

Canadian Rockies Ecoregion

The Canadian Rockies ecoregion is located in the northeastern corner of Washington.

The vast majority of this ecoregion occurs in adjacent British Columbia and Idaho, extending into Alberta and Montana. Approximately 4 percent of Washington is within this ecoregion. As of 1991, less than 10 percent of the Washington portion had been converted to agricultural and urban land uses (Washington GAP, 1997). Development is concentrated in low, broad valleys along the Pend Oreille River.



PHYSIOGRAPHY

- ▶ Selkirk Mountains and Pend Oreille River are dominant landforms within Washington.
- ▶ The mountains are transitional between the western rolling Okanogan Highlands and the eastern higher ridges and mountains, interspersed with wide valleys.
- ▶ Once completely glaciated, the ecoregion now displays ice-carved, U-shaped valleys and isolated ice-sculpted mountain peaks, with elevations from 1,300 feet at the Columbia River to more than 7,000 feet in the Salmo-Priest Wilderness Area.

CLIMATE

- ▶ Precipitation ranges from 18 inches annually along the Columbia River to about 80 inches in the Salmo-Priest Wilderness Area, with most of the ecoregion receiving between 24 and 34 inches.
- ▶ Significant snowpack develops at mid and upper elevations.

BIOTA

- ▶ Coniferous forests dominate, with composition reflecting variation in moisture, temperature and elevation.
- ▶ Douglas-fir – ponderosa pine forests occur at low elevations, with grand fir – western hemlock – western redcedar forests characteristic of mid-montane elevations, and subalpine fir – Engelmann spruce forests at higher elevations.
- ▶ Whitebark pine, lodgepole pine, and subalpine larch form parklands in the highest elevations.
- ▶ Western larch and western white pine can be major components of the moister forests.
- ▶ Fire was significant in developing these forests, with a 10-year return interval for lowland foothills and 150-year return interval for high elevations and protected canyons. Fire suppression has resulted in dense, fire-prone forests.
- ▶ Grasslands, variously dominated by green fescue, Idaho fescue, or rough fescue, occur along the foothills and on higher elevation, south-facing slopes.

BIODIVERSITY HIGHLIGHTS

- ▶ Presence of moose, grizzly bear, mountain caribou
- ▶ Plant species common in Rocky Mountains, but rare in Washington.
- ▶ Rocky Mountain grand fir – western hemlock – western redcedar forests

MAJOR LANDOWNERS

- ▶ U.S. Forest Service
- ▶ U.S. Fish & Wildlife Service
- ▶ DNR
- ▶ State Parks

DOMINANT LAND USES

- ▶ Forestry
- ▶ Agriculture
- ▶ Outdoor recreation / conservation
- ▶ Mining

PRINCIPAL RISKS TO BIODIVERSITY

- ▶ Landscape-level changes in forest composition and structure
- ▶ Fire suppression / catastrophic fire
- ▶ Increasing development, primarily at low elevations

CONSERVATION NEEDS

- ▶ Wetland habitats (bogs, riparian areas, etc.) for rare plants, amphibians, and fish
- ▶ Coordinated recovery efforts for salmon along Pend Oreille and Columbia rivers
- ▶ Coordinated recovery efforts for woodland caribou, grizzly bear, gray wolf, lynx and martin in Selkirk Mountains.
- ▶ Coordinated strategy for recovery of low elevation, dry, open ponderosa pine – Douglas-fir forests





Trombetta Canyon,
Stevens County

Natural Heritage, Natural Areas, and Special Lands Acquisition priority projects and activities for the 2007-2009 biennium are identified below, along with conservation actions undertaken during the 2005-2007 biennium. These are not exhaustive lists; they are meant to provide the reader with an overview of the type and scope of projects being undertaken. A few projects have been highlighted, while others have simply been listed.

05 THROUGH 07
Conservation Actions

**Little Pend Oreille River
 NAP fenced**

Fencing was installed to protect sensitive features from recreational activities occurring on adjacent lands.

Additional inventory for species and ecosystems is needed to address gaps in the natural areas system.

07 THROUGH 09
Priority Projects/Activities

Identify gaps in natural areas system

Geographic gaps, particularly at low elevations, suggest that better representation within natural areas is needed for the ecoregion's biodiversity. NHP scientists will work with U.S. Forest Service, U.S. Fish & Wildlife Service, Bureau of Land Management, and State Parks to identify needs and potential sites to fill those needs.

