Flora of the Region

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Situated as it is at the west end of the Columbia River Gorge and within Columbia River freshwater tidal zone, at the convergence of several larger ecoregions (i.e., the Willamette Valley and Puget Trough, and the Cascade and Coast ranges), the greater Portland-Vancouver region is home to unique and diverse native flora. Known native plant species in the region number roughly 650; of these, approximately 250 either have been extirpated since modern settlement began or have not been detected during the last 20 years. Plant species being rare, in decline, or regionally extirpated is strongly associated with loss and degradation of habitat. It is likely that some of the 250 “missing” species always have been infrequent in the region and thus were lost quickly as a result of habitat destruction or disruption of critical processes. Others succumbed to wholesale habitat loss. For example, diking, settlement, and development of the vast floodplain wetlands along the Columbia and Willamette rivers resulted in the loss and decline of emergent wetland and ruderal (i.e., disturbance-loving) species that flourished on those systems’ sandy soils. The nearly complete loss of oak and prairie habitats has had similar impacts. Species associated with old-growth or late seral forests have declined with conversion to production forestry. Increasingly, our remaining native flora is threatened by non-native invasive plant and animal species, introduced pests and pathogens, continued habitat loss, and lack of knowledge. Action is needed to protect and conserve the species that remain.

How Do Plants Provide Habitat?
Vegetation is the foundation for nearly all habitats because it creates food and structure. Along the Columbia River, species such as Columbia River willow (Salix fluviatilis), Columbia sedge (Carex aperta), and other wetland emergents have evolved with the late spring freshets of the Columbia River system and tolerate extremely high water levels in the early summer. These species provide important habitat for a number of rare or declining wildlife species, including neotropical migratory songbirds, native amphibians, and juvenile salmonids.

Flowering plants provide habitat for pollinators such as butterflies and native bees, along with other insects. Higher plant diversity generally means higher insect diversity. And because of the
### Primary Threats to Rare Plants in the Portland-Vancouver Region, by Type

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Primary Threats to Plant Diversity and Rare Plant Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upland Forest (Primarily Old-Growth)</td>
<td>Habitat loss from logging and development</td>
</tr>
<tr>
<td>Oak woodland, savanna, and prairie</td>
<td>Habitat loss resulting from conversion to residences, farming, or forest; alteration of habitat as a result of lack of natural disturbance (e.g., fire); invasion of exotic species and natural succession to woody plant communities</td>
</tr>
<tr>
<td>Riparian, bottomland hardwood, and shorelines and mudflats</td>
<td>Alteration of habitat as a result of diking or bank hardening, flow alterations related to dam operations, stormwater inputs, or invasive species; loss of habitat as a result of development and conversion to agricultural uses</td>
</tr>
<tr>
<td>Wetlands</td>
<td>Alteration of habitat as a result of changes in flow patterns (hydrologic modification) or exotic species invasion; loss of habitat as a result of residential or agricultural development</td>
</tr>
<tr>
<td>Shrublands</td>
<td>Loss of habitat as a result of development and intensive forest management</td>
</tr>
<tr>
<td>Aquatic/Open Water</td>
<td>Alteration of habitat as a result of hydrologic modifications, contamination, or invasive species</td>
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### Threats and Challenges

Natural areas in the greater Portland-Vancouver region continue to support rare plant populations. However, these populations are threatened by habitat loss and fragmentation, invasive species, loss of genetic diversity, lack of knowledge regarding species status, and lack of availability of plant materials.

#### Habitat Loss and Fragmentation

Plants move only by dispersal of seeds or vegetative propagules (such as root fragments). The continuing loss of land to development reduces potential habitat for uncommon and rare species. Beyond the effect of outright habitat loss is the effect of road building and other development on the size of and connectivity of habitat patches. Smaller, more isolated individual patches result in a tight relationship between some plants and some insects, the loss of a plant species can mean a loss of one or more insect species as well. Insects are the basis of the food web for birds associated with rare habitats, and they also pollinate agricultural crops in the region. Oak trees provide important habitat for the western grey squirrel and acorn woodpecker, both of which require mature oaks with bountiful acorn production as a food source.

