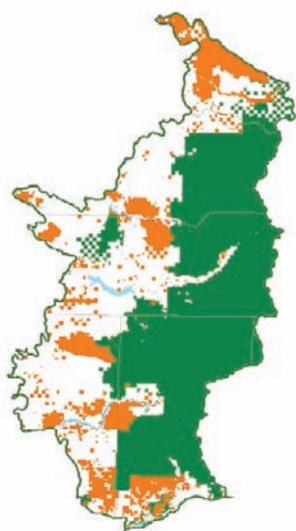


West Cascades Ecoregion

The West Cascades ecoregion extends west from the Cascade crest from Snoqualmie Pass southward to the Oregon-California border. Approximately 8 percent of Washington is within this ecoregion. As of 1991, less than 2 percent of the Washington portion had been converted to urban and/or agricultural use (Washington GAP, 1997).



WEST CASCADES LAND OWNERSHIP

- Federal
- State
- Tribal
- Private



CLIMATE

- ▶ Climate is wet and relatively mild.
- ▶ Precipitation ranges from 55 to 140 inches annually across the ecoregion, most falling from October through April as snow and rain.
- ▶ High elevations in the mountains are continuously covered with snow for months, while middle elevations have significant snow pack that fluctuates over the course of the winter with rain-on-snow events, and the lowest elevations accumulate little snow.

PHYSIOGRAPHY

- ▶ Consists mostly of highlands modified by montane glaciers and associated river valleys.
- ▶ Typical elevation range is 1,000 to 7,000 feet above sea level, with Mount Rainier at 14,410 feet and the lowest Columbia River Gorge elevation at 50 feet.
- ▶ Isolated volcanic peaks and associated high plateaus rise above surrounding steep mountain ridges, formed primarily from extrusive volcanic rocks.
- ▶ Small, steep-gradient streams typically feed major rivers.
- ▶ Natural lakes are frequent, typically created by glacial processes and landslides.

BIOTA

- ▶ Conifer forests are the dominant vegetation. Douglas-fir – western hemlock forests are typical at low elevations, while middle elevations have Pacific silver fir, western hemlock, Douglas-fir, and noble fir, and high elevations have mountain hemlock – silver fir forests and subalpine parklands.
- ▶ Higher elevations on volcanic peaks support alpine heath, meadows, and fellfields among glaciers and rock.
- ▶ Special habitats include riparian areas dominated by broadleaf species, wetlands, grassy balds, and oak woodlands.
- ▶ Mount Rainier and the Columbia River Gorge are areas of high plant diversity; both support rare endemic plant species.
- ▶ The Columbia River Gorge has biogeographic significance because of the mixing of coastal and interior floras.

BIODIVERSITY HIGHLIGHTS

- ▶ Dominated by native vegetation
- ▶ Isolated remnants of old-growth forest remain
- ▶ Columbia River Gorge and Mount Rainier are rich in rare, endemic plant species

MAJOR LANDOWNERS

- ▶ National Park Service
- ▶ U.S. Forest Service
- ▶ DNR
- ▶ Private timber companies

DOMINANT LAND USES

- ▶ Forestry
- ▶ Outdoor recreation / conservation

PRINCIPAL RISKS TO BIODIVERSITY

- ▶ Landscape-level changes in forest composition and structure
- ▶ Loss of old-growth
- ▶ Conversion of forest to non-forest uses
- ▶ Increasing development in valleys
- ▶ Invasive species

CONSERVATION NEEDS

- ▶ Protection and restoration of riparian floodplains and corridors
- ▶ Conservation of grassy balds and oak woodlands
- ▶ Recovery of old-growth dependent species
- ▶ Conservation of Columbia River Gorge rare plants



Table Mountain NRCA





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

Two new natural areas created: Charley Creek NAP and Tahoma NRCA

Trust land transfers were completed for both sites before the end of the 2005-2007 biennium. Additional lands will be a priority for transfer during the 2007-2009 biennium.

Table Mountain NRCA Management Plan completed

Sensitive features within the NRCA have also been protected by rerouting and restoring a hiking trail.

Other Activities

- ▶ West Tiger Mountain NRCA was enlarged.
- ▶ Herbaceous bald inventory and classification completed—Natural Heritage scientists completed an assessment of forest openings dominated by grasses, sedges and forbs.

