developed at 4.5 percent, and water/wetlands at 4.2 percent.

Table 4.8-1. Land Cover in the WOR Region

Border State		Total Land Area (Thousands of Acres)	Developed (%)	Cultivated Crops (%)	Pasture/Hay (%)	Herbaceous (%)	Forested (%)	Water (%)	Snow/Ice/Barren Land* (%)
Idaho	Study Area	3,107	1.9	1.9	0.4	2.0	79.7	6.2	7.8
	Statewide	55,278	1.6	9.3	14.9	13.2	32.8	1.8	39.7
Montana (WOR Region)	Study Area	7,687	1.1	1.2	6.1	4.3	74.7	4.0	13.0
	Statewide	95,383	1.3	14.2	43.8	42.1	22.2	2.4	16.0
Washington	Study Area	21,848	6.0	4.9	7.4	5.5	55.9	3.9	21.9
	Statewide	43,859	5.7	14.7	7.7	5.6	42.6	3.5	25.7
WOR Region	Study Area	32,643	4.5	3.8	1.7	4.9	62.6	4.2	18.4
	Selected States	194,521	2.4	12.9	1.8	25.6	29.8	2.5	24.9
Total United States**		2,053,000	5.0	21.9	14.1	31.2	27.7		

The WOR Region includes all areas 100 miles south of the U.S.-Canada border in Idaho, Washington, and the portion of Montana west of the Rocky Mountains.

* “Barren Land” includes the NLCD land classification “Shrub/Scrub.”

** Data for the United States as a whole are shown as calculated in USEPA, 2008. This report sums land-cover categories for cultivated crops and pasture/hay to account for total agricultural cover, and sums Snow/Ice, Barren, and Wetlands land cover. This table aggregates the USEPA, 2008, calculation of water and shrub/scrub land cover with the category of Snow/Ice/Barren/Wetlands, though water alone covers 1.6 percent of the land area in the United States, while Ice/Snow/Barren/Wetlands cover 5.7 and shrub/scrub covers 20.4 percent.

Source: (USDOJ, 2001).

The study area includes a high percentage of forested lands and a low percentage of agricultural lands (particularly cultivated crops) relative to the entire country. The amount of developed land in the study area is similar to the country as a whole. Herbaceous land cover is substantially less prevalent in the study area relative to the country. Within the study area in each state, forests cover the majority of total land area. The amount of forested land in the study area of each state is also higher than that of each state as a whole.

Figures 4.8-1 and 4.8-2 show maps of land cover and use in the WOR Region.

Recreation also occurs on other land not specifically designated for the activity and land other than that profiled in Section 4.17 (Recreation), which focuses specifically on major Federal recreation sites. For example, wildlife viewing or hiking may be permitted on some conservation or natural areas in the study area. In addition, hunting and snowmobiling may occur on public or private forested land areas. Absent information on the specific distribution of recreational activities across the landscape, this analysis relies on the above categories of land as a low-end estimate of the area in which recreation is likely taking place.

Recreational land use in the WOR Region accounts for 2.6 million acres or 7.9 percent of the total land area—lower than the share of recreational land use for the country as a whole (10.1 percent) (Table 4.8-2). NPS manages the most land (over 2.3 million acres) in the region used, in part, for recreational purposes. More than half (1.7 million acres) of these NPS-managed lands are in Washington. Much of the NPS land in the WOR Region sits in national parks (Olympic and North Cascades, both in Washington, and Glacier in Montana) and national recreation areas, such as Lake Roosevelt, which is also in Washington. Section 4.17 discusses the potential impacts of CBP activities on lands designated and otherwise used for recreational purposes. Appendix I provides the profiles of major Federal U.S. and Canadian protected and set-aside areas often used for recreational purposes in the study area.

Conservation areas in the WOR Region account for about 5.7 million acres or 17.3 percent of the total land area (Table 4.8-3).

The largest conservation areas that overlap the WOR Region are the Bob Marshall Wilderness in Montana and the Glacier Peak Wilderness and Pasayten Wilderness (in the Okanogan-Wenatchee National Forest) in Washington. The USFS manages almost half of all conservation land in the WOR Region (2.7 million acres). The majority of this USFS land is in Washington, almost a million acres of which is in the Okanogan-Wenatchee National Forest.

The WOR Region uniquely hosts two World Heritage Sites. The Waterton-Glacier International Peace Park combines Waterton Lakes National Park in Alberta, Canada, with the Glacier National Park in Montana to provide a unique climate and prairie to mountain connectivity as well as unique scenery.¹ Olympic National Park in Washington has around a 60 mile undeveloped coastline and a diverse ecosystem.² As a signatory to the World Heritage

¹ <http://whc.unesco.org/en/list/354>, May 11, 2012

² <http://whc.unesco.org/en/list/151>, May 11, 2012

Convention, the United States maintains responsible for and sovereignty over the protection, of these sites as places of great intrinsic natural and cultural value for the heritage of humanity.³

Table 4.8-2. Recreational Land Use in the WOR Region

Border State		Recreational Land Use* (Thousands of Acres)	Share of Recreational Land Use (%)
Idaho	Study Area	12	0.4
	Statewide	16,453	29.8
Montana (WOR Region)	Study Area	686	8.9
	Statewide	14,344	15.0
Washington	Study Area	1,881	8.6
	Statewide	8,683	19.8
WOR Region	Study Area	2,579	7.9
	Selected States	39,480	20.3
Total United States		208,088	10.1

The WOR Region includes all areas 100 miles south of the U.S.-Canada border in Idaho, Washington, and the portion of Montana west of the Rocky Mountains.

* Recreation lands all lands clearly identified by USGS title of land type as intended for recreation (e.g., parks, scenic areas, or recreation areas).

Source: (USDOI, 2010).

Table 4.8-3. Conservation Land Use in the WOR Region

Border State		Conservation Land Use (Thousands of Acres)	Share of Conservation Land* Use (%)
Idaho	Study Area	315	10.1
	Statewide	7,475	13.5
Montana (WOR Region)	Study Area	1,331	17.3
	Statewide	11,800	12.4
Washington	Study Area	4,017	18.4
	Statewide	6,630	15.1
WOR Region	Study Area	5,663	17.3
	Selected States	25,904	13.3

³ <http://www.nps.gov/oia/topics/worldheritage/worldheritage.htm>, May 11, 2012.

Border State		Conservation Land Use (Thousands of Acres)	Share of Conservation Land* Use (%)
Total United States		300,149	14.6

The WOR Region includes all areas 100 miles south of the U.S.-Canada border in Idaho, Washington, and the portion of Montana west of the Rocky Mountains.

* Conservation lands are all lands clearly identified by USGS title of land type as intended for conservation (e.g., reserves, preserves, conservation land, and natural areas).

Source: (USDOJ, 2010)

4.8.2.2 Land Cover and Related Land Uses in the Areas North of the WOR Region

This section considers resources north of the border from the WOR Region extending 2 miles into Canada. The region covers about 585,000 acres, slightly less than 0.3 percent of land area for the entire Province of British Columbia (Table 4.8-4). Almost three-quarters of this area is forested (73.3 percent); however, forested land is less prevalent in this area than in the province as a whole (82 percent forested). The next most common land cover type is water/wetlands (14.8 percent), which is double the percentage of water/wetlands in the country as a whole and three times the percentage of water/wetlands in the province. Agricultural land covers about 11 percent of the area north of the WOR Region (4.4 percent cultivated crops; 6.6 percent pasture/hay), a substantially greater portion than for the province as a whole. Developed areas and snow/ice/barren lands each make up less than 1 percent of land cover. Although very little identified snow/ice land cover occurs in Canada just north of the WOR Region, 38.2 percent of land cover in Canada as a whole is snow/ice. Relative to the entire country, the study area has a small amount of barren land. Figures 4.8-1 and 4.8-2 show maps of land cover and land use north of the WOR Region.

Table 4.8-4. Land Cover in Canada North of the WOR Region

Border Province		Total Land Area (Thousands of Acres)	Developed (%)	Cultivated Crops (%)	Pasture/ Hay (%)	Forested (%)	Water/ Wetlands (%)	Snow/Ice/ Barren Land* (%)
British Columbia	Study Area	585	0.0	4.4	6.6	73.3	14.8	0.8
	Province	221,714	0.1	0.7	0.6	82.0	4.8	11.8
Total Canada		2,071,476	0.1	1.7	6.0	46.7	7.3	38.2

* The areas north of the WOR Region in Canada include the portions of the Province of British Columbia extending 2 miles north of the U.S.-Canada border.

Source: (NRC, 2009).

Table 4.8-5 indicates that recreational land use in the areas north of the border from the WOR Region accounts for almost 71,000 acres, or 12.1 percent of the total land area. This figure is almost double the proportion of recreational land use in Canada as a whole (6.1 percent).

The share of recreational land use in the areas north of the border from the WOR Region is similar to recreational land use in the province as a whole. Provincial parks make up the majority of recreation land area.

Conservation areas north of the border from the WOR Region account for about 29,000 acres, which is 4.9 percent of the total land area. This percentage is similar to the proportion of conservation areas in Canada as a whole (4.7 percent) (Table 4.8-6). The proportion of conservation land north of the border from the WOR Region is more than double that of the province.

Table 4.8-5. Recreational Land Use in Canada North of the WOR Region

Border Province		Recreational Land Use (Thousands of Acres)	Share of Recreational Land Use (%)
British Columbia	Study Area	71	12.1
	Province	25,982	11.7
Total Canada		126,389	6.1

The areas north of the WOR Region in Canada include the portions of the Province of British Columbia extending 2 miles north of the U.S.-Canada border.

Note: Recreation Lands are all lands clearly identified in the NRC dataset as intended for recreation; for example, they are described as parks or recreation areas.

Source: (NRC, 2007).

Table 4.8-6. Conservation Land Use in Canada North of the WOR Region

Border Province		Conservation Land Use (Thousands of Acres)	Share of Conservation Land Use (%)
British Columbia	Study Area	29	4.9
	Province	4,884	2.2
Total Canada		98,234	4.7

The areas north of the WOR Region in Canada include the portions of the Province of British Columbia extending 2 miles north of the U.S.-Canada border.

Note: Conservation lands are all lands clearly identified in the NRC dataset as intended for conservation; for example, described as reserves, preserves, protected areas, or habitat areas.

Source: (NRC, 2007).

Figure 4.8-1. Land Cover in the WOR Region

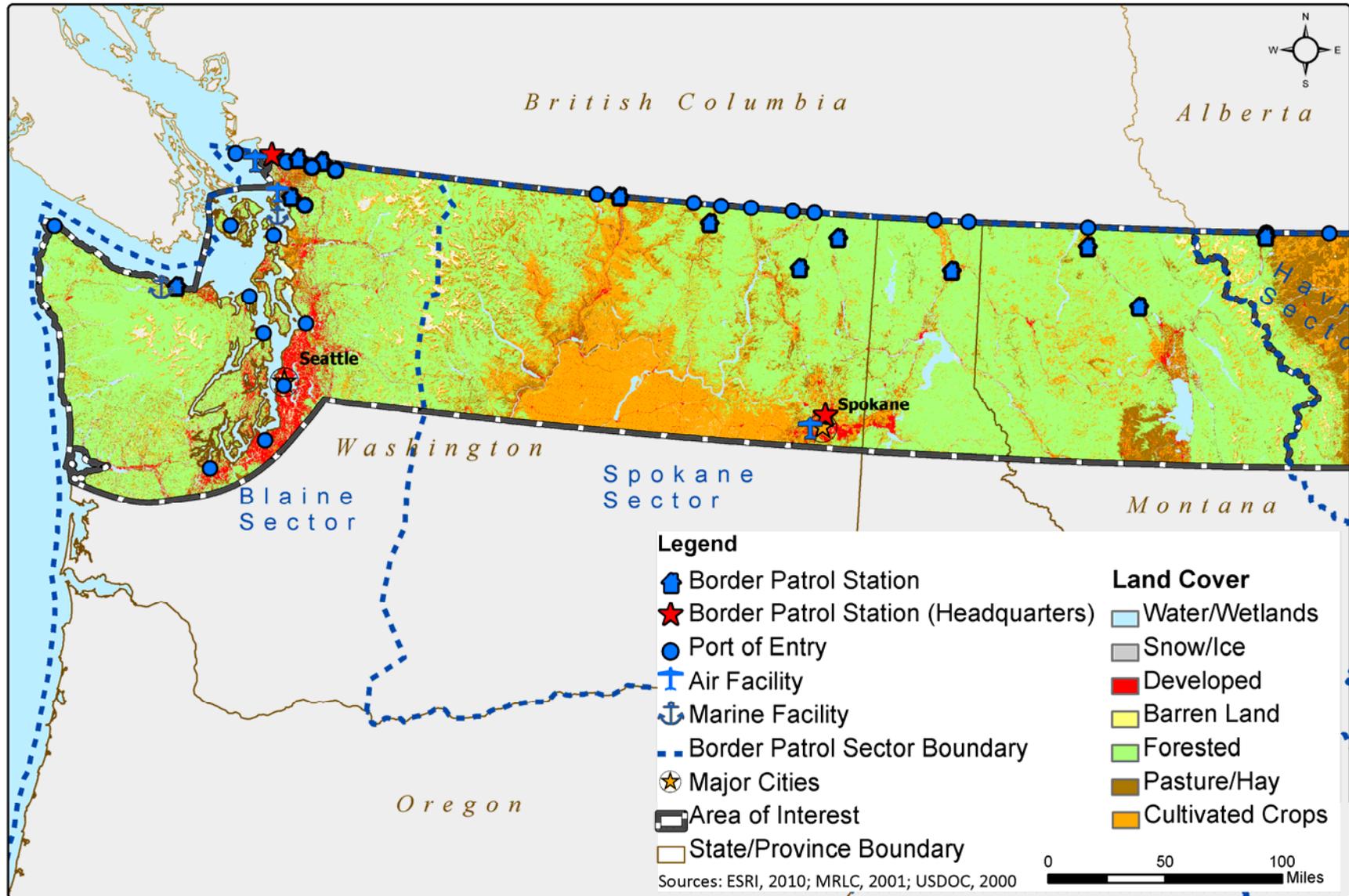
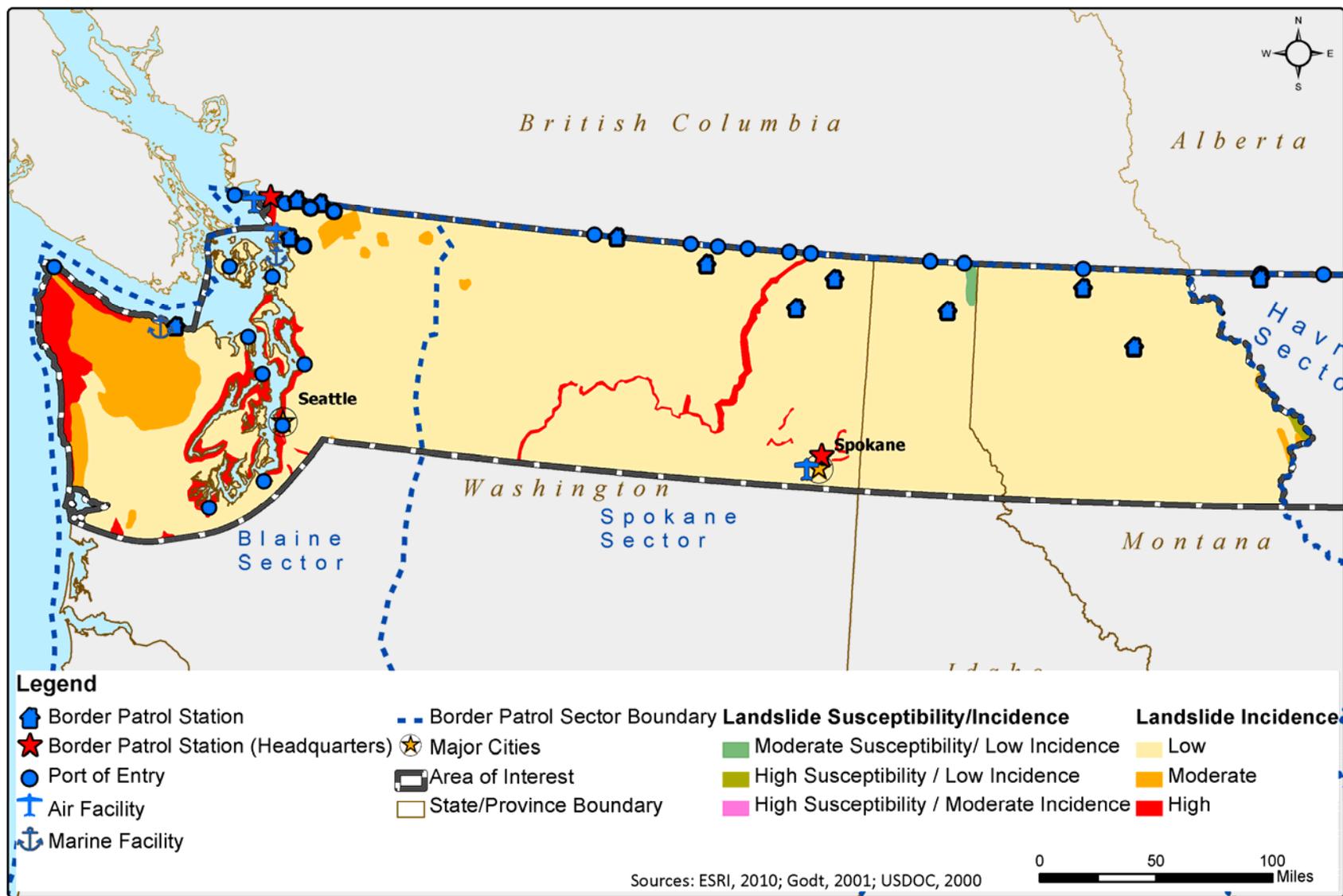


Figure 4.8-2. Land Use in the WOR Region



4.8.2.3 Land Ownership in the WOR Region

The major categories of land ownership in the WOR Region are Federal (46.4 percent), state (8.2 percent), tribal (10.4 percent), and private (0.8 percent) (Table 4.8-7). Federal lands include national parks, national forests, conservation areas, and military lands and are managed by BLM, Bureau of Reclamation (BOR), Department of Defense (DOD), Department of Energy (DOE), U.S. Fish & Wildlife Service (USFWS), USFS, NPS, or are classified as “other Federal land.” State lands are properties owned by state departments of conservation, departments of land, departments of natural resources, departments of transportation, fish and wildlife, historical societies, state land boards, parks and recreation, or classified as “other state land.” Tribal land accounts for regions owned by Native American Tribes and are recognized by the Federal Government. Federal laws and the Constitution grant Tribal Nations greater sovereignty than that granted to state or local governments. Private lands are those owned by the Audubon Society, the Rocky Mountain Elk Foundation, The Nature Conservancy (TNC), private universities, other conservation groups, or private non-profits, or classified as “private conservation easement/conservation deed restriction,” “private conservation land,” or “private institution–managed for biodiversity.”

The WOR Region includes 15.1 million acres of Federal land, accounting for 46.4 percent of land ownership. Federal land in the portion of Montana west of the Rocky Mountains accounts for about 5.1 million acres (one-third of all Federal land in the WOR Region) and Federal land in Washington makes up 8.4 million acres (about 55 percent of all Federal land in the region). The three states in this region account for the greatest share of Federal land ownership across all northern border states. The USFS manages the majority of this Federal land.

Approximately 2.7 million acres of land is state-owned within the WOR Region. This 8.2 percent of ownership share is slightly lower than the 9.2 percent average in the United States.

Tribal lands make up a little under 2 million acres of land area in the WOR Region. All 546,000 acres of tribal land within the WOR Region in Montana occurs in the Flathead Reservation. The largest area of tribal lands within the region in Washington is the Colville Reservation (1.35 million acres). The Quinault Reservation on the west coast and the Spokane Reservation adjacent southeast of the Colville Reservation are the next largest areas with approximately 352,000 total acres. The remaining small, and predominately coastal, reservations within Washington state combine to about 111,000 acres in area. The Neah Bay POE, located on the tip of the Olympic Peninsula, sits within the Makah Reservation. The proportion of tribal land found in the study area (10.4 percent) is greater than the overall proportion in the selected states (7.0 percent). This percentage is almost double the proportion of tribal lands within the United States as a whole (4.9 percent). Section 4.11 provides a more complete discussion of Native American resources in the WOR Region.

This region also includes about 249,000 acres of land area classified as private. The majority of this private land occurs in the western portion of Montana (almost 200,000 acres), most of which is under state-managed conservation easements, although the Rocky Mountain Elk Foundation and TNC also own portions of the region’s private land. The share of private land ownership in the study area is equivalent to the share of private land ownership for the country as a whole. Figure 4.8-3 shows a map of land ownership within the WOR Region.

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

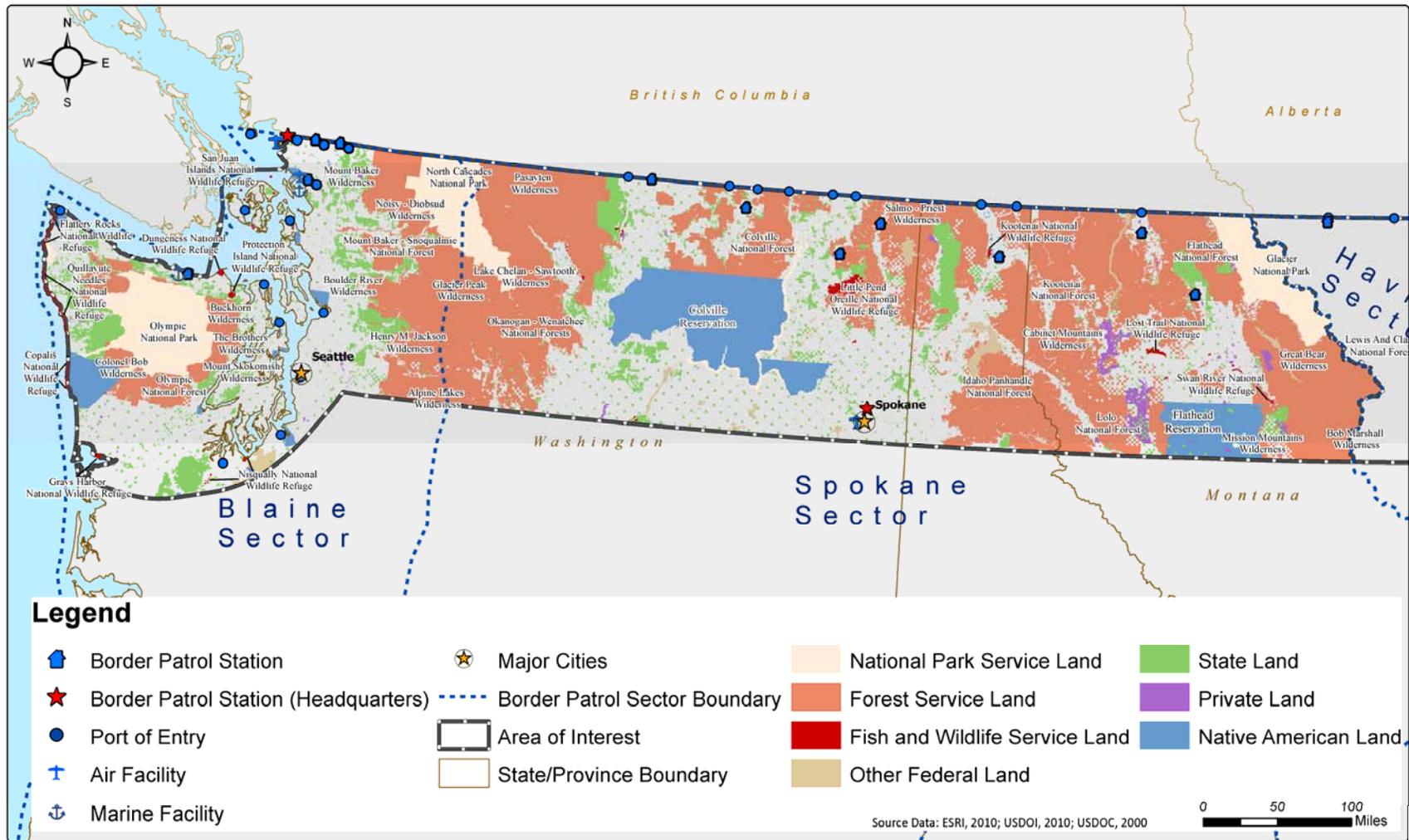
Table 4.8-7. Land Ownership in the WOR Region*

Border State (Thousands of Acres)		Federal Land		State Land		Tribal Land		Privately Held Conservation Land		Total Conservation & Tribal Lands	
		Thousands of Acres	Percentage of Study/ State Area	Thousands of Acres	Percentage of Study/ State Area	Thousands of Acres	Percentage of Study/ State Area	Thousands of Acres	Percentage of Study/ State Area	Thousands of Acres	Percentage of Study/ State Area
Idaho	Study Area 3,109	1,707	54.9	310	10	337	10.8	6	0.2	2,360	76
	Statewide 52,891	33,700	63.7	2,710	5.1	1,779	3.4	110	0.2	38,299	72
Montana (WOR)	Study Area 7,691	5,084	66.1	314	4.1	1239	16.1	198	2.6	6,835	89
	Statewide 93,149	26,975	29.0	5,646	6.1	8,248	8.9	2,998	3.2	43,867	47
Washington	Study Area 21,825	8,359	38.3	2,041	9.4	1,816	8.3	45	0.2	12,261	56
	Statewide 42,531	12,789	30.1	3,886	9.1	3,159	7.4	95	0.2	19,929	47
WOR Region	Study Area 32,625	15,150	46.4	2,665	8.2	3,392	10.4	249	0.8	21,456	66
	Selected States 189,161	73,464	38.8	12,242	6.5	13,186	7.0	3,203	1.7	102,095	54
Total United States		657,885	32	189,314	9.2	100,574	4.9	15,918	0.8	963,691	47

* The WOR Region includes all areas 100 miles south of the U.S.-Canada border in Idaho, Washington, and the portion of Montana west of the Rocky Mountains. Land ownership estimates do not add up to 100 percent for a given area due to gaps in information on land ownership within border states. Sources: (USDOI, 2010), (USDOC, 2012).