Assess conservation status for Onion Ridge

A previous proposal for a natural area along this ridge will be reevaluated by NHP and Natural Areas scientists in cooperation with the Northeast Region of DNR.

Assess the biodiversity values present within Trombetta Canyon

Rare plant species are known from this limestone canyon, but a more comprehensive inventory for both rare species and high quality ecosystems is needed.



DNR PHOTOS

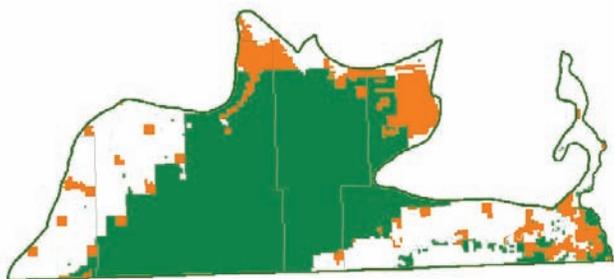


Top: A view of the northern entrance to Trombetta Canyon.

Below: Onion Ridge

Blue Mountains Ecoregion

The Blue Mountains – Middle Rockies ecoregion extends from adjacent Idaho and Oregon into the southeast corner of Washington. It includes the Grande Ronde and Snake River canyons northward to a few miles south of Clarkston. Approximately 1 percent of Washington is within this ecoregion. As of 1991, less than 1 percent of the Washington portion had been converted to agricultural or urban development (Washington GAP, 1997). The limited development that has occurred within the ecoregion has been along the Grande Ronde River.



BLUE MOUNTAINS LAND OWNERSHIP

- Federal
- State
- Tribal
- Private

PHYSIOGRAPHY

- ▶ Blue Mountains were formed by uplift of Columbia River Basalt flows and simultaneously down-cut by the Grande Ronde and Snake Rivers.
- ▶ Washington's Blue Mountains are typically flat top plateaus above deep canyons.
- ▶ The elevation within the ecoregion ranges from 750 feet along the Snake River to 6,387 feet. Most of the ecoregion is between 2,000 and 4,000 feet.
- ▶ Windblown silts and volcanic ash cover most of the plateaus, providing material for soil development.

CLIMATE

- ▶ Precipitation varies from less than 10 inches annually in the Grande Ronde River canyon to more than 50 inches just 25 miles west in the Wenaha-Tucannon Wilderness Area, with most of the ecoregion between 14 and 24 inches.
- ▶ Much of the precipitation occurs as snow, although fall and spring rains are common, often creating floods.

BIOTA

- ▶ Dominated by coniferous forest, but also supports grasslands and shrublands along low dry canyons, on broad plateaus and in subalpine meadows.
- ▶ Douglas-fir – ponderosa pine forests are characteristic of the low and middle elevations, with subalpine fir – Engelmann spruce occurring at higher elevations.
- ▶ Western larch, lodgepole pine, and western white pine are components of mesic forests.
- ▶ Canyon grassland vegetation occurs on the steep slopes above the Grande Ronde and Snake Rivers, while plateau grasslands are within the forest matrix, and dense shrublands are in the higher canyons along the Oregon border.
- ▶ Stand replacement fires historically occurred at irregular intervals from 10 years in the lowland foothills to 150 years or more at high elevations. Fire suppression has resulted in a semi-natural to natural landscape composed of dense, fire-prone forests.

BIODIVERSITY HIGHLIGHTS

- ▶ Relatively intact, dominated by natural and semi-natural vegetation
- ▶ Canyon grasslands
- ▶ Blue Mountains and Snake River Canyon are home to a number of endemic plant species
- ▶ Common plant and animal species in this ecoregion are characteristic of the Rocky Mountains