07 THROUGH 09
Priority Projects/Activities

Charley Creek NAP and Tahoma NRCA acquisitions

Additional transfers are expected to occur within the 2007-2009 biennium.

Habitat restoration within Columbia Falls NAP and Table Mountain NRCA

Old forest roads will be abandoned and restored at these two natural areas.

Other Activities

Identify gaps in natural areas system within the ecoregion in partnership with U.S. Forest Service and National Park Service.



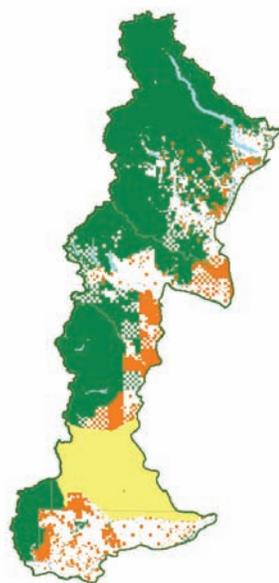
DNR PHOTOS



Top: Americorps crew works on restoration project within Table Mountain NRCA.
Below: Columbia Falls NAP.

East Cascades Ecoregion

The East Cascades ecoregion lies east of the Cascade crest, from Sawtooth Ridge near Lake Chelan south to the Oregon-California border. Its eastern border follows the transition zone between montane forest and lowland shrub-steppe. Approximately 10 percent of Washington is included within this ecoregion. As of 1991, less than 2 percent of the Washington portion had been converted to agricultural or urban development (Washington GAP, 1997). The development that has occurred is concentrated in the Chelan, Wenatchee, upper Yakima, and Little White Salmon valleys.



EAST CASCADES LAND OWNERSHIP

- Federal
- State
- Tribal
- Private



PHYSIOGRAPHY

- ▶ Washington's East Cascades were modified by alpine glaciers and landslides, creating rugged ridges extending southeast to east from the Cascade crest, with broad valleys occupying the lowlands between the mountain ridges.
- ▶ Isolated volcanic cones occur on the steep mountain ridges.
- ▶ Geology of the East Cascades is varied, including large serpentine areas in the Wenatchee Mountains.
- ▶ Elevation generally ranges from 2,000 to 7,000 feet, although Mt. Adams rises to 12,276 feet and the lowest elevation in the Columbia River Gorge is 100 feet.
- ▶ The Wenatchee and Simcoe mountains are eastward extensions of this ecoregion.

CLIMATE

- ▶ Climate changes rapidly west to east, from cold with high precipitation (120 inches) along the Cascade crest to hot and dry with less than 20 inches per year along the foothills.
- ▶ Most precipitation falls from November through April, with a snow pack accumulating at higher elevations.

BIOTA

- ▶ Conifer forests are dominant and usually more open and patchy than forests of ecoregions west of the Cascades.
- ▶ Grand fir – Douglas-fir – ponderosa pine forests are characteristic, while Oregon white oak woodlands appear at lower elevations in the southern half of the ecoregion, and subalpine fir – mountain hemlock – Engelmann spruce are found at higher elevations.
- ▶ Douglas-fir – western hemlock – Pacific silver fir forests are present and locally abundant near low divides of the Cascades. Whitebark pine, lodgepole pine, and western larch are common components of these forests.
- ▶ Decades of fire suppression have resulted in large areas of dense, fire-prone forests that historically experienced stand replacement fires at irregular intervals, from 10 years in the lowland foothills to 150 years or more at high elevations.
- ▶ Shrub-steppe vegetation occurs along the foothills and higher south-facing slopes, generally composed of big sagebrush or antelope bitterbrush with native bunchgrasses.
- ▶ Alpine and subalpine parklands occur on the highest ridges, more commonly north of Snoqualmie Pass.

BIODIVERSITY HIGHLIGHTS

- ▶ Relatively intact, dominated by natural and semi-natural vegetation
- ▶ High concentrations of rare plants in Columbia River Gorge and Wenatchee Mountains
- ▶ Open ponderosa pine forests maintained by frequent, low-intensity fires

