



PRESERVING PRAIRIES AND SAVANNAS IN A SEA OF FOREST

A CONSERVATION CHALLENGE IN THE PACIFIC NORTHWEST

ARTICLE AND PHOTOGRAPHS BY ED ALVERSON

"We ride a few miles in nature's oak park, the most enchanting scenery of the kind I ever saw, the ground, the trees, all beautiful; such is the variety and beauty of the flowers as to present themselves in every step; it is like a flower garden, a flower garden, indeed, on a large scale, to an extent unmeasured, and it hardly seems right that our horses should step."

Rev. George Gary
Oregon City, Oregon, May 1845

Northwestern North America, where the continent meets the Pacific Ocean, is a region of great ecological contrasts. Within the province of British Columbia (Canada) and the states of Washington and Oregon (USA), snowy mountains rise above fertile valleys. Extremes of climate, from rainforest to desert, temperate to alpine, create a complex landscape of diverse habitats.

Wilderness still persists in the rugged mountains but the lowland landscape has a different story to tell. Where there is now a sprawling expanse of developed landscapes – the cities of Vancouver, Seattle and Portland, as well as outlying farms and industrial forests – there were once magnificent conifer forests, punctuated by contrasting areas of prairies and open canopied savannas or 'oak meadows'.

Before settlers of European descent arrived, the valleys west of the Cascades (which include the Willamette Valley of Oregon, the Puget Trough of Washington and the Georgia Basin of southwest British Columbia) were well populated by native peoples. These people fished for salmon, hunted wild game and gathered food plants – roots, bulbs, seeds and berries – from an abundant native landscape.

Prairies and savannas were the most important source of food plants to the native people. They were also the habitats most subject to their management. In particular, fire in prairies was used to

▲ **Upland prairie in early spring with *Ranunculus occidentalis* bordered by Oregon white oak (*Quercus garryana*).**

stimulate growth of bulbs such as camas lily (*Camassia* spp.), facilitate the harvest of seeds and acorns (particularly from Oregon white oak or Garry oak, *Quercus garryana*) and prepare small plots of ground for cultivation of tobacco. The resulting landscape was a mosaic of forest, savanna and prairie which supported a great diversity of plant and wildlife habitats, a model of a sustainable partnership between humans and nature.

From the European perspective, the Arcadian nature of the lowland landscape in the Pacific Northwest comes through in the descriptions of early explorers from the late 1700s and early 1800s. The Scottish botanist David Douglas, who explored the region between 1825 and 1834 in search of seeds of potential new garden plants, described the Willamette Valley in August 1826: "Country undulating, soil rich, light, with beautiful



◀ **Golden paintbrush (*Castilleja levisecta*), a rare endemic federally listed as endangered, survives at only 12 sites.**

solitary oaks and pines interspersed through it..." Douglas further observed the extent to which fire influenced the vegetation: ... "and must have a fine effect, but being all burned and not a single blade of grass except on the margins of rivulets to be seen". The landscape turned from black to green after the fall and winter rains, as described by the 'mountain man' James Clyman when he travelled through the same region in May 1845: "I ... was highly pleased with the beautiful variety of hill and valley so softly valled and intermingled with hill and dale as likewise timber and prairie all luxuriantly clothed in a rich and heavy coat of vegetation and litterally clothed in flowers the upland in yellow and the valleys in purple. The quantity of small flowering vegettles is very remarkable and beyond conception."

Grasslands under threat

As white settlers displaced the native people from their traditional homelands, the economic imperatives of the settlers meant the end of the prairies and savannas. The settlers rapidly converted the open prairies to fertile agricultural land. They eliminated the periodic fires that had kept the prairies and savannas open, and in this temperate, often rainy climate, the result was more forest. Their abundant cattle, sheep and pigs foraged in areas not cultivated, depleting the grazing-sensitive native grasses and wildflowers, which were largely replaced by introduced plants from Eurasia.

The economic wealth that the land produced encouraged the growth of towns and cities, which further claimed

much of the remaining prairie landscape. By the mid-20th century, the conversion was nearly complete. Of the original 700,000 ha (1,700,000 acres) of prairie and savanna habitat that existed in the mid-1850s less than 1% remained. As the modern age unfolded, nobody seemed to notice the loss.

Fortunately, in recent decades, a small band of conservationists has 'rediscovered' the prairies within this sea of forest, and have worked hard to conserve this landscape which so impressed the early explorers such as David Douglas. One example of this renewed attention is a recently completed assessment of the biodiversity of the Willamette Valley-Puget Trough-Georgia Basin ecoregion (map, p. 26). It begins with a description of the prairies and savannas and their biological significance, which underscores why they are such important islands of diversity in the Pacific Northwest's sea of forest.

Ecologists have classified the plant communities in the Willamette/Puget/Georgia ecoregion associated with prairies and savannas, representing different points along moisture and successional gradients. Seasonal **wet prairies** (usually found on heavy clay soils) and associated **vernal pools** represent the wettest end of the moisture gradient. Upland prairies

▼ **Meadow checkermallow (*Sidalcea campestris*), Willamette Valley endemic.**



◀ **Tolmie's mariposa lily (*Calochortus tolmiei*), widespread in prairie & savanna.**



are freely draining in the winter, have the best soils and have been largely converted to farmland. **Herbaceous balds and bluffs** are associated with bedrock outcrops, and are subject to extreme summer drought. **Savannas** have scattered oaks and a ground flora similar to upland prairies but grade into **oak woodlands** which support a moister flora dominated by shrubs.

Prairies and savannas originally only occupied a small proportion of the land (most of the rest was coniferous forest) but they contributed significantly to the floristic diversity of the region. In fact, 350 native vascular plant taxa are generally restricted to prairies, savannas and associated oak woodlands in the Willamette/Puget/Georgia ecoregion. Graminoids are dominant throughout the year, with seasonal displays of wildflowers. For example, 42 species of native grasses are associated with prairie, savanna and oak woodland habitats, as well as 75 species of Asteraceae and 30 species of Liliaceae. The flora includes 32 endemic or near-endemic taxa. Many of the endemics are threatened by habitat loss; 20 of them are considered globally 'at risk'.

The prairies and savannas are also home to many declining wildlife species, such as the Fender's Blue and Valley Silverspot

▼ **The rare endemic white rock larkspur (*Delphinium leucophaeum*) survives in herbaceous balds and on roadsides.**



butterflies, Western Meadowlark, Western Gray Squirrel, several species of endemic pocket gophers and reptiles such as Gopher and Sharp-tailed snakes.

In April the floral display in the prairies and savannas swings into full gear, with yellow buttercups (*Ranunculus occidentalis*), pink shooting stars (*Dodecatheon hendersonii*), white saxifrage (*Saxifraga integrifolia*) and white Oregon fawn lilies (*Erythronium oregonum*) brightening the landscape. In May the prairies are often filled with sheets of purple camas lilies (*Camassia quamash*), accentuated with larkspurs (*Delphinium* spp.), pink sea blush (*Plectritis congesta*), and yellow balsamorhiza (*Balsamorhiza hirtella*). Peak diversity of flowering species is in late spring; a single square metre of high quality prairie may support over 20 species of native plants. Increasing summer drought in July and August brings seed maturation and vegetative dormancy, along with the burn season, but a few composites (*Aster* spp., *Grindelia integrifolia*) and umbels (*Perideridia montana* and *P. oregana*) flower into late summer and fall.

The conservation challenge

Just as the prairies and savannas of the Willamette/Puget/Georgia ecoregion were important to native people, the botanical community of the region has come to appreciate the beauty and diversity that these habitats bring to the region. With the start of conservation efforts has also come a better appreciation of the challenge to preserve this heritage for future generations.

Habitat inventories have shown that most existing prairie remnants are small, less than 25 ha in size, and only a few are over 100 ha. Conservation efforts are complicated by land ownership patterns, as only small percentages of the total land area (no more than 5–10%) are in public ownership.

◀ The different types of prairie:

From left to right: Wet prairie in the summer dry season with *Deschampsia cespitosa* as the dominant native grass, near Eugene, Oregon.

A herbaceous bald with parasitic mistletoe growing on Oregon white oak, near Corvallis, Oregon.

Oak savanna with Oregon sunshine (*Eriophyllum lanatum*), Willamette Valley west of Eugene, Oregon.

A vernal pool with Fragrant popcorn-flower (*Plagiobothrys figuratus*), in Basket Slough National Wildlife Refuge, Willamette Valley, Oregon.

***Camassia quamash* in bloom on gravelly glacial outwash soils, Washington.**

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▼ **Kincaid's lupine (*Lupinus sulphureus* subsp. *kincaidii*), a rare endemic and federally listed threatened species, in upland prairie, Willamette Valley, Oregon.**





▲ **Nelson's checkermallow (*Sidalcea nelsoniana*)**, a rare endemic and federally listed threatened species, at Bald Hill Park near Corvallis, Oregon

▼ **Ecoregions of Northwest North America**



Map courtesy of The Nature Conservancy

Maintaining native vegetation in these few remnants is also a challenge. Many Eurasian weeds, such as bentgrass (*Agrostis capillaris*), velvet grass (*Holcus lanatus*), false dandelion (*Hypochaeris radicata*) and oxeye daisy (*Leucanthemum vulgare*), are often abundant in prairie vegetation. Especially problematic are woody plants such as broom (*Cytisus scoparius*), blackberry (*Rubus armeniacus*) and hawthorn (*Crataegus monogyna*), which even without disturbance can completely take over prairie remnants.

Furthermore, prairies and savannas have also been colonized by native trees in the absence of fire or other disturbance, particularly by conifers such as fast-growing Douglas-fir. Many former oak savannas and woodlands have developed into conifer forests, where the skeletons of massive, formerly open-grown oaks slowly decay in the moist shade of the fir forest. So while typical protection measures, such as creation of reserves, might prevent outright habitat destruction from development or agriculture, active stewardship of reserves is needed to ensure the long-term survival of native prairie and savanna species.

The task of conserving prairie and savanna habitats in the Willamette/Puget/Georgia ecoregion has fallen to a vast number of federal, local and non-profit agencies and organizations. Without prioritization and coordination, allocation of scarce resources – of both money and land – might not be as efficient as possible. Identifying conservation priorities was the primary motivation for the Washington and Oregon chapters of The Nature Conservancy, along with Nature Conservancy of Canada and many other agency partners, as they completed the biodiversity assessment for the Willamette Valley, Puget Trough and Georgia Basin. While this assessment encompasses all ecological systems present in the ecoregion, the prairies and savannas are a major focus.

The results of this planning yielded a 'portfolio' or network of sites that best represents the native species and ecosystems. The aim of the assessment was to identify sites where the greatest number of high quality habitats and rare species occur together and so should be the highest priority sites on which to focus conservation resources. And by working to protect a portfolio of sites that most efficiently conserves the region's biodiversity, the conservation community can both maximize efficiency and minimize conflict with other social and economic demands on the landscape.

Several dozen important prairie and savanna sites have already been protected in reserves by federal, state, local and private non-profit agencies. While most of these remnants are small, from 10 to 200 ha (25 to 500 acres), they include some of the most important remaining habitats for rare endemic prairie plants.

Even if protection from development can be accomplished by designating reserves, the biodiversity assessment identified the expansion of invasive species, and the absence of fire from ecosystems that were historically maintained by fire, as the most important and widespread threats to prairies and savannas.

Returning fire to the landscape is an important but challenging strategy. The city of Corvallis, Oregon, has a large open space system managed by the city parks department with important examples of prairie and oak woodland, as well as populations of rare plants. Grant funding has supported efforts to clear encroaching brush and tree saplings from an oak savanna remnant. The Corvallis Fire Department has been enlisted to undertake prescribed burns in oak savanna habitat in the city's Bald Hill Park.

By first clearing the brush and removing excessive fuels, it is again possible to have a low intensity underburn which reflects the behaviour of most fires in the historic prairie/savanna landscape. This is just one of many examples of prescribed burning that has occurred (though on a small scale) at many other sites in the region. The results vary from site to site, but a consistently observed response is that native herbaceous plants increase their flower and seed production after a



fire. Most invading woody plants will be top-killed by fire but (except for conifers) usually re-sprout the following year.

Managing non-native species is both a logistical and ecological challenge. For a given site, priority species for control must be identified and treatments – hand removal, mechanical treatment, herbicide application – sustained. Many non-native species are persistent, both from underground parts or a seed bank, and treatments must continue or the gains that are made will quickly be lost.

Successful projects are often those that combine multiple public benefits with conservation goals. In Oregon, the West Eugene Wetlands project (a partnership including the City of Eugene, Bureau of Land Management and The Nature Conservancy) is protecting and managing existing remnants of wet prairie, as well as restoring adjacent wet prairies; over 200 acres of wetland and upland prairie have been restored so far. At the same time the project is improving water quality and providing recreation and education opportunities, all in the midst of an industrial urban setting in which limited development is also permitted.



▲ **The beautiful spring landscape of oak-covered hills, with *Iris tenax***

Cultivating greater appreciation among the general public is also important. In the southern Puget Sound region, near Olympia, Washington, several good examples of gravelly glacial outwash prairies with mysterious ‘Mima Mound’ topography are found on state-owned reserves. Every May, the public is invited to visit the prairies during the height of bloom of camas lilies, as part of the annual Prairie Appreciation Day.

In British Columbia, the few remaining areas of native prairie and savanna habitat are under great threat of development. As a result, 59 prairie-associated plant taxa are considered to be at risk in BC, many of which occur nowhere else in Canada. The Garry Oak Ecosystems Recovery Team has produced a Recovery Strategy for Garry Oak and its associated ecosystems and at-risk species. And there is already research showing that existing remnants can be improved by removing non-native species, followed by prescribed burning and seeding of native species.

Achieving success with long-term conservation of the prairie/savanna landscape will require education, appreciation and action, at a variety of scales – from individual citizens working on their own local natural areas, to agencies and organizations working across state and even national boundaries to develop innovative conservation strategies and recover endangered species. Working to preserve these islands of diversity will help to develop and maintain a sense of place. 🌿

◀ **Wet prairie in the fall after woody vegetation has been removed and just after a prescribed burn.**

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Where to go to see native prairies and savannas in the Willamette Valley, Puget Trough and Georgia Basin

Oregon:

- West Eugene Wetlands, Eugene
- Finley National Wildlife Refuge, 10 miles S of Corvallis
- Bald Hill Park, 3 miles W of Corvallis
- Basket Slough National Wildlife Refuge, 10 miles W of Salem
- Camassia Natural Area, West Linn

Washington:

- Ridgefield National Wildlife Refuge, 15 miles N of Vancouver
- Mima Mounds Natural Area Preserve, 12 miles SW of Olympia
- Scatter Creek Wildlife Area, 14 miles S of Olympia
- Washington Park, Anacortes
- Moran State Park, Orcas Island

British Columbia:

- Mount Hill Park, 6 miles W of Victoria
- Mount Tzualem Ecological Reserve, 3 miles NE of Duncan

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▼ **Collecting seeds of native grasses, TNC Kingston Prairie Preserve, Willamette Valley, Oregon.**

