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PONDEROSA PINE WOODLANDS

Ponderosa pine woodlands are common in Oregon’s eastside ecoregions. While dominated by ponderosa pine, these woodlands may also have lodgepole pine, western juniper, aspen, western larch, grand fir, Douglas-fir, mountain mahogany, incense cedar, sugar pine, or white fir, depending on ecoregion and site conditions. Known for their open forest structure, these woodlands generally have less than 40 large trees per acre. Their understories are variable combinations of fire tolerant shrubs, herbaceous plants, and grasses. Ponderosa pine forests are generally found in regions with arid conditions with summer rainfall. Annual rainfall totals 10 to 21 inches with 2 to 6 inches falling in the summer months. Average annual precipitation ranges from 14 to 30 inches. Elevations range from 100 ft to over 6000 ft. Tree canopy cover is usually between 10 – 60% creating a woodland savanna habitat.

ECOREGIONS

Ponderosa pine woodlands are a Key Habitat in the **Blue Mountains, East Cascades,** and **Klamath Mountains** ecoregions Ponderosa pine woodlands are scattered along the drier eastern fringes and some moist habitat in the Willamette Valley.

CHARACTERISTICS

The open structure of ponderosa pine habitats was historically maintained by frequent, low-intensity surface fires, with some intermittent higher-intensity fires. The thick bark of mature ponderosa pines provides protection against moderate fires, allowing these trees

24 to survive and regenerate after fire events. The structure and composition of ponderosa
25 pine woodlands vary across the state, depending on local climate, soil type and moisture,
26 elevation, aspect, and fire history. The soils in ponderosa pine woodlands are often well-
27 drained and sandy or loamy. Ponderosa pine woodlands typically have an open canopy
28 structure, allowing sunlight to penetrate and support a diverse understory of herbaceous
29 plants and shrubs.

30 ECOREGIONAL CHARACTERISTICS

31 **Blue Mountain**

32 In this ecoregion, ponderosa pine often coexists with other conifers, such as Douglas-fir,
33 western larch, and grand fir. The understory is diverse, including shrubs like mountain big
34 sagebrush, bitterbrush, mahogany, snowbrush and various native grasses and forbs such
35 as Idaho fescue and bluebunch wheatgrass. Ponderosa pine habitats also include
36 savannas, which have sporadic, widely spaced trees that are generally more than 150
37 years old. The structure of a savanna is open with an understory dominated by fire-adapted
38 grasses and forbs as well as shrub fields. Ponderosa pine habitats generally occur at mid
39 elevation and are replaced by other coniferous forests at higher elevations.

40 **East Cascades**

41 As the rain shadow effect of the Cascade Mountains moves east, ponderosa pine
42 woodlands become the dominant forest types of the East Cascades Ecoregion. In these
43 woodlands, other conifer species present may include Douglas-fir, western larch, and, in
44 some areas, lodgepole pine. The understory is characterized by a mix of shrubs and
45 herbaceous plants. Common shrubs include bitterbrush, mountain big sagebrush, and
46 snowberry. The herbaceous layer often includes native grasses such as Idaho fescue and
47 bluebunch wheatgrass. Ponderosa pine habitats generally occur at mid elevation, where
48 climatic and soil conditions support the growth of these trees, and are replaced by other
49 coniferous forests at higher elevations.

50 **Klamath Mountains**

51 Here, pine woodlands are usually dominated by ponderosa pine, but may be dominated by
52 Jeffery pine, depending on soil mineral content, fertility, and temperatures. The understory
53 often has shrubs, including green-leaf manzanita, buckbrush, and snowberry. Pine-oak
54 woodlands are found primarily in valley margins and foothills on rolling plains or dry
55 slopes. The structure is park-like with an open grassy or shrubby understory. Pine or pine-
56 oak woodlands occur on dry, warm sites in the foothills and mountains of southern
57 Oregon.