Note: For a more complete discussion of Native American resources along the northern border, refer to Section 4.11 of this report.

Figure 4.8-3. Land Ownership in the WOR Region



4.8.2.4 Land Ownership in Canada North of the WOR Region

Federal and provincial land ownership is characterized using the protected areas data compiled by NRC. As a result, ownership (excluding aboriginal lands) is determined for only about 10.8 percent of the entire land area of the country. The following discussion, therefore, reflects only the relatively small portion in Canada for which landowners are identified.

The share of Federal land ownership in the area north of the WOR Region is significantly lower than that throughout the country as a whole (Table 4.8-8) (0.1 percent in the region versus 4.8 percent in the country). The region also includes a lower proportion of Federal land compared to the entire province. The proportion of provincial ownership in the north of the WOR Region is, however, greater than for Canada as a whole.

Aboriginal land is characterized using NRC data of Native American reserves, land claim settlement lands, and related aboriginal designations. Table 4.8-9 shows the share of aboriginal land in the areas in Canada north of the WOR Region (1 percent) is less than the share of aboriginal land countrywide (7.4 percent). However, the area north of the WOR Region includes a larger proportion of aboriginal lands as compared to the broader Province of British Columbia.

Table 4.8-8. Land Ownership in Canada North of the WOR Region*

Border Province		Federal Land		Provincial Land	
		Total Land Area	Share (%)	Total Land Area	Share (%)
British Columbia	Study Area	0.4	0.1	99	16.9
	Province	1,599	0.7	29,268	13.2
Total Canada		98,844	4.8	125,779	6.1

* The areas north of the WOR Region in Canada include the portions of the Province of British Columbia extending 2 miles north of the U.S.-Canada border.

Notes: Federal lands are all lands with the designation national park, migratory bird sanctuary, national wildlife area, Prairie Farm Rehabilitation Administration, and marine protected area. Provincial lands are all lands designated under provincial administration, which often includes funding and support from Federal agencies.

Source: (NRC, 2007).

Table 4.8-9. Aboriginal Land in Canada North of the WOR Region*

Border Province		Aboriginal Lands (Thousands of Acres)	Share (%)
British Columbia	Study Area	6	1.0
	Province	867	0.4
Total Canada		152,965	7.4

* The areas north of the WOR Region in Canada include the portions of the Province of British Columbia extending 2 miles north of the U.S.-Canada border.

Source: (NRC, 2010).

4.8.2.5 Land Use Management

In the WOR Region, access to Forest Service roads remains an important factor in maintaining situational awareness throughout the border area. Access to these areas for securing lookouts or conducting surveillance is balanced with the land management activities that ensure habitat protection for public-trust species. The following areas pose specific access challenges to CBP: national forest areas (Mt. Baker-Snoqualmie, Okanogan, Idaho Panhandle, Colville, and Kootenai) and wilderness areas (Mt. Baker, Stephen Mather, Pasayten, and Salmo-Priest).

4.8.2.6 Consistency with Enforceable Policies of the Coastal Zone Management Act

In the WOR Region, CBP activities in Washington affect coastal zones associated with the northern border and must comply with the appropriate state “enforceable policies” outlined generally below. Most CBP activities in the state coastal zones are anticipated to fall in the negligible to moderate range and must comply with the Federal consistency requirements and procedures established by the individual states, identified below for Washington state.

Washington

Washington’s northern border coastal zone consists of all land in the coastal counties that front salt water and sit within the 100-mile zone that CBP has identified south of the border. The Washington Coastal Zone Management Program (CZMP) document, “Managing Washington’s Coast” (WSDE, 2001), defines the Washington program; the Department of Ecology administers the act to ensure consistency. Federal agencies must review activities for consistency under six laws:

- Shoreline Management Act (including local government shoreline master programs);
- State Environmental Policy Act;
- Clean Water Act;
- Clean Air Act;
- Energy Facility Site Evaluation Council; and,
- Ocean Resource Management Act.

Chapter 5 of “Managing Washington’s Coast” explains the procedures for demonstrating consistency with the enforceable policies of the Washington CZMP (WSDE, 2001).

4.9 AESTHETIC AND VISUAL RESOURCES

4.9.1 INTRODUCTION

Visual resources include those features that define the visual character of an area—natural features, vistas, or viewsheds, and even urban or community visual characteristics that include architecture, skylines, or other characteristics. Visual resources and aesthetics are important due to their unique qualities and the responses they inspire in humans. This section provides the analytical tools to conduct a precise visual impact assessment for future site-specific projects or activities; it also offers examples of the types of landscapes that exist along the border. It analyzes how, in which settings, to what extent, and with which viewer groups the various CBP activities might create visual impacts. It does not characterize every potential vista or visual landscape along the entire northern border, but does provide guidelines for minimizing, mitigating, or avoiding such impacts.

The Visual Resource Management (VRM) system developed by BLM defines the visual sensitivity of an area and the potential effect of a project on a visual resource. It assigns ratings of Classes I to IV based on combinations of scenic quality, sensitivity levels, and distance zones (for the Framework for Characterizing Resource Impacts on the northern border, see Chapter 3, Section 3.9).

4.9.2 AFFECTED ENVIRONMENT

4.9.2.1 Affected Landscapes

Four broadly defined landscapes occur within the potential settings of the proposed project. These four landscapes are: natural, rural, urban, and industrial (USDOT, 1999), and are briefly described below.

Natural Landscapes

A significant portion of the land in the WOR region is covered by forest. In the part of Idaho in the area of study, up to 79.7 percent of the land is forested. More sparsely vegetated mountainous areas in the western United States are dominated by geological landforms, such as rock outcroppings, ridges, escarpments, and plateaus. Even where significant topographic relief occurs, the heavily forested landforms are undistinguished and tend to confine a viewer's attention to the immediate foreground. Many of these landscapes would fall into the "A" category for scenic quality and thus be sensitive to visual modifications. The natural lightscape of heavily forested areas such as the North Cascades National Park in Washington state and its 600,000 acres designated as the Stephen Mather Wilderness, is free from the disturbance of man-made lights. In Montana, Glacier National Park is the United States part of the first international peace park (IPP), the Waterton-Glacier IPP. This joint United States-Canada park is described on the *World Heritage Convention* website as, "an area of significant scenic values with abundant and diverse flora and fauna" with "a distinctive climate, physiographic setting, mountain-prairie interface, and tri-ocean hydrographical divide."⁴

⁴ <http://whc.unesco.org/en/list/354>, 2012 Apr 25, 11:36 a.m.

Rural Landscapes

Rural landscapes include features such as croplands, orchards, fields, fences, and farm-related structures (USDOT, 1999). While border POEs and BPS along the U.S.-Canadian border tend to be in rural, less densely populated areas well outside of major cities, the majority of the population in the study area lives in larger population centers.

Urban Landscapes

In the WOR Region, most major cities are clustered near ocean access. Although these large urban areas are not the most significant features of the region, they still represent the visual setting for the largest portion of the population. Unlike in many other states along the northern border, in Washington POEs and BPS are often located in large urban areas. These landscapes already contain sizable amounts of infrastructure and would be able to absorb a greater amount of change and more additions to the visual environment than rural or natural landscapes. The largest concern in urban landscapes is the number and sensitivity of the visual user groups (see Section 4.9.2.3).

Industrial Landscapes

Heavy and light industrial landscapes tend to be scattered, situated in specific zones or districts such as along roads and waterfronts or near airports. Relatively few industrial landscapes exist along the northern border in the WOR Region. Such landscapes can absorb the greatest degree of visual change, due to existing dominant visual features and their generally low scenic quality ("C" category). These landscapes are usually classified as Visual Resource Class IV in which major changes to the visual environment can occur without major impacts to the visual environment or viewer groups.

4.9.2.2 Areas with High Visual Sensitivity

The WOR Region has a greater amount of public land sensitive to visual impacts compared to other regions. Washington state has about 1.9 million acres of recreational land and 21.7 percent of it falls in the northern border study area. It has about 4 million acres of conservation land in the study area (some is also considered recreational land), which would be negatively affected by changes in the Affected User Groups

Commuters and Through Travelers

These viewers pass through the study area on a regular basis in automobiles on their way to work or other destinations. On most roads within the study area, the views are from street level. Typically, drivers have limited views of CBP infrastructure and activity, except at locations where CBP actions cross the road. Commuters and through travelers are typically moving, have a relatively narrow visual field due to roadside vegetation or structures, and generally are preoccupied with traffic and navigating the roadways. For these reasons, commuters and through travelers' perception of (and sensitivity to) visual quality and changes in the visual environment are likely to remain relatively low. Passengers in moving vehicles, however, have greater opportunities for off-road views of a project than do drivers.

Local Residents

These individuals may view the proposed actions from stationary locations, such as yards and homes, and while driving along local roads. The sensitivity of residents to visual quality varies

and may be tempered by a viewer's exposure to existing CBP actions and infrastructure and other visually varied features already in existence. Presumably, most residents will be highly sensitive to changes in the landscape viewable from their homes and neighborhoods. CBP also considers visual impacts to Native American sacred sites or trust resources before carrying out a project.

Business Employees

These individuals work at local businesses, primarily in the commercial portions of the study area. Business employees will generally experience limited views of the alternative actions except at road crossings while driving to work or where CBP infrastructure and activity occurs near their place of employment. Most business employees work in one and two-story structures that may or may not have outside views. Those with views often look out on numerous, often varied, built features and the employees within are focused on their jobs. For these reasons, business employees are not likely to be sensitive to landscape changes

Recreational Users

The states with the greatest share of Federal land ownership are Idaho (54.9 percent), Washington (38.3 percent), and Montana (27.6 percent). Given the amount of public land (including recreational and conservation lands) in the WOR Region, recreational users could represent a much larger viewer group than other regions. Certain recreational users within the study area, however, already have clear views of current CBP infrastructure and activities. Proximity to existing infrastructure and activity may decrease their expectations of visual quality and their sensitivity to visual change.

4.10 SOCIOECONOMIC RESOURCES

4.10.1 INTRODUCTION

This section provides a socioeconomic profile of the WOR Region, and discusses potential impacts of CBP's program alternatives on these resources. The study area includes areas in the United States and Canada within 100 miles of the border. Some categories of socioeconomic impacts, as discussed in the Environmental Consequences section, are as likely to be on the Canadian side of the border as the U.S. side. For example, time delays at border crossings may affect populations and businesses on both sides of the border. In addition, much of the economic activity in American border regions involves cross-border movement of people and goods; therefore, the impacts of CBP activities on Canadian socioeconomic resources are considered in addition to the impacts on U.S. resources. The impacts of CBP actions on communities and regional economies in Canada are most likely closest to the border. But since delineating precisely how far from the border impacts may extend is not possible, this analysis includes information on the area 100 miles north of the border, mirroring the study area in the United States. This definition of the study area does not imply that impacts are necessarily equivalent in the two countries.

Much of the economic data presented here for Canada are not available below the provincial level, so the provinces provide the best available representation of the border region. Provincial data does not necessarily illustrate the scope of economic impacts; it merely reflects the level at which demographic and economic data are available. All monetary values are expressed in 2009 U.S. dollars, unless otherwise indicated.

The socioeconomic environment includes people and their communities, accounting for such things as population movement, density, and age distribution. It also includes economic considerations such as income levels, opportunities for employment, and overall economic trends. Section 4.10.2 provides an overview of the socioeconomic resources across the WOR Region and north of the region in British Columbia. It then offers a more detailed characterization of the regional demography, including population levels and distribution, regional growth trends, income, employment levels, poverty statistics, and property values. This section also profiles the regional economy, indexing important economic sectors in terms of income and employment. It further provides regionally focused information on important economic sectors for six POEs and BPS. These sites include the most active POEs in terms of the annual number of crossings and the value of cargo transported.

4.10.2 AFFECTED ENVIRONMENT

4.10.2.1 Regional Demographics

To provide context for the potential impacts of CBP actions, some basic, descriptive, socioeconomic information is provided for the WOR Region and the area north of this region in Canada and is compared to the broader states, provinces, and national economies, where possible. While the profiled region is defined as the area both 100 miles north and south of the U.S.-Canada border, the statistics in the various tables and text within this section include data for all U.S. counties and Canadian census divisions overlapping these 100-mile regions. These areas represent the finest geographic resolution available for these data and are used, therefore, to approximate values for populations and other demographic variables.

4.10.2.2 Population and Growth Trends

In the United States, approximately 5.9 million people live in the WOR Region (Table 4.10-1). The segment of the population residing in border communities accounts for 64.6 percent of the population in the WOR states of Idaho, Montana, and Washington. Washington has the largest population in the region with nearly 5.5 million people in the border zone. The border communities in Idaho and Montana are far less populated.

Between 2000 and 2009, the population growth in WOR border communities in Idaho (20.1 percent), Montana (14.9 percent), and Washington (11.9 percent) outpaced population growth for the United States as a whole (8.7 percent) (Figure 4.10-1). Since the 2000 census, Idaho has been the fifth fastest growing state in the country.

Table 4.10-1. Population of the WOR Region*

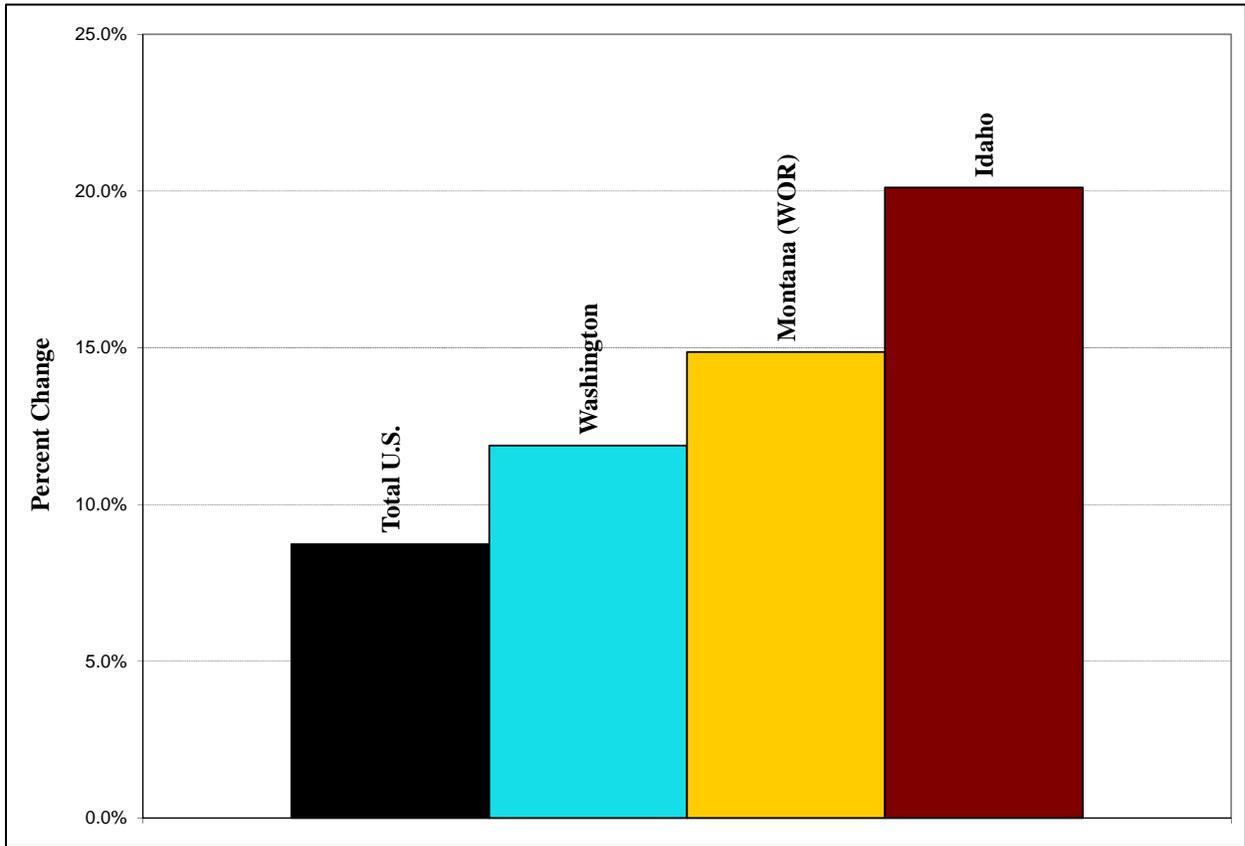
Border State	Population within the Border Area**	Population Overall	Percent of Population within the Border Area
Idaho	204,404	1,545,801	13.2
Montana (WOR)	263,754	974,989	27.1
Washington	5,462,961	6,664,195	82.0
Total WOR Region	5,931,119	9,184,985	64.6
Total United States	28,412,077	310,973,729	9.1

* The American Community Survey provides estimates of demographic, social, economic, and housing characteristics every year for all states, as well as for all cities, counties, metropolitan areas, and population groups of 65,000 people or more (USDOC, 200a).

** Statistics in this column account only for those portions of the states within the WOR Region. Total United States accounts only for those portions of the border area of all four regions.

While border POEs and BPSs along the U.S.-Canada border tend to be in rural, less densely populated areas outside major metropolitan areas, the majority of the population in the region lives in larger population centers. Population centers in this report include all of the counties that overlap a metropolitan statistical area (MSA), which is defined by the Office of Management and Budget and used by the USCB to report demographic statistics. Overall, for the WOR Region in the United States, approximately 84.6 percent of the population lives in population centers (Table 4.10-2). The WOR Region in Washington includes the Seattle-Tacoma-Bellevue MSA.

Figure 4.10-1. Percent Change in WOR Region Population, 2000–2009



Source: (USDOC, 2009a).

Table 4.10-2. Population Centers in the WOR Region*

Border State	Population Center	State's WOR Population Living in Population Centers**	Total State Population in the WOR Region	Percent of State's WOR Population in Population Centers
Idaho***	Coeur d'Alene	139,390	204,404	68.2%
Montana (WOR)***	Great Falls	82,178	263,754	31.2
Washington	Bellingham	200,434	5,462,961	3.7
	Bremerton-Silverdale	240,862		4.4
	Mount Vernon-Anacortes	119,534		2.2
	Olympia	250,979		4.6
	Seattle-Tacoma-Bellevue	3,407,848		62.4
	Spokane	468,684		8.6
	Wenatchee	109,937		2.0
	Total Washington State	4,798,278		87.8
Total WOR Region		5,019,846	5,931,119	84.6
Total United States****		261,110,826	310,973,729	84.0

* The American Community Survey provides estimates of demographic, social, economic, and housing characteristics every year for all states, as well as for all cities, counties, metropolitan areas, and population groups of 65,000 people or more.

** Statistics in this column account only for those portions of the WOR Region within each state.

*** The WOR Region in Idaho and Montana includes only one population center per state. Thus, no state total column is presented, as for Washington.

**** Population statistics in this row represent the proportion of the total American population residing in population centers across the whole country.

In Canada, approximately 3.7 million people reside in the study area north of the WOR Region (Table 4.10-3). Most major cities sit in the southern part of the country; therefore, Canada's population is more heavily concentrated along the border than the American population. For example, in British Columbia, approximately 91.9 percent of the population lives in border communities. British Columbia has some of the largest populations living in border communities in Canada. As some census divisions overlapping the 100-mile buffer area are large and extend well beyond 100 miles from the border, this analysis may overstate the Canadian population in the study area north of the WOR Region.

Between 1996 and 2006, the population of Canada grew 9.5 percent. More recently, according to Statistics Canada, about two-thirds of Canada's growth between 2009 and 2010 was attributable to net international migration. The number of immigrants to Canada increased from 245,300 between 2008 and 2009 to 270,500 between 2009 and 2010. During the economic recession in 2009 and 2010, however, a decrease in the net flow of non-permanent residents occurred, with more immigrants leaving the country, resulting in overall lower net international

migration in 2010 than the previous year. Population growth in British Columbia (12.4 percent) outpaced growth for Canada as a whole (Figure 4.10-2).

