



## Woodland Fish and Wildlife

### *Wetlands as Varied as Our Region*

**T**he Pacific Northwest is highly varied geologically and biologically. This leads to an equally diverse range of wetlands types, including Sitka spruce/skunk cabbage swamps near the coast, willow-choked stream canyons and seasonally-wet salt grass flats east of the Cascades, remnant river channels and wet prairies in the Willamette Valley, and lodgepole pine/sedge forests and saturated meadows in the Cascades.

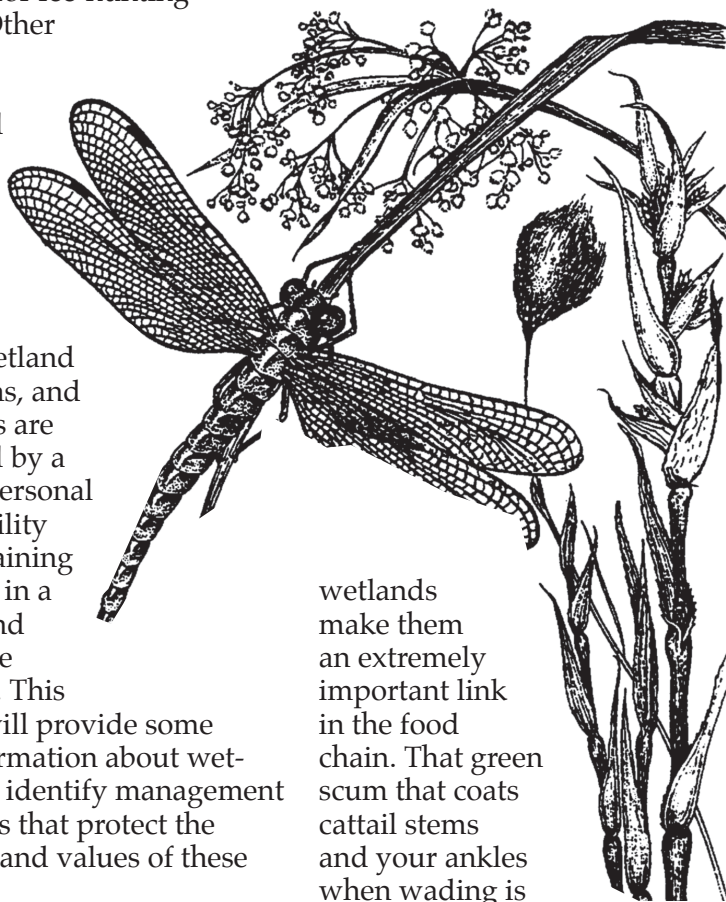
In Oregon and Washington, more than 50% (and up to 70% in some areas) of our original wetlands have been lost, mostly by conversion to agricultural or urban uses. Many other wetlands have been severely degraded through poor land use practices and by invasion of undesirable plants. Wetlands, like streams, are very sensitive to surrounding and upslope land uses. Unlike many activities that permanently alter wetlands, forest management can be compatible with good wetland management.

**Why would you, as a woodland owner and/or manager, be concerned about wetlands?** Wetlands provide

a wide range of important functions and values, though the benefits that wetlands provide vary greatly by type, location, and condition. Many landowners manage and protect wetlands to improve wildlife habitat for their own enjoyment or to improve the potential for fee-hunting income. Other managers may be motivated mostly by the desire to comply with state and federal wetland regulations, and still others are motivated by a sense of personal responsibility for maintaining their land in a healthy and productive condition. This bulletin will provide some basic information about wetlands and identify management techniques that protect the functions and values of these lands.

#### **Importance of Wetlands to Fish and Wildlife**

Wetlands are highly effective at converting the sun's energy into food. The plant material and small organisms produced in abundance in



wetlands make them an extremely important link in the food chain. That green scum that coats cattail stems and your ankles when wading is

**Number of wildlife species using riparian zones or freshwater wetland habitats.**

Source: Brown, 1985. Volume 2, Appendix 8 gives specific information on these 414 species, including their use of different wetland types for breeding, resting, and/or feeding, and whether the wetland type is a primary or secondary habitat (see Reference section for full citation).