MAJOR LANDOWNERS

- ▶ U.S. Forest Service
- ▶ Tribes
- ▶ DNR
- ▶ WDFW
- ▶ Private timber companies

DOMINANT LAND USES

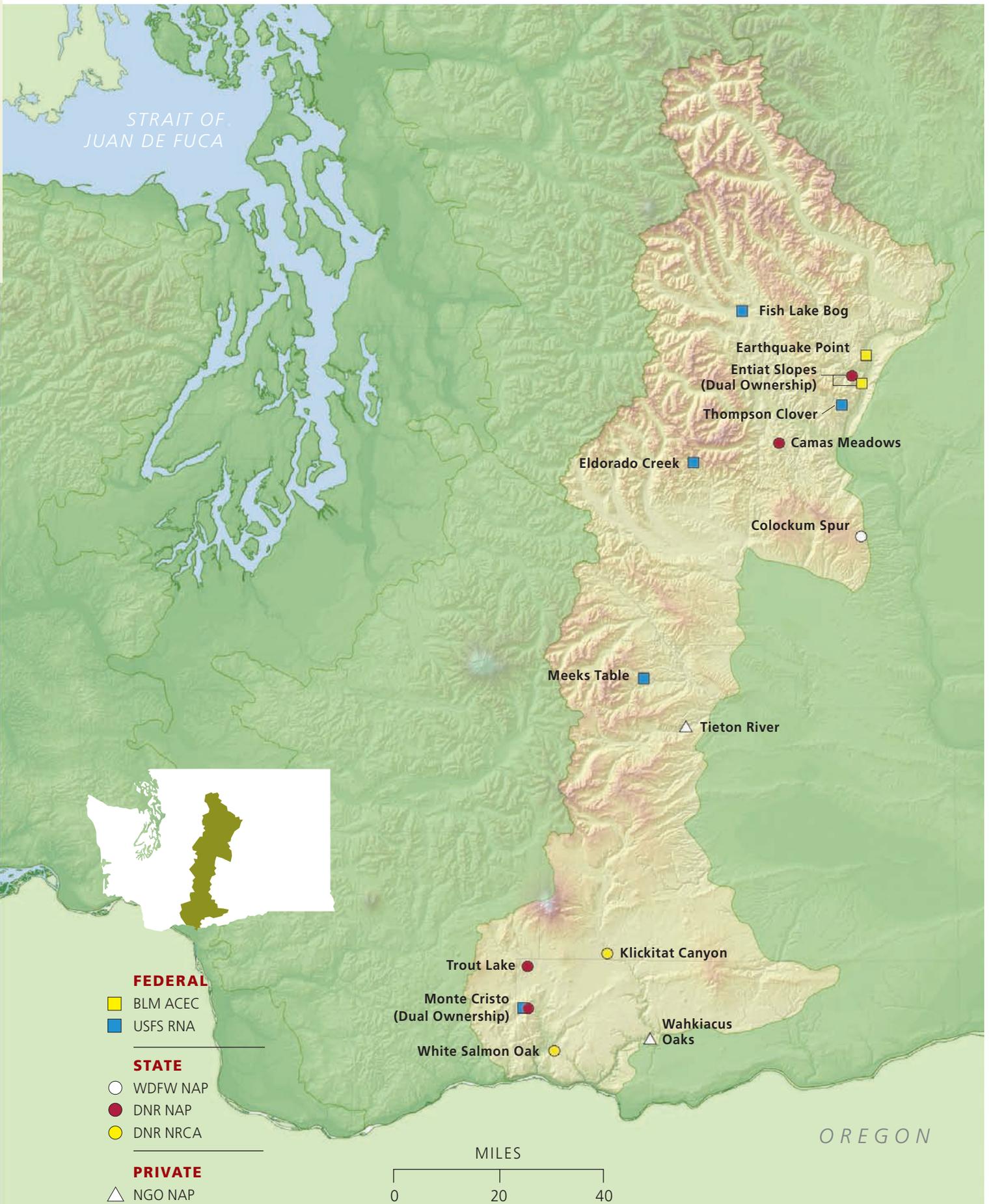
- ▶ Forestry
- ▶ Livestock grazing
- ▶ Outdoor recreation / conservation

PRINCIPAL RISKS TO BIODIVERSITY

- ▶ Landscape-level changes in forest composition and structure
- ▶ Changes in land use; conversion of forest to non-forest uses
- ▶ Fire suppression / catastrophic fire
- ▶ Invasive species
- ▶ Fragmented ownership along eastern edge of the ecoregion

CONSERVATION NEEDS

- ▶ Coordinated strategy for recovery of dry, open, low elevation ponderosa pine forests
- ▶ Improving representation of ponderosa pine and other low elevation ecosystems within natural areas system
- ▶ Invasive plant species control, particularly in grassland habitats
- ▶ Coordinated salmonid recovery
- ▶ Maintaining corridors with the Columbia Plateau ecoregion





Ponderosa pines in the East Cascades ecoregion.