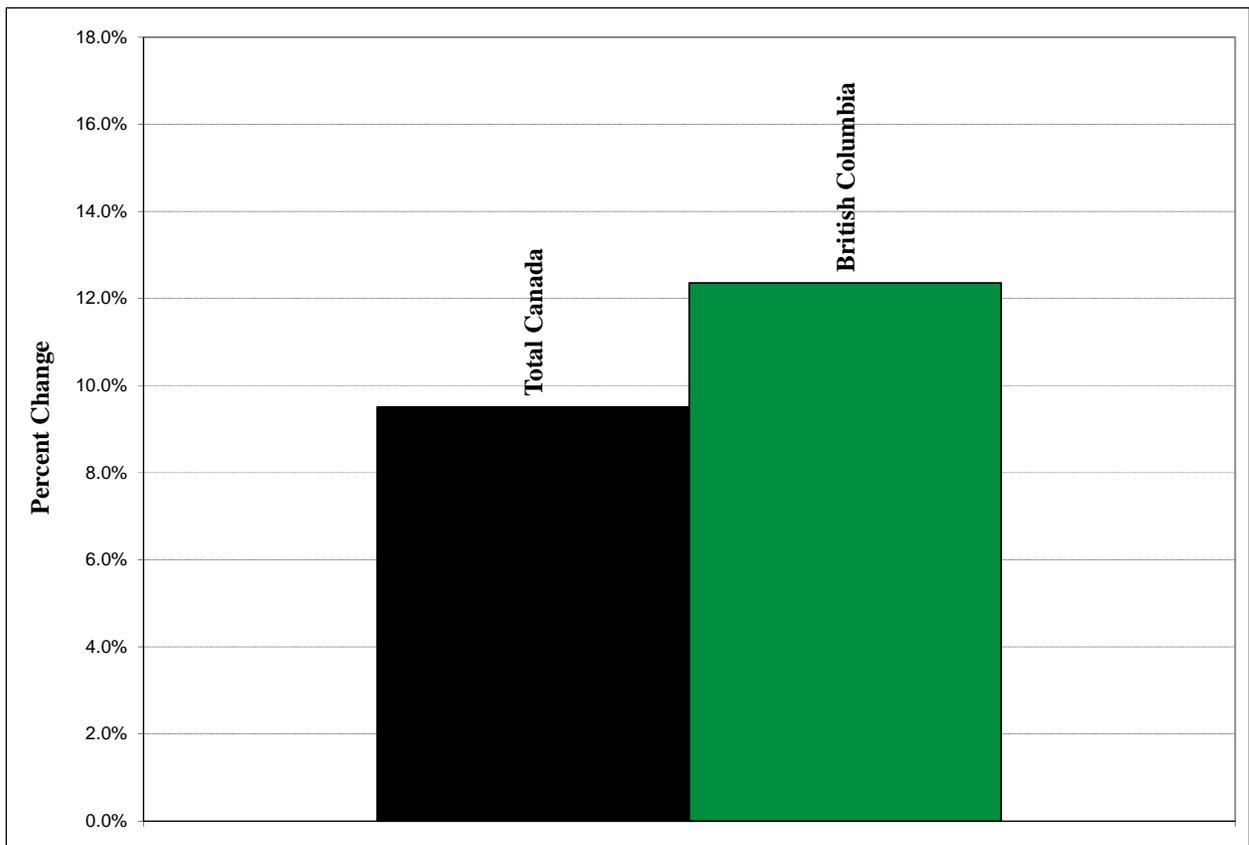
Approximately 68.9 percent of the Canadian population in the study area north of the WOR Region resides within population centers (Table 4.10-4).

Table 4.10-3. Population North of the WOR Region in Canada

Border Province	Study Area Population North of the WOR Region*	Total Population in the Province	Percent of Total Province Population Residing in the Study Area North of the WOR Region
British Columbia	3,745,365	4,074,385	91.9
Total Canada	25,562,910	31,241,030	81.8

* Statistics in this column account only for those portions of the provinces within the study area. Total Canada accounts only for those portions of the provinces within the study area for all four regions.
Source: (StatCan, 2006a).

Figure 4.10-2. Percent Change in Canadian Population North of the WOR Region, 1996–2006



Sources: (StatCan, 1996); StatCan, 2006a)

Table 4.10-4. Population in Census Metropolitan Areas in Study Area North of the WOR Region

Border Province	Population Center	Study Area Population Living in Population Centers North of the WOR Region*	Total Study Area Population North of the WOR Region*	Percent of Total Study Area Population North of the WOR Region Living in Population Centers
British Columbia	Abbotsford-Mission	156,640	3,745,365	4.2
	Vancouver	2,097,960		56.0
	Victoria	325,065		8.7
	Total Province	2,579,665		68.9
Total Canada**		21,508,575	31,241,030	68.8

* Population statistics in these columns account only for those portions of the census metropolitan areas (CMAs) and provinces within the study area.

** Population statistics in this row represent the proportion of the total Canadian population that resides in population centers across the whole country.

Source: (StatCan, 2006a).

4.10.2.3 Income, Poverty, and Unemployment

Border communities in Washington, including Seattle, have the highest median household income of all border communities across the U.S.-Canada border. Montana has the lowest median income of all border states (Table 4.10-5).

The poverty rate is defined as the number of individuals included in the poverty count as a percentage of the population for whom the poverty status is determined. The poverty rate in the border region of Washington is the lowest of the three states (9.9 percent); Montana has the highest rate (15.1 percent).

The unemployment rates in Idaho, Montana, and Washington are lower than the national average (Table 4.10-6). In Idaho and Montana, the unemployment rate is higher in the border region than for the state as a whole. In Washington, the unemployment rate is slightly lower in the border region than in the state.

Table 4.10-5. Income and Poverty Statistics for States in the WOR Region

Border State and WOR Region*		Median Household Income** (\$)	Population Below the Poverty Line***	Percent of Population Below the Poverty Line
Idaho	WOR Region	44,906	20,638	12.4
	Statewide	47,465	148,732	11.8
Montana	WOR Region	41,353	34,056	15.1
	Statewide	41,720	128,355	14.6
Washington	WOR Region	59,394	473,375	9.9
	Statewide	57,829	612,370	10.6
Total WOR Region	WOR Region	58,132	528,069	10.2
	Selected States	54,375	889,457	11.2
Total United States		53,051	33,899,812	12.4

* Statistics in the non-shaded rows account only for portions of the states within the WOR Region.

** Median household income is reported in inflation-adjusted 2009 dollars.

***To determine the poverty rate in the United States, the Census Bureau references income thresholds that vary by family size and ages of family members. If a family's total income, not including noncash benefits (such as food stamps and housing subsidies), is below the family's income threshold, every individual in the family is included in the poverty count.

Source: (USDOC, 2000a; USDOC, 2000b).

Table 4.10-6. Unemployment Rates for the WOR Region

Border State or WOR Region*		Unemployment Rate (%)
Idaho	WOR Region	9.7
	Statewide	8.0
Montana	WOR Region	8.5
	Statewide	6.2
Washington	WOR Region	8.7
	Statewide	8.9
Total WOR Region	WOR Region	8.7
	Selected States	8.5
Total United States		9.3

* Statistics presented in the non-shaded rows account only for portions of the states within the WOR Region.

Source: (USDOL, 2009a)

The median household income in Canada north of the border region is approximately \$48,600 (in 2009 U.S. dollars) compared with \$49,400 for Canada as a whole (Table 4.10-7).

The poverty rate in Canadian communities is defined as the percentage of low-income “economic families.” (See note in Table 4.107 for explanation of “economic family.”) This threshold-based designation is comparable to the poverty statistics in the USCB. In the study area north of the WOR Region, the poverty rate is approximately 13.6 percent compared with 11.6 percent for Canada as a whole (Table 4.10-7). Border communities in British Columbia have the highest poverty rates of all border communities north of the U.S.-Canada border.

The unemployment rate in Canada north of the WOR Region was 5.7 percent in 2006 compared to 6.0 percent for British Columbia as a whole and 6.6 percent for all of Canada (Table 4.10-8).

Table 4.10-7. Income and Poverty Statistics North of the WOR Region in Canada

Border Province and Study Area North of WOR Region*		Median Household Income** (\$US)	Number of Low-Income Economic Families***	Percent of Low-Income Economic Families***
British Columbia	Study area north of WOR Region	48,644	139,851	13.6
	Province	48,541	148,004	13.3
Total Canada		49,393	1,006,911	11.6

* Statistics in the non-shaded rows account only for portions of the provinces within the study area.

** Median household income is reported in inflation-adjusted 2009 U.S. dollars.

*** The Canadian Census reports statistics for low-income economic families. This threshold-based designation is comparable to the poverty statistics in the USCB. The term “economic family” refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law, or adoption. A couple may be of the opposite or same sex. Foster children are included.

Source: (StatCan, 2006b).

Table 4.10-8. Unemployment Rates North of the WOR Region in Canada

Border Province and Study Area North of WOR Region*		Unemployment Rate (%)
British Columbia	Study area north of WOR Region	5.7
	Province	6.0
Total Canada		6.6

* Statistics in the non-shaded rows account only for portions of the provinces within the study area.

Source: (StatCan, 2006c).

4.10.2.4 Property Values

The WOR Region has the highest median property value of all regions along the northern border. In the WOR Region, the median property value between 2006 and 2008 was approximately \$315,400, which is significantly higher than the median property value for the United States as a whole (\$192,400) during the same time period (Table 4.10-9). Notably, the highest median property values among all border communities across the northern border from Washington to Maine occur in Washington (median property value of \$321,400), Idaho (\$234,900), and Montana (WOR) (\$226,700), the three states within the WOR Region. In each of the states, the median property value in the WOR Region is higher than the median property value for the state as a whole.

Table 4.10-9. Median Property Values for the WOR Region

Border State and WOR Region		Median Home Value* (\$)
Idaho	WOR Region	234,900
	Statewide	174,800
Montana	WOR Region	226,700
	Statewide	168,200
Washington	WOR Region	321,400
	Statewide	293,000
Total WOR Region	WOR Region	315,400
	Selected States	260,200
Total United States		192,400

* The American Community Survey provides estimates of housing characteristics for all geographic areas with populations of 20,000 or more, including the Nation, all states and the District of Columbia, all congressional districts, and approximately 1,800 counties every 3 years. Due to the use of value categories rather than specific amounts collected for each individual housing unit in 2006 and 2007, property values cannot be adjusted for inflation. Property values are reported in nominal dollar terms.

Source: (USDOC, 2008a).

British Columbia has the highest median property values in Canada. In the study area north of the WOR Region, the median property value in 2006 was approximately \$396,000 (in 2009 U.S. dollars) compared with \$232,200 for Canada as a whole (Table 4.10-10). Border communities in British Columbia have the highest median property values among all border communities north of the U.S.-Canada border.

Table 4.10-10. Median Property Value North of the WOR Region in Canada

Border Province and Study Area North of WOR Region*		Average Value of Dwelling** (\$US)
British Columbia	Study area north of WOR Region	396,000
	Province	369,200
Total Canada		232,200

* Statistics in the non-shaded rows account only for those portions of the provinces within the study area.

** A dwelling is defined as a set of living quarters designed for or converted for human habitation in which a person or group of persons reside or could reside. In addition, a private dwelling must have a source of heat or power and must be an enclosed space that provides shelter from the elements, as evidenced by complete and enclosed walls and roof and by doors and windows that protect from wind, rain, and snow. Property values are reported in 2006 U.S. dollars.

Source: (StatCan, 2006b).

4.10.2.5 Regional Economies

Tourism is a major component of economic activity along the northern border. Canada is the top country of origin for visitors to the United States. In 2008, the number of Canadian visitors staying one or more nights in the United States was nearly 19 million (USDOC, 2008b). In this context, “Canadian visitors” refers to Canadian residents visiting the United States. The WOR

Trade with Canada
<p>The flow of goods, services, and people across the border contributes significantly to economic activity in border communities. Canada is the largest trading partner of the United States. In 2009, the total value of merchandise trade with Canada was approximately \$429.6 billion—\$204.7 billion in exports and \$224.9 billion in imports. Shipments by surface modes of transportation, excluding pipelines, account for approximately 79 percent of total merchandise trade with Canada. The top exports to Canada by surface transportation are automobiles and automotive parts and accessories, and other machinery, appliances, and equipment. The top imports from Canada are automobiles and automotive parts and accessories, other machinery and appliances, and processed paper and pulp products. On average, approximately \$930 million in merchandise crosses the northern border by surface transportation every day (USDOT, 2009a). Appendix Q provides trade statistics for surface transportation between the United States and Canada.</p>

Region includes significant tourist destinations; Washington state is the third most visited state by Canadians, after New York and Florida.

Crossing the northern border using surface modes of transportation forms the principal means of entry for Canadians visiting the United States, accounting for two-thirds (12.6 million) of all Canadian visitor entries (USDOC, 2008c). Although approximately 21 percent of Canadian visitors entering the United States by surface transportation visited the WOR Region, spending in this region accounted for a relatively low percentage (less than 8 percent) of total spending in the country by these visitors. Canadian visitors entering by surface transportation contributed approximately \$622 million to the WOR Region in 2008 (Table 4.10-11). The average visitor

spent approximately \$237 per visit. The most common stated purposes for visiting states in the WOR Region are vacation (75 percent), visiting friends or relatives (19 percent), and business or employment (6 percent). The WOR Region has the second highest percentage of travel due to business or employment. While business travelers tend to spend more per trip, they also rely more heavily on air travel and travel further from the border.

In 2008, Washington state generated the third highest volume of visitors from the United States entering Canada (StatCan, 2008a). The average Washington visitor spent approximately \$387 per visit compared with \$399 for the average visitor from the United States (StatCan, 2008b). Washington, the only state in the WOR Region for which data on travel to Canada are available, contributed approximately \$447 million to the Canadian economy in 2008.

Table 4.10-11. Canadian Visitors Entering the WOR Region by Surface Transportation*

Destination	Visitors		Spending			Purpose of Trip		
	Number of Visitors (000s)	Average Nights Per Visit	Visitor Spending (\$US millions)	Spending per Visitor (\$US)	Average Daily Spending per Visitor (\$US)	Business, Convention, or Employment (%)	Visiting Friends or Relatives (%)	Holiday, Vacation, or Other (%)
Idaho	—**	—**	—**	—**	—**	—**	—**	—**
Montana	634	3.1	189.4	299	96	5.1	11.7	83.2
Washington	1,991	2.8	432.7	217	77	6.5	20.9	72.5
Border States in WOR Region	2,625	2.9	622.1	237	83	6.1	18.7	75.1

* Surface modes of transportation include autos, buses, and other non-air modes of transportation. Average nights per visit and average daily spending per visitor are based on total visitors, including air travelers.

** The Office of Travel & Tourism Industries suppresses state data for which the sample size is less than 400,000.

Sources: (USDOC, 2008b; USDOC, 2008c).

4.10.2.6 Economic Profiles of POEs and BPSs in the WOR Region

This section provides regional economic profiles for border communities in the United States and Canada that surround selected POEs in the WOR Region. The purpose of this section is to characterize socioeconomic resources of specific border communities in the region, providing context for the discussion of potential consequences of CBP's alternative actions, and highlighting the diversity in regional economies surrounding POEs and BPSs along the northern border. Appendix Q contains data on trade, employment, and payroll statistics by economic sector for U.S. counties and Canadian provinces that contain profiled POEs and BPSs in the four border regions.

This section profiles six sites in the WOR Region, which includes the most heavily used POEs along the border in the region in terms of total crossings and total value of trade, along with some smaller, more rural POE sites. Additionally, the sites were chosen based on their unique characteristics to reflect different socioeconomic conditions in border communities. For example, sites profiled in the WOR Region include the POE with the greatest number of international ferry crossings. Table 4.10-12 lists sites ranked by crossing volume and provides information on associated crossing activity.

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Table 4.10-12. POE and BPS Sites Profiled in the WOR Region

Port	Annual Individual Crossings (% of Total)	Annual Vehicle Crossings (% of Total)	National Rank by Crossing Volume	Annual Trade Value (Surface Mode)	Rank by Trade Value	Two Largest Commodities (% of Port's Trade Value)	Important Features
WA: Blaine	6,644,535 (10.8%)	3,169,214 (9.9%)	3	\$14,617,814,401 (4.3%)	6	<ul style="list-style-type: none"> Nuclear reactors, boilers, machinery, and mechanical appliances (10.6%) Electrical machinery and equipment (7.4%) Vehicles and parts (7.2%) 	<ul style="list-style-type: none"> Roughly collocated with Blaine BPS
WA: Sumas	1,548,662 (2.5%)	801,864 (2.5%)	8	\$1,980,353,093 (0.6%)	15	<ul style="list-style-type: none"> Wood and articles thereof (22%) Nuclear reactors, boilers, machinery, and mechanical appliances (10.3%) 	<ul style="list-style-type: none"> Roughly collocated with Sumas BPS
WA: Point Roberts	1,340,525 (2.2%)	741,040 (2.3%)	12	\$8,399,803 (0.002%)	64	<ul style="list-style-type: none"> Electrical machinery and equipment (16.8%) Ships, boats, and floating structures (15.9%) 	
ID: Porthill	292,234 (0.5%)	165,496 (0.5%)	29	\$12,749,234 (0.004%)	57	<ul style="list-style-type: none"> Beverages, spirits, and vinegar (38.4%) Wood and articles thereof (37.7%) 	<ul style="list-style-type: none"> Largest in ID*

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

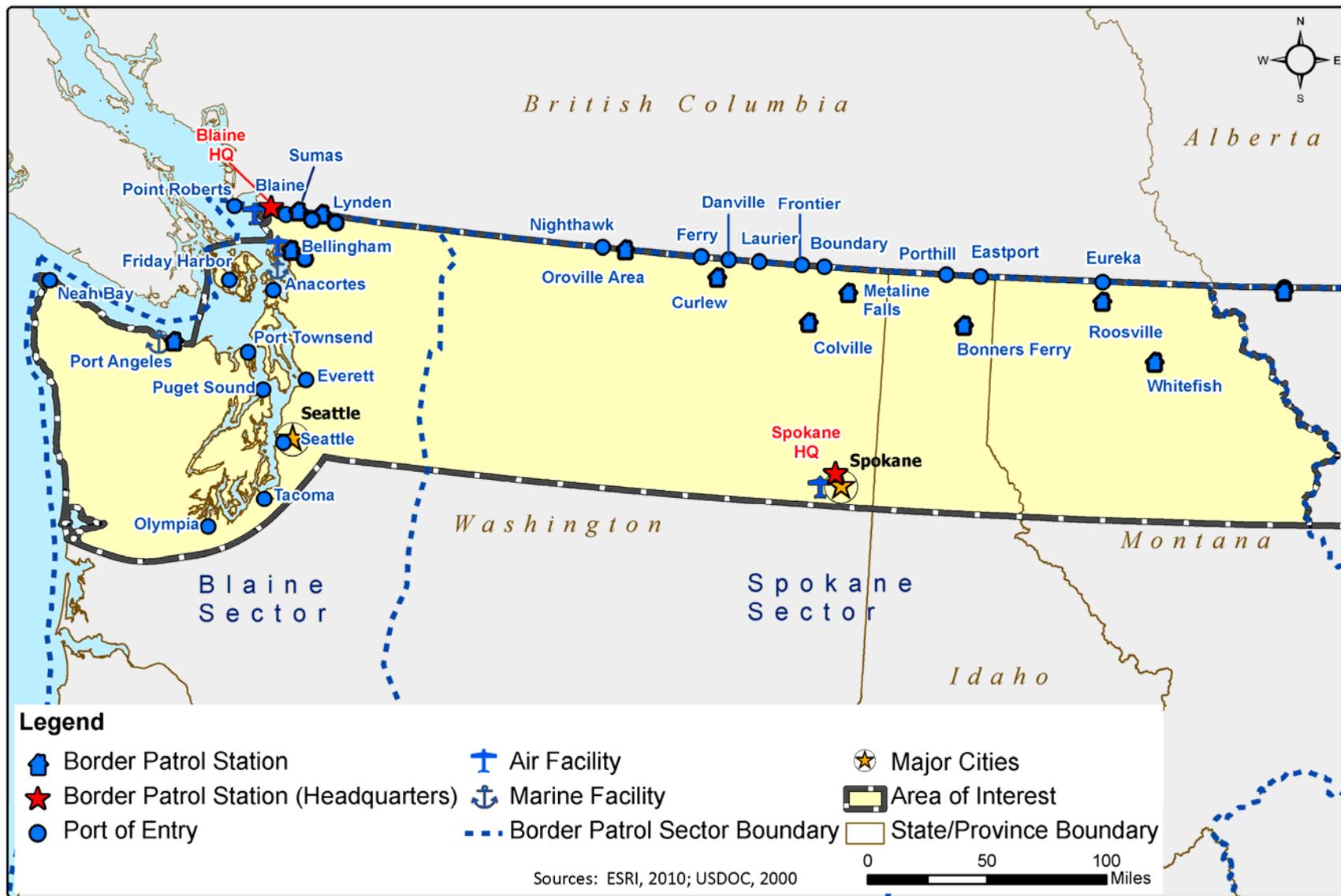
Port	Annual Individual Crossings (% of Total)	Annual Vehicle Crossings (% of Total)	National Rank by Crossing Volume	Annual Trade Value (Surface Mode)	Rank by Trade Value	Two Largest Commodities (% of Port's Trade Value)	Important Features
MT: Eureka/ Roosville	246,674 (0.4%)	118,857 (0.4%)	30	\$49,775,465 (0.02%)	42	<ul style="list-style-type: none"> • Wood and articles thereof (54.3%) • Mineral fuels, mineral oils, and products thereof 16.6%) 	<ul style="list-style-type: none"> • Roosville POE is colocated with Eureka BPS
WA: Port Angeles	132,178 (0.2%)	58,708 (0.2%)	39	\$17,351,984 (0.005%)	51	<ul style="list-style-type: none"> • Fertilizers (12.7%) • Nuclear reactors, boilers, machinery, and mechanical appliances (6.9%) 	<ul style="list-style-type: none"> • Largest with ferry*; Colocated with Port Angeles BPS

* Size based on number of individual border crossings.

** Bureau of Transportation Statistics does not provide data on commodities and crossings at BPSs.

Sources: (IEc analysis of Bureau of Transportation Statistics data. USDOT, 2009a; USDOT, 2009b; USDOT, 2009c).

Figure 4.10-3. Locations of POEs and BPSs in the WOR Region



The remainder of this section characterizes the regional economies of the U.S. counties and Canadian provinces containing the WOR Region sites identified in Table 4.10-12 and Figure 4.10-3.

Clallam County, Washington

Across the border from British Columbia, Clallam County, Washington contains one of the profiled sites: Port Angeles. Clallam County sits on the northern half of the state's Olympic Peninsula and includes part of Olympic National Park. Much of the land surrounding the park is national forest. The population on the peninsula is sparse with most of the inhabitants in villages on the eastern and northern coasts, including Port Angeles (USAT, 2010). Clallam County includes a border inspection station at Port Angeles for the passenger ferry crossing to Victoria, British Columbia. The major economic sectors in Clallam County by annual payroll are health care and social assistance (\$127 million), retail trade (\$95 million), and manufacturing (\$72 million). These three sectors account for nearly half of all private, nonfarm jobs in the county.

- **Port Angeles POE and BPS:** Port Angeles is the largest ferry crossing between the United States and Canada. It is, however, a relatively small POE in terms of total crossings, accounting for approximately 0.2 percent of individual border crossings per year (132,000 individuals) and less than 0.01 percent of total U.S.-Canada trade (\$17.4 million). The primary commodities crossing the border are agricultural products, including fertilizers (12.7 percent), vegetables, roots, and tubers (6.8 percent); and machinery and mechanical appliances and parts (6.9 percent).

A Note on Data Sources

All statistics for private, nonfarm employment, unless otherwise noted, come from USCB County Business Patterns for 2008. All statistics on agricultural production employment, unless otherwise noted, are from the USDA, Census of Agriculture for 2007. All Canadian statistics, unless otherwise noted, come from the Statistics Canada 2006 Census. All detail on border crossings and trade value, unless otherwise noted, are from the U.S. Department of Transportation Bureau of Transportation Statistics' Transborder Freight Data for 2009. Monetary values are expressed in 2009 U.S. dollars.

Whatcom County, Washington

Whatcom County is in the northwestern part of the state and contains three major POEs along the border with British Columbia (Blaine, Sumas, and Port Roberts). These POEs collectively accounted for 9.5 million (15.5 percent) of all individual border crossings and \$16.6 billion (4.9 percent) of all U.S.-Canada cross-border trade in 2009. Cross-border trade heavily supports the regional economy. Whatcom County is home to several import/export warehouses, freight and courier services, and gas stations serving long-haul cargo trucks (USDHS, 2008).

Manufacturing is the largest sector of Whatcom County's economy, contributing \$460 million in annual payroll and providing more than 9,400 jobs. The Conoco-Phillips refinery at Neptune Beach, the BP West Coast Products refinery at Cherry Point, and the Alcoa Intalco aluminum refinery at Cherry Point are some of the largest employers in the county (WCCP, 2010a). In the last 20 years, Canadian manufacturing investment in Whatcom County has significantly increased, taking advantage of lower energy costs and easy access to U.S. markets. The next

largest economic sectors by contribution to annual payroll are construction (\$436 million), health care and social assistance (\$392 million), and retail trade (\$276 million).