#### Invasive Species

Non-native plants that are introduced unintentionally, as horticultural species, or for agricultural purposes pose a fundamental threat to native and sometimes rare plant populations. Species such as reed canarygrass (Phalaris arundinacea), invasive knotweeds (Polygonum spp.), and false indigo (Amorpha fruticosa) readily out-compete natives in riparian and floodplain areas along the Willamette and Columbia rivers. In oak habitats and rock outcrop areas, false bronce (Brachypodium sylvaticum) and shining-leaf geranium (Geranium lacustre) wreak havoc on rare plant communities that are generally dominated by annual or short-lived perennial species that depend on fire.

#### Population Genetics

Genetic diversity gives populations the ability to adapt to changing conditions. When populations drop to a very small size, they can lose important elements of diversity and adaptability through a bottleneck effect (i.e., inbreeding depression) that is irreversible even if the population size later recovers. Historically, plant populations maintained genetic diversity through migration and mixing of populations and the adaptation of connected groups of small populations (meta-populations) to localized conditions. Over the past 150 years, development of the region has resulted in the loss of genetic diversity and inbreeding in some species.

Hybridization between introduced and native species increasingly is recognized as a problem in the conservation of native plant populations. In the greater Portland-Vancouver region, hybrids have been well documented for natives such as Prunus emarginata (wild cherry), Malus fusca (crabapple), and Crataegus suksdorfi (hawthorn). Hybrids threaten species viability through loss of genetic diversity and local adaptation. Eventually, natives can be reduced or replaced by hybrids. A primary but often overlooked element of genetic conservation is the coordination and prioritization of restoration across the landscape. In general, funding is site-based rather than species based, and restoration projects may not address genetic issues such as inbreeding that threaten populations. This problem is exacerbated by the focus of much regional restoration funding on "starting fresh" rather than preserving or conserving existing sites, which is generally viewed as maintenance or operations rather than restoration.

#### Lack of Knowledge

The lack of comprehensive site inventories by capable botanists results in a lack of knowledge about the status of many plant species and hampers our ability to make informed decisions. Although there are records of many taxa collected or observed, there has been no thorough floristic study of the Portland metropolitan area beyond the information gathered in *Urbanizing Flora of Portland* (Christy et al. 2009). Analysis of historical and modern herbarium collections, cross-referenced to regional plant lists, revealed an overall lack of information about the status of many rare plant populations. Out of 581 species defined as “native, rare” that occurred in the region historically, approximately 320 are documented to still exist.
occur. More than 254 are extirpated or have not been observed in the last several decades.

**Lack of Plant Material Availability**

Although many more growers produce native plant materials now than even just 10 years ago, most species remain unavailable. This lack of availability of plant materials thwarts all but the most determined and well-funded restoration efforts.

**Likely Effects of Climate Change**

Current climate change models predict changes in temperature and precipitation patterns, rises in sea level, and an increase in forest fires and pests. These changes could affect efforts to conserve rare plant species in several ways:

- A number of species documented in our region occur primarily east of the Cascades or in the eastern Columbia River Gorge. Many have not been documented recently and may have occurred in the greater Portland-Vancouver region during prolonged dry or warm periods. Species whose westernmost range is at the edge of the region may expand once again into the region and proliferate. Conversely, species for whom the region is at the southern edge of their range may struggle to persist.

- On tidally influenced sites on the Willamette and Columbia rivers, rises in sea level could affect remnant populations of rare species associated with those systems.

- Increased potential for forest fire may pose a high risk to both coniferous forests and oak woodlands, where fuels have accumulated naturally and through fire suppression. On the other hand, it is possible that an increase in natural fires could benefit oak and prairie habitats.

**Priority Conservation and Restoration Strategies**

**Survey the Region’s (Rare) Plants**

A comprehensive inventory of the region’s flora is needed, with sampling of as many examples of each habitat type in the region as possible. Voucher specimens including standard locality data should be collected. Specimens should go to Portland State University, Oregon State University, and specialists in the taxa being collected. A comprehensive inventory is likely to reveal that most remaining taxa are represented on lands in public ownership. Public lands may hold the only remaining populations of some species in the area. Likely hotspots include Cooper Mountain, the Willamette Narrows, the Clackamas Bluffs, Lacamas Creek/Meadow, remnant peat swamps, and private ownership. Because the largest and least-disturbed areas of these common habitats are in public ownership, it is possible that some less common woodland species may also be confined to these tracts of land.

