



Strategy Habitat: Wetlands

Ecoregions:

Wetlands are a Strategy Habitat throughout Oregon (all eight ecoregions).

Characteristics:

Wetlands are covered with water during all or part of the year. Permanently wet habitats include backwater sloughs, oxbow lakes, and marshes, while seasonally wet habitats include seasonal ponds, vernal pools, and wet prairies. Wetland habitats are highly diverse and include the following different types:

- **Alkaline wetlands** occur in depressions in more arid areas and are intermittently flooded. An impermeable soil layer prevents water from percolating through the soil and concentrates salts in some areas. Soil salinity varies greatly by soil moisture and type and determines plant species. Plant species are tolerant of saline conditions due to the concentration of salts by water evaporation. Vegetation includes salt-tolerant grasses, rushes, sedges and shrubs such as black greasewood. Examples are found in the Klamath and Goose Lakes of the East Cascades ecoregion, and in the Northern Basin and Range ecoregion.
- **Deciduous swamps and shrublands** are located in depressions, around lakes or ponds or on river terraces. They generally flood seasonally with nutrient-rich waters and are dominated by woody vegetation including willows, hardhack, alder, red-osier dogwood, Pacific crab apple, and ash.
- **Marshes (including emergent marshes)** occur in depressions (ponds), fringes around lakes and along slow-flowing streams especially in valley bottoms. Marshes are seasonally or continually flooded and have water-adapted plants such as sedges, bulrush, spikesedges, rushes, cattails, and floating vegetation. Marshes can have mucky soils resulting in water with high mineral content and dominated by herbaceous species, often including wildflowers.
- **Off-channel habitat** (oxbow lakes, stable backwater sloughs,

and flooded marshes) are created as rivers change course. In these areas, water moves slowly, providing quiet aquatic habitats.

- **Playas**, found in the Northern Basin and Range ecoregion, are sparsely vegetated (generally <10 percent plant cover) with grasses and are surrounded by a ring of shrubs. They are seasonally flooded and have highly saline soil. Plant species composition depends on soil salinity and moisture. Characteristic species include iodine bush, black greasewood, spiny hopsage, saltbush, alkali grass, wildrye and saltgrass.
- **Seasonal ponds and vernal pools** hold water during the winter and spring but typically dry up during the dry summer months. Vernal pools occur in complexes of networked depressions that are seasonally-filled with rainwater. They host a variety of species with unique adaptations.
- **Wet meadows (including montane wet meadows)** occur on gentle slopes near stream headwaters, in mountain valleys, bordering lakes and streams, near seeps, in large river valley bottoms, and in open wet depressions among montane forests. They are dominated by tufted hairgrass, sedges, reedgrass, spikesedge, rushes, and wildflowers. Montane wet meadows may have shallow surface water for part of the year, are associated with snowmelt, and are not typically subjected to disturbance events such as flooding
- **Wet prairies** occur in lowlands, especially in floodplains where as wet meadows occur in depressions surrounded by forests and are associated with snowmelt. Wet prairies are dominated by grasses, sedges and wildflowers.

Conservation Overview:

Wetlands provide important habitat for migrating and breeding waterfowl, shorebirds, waterbirds, songbirds, mammals, amphibians and reptiles. In addition to being critical for birds and many kinds of wildlife, floodplain wetlands and backwater sloughs and swamps are impor-

tant rearing habitats for juvenile salmon. Wetlands have direct value for people because they improve water quality by trapping sediments and toxins, recharge aquifers, store water, and reduce the severity of floods. Restoration and careful management of wet meadow systems and other wetlands can increase sustainable production of forage for livestock and increase late-season stream flows.

In general, most wetland habitat loss has occurred at lower elevations and valley bottoms. Many of these wetlands have been drained and converted to agriculture. Some ecoregion-specific conservation issues include:

- **Blue Mountains:** In the Grand Ronde and Baker valleys, many of the lower elevation wetlands have been drained and converted to agriculture. Wetlands have been lost in other low elevation areas as well. Most remaining wetlands in this ecoregion are found at higher elevations, although some important valley bottom wetlands occur on private land.
- **Columbia Plateau:** Historic wetlands along the Columbia River have been inundated by reservoirs, while floodplain wetlands along the Umatilla and Walla Walla rivers and other tributary streams have mostly been developed for agriculture. The ecoregion once had extensive springs and vernal pools, many of which have been lost as water tables lowered. Currently, many wetlands in this ecoregion are man-made, such as marshes established along the edges of reservoirs and wetlands created as a result of crop irrigation practices. The Wanaket Wildlife Area, managed by the Confederated Tribes of the Umatilla, is a network of wetlands created through irrigation of pastureland and provides important habitat for many wetland – dependent

species (see www.ohjv.org/projects/columbia.html#wanaket).

Similarly, ponds on the Umatilla National Wildlife Refuge use runoff from the fish hatchery to seasonally water shallow pools for migrating shorebirds and to provide breeding habitat for Woodhouse's toads. Irrigation wetlands can be critical habitat, but can also be impacted by runoff containing fertilizers or other chemicals.

- **Coast Range** wetlands are vulnerable to development as more people relocate to be near the coast. Although wetland drainage is now discouraged, continuing development is a threat to some remaining wetlands. In addition, the ecological processes that create coastal wetlands - such as landslides, beavers, or logjams blocking streams – often are not compatible with current land uses, especially in more developed areas.
- **East Cascades:** The upper Klamath Basin once had an extensive shallow lake and marsh system, but much has been lost due to drainage and conversion to agriculture and urban uses, contributing to the complex issues surrounding water use and species conservation in the basin. The remaining wetlands in the Klamath Basin support one of the largest concentrations of waterfowl in North America, with over three million ducks and a half-million geese passing through annually. The area is a critical migratory staging area for 80 percent of all Pacific Flyway waterfowl. In the winter, the Klamath Basin hosts the largest wintering population of bald eagles in the continental United States. Klamath Basin provides Oregon's only permanent nesting areas for red-necked grebes and yellow rails.
- **Klamath Mountains:** Most low-elevation seasonal wetlands have been lost to habitat conversion to agricultural, urban,

Conservation Agreement for the Oregon Spotted Frog, Mink Lake Basin Population

In healthcare, there is a saying, "an ounce of prevention is worth a pound of cure." The same is true for nature conservation. Focusing efforts to benefit declining species before they become threatened is more successful and cost-effective than when populations become critically low. Conservation Agreements, which are voluntary partnerships between agencies or between agencies and private landowners, can provide a dose of conservation prevention. In 2000, the USFWS, USFS and ODFW created a Conservation Agreement for the Mink Lake Basin population of the Oregon spotted frog. Surveys conducted in the 1990's indicated that the Oregon spotted frog had disappeared from up to 90% of its former range in Oregon, Washington and British Columbia. As of 1999, only 31 populations were known to remain, making each population important. The Mink Lake Basin, part of the

Three Sisters Wilderness Area of the Willamette National Forest, contained 2 known spotted frog populations. With over 100 ponds, lakes and wetlands and fewer impacts from habitat loss and degradation, the Mink Lake Basin offered a valuable conservation opportunity for this species. The agency partners identified limiting factors and evaluated risk to the two frog populations, then created a Conservation Agreement to address those factors. The Agreement addressed needs and responsibilities for site protection planning, population surveying and monitoring, data management, and developing education materials for wilderness recreationalists. The Conservation Agreement is a first step to ensure the long-term survival of these populations. By working together, people can find new ways to prevent species from becoming Threatened and Endangered.

and rural residential uses. Upland activities or altered hydrology impact many remaining wetland habitats. Rare vernal pool wetlands in Agate Desert near Medford support several rare plant and animal species.

- **Northern Basin and Range** has several large, deep freshwater marshes. Significant large wetlands are associated with the large lake basins: Abert, Summer, Malheur and Harney lakes, and Warner Basin. However, many of the ecoregion's smaller historic wetlands have been lost due to habitat conversion or have been degraded through stream channelization, water diversions, and historic overgrazing. Creation of watering holes for livestock and wildlife has altered the hydrology at many major playas, making them one of the most altered habitat types in the ecoregion. In some areas, flood-irrigation of private pasture and hay meadows provides important seasonal habitat for migrating and breeding birds. In areas where flood irrigation is being applied to row crops, converting flood irrigation to piped sprinkler systems can improve water quality, reduce sedimentation, and reduce water loss due to evaporation. However, loss of flood irrigation without restoring wetlands in the landscape will negatively affect wetland species now dependent on flooded habitats. Cooperative projects such as settling ponds designed for cleaning flood irrigation "tail water" may offer a way to address water quality and wetland habitat issues.
- **West Cascades** wetlands are generally in excellent condition, although some areas, such as those located around Mt. Hood,

can be impacted by uncontrolled livestock grazing, camping, or off highway vehicles use.

- **Willamette Valley:** Almost all remaining wetlands in this ecoregion have been degraded to some degree by altered water regimes, pollution, and invasive plants and animals.

Limiting factors to Wetland habitats:

Factor: Habitat loss: A high percentage of low-elevation and valley bottom wetlands have been lost or degraded through diking and draining, particularly in the Willamette Valley, Klamath Mountains and Coast Range ecoregions. In other areas, such as the Blue Mountains ecoregion, overgrazing can lead to soil compaction, changes in plant species composition, and spread of invasive plants. In some cases, due to short growing seasons and other factors, degraded meadows can be slow to recover if overgrazed. In the East Cascades, significant bird nesting habitat has been lost: early season haying in wetland habitats on private and public land can result in poor reproduction of ground-nesting birds due to increased predation on exposed nests and, in particular, direct mortality of young.

Approach: Identify wetlands that have been altered or lost and identify the potential for restoration. Some wetlands remain on private lands, so cooperative voluntary approaches are important to wetland conservation. There are also valuable wetlands on federal, state, and private reserves that are currently being restored. Build upon current cooperative efforts to maintain and restore wetlands

Big Marsh Wetland Restoration

Located just east of the Cascade crest and southeast of Crescent Lake, Big Marsh is part of the Oregon Cascades Recreation Area and offers excellent bird watching, hunting, hiking, and cross-country skiing opportunities. Big Marsh is a lush complex of wetland, aquatic, and meadow habitats. It is home to many wildlife species, including greater sandhill crane, blue-winged teal, Wilson's snipe, bitterns, mink, river otters, and elk. The marsh supports Oregon's largest remaining population of spotted frogs and provides breeding habitat for the rare yellow rail. Big Marsh's habitat diversity also hosts many uncommon and interesting plants including sundew, a carnivorous plant.

The valuable habitat present at Big Marsh today is the result of 15 years of cooperative restoration efforts. In the 1940's, ditches were installed to drain the marsh for grazing. The drainage resulted in a lowered water table, drier soils, and loss of aquatic and wetland habitats. Dry conditions and fire suppression allowed conifers to encroach into the marsh, further degrading open meadow and marsh habitats. The USFS

purchased the marsh in 1982 and began restoration in 1989 in partnership with Ducks Unlimited. The main drainage ditch was blocked, which allowed water to spread naturally across the marsh and return to historic channels. Since 1997, side drainage ditches have been dammed or closed to further improve water flow, floodplain function, and habitat diversity. Recently, prescribed fire has been used on 650 acres to remove encroaching conifers and to restore historic open emergent wetland habitat. Also, lodgepole has been hand-removed from 300 acres with the assistance of RMEF, OHA, and SOLV volunteers. Future planned efforts include additional prescribed fire and lodgepole cutting, willow plantings, installation of a logjam to slow water discharge, continued monitoring of spotted frogs and yellow rails, and plantings of two rare plant species. Over the years, the USFS has partnered with RMEF, OHA, SOLV, Klamath County, Oregon Trout, Trout Unlimited, Federation of Flyfishers, ODFW, and USGS to restore habitat and monitor wildlife and fish at Big Marsh.

in partnership with private and public landowners. Continue to provide incentives to protect, maintain or restore wetlands such as the Wetlands Reserve Program offered through Natural Resource Conservation Service and private mitigation banking. Develop and implement grazing regimes that are compatible with wet meadow conservation objectives. Use cooperative efforts and incentive programs to establish semi-permanent livestock exclusion zones in priority areas. In partnership with landowners, implement later haying dates in critical bird nesting areas, particularly in the East Cascades.

Continue successful programs to educate individuals about the function and services provided by wetlands. Manage beaver populations to contribute to wetland creation and maintenance, when compatible with existing land uses. As part of mitigation programs, restore or create wet prairie, vernal pool and other seasonal wetland habitats as well as permanent wetlands. Promote awareness of the importance of temporary pond habitat. Explore opportunities to expand existing protected sites as a preference to restoring isolated small sites.

Factor: Water availability: Water is extremely limited in much of the Blue Mountains, East Cascades, and Northern Basin and Range ecoregion. As a result, there is competition for water resources, particularly in late summer. Lowered water tables affect wetland habitats. Competition for water harms both ecologic and economic goals. Water diversions for other uses change the seasonal-

ity of flooding, reduce the growing season, and can slow recovery and increase invasion of nonnative grasses. Drought years intensify water shortages.

Approach: Use cooperative efforts and incentive programs -- such as financial incentives for wetlands restoration, water rights acquisition, and wetland mitigation banking -- to manage water allocation and wetland habitats. Recognize importance of irrigated wetland habitats, and maintain benefits to species when considering various management and irrigation options.

Factor: Degraded water quality: Although wetlands have a role in purifying water, water quality is poor in some wetland systems. High temperatures affect water quality in some areas. Nonpoint source runoff from agricultural and residential areas contains pollutants that can affect water quality and nutrient levels, and these levels may increase as water evaporates throughout the season. High nutrient loads can contribute to toxic algal blooms. Under some conditions, repeated use of irrigation water can degrade water quality.

Approach: Provide economic incentives to decrease and manage the release of potential contaminants, such as fertilizers or pesticides, by controlling the timing of application. Use incentives to promote substitutes that are less toxic to wildlife and break down quickly in the environment. Work with agency, landowner and business partners to implement the federal Clean Water Act. Restore additional wetlands to increase filtering capacity.

Ladd Marsh Wildlife Management Area

With a whirl of wings and kaleidoscope of color, thousands of ducks take flight from a hidden marsh on ODFW's Ladd Marsh Wildlife Area. Some have nested and raised their young during the summer, while others are merely passing through on their way to their winter homes. Located in the south-west corner of the Grande Ronde Valley, Ladd Marsh harbors some of the few remaining areas of undisturbed native valley floor vegetation and demonstrates the power of cooperative restoration efforts. A sprawling complex of shallow lake and wetlands known as Tule Lake once covered 10,000 acres in the valley. Ditching and diking, begun in the late 1800's, drained all but small remnants of the original wetlands. In 1949, 400 acres of remnant wetlands were set aside for Ladd Marsh. Since then, acquisitions and restoration efforts have restored approximately 1,300 acres of the original Tule Lake

wetlands. Restoration has increased the numbers of waterfowl, shorebirds, and sandhill cranes using the area. Mountains, grasslands, and wetlands converge to provide habitat for nearly 300 different species of birds that occupy Ladd Marsh on a seasonal or year-round basis. Elk, mule and white-tailed deer, and pronghorn antelope find summer and winter forage on the hillsides and meadows. With abundant wildlife, Ladd Marsh is popular with hunters and wildlife watchers. An auto tour route, viewing platforms, and hiking trails help make the marsh a treasure for all Oregonians to enjoy. More than a dozen partners have contributed to these efforts, including Ducks Unlimited, The Nature Conservancy, NRCS, Bonneville Power Administration, USFWS, OWEB, Union County, Rocky Mountain Elk Foundation, ACOE, and the City of LaGrande.

In the Willamette Valley: Adopt critical actions recommended by the Willamette Restoration Initiative on Clean Water, such as reduce the levels of toxins and other pollutants in the Willamette Basin, provide economic incentives to decrease water pollution, and promote a developer education/certification program tied to incentives.

Factor: Invasive species: Invasives such as reed canarygrass, purple loosestrife, and Japanese knotweed invade and degrade wetlands, displacing native plants and reducing sources of food for wildlife and altering water flow and storage function. Perennial pepperweed and purple loosestrife in particular has affected important wetlands including Malheur Lake. Carp can impact wetlands by

consuming important plants and by increasing turbidity.

Approach: Emphasize prevention, risk assessment, early detection and quick control to prevent new invasives from becoming fully established. Control key invasive plants using site-appropriate tools such as flooding (reed canary grass), biological control (purple loosestrife), and mechanical treatment such as mowing (all species). Use chemical treatment carefully and where compatible with water quality concerns (all species), focusing on spot treatment during the dry season. Adjusting water levels can also help to control invasive carp. Use revegetation and other means to establish and maintain healthy plant communities that are relatively resistant to invasion and that also meet other land use objectives.

Sycan Marsh Preserve: A Wetland Revitalized

Vast, remote and sometimes inaccessible, The Nature Conservancy's Sycan Marsh Preserve is a 30,500 acre montane-meadow wetland perched at 5000' elevation and surrounded by ponderosa and lodgepole pine forests, about 80 miles northeast of Klamath Falls. The name

"level grassy place," an apt description as the marsh is dominated by grasses, sedges and rushes thriving in a nearly level basin. The marsh is bounded to the east by the gently sloping flank of Winter Rim and by the Yamsay Mountain shield volcano to the west.



The wetland complex supports an exceptional diversity of wildlife, fish, and freshwater features. Over 130 species of birds are known to nest here, with an additional 60 species occurring during migration. The marsh supports one of the highest concentrations of nesting greater sandhill cranes in Oregon, and also has high densities of nesting willets, Wilson's phalaropes and black terns, long-bill curlews, white-faced ibis and common snipe. The marsh is one of a half-dozen locations in Oregon with breeding populations of yellow rail, and has nesting records for upland sandpiper, horned grebe and trumpeter swan, all



rare breeders in Oregon. During spring migration, northward bound waterbirds stage on the marsh, with upwards of 10,000 tundra swans, 1,000

Sycan is derived from the Klamath Indian term "saiga keni" meaning

or more lesser sandhill cranes and flocks of white-fronted geese and northern pintails noted in some years.

The surrounding forested lands host over eight species of woodpeckers, including black-backed, northern three-toed and white-headed woodpeckers. Ongoing research by The Nature Conservancy and the U.S. Forest Service is evaluating the effects of prescribed fire and thinning on cavity nesting bird species on these adjacent forested lands. Sycan Marsh and its key tributaries, the Sycan River and Long Creek, support populations of threatened bull trout, rare native freshwater lampreys, several species of unique freshwater mussels and other aquatic invertebrates, and native redband trout. The marsh also supports unique plant communities, including a large fen, which is a groundwater system characterized by sundews, buckbean and other unique species.

Within the past decade, Sycan Marsh has been the subject of extensive restoration efforts lauded by wetland and wildlife managers. Major drainage canals have been filled, dikes cut, and water control structures repaired and managed with the goal of replicating the historic flow

of water across the marsh. Efforts to recover bull trout have involved removal of non-native brook trout and the restoration of critical riparian habitat and stream channels on Long Creek. Surrounding upland forests have been thinned to improve watershed functions and benefit wildlife, including cavity-nesting birds.

Partners in the restoration and management of Sycan Marsh include the U.S. Forest Service, USFWS, NRCS, OWEB, the North American Wetland Council, ODFW and Klamath Tribes. In partnership with the ZX Ranch, The Nature Conservancy is testing different grazing regimes to evaluate practices and their compatibility with wetland and upland management strategies. The Sycan Marsh preserve is the focus of numerous research and monitoring projects concerning fish, wildlife, invertebrates, plants, freshwater and forest systems and restoration techniques. These efforts will provide guidance to future restoration and management actions both at Sycan Marsh and throughout the region.

Vernal Pools in Western Oregon

Vernal pools are a unique wetland type that fill and dry out each year with changing seasons. They are found in depressions among grasslands and open woodlands throughout the Willamette Valley and Klamath Mountains ecoregions. They range from a few square yards to several acres in size. Due to a layer of clay or other impervious materials, they retain water throughout some of the spring, but they typically dry completely by the early summer months. Vernal pools tend to be acidic wetlands with characteristic plant species including downingia, quillwort, pillwort, spikerush, popcorn flower, veronica, and tufted hairgrass. Due to drying patterns, vernal pools typically form concentric rings of similar vegetation. They are home to many unusual and rare plant species because of their relative isolation in upland-dominated landscapes and their wet-dry cycles.

In addition to rare plants, many wildlife species have adapted to life in these temporary pools. For example, amphibians have a short time period for growth and reproduction, and tadpoles in the pond must quickly obtain enough energy to metamorphose into frogs. Fairy shrimp produce their embryos in hardened cysts that remain dormant over

the dry period of the pond. When they are vernal pools dry later in the spring, they provide feeding and nesting habitat for grassland birds.

In many areas, vernal pools have been converted to other uses, particu-

larly urban and rural residential development and agriculture. Recognizing the unique and sensitive nature of vernal pools, a recovery plan



was recently drafted by the U.S. Fish and Wildlife Service (November 2004). It covers 33 species associated with vernal pools in California and Southern Oregon, including several Strategy species in the Klamath Mountains ecoregion (many plants; vernal pool fairy shrimp). Many of these species are local endemics occurring in this ecoregion because of its unique geology and climate. Upland habitat condition influences vernal pools in some areas because alterations in hydrology affect the amount and timing of pond fill. Restoration efforts focused on this sensitive habitat will benefit a wide variety of species with unique adaptations.

Howell's Spectacular Thelypody (*Thelypodium howellii* ssp. *spectabilis*) Conservation



The Baldock Slough Wetland Reserve Program project is truly an example of an innovative and effective plant conservation partnership. The Oregon Department of Agriculture (ODA), the U.S. Fish and Wildlife Service (USFWS), the Natural Resources Conservation Service (NRCS), Baker County, private landowners and private nurseries have combined resources and expertise to establish a new population of the endangered Howell's spectacular thelypody while working to conserve

important wetland resources in Baker County. In 2001, thelypody seeds and nursery-grown plugs were planted at two sites and monitored for three years. Additional restoration efforts included invasive plant control, hydrologic restoration, and preliminary seed grow-out trials. The showy purple flowers of the thelypody were visible in many of the plots the year after transplanting. As of June 2004, both seed and plug plots have demonstrated recruitment, with many plots having over one hundred seedlings. Future monitoring is needed to document the ongoing success of the new populations, but the initial prognosis for these new populations is good.

Hairy Popcorn Flower or Rough Allocarya (*Plagiobothrys hirtus*) Conservation



State, federal and local government agencies have combined forces with The Nature Conservancy (TNC) and other private landowners to work towards recovering the hairy popcorn flower. This endangered species, with its cheerful white and yellow flowers, occurs only at low elevations in Douglas County. It is found in seasonal wetlands, which are one of the most rapidly disappearing habitat types throughout the state. The partnership to conserve the hairy popcorn

flower started back in 1996, when the U.S. Fish and Wildlife Service provided initial funding for Oregon Department of Agriculture staff to collect seeds from several existing popcorn flower sites, develop seed germination and propagation protocol, and plant the cultivated plants on Oregon Department of Transportation (ODOT) and TNC land. The project was then expanded to include additional sites on Bureau of Land Management (BLM) and adjacent privately-owned lands. Since then, these populations have been monitored regularly, and they appear to be self-sustaining.

Wet Meadow Potholes Provide Stronghold for Biological Complexity

Even a puddle can provide a home. In fact, several small but distinct and important types of wetlands are filled each year by rain or snowfall, with no input from streams. These habitats include vernal pools that are only seasonally wet with snowmelt; shallow potholes that are often created by elk wallowing during the rut; wet meadows with waterlogged soil after seasonal snow; and wet prairies, where standing water occurs for only a very short time. Bull elk create wallows during the breeding season, which become valuable puddle habitat in the spring. Habitats like these range in size from puddles to many acres in size. These habitats are typically poorly described and rarely inventoried, but they are truly critical for the life cycles and genetic diversity of many animals in the West Cascades, including amphibians and insects such as dragon-

flies, fairy shrimp and water striders. Because they dry out near the end of each summer, these habitats cannot support fish, which are common predators of amphibians and aquatic insects. For example, Cascade frogs, Pacific treefrogs and long-toed salamanders commonly rely upon wet meadow potholes to lay their eggs. The timing of pool drying each year is critical, as tadpoles must metamorphose before the pond dries up. Additionally, meadow potholes can be an essential water source for migratory birds, which also use these resources only seasonally. Recognition of the diversity and importance of these meadow habitats is the first step towards protecting them. The next time you are out in a wet meadow, pause along the trail to look in a puddle or two, and at the right time of the year you might be surprised at what you see.