Historically, resource-based industries—agriculture, farming, fishing, logging, and mining—accounted for a large percentage of the regional economy in Whatcom County. Agriculture remains an important sector in terms of employment, accounting for more than 6,800 jobs. Over 92 percent of the land in unincorporated Whatcom County is zoned rural, forestry, or agriculture (WCCP, 2010a). More private lands have been developed for urban or rural use, however, and the amount of land in agricultural production has declined. Logging, while subject to environmental limitations, provides many jobs. In October 2008 and November 2009, Whatcom County took steps to transfer 8,400 acres of forests from state to county management to create the new Lake Whatcom Forest Preserve to protect the Lake Whatcom watershed and limit commercial logging in that area (CNW, 2010).

A significant portion of Whatcom County's economy is supported by travel and tourism from British Columbia. According to the Washington State Department of Commerce, visitors spent approximately \$435.5 million in Whatcom County and supported approximately 7,120 travel and tourism jobs in 2009 (DRA, 2009). Travel-related economic activity accounted for 5.7 percent of all jobs and 2.5 percent of all earnings in 2009. Furthermore, in the mid-1990s, the county estimated that 30 to 40 percent of retail activity depended upon Canadian consumers (WCCP, 2010b). The Bellis Fair Mall, which opened in 1988, is a major destination for Canadian consumers seeking to pay lower taxes on goods and services. The impact of Canadian consumer activity, however, has fluctuated with the value of the Canadian dollar and changes to border security.

- Point Roberts POE: Point Roberts sits on a peninsula extending from mainland Canada and has no land border with the contiguous United States. While physically connected to Canada, the community of Point Roberts is part of the United States. The Point Roberts POE is a four-lane border crossing for motor vehicles, bicycles, and pedestrians, connecting with British Columbia. Point Roberts has a population of less than 1,500; students above the third grade must travel across the border daily to attend school in Blaine, a trip that involves a 40-minute drive, as well as two border crossings. Much of the local Point Roberts economy is affected by recreational and weekend visitors from the greater Vancouver area (PRCOC, 2006). While Point Roberts accounts for a large number of border crossings (1.34 million, the twelfth largest in the United States) the total value of trade is very small (\$8.4 million, or 0.002 percent of total U.S.-Canada trade). The major commodities crossing the border in 2009 were electrical machinery and equipment (16.8 percent) and ships and boats (15.9 percent).
- Blaine POE and BPS: Blaine, often referred to as “The Gateway to the Pacific Northwest,” is adjacent to Boundary Bay at the northernmost point of Interstate 5 in Washington. Interstate 5 serves as a major north-south thoroughfare from Seattle to Vancouver. The Blaine POE consists of two separate border inspection stations between Blaine, Washington and Surrey, British Columbia. The Peace Arch Crossing (Douglas Crossing), the primary passenger vehicle POE, is in Peace Arch Park, which straddles the U.S.-Canada border. Peace Arch Park also contains a pedestrian border crossing. All trucks and commercial vehicles must cross the border at the Pacific Highway crossing,

also known as the “Truck Crossing,” along Highway 15 and Washington State Route 543. Blaine is the third busiest border crossing by crossing volume and the sixth largest by trade value. It is the largest crossing in the western part of the United States and Canada. More than \$14.6 billion in goods crossed the border through Blaine in 2009, approximately 4.3 percent of all U.S.-Canada merchandise trade. The major commodities crossing the border are machinery and mechanical appliances and parts (10.6 percent), electrical machinery and equipment (7.4 percent), and vehicles and parts (7.2 percent).

- **Sumas POE and BPS:** The 24-hour border crossing at Sumas is often a less-congested alternative to nearby Blaine. The crossing is near Highway 1 in Canada, centered between Bellingham, Washington and Vancouver, British Columbia (USDHS, 2008). The Sumas POE experiences the second largest number of pedestrian crossings of all the POEs on the Canadian border but accounts for only 2.5 percent of total crossings. Sumas is a small town with fewer than 1,400 residents, lying across the border from Abbotsford, British Columbia. Sumas is a smaller commercial POE than Blaine. Approximately \$2.0 billion in goods crossed the border in 2009 at Sumas, less than 1 percent of all U.S.-Canada merchandise trade. The major commodities crossing the border are wood and articles of wood (22.0 percent), machinery, mechanical appliances, and parts (10.3 percent), and vehicles and parts (7.3 percent).

Boundary County, Idaho

Boundary County, Idaho, located at the northern tip of the state, shares its northern border with British Columbia and contains one POE (Porthill). The population is slightly over 10,000 and has been growing at a faster pace than the entire United States—approximately 11 percent since 2000. While Boundary County has an attractive natural environment for outdoor recreation as well as a destination resort casino, many tourists spend only one or two nights in the area or pass through without stopping (THC, 2009). The three largest economic sectors by annual payroll—health care and social assistance (\$14.5 million), manufacturing (\$10.7 million), and retail trade (\$10.1 million)—account for approximately half of all private, nonfarm jobs in the region.

- **Porthill POE:** The Porthill POE in Boundary County connects Idaho State Highway 1 and British Columbia Highway 21. The Porthill POE is the largest border crossing in Idaho, but accounts for less than 0.5 percent of total U.S. crossings and less than 0.01 percent of total U.S.-Canada merchandise trade. Two groups of commodities account for the vast majority of cross-border commerce—beverages, spirits, and vinegar (38.4 percent) and wood and articles of wood (37.7 percent).

Lincoln County, Montana

Lincoln County, Montana is located in the northwestern corner of the state and contains one POE (Roosville) and one BPS (Eureka) along the border with British Columbia. The county has a population of approximately 18,700 people. Unlike much of the rest of the WOR border region, Lincoln County’s population has not experienced population growth since 2000, decreasing by approximately 0.6 percent. The county is home to portions of three national forests; natural resources play a prominent role in the region’s economy. The three largest non-farm economic sectors by annual payroll are health care and social assistance (\$22.3 million), hunting, fishing,

forestry, and support activities for agriculture (\$14.7 million), and retail trade (\$14.1 million). These three economic sectors account for approximately 42 percent of the county's employment.

- **Roosville POE and Eureka BPS:** The Roosville POE in Lincoln County links U.S. Highway 93 with British Columbia Provincial Highway 93. The crossing accounts for less than 0.4 percent of total U.S.-Canada border crossings and less than 0.02 percent of the total value of U.S.-Canada trade. Wood and wood products make up over 54 percent of the POE's total trade value; mineral products contribute an additional 17 percent. The BPS is in the town of Eureka, approximately 9 miles south of the Roosville POE.

British Columbia, Canada

The six profiled sites in the WOR Region fall within British Columbia on the northern side of the border. British Columbia is the westernmost Canadian province and the third most populated. British Columbia is a popular tourism destination for outdoor activities and recreation, including boating, golfing, hiking, and skiing (TBC, 2010). The province's Whistler Blackcomb is considered one of the best ski resorts in North America. Vancouver Island is also a major tourist destination and home to the Pacific Rim National Park Preserve, one of the world's most diverse ecosystems. Victoria, the capital of British Columbia, is on Vancouver Island, accessible by ferry from Port Angeles and Seattle, Washington. Vancouver is the largest city in British Columbia and the third largest city in Canada. The city was a major travel destination as host of the 2010 Winter Olympic Games, and remains a popular destination for shopping, dining, and other cultural attractions.

Manufacturing is the largest economic sector in British Columbia, contributing \$8.2 billion in annual payrolls and providing more than 189,000 jobs. Manufacturing is followed by professional, scientific, and technical services (\$7.9 billion) and health care and social assistance (\$7.5 billion). Retail trade is the largest economic sector in terms of employment, supporting nearly 250,000 jobs and \$5.8 billion in annual payroll. Tourism accounted for nearly 120,000 jobs and generated \$9.8 billion in revenues in 2005 (CTABC, 2010). British Columbia Public Service is the largest employer in the province.

4.11 CULTURAL AND PALEONTOLOGICAL RESOURCES

4.11.1 INTRODUCTION

This section provides an overview of cultural and paleontological resources located in the WOR Region of the northern border and discusses potential impacts of CBP's program alternatives on those resources.

4.11.2 AFFECTED ENVIRONMENT

4.11.2.1 Archaeological Resources: Prehistoric/Precontact Context

Among the known cultural resources in the WOR Region are archaeological sites from the prehistoric and pre-European contact periods. This section provides an overview of those periods. An expanded prehistoric and pre-European contact-period context and references can be found in Appendix H. In North America, the Prehistoric/Precontact Era is generally divided into three broad periods: Paleo-Indian, Archaic, and Woodland/Ceramic/Late. During the Prehistoric Era, North American groups evolved from highly nomadic big-game hunters to politically sophisticated and sedentary Tribes and nations employing large-scale agriculture. There are thousands of known archaeological sites within the WOR Region, which represent a fraction of the potential sites that may exist in the region. This record of known sites has been built up over the years as a result of reports by amateurs and vocational archaeologists as well as the result of formal archaeological surveys conducted by professionals and academics. In parallel with the evolution of prehistoric groups from nomadic hunting to sedentary agriculture/aquaculture and the resulting increases in population, sites from the earlier periods (ca. 12,000 to ca. 7,000 years before present [B.P.]) are rare. Sites from the later periods account for the bulk of the known sites in the region.

Paleo-Indian Period

The Paleo-Indian period (ca. 12,000 to ca. 10,000 B.P.) is similar in much of the study area and was characterized by people inhabiting the recently deglaciated environment. Subsistence was dominated by big-game hunting of mastodon, mammoth, caribou, horse, bison, musk-ox, giant ground sloth, white-tailed deer, elk, moose, and wapiti, along with species of smaller mammals, birds, fish, reptiles, and shellfish. These early hunting groups generally had highly mobile lifeways. There are several types of Paleo-Indian sites including small camps; workshops/quarries; kill sites; rockshelters/cave camps; major, recurrently occupied camps; and possible cremation sites.

Archaic Period

During the Archaic period (ca. 10,000 to ca. 3,000 B.P.), the environment changed from unstable post-glacial conditions to an essentially modern state. In the context of this changing landscape came numerous cultural and technological changes. People gradually adopted less-mobile lifestyles. At the same time, they broadened the variety of resources on which they depended for food and shelter. Some groups began regularly interacting and trading with other people across large distances—sometimes over a thousand miles away. There are relatively few sites from the first 3,000 years of the Archaic known in the northern portion of the United States, a fact probably related to the continually changing climate and environment. Sites from the last 4,000 years of the period are more common and show people had developed a great variety of tool

types and styles, mostly made from stone, bone, and wood. In general, Archaic sites are found along water and on lake plains.

Woodland/Ceramic/Late Period

The Woodland/Ceramic/Late period lasted from 3,000 B.P. to the time when European trade goods reached Indian groups (450 to 250 B.P.). During this time, people invented several new technologies, including clay pots and the bow and arrow. Long-distance trade intensified. Groups adopted agriculture, developed even less-mobile lifeways than before, and started living in larger settlements, some with over 1,000 inhabitants. People in the Northwest lived in large villages (some with distinctive pithouses) centered on rivers and relied increasingly on salmon fishing for subsistence.

4.11.2.2 Prehistoric Archaeological Site Probability

Archaeologists use a variety of information and techniques to carry out *predictive modeling*, the process of assessing the probability of the existence of archaeological sites in a given location. This section provides an overview of the current understanding of archaeological site probability in the WOR Region.

Washington and Idaho

The WOR Region project area transects archaeologically sensitive landforms within both the Northwest Coast and Plateau Culture Areas. The most sensitive landforms for prehistoric archaeological resources include coastal and river-valley features such as cusped forelands (geographical features found on coastlines and lakeshores that are created primarily by long shore drift and extend outward from the shoreline) and spits, natural beach berms and shorelines in protected bays, river terraces, and alluvial fans. Native American land use was concentrated in these areas, especially near estuaries and the confluences of major rivers, and so these areas would therefore have the greatest sensitivity for villages, campsites, and specialized resource-procurement sites. There is potential for such archaeological deposits to be deeply buried depending upon the local geology and geomorphology of a particular area. Although upland and mountain landforms, in general, have much less potential for the remains of long-term residential sites, certain upland areas exhibit evidence of concentrated human activity and therefore retain some potential for prehistoric archaeological sites. These areas include upland lakes and wetlands, outcrops of stone that was used for tools, and mountain passes, saddles, and ridgelines.

Other important considerations for archaeological site probability include the age and extent of previous disturbance of landforms. In general, the age of a particular surface constrains the potential antiquity of archaeological resources that may be found there. Also, probability must be assessed in terms of the extent of historic and modern development that may have previously disturbed or destroyed prehistoric archaeological site deposits.

Montana

No standardized or widely accepted site-location predictive or probability model for the presence of prehistoric sites exists for the Montana. Only a small fraction of the northern border area of Montana has been previously inventoried and evaluated for prehistoric sites. Actual numbers of recorded sites and previous project survey boundaries exist in the Montana State Historical Preservation Office (SHPO) database, but exact numbers of cultural resources are not available

for this overview. It is estimated that at least 1,000 prehistoric/precontact sites have been recorded within 100 miles of the Montana-Canada border. Most of the project area in Montana is sparsely populated, so the probability of finding intact precontact sites is very high.

4.11.2.3 Historic Context

This section provides a brief historic context that describes the development of the WOR Region after European contact. An expanded historic context and references can be found in Appendix H.

Contact between Indigenous people and Europeans began in the late 1500s along the West Coast of what is now the United States with the infrequent arrival of adventurous explorers. Sustained interactions only began during the middle of the eighteenth century as Russian, Spanish, and English settlers arrived to establish communities near water resources in the region. The United States began exploring the region after 1805 with the expedition of Meriwether Lewis and William Clark. After 1805, the Pacific Fur Company tried to compete in the fur trade by establishing an overland system of posts combined with a maritime trading network, but the War of 1812 damaged their interests. The United States claimed an area comprising present-day Oregon, Washington, Idaho, western Montana, and most of British Columbia as American territory from 1810 to the 1840s. However, the area was jointly claimed by the United States and Great Britain from 1818 to 1846 by the Anglo-American Convention of 1818. In 1846, the 49th parallel was established by the Oregon Treaty as the boundary between the United States and Canada.

The Oregon Territory was established in 1848 and included all of the land in the WOR Region. Territorial population grew, although few were drawn away from the coast to the interior. From the 1840s, waves of settlers were drawn to the region by the area's rich mineral wealth. Gold was the earliest draw, but later iron, silver, copper, lead, and bauxite became sought-after commodities. By the end of the Civil War, mining and agricultural communities had been established throughout the region. Improvements in transportation became the major determinant of growth, as settlements first developed along Indian trails and waterways. Settlement expanded as the Federal Government and mining companies carved roads from the countryside. Later, railroads were constructed in the region and remained important until after World War II.

Several land acts were passed to encourage settlement, and the Timber and Stone Act of 1878 and the Forest Homestead Act of 1906 were widely used for claims in heavily timbered areas. Settlers also purchased property from the railroads, which advertised and sold portions of their grants, or in later years from lumber companies that offered cheap, cut-over lands (McLaughlin, 1994). Mining and timbering were the predominant industries, and both experienced cycles of booms and busts into the twentieth century. The emergence of irrigation transformed other parts of the semi-arid interior. Apples, cherries, and other fruit trees thrived on irrigated lands. The construction of the Grand Coulee Dam (1942) led to the development of the Columbia Basin Project, an ambitious effort to irrigate more than one-half million arid acres for alfalfa, sugar beets, potatoes and a variety of other crops. Near the Idaho-Washington border, the Rathdrum Prairie was also irrigated for agricultural production, although financed by several private ventures.

During the twentieth century the leading cities within the PEIS project area — Seattle, Tacoma, and Spokane, Washington — initiated most of the economic activity in the region, serving as labor pools, trade and transportation centers, and the principal markets for the rest of Washington and northern Idaho.

4.11.2.4 Historic/Protohistoric Archaeological Site Probability

Among the known cultural resources in the WOR Region are archaeological sites from the historic and post-European contact periods. This section provides an overview of the current understanding of historic archaeological site probability in the WOR Region. This section includes the Protohistoric period (defined as the time between the initial arrival of European goods and diseases and actual contact between Native Americans and non-Natives), which extended from about A.D. 1700 to A.D. 1810. Items including guns and horses were quickly integrated into indigenous economic and subsistence systems.

The earliest direct contacts between Native Americans and Europeans in the Northwest were interactions between groups of coastal Indians and Spanish and British explorers in the late 1700s. Later, after the 1805 Lewis and Clark expedition, American involvement in the area intensified. The first fifty years of the contact period in the area primarily involved interaction between Native American groups and non-Native fur traders and Christian missionaries.

Washington and Idaho

Washington and Idaho have not developed statewide predictive models for historic archaeological site probability, but review of previously recorded sites suggests that the most sensitive areas for historic archaeological sites are very similar to those for prehistoric sites. Coastal and river-valley features and particularly protected bays, river terraces, and alluvial fans continued to be common occupation sites in the historic period. Early settlement focused on these types of areas where fertile soils, water supplies, and easy access made subsistence easier. Generous land laws in the nineteenth century also encouraged land development in more remote areas, as did reclamation efforts, but proximity to water and transportation routes continued to be major determinants of settlement. Early trails and roads often followed routes initially used by Native Americans and could be found along ridgelines and through mountain passes.

Montana

Like Washington and Idaho, western Montana has no standardized or widely accepted site-location predictive or sensitivity model for historic archaeological sites. Only a small fraction of the northern border area of Montana has been previously inventoried and evaluated for historic-period cultural sites. Actual numbers of recorded sites and previous project survey boundaries exist in the Montana SHPO database, but exact numbers of cultural resources are not readily available for this overview. It is estimated that at least 100 historic-period archaeological sites are recorded within 100 miles of the western Montana-Canada border.

In general for the entire area, historic archaeological sites can occur in or near present-day municipalities and villages as well as along historic-period roads, particularly cross-roads. Sites may also be found along certain railway sections and waterways.

4.11.2.5 Above-Ground Historic Properties

There are numerous above-ground historic properties in the WOR border area that are National Register listed or eligible or potentially eligible for listing. The highest densities are located in the western third of Washington State. During the Contact and Exploration period (mid-1700s to mid-1800s) in the inland areas of Washington and northern Idaho, early traders often followed well-established overland routes and interacted with Native peoples of the region, sometimes establishing semi-permanent occupation sites that could include cabins as well as caches and storage structures. During this period, any building construction most likely consisted of logs either laid horizontally or in the Hudson's Bay Style with vertical log posts and horizontal log infill mortised to uprights. Property types relating to early exploration of the region include both temporary camps that would likely have only archaeological components and semi-permanent occupation sites that may consist of above-ground contributing resources such as caches, sheds, or wooden shelters.

In the frontier period, fur-trade companies erected a number of forts and smaller outposts to conduct the trade and provide a base of operations for employees. Missionaries sometimes built mission complexes at strategic locations. Semi-permanent and permanent-occupation sites are property types that could include forts, trading posts, cabins, and missions as well as associated storage, domestic, and food-processing structures. The North American Boundary Commission's survey (1858–1862) was a joint U.S.-Great Britain expedition formed after the Oregon Treaty of 1846 to determine the location of the 49th parallel and mark the border. Property types associated with the expedition include temporary camp sites as well as markers, stone cairns, and other transportation features.

The development of various transportation networks brought new settlement to Washington and Idaho and ultimately encouraged the growth of industry and commerce as improved water routes, roads, and rail lines connected the region to the outside world. These property types correspond to travel by water, land, and air. Agricultural property types reflect the environmental and geographic conditions that dictate the kinds of farming, grazing, or other agricultural activities taking place in a specific area. Agricultural property types include animal husbandry, grazing, and crop-production properties as well as storage, processing, and maintenance facilities. Among the prominent features of animal-related agricultural properties are barns, corrals, birthing sheds, and small-animal pens. Grazing properties may include stock driveways, holding pens and chutes, fencing and pastures, and salting areas. Contributing to crop-related properties are fields, orchards, gardens, and fences. Storage properties are represented by barns, hay sheds, silos, granaries, and milk houses, while smokehouses and stills are examples of common processing properties. In addition, irrigation systems are a type of agricultural property prevalent in the arid and semi-arid portions of the region; contributing features may include dams, reservoirs, and pump facilities as well as systems of ditches, canals, flumes, and pipes. Many of these agricultural property types may also be associated with domestic buildings and structures such as dwellings, privies, or other outbuildings that frequently characterize small farmsteads or independently run agricultural operations.

The early economies of Washington and Idaho relied on logging and mining as their primary industries, although fish- and grain-processing, concrete manufacturing, and energy production were among a number of other industries that made use of the region's rich natural resources. Properties for each of these industries can be related to extraction, processing, maintenance,

storage, and manufacture. A number of coastal cities and Spokane in the interior became commercial centers not only for regional but also international trade. Towns of all sizes developed commercial districts that provided retail, supply, and storage facilities. Historic property types associated with commerce and trade include retail, wholesale, and professional properties as well as organizational and storage facilities.

Early settlement in Idaho and Washington (1820s) focused on river drainages and coastal lowlands, but generous land laws also encouraged claims in more remote areas. Early dwellings were often built as a requirement for “proving up” on these properties. Many towns grew on transportation routes or were built by companies for their workers, and as cities grew, neighborhood development was often based on a variety of socio-economic factors. Domestic property types along the northern border include single-family and multiple-occupancy dwellings, hotels, institutional housing, and camps.

A small fraction of the WOR area has been previously inventoried and evaluated for historic structures. Actual numbers of recorded above-ground historic properties and previous project survey boundaries exist in SHPO databases and files, but exact numbers of cultural resources are not readily available for this overview. As is the case with other site types in the project area, there is a high probability of discovering previously unrecorded and significant above-ground historic properties that will meet the criteria for listing in the National Register.

Tables 4.11-1, 4.11-3, and 4.11-4 identify historic properties that have been designated as historically important at the national, state, and local levels and briefly describe the historic environments in the vicinity of CBP facilities in the WOR area of study. Tables 4.11-2 and 4.11-5 list the historic buildings located on CBP properties.

Table 4.11-1. Cultural Resources in the Vicinity of CBP Facilities in Montana

Component*	Type**	Name	Address	National, State, and Local Historical Designations and Environment
OFO	POE	Del Bonita (East of the Rockies)	4071 Chalk Butte Road Cut Bank, MT 59427	City; county seat; end of the Cherokee Trail or Rocky Mountain Trail; location of Captain Meriwether Lewis skirmish with Blackfeet in the vicinity; no National Register properties in the vicinity
OFO	POE	Piegan (East of the Rockies)	4999 Highway 89 North Babb, MT 59411	Small community on the Blackfeet Reservation; Piegan Border station and Quarters and the Chief Mountain Border station and Quarters are both National Register properties; one National Register district in the vicinity
OFO	POE	Roosville	7915 Highway 93 North Eureka, MT 59917	Small town; two National Register properties in the vicinity
USBP	BPS	Shelby	25 Airport Road Shelby, MT 59474	City; three National Register properties in the vicinity

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Component*	Type**	Name	Address	National, State, and Local Historical Designations and Environment
USBP	BPS	Sainte Mary (EOR)	4999 US Highway 89 Babb, MT 59411	See previous description for the Piegan POE
OFO	POE	Sweetgrass Area (EOR)	39825 Interstate 15 Sweetgrass, MT 59484	Small community; U.S. Customs Building is a National Register property; no other listings in the vicinity
USBP	BPS	Eureka	7695 Airport Road Eureka, MT 59917	See previous description for the Roosville POE
USBP	BPS	Whitefish	1295 Highway 93 West Whitefish, MT 59937	City; three National Register properties in the vicinity

*OFO = CBP Office of Field Operations, OAM = CBP Office of Air and Marine, USBP = U.S. Border Patrol

**POE = Port of Entry, BPS = Border Patrol station

Table 4.11-2. Historic Buildings on CBP Property in Montana

Building Name	Type	City	Number	Year Finished	Rating Class*
Chief Mountain Border station	Border station	Babb (EOR)	MT0501AD	1939	National Register Listed
Chief Mountain Border Station Pump House	Other	Babb (EOR)	MT0503AD	1939	Not rated
Chief Mountain Border Station Garage	Garage	Babb (EOR)	MT0502AD	1939	Not rated
Piegan Border Station Apartment Complex	Border Station	Babb (EOR)	MT0551AE	1933	5a
Roosville Border Station Residence Customs	Residence	Eureka	MT0703AG	1933	5a
Roosville Border Station Residence Immigration	Residence	Eureka	MT0702AG	1933	5a
Roosville Border Station	Border Station	Eureka	MT0701AG	1933	5a

Source: USGSA, 1999; Appendix C, GSA Historic Buildings.