**Conduct Site-Level Surveys Before Site-Disturbing Activities**

Aside from regulations affecting federal or state-listed species, there is no policy regarding conservation and management of rare plants and rare plant communities within the region. The Endangered Species Act does not protect listed plants from “take” in the same way listed animals are protected, although it is illegal to collect or maliciously harm listed plants on federal land and protection from commercial trade and the effects of federal actions do apply for plants. Increased recognition and guidance are needed. As a starting point, natural area managers should perform rare plant surveys before any soil- or vegetation-disturbing activities, especially on sites likely to support rare plants. Survey results should be shared with the Oregon Biodiversity Information Center and Washington Department of Natural Resources Natural Heritage Program. Managers are encouraged to actively protect and enhance known rare plant populations, or at the very least avoid disturbing them.

**Manage Known Rare Plant Populations**

Effective management of rare plant populations requires documentation, protection, and maintenance or restoration of habitat quality. Where populations are small or isolated, managers should consider increasing genetic diversity by bringing in seeds from other local populations.

**Collect and Cultivate Plants**

The region’s land managers and private growers should partner to collect and cultivate more of the region’s native plants for use in restoration efforts. There is a critical need to conserve genetic diversity and expand populations, especially of rare plants. Focusing efforts on observing and collecting seeds, spores, and cuttings of rare species may result in some of the most vulnerable populations being rescued.

**Habitat Needs and Opportunities for Conservation Strategy Species**

State conservation strategies in Oregon and Washington approach statewide conservation on two levels. The “coarse filter” approach seeks to address conservation at the habitat level, while the “fine filter” approach addresses the status of rare and declining species by identifying those species that require special attention. Table 4-2 lists selected rare plants in the greater Portland-Vancouver region that are focal species of the states’ plans and describes appropriate conservation strategies. Appendix F provides a more complete list of rare flora in the region.

**Key Groups Working on Plant Conservation**

**Natural Resources Conservation Service, Corvallis Plant Materials Center (ORPMC)**

The ORPMC develops new technology in plant propagation and establishment, seed production, revegetation, restoration, and erosion control; it also develops new plant sources, which includes developing seed sources and plant materials for rare plant conservation.

**Institute for Applied Ecology**

The Institute for Applied Ecology is proposing the formation of a Willamette Valley-wide plant materials cooperative to coordinate production of native plant materials. Proposed partners for this project include federal, state, and local agencies; private growers; and nongovernmental organizations and nonprofit groups.
## Conservation Strategies for Rare Plants in the Region That are Focal Species of State Conservation Plans