MAJOR LANDOWNERS

- ▶ U.S. Forest Service
- ▶ WDFW
- ▶ Bureau of Land Management
- ▶ DNR

DOMINANT LAND USES

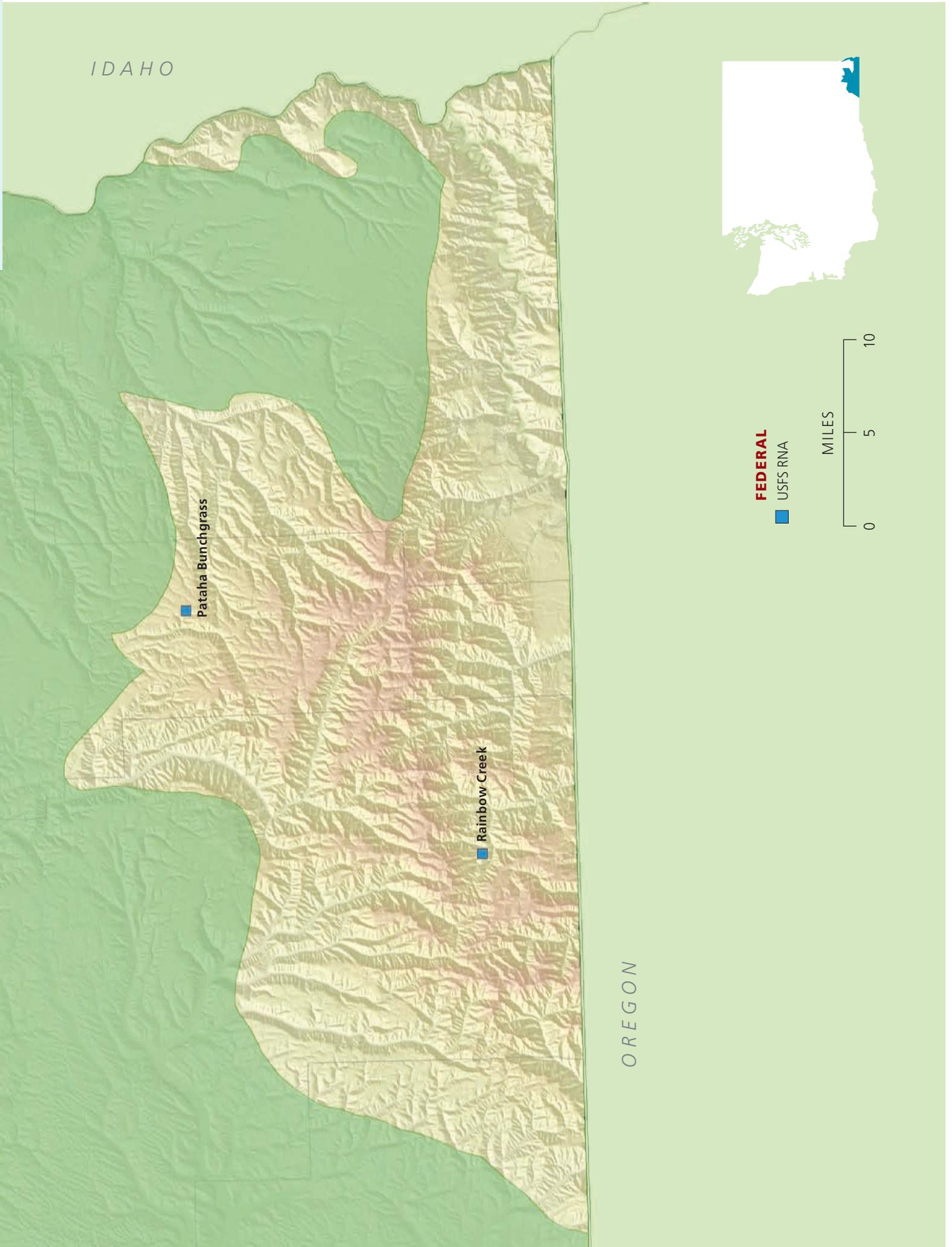
- ▶ Agriculture
- ▶ Forestry
- ▶ Outdoor recreation / conservation

PRINCIPAL RISKS TO BIODIVERSITY

- ▶ Excessive grazing
- ▶ Invasive species (yellow star-thistle, knapweeds, rush skeleton weed, others)
- ▶ Landscape-level changes in forest composition and structure
- ▶ Fire suppression leading to altered forest stand development

CONSERVATION NEEDS

- ▶ Coordinated strategy for recovery of low and mid-elevation open ponderosa pine – Douglas-fir forests
- ▶ Invasive plant species control in canyon grasslands
- ▶ Improved protection of riparian habitats
- ▶ Maintaining corridors with the Columbia Plateau ecoregion



IDAHO

OREGON

Pataha Bunchgrass

Rainbow Creek

FEDERAL
USFS RNA

MILES
0 5 10

Lime Hill and the canyon grasslands of the Blue Mountains ecoregion.