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*GSA Historic Rating Class 5a: A building 50-yearsold or older that has not been evaluated for National Register eligibility but is likely eligible, such as a courthouse, custom house, or historic office building (“Held in Public Trust” Appendix C; see footnote above).

Table 4.11-3. Cultural Resources in the Vicinity of CBP Facilities in Idaho

Component*	Type**	Name	Address	National, State, and Local Historical Designations and Environment
OFO	POE	Eastport	Highway 95 North at the Border Eastport, ID 83826	Rural community; Two National Register properties in the vicinity
OFO	POE	Porthill	Highway 1 at the Border Porthill, ID 83853	Rural community; no National Register properties in the vicinity
USBP	BPS	Bonnors Ferry	7167 First Street Bonnors Ferry, ID 83805	Small city; county seat, situated on south bank of Kootenai River; Six National Register properties in the vicinity
USBP	BPS	Twin Falls	2496 Addison Avenue East Twin Falls, ID 83301	City; county seat; oldest dated artifacts in North America found at excavations at nearby Wilson Butte Cave; 4 National Register districts; 15 National Register properties in the vicinity

*OFO = CBP Office of Field Operations, USBP = U.S. Border Patrol

**POE = Port of Entry, BPS = Border Patrol station

Table 4.11-4. Cultural Resources in the Vicinity of CBP Facilities in Washington

Component*	Type**	Name	Address	National, State, and Local Historical Designations and Environment
OFO	POE	Blaine	9901 Pacific Highway Blaine, WA 98230	City; Three historic and one prehistoric National Register properties in the vicinity
OFO	POE	Pacific Highway Crossing	WSR 543 (I-5), Blaine, WA 98230	See description for Blaine above.
OFO	POE	Peace Arch	WSR 543 (I-5), Blaine, WA 98230	The Peace Arch is National Register listed
OFO	POE	Longview	1450 Terminal Way Longview, WA 98631	City (on confluence of Cowlitz and Columbia Rivers); 21 National Register properties and 1 state-listed property in the vicinity; Longview built on location of Mount Coffin, a Native American burial ground.
OFO	POE	Seattle	1000 Second Avenue Seattle, WA 98104	City (largest in Washington and Pacific Northwest); 6 National Register districts; 150+ National Register properties; 4 state-listed Historic Districts/Blocks; 76 state-listed properties in the vicinity
OFO	POE	Sumas	103 Cherry Street Sumas, WA 98295	Small town; U.S. Border Station at Sumas is National Register listed; no other National Register properties in the vicinity; One state-listed property in the vicinity

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Component*	Type**	Name	Address	National, State, and Local Historical Designations and Environment
OFO	POE	Tacoma	2202 Port of Tacoma Road Tacoma, WA 98421	Mid-sized urban port city; 5 National Register districts; 87 National Register properties; 1 state-listed historic district not on National Register; 22 state-listed properties not on National Register in the vicinity
USBP	BPS	Sumas	9648 Garrison Road Sumas, WA 98295	See previous description for the Sumas POE.
USBP	BPS	Port Angeles	138 West 1 st Street Port Angeles, WA 98263	City (on northern edge of Olympic Peninsula); 11 National Register properties in the vicinity; 8 state-listed properties not on National Register including P'e'nis Clallam Indian Village in the vicinity
USBP	Sector HQ	Blaine	1580 H Street Blaine, WA 98230	See previous description for the Blaine POE.
OAM	Air Facility	Blaine	1580 H Street Blaine, WA 98230	See previous description for the Blaine POE.
USBP	BPS	Bellingham	2745 McLeod Road Bellingham, WA 98225	City (12 th largest in the state, situated on Bellingham Bay); county seat; 2 National Register districts; 36 National Register properties; 8 state-listed historic properties not on National Register in the vicinity
USBP	BPS	Metaline Falls	105 Highway 31 Metaline, WA 99152	Very small town; no National Register properties in the vicinity
USBP	BPS	Oroville	1105 Main Street Oroville, WA 98844	Small city; Enloe Dam and Power plant are National Register properties; One other National Register property in the vicinity
USBP	BPS	Colville	209 East Juniper Colville, WA 99114	Small city; county seat; founded near Fort Colville (1825) and later fort named the same (1859); Nine National Register properties in the vicinity; One state-listed historic property not on National Register
USBP	BPS	Curlew	5 Forest Lane Curlew, WA 99118	Rural community at confluence of Long Alec Creek & Keller River; Three National Register properties in the vicinity
USBP	Sector HQ	Spokane	10710 N. Newport Highway Spokane, Washington 99218	Large city (located on Spokane River); county seat; approximately 20 National Register districts and blocks; 80+ National Register properties; 2 state-listed Historic Districts/Blocks not on National Register; 12 state-listed properties not on National Register in the vicinity

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Component*	Type**	Name	Address	National, State, and Local Historical Designations and Environment
OAM	Air Facility	Spokane	10710 N. Newport Highway Spokane, Washington 99218	See description for Spokane above.

*OFO = CBP Office of Field Operations, USBP = U.S. Border Patrol, OAM = CBP Office of Air and Marine

**POE = Port of Entry, BPS = Border Patrol station

Table 4.11-5. Historic Buildings on CBP Property in Washington

Building Name	Type	City	Number	Year Finished	Rating Class*
U.S. Border Station & Quarters, Curlew, WA	Border station	Curlew	WA0551FB	1937	5a
U.S. Border Station, Laurier, WA	Border station	Laurier	WA0601LB	1936	
U.S. Border Station, Metaline Falls, WA	Border station	Metaline Falls	WA0611MB	1932	National Register Listed
U.S. Border Station Residence, Laurier, WA	Residence	Laurier	WA0603LB	1936	
U.S. Border Station Residence, Laurier, WA	Residence	Laurier	WA0602LB	1936	
U.S. Border Station Residence #1, Metaline Falls, WA	Residence	Metaline Falls	WA0612MB	1932	
U.S. Border Station Residence #2, Metaline Falls, WA	Residence	Metaline Falls	WA0613MB	1932	
U.S. Port of Entry/Point Roberts Border Station, Point Roberts, WA	Border station	Point Roberts	WA0119ZZ	1997	
U.S. Border Station, Oroville, WA	Border station	Oroville	not assigned	1933	Not rated

Source: USGSA, 1999; Appendix C, GSA Historic Buildings.

*GSA Historic Rating Class 5a: A building 50-years-old or older that has not been evaluated for National Register eligibility but is likely eligible, such as a courthouse, custom house, or historic office building (“Held in Public Trust” Appendix C; see footnote above).

4.11.2.6 Native American Cultural Resources

This section provides information about the potential location of Native American cultural resources, sacred sites, and traditional cultural properties (TCPs) in the WOR Region, based on the geographic location of Native Americans both historically and in the present. There are 33 tribal groups within the WOR area (Table 4.11-6). Twenty-five of these Tribes have reservations within the WOR study area (Figure 4.11-1).

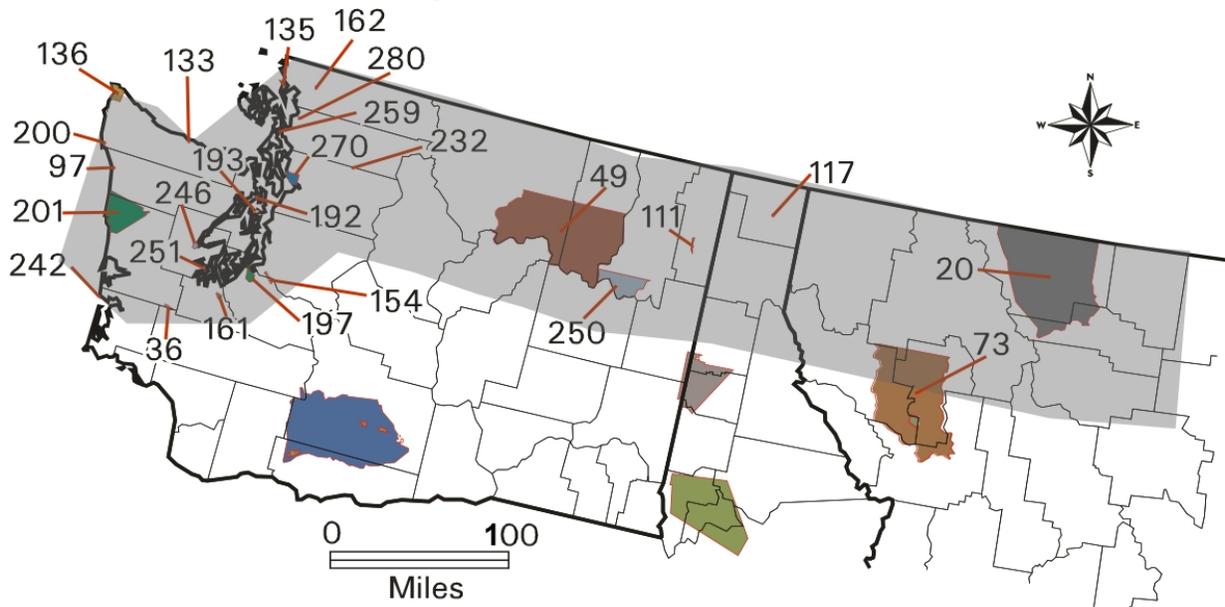
Table 4.11-6. Native-American Tribes That Have a Reservation, Judicially Established Interest, or Established Traditional Ties to Land within the 100-mile PEIS Corridor

Blackfeet Tribe of the Blackfeet Indian Reservation of Montana	Port Gamble Indian Community of the Port Gamble Reservation
Coeur D'Alene Tribe of the Coeur D'Alene Reservation	Puyallup Tribe of the Puyallup Reservation
Confederated Salish & Kootenai Tribes of the Flathead Reservation	Quileute Tribe of the Quileute Reservation
Confederated Tribes of the Chehalis Reservation	Quinault Tribe of the Quinault Reservation
Confederated Tribes of the Colville Reservation	Samish Indian Tribe
Confederated Tribes and Bands of the Yakama	Sauk-Suiattle Indian Tribe of Washington
Cowlitz Indian Tribe	Shoalwater Bay Tribe of the Shoalwater Bay Indian Reservation
Hoh Indian Tribe of the Hoh Indian Reservation	Skokomish Indian Tribe of the Skokomish Reservation
Jamestown S'Klallam Tribe of Washington	Snoqualmie Tribe
Kalispel Indian Community of the Kalispel Reservation	Spokane Tribe of the Spokane Reservation
Kootenai Tribe of Idaho	Squaxin Island Tribe of the Squaxin Island Reservation
Lower Elwha Tribal Community of the Lower Elwha Reservation	Stillaguamish Tribe of Washington
Lummi Tribe of the Lummi Reservation	Suquamish Indian Tribe of the Port Madison Reservation
Makah Indian Tribe of the Makah Indian Reservation	Swinomish Indians of the Swinomish Reservation
Muckleshoot Indian Tribe of the Muckleshoot Reservation	Tulalip Tribes of the Tulalip Reservation
Nisqually Indian Tribe of the Nisqually Reservation	Upper Skagit Indian Tribe of Washington
Nooksack Indian Tribe of Washington	

The following maps indicate federally recognized Tribes that have a reservation within approximately 100 miles of the Canadian border, have a judicially established connection to land within the 100-mile corridor, or have established traditional ties that may involve traditional cultural properties or archaeological sites. The maps include:

1. A map of Indian reservations located within the 100-mile corridor (Figure 4.11-1);
2. A USGS map showing nineteenth-century cessions, reservations, and portages (Figure 4.11-2). This map was retrieved from ancestry.com; while the sourcing is unclear, the accuracy is corroborated by a 1992 map compiled by the Bureau of Indian Affairs and a 1998 GIS layer created by USGS (not included). The map shows Tribes that had a presence along the northern border 100 years ago and indicates cases where Indian lands were ceded prior to that period;
3. A USGS map showing judicially established Indian land areas as of 1978 (Figure 4.11-3). The map portrays the results of cases before the U.S. Indian Claims Commission or U.S. Court of Claims in which an American Indian Tribe proved its original tribal occupancy of a tract within the continental United States; and,
4. A USGS map indicating early tribal, cultural, and linguistic areas (Figure 4.11-4). The information was derived from anthropological, archaeological, and linguistic studies. The map generally corroborates the other maps with regard to traditional tribal areas.

Figure 4.11-1. Native American Lands within the 100-mile PEIS Corridor Crossing Washington, Idaho, and Western Montana



Key to Figure 4.11-1					
			200	Quileute Tribe of the Quileute Reservation	
20	Blackfoot Tribe of the Blackfoot Indian Reservation of Montana	135	Lummi Tribe of the Lummi Reservation	201	Quinault Tribe of the Quinault Reservation
36	Confederated Tribes of the Chehalis Reservation	136	Makah Indian Tribe of the Makah Indian Reservation	232	Sauk-Suiattle Indian Tribe of Washington
49	Confederated Tribes of the Colville Reservation	154	Muckleshoot Indian Tribe of the Muckleshoot Reservation	242	Shoalwater Bay Tribe of the Shoalwater Bay Indian Reservation
73	Confederated Salish & Kootenai Tribes of the	161	Nisqually Indian Tribe of the Nisqually Reservation	246	Skokomish Indian Tribe of the Skokomish Reservation

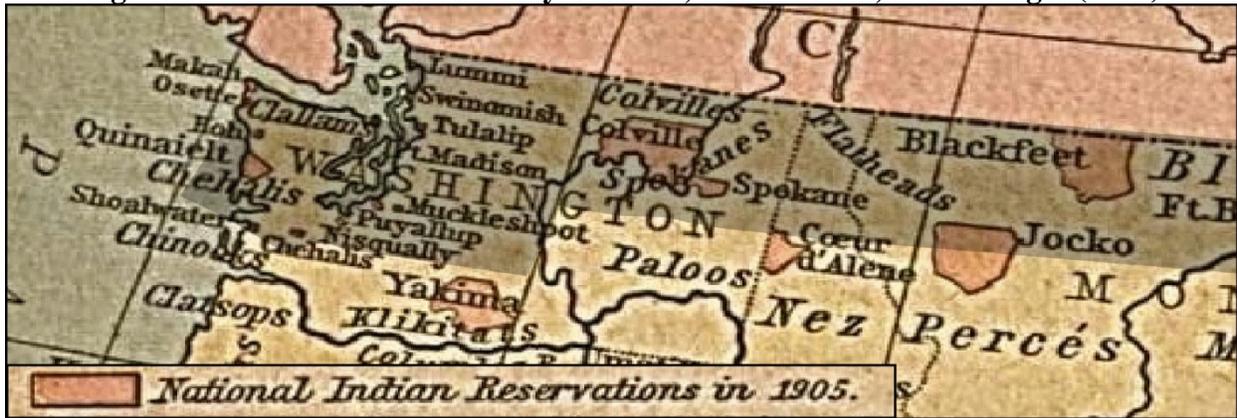
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	Flathead Reservation				
97	Hoh Indian Tribe of the Hoh Indian Reservation	162	Nooksack Indian Tribe of Washington	250	Spokane Tribe of the Spokane Reservation
111	Kalispel Indian Community of the Kalispel Reservation	192	Port Gamble Indian Community of the Port Gamble Reservation	251	Squaxin Island Tribe of the Squaxin Island Reservation
117	Kootenai Tribe of Idaho	193	Suquamish Indian Tribe of the Port Madison Reservation	259	Swinomish Indians of the Swinomish Reservation
133	Lower Elwha Tribal Community of the Lower Elwha Reservation	197	Puyallup Tribe of the Puyallup Reservation	280	Upper Skagit Indian Tribe of Washington

Source: (USDOJ, 2010).

Note: A shaded 100-mile corridor has been added.

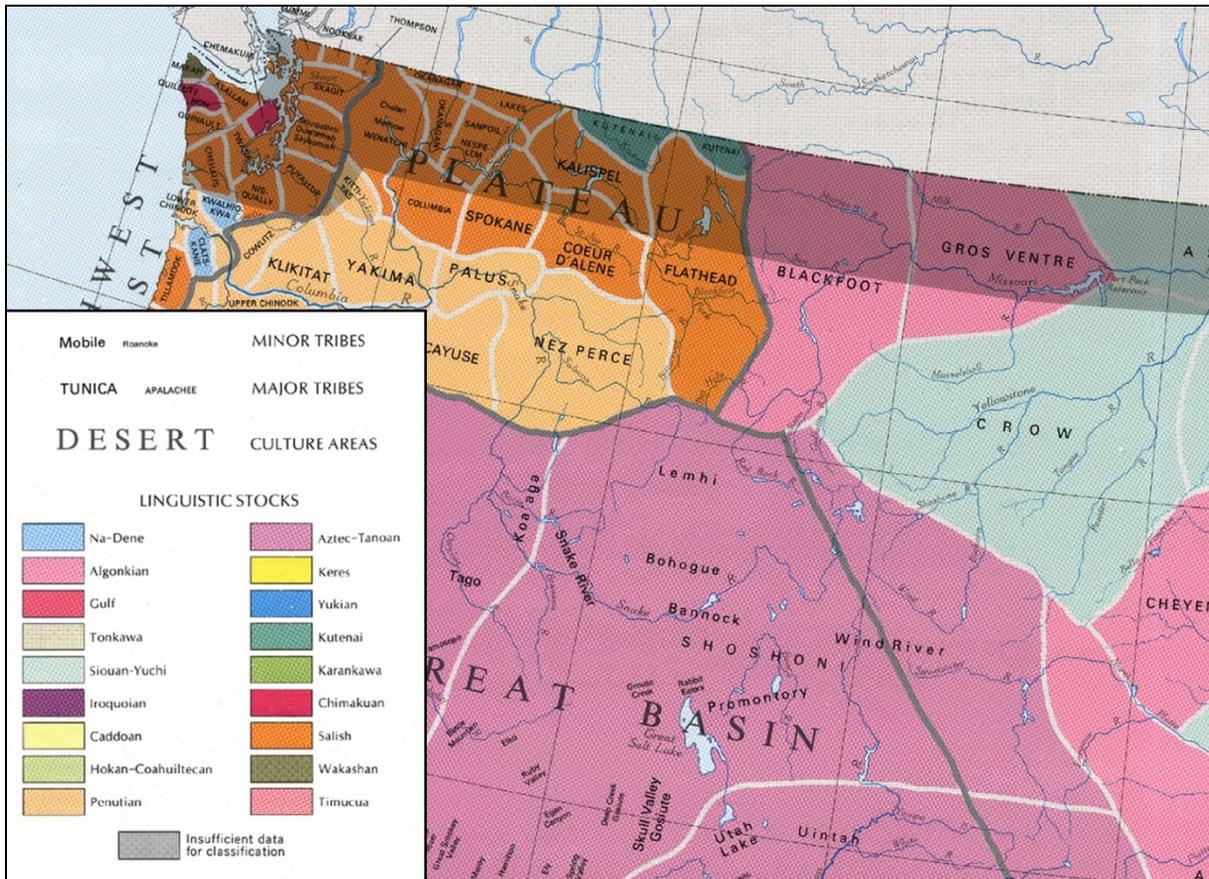
Figure 4.11-2. Nineteenth-Century Cessions, Reservations, and Portages (1907)



Source: (Ancestry.com, No Date).

Note: A shaded 100-mile corridor has been added.

Figure 4.11-4. Early Tribal, Cultural, and Linguistic Areas



Source: (USDOI, 1991).

Note: A shaded 100-mile corridor has been added.

4.11.2.7 Paleontological Resources

As with archaeology, paleontologists use a variety of information and techniques to carry out predictive modeling, the process of assessing the probability of existence of paleontological sites in a given location. This section provides an overview of the current understanding of paleontological site probability in the WOR Region. An expanded discussion of paleontological resources and references can be found in Appendix H.

Within the study area, four major geological groups were identified: sedimentary, volcanic, plutonic, and metamorphic. Of these rock groups, only sedimentary rocks have a high or moderate potential for containing paleontological materials. Both plutonic and volcanic rocks rarely contain fossils because igneous environments are not suitable for living things. Metamorphic rocks rarely contain fossils because the conditions of metamorphism tend to alter the texture of the rocks and destroy any fossils contained within.

Washington

Paleontological-sensitive geological units in Washington include Precambrian rocks, Paleozoic sandstone, shale, limestone from ancient shorelines, and Mesozoic deep and shallow marine

sediments. Cenozoic deposits include shallow marine sandstone and siltstone as well as glacial deposits containing large-vertebrate fossils.

Idaho

Paleontologically sensitive geological units in Idaho include Precambrian, Paleozoic, Mesozoic, and Cenozoic deposits. Precambrian deposits contain stromatolites (formed in shallow water) and trace fossils. Paleozoic deposits are terrestrial and marine and represent fluctuating sea levels. Mesozoic deposits are shallow, marine sedimentary rocks. Cenozoic deposits consist of lake and river deposits as well as retreating glacial deposits containing large-vertebrate fossils.

Montana

Paleontologically sensitive geological units in Montana consist predominantly of Precambrian, Cretaceous, and Tertiary sedimentary units. Precambrian sedimentary units include shallow sea stromatolites and trace fossils. Paleozoic deposits are from warm and shallow marine waters that created a thin blanket over almost all of Montana. Mesozoic deposits are of terrestrial and tropical marine origin. The Cenozoic marks the retreat of the ocean and the onset of a colder period. Deposits from the Cenozoic thus range from tropical shallow seas to glacial deposits.

4.12 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

4.12.1 INTRODUCTION

Executive Order (EO) 12898 of February 11, 1994 (EO 12898, 1994), titled “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires that each Federal agency identify and address any disproportionately high and adverse effect of its programs, policies, and activities on minority and low-income populations. The USEPA defines *environmental justice* as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (USEPA, 2010).

EO 13045 of April 21, 1997 (EO 13045), titled “Protection of Children from Environmental Health Risks and Safety Risks,” places a high priority on the identification and assessment of environmental health and safety risks that may disproportionately affect children. The order requires that each agency “ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks.” EO 13045 considers that physiological and social development of children makes them more sensitive than adults to adverse health and safety risks and recognizes that children in minority, low-income, and indigenous populations are more likely to be exposed to, and have increased health risks from, environmental contamination than the general population (USEPA, 2010).

4.12.2 AFFECTED ENVIRONMENT

This section describes the affected environment for the assessment of potential environmental-justice effects that could result from implementation of any of the CBP program alternatives in the WOR Region. The affected environment section identifies and describes minority and low-income populations, as well as populations of children that may be present in the defined study area and that may be differentially affected by actions proposed under each of the alternatives considered in this PEIS.

The study area for the evaluation of environmental justice effects is defined—in accordance with Section 4.10, Socioeconomic Resources—as the border communities in both the United States and Canada within 100 miles of the U.S.-Canada border. The U.S. portion of this study area (WOR Region) includes the border communities in the states of Washington, Idaho, and Montana west of the Continental Divide. The study area north of the WOR Region in Canada includes the border communities in the Province of British Columbia. For comparison purposes, the analysis also includes the population(s) of the respective border states and Canadian province as a whole. Border communities are defined geographically by the administrative boundaries of U.S. counties and Canadian census divisions contained within or overlapping the study area. A detailed demographic analysis of the study area is in Section 4.10.