58 CONSERVATION OVERVIEW

59 Ponderosa pine habitats historically covered a large portion of the Blue Mountains
60 ecoregion, as well as parts of the East Cascades and Klamath Mountains. Ponderosa pine
61 is still widely distributed in eastern and southern Oregon. However, the structure and
62 species composition of woodlands have changed dramatically. Historically, ponderosa
63 pine habitats had frequent, low-intensity fires that maintained an open understory as well
64 as some high-intensity fires. Due to past selective logging, the exclusion of Indigenous
65 peoples burning practices, and fire suppression, dense patches of smaller conifers have
66 grown in the understory of ponderosa pine forests. Depending on the area, these conifers
67 may include shade-tolerant Douglas-fir, grand fir, white fir, and lodgepole pine as well as
68 small ponderosa pines. These dense stands are vulnerable to drought stress, insect
69 outbreaks, and disease. Many of these mixed conifer forests are located in **Fire Regime**
70 **Condition Class II** or **Condition Class III** areas where the risk of loss of key ecosystem
71 components is moderate or high. Due to this overstocked condition, low intensity fires
72 become more severe and kill large trees that would survive a smaller fire. Also, the lack of
73 fire has led to thick needle fall duff in the understory. Large trees will send roots into this
74 duff layer and can be killed by even low intensity fires.

75 Of particular concern is the loss of large-diameter pine habitats. Most old-growth
76 ponderosa pine stands are greatly reduced in size and connectivity, occurring in a
77 patchwork with much younger forests. Younger stands can provide habitat for some
78 wildlife species; however, old-growth ponderosa pine forests support species such as
79 the **White-headed Woodpecker** that require large-diameter trees and an open understory
80 and are sensitive to changes in the forest seral stage.

81 Loss/conversion of these habitat types to shrub fields or non-forest are occurring because
82 of landscape scale high intensity wildfires. While Ponderosa pines readily re-establish
83 after disturbance, these landscape scale fires are making it difficult for successful
84 regeneration post-fire due to a lack of natural seed source within natural seed dispersal
85 ranges.

86 On federal and private lands, especially in the Wildland Urban Interface, ponderosa pine
87 habitats are increasingly being restored or managed consistent with wildlife conservation
88 goals through fuel reduction treatments, retention of large-diameter trees, and high snags
89 densities.

90 Ponderosa pine habitats are important for wildlife that prefer open, dry forests. The White-
91 headed Woodpecker, a **Species of Greatest Conservation Need** (SGCN), is entirely
92 dependent on open late-successional ponderosa pine woodlands. Some SGCN
93 associated with ponderosa pine habitats include the **Flammulated Owl**, **Lewis's**
94 **Woodpecker**, **long-legged myotis**, **pallid bat**, and many others.

95 LIMITING FACTORS AND RECOMMENDED APPROACHES

96 **Limiting Factor: Altered Fire Regimes and Addressing Risk of Uncharacteristically Severe**
97 **Wildfire**

98 Past forest practices, the exclusion of Indigenous peoples burning practices, and fire
99 suppression have resulted in either dense growth of young pine trees or dense, young
100 mixed conifer stands, depending on local site conditions and natural climax species.
101 These dense stands are at increased risk of uncharacteristically severe wildfires, drought,
102 disease, and damage by insects. Over time, some stands will convert to Douglas-fir and
103 grand fir forests, which do not provide adequate wildlife habitat for species dependent on
104 open ponderosa pine habitats. While normally drought tolerant, large old growth
105 ponderosa pines are dying due to overstocked young trees that would historically be
106 controlled by frequent low intensity fires. Particularly in the Blue Mountains and East
107 Cascades ecoregions, dense understories and insect-killed trees make it difficult to
108 reintroduce natural fire regimes. In parts of the Blue Mountains, East Cascades and
109 Klamath Mountains, increasing home and resort development in forested habitats makes
110 prescribed fire difficult in some areas due to concerns about smoke and escaped burns,
111 increasing the risk of wildfires. Portions of East Cascades ponderosa woodlands are also
112 being inundated with invasive annual grasses such as cheatgrass and medusahead,
113 increasing fuel continuity and altering the natural fire behavior.

114 **Recommended Approach**

115 Use an integrated approach to forest health issues that considers historical conditions,
116 including roads and human use, wildlife conservation, natural fire intervals, and
117 silvicultural techniques. Develop implementation plans for thinning overstocked stands
118 combined with prescribed fire that are acceptable for management of both game and non-
119 game species. Evaluate individual stands to determine site-appropriate actions, such as
120 monitoring in healthy stands, or thinning, mowing, and prescribed fire in at-risk stands.
121 Implement fuel reduction projects to reduce the risk of forest-destroying wildfires.
122 Reintroduce fire where feasible. Engage with local Tribes to bring their Indigenous
123 Knowledge of prescribed fire to the overstocked forests. Combine low intensity prescribed
124 fires with thinning stands and develop markets for small-diameter trees. Manage for a
125 landscape mosaic that includes structural complexity and species diversity in the
126 understory and overstory across multiple spatial scales. Retain healthy patches of thermal
127 and hiding cover, forage and security screening vegetation in high value winter range
128 habitats.
129