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05 THROUGH 07
Conservation Actions

Showy Stickseed recovery

The Natural Heritage Program botanist participated on the recovery team with USFS and USFWS for Showy Stickseed (*Hackelia venusta*), assisting in development of the draft recovery plan and gathering information to help identify potential introduction sites.

Weevil predation on seeds of rare plant species studied

A monitoring protocol to determine the impact of weevil predation on seeds of Wenatchee Mountains checkermallow (*Sidalcea oregana* var. *calva*) was developed and implemented.

Other activities

- ▶ Habitat enhancement work was initiated for two rare plant species within Camas Meadows NAP
- ▶ Oregon Spotted Frog (*Rana pretiosa*) egg mass counts were conducted at Trout Lake NAP
- ▶ Wetland restoration work was initiated at Trout Lake NAP
- ▶ Rare plant survey methodology was shared with staff of Yakama Indian Reservation

07 THROUGH 09
Priority Projects/Activities

Oregon Spotted Frog management at Trout Lake NAP

The Oregon Spotted Frog has undergone significant rangewide declines. Natural Heritage and Natural Areas staff will undertake several projects during the biennium to address the conservation needs of the frog, including monitoring of reproductive success, assessing the significance of a fungal infection, and restoring portions of the wetland.

Rare plant conservation at Camas Meadows NAP

Vegetation restoration is underway at this site, which is extremely important to the long-term survival of two rare plant species: Wenatchee Mountains checkermallow and Wenatchee Mountains larkspur (*Delphinium viridescens*). The site has changed over the years in response to fire suppression, livestock grazing and alterations to the natural flow of water through the meadows.

Additional projects

- ▶ Identify gaps in the natural areas system within the ecoregion
- ▶ Study weevil predation on seeds of Wenatchee Mountains checkermallow
- ▶ Develop a habitat characterization for Showy Stickseed



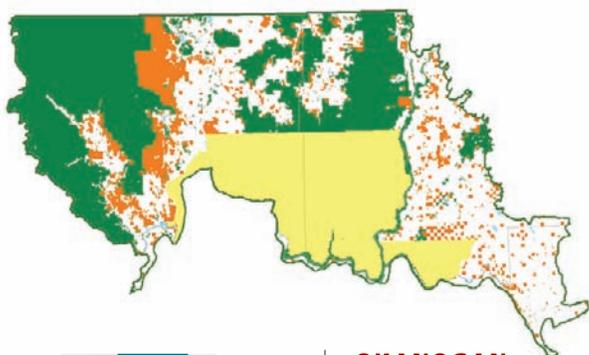
DNR PHOTOS



Top: Trout Lake NAP.
Below: Showy stickseed, a rare plant endemic to the Wenatchee Mountains.

Okanogan Ecoregion

The Washington portion of the Okanogan ecoregion extends from the Cascade crest in the North Cascades east to the Selkirk Mountains. The ecoregion extends up the east slope of the Cascades into Canada and along the west slope of the Canadian Rockies to Kamloops, British Columbia. The southwestern border of the ecoregion follows Sawtooth Ridge northeast of Lake Chelan. The Methow and Okanogan valleys are included, as are the Okanogan Highlands east to the Colville and Spokane valleys. Approximately 14 percent of Washington is within this ecoregion. Less than 10 percent of the Washington portion had been converted to agricultural or urban use as of 1991 (Washington GAP, 1997). Development is concentrated in the Spokane, Colville, Methow and Okanogan valleys.



OKANOGAN LAND OWNERSHIP

- Federal
- State
- Tribal
- Private

PHYSIOGRAPHY

- ▶ This ecoregion is less distinct than others in Washington, being more transitional and having characteristics of adjacent areas.
- ▶ The northeast Cascades peaks, rising to more than 9,400 feet, are the highest and most rugged part of the ecoregion, giving way to a series of low elevation valleys at about 750 feet.
- ▶ The mountains to the east in the Kettle Range and Huckleberry Mountains are more rounded.
- ▶ Continental and alpine glaciers played a major role in shaping these landforms.

CLIMATE

- ▶ Overall, the ecoregion has the coldest climate in the state due to the presence of cold, dense arctic air in winter. However, it also experiences hot, dry air from the Columbia Basin in the summer.
- ▶ The western portion of the ecoregion is in the rain shadow of the Cascade Mountains, while the eastern portion is in a zone of increasing precipitation created by the Rocky Mountains.
- ▶ Annual precipitation ranges from less than 12 inches annually in the Okanogan Valley to between 50 and 90 inches in the Cascades, with most of the ecoregion receiving 14 to 24 inches.
- ▶ There are fairly steep temperature and precipitation gradients from the mountains to the valleys within this ecoregion.

BIOTA

- ▶ Conifer forests dominate the mountain ridges and low hills, and are more open and less continuous, consisting of smaller stands, than forests west of the Cascade crest and in the Canadian Rockies.
- ▶ Valleys and lowlands are often non-forested.
- ▶ Douglas-fir – ponderosa pine forests are characteristic, transitioning to shrub-steppe in the low broad valleys in the east and to grasslands in the west.

- ▶ Subalpine fir – Engelmann spruce forests occur at higher elevations, while Whitebark pine, lodgepole pine, and subalpine larch form parklands in the highest elevations, often associated with dry alpine or subalpine meadows.

- ▶ Moisture forests are dominated by Douglas-fir, with western larch, western white pine or quaking aspen as common components.

- ▶ 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 dense, fire-prone forests.

BIODIVERSITY HIGHLIGHTS

- ▶ Relatively intact, dominated by natural and semi-natural vegetation
- ▶ High numbers of rare plant species on Chopaka Mountain and in Kettle Range
- ▶ Many species at the edge of their natural range
- ▶ Important for wide-ranging carnivore species

MAJOR LANDOWNERS

- ▶ U.S. Forest Service
- ▶ Tribes
- ▶ DNR
- ▶ WDFW

DOMINANT LAND USES

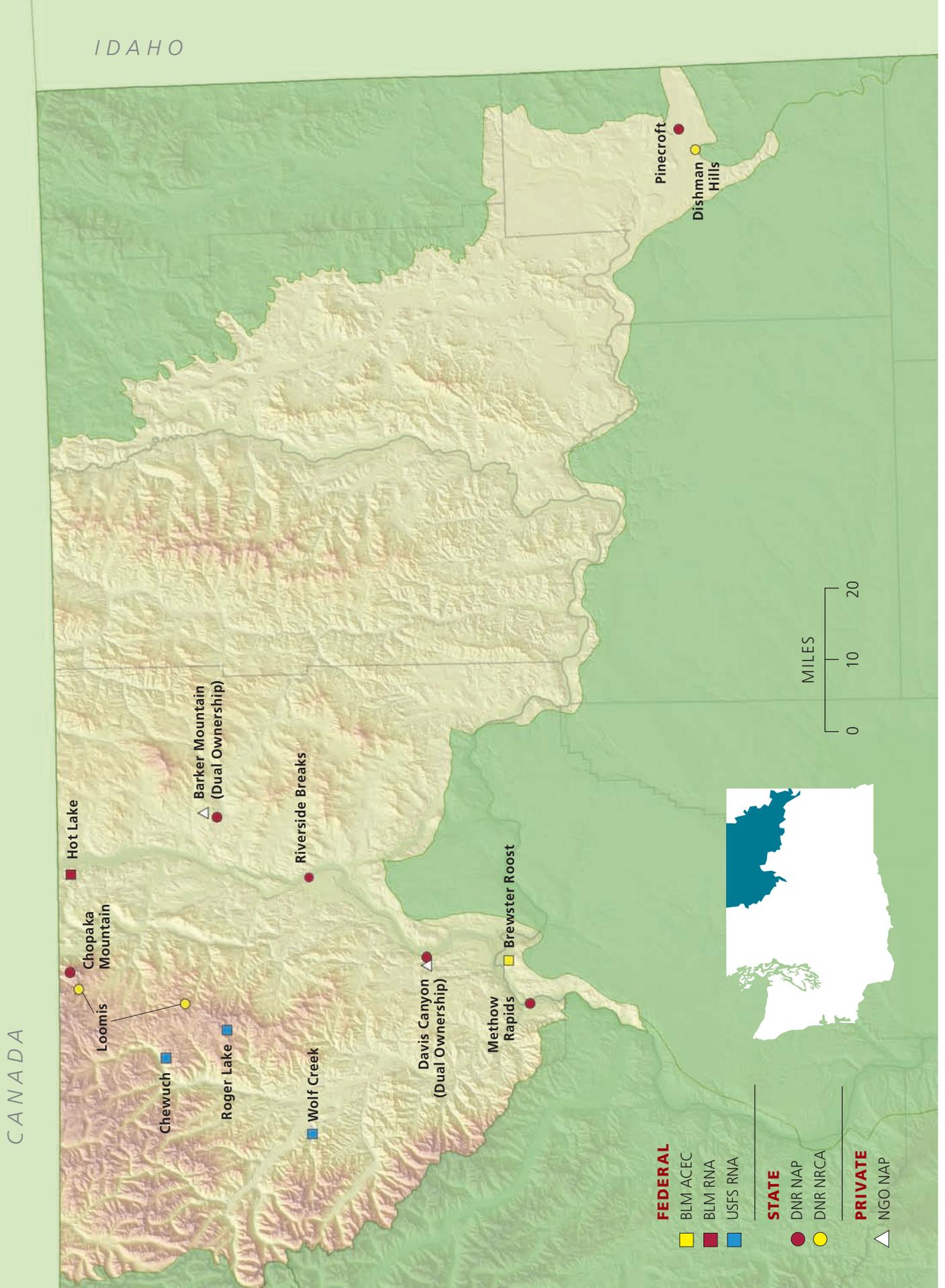
- ▶ Livestock grazing
- ▶ Forestry
- ▶ Agriculture
- ▶ Conservation / outdoor recreation

PRINCIPAL RISKS TO BIODIVERSITY

- ▶ Excessive grazing
- ▶ Invasive species
- ▶ Landscape-level change in forest composition and structure
- ▶ Fire suppression / catastrophic fire
- ▶ Increasing development, particularly at lower elevations

CONSERVATION NEEDS

- ▶ Coordinated recovery of dry, open, low elevation ponderosa pine – Douglas-fir forests
- ▶ Maintenance of lodgepole pine forests
- ▶ Invasive plant species control in shrub-steppe
- ▶ Coordinated riparian ecosystem and fish recovery efforts
- ▶ Coordinated recovery of grizzly bear, gray wolf, lynx, and martin



View from Slate Peak





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05 THROUGH 07

Conservation Actions

Pinecroft NAP used as outdoor lab for high school science students

Students at Spokane’s North Central High School conduct research at Pinecroft NAP. The students hold an annual conference and publish their research in the North Central High School Journal of Science. Recent research topics have included assessments of insects, soil fertility, and microclimates within the preserve.

Fire reintroduced to Davis Canyon NAP

Decades of fire suppression has resulted in changes to many of Washington’s ecosystems, in particular those within areas with a high natural fire frequency. A controlled burn was used at Davis Canyon NAP to reduce the amount of late-seral bitterbrush/bunchgrass.

Other activities

- ▶ Natural Heritage participated with WDFW, TNC and others in development of an ecoregional assessment for the Okanogan
- ▶ Natural Areas scientists provided advice regarding fire suppression activities for the Tripod Complex fire, and began restoration efforts on the Loomis NRCA
- ▶ DNR staff completed a boundary expansion for Methow Rapids NAP and successfully competed for conservation grant funding
- ▶ Natural Areas and the NE Region provided support for volunteer inventory for rare plants on Chopaka NAP and adjacent portions of the Loomis NRCA

07 THROUGH 09

Priority Projects/Activities

Increase protection for Methow Rapids Natural Area Preserve

An expanded boundary was approved last biennium with the goal of improving the protection for the features present within the site. Depending on availability of funds and willing sellers, lands will be acquired and added to this NAP.

Water howellia monitoring

Natural Heritage will implement a monitoring protocol for this federally threatened annual plant species known from Dishman Hills NRCA as well as from one trust land site within the ecoregion. The monitoring protocol is being used on several federally-managed sites that harbor this species.

Additional projects

- ▶ Identify gaps in the natural areas system within the ecoregion
- ▶ Monitor post-fire ecosystem recovery within Loomis NRCA; implement fire rehabilitation projects.
- ▶ Monitor the effects of prescribed burning at Davis Canyon NAP



DNR PHOTOS



Top: Prescribed fire used as a management tool at Davis Canyon NAP.
Below: Methow Rapids NAP