



WILLAMETTE VALLEY
OAK & PRAIRIE
COOPERATIVE

Savanna & Woodland **Habitat Types**

of the south Willamette Valley



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Introduction

The following habitat key is designed to help the common person, regardless of training level, to identify oak savanna, woodland, and forest types in the Willamette Valley. By focusing on the key features of canopy cover, tree species composition, and understory characteristics, this guide can help determine the basic management techniques necessary to restore and uphold native habitats.

Intact oak savannas, woodlands, and prairies in the Pacific Northwest support some of the highest biodiversity in the region. Having co-evolved with Indigenous land stewardship, they provide numerous cultural and ecological values and depend on regular management to persist.

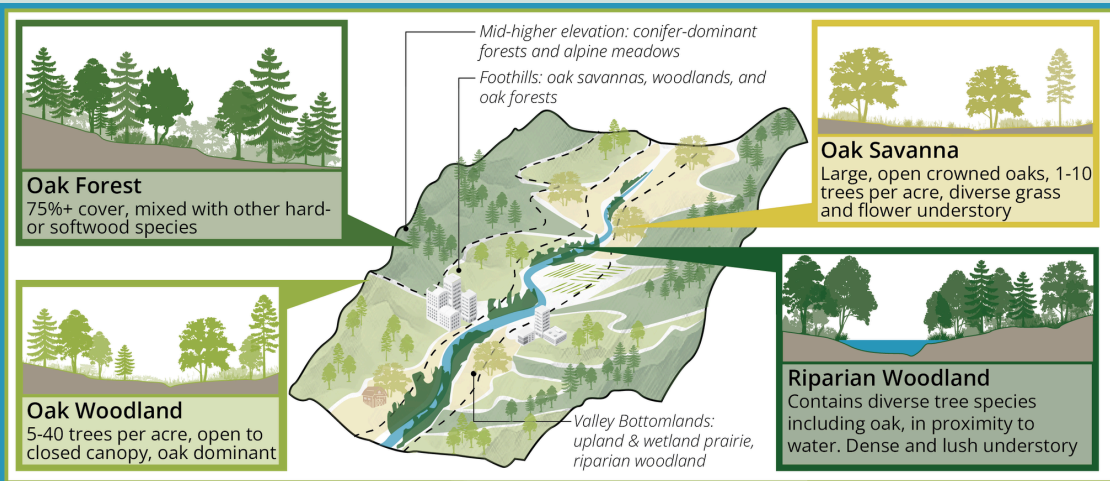
Acknowledgements

The habitat classifications were based on those in "[Land Manager's Guide to Bird Habitat and Populations in Oak Ecosystems of the Pacific Northwest](#)" by Bob Altman & Jaime Stephens (2012). Content was then modified for the Willamette Valley by Ed Alverson and Katie 'Day' MacKendrick. This booklet was created by Abby Andrus.

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Habitat Gradient

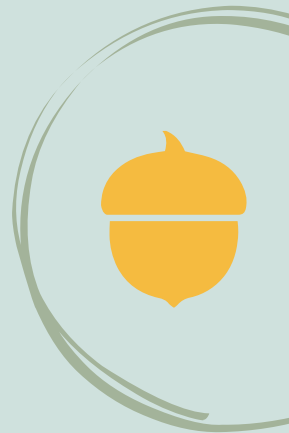


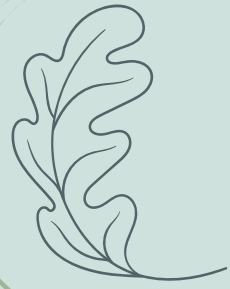
Figure

Depiction of the various forested oak habitats in the Southern Willamette Valley. Mid-higher elevation includes conifer-dominant forests and alpine meadows. Foothills include oak savannas, woodlands and oak forests. Valley bottomlands include upland and wetland prairie, and riparian woodland.

From Oregon State University Extension's "[Managing Willamette Valley margin forests with fire in mind](#)" by Lauren Grand (2024).

Graphic by Miranda Hawkes (Long Tom Watershed Council).





Habitat Types

- Prairie
- Oak Savanna
- Mixed Savanna
- Oak/Pine Savanna or Woodland
- Open Oak Woodland
- Closed Oak Woodland
- Mixed Woodland
- Oak/Hardwood Woodland or Forest
- Oak Forest
- Oak/Fir Forest
- Riparian Oak Forest

Prairie



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
0-5%	<1 tree per acre	Occasional trees may be oak, ash, or other species	Grasses and forbs dominant.

Historic Condition	Existing Condition	Implication	Management Strategy
Minimal canopy and shrub cover, seedlings/saplings killed through regular burning	Significantly more shrub and small tree cover	Fire exclusion	Fuels reduction actions - remove non-native shrubs, reduce native tall shrubs
High native grass/forb diversity; sparse or low stature vegetation	Low native grass/forb diversity; sparse or low stature vegetation	Overgrazed or overmowed	Controlled burn, plant natives

Oak Savanna



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
5-25%	1-5 large trees or 1-10 younger trees per acre	>90% of mature trees are oak	5-10% shrub/small tree cover Remainder grasses and forbs. Retain a component of saplings to allow for desired level of long term recruitment.

Historic Condition	Existing Condition	Implication	Management Strategy
Minimal shrub cover and minor component of oak recruitment	Significantly more shrub and small tree cover	Fire exclusion	Fuels reduction actions - remove non-native shrubs, reduce native tall shrubs
High native grass/forb diversity; sparse or low stature vegetation	Low native grass/forb diversity; sparse or low stature vegetation	Overgrazed or overmowed	Controlled burn, plant natives

Mixed Savanna



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
5-25%	1-5 large trees or 1-10 younger trees per acre	Mixture of oak and conifers (Douglas-fir, Ponderosa pine, Incense Cedar)	5-10% shrub/small tree cover; remainder grasses and forbs. Retain a component of saplings to allow for desired level of long term recruitment.

Historic Condition	Existing Condition	Implication	Management Strategy
Minimal shrub cover and minor component of tree recruitment	Significantly more shrub and small tree cover	Fire exclusion	Fuels reduction actions - remove non-native shrubs, reduce native tall shrubs
High native grass/forb diversity; sparse or low stature vegetation	Low native grass/forb diversity; sparse or low stature vegetation	Overgrazed or overmowed	Controlled burn, plant natives

Oak / Pine Savanna or Woodland



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
5-75%	1-5 (sav, min) or 10-30 large trees (woodland, max). 1-10 (sav, min) or 20-40 (woodland, max) younger trees	Oak-Ponderosa pine codominant	5-10% shrub/small tree cover; remainder grasses and forbs. Retain a component of saplings to allow for desired level of long term recruitment.

Historic Condition	Existing Condition	Implication	Management Strategy
Grasses dominate spaces between oaks and pines, age class diversity in tree species, but no more than canopy cover targets	Grasses dominate spaces between oaks and pines, age class diversity in tree species, but no more than canopy cover targets	Natural community type, drier site, older pines persistent	Sustain management actions
Savanna: minimal shrub cover and minor component of tree recruitment. Woodland: may have patches of greater cover of tall shrubs	Significantly more native and non-native shrub and small tree cover	Fire exclusion	Fuels reduction actions - remove non-native shrubs, reduce native tall shrubs where appropriate (savanna)

Open Oak Woodland



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
25-50%	5-10 large trees or 10-20 younger trees per acre	>90% of mature trees are oak	Variable shrub/small tree cover; may have areas of dense tall shrubs such as California hazel

Historic Condition	Existing Condition	Implication	Management Strategy
Tall shrub component which may be dense	Significantly more native shrub and small tree cover than in savanna	Fire exclusion; absence of management	Fuels reduction actions - remove non-native shrubs
High native grass/forb diversity; sparse or low stature vegetation	Low native grass/forb diversity; sparse or low stature vegetation	Overgrazed or overmowed	Controlled burn, replenish soil carbon, plant natives
Overstory a combination of open grown legacy trees and oak sprouts maintained by occasional fire	Legacy trees crowded with younger trees	Fire exclusion; absence of management	Release legacy trees, and/or restore to oak savanna if this condition is documented historically

Closed Oak Woodland



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
50-75%	10-30 large trees or 20-40 younger trees per acre	>90% of mature trees are oak	Variable shrub/small tree cover; may have areas of dense tall shrubs such as California hazel

Historic Condition	Existing Condition	Implication	Management Strategy
Tall shrub component which may be dense	Significantly more native shrub and small tree cover than in savanna	Fire exclusion	Fuels reduction actions. Consider restoring to open oak woodland conditions, or manage for merchantable sawlogs.
Mixed-age tree canopy with some legacy trees	Legacy trees crowded with younger trees	Fire exclusion; absence of management	Release legacy trees and restore to open or closed oak woodland

Mixed Woodland



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
25-75%	5-10 large trees or 10-20 younger trees per acre	Mixture of oak and conifers (Douglas-fir, Ponderosa pine, Incense Cedar)	Variable shrub/small tree cover; may have areas of dense tall shrubs such as California hazel

Historic Condition	Existing Condition	Implication	Management Strategy
Tall shrub component which may be dense	Significantly more shrub and small tree cover	Fire exclusion; absence of management	Fuels reduction actions - remove non-native shrubs
Mixed diversity and abundance of herbaceous species depending upon shrub density. Understory may include a component of fire followers	Low native grass/forb diversity; sparse or low stature vegetation	Overgrazed or overmowed	Controlled burn, replenish soil carbon, plant natives
Mixed-age tree canopy with some legacy trees	Legacy trees crowded with younger trees	Fire exclusion; absence of management	Release legacy trees, and/or restore to savanna if this condition is documented historically

Oak Forest



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
75%+	~>30 large trees or >40 smaller trees/acre	>90% of mature trees are oak	Variable shrub/small tree cover; may have areas of dense tall shrubs such as California hazel

Historic Condition	Existing Condition	Implication	Management Strategy
Trees were columnar in shape with limited branching and crown foliage volume	Trees are columnar in shape with limited branching and crown foliage volume	Competition for resources	Consider restoring to open or closed oak woodland conditions, or manage for merchantable sawlogs
Uncertain; understory shrub density may have been high	Subcanopy and understory devoid of woody vegetation	Lack of sunlight reaching forest floor (due to fire exclusion)	Consider restoring to open or closed oak woodland conditions, or manage for merchantable sawlogs
Uncertain, understory may have varied depending upon soils, slope/aspect, elevation	Subcanopy and understory densely vegetated with shade tolerant forb, shrub and tree species	Moist, productive soil	Consider restoring to open or closed oak woodland conditions, or manage for merchantable sawlogs. Fuels reduction actions.

Oak / Fir Forest



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
75%+	~>30 large trees or >40 smaller trees/acre	Oak-fir codominant	<5%-sparse shrub; small tree cover; remainder ferns, graminoids and forbs

Historic Condition	Existing Condition	Implication	Management Strategy
Uncertain; understory shrub density may have been high	Significantly more shrub and small tree cover	Fire exclusion; absence of management	Fuels reduction actions
Uncertain, some ecological factors would have allowed oak to persist in overstory	Dead or dying oak trees in canopy or subcanopy / younger firs overtopping older oaks	Fire exclusion	Restore to open oak woodland or oak savanna conditions. Harvest fir for timber
Historically limited in extent	Foothill elevational transition into Doug-fir forest / north aspect or moister soil types w/in oak habitats	Natural community type	Sustain management actions

Oak/Hardwood Woodland or Forest



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
50%+	10-30 large trees or 20-40 younger trees per acre	Oak-ash (wetter), Oak-maple (drier), Oak-madrone (driest) codominant. May have minor conifer component.	Variable depending on canopy cover and wet or dry. Closed canopy = sparse shrubs, remainder grasses and forbs. Open canopy = ~30% shrub cover, remainder grams and forbs (wetter); sparse shrubs, remainder grasses and forbs (drier, driest)

Historic Condition	Existing Condition	Implication	Management Strategy
Uncertain; understory shrub density may have been high	Dense canopy, trees are columnar in shape with limited branching and crown foliage volume	Fire exclusion	Fuels reduction actions
Uncertain, understory may have varied depending upon soils, slope/aspect, elevation	Open or closed canopy with robust native shrub, tree, forb and gram understory. see riparian oak	Natural community type	Sustain management actions

Riparian Oak Forest



Canopy Cover	Stand Density	Desired Overstory	Desired Understory
75%+	10-30 large trees or 20-40 younger trees per acre	Oak dominant to codominant with hardwood or rarely conifer	Variable, more likely denser understory shrubs and sub-canopy trees. if seasonal pools, more herbaceous composition

Historic Condition	Existing Condition	Implication	Management Strategy
Productive soils, adjacent to water body(s) such as creeks and smaller rivers. Typically on natural levees on silt/clay soils in mosaic with Oregon ash forest on lower wetter ground.	Productive soils, adjacent to water body(s) such as creeks and smaller rivers. Typically on natural levees on silt/clay soils in mosaic with Oregon ash forest on lower wetter ground.	Natural community type	Sustain management actions

Key Features

Here are some characteristics to maintain in any savanna or woodland that are known to support numerous species and ecological functions:

- Large diameter trees with low-growing, spreading limbs
- Age diversity of trees
- Snags (standing dead trees), dead wood, and tree cavities
- Patchy shrub cover
- Gradual transitions ("feathered edge") from open landscape to denser forest

General Notes

- Poison oak cover in all types is likely much higher now than it was historically prior to Euroamerican settlement due to grazing and fire exclusion
- Non-native shrubs should be removed throughout: blackberries, Scotch broom, roses, English hawthorn, feral fruit trees, etc.
- Adding soils carbon (i.e. lop & scatter or woodchips) may not be beneficial for native herbaceous diversity and abundance in savanna
- Fuels reduction actions may include thinning, mastication, mowing, herbicide application. Maintain with prescribed burning if possible.

Find more resources and updates about the Willamette Valley Oak and Prairie Cooperative at:

oakalliance.org/partnerships/wvopc/