Box 1

Class	Number of westside wildlife species	Number of species using riparian or wetland plant communities	Number of species using riparian zones or wetlands as a specialized habitat but not using plant communities	Total number of species using riparian zones or wetlands
Amphibians & Reptiles	44	35	2	37
Birds	267	192	38	230
Mammals	103	91	1	92
Total	414	318	41	359

teeming with small organisms. The swarms of swallows, flycatchers, and bats scooping up insect hatches over wetlands are one common indicator of the high productivity of wetlands.

**Importance to Fish**

Stream-associated wetlands provide essential fish habitat. Plant material and organisms produced in stream-associated wetlands are important food sources for fish. Also, side channels and backwater pools are used by fish as rearing areas and as “refuges” during high stream flows.

Young cutthroat trout and Coho salmon grow many times faster in a stream-associated wetland than in the main stream. This is because fish reared in calm waters of wetlands use most of the food they consume for growth, whereas

fish reared in stream currents must convert a large



Box 2

**Wetland Functions and Values**

Wetlands vary greatly in location and type, and therefore not all provide the same functions and values that wetlands in general are known to provide.

**Flood Storage and Stream Flow Augmentation—**

Stream-associated wetlands store water during high flows, reducing flood peaks. Then the areas augment summer stream flows by slowly releasing stored water back into the stream system.

**Water Quality Protection—**Wetlands reduce pollution by filtering and processing harmful substances.

**Fish and Shellfish Production—**Wetlands are important spawning and nursery areas for fin and shellfish.

**Timber Production—**Forested wetlands are a source of commercially valuable timber.

**Erosion and Sediment Control—**Wetlands reduce flood velocities, reduce erosion, and trap water-borne sediments.

**Recreation—**Wetlands provide opportunities for fishing, hunting, boating, plant identification, scientific study, and wildlife observation.

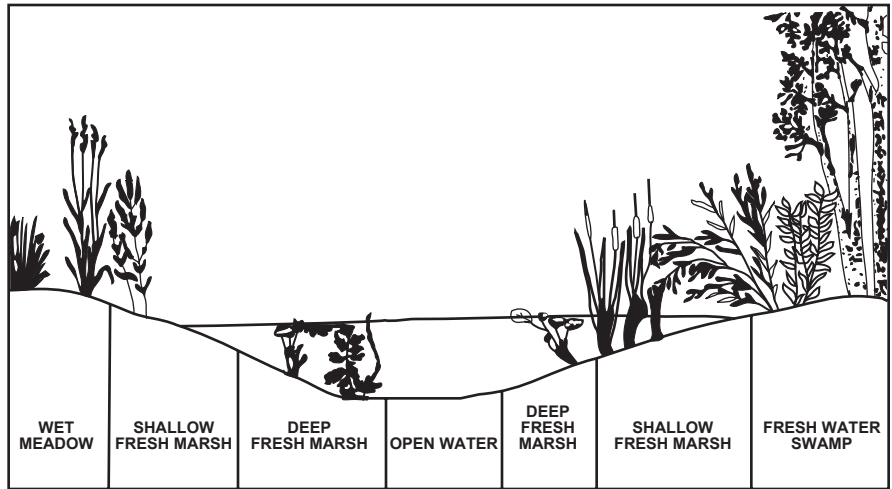
portion of the food they consume into energy. Also, wetland habitats such as beaver ponds, side channels, and seasonal swamps are critical to salmonids for winter survival. One study found that 15% of a watershed's Coho production came from fish that over-wintered in wetlands that are dry during the summer. The survival rate of Coho salmon that over-winter in abandoned beaver ponds that are dry in the summer was about twice as high as the survival rate for the overall stream system.

**Importance to Wildlife**

Wetlands and streamside riparian areas are crucial to the survival of many wildlife species. These habitats provide food in abundance, water, refuge from summer heat, shelter from winter cold, hiding cover, and late-summer green forage when upland areas are dry, as well as critical breeding and rearing habitats.

Despite comprising a relatively small portion of the landscape, wetlands and riparian areas are relied on heavily by nearly all of the wildlife in Oregon and Washington. Of 414 western Oregon and Washington wildlife species, 359 use riparian zones or wetlands during some season or parts of their life cycle (see Box 1, page 2). The situation is similar east of the Cascades. Of 378 terrestrial species in the Blue Mountains, 285 are either directly dependent on wetlands and riparian areas or utilize them more than other habitats.

**Idealized Cross Section View of Freshwater Wetland**



**How to Recognize Wetlands**

**What are Wetlands?**

Although there are many types of wetlands in the Pacific Northwest, they share three common characteristics. **Most important is an abundance of water.** Whatever the water source—high water table, rainwater “perched” on impervious layers in the

by **hydrophytes**—plants that survive in permanently or seasonally saturated soils.

However, plants, like animals, have varying degrees of specialization. While some species adapt readily to a wide variety of conditions and may be referred to as “generalists” (weeds are prime examples), other plants are specialists and thrive in a very specific habitat. For this reason, some plant species are better indicators

**WETLAND DEFINITION**  
*Wetlands are areas inundated by surface or ground water at a frequency and duration sufficient to support, and that normally do support, mostly vegetation adapted for life in saturated soil.*

soil, frequent flooding, or groundwater seeps—**prolonged saturation is what creates the wetland.** Saturated soils form distinctive, visible physical characteristics and are called **hydric soils.** Most often, these saturated conditions support a plant community dominated

of wetlands than others. The U.S. Fish and Wildlife Service has compiled a list of plants that grow in wetlands. Each species is given a wetland indicator status based on the frequency with which it occurs in wetlands. For example, skunk cabbage is an **Obligate Wetland species** and is found only in wetlands. **Facultative Wetland species** occur in wetlands 66–99% of the time; they are found in either permanent or seasonal wetlands and can be used to identify seasonal

wetlands during the dry time of the year. **Facultative species** are often the generalists—they occur in a wide variety of sites, including seasonal wetlands, and are especially common in areas disturbed by farming, grazing, or other activities. As generalists, they are the least reliable “indicators” of wetlands.

**Where Will You Find Wetlands?**

Wetlands are usually found in the lowest portion of the landscape. They may be stream-associated or “isolated.” Landscape position, climate, and soil type all influence wetlands formation. Expect to find wetlands:

- in low areas with a very high winter water table
- in valley flats or depressions where impervious soil layers create a “perched water table”
- near rivers and streams
- low on slopes where groundwater seeps or breaks out as springs
- in mountain meadows watered by gradual snowmelt
- in broad river valleys with side channels or abandoned stream channels

**Types of Wetlands**

There are many types of wetlands and many terms used to describe them. Terms such as “swamps,” “bogs,” “marshes,” and “wet meadows” all refer to types of wetlands. Wetlands

**EXAMPLES OF WETLAND TYPES AND TYPICAL VEGETATION**

**Open Water Wetlands**

water lily  
pondweed  
duckweed  
bladderwort  
water-cress

**Marsh**

common cattail  
hardstem bulrush  
yellow iris  
spike rush  
reed canarygrass  
water parsley

**Wet Meadows**

creeping buttercup  
willow dock  
giant horsetail  
sedges  
gum weed

**Shrub Wetlands**

Pacific willow  
Douglas’ spirea  
sweetgale

**Forest Wetlands**

**Overstory**

red alder  
Oregon ash  
Sitka spruce  
western redcedar

**Typical Understory**

lady fern  
water parsley  
slough sedge  
skunk cabbage  
Douglas’ spirea

wapato  
slough sledge  
bur-reed  
rice cutgrass  
marsh speedwell  
water plantain

nodding beggars-tick  
American sloughgrass  
fragrant popcorn flower  
tufted hairgrass  
soft rush

red-osier dogwood  
alpine bog laurel  
bog birch

**Overstory**

lodgepole pine  
quaking aspen  
Engelmann spruce

**Typical Understory**

aquatic sedge  
widefruit sedge  
Baltic rush  
Douglas spirea  
bog blueberry



Pacific Willow  
*Salix*  
*Lastandra*  
*Benth*

scientists have developed formal terms that are used to classify and map wetlands, lakes, streams, and estuaries. Types of wetlands are grouped mainly by their vegetative characteristics. For example, wetlands dominated by

trees are classified **Forested Wetlands**, while those dominated by sedges and grasses are classified **Emergent Wetlands**. One wetland can be a mix of various types.

Forested wetlands may be particularly difficult to identify

because many of the trees in the forested wetlands are classified as “facultative,” that is, they are generalists that occur in both wetlands and uplands. Therefore, the presence of these tree species does not mean that area is or is not a wetland. For

Box 4

### Are There Wetlands On Your Land?

A YES answer to any of the questions may indicate that the site is a wetland.

Yes No

- Are there natural drainage channels or swales?
- Is the ground soggy underfoot in the spring?
- Are there depressions where water pools for two to three weeks in the spring?
- Do you avoid the area with heavy equipment for fear of getting bogged down?
- Has the site been ditched to dry it out?
- Are seeps or springs present?
- Is the soil black or light gray rather than brown or reddish brown?
- Is there evidence of surface scour from running water?
- Do you see many clumps of rushes (round stems), sedges, (triangular stems), skunk cabbage, willows, or Oregon ash? (These are just a few of the many plants that grow in wetlands.)
- In forested areas, are there large hummocks, trees with fluted bases, and trees grown on nurse logs?



***A Word of Caution***—Seasonal wetlands may look very dry in mid-to-late summer. Use the checklist to evaluate your land, and consult a specialist before doing work in an area that may be a wetland. Many activities in wetlands are regulated by state and federal law.



forested wetlands then, the understory species as well as the soil characteristics and the hydrology of the site provide the needed clues for wetlands identification. In addition, well developed forested wetlands often exhibit a hummock and hollow topography, with trees restricted to the hummocks.

Some wetlands are agriculturally managed and have been used many years for grazing or to grow crops. Some of these have been ditched, drained, or diked to remove the water, thus converting them to non-wetlands. Others, however, still have wetland hydrology and still pond water for several days in the spring. When cropped, these agricultural wetlands may not look at all like wetlands; when abandoned, however, the wetlands plant species gradually reappear.

There are a number of regional publications that serve as excellent guides to wetlands types and identification in Oregon and Washington (see References).

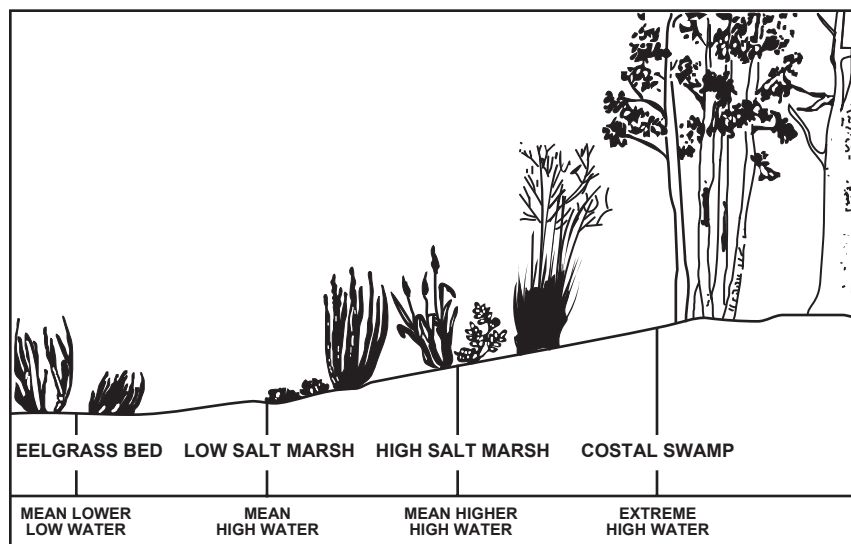
### Management Considerations

The many functions that wetlands provide make protection, restoration, and wise management of wetlands important to landowners and the general public. Forestry can be compat-

ible with sound wetland management. While most forestry activities may alter the wetland, they need not convert it to an upland. The goal in managing woodlands and wetlands, then, is to avoid activities that may convert the wetlands to uplands and to manage site alterations to retain the benefits provided by the wetlands.

Wetlands change in a variety of ways. Some change is inevitable, as landscapes are changing all the time. While some change is natural, other change is not, or is accelerated by the activities of people. The key to managing wetlands and woodlands is to plan carefully and thoughtfully, and to be aware of the effects your activities will have on the landscape. *Some wetland sites may be so sensitive and so difficult to reforest that you may want to consider excluding them from your harvest plans.*

The amount and duration of water on a site affects soil development. Soil development, in turn, affects the plant community characteristics. Just as specific water, soil, and vegetation characteristics define a wetland, it is these characteristics that we must manage with care in order to maintain the functions and values of wetlands. Some potential forest practices disturbances to wetlands are: alteration of hydrologic functions; soil compaction; introduction of invasive plant species; changes in the microclimate due to vegetation removal in and around the wetland; alteration of habitat through the removal of vegetation, snags, and downed wood; and reduction of woody debris that simplify the composition, structure, and stability of wetlands.



**Idealized cross sectional view of spatial and vertical relation of estuarine wetland types.**

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## Management Techniques

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Forestry activities that demand careful planning to minimize damage to wetlands include road and landing construction, heavy equipment use in and around wetlands, reforestation, and harvesting.

### Roads and Landings

Road building and landing construction are activities that may require filling. These activities should be avoided in wetlands, as they may seriously or permanently alter the wetland. When deciding on road or landing locations, conduct an inventory of all sensitive areas (wetlands, riparian areas, sensitive wildlife sites, high risk sites, etc.) and outline operational considerations. Weigh all of these factors before deciding on a road or landing location.

If you must build a road in or near a wetland, minimize its impact. Use clean, temporary fills, minimize the amount of fill you use, and minimize the road width. Give careful consideration to the size, spacing, and orientation of culverts, particularly in systems with wide water table fluctuations or with seasonal flows. Use adequate culvert sizes and increase the frequency of culvert spacing.

### Equipment Use

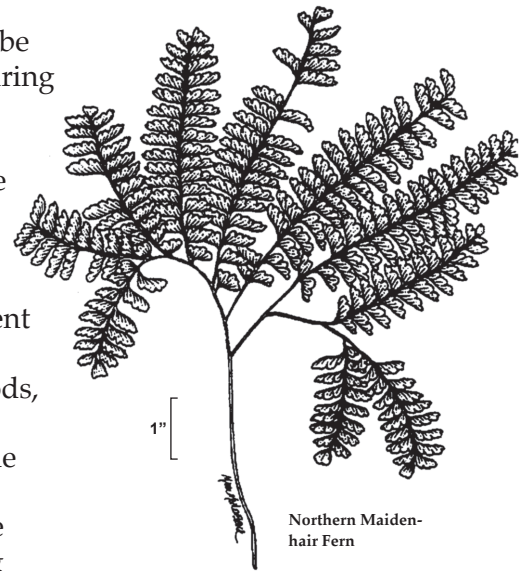
Excessive soil disturbance can reduce site productivity, alter drainage patterns, and prepare seed beds for invasive plant species which are adapted to disturbed sites. These pest species, such as reed canarygrass and purple loosestrife, are very aggressive and hardy, can clog culverts and streams, are of low value to wildlife, and displace native vegetation.

Wetland soils may not be wet year round. In fact, during the some parts of the year, they may be quite dry. These soils can be sensitive to disturbance, and the heavy use of equipment on these sites should be avoided. If heavy equipment must be used in wetlands, confine its use to dry periods, and, even then, keep the equipment on any available high spots. Low ground pressure equipment can be very effective in protecting wetland sites.

### Reforestation

The key to successful reforestation is to plan before harvest begins. Many forested wetlands have developed over a long period of time under limiting conditions. For instance, in forested wetlands with hummock and hollow topography, regeneration may be confined to the hummocks.

Similarly, in some spruce swamps, the existing trees became established on nurse logs, and in order for seedlings to become established again, the seed source must be good and nurse logs must be available. Prior to harvesting, land managers should develop a plan to provide these special components of successful reforestation.



### Harvesting

For harvest operations involving wetlands, managers should consider soil moisture, proximity to water, regeneration problems, potential for windthrow of residual trees, and wildlife habitat.

If the wetland is associated with a stream, harvesting operators should plan for the retention of leaf trees near the

stream to provide for shade, canopy, and the contribution of future large woody debris to the stream system. For wetland sites away from streams, leaving snags, downed wood and leave trees of varying sizes and species will provide essential and diverse habitat for many species of birds, small mammals, and big game. Generally, leaving trees that are representative of the stand, both in species and size class, will benefit the wetlands. It is important to retain trees, particularly conifers, even on small wetlands. Also, remember to retain downed logs as nurse logs and for wildlife habitat.

Vegetation left around wetlands can accomplish several things. It can protect the site from sedimentation. Also, vegetation will help regulate temperature and moisture conditions by providing windbreaks and shading, providing a buffer between human activities and wetlands, and providing for thermal covers, browse, and other habitat components for many wildlife species. The optimal size of a leave tree area varies in relation to a number of factors including slope, erodibility of uplands, the stocking level of the stand, and the potential for windthrow.

Wetlands vary greatly by species composition, region, land use, and other site-specific variables. It is also advisable to consult a local biologist for management advice.

### **Related Land Uses**

Grazing and other agricultural activities can also substantially alter wetlands. Heavy livestock grazing in and around wetlands can change the plant species composition and disrupt the banks of adjacent water bodies. Controlling the number of animals and the timing of the grazing in sensitive areas can alleviate much damage, often bringing improvement to forage and moisture conditions. Consider fencing some of the more sensitive areas.

For forest management advice on wetlands, contact the Oregon Department of Forestry or the Washington Department of Natural Resources. Before beginning any ditching, draining, filling, clearing, or other alteration of wetlands, consult your county Extension agent, Department of Agriculture representative, and/or the wetland regulatory agencies. Anyone receiving U.S. Department of Agriculture benefits should consult the Natural Resources Conservation Service prior to altering wetlands. Penalties for wetland conversion may include loss of benefits and/or fines.

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## **Incentive Programs and Regulations**

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### **Landowner Incentive Programs**

Assistance is available to landowners who wish to improve wildlife or fisheries

habitats on their land. For information and assistance, contact:

- the Oregon or Washington Department of Fish and Wildlife
- the U.S. Fish and Wildlife Service
- your local Soil and Water Conservation Service
- the U.S. Natural Resources Conservation Service
- Service Foresters of the Oregon Department of Forestry or the Washington Department of Natural Resources.

### **Wetland Regulations**

Many activities in or adjacent to wetlands are regulated by local, state, and/or federal laws. (See Agencies under Information Sources.) Activities in wetlands or stream that may be regulated include:

- filling
- excavation
- timber harvest
- stump removal
- bulldozing or grading
- alteration of stream banks or stream course
- plowing or discing natural wetlands
- ditching
- construction
- draining

## **Oregon**

In Oregon, commercial forest operations conducted on private land are regulated by the Oregon Department of Forestry under the state



Forest Practices Act (FPA). Activities in or near wetlands that are part of a commercial forest operation and comply with the FPA do not require a separate permit from the Oregon Department of State Lands (DSL) or the Army Corps of Engineers. However, it is important to remember that if the timber harvest activity is related to a change in land use (to a non-forestry use), a DSL and/or Corps of Engineers permit may be required for subsequent activity, including stump removal. Wetland fills or

alterations not directly related to forest management are generally