4.12.2.1 Minority Populations

The most recent USCB data for minority populations available for all counties and states in the United States are part of the Decennial Census for the year 2000 (USDOC, 2000a). Statistical data from this census have been used to characterize the minority populations within the WOR

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Region. Summary statistics for minority populations in the WOR Region, their respective states, and the Nation are presented in Table 4.12-1.

For individual states within the region, the minority percentage of the population in the border communities is lower than, or roughly equal to, the minority component of the respective state population. Populations in the category of Asian, Native Hawaiian, Pacific Islander, and Other constitute the largest single minority identification within the border communities. These populations represent a slightly higher percentage of the study-area population than for the combined population of the three states that make up the WOR Region.

**Table 4.12-1. Minority Statistics for the WOR Region
(Percent of Population)**

Border State/Region*		White	Black or African American	American Indian and Alaska Native	Asian, Native Hawaiian, Pacific Islander, Other	More Than One Group	Hispanic Origin**
Idaho	WOR Region	95.8	0.2	1.2	1.1	1.8	2.2
	Statewide	90.9	0.4	1.4	5.2	2.1	7.9
Montana	WOR Region	92.2	0.1	4.5	1.2	2.0	1.7
	Statewide	90.6	0.3	6.1	1.1	1.9	2.0
Washington	WOR Region	81.6	3.6	1.5	9.2	4.1	5.7
	Statewide	81.7	3.1	1.5	9.7	3.9	7.5
WOR Region Total	WOR Region	82.6	3.3	1.6	8.6	3.9	5.4
	Selected States	84.2	2.4	2.0	8.0	3.4	6.9
Total United States		75.1	12.2	0.9	9.2	2.6	12.5

Source: (USDOC, 2000a).

*Statistics presented in the unshaded rows include only those portions of the states that lie within the study area; this includes all counties overlapping the area within 100 miles south of the border.

**Hispanic origin is an ethnicity that may include individuals who are also represented in other categories (such as White or Black). Therefore, Hispanic origin is a separate measure and is calculated separately from the other categories.

Data on minority populations north of the WOR Region in Canada were taken from the 2006 Census of Canada (Table 4.12-2). For British Columbia, minority populations constitute 26.6 percent of the total population of the border communities. This is somewhat higher than the 24.8 percent minority population of the province as a whole and substantially higher than the 16.2 percent visible minority population of Canada as a whole.

The “Other Visible Minority” population (including multiple ethnicities) constitutes the largest single minority category in both the study area and the Province of British Columbia. This category consists primarily of the following groups: Chinese, South Asian, Arab, West Asian, Filipino, Southeast Asian, Latin American, Japanese, and Korean. However, Aboriginal Peoples constitute the largest single identifiable minority within this study area.

Table 4.12-2. Visible Minority Statistics North of the WOR Region in Canada* (Percent of Population)

Border Province**		Not a Visible Minority	Black	Other Visible Minority* **	Two or More Visible Minorities	Aboriginal Peoples****
British Columbia	North of the WOR Region	73.4	0.7	25.2	0.7	3.6
	Province	75.2	0.7	23.4	0.6	4.8
Total Canada		83.8	2.5	13.3	0.4	3.8

Source: (StatCan, 2006a).

*Canada’s Employment Equity Act (2005) defines *visible minorities* as “persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in color.”

**Statistics presented in the unshaded row account only for those portions of the province that lie within the study area; this includes all census divisions overlapping the area within 100 miles north of the border.

***The “Other Visible Minority” population consists mainly of the following groups: Chinese, South Asian, Black, Arab, West Asian, Filipino, Southeast Asian, Latin American, Japanese, and Korean.

****Self-identification by Aboriginal Peoples does not preclude self-identification inclusion in one of the other categories. The “Aboriginal Peoples” column of this table is, therefore, not additive with the other columns.

4.12.2.2 Low-Income Populations

Data from the most recently completed USCB (USDOC, 2000b; USDOC, 2000c) were used to characterize low-income minority populations in the WOR Region. Median household income and poverty rates are in Table 4.12-3.

For the WOR Region, the median household income is \$4,127 higher than the median for the total U.S. border region and \$5,081 higher than the median for the Nation as a whole. However, in both Idaho and Montana, the median household income in the WOR Region is lower than that for the state as a whole. Median income for the border communities in Washington is \$1,565 higher than the statewide median.

For the state of Washington, individuals at or below the poverty line in the border communities represent a smaller percentage of the population, 9.9 percent, than for either the state or the Nation as a whole. Poverty rates for the Montana portion of the WOR study area are slightly higher, 0.5 percent, than for the state as a whole, but substantially higher, 2.7 percent, than the percentage for the national population. Poverty rates for the Idaho segment of the WOR study area are also slightly higher than for the state but comparable to national levels.

Table 4.12-3. Income and Poverty Statistics for the WOR Region

Border State/Region*		Median Household Income** (\$)	Percent of Population Below the Poverty Line
Idaho	WOR Region	44,906	12.4
	Statewide	47,465	11.8
Montana	WOR Region	41,353	15.1
	Statewide	41,720	14.6
Washington	WOR Region	59,394	9.9
	Statewide	57,829	10.6
WOR Region Total	WOR Region	58,132	10.2
	Selected States	54,375	11.2
Total United States		53,051	12.4

Source: (USDOC, 2000b; USDOC, 2000c).

*Statistics presented in the unshaded rows include only those portions of the states that lie within the study area; this includes all counties overlapping the area within 100 miles south of the border.

**Median household income is reported from the 2000 USCB in inflation-adjusted 2009 U.S. dollars.

Data on median household income and populations living below the poverty level north of the WOR Region in Canada were gathered from the 2006 Census of Canada. Statistics for British Columbia are in Table 4.12-4.

The median income for the border communities in British Columbia is \$48,644. This is slightly higher than the median for the province as a whole, but somewhat lower than the national median. Based on the percentage of low-income economic families, the poverty rate for the study area in Canada is approximately 2 percentage points higher than the national rate. However, the study area rate is only slightly higher than the 13.3-percent rate for the province as a whole.

Table 4.12-4. Income and Poverty Statistics North of the WOR Region in Canada

Border Province*		Median Household Income** (\$US)	Percent of Low-Income Economic Families***
British Columbia	North of the WOR Region	48,644	13.6
	Province	48,541	13.3
Total Canada		49,393	11.6

Source: (StatCan, 2006b).

*Statistics presented in the unshaded row include only those portions of the province that lie within the study area; this includes all census divisions overlapping the area within 100 miles north of the border.

**Median household income is reported from the 2006 Canadian Census in inflation-adjusted 2009 U.S. dollars.

***The Canadian Census reports statistics for “low-income” economic families. This threshold-based designation is comparable to the poverty statistics reported in the USCB. An *economic family* is a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law, or adoption. A couple may be of opposite or same sex. Foster children are included.

4.12.2.3 Population of Children Under 18 Years of Age

The distribution of population by age for the WOR Region is provided in Table 4.12-5. Within individual states of the region, both Montana and Washington have smaller percentages of children in the populations of the border communities than is found in the national population. The study area in Washington state has the smallest percentage of children under 18 in its population, 24.9 percent, of any of the three state segments of the study area.

**Table 4.12-5. Age Distribution in the WOR Region
(Percent of Population)**

Border State/Region*		Under 18	18-24	25-34	35-44	45-54	55-64	65+
Idaho	WOR Region	26.5	7.9	11.6	15.6	15.4	10.0	13.0
	Statewide	28.5	10.7	13.0	15.1	13.1	8.3	11.3
Montana	WOR Region	24.6	10.5	11.7	15.8	15.5	9.6	12.3
	Statewide	25.5	9.5	11.4	15.9	14.9	9.4	13.4
Washington	WOR Region	24.9	9.3	14.5	17.0	14.5	8.4	11.3
	Statewide	25.6	9.4	14.2	16.8	14.3	8.4	11.2
WOR Region Total	WOR Region	25.0	9.3	14.2	16.9	14.6	8.5	11.4
	Selected States	26.1	9.7	13.7	16.4	14.2	8.5	11.5
Total United States		25.6	9.6	14.1	16.3	13.4	8.6	12.4

Source: (USDOC, 2000c).

*Statistics presented in the unshaded rows account only for those portions of the states that lie within the study area; this includes all counties overlapping the area within 100 miles south of the border.

The distribution of population by age for the study area north of the WOR Region in Canada is provided in Table 4.12-6. For this study area, children under 20 years of age represent 23.0 percent of the population of the Province of British Columbia. This is a slightly lower percentage than for the province as a whole but noticeably higher than the percentage of children under 20 years of age in the national population. For both the study area and the province as a whole, the percentage of children is slightly more than for the nation as a whole.

**Table 4.12-6. Age Distribution North of the WOR Region in Canada
(Percent of Population)**

Border Province*		Under 20	20-24	25-34	35-44	45-54	55-64	65+
British Columbia	North of the WOR Region	23.0	6.5	12.3	15.3	16.2	12.4	14.4
	Province	23.4	6.5	12.2	15.3	16.2	12.3	14.0
Total Canada		24.7	6.6	12.8	15.3	15.8	11.7	13.0

Source: (StatCan, 2006c).

*Statistics presented in the unshaded row account only for those portions of the province that lie within the study area; this includes all census divisions overlapping the area within 100 miles north of the border.

4.13 HUMAN HEALTH AND SAFETY

4.13.1 INTRODUCTION

Many of the routine activities conducted by CBP in the WOR Region have the potential to affect human health and safety (HH&S). HH&S relates to the health and safety of the general public (including vehicle occupants), CBP and station employees, and maintenance personnel. Safety can also refer to safe operations of aircraft or other equipment. This section considers the potential adverse and beneficial impacts of CBP's alternative actions on HH&S.

4.13.2 AFFECTED ENVIRONMENT

Construction

HH&S concerns during construction and modernizing of facilities involve exposing workers to conditions that pose a health or safety risk. Construction site safety is largely a matter of adherence to regulatory requirements. These regulatory requirements are imposed for the benefit of employees, and they implement operational practices that reduce risks of illness, injury, death, and property damage. The U.S. Occupational Safety and Health Administration (OSHA) issues standards that specify the amount and type of safety training and education required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits with respect to workplace stressors (29 CFR 1910). CBP applies and adheres to these standards in policy and practice.

Routine Operations

Trade and Travel Processing at POEs

The affected environment of agricultural inspections is the inspection location. Agricultural inspections are typically conducted onsite at POEs, but officers sometimes escort the shipment to the receiver site for inspection (USDHS, 2011). Inspections can also take place on the vessel or train transporting cargo into the United States. After inspection, many types of shipments are released to the appropriate agency. This region contains the Blaine POE, the largest port for agricultural products along the northern border, with over two dozen agricultural specialists.

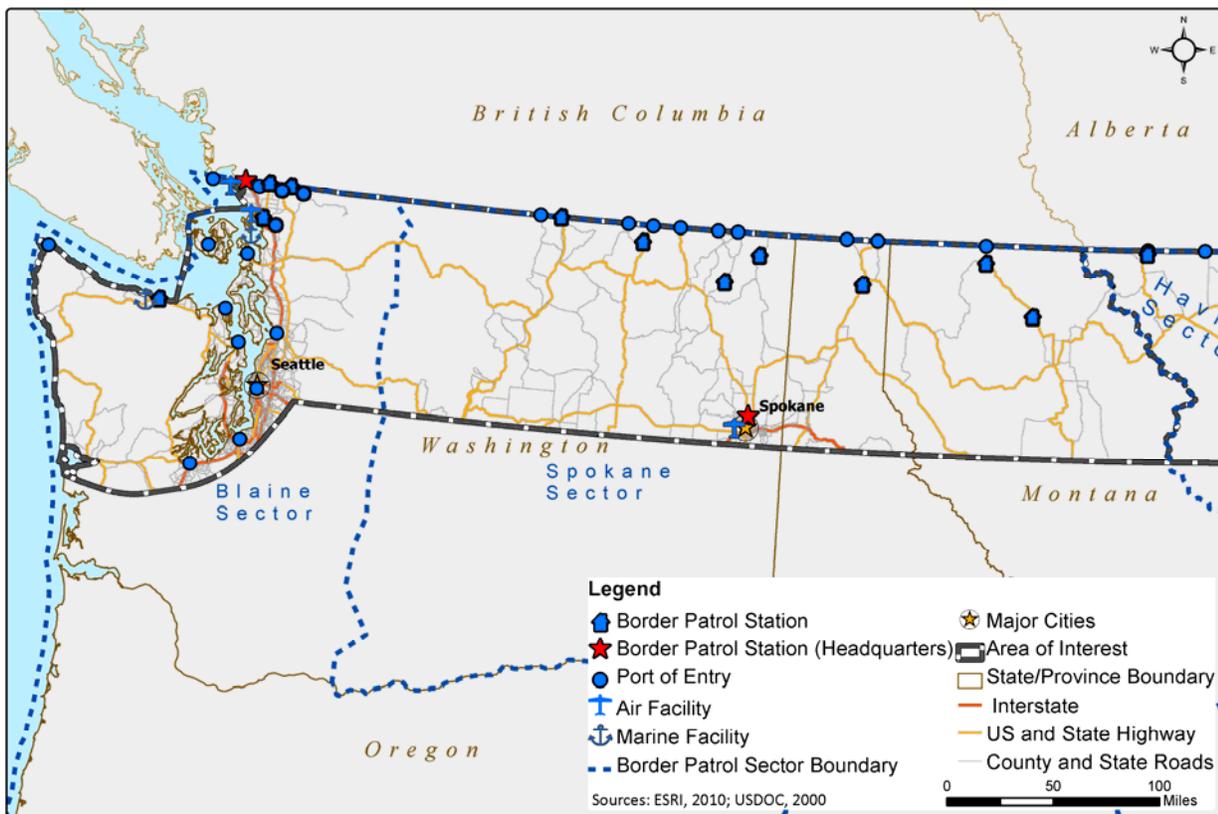
During these interceptions, HH&S effects are possible. Release of nonindigenous diseases into the United States would be harmful to HH&S. To prevent nonindigenous diseases from entering the United States, CBP places bans on certain animals, animal products, and other possible carriers of disease. In 2003 in Canada a positive case of bovine spongiform encephalopathy ("mad cow" disease) touched off an immediate ban on ruminant meat from Canada into the United States. That same year, there was an outbreak of monkey pox in the United States. This outbreak was linked to exotic animals being imported into the United States as pets. A ban was immediately imposed on certain live rodents from Africa, and agricultural specialists still enforce this ban (USDHS, 2004a). Preventing nonindigenous diseases from entering the United States has a beneficial effect on HH&S because it limits the outbreak of disease.

Ground Surveillance and Situational Response Activities

Motorized and Nonmotorized Patrols

Motorized patrols take place on U.S. national, state, county, and local municipalities’ paved roads. Figure 4.13-1 shows U.S. national, state, and county roads that USBP agents can use for motorized patrolling in the WOR Region. In rural areas along the border, USBP agents also use dirt roads for motorized and nonmotorized patrols. Dirt roads along the border region were built to be 24-feet wide, but due to vegetation growth, the roads are now typically less than 10-feet wide (USDHS, 2011). USBP agents also use other Federal agencies’ roads, including roads in national forests and national parks. When possible, the USBP agents remain on existing roads to apprehend cross-border violators but when required, they go off-road. Off-road vehicles and nonmotorized patrols take place off-road and in remote areas along the border.

Figure 4.13-1. U.S., Interstate, State, and County Roads along WOR Northern Border



Aircraft Operations

Manned surveillance patrols are operated between 300 feet above ground level (AGL) and flight level (FL) 250. Aircraft patrols are operated at different heights based on different operational and environmental conditions including weather conditions and high-traffic environments. Manned aerial surveillance patrols are conducted along the WOR border and can be operated out of the Bellingham Air and Marine Branch, Blaine Air Branch, and Spokane Air Branch. These

branches possess different equipment and resources for aerial patrols. In order to fly for CBP, OAM agents must have a Federal Aviation Administration (FAA) issued license (USDHS, 2010a). Accidents during manned aerial surveillance patrols could potentially injure OAM officers or members of the general public.

Unmanned Aircraft Systems (UAS) are remotely piloted aircraft, and patrols can occur along the WOR Region. UASs are operated at 18,000 feet above ground level or higher.

The FAA sets the constraints for where a UAS may operate and how these operations may be conducted safely in the National Airspace System (NAS). Their main focus when evaluating UAS operations in the NAS is to make sure a UAS will not endanger other users of the NAS or compromise the safety of persons or property on the ground.

The FAA recognizes the great potential of UASs in homeland security and strives to accommodate the DHS's needs for UAS operations, without jeopardizing safety. Because airspace is a finite resource, the FAA sets aside Restricted or Prohibited Areas to help mitigate risks. These Restricted or Prohibited Areas are for an operator's exclusive use when needed.

For CBP's UASs to gain access to the civil airspace, CBP must go through the FAA's Certificate of Waiver or Authorization (COA) process. This is the avenue by which public users (Government agencies and Federal, state, and local law enforcement) that wish to fly a UAS can gain access to the NAS, provided that the risks of flying the UAS in the civil airspace can be appropriately mitigated.

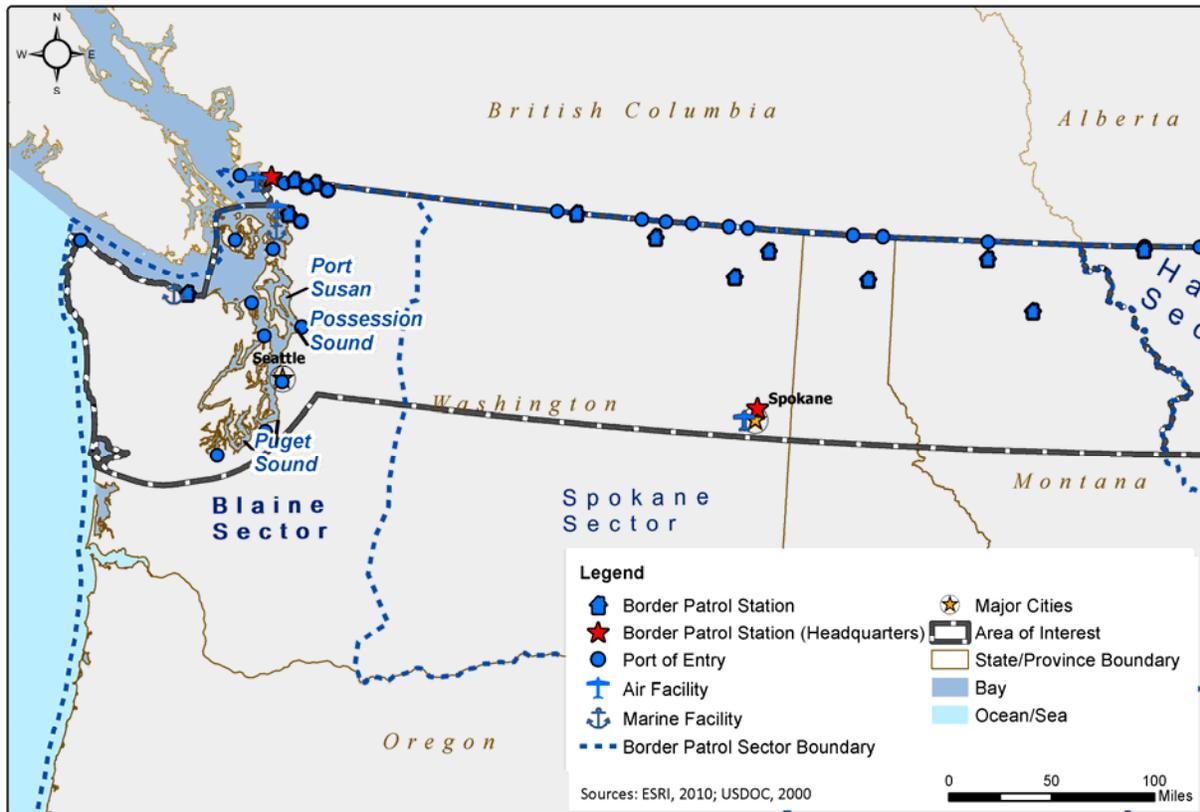
To minimize the risk of operating a UAS, the FAA frequently requires risk mitigations before granting a COA. These mitigations include special provisions unique to the requested type of operation. For example, the applicant may be restricted to operating only in a defined airspace or operating only during certain times of the day. The UAS may be required to have a transponder if it is to be flown in a certain type of airspace. Other safety enhancements may be required, depending on the nature of the proposed operation. To ensure safety, the COA application is reviewed for feasibility; airspace experts review and ensure that the operation will not severely impact the efficiency of the NAS. As of April, 2011, CBP has been issued 12 COAs.

Given that there are emergency and disaster situations where the use of UASs has saved lives and otherwise mitigated emergency situations, the FAA has issued three special disaster COAs, one of which was to CBP (Kalinowski & Allen, 2010).

Vessel Operations

Approximately 2,063 square miles of navigable water exists along the WOR Region northern border (ESRI, 2010). Figure 4.13-2 shows the navigable waters in this region. To assist in river or lake patrols, OAM provides the USBP agents in this region with a range of watercrafts (USDHS, 2011). Accidents during patrols could take place between CBP, cross-border violators, and the general public.

Figure 4.13-2. Navigable Water in the WOR Region



Radiation

CBP uses X-rays and gamma rays to inspect merchandise and conveyances, eliminating the need for an intrusive manual search. These detection systems provide images of material enclosed in cars, trucks, railcars, sea containers, personal luggage, packages, parcels, and mail (USDHS, 2009a). Increasing the efficiency and the number of searches can have a beneficial effect on HH&S. Beneficial effects could result if the number of interdictions increases and the occurrence of intentional destructive acts (IDAs) decreases as a result of using X-ray and gamma rays. The affected environment includes the location of equipment that produces X-rays and gamma rays, as well as the area immediately surrounding the equipment.

Occupational dose is the dose received by an individual in a restricted area or in the course of employment in which the individual’s assigned duties involve exposure to radiation and to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. The individuals subject to the occupational dose classification must closely monitor their degree of radiation exposure using dosimeters (USDHS, 2004b).

Exposure dose is the dose received by a member of the public from exposure to radiation and to radioactive material released by a licensee, or to another source of radiation either within a licensee’s controlled area or in unrestricted areas (USDHS, 2004b).

X-rays and gamma rays have the potential to expose people to ionizing radiation. The Nuclear Regulatory Commission (NRC) sets regulations and establishes standards for protection against radiation arising from activities conducted under licenses it issues. CBP has adopted the NRC

standard because OSHA addresses only occupational dose exposure limits. These requirements are set forth in 10 CFR Part 20 (USDHS, 2004b).

In 10 CFR Part 20, the NRC identifies two classifications of radiation dose: occupational dose and exposure dose (USDHS, 2004b). Neither of these doses includes background radiation, radiation patients receive from medical practices, radiation received from participation in medical research programs, or radiation received as a member of the general public.

As set by the NRC in 10 CFR Part 20, the maximum permissible level of radiation dose to individual members of the general public in unrestricted areas (i.e., exposure dose) is 0.1 rem per year above the typical 0.360 rem per year dose provided by natural and man-made background radiation.

As part of its “as low as is reasonably achievable” (ALARA) program, CBP has determined that the radiation dose received by its personnel shall not exceed the public dose (USDHS, 2004b).

In 10 CFR 20.1003, NRC defines the philosophy of ALARA in relation to exposure:

ALARA (acronym for “as low as is reasonably achievable”) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

Exposure to radiation can be harmful to HH&S. Because of the difficulties in determining if the health effects demonstrated at high radiation doses are also present at low doses, current radiation protection standards and practices are based on the premise that any radiation dose may result in detrimental health effects, such as cancer and hereditary genetic damage.