<table>
<thead>
<tr>
<th>Species</th>
<th>Status and Habitat</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadleaf’s lomatium (Lomatium broadleaf)</td>
<td>Endangered—Federal, Oregon, Washington Prairie and savanna</td>
<td>Survey potential habitat for populations, maintain or restore occupied habitat, maintain and augment populations, reintroduce new populations, collect and store seeds.</td>
</tr>
<tr>
<td>Columbia cress (Roopsia columbiana)</td>
<td>Endangered—Washington Columbia River riparian zone</td>
<td>Survey potential habitat for populations, maintain or restore occupied habitat, maintain and augment populations, reintroduce new populations, collect and store seeds.</td>
</tr>
<tr>
<td>Water Howellia (Howellia aquatilis)</td>
<td>Threatened—Federal, Oregon, * and Washington Wetlands, seasonal ponds (“ponds in the woods”)</td>
<td>Maintain or restore seasonal wetland habitats, control invasive plants at priority sites, survey for additional populations.</td>
</tr>
<tr>
<td>Kellogg's dwarf rush (Juncus kelloggii)</td>
<td>Endangered—Washington Wet meadow</td>
<td>Survey potential habitat, maintain or restore existing habitat. Augment populations, reintroduce new populations, collect and store seeds.</td>
</tr>
<tr>
<td>Kincaid’s linope (Linopsis sophorophora ssp. kincaidi)</td>
<td>Threatened—Federal and Oregon Endangered—Washington Savanna and prairie</td>
<td>Maintain or restore habitat, survey for new populations, reintroduce and augment populations.</td>
</tr>
<tr>
<td>Nelson’s Sidalcea (Sidalcea nelsoniana)</td>
<td>Threatened—Federal and Oregon Endangered—Washington Wet prairie</td>
<td>Maintain or restore habitat, maintain and augment populations, continue experimental reintroduction.</td>
</tr>
<tr>
<td>Oregon silvanilla (Silvanilla oregana)</td>
<td>Endangered—Washington Moist cliffs near waterfalls</td>
<td>Survey potential habitat for populations, especially in the Columbia River Gorge. Research on threats (e.g., rock climbers, hydrology) is needed.</td>
</tr>
<tr>
<td>Peaceo larkspur (Delphinium pauciflorum)</td>
<td>Endangered—Oregon Wet prairie, forested wetland edges, oak woodlands, along roadsides and fence rows</td>
<td>Maintain or restore habitat, maintain and augment populations, reintroduce new populations, collect and store seeds.</td>
</tr>
<tr>
<td>Smooth goldfields (Lasthenia glaberrima)</td>
<td>Endangered—Washington Wet stream banks and vernal pools</td>
<td>Maintain and restore habitat, survey for new populations, reintroduce populations to suitable habitat. Research on threats is needed.</td>
</tr>
<tr>
<td>Thir-leafed peavine (Lathyrus tuberosus)</td>
<td>Endangered—Washington Oak, grasslands or shrubland</td>
<td>Survey prairie and oak habitat remnants for populations. Maintain or restore habitats, augment populations.</td>
</tr>
<tr>
<td>White-rock (Pale) larkspur (Delphinium leucophaeum)</td>
<td>Endangered—Oregon and Washington Rocky hills, prairie, savanna, open oak woodland</td>
<td>Maintain and restore habitat, survey for new populations, reintroduce populations to suitable habitat.</td>
</tr>
<tr>
<td>White-topped aster (Seirianthus ryanii)</td>
<td>Threatened—Oregon Rocky hills, prairie, savanna</td>
<td>Maintain or restore prairie, maintain populations, collect and store seeds, develop stock for outplanting to suitable habitats.</td>
</tr>
<tr>
<td>Willamette daisy (Eryngium decumbens var. decumbens)</td>
<td>Endangered—Federal and Oregon Wet and dry prairies</td>
<td>Survey potential habitat for populations, develop plant stock for outplanting, reintroduce populations to suitable habitats and protect and manage occupied sites.</td>
</tr>
</tbody>
</table>

### Species
Species has been listed federally, but Oregon Administrative Rules (OAR 608-072) have not yet been updated. All federally listed plant species occurring in Oregon are administratively protected by the State of Oregon.
Urbanizing Flora of Portland, Oregon, 1806-2008

This compilation of the vascular plants of the Portland-Vancouver area analyzes changes in the region’s vegetation since 1806 based on herbarium specimens, publications, and unpublished manuscripts. A total of 1,556 taxa in 125 families are represented. The paper includes a history of botany in Portland, a gazetteer of historical and modern place names, botanical miscellanea, and lists of rare species for use by local planners and land managers.

Natural Resource Inventory Update
City of Portland, Bureau of Planning and Sustainability. 2009.
http://www.portlandoregon.gov/bps/40540

Updated in 2009, the inventory includes a number of items that categorize natural resources within the city of Portland. Inventory products include the following:

- Updated natural resource feature information, geographic information system (GIS) data, and maps
- Updated special-status animal and plant species
- Lists and maps of Special Habitat Areas (SHAs)
- Criteria and models to evaluate the relative function and quality of the resources using GIS technology
- Relative ranking maps for riparian areas, wildlife habitat, and combined resources
- Documentation of the project approach

Field Guide to the Rare Plants of Washington

Field Guide to the Rare Plants of Washington provides information on Washington’s endangered, threatened, and sensitive vascular plants. The guide includes descriptions and information on identification, distribution, and habitat for all plant species with conservation status in Washington.

Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington