OAK HABITATS (Proposed change from Woodlands)

There are several oak habitat types in Oregon, where oaks comprise most of the canopy. These can include oak savannah, oak woodlands, oak forest, and riparian oak. Oaks may also co-dominate a canopy in oak/fir, oak pine, and oak hardwood habitats.

ECOREGIONS

The range of oak habitats from oak forests to oak savannah are collectively a Key Habitat in the Coast Range, East Cascades, Klamath Mountains, West Cascades, and Willamette Valley ecoregions.

CHARACTERISTICS

In general, the understory of an Oregon white oak woodland is relatively open with shrubs, grasses, and wildflowers. The tree canopy of most oak woodland obscures 25-75 percent of the sky, and an oak forest typically has more than 75 percent cover. Oak savannas are grasslands with scattered oak trees, generally only one to five trees per acre. Riparian oak can tolerate wetter conditions and may be mixed with other tree species including ash and willow. Oak habitats are ideally maintained through periodic, low-intensity fire, which removes small conifers and maintains a moderate cover of low shrubs.

Depending on the ecoregion and site characteristics, oak habitats may also include ponderosa pine, California black oak, Douglas-fir, madrone, canyon live oak, and tanoak. Tanoak is closely related to true oaks, sharing a family, but is not a true oak. Tanoak, however, is an important mast producer often associated with canyon live oak.

ECOREGIONAL CHARACTERISTICS

Coast Range

Oak habitats are typically found in drier landscapes, such as south-facing slopes and foothills bordering the Willamette Valley. The southwestern Oregon coast range is the northerly extent of the range of canyon live oak and tanoak.

East Cascades

In the East Cascades ecoregion, oak woodlands occur primarily on the north end of the ecoregion and in the south along the Klamath River Canyon. They are located at the transition between ponderosa pine or mixed conifer forests in the mountains, and the shrublands or grasslands to the east. Oak habitats in the East Cascades are different in structure and composition than those in western Oregon but are just as important to a variety of wildlife and rare plants.

Klamath Mountains

Oak habitats are found in lower elevations in the valley floors up to 4000', on dry sites, or in areas with frequent, low-intensity fires. Oak woodlands may occur in a mosaic with chaparral and dry conifer woodlands. Nearing the northern extent of its range in this ecoregion, chapparal is dominated by shrubs species including buckbrush and manzanita thickets, with deer brush, yerba santa, and silk tassel making up the rest of the shrub component.

West Cascades

Oak woodland habitats are found in drier landscapes, such as south-facing slopes and foothills bordering the Willamette Valley. Oak habitats extend up to 3500' in southwestern Oregon in the West Cascades. Portions of the West Cascades may have historically had a more closed canopy oak habitat as well as very expansive chaparral that filled the understory.

Willamette Valley

In the Willamette Valley, Oregon white oaks were originally found in a mosaic of oak savanna, forests, and riparian habitats throughout the valley floor and low-elevation slopes. One variation of oak habitat, that has almost disappeared due to historic harvest, is white oak and Willamette Valley ponderosa pine. This habitat type is found in valley bottoms and is tolerant of seasonal flooding. Oaks were most common on flat to moderately rolling terrain, usually in drier landscapes, and often between prairie remnants and conifer forests. Today, oak woodlands generally are found in small pockets and some corridors surrounded by other land uses, such as development or agriculture.

CONSERVATION OVERVIEW

Oak habitats, traditionally managed on a landscape scale by Tribes, once covered almost one million acres in the Coast Range and 400,000 acres in the Willamette Valley. However, the Coast Range now has less than 6 percent of its estimated historical oak woodlands, and the Willamette Valley less than 3 percent. Habitat loss has been less severe in the East Cascades, where fire suppression may have led to expansion of oaks into former shrub-steppe and grassland habitats. Valuing Traditional Ecological Knowledge and practices in oak management is critical to protecting and restoring oak habitats. The many generations of Indigenous oak management have played a central role in the extent of oak within Oregon.

Oak habitats have been impacted by conversion to other land uses, invasive species, and vegetation changes due to fire suppression. As a result of conifer plantings and changes in

fire frequency and intensity after European settlement, Douglas-fir now dominates in many areas of the Coast Range and Willamette Valley foothills. Fire suppression contributes to the transition from oak to mixed conifer due to high density of Douglas fir and pine, with the Douglas fir experiencing mass mortality due to severe drought conditions.

Oak habitats are being converted to agriculture, residential, and other uses in the Willamette Valley, the Coast Range foothills, and the coastal hills in southern Oregon. Although loss of oak woodland in the Klamath Mountains is not currently as severe as in the Willamette Valley, increasing development threatens these habitats. The same rolling hills and scenic landscapes that indicate healthy pine-oak habitat also attract new residents and developers. Because much of the remaining oak are in private ownership and maintenance of these habitats requires active management, cooperative incentive-based approaches are crucial to conservation.