When discussing potential impacts caused by radiation exposure it is important to relate how much exposure is anticipated. In an August 2004 revised position statement on radiation risk, the Health Physics Society recommended against the quantitative estimation of health risks below an individual dose of 0.5 rem in one year or a lifetime dose of 10 rem above that received from natural sources. Doses from natural background radiation in the United States average about 0.360 rem per year (HPS, 2004).

Radio Frequency

The radio frequency (RF) environment refers to the presence of electromagnetic (EM) radiation emitted by radio waves and microwaves on the human and biological environment. RF waves have a frequency or rate of oscillation within the range of approximately 3 Hertz (Hz) to 300 gigahertz (GHz). This energy can interact with matter (USDHS, 2008a).

OSHA regulates RF and EM emissions for employees under 29 CFR 1910. The Federal Communications Commission (FCC) is responsible for licensing frequencies and ensuring that the approved use does not interfere with television or radio broadcasts, or substantially affect the natural or human environment (USDHS, 2008a). The FCC has adopted a modified version of the American National Standards Institute (ANSI) guidelines and Institute of Electrical and Electronics Engineers (IEEE) standards to evaluate exposure due to RF transmitters licensed and authorized by the FCC. The FCC's guidelines also reflect the National Council of Radiation Protection and Measurements exposure guidelines.

Uncontrolled exposure occurs when the general public is exposed or when persons employed are not made fully aware of the potential for exposure or cannot exercise control over their exposure (USDHS, 2008a).

Controlled exposure occurs when a person is exposed to RF fields as part of their employment and the person has been made fully aware of the potential exposure and can exercise control over their exposure. (USDHS, 2008a).

The National Council of Radiation Protection and Measurements and ANSI/IEEE exposure criteria identify the same threshold level at which harmful biological effects may occur. The whole-human-body absorption of RF energy varies with the frequency of the RF signal. The most restrictive limits on exposure are in the frequency range from 30 to 300 megahertz where the human body absorbs RF energy most (USDHS, 2008a).

There are two tiers of exposure limits: occupational or "controlled," and general or "uncontrolled." In order for a transmitting facility or operation to be out of compliance with the FCC's RF guidelines in an area where levels exceed maximum permissible exposure (MPE) limits, it must first be accessible to the public. The MPE limits indicate levels above which people may not be safely exposed regardless of the location where those levels occur (USDHS, 2008a).

Adverse biological effects associated with RF energy are typically related to the heating of tissue by RF energy. This is typically referred to as a thermal effect, where the EM radiation emitted by an RF antenna passes through and rapidly heats biological tissue; similar to the way a microwave oven cooks food. According to the Health Physics Society, numerous studies have shown that environmental levels of RF energy routinely encountered by the general public are typically far below levels necessary to produce significant heating and increased body temperature. RF energy that would produce harmful heating is generally associated only with workplace environments near high-powered RF sources, such as those used for molding plastics or processing food products. In such cases, exposure of human beings to RF energy could exceed MPE, and restrictive measures or actions would thus be required to ensure the public's safety (USDHS, 2008a).

There is also some concern that signals from some RF devices could interfere with pacemakers or other implanted medical devices; however, electromagnetic shielding has been incorporated into the design of modern pacemakers to prevent RF signals from interfering with the electronic circuitry in the pacemaker (USDHS, 2008a).

Because RF devices emit RF energy and EM radiation, adverse impacts could occur. The severity of these impacts depends on the equipment used and the elevation of the tower (USDHS, 2008a).

Beneficial impacts from RF devices could also occur. The use of RF could increase the frequency of interdictions along the northern border, improving the HH&S of the American population.

Firing Ranges

HH&S can be affected by noise levels and exposure to lead from firing ranges on both indoor and outdoor ranges in this region. Humans become exposed to lead associated with shooting ranges through lead-contaminated soil. Another potential pathway is through inhalation of lead dust by shooters during firing when airflow on the firing line is blocked. Range workers may also be exposed to lead dust while performing routine maintenance operations, such as raking or cleaning out bullet traps. Each of these pathways is site specific and may or may not occur at individual ranges (USDA, 2010).

Figure 4.13-3 CBP Officers Train at Firing Range



Source: (USDHS, No Date).

OSHA sets regulations for protecting workers who handle or are exposed to lead, including airborne lead at indoor firing ranges (NSSF, 2001; 29 CFR 1910.1025). The OSHA standard for airborne lead exposure is 30 micrograms per cubic meter of air with an 8-hour time-weighted average (29 CFR 1910.1025).

Spent ammunition on ranges is not regulated as solid/hazardous waste unless it is discarded and left to accumulate for a long period of time. It is not regulated if it is recovered or reclaimed on a regular basis. If the range poses an imminent or substantial danger to human health or the environment, it can be addressed through the Resource Conservation and Recovery Act (RCRA).

USEPA regions also set guidelines and establish best management practices (BMPs) for building new ranges and for remediating outdoor ranges. These guidelines are in place to help minimize lead contamination in soil and water. HH&S would be adversely affected if CBP agents were exposed to lead on firing ranges or if the public's water supply was contaminated with lead (USEPA, 2003). The frequency and severity of response to lead exposure in humans depend on the amount of exposure. Symptoms include neurological, gastrointestinal, reproductive, and renal effects (NYDH, 2009).

In addition to lead exposure, the noise generated on firing ranges may have an adverse effect on the health of CBP agents. Exposure to harmful levels of noise over a long time period can damage sensitive structures in the ear, resulting in noise-induced hearing loss (NIDCD, 2008). To protect employees from noises at harmful levels, OSHA sets noise standards and guidelines for the work environment. The OSHA noise exposure limit is set at a maximum permissible exposure limit of 90 decibels, A-weighted (dBA), averaged over an 8-hour time period (29 CFR 1910.95).

4.14 HAZARDOUS AND OTHERWISE REGULATED MATERIALS

4.14.1 INTRODUCTION

Hazardous materials are materials that are capable of posing an unreasonable risk to health, safety, and prosperity. Hazardous materials can be classified into roughly three categories:

- Hazardous or regulated substances;
- Hazardous or regulated waste; and,
- Special hazards.

4.14.1.1 Hazardous Substances

Any substances that are considered severely harmful to human health or the environment may be classified as “hazardous.” Hazardous substances take many forms. Many are commonly used substances that are harmless in their normal uses but are quite dangerous when released. They are defined in terms of those substances either specifically designated as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as the Superfund Law, or those substances identified under other laws (USEPA, 2011a). A great deal is known about hazardous substances and their effects. This information helps responders act quickly and safely to reduce the risks from emergency situations (USEPA, 2011b).

4.14.1.2 Hazardous Waste

A hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA) as a solid waste, or combination of solid wastes, that, because of its quantity; concentration; or physical, chemical, or infectious characteristics may:

- Cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Hazardous wastes fall into two categories: characteristic wastes and listed wastes. Characteristic hazardous wastes are materials that are known or tested to exhibit a hazardous trait such as ignitability (i.e., flammability), reactivity, corrosiveness, and toxicity. Listed hazardous wastes are materials specifically listed by the USEPA or a state regulation as a hazardous waste.

Hazardous wastes listed by the USEPA fall into two categories:

- Process wastes from general activities (F-listed) and from specific industrial processes (K-listed); and,
- Unused or off-specification chemicals, container residues, and spill cleanup residues of acute hazardous-waste chemicals (P-listed) and other chemicals (U-listed).

These wastes may be found in different physical states as gases, liquids, or solids. Furthermore, a waste is deemed hazardous if it cannot be disposed of by common means like other byproducts of our everyday lives. Depending on the physical state of the waste, treatment and solidification

processes might be available. In other cases, however, there is not much that can be done to prevent harm (Leonard, 2009).

Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes; their associated regulatory requirements are specified in 40 CFR 273. Four types of waste are currently covered under the universal waste regulations: hazardous-waste batteries, hazardous-waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous-waste thermostats, and hazardous-waste lamps.

The RCRA regulates the management and disposal of hazardous waste. One common method of treatment is hazardous combustion, or incineration, which is used to destroy hazardous organic components and reduce the volume of waste (USEPA, 2009a).

4.14.1.3 Special Hazards and Otherwise Regulated Materials

Special hazards are those substances that might pose a risk to human health; they are addressed separately from other hazardous materials. Special hazards include asbestos-containing material, polychlorinated biphenyls (PCBs), and lead-based paint (LBP). The USEPA has the authority to regulate these special-hazard substances under the Toxic Substances Control Act 15 U.S.C. 53. The USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR 763, with additional regulation concerning emissions (40 CFR 61). Depending on the quantity or concentration, the disposal of LBP waste is potentially regulated by the RCRA at 40 CFR 260. The disposal of PCBs is addressed in 40 CFR Parts 750 and 761.

4.14.2 AFFECTED ENVIRONMENT

4.14.2.1 Hazardous Substances, Hazardous Wastes, Special Hazards, and Otherwise Regulated Materials

Due to the duplicative discussion of hazardous substances, hazardous wastes, special hazards and otherwise regulated materials, complete descriptions of the range of hazards are found in Section 3.14.

4.15 UTILITIES AND INFRASTRUCTURE

4.15.1 INTRODUCTION

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly man-made; generally, the more urban and developed an area, the more infrastructure it has (USDHS, 2008a). This section describes ranges of use for each utility resource based on recent CBP site-specific analyses of protection, relocation, construction, and operation of BPSs, and construction, modernization, and operation of POEs. This section then describes the utility resources of most CBP facilities: BPSs, POEs, forward operating bases (FOBs), traffic checkpoints, and communication towers.

4.15.2 AFFECTED ENVIRONMENT

4.15.2.1 Water Supply

Municipal water systems or rural lines, which supply CBP facilities such as Peace Arch, Pacific Highway, and Point Roberts POEs, and the Bonners Ferry Border Patrol station, pump up to 1.7 million gallons of water per day from nearby reservoirs, lakes, or a system of groundwater wells (WSDOH, 2009). An adequate-to-substantial reserve capacity remains in these lakes, reservoirs, and aquifers (Banham, 2011).

For sites with wells present, such as the Boundary, Frontier, and Nighthawk POEs in Washington, a number of scenarios for water provisioning may be employed. Some sites utilize onsite wells by tapping a nearby water main. In more remote locations (where tapping a water main is not feasible), potable water is provided by an onsite well. Generally, wells are within 90 feet of the main building; water is pumped through an inline water filter system and stored in multiple storage tanks. When necessary (and possible), water is filtered, softened, distilled, or treated as required for potable uses. If no usable onsite well exists for potable water, the water may come from a leased-offsite well located several hundred yards away. In a few locations, well water is run through a chlorination or reverse osmosis system for nondrinking usage.

When onsite wells are rendered obsolete or no well exists, as is often the case in this region due to high lead content, CBP supplies drinking water in commercial water bottles. At larger facilities, the delivered potable water is stored in 5-gallon jugs and is sometimes used for cooking. For those few facilities where bottled water is delivered, on average between 50 and 60 gallons are used per month.

4.15.2.2 Electrical and Communications Utilities

Electrical power is provided to most CBP facilities by a commercial grid system. These local or regional utility cooperatives and distribution companies serve from 340,000 to 1,500,000 customers over a 30,000 to 300,000-square-mile area throughout the WOR Region (AU, 2011; BPA, 2008). Electrical power is fed from the main service to an automatic transfer switch and electrical panels, then through the buildings. Primary electrical service is provided by overhead transmission lines to the facilities, and secondary electrical service is provided from a pole-mounted transformer. Many of these facilities have an onsite emergency electric generator with a 200-, 250-, or 1,000-gallon diesel fuel tank (USDHS, 2003a; USDHS, 2003b; USDHS, 2003c).

At seasonal facilities in more rural areas, electricity is provided by one or two smaller generators connected to automatic transfer switches and the building power system.

Monopole communication towers do not utilize more than 3,650 kilowatt (kW)-hours per month from commercial grid power (USDHS, 2008b). Primary power is provided to most monopole towers by the commercial power grid, but some in remote locations, are powered by solar photovoltaic arrays with battery storage systems. Communication relay towers (CRTs) typically utilize a 17-kW generator. Remote video surveillance system (RVSS) are connected to the commercial grid where available. If commercial power is not available, the towers are supplied by either a generator of up to 30-kW or a solar photovoltaic generator (USDHS, 2008b). If a commercial power grid is not immediately available when towers are deployed, primary power is supplied by a 30-kW generator with a propane-fueled motor supplied by a 2,000-gallon tank until the commercial power infrastructure is in place. Back-up power for each tower site would be provided by a battery back-up system. All power lines are installed overhead from the main trunk power line to the tower-site shelter and then on elevated cable trays to the tower, with the primary power source being the commercial grid. At facilities lacking communication towers, antennas are mounted on posts attached to the main building.

Most POEs are provided telephone service by a nearby telephone substation. Existing telephone lines run underground or overhead (or some combination of the two) and, when possible, follow a highway right-of-way. Most consist of one or two T-1 (fiber optic) lines and one to three dial tone lines. Where T-1 or fiber-optic service is not available, Internet service is accessed through telephone modems.

4.15.2.3 Fuel Supply

Propane or natural gas supplies fuel for heating, ventilation, and air conditioning (HVAC) systems. Propane, which can also power emergency generators, is stored in one or two 500-gallon onsite liquid propane tanks (USDHS, 2009a). Some facilities are serviced by interconnections with commercial natural gas suppliers through underground natural gas pipelines.

All towers that normally receive electric power through connection to a commercial grid have a 500-gallon propane tank to fuel the back-up generator in case of potential power outages (USDHS, 2008c). Each 500-gallon tank would be refueled every two months, assuming approximately two hours of run time monthly for a generator maintenance check and other operations as needed (USDHS, 2008c). When commercial grid power is not immediately available upon tower deployment, primary power would be supplied temporarily by a 30-kW generator, and a larger, 2,000-gallon propane tank. Refueling of these larger propane tanks would occur approximately every seven days (USDHS, 2008c).

4.15.2.4 Wastewater Management

Urban CBP facilities such as the Peace Arch, Pacific Highway, and Point Roberts POEs in Washington are connected via municipal piping systems to wastewater treatment plants, which permit up to 3.1 million gallons per day (mgd) (CoB, 2010). Such a facility has a 0.8 mgd annual average daily flow (AADF) and a 3.2 mgd peak hourly flow (PHF) (SPI, 2010). Newer wastewater treatment facilities, such as the Lighthouse Point Wastewater Reclamation Facility in

Blaine, Washington utilize membrane bioreactor technology to produce reuse-quality effluent water for irrigation and industrial purposes (USGSA, 2006).

In more rural locations like the Frontier, Nighthawk, and Boundary POEs in Washington, sanitary waste is disposed to an onsite septic tank. Types of septic tanks vary; some have a grinder pump, a lift station, or two venting pipes, but all are connected to the appropriate drainage mound and field or leach field. Solid waste is removed from sites by a cleaning contractor or a private disposal company. Average septic tanks are pumped once every two years and treated twice a year, but those approaching capacity can be pumped as often as once every three months.

The state department of transportation (DOT) or appropriate county-level department generally provides snow removal on state highways, and onsite snow removal service is contracted out to a janitor or maintenance company (USDHS, 2009a). At some POEs, facility staff handle light-duty snow removal (USDHS, 2009a).

4.16 ROADWAYS AND TRAFFIC

4.16.1 INTRODUCTION

The United States relies heavily on a vast transportation network to expedite the flow of goods and people to and from Canada. CBP’s mandate to enable efficient border crossings while providing the highest level of security and safety for all motorists is of utmost importance. Over the past decade, many POEs have received technological and highway safety-related upgrades, as well as upgrades related to ease of access. States and municipalities maintain the roadways leading to the borders to allow for tourism and trade in their areas. The following text provides an overview of traffic and transportation regulations and describes the general traffic conditions for urban, suburban, rural, and remote areas.

4.16.2 AFFECTED ENVIRONMENT

4.16.2.1 Existing Roadway Network and Roadway Effectiveness

The majority of the roadways within 100 miles of the northern border within the WOR Region are primarily secondary and tertiary paved roads, although there are some state highways located throughout the region. Many of the areas in the WOR Region are remote, and some include travel destinations such as national parks, national forests, and wilderness areas.

The number of motor vehicles in the United States has been steadily increasing, with more than 254 million vehicles registered in 2009 (BTS 2012). Annual travel on U.S. roadways reached an estimated 2.9 trillion vehicle-miles, or about three times the level reported in 1960. Travel grew about 47 percent during the 1960s, another 38 percent in the 1970s, and another 41 percent in the 1980s. Travel in urban areas in 2009 accounted for 1.9 trillion vehicle-miles, or 66 percent of total travel, compared to 44 percent in 1960 (BTS 2012a). On the rural interstate system, automobiles, light trucks, and buses account for 77 percent of average daily traffic volumes, with heavy trucks representing the remainder. Percent distribution of traffic for commercial and noncommercial vehicles in both rural and urban areas is shown in Table 4.16-1.

Table 4.16-1. Percent Distribution of Traffic by Vehicle Class, Total United States

Type of Roadway	Vehicles (%)	
	Noncommercial	Commercial
Rural		
Interstate	81.6	18.4
Other principal arterials	87.2	12.8
Minor arterial, collector and local	88.5	11.5
Rural average	86.6	13.4
Urban		
Interstate	88.2	11.8
Other freeways and expressways	90.5	9.5
Other principal arterials	89.5	10.5

Type of Roadway	Vehicles (%)	
	Noncommercial	Commercial
Minor arterials	90.4	9.6
Collectors	90.3	9.7
Local	91.0	9.0
Urban average	89.8	10.2

Source: (USDOT, 1996).

4.16.2.2 Level of Service

Level of service (LOS) is a qualitative measure of the operating conditions of an intersection or other transportation facility. There are six levels of service (A through F): LOS A represents the best operating conditions with no congestion; LOS F represents the worst operating conditions with heavy congestion. Roadways and intersections with LOS E or F are those with traffic conditions at or above capacity. This means that traffic patterns in these areas are congested, unstable, and normally unacceptable to individuals attempting to access and use roadways and intersections (TRB, 2000). The LOS concept has been used to facilitate a general discussion of traffic conditions in urban, suburban, rural, and remote areas. This discussion of typical patterns for different types of roadway networks is not meant to substitute for local studies and analyses that may be required.

4.16.2.3 Variability

Traffic varies by month of the year, day of the week, and hour of the day. Often the capacity of the roadway system can be exceeded by the volume of traffic using it. This can cause a breakdown in flow (i.e., LOS E or F) and can initiate effects that extend far beyond the time during which the demand exceeded capacity. Traffic in these circumstances may take several hours to dissipate. Seasonal peaks in traffic demand are also of importance, particularly for recreational facilities.

Seasonal fluctuations in traffic demand reflect the social and economic activity of the area being served by the highway. These seasonal fluctuations typically exhibit several relevant characteristics:

- Monthly variations are more severe on rural routes than on urban routes;
- Monthly variations are more severe on rural routes serving primarily recreational traffic than on rural routes serving primarily business traffic; and
- Daily traffic patterns vary by month of year most severely for recreational routes.

Traffic variations by day of the week are related to roadway type. Normally, weekend traffic volumes are lower than weekday traffic volumes for highways serving predominantly business travel, such as urban freeways. In comparison, peak traffic occurs on weekends on main rural and recreational highways. Furthermore, the magnitude of daily variation is highest for recreational access routes and lowest for urban commuter routes.

Typical hourly variation in traffic is related to highway type and day of the week. The typical morning and evening peak hours are evident for urban commuter routes on weekdays. The evening peak is generally somewhat more intense than the morning peak. On weekends, urban routes show a peak travel period that is less intense and more spread out, occurring in early to mid afternoon. Recreational routes also have single daily peaks. Saturday peaks on such routes tend to occur in the late morning or early afternoon (as travelers go to their recreational destination) and in late afternoon or early evening on Sundays (as they return home).

Traffic analysis focuses on the peak hour of traffic volume because it represents the most critical period for operations and has the highest capacity requirements. If the highest hourly volumes for a given location were listed in descending order, a large variation in the data would be observed, depending on the type of roadway.

4.16.2.4 Urban and Suburban Transportation Networks

Delays and heavy traffic can be prevalent in all major cities. These delays are most frequent during rush hour times: 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m., Monday through Friday. Other reasons for congestion in urban areas are emergency vehicles, accidents, and vehicle breakdowns. Seattle and Spokane are the only urban areas in the WOR Region.

The ability of urban streets to function well is generally limited by the capacity of signalized intersections, with traffic normally uninterrupted on roadway segments between intersections. Signal timing plays a major role in the capacity of urban streets, limiting the portion of time available for movement between intersections. Traffic conditions may vary greatly, and such factors as curb parking, transit buses, lane widths, upstream intersections, and other factors may substantially affect roadway conditions. In urban areas, LOS at critical intersections is typically be E or F during peak periods, and is characterized by very unstable or forced traffic flow.

Urban streets show less variation than other areas. Most users are daily commuters or frequent users, and special event traffic is less common. Furthermore, many urban routes are filled to capacity during each peak hour, and variation is therefore severely constrained.

Traffic in suburban areas is similar to that in urban areas; however, traffic delays are less of an issue unless traffic is being routed through residential areas. As with urban areas, there may be heavy traffic during rush hour; typically 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. Traffic congestion in suburban areas is normally confined to primary and secondary arterials, not residential areas. Public transportation is often provided, and traffic reports are available for updated roadway conditions.

4.16.2.5 Rural and Remote Transportation Networks

In rural and remote areas, traffic is mainly affected by roadway conditions. Heavy traffic volumes are rare and normally only occur due to road closure and construction activities. Rural highways in the United States and Canada rarely operate at volumes approaching capacity. In addition, rural and recreational routes often show a wide variation in peak-hour volumes. Extremely high volumes occur on a few weekends or in other peak periods, and traffic during the rest of the year is substantially less, even during the peak hour. For example, highways serving resorts and recreational areas may be virtually unused during much of the year, only to be subject to oversaturated conditions during peak summer periods.

Seasonal weather conditions are the primary cause of inefficient access on rural and remote roadways. Snow, flooding, and mudflows can make roads impassable; these events usually occur between October (when snow accumulations begin) and April (when melting snow and rains can cause flooding and mudslides). Local municipalities are prepared for maintenance of rural roadways, and residents often have alternate means of transportation, such as snowmobiles, ATVs, and horses. Remote areas, by definition, are sparsely populated, but the few residences within these areas normally have alternate transportation sources in case of emergencies. Television, radio, and NPS traffic reports are the primary sources of updates for rural and remote roadway conditions (USDOJ, 2010).

4.16.2.6 Federal and State Transportation Regulations

POEs across the regions are accessed by a number of highways that are maintained by each state's DOT or municipal highway authority. In remote areas where trails and gravel roadways are used, it is the maintaining agencies responsibility to inform the public of road and trail closures. In the United States, each state has its own regulations and governing agency, although most regulations are similar for the purpose of uniformity. In most states, the roadway design manual is based upon recommendations in the American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets, commonly referred to as the "Green Book." The Green Book is not a design manual but rather a series of recommended roadway design parameters (USDOT, 2010). In addition, many Federal departments have also adopted their own traffic code for enforcement on their respective reservations (e.g., national parks and military bases). A list of the state DOTs and regulatory agencies that plan and administer the roadway design regulations is provided in Appendix S.

4.16.2.7 CBP Activities Affecting Roadways and Traffic

CBP activities include enforcement of customs, immigration, and agriculture regulations at U.S. borders, and CBP has a primary responsibility for preventing unlawful entry into the United States while ensuring the safe and efficient flow of goods and people. For the northern border within this region, these activities are focused around the POEs, but construction activities, the operation of other facilities, and patrol activities have some effects on transportation resources. A general description of these activities is provided in Chapter 2. This section outlines these activities from a transportation and traffic standpoint.

Ports of Entry

Many different roadways including interstates, U.S. national highways, state highways, and rural roadways approach the POEs along the northern border within this region. These cross-border access points are often colocated with towns and cities adjacent to the border, and roadways facilitate traffic approaching and departing from the POEs.

Vehicles entering POEs from Canada proceed across the border and then separate into inspection lanes. Often inspections of commercial vehicles and passenger vehicles are conducted in separate areas. These are normally parking areas for vehicles that are selected for secondary inspection, with dedicated truck lanes to help facilitate the flow of larger vehicles. At some of the larger facilities, there are committed areas for secondary truck inspections that may involve offloading and detailed examination.

As with any other roadway, cross-border traffic varies by month, day of the week, and hour of the day. Seasonal fluctuations in traffic demand reflect the social and economic activity of the area being served by the facility. Canadian traffic reaches a peak in either July or August and ebbs to a low point in February. Summer peaks are consistently 65 to 75 percent higher than winter lows (BPRI, 2010). Normally, weekend volumes are lower than weekday volumes for POEs serving predominantly business travel. Monthly variations are more severe on rural POEs than on urban entry points. Vehicle queues are common, particularly at urban POEs, and can last for several minutes to several hours in rare cases. In general, queue length and wait times determine the overall LOS of a POE from a transportation and traffic standpoint. The busiest POEs in the WOR Region are shown in Table 4.16-2. A complete list of POEs and their level of use by transportation mode is provided in Appendix S.

Table 4.16-2. Busiest POEs for Passenger Vehicles in the WOR Region

Rank	Port Name	Annual Personal Vehicles	Annual Personal Vehicle Passengers
1	WA: Blaine	2,842,631	5,966,409
2	WA: Point Roberts	722,725	1,300,852
3	WA: Sumas	672,262	1,353,153

Source: (USDOT, 2009).

At POEs in urban areas, special lanes are used for frequent travelers and commercial vehicles with Nexpress radio frequency units for fewer delays. Buses are provided for public transportation, and pedestrian walkways provided for tourists. CBP and other non-government organizations provide real-time traffic information via the internet, Twitter, and mobile applications (USDHS, 2010). Other technologies used to improve the functionality of POEs are described in Chapter 2.

Vacation travel and occasional same-day shopping trips are important travel purposes along most of the border. Several Canadian and U.S. near-border cities and towns are common consumer destinations. Vacation and same-day recreational travel are less frequent and more seasonal than consumer trips in the paired-cities model. In addition, these types of travel are highly discretionary and are easily influenced by exchange rates and economic conditions (BPRI, 2010).

All POEs facilitate pedestrians and cyclists. However, pedestrian and bicycle circulation is infrequent at most rural POEs because of their remote locations and distance from residential areas. Some POEs have provisions for bike storage. Many POEs have boat and seaplane landing areas.

Transportation Checkpoints

Traffic checkpoints are conducted on roads leading from the border and consist of inspections of interior-bound conveyances, including passenger vehicles (cars, trucks, vans, and buses) and container vehicles and cargo trucks. These checkpoints provide CBP with an opportunity to detect and interdict cross-border violators that have thus far avoided apprehension. Vehicle checkpoints are generally traffic lanes temporarily controlled by CBP. Checkpoints may include

support buildings to provide temporary office and holding space, as well as lights, signage, and other support equipment.

Checkpoints are established at airports for commercial aircraft and at locations along railroad lines for passenger and freight trains.

Non-road/Off-road Activities

Off-road traffic surveillance operations can include agents stationed at specific observation points or driving predetermined routes (line watch); detection of disturbances in natural terrain that could indicate the passage of people, animals, or vehicles (sign cutting); and road patrols. All sectors use a variety of vehicles, including four-wheel drive vehicles, sedans, scope trucks, ATVs, motorcycles, snowmobiles, and bike patrols in urban areas or over rough terrain.

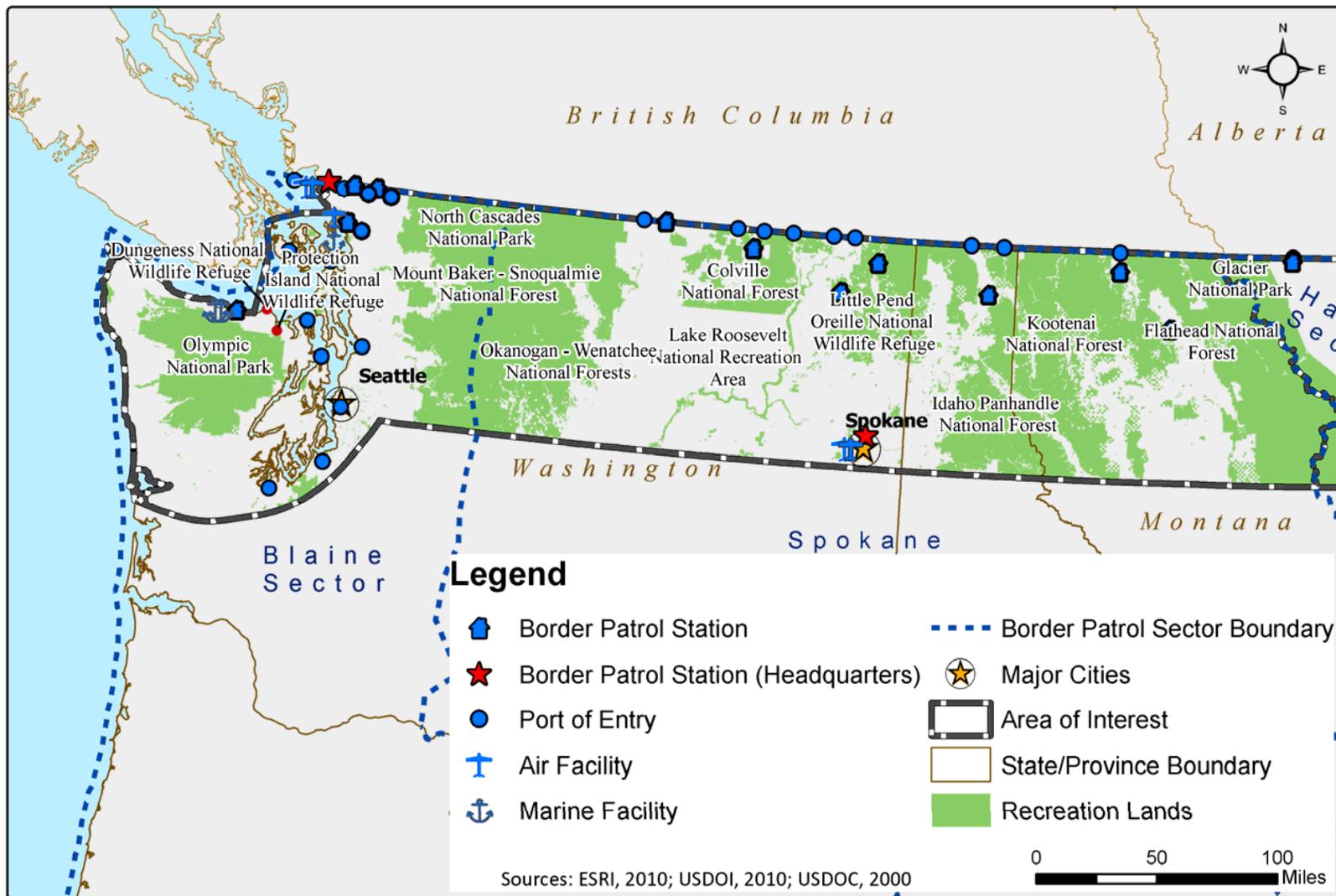
BPSs vary in size and typically include any or all of the following components: administrative and support buildings, vehicle maintenance garages, equine and canine facilities, vehicle wash facilities, fuel tanks, small arms practice ranges, illegal immigrant processing and temporary holding facilities, confiscated vehicle storage facilities, and agent and visitor parking. CBP agents use a variety of off-road transportation modes to patrol border areas. These consist of four-wheel drive vehicles, ATVs, snowmobiles, horses, and, in some sensitive habitats, agents operating on foot. As outlined in Chapter 2, CBP activities that may affect transportation resources include UAS activities, manned aerial surveillance patrols, and other patrols.

4.17 RECREATION

4.17.1 INTRODUCTION

A wide variety of recreation areas exist along the northern border on both the U.S. and Canadian sides. On the U.S. side, these recreation areas include national parks (NP), national recreation areas (NRA), lakeshores, national forests (NF), national wildlife refuges (NWR), and designated wilderness areas. On the Canadian side, recreational areas include national park reserves, provincial parks, protected areas, and natural areas. U.S. recreation categories are described briefly below, since the designation bears on the nature of activities permitted. Figure 4.17-1 shows a map of federally protected recreation areas in the WOR Region.

Figure 4.17-1. Federally Protected Recreation Areas, Including National Forests, Parks, Recreation Areas, and Wildlife Refuges in the WOR Region



4.17.2 AFFECTED ENVIRONMENT

National parks, national forests, national wilderness areas, national wildlife refuges, and national recreation areas within the WOR study area are profiled below by the impact category they most closely match. In addition to that national protected areas that form the primary focus of this analysis, many state and regional parks and protected areas along the northern border have recreation areas that could be affected by activities along the border.

As noted in Section 4.8.2 on land use, the WOR Region contains a high proportion of state or federally owned land. This study area contains more national parks and forests than any other northern border region. Much of this land is designated for various forms of recreation. The impact use profiles of these recreation lands varies with low-impact and medium-impact use categorizations slightly more prevalent than high-impact use areas (Section 3.17, discusses the categorization of recreational sites). Some of the most common recreation activities are camping (both backcountry and at campsites), biking, and hiking. Less common activities include off-highway vehicle riding, skiing, and swimming.

The following sections provide recreation profiles of the U.S. national parks, national recreation areas, national forests, and national wildlife refuges. Appendix I contains profiles of Canadian protected areas.

4.17.2.1 Washington

North Cascades National Park Complex

The North Cascades Complex comprises three units (North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area) that are collectively managed by the National Park Service as a single administrative entity.

Approximately 94% of the North Cascades Complex is designated as the Stephen Mather Wilderness, which is immediately surrounded by approximately 1.3 million acres of federally designated wilderness. Taken together, these wilderness areas collectively represent perhaps the most rugged and remote alpine landscapes in the contiguous United States. Wilderness is a fundamental resource and value for the greater North Cascades ecosystem in general and for the North Cascades Complex in particular. The national park portion of the Complex is almost entirely within wilderness (99 percent) with very limited, primitive facilities.

North Cascades National Park

The region of the North Cascades NP Complex adjacent to the border is primarily backcountry wilderness. Most of the area is designated as cross-country II zone in which small parties may hike, camp, and boat, and use private stock. Trails, minor roads, and backcountry campsites exist in this area.

North Cascades National Park Complex



Source: (USDOI, 2009b).

A smaller portion of this area of the park is designated as a trail zone with more established trails and many campgrounds. Between 2000 and 2009, annual visitation ranged between 16,912 and 26,972 visitors per year (for the park outside of Ross Lake NRA and Lake Chelan NRA). Most of this park can be categorized as low- or medium-impact use areas (USDOI, 2010a; USDOI, 2009b).

Lake Chelan National Recreation Area

Lake Chelan NRA forms the southern part of the North Cascades NP and does not touch the northern border. This NRA contains both cross-country II zones for use by small parties as well as trail zones. The entire recreation area has numerous campgrounds, picnic areas, developed lodging, and well-maintained trails. Between 2000 and 2009, annual visitation ranged between 25,139 and 42,548 visitors per year. Much of this park can be categorized as high-impact use area (USDOI, 2010a; USDOI 2009c).

Ross Lake National Recreation Area

Ross Lake National Recreation Area (ROLA) is the most accessible unit and receives the highest visitation. Recreational amenities in ROLA include several important front country areas with developed campgrounds, boat launching facilities and associated amenities. Approximately 66 percent of ROLA is designated as wilderness

Ross Lake NRA is part of the North Cascades NP Complex and is divided into four major management zones. The two zones adjacent to the northern border are designated as backcountry and wilderness. Backcountry zones have limited visitor facilities and structured opportunities for visitor recreation. Wilderness zones (the dominant zone in ROLA) are dominated by natural conditions, with very limited primitive visitor facilities. Both of these areas along the border are undeveloped with few campgrounds, roads, and trails. Farther south, the area along the North Cascades Highway is designated as “front country” and is developed for a range of recreational and educational visitor opportunities. Seattle City Light (SCL) has developed the hydroelectric zone for hydroelectric power generation. ROLA also includes the Skagit River, which is managed for preservation of its natural and cultural resources. The Skagit River has been recommended for designation as a Wild and Scenic River from Gorge Powerhouse to the eastern boundary of the area. Between 2000 and 2009, annual visitation ranged between 253,333 and 387,216 visitors per year. Most of this park (relevant to the

northern border) can be categorized as a low-impact use area with some medium-impact use areas (USDOI, 2009d).

Lake Roosevelt National Recreation Area

Lake Roosevelt NRA sits along the shoreline of Lake Roosevelt and the Columbia River. A small portion of the area is close to the northern border. Major recreation activities involve boating, fishing, camping, picnicking, swimming, and walking or hiking along the shoreline (Figure 4.17-4). The area of the NRA closest to the border is well developed for visitor recreation. It includes boating facilities (such as fuel launches and marinas) as well as boat-in campsites on islands, visitor stations, trails, and paved and unpaved roads. Park visitation varies between 1.3 and 1.5 million visitors per year (2000 to 2009). Much of this park can be categorized as a high-impact use area (USDOI, 2006a; USDOI, 2009e).

Protection Island National Wildlife Refuge

Protection Island NWR is located in Discovery Bay in the Strait of Juan de Fuca. This 364-acre refuge includes the 48-acre Zella M. Schultz Seabird Sanctuary. The refuge is closed to the public except for nine families and a research group, who received special access during establishment of the NWR. Most of this area can be categorized as a low-impact use area (USDOI, 2009f).

Dungeness National Wildlife Refuge

The Dungeness NWR sits on a strip of land in Dungeness Bay, approximately ten miles south of the marine Canadian border. The refuge consists of 636 acres. No camping is allowed within the refuge, but can take place in the adjoining Dungeness Recreation Area. Jogging, swimming, and other beach activities are allowed only in select areas during certain times of the year. Bikes, kites, other sports equipment, and pets are prohibited. The main recreation activities are hiking and walking. Most of this area can be categorized as a low-impact use area (USDOI, 2010b).

Little Pend Oreille National Wildlife Refuge

This refuge is near the Colville National Forest, approximately 40 miles south of the border and consists of 41,568 acres. Camping is allowed in six established campgrounds. Other recreational activities include hiking, hunting, fishing, biking, horseback riding, and snowmobile riding in certain areas. Much of this refuge can be categorized as a medium-impact use area (USDOI, 2010c).

Olympic National Park

Olympic National Park sits on the northwest tip of Washington. While it does not physically touch the border, it is very close to Juan de Fuca Strait, which is crossed by the border (in water). The central 95 percent of the park is designated as wilderness. The area of the park closest to the northern border is more developed and has more visitor facilities and includes paved and unpaved roads, parking areas, campgrounds, well-developed visitor center facilities, and ranger stations. It includes areas designated for day use and development and some wilderness area. Visitors engage in hiking, educational activities, camping, beachcombing, fishing, and driving along scenic routes. Overall, the park contains 14 developed visitor areas, 4 lodges, 16 campgrounds, and 600 miles of trails. Between 2000 and 2009, visitation ranged between

2,749,197 and 3,691,310 visitors per year. Much of this area can be categorized as a medium-impact use area (USDOJ, 2009g; USDOJ, 2010d).

Colville National Forest

Colville National Forest is in the upper northeast corner of Washington and crosses into Idaho. This forest has over 60 trails, most of which are suitable for hiking, horseback riding, and biking, and several that are suitable for skiing. As of 1981, when the national forest's forest management plan (FMP) was written, 367 miles of trails in the forest (41 of these miles were in wilderness) existed. Currently, there are 28 developed campgrounds, which may include amenities such as highway access, boat launches, and picnic tables along with boating facilities and facilities for winter sports. As of the 1981 FMP, 67 developed recreational facilities existed. Other recreation activities include hunting, fishing, picnicking, and driving through scenic highways and roads. There is also backcountry camping and about two thirds of all recreation activities occur outside developed campgrounds. In 1981, 30,613 acres of the park were allocated as the Salmo-Priest Wilderness, 857,544 acres were roaded non-wilderness, and 206,843 acres were unroaded non-wilderness. There were 41.5 miles of trails and an average of 1,800 visits per year in the Salmo-Priest Wilderness area as of 1981. The wilderness contains zones designated as semi-primitive, nonmotorized, primitive (trailed), and primitive (trail-less). In the FMP, a desire and plan was expressed for more developed trails to increase use. The annual visitation estimate for forest visits is 335,700 visits. Much of this area can be categorized as medium-impact use area (USDA, 2010a; USDA, 2010b).

Nisqually National Wildlife Refuge

Nisqually National Wildlife Refuge is also near Colville National Forest and is south of the border. The refuge has 2 miles of walking trails, one of which is a 1-mile boardwalk trail. In addition to walking and hiking, recreation includes fishing from boats, boating, and waterfowl hunting. Most of this area can be categorized as a low-impact use area (USDOJ, 2010e).

Mount Baker-Snoqualmie National Forest

The Mount Baker-Snoqualmie National Forest extends from the northern border, adjacent to the Northern Cascades NP Complex south to Mount Rainier NP. The section of forest closest to the northern border includes two forest service centers. Part of the Skagit Wild and Scenic River flows through this park. In addition, 48 percent of the Mount Baker-Snoqualmie National Forest is designated as wilderness. This includes part or all of Alpine Lakes, Boulder River, Clearwater, Glacier Peak, Henry M. Jackson, Mount Baker and Noisy Diobsud, Norse Peak, and Wild Sky wilderness areas. The forest contains over 30 different campgrounds as well as infrastructure for fishing, picnicking, and winter sports. There are 1,500 miles of trails, including trails for mountain biking and off-highway vehicles. Other recreation activities include mountain climbing and scenic driving. The park also includes Mount Baker NRA, which is managed for snowmobile and cross-country skiing. The annual visitation estimate for forest visits is 1,677,500 visits. Much of this park can be categorized as high-impact use area with some low- and medium-impact use areas (USDA, 2008a; USDA, 2009a).

4.17.2.2 Idaho

Idaho Panhandle National Forest (includes Coeur d'Alene National Forest and Kaniksu National Forest)

This national forest stretches from approximately 25 miles south of the border (Kaniksu National Forest) south to the Coeur d'Alene National Forest. The forest includes part of the Salmo-Priest Wilderness (11,950 acres). Several other areas are also recommended for wilderness area designation (146,700 acres). Within the park are over 100 miles of trails suitable for biking. For camping, the forest includes rental cabins, lookouts, campgrounds with amenities, campgrounds for Recreational Vehicles, and backcountry camping. Other recreational activities include water sports, climbing, horse riding, hunting, scenic driving, and picnicking. The forest includes two Wild and Scenic Rivers, the St. Joe River, and the Upper Priest River. In the 1987 FMP developed for the forest, the Coeur d'Alene River, the Little North Fork Clearwater River, and the Pack River were identified as having the potential to be Wild and Scenic rivers. The annual visitation estimate is 1,277,700 visits. Much of this area can be categorized as a medium-impact use area (USDA, 2009b; USDA, 2009c).

Okanogan National Forest and Wenatchee National Forest (managed singly) (Idaho and Washington)

The Okanogan portion of the national forest sits along the northern border, while the Wenatchee area is further south. Approximately 40 percent of the forest is designated as wilderness, spread among eight areas. This forest includes a large part of the 529,477 acres of the Pasayten Wilderness (a small portion falls within Mount Baker-Snoqualmie National Forest). The Boundary Trail is a major trail in the Pasayten Wilderness that goes north from the southeast corner along the Canadian border for more than 73 miles. The forest also includes all or part of Lake Chelan-Sawtooth (145,667 acres), Goat Rocks Wilderness (105,633 acres), Glacier Peak Wilderness (576,900 acres), Henry M. Jackson Wilderness (103,591 acres total; 27,242 acres within Wenatchee), Norse Peak Wilderness (50,923 acres), and William O. Douglas Wilderness (166,000 acres). No roads or developments occur within wilderness areas. There are 800 miles of wilderness trails as well as well-maintained trails accessible to people with disabilities. The forest includes over 24 developed campgrounds and is open to backcountry camping as well. Other recreational activities include off-highway vehicle use, fishing, climbing, mountain biking, horse riding, and small-scale prospecting. The annual visitation estimate for Okanogan National Forest is 678,900 visits with 2,312,200 visits per year for Wenatchee National Forest. Much of this park can be categorized as medium-impact and low-impact use areas (USDA, 2010c; USDA, 2009d; USDA, 2009e).

4.17.2.3 Montana

Kootenai National Forest

Kootenai National Forest is located in the northwest corner of Montana along the northern border. In the center of Kootenai NF is the 93,000-acre Cabinet Mountains Wilderness. In the forest, 39 developed campgrounds are accessible by car or boat along with several rental lookouts and cabins. There are also hundreds of miles of hiking, horse, and bicycle trails. Additional recreational activities include water recreation, fishing, rock climbing, scenic driving, gold panning, downhill and cross-country skiing, and snowmobiling. The annual visitation

estimate is 919,300 visits. Much of this area can be categorized as a medium-impact use area with some high-impact use areas (USDA, 2009f; USDA, 2008b).

Glacier National Park

Glacier NP sits in north-central Montana along the northern border and in combination with the Waterton Lakes National Park in Canada comprises the first (Waterton-Glacier) International Peace Park, a World Heritage Site. Glacier and Waterton are both biosphere reserves with 95 percent of Glacier managed as recommended wilderness and 85 percent of Waterton Lakes National Park designated as wilderness. This park is managed to protect its natural processes although some developments occur in this area, including trails, campsites, primitive signs, sanitation facilities, and patrol cabins. There are many recreational opportunities including backcountry camping, camping at designated campgrounds, hiking along developed and undeveloped trails, skiing, snowshoeing, private and guided horseback riding, boating, and fishing. Overall, most of the area of Glacier NP closest to the northern border is undeveloped backcountry with unpaved trails, campsites, and primitive facilities. It also includes more developed day-use trails as well as bridges, overlooks, sanitation facilities, contact and customs stations, boat docks, corrals, administrative facilities, and employee housing. There are paved and unpaved roads, small parking lots, trails and trailheads, employee housing, ranger stations, small boat launching facilities, interpretive signs, and campgrounds in the park. The middle fork of the Flathead River is designated as a Wild and Scenic River, however, this portion of the river is not in either border region. Glacier NP visitation ranged from 1,664,046 to 2,083,329 people per year between 2000 and 2009. Most of this area (relevant to the northern border) can be categorized as a low-impact use area (USDOJ, 2009h; USDOJ, 2010h).

Flathead National Forest

The Flathead National Forest is approximately 50 miles south of the northern border in Montana. This forest manages the largest part of the Bob Marshall Wilderness Complex, which includes the Great Bear Wilderness, the Bob Marshall Wilderness, and the Scapegoat Wilderness and a total of 1.5 million acres. In addition, the North Fork, Middle Fork, and portions of the South Fork of the Flathead River lie within the National Wild and Scenic River's system and are used for floating excursions. Within the park, 12 cabins are available for rent as well as 31 campgrounds. Backcountry camping is also permitted as well as downhill skiing, berry picking, hunting and fishing, and scenic driving through non-wilderness areas. The annual visitation estimate is 1,077 thousand visits. Much of this area can be categorized as a low impact use area (USDA, 2010d; USDA, 2009g).

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