130 **Implement fuel reduction projects** to reduce the risk of forest-destroying wildfires,
131 considering site-specific conditions and goals. Consider thinning overstocked stands
132 combined with prescribed fire where appropriate, given safety and wildlife management
133 concerns. Fuel reduction strategies need to consider the habitat structures that are
134 required by wildlife, including snags, downed logs, and hiding cover. Design frequency and
135 scale of prescribed fire to improve regeneration and establishment of native shrubs.
136 However, lower log and shrub densities may be desirable in priority White-headed

137 Woodpecker areas, so sites need to be evaluated for appropriate understory vegetation
138 management. Maintain areas of multi-species, dense woody plant hiding cover in patches.
139 Carry out forest management actions to protect and increase resilience of remaining intact
140 habitats from wildfire.

141 Support community-based forest collaboratives to increase the pace and scale of forest
142 restoration. Engage in frequent outreach to educate the public about the ecological
143 importance of fire to the ponderosa pine forests. Monitor forest health initiatives and use
144 adaptive management techniques to ensure efforts are meeting habitat restoration and
145 uncharacteristic fire prevention objectives with minimal impacts on wildlife. Work with
146 homeowners and resort operators to reduce vulnerability of properties to wildfires while
147 maintaining habitat quality. Highlight successful, environmentally sensitive, fuel
148 management programs. Retain features that are important to wildlife, including snags,
149 downed logs, forage, and hiding cover for wildlife species, and replant with native shrub,
150 grass, and forb species. Manage reforestation after wildfire to create species and
151 structural diversity based on local management goals. (KCI: **Disruption of Disturbance**
152 **Regimes**)

153 **Limiting Factor: Loss of Size and Connectivity of Large-structure Ponderosa Pine Habitats**

154 Particularly in the Blue Mountains and East Cascades ecoregions, old-growth ponderosa
155 pine habitats have been greatly reduced in size and connectivity by timber harvest, the
156 exclusion of Indigenous peoples burning practices and fire suppression leading to
157 overstocked stands, conversion to rural residential uses, and other activities. Few large
158 blocks of habitat remain.

159 **Recommended Approach**

160 Maintain large blocks of large-diameter ponderosa pine habitat. Identify current and
161 potential movement **corridors** between habitat blocks for protection and restoration. In
162 areas of the East Cascades experiencing rapid development, work with local communities
163 to minimize development in large blocks of intact habitat.

164 **Limiting Factor: Invasive Species**

165 In parts of the Blue Mountains and East Cascades, invasive plants such as diffuse and
166 spotted knapweed, and Dalmatian and common toadflax, are invading and degrading
167 some ponderosa pine woodlands. Also in the Blue Mountains, cheatgrass and
168 medusahead rye can result in an invasive plant understory that is highly susceptible to
169 burning with a high-fuel content vegetation that carries wildfire more easily than the native
170 vegetation. Armenian (Himalayan) blackberry, Scotch broom, and several grasses are an
171 issue in the Klamath Mountains.

172 **Recommended Approach**

173 Emphasize prevention, risk assessment, early detection, and quick control to prevent
174 new **invasive species** from becoming fully established. Prioritize efforts and control key
175 invasive species using site-appropriate methods. Control wildfires in cheatgrass-
176 dominated areas of the Blue Mountains. Fortunately, many areas of the Blue Mountains
177 and East Cascades still have few invasive species currently threatening ponderosa pine
178 habitats. In these areas, invasive plants should be monitored and controlled as they first
179 arrive when control is more efficient, practical, and cost-effective. Reintroduce site-
180 appropriate native grasses and forbs after invasive plant control. Prescribed burning may
181 be useful for management of some invasive species in the Klamath Mountains.

182 RESOURCES FOR MORE INFORMATION

183 **Oregon Department of Forestry Forest Practices Research and Monitoring Program**

184 **Partners in Flight Conservation Strategy for Landbirds in the Northern Rocky**
185 **Mountains of Eastern Oregon and Washington**

186 **Partners in Flight Conservation Strategy for Landbirds of the East-Slope of the**
187 **Cascade Mountains in Oregon and Washington**

188 **Managing for Cavity-Nesting Birds in Ponderosa Pine Forests**