Oak habitats provide important food sources, shelter, and resting places for large range of birds and wildlife. Loss of oaks, particularly large-diameter, open-structured trees valuable to wildlife, is of particular concern because oak trees have a slow growth rate, slowing restoration success. In addition, reproduction and recruitment of younger trees are poor in many areas.

Sudden oak death, a fungal tree pathogen identified in northern California in the 1990s has been slowly spreading north. In 2001, the pathogen was detected in Curry County, which continues to be the only area in Oregon where the pathogen is known to occur in a natural setting. Mediterranean oak borer was found in Oregon in 2018 and is also being tracked.

Depending on the area, Species of Greatest Conservation Concern associated with oak habitats include Columbian white-tailed deer, Acorn Woodpecker, Chipping Sparrow, White-breasted Nuthatch, Lewis's Woodpecker, Western Bluebird, white rock larkspur, and wayside aster. Northern spotted owl may utilize oak trees in a mixed forest setting.

LIMITING FACTORS AND RECOMMENDED APPROACHES

Limiting Factor: Fire Suppression and Fir Encroachment

With fire suppression, Douglas-fir encroaches into oak habitats and eventually shades out oak trees and seedlings, as well as other plants that require open growing conditions. Many oak woodlands are now dominated by Douglas-fir or have transitioned to fir-oak habitats due to fire suppression. Without active management, these areas will eventually become conifer forests. In some areas of the East Cascades, fire suppression combined with

grazing has influenced fine fuel production and led to encroachment by conifers and establishment of dense patches of small, shrubby oaks.

Large wildfires, like those experienced across the West Cascades and Eastern Oregon have galvanized public interest in fuels reduction treatments across public and private lands. When conducted in a manner to retain some understory habitat for wildlife, such as thinning of small diameter conifers and small diameter oak-on-oak encroachment with piles and habitat clumps, oak habitats can be restored to fire resiliency and prepped for low-intensity controlled burns.

Recommended Approach

Updating policy that hinders managed fire on the landscape will enable more prescribed fire. Certified Burn Manager program and cultural waivers are examples of policy improvements. Use multiple tools, including prescribed fire, mowing, grazing, and selective harvest to maintain open canopy oak-dominated woodlands. Ensure that tools are site-appropriate and implemented to minimize impacts to native species. Re-establish site-appropriate native grasses, herbaceous plants, and shrubs. (KCI: Disruption of Disturbance Regimes)

Limiting Factor: Land Use Conversion and Continued Habitat Loss

Particularly in the Willamette Valley and Klamath Mountains ecoregions, oak habitats continue to be converted to agricultural (especially vineyards), rural residential, and urban uses. Habitat loss can contribute to habitat fragmentation for wildlife, leading to increased wildlife, invasive species, and spread of diseases. Remaining oaks can be impacted by soil compaction in agricultural and residential settings.

Recommended Approach

Much of the remaining oak habitat requires active management and occurs on private land, where cooperative incentive programs are the best approach. Work with private landowners to maintain and restore oak habitats. Promote oak conservation on working lands. Work with local communities to plan development in a manner that conserves critical habitats. Encourage protections for oaks in land use actions. Create new opportunities for acquisition and conservation easements to protect oak habitat.

Limiting Factor: Loss of Habitat Structure

Large-diameter oak trees with lateral limb structure and cavities have been lost. In many areas, there are not sufficient numbers of replacement trees to maintain these habitat elements over time. In the absence of fire, densely stocked, regenerating oaks often do not develop open-grown structures due to shading. In the East Cascades, grazing or very hot

fires can lead to development of brushy-structured trees. The shaded or grazed oaks do not develop the lateral limbs, cavities, and higher acorn crops of open-grown trees, and are thus less valuable to wildlife. Woodcutting often removes snags.

Recommended Approach

Maintain a diversity of tree sizes and ages across the stand, with emphasis on large oak and other key tree species appropriate to the habitat type. Remove conifers that are competing with larger oaks. Maintain snags and create snags from competing conifers to provide cavity habitat. Encourage oak reproduction through plantings or protective exclosures. It may be appropriate to use nest boxes as temporary cavity habitat in oak restoration project areas. Improve methods to promote oak reproduction and creation of open-grown structures.

Limiting Factor: Invasive Species and Diseases

In many oak woodland stands, the overstory is intact but the understory is highly degraded. Depending on the ecoregion and site, invasive plants, such as Armenian (Himalayan) blackberry, bird cherry, evergreen blackberry, Scotch broom, English hawthorn, false brome, yellowstar thistle, diffuse knapweed, and puncturevine, invade and degrade oak habitats.

Invasive insects, such as the Mediterranean oak borer and carpenter worm moth spread diseases, cause defoliation, and weaken the structure of the trees. Fungal diseases such Sudden Oak Death and Armillaria root rot can also significantly impact oak trees.

Recommended Approach

Identify the best remaining native oak habitats and work with landowners to maintain habitat quality. Emphasize prevention, risk assessment, early detection, and quick control to prevent new invasive species from becoming fully established. Prioritize control efforts and use site-appropriate methods to control newly established invasive plant species for which management can be most effective. In high-risk areas, use weed-wash stations for machinery during mechanical restoration or treatment of a site. Re-seed with site-appropriate native grasses and forbs after control efforts. Prescribed burning may be useful for management of some invasive species, particularly shrubs. Support efforts toward expanding native seed resources. (KCI: Invasive Species)

Limiting Factor: Climate Change

The mean annual air temperature in the Pacific Northwest is projected to increase under a changing climate. This warming is projected to be the highest during the summer. Annual

precipitation patterns in the Pacific Northwest may also be changing. While there is always uncertainty in projections, the general trend shows winter precipitation to increase and summer precipitation to decrease. While oaks may be tolerant of warmer and drier summer conditions, the severity of the impact may have detrimental effects.

Recommended Approach

Protect and restore a diverse portfolio of oak habitats to preserve genetic diversity. Continue efforts to restore currently degraded areas and re-establish former oak habitats. Engage in strategic, landscape-scale planning efforts to create a connected and resilient network of oak habitats. Identify where future climate conditions may support oak habitats, including areas upslope of their current range where they were not historically found. Identify data gaps and support research needs.

HABITAT TRENDS ANALYSIS

Open Oregon white oak and black oak woodlands were common across western Oregon prior to Euro-American settlement. Their open structure was maintained by fire and the subsequent fire suppression and development pressures of the 20th century led to a loss of oak woodlands. A 2025 trends analysis finds a significant decrease in oak woodlands/forests in favor of oak and conifer forests and agricultural uses between 1851 and both 1998 and 2016. Approximately 8% of the 1851 oak forests were still oak forests in 2016; it appears that many contemporary oak forests and woodlands are historic meadows with oak encroachment.

REFERENCES

Altman, B. and J. L. Stephens. 2012. Land Managers Guide to Bird Habitat and Populations in Oak Ecosystems of the Pacific Northwest. American Bird Conservancy and Klamath Bird Observatory. 82 pp.

Brunner, R. and E. Gaines. Institute for Natural Resources. 2025. Oregon Vegetation Change 1851-2023. Trends analysis conducted for Oregon Department of Fish and Wildlife.

RESOURCES FOR MORE INFORMATION

Willamette Valley Oak and Prairie Cooperative Strategic Action Plan

OR-WA Partners in Flight Landbird Conservation Strategy

OR-WA Partners in Flight Eastslope Cascades Conservation Strategy

Land Manager's Guide to Bird Habitat and Populations in Oak Ecosystems of the Pacific Northwest

Oregon White Oak Restoration Strategy for National Forest System Lands East of the Cascade Range

Cascadia Prairie Oak Partnership Technical Library of Resources: https://cascadiaprairieoak.org/technical-library

Restoring Oak Habitats in Southern Oregon & Northern California v2.0

Restoring Oak Habitats in Southern Oregon & Northern California: A Guide for Private Landowners v3.0

Klamath Siskiyou Oak Network and the Umpqua Oak Network: Bridging the need of doing work on private lands for the benefit of oak restoration and fire resiliency

Oak Alliance-oakalliance.org

https://woodlandfishandwildlife.com/wp-content/uploads/2019/12/Wildlife-Friendly-Fuels-Reduction-in-Dry-Forests-of-the-Pacific-Northwest_reduced.pdf

Methods for landowners to practice to protect the health of individual trees: https://www.nps.gov/articles/oak-decline.htm

Prairie, Oaks, and People – A Conservation Business Plan to Revitalize the Prairie-Oak Habitats of the Pacific Northwest; https://cascadiaprairieoak.org/documents/prairie-oaks-and-people-a-conservation-business-plan-to-revitalize-the-prairie-oak-habitats-of-the-pacific-northwest

Patterns of Vegetation Change in Grasslands, Shrublands, and Woodlands of Southwest Oregon: https://www.blm.gov/or/districts/medford/files/pattvegchange.pdf

https://www.oregon.gov/oda/programs/PlantHealth/Pages/SODProgram.aspx