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05 THROUGH 07

Conservation Actions

Rare plant species inventory of the canyon grassland ecosystems

NHP and other scientists conducted limited inventory of rare plant species and ecosystems occurring within the canyon grasslands. The initial efforts suggest that additional inventory and conservation planning are needed.

The Blue Mountains and canyon grasslands are home to a number of endemic plant species.

07 THROUGH 09

Priority Projects/Activities

Identify gaps in natural areas system

There are currently only two natural areas within this ecoregion. NHP scientists will work with U.S. Forest Service, Bureau of Land Management, and Department of Fish and Wildlife to identify potential additions to the natural areas system for more complete representation of the ecoregion's biodiversity.

Conservation in Lime Hill area

The area south of the confluence of the Grande Ronde and Snake rivers harbors a number of rare plant species and has a variety of ecosystem types (canyon grasslands and shrublands) that are in good ecological condition. None of these features is currently represented within the statewide system of natural areas.



DNR PHOTO



KARL URBAN

Top: Pataha Bunchgrass RNA, one of the only two established natural areas in the ecoregion.

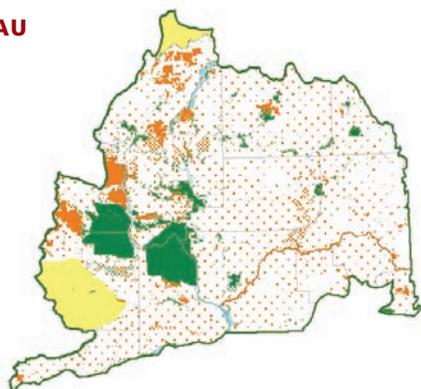
Below: Sabin's lupine, a rare species endemic to the Blue Mountains

Columbia Plateau Ecoregion

The Columbia Plateau ecoregion includes the area in eastern Washington bounded by the Cascade, Okanogan, Blue and Rocky Mountains. It extends south in eastern Oregon to the Nevada border and then east to the Snake River Plain in Idaho. Approximately one-third of Washington is in this ecoregion. More than 50 percent of the Washington portion of this ecoregion has been developed for agricultural or urban use (Washington GAP, 1997). Agriculture consists of a mixture of dryland and irrigated farming. Urban development is mostly associated with proximity to water.

COLUMBIA PLATEAU LAND OWNERSHIP

- Federal
- State
- Tribal
- Private



CLIMATE

- ▶ The hottest and driest ecoregion in Washington, it lies in the Cascade Mountains rain shadow.
- ▶ Precipitation increases west to east from about 6 inches annually along the Columbia River's Hanford Reach to 25 inches in the Palouse Hills, with most of the ecoregion between 8 and 14 inches.
- ▶ Periodic drought and fire are common environmental features, with fires historically occurring at intervals of 10 to 50 years.

PHYSIOGRAPHY

- ▶ Columbia River basalt is the primary, almost exclusive, bedrock within the ecoregion.
- ▶ Windblown silts and volcanic ash cover extensive areas, forming rolling, deep, productive soils.
- ▶ Ice-age floods carved deep canyons and coulees through the basalt, scouring some areas of soils and vegetation and leaving exposed basalt.
- ▶ Dominant landforms include the Palouse Hills, Channeled Scablands, Yakima Fold Hills, Pasco Basin, Crab Creek, and the Frenchman Hills.
- ▶ Elevations range from 160 feet above sea level along the Columbia River in the southwestern corner to nearly 4,000 feet above sea level on isolated hills (Badger and Tekoa mountains).

BIOTA

- ▶ Dominated by shrub-steppe vegetation, with various species of sagebrush and bunchgrasses. Much of the remaining native vegetation occurs on steep canyon sides and on the shallower soils of basalt scablands.
- ▶ Bitterbrush and three-tip sagebrush steppe appear along the foothills of the Cascades.
- ▶ Douglas-fir – ponderosa pine forests occur on the moister sites near the foothills of surrounding mountains.
- ▶ Special habitats include sand dunes, gravelly areas, basalt cliffs, steep canyons, alkali lakes and vernal pools.
- ▶ Many grassland and shrub-steppe species are declining, with isolation and fragmentation of intact habitat as a primary factor and non-native, weedy plant species as an additional factor; weeds are a persistent and increasing feature of the limited semi-natural and natural landscape.

BIODIVERSITY HIGHLIGHTS

- ▶ Rich endemic flora
- ▶ Many native annual Great Basin plant species
- ▶ Several shrub-steppe dependent bird species

MAJOR LANDOWNERS

- ▶ Bureau of Land Management
- ▶ US Fish and Wildlife Service
- ▶ US Department of Defense
- ▶ DNR
- ▶ WDFW
- ▶ Tribes

DOMINANT LAND USES

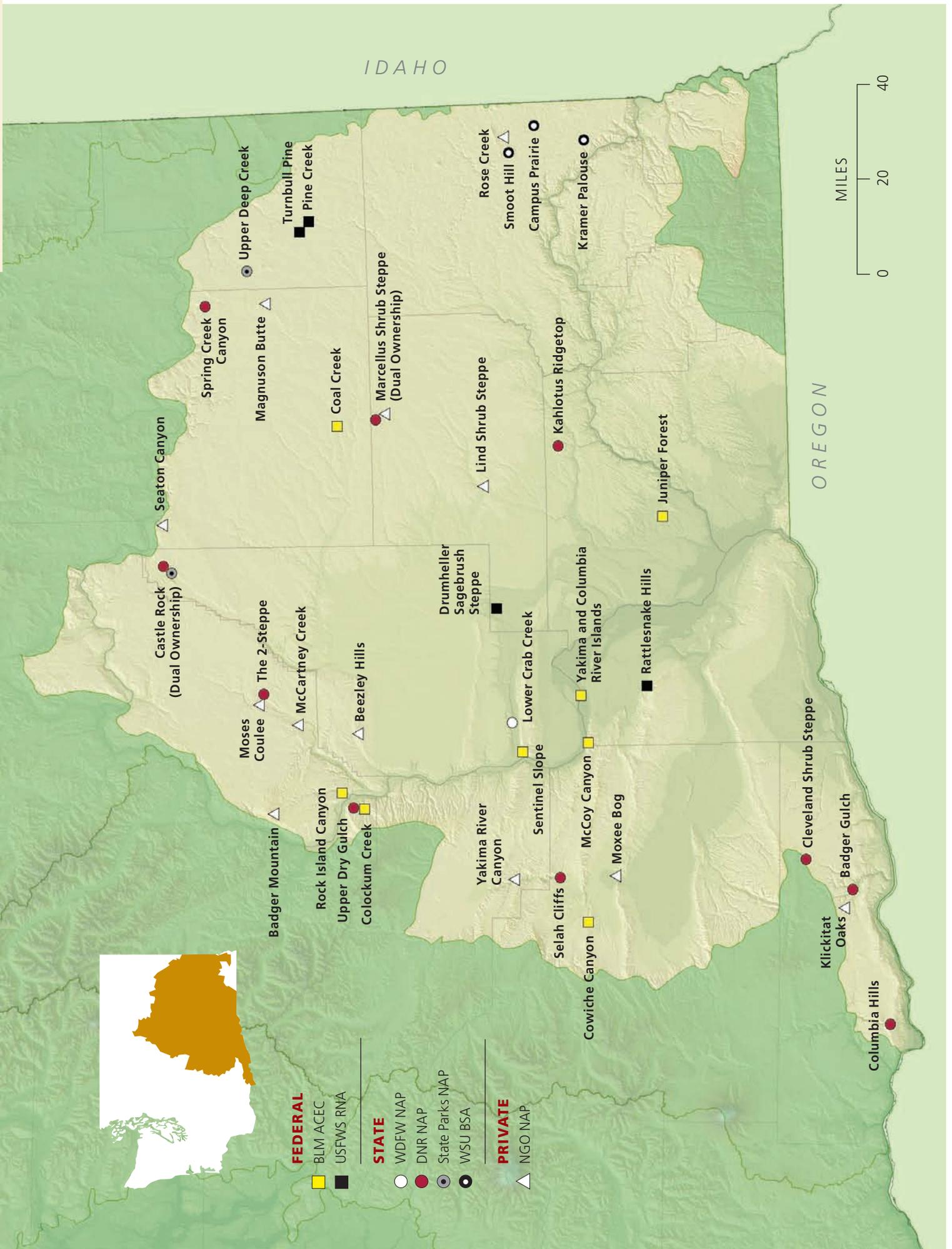
- ▶ Agriculture
- ▶ Livestock grazing
- ▶ Outdoor recreation / conservation
- ▶ Military training

PRINCIPAL RISKS TO BIODIVERSITY

- ▶ Continued conversion of shrub-steppe to agriculture
- ▶ Increasing development; isolation of areas with native biodiversity
- ▶ Invasive species
- ▶ Excessive grazing
- ▶ Development of alternative energy sources
- ▶ Development of increased water storage capacity

CONSERVATION NEEDS

- ▶ Invasive species control in shrub-steppe and grasslands
- ▶ Protection and restoration of Palouse Prairie remnants
- ▶ Coordinated recovery planning for pygmy rabbit, sage grouse, sharptail grouse, shrub-steppe birds, and salmonid species
- ▶ Conservation planning for sand dunes and vernal pools
- ▶ Better knowledge of aquatic and terrestrial invertebrates
- ▶ Creating corridors between shrub-steppe remnants



- FEDERAL**
- BLM ACEC
- USFWS RNA
- STATE**
- WDFW NAP
- DNR NAP
- State Parks NAP
- WSU BSA
- PRIVATE**
- NGO NAP

Upper Dry Gulch Natural Area Preserve



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05 THROUGH 07

Conservation Actions

Upper Dry Gulch NAP expansion approved by Natural Heritage Advisory Council

An expansion of the NAP was proposed to increase the protection for Whited's milkvetch, a species whose worldwide range is limited to less than 10 square miles in Chelan County.

State lands shrub-steppe inventory

NHP scientists began an inventory of DNR-managed lands, focusing on shrub-steppe ecosystems. Knowing the ecological values of the scattered parcels is a first step in making ecologically sound conservation decisions.

Identifying the conservation status of the Striped Whipsnake

Innovative inventory and tracking methods were developed to get a better understanding of the distribution and habitat requirements of this rare snake (*Masticophis taeniatus*).

Pygmy Rabbit recovery efforts

Conducted inventories and represented DNR on the recovery team

Sand dune ecosystems assessment

Conducted inventories, developed preliminary vegetation classification, began overall conservation assessment, and completed report for the BLM.

Rare plant monitoring

Monitored several of Washington's rarest plants, including Umtanum desert buckwheat (*Eriogonum codium*), northern wormwood (*Artemisia campestris* var. *wormskioldii*), obscure buttercup (*Ranunculus reconditus*) and Whited's milkvetch (*Astragalus sinuatus*).

07 THROUGH 09

Priority Projects/Activities

Shrub-steppe conservation on DNR-managed lands

The ecoregion's high natural diversity is at risk as a result of development, conversion, and changing land use patterns. Natural Heritage is conducting inventory work throughout the shrub-steppe to provide land managers with objective information regarding the ecological value of the lands.

Sand dune ecosystems conservation recommendations

Dune ecosystems in eastern Washington have been stabilized, converted to agriculture, and used for recreation. NHP scientists have been cataloging the biodiversity values present in these ecosystems and will develop specific conservation proposals during the 2007-2009 biennium, including the possible creation of a natural area.

Interpretive trail at Selah Cliffs NAP

Planning is complete for an interpretive trail that will provide public access and an opportunity to learn more about the natural history of the area. The trail, signs and additional acquisitions are being funded by the Washington Wildlife and Recreation Program.

Additional projects

- ▶ Rare plant conservation recommendations for Palouse and canyon grassland species
- ▶ Pursue expansion of Upper Dry Gulch NAP
- ▶ Conduct numerous rare plant inventory and monitoring projects (in partnership primarily with the U.S. Fish and Wildlife Service)



DNR PHOTOS

Top: Selah Cliffs Natural Area Preserve.

Below: The Striped Whipsnake has been a target of NHP's inventory and conservation planning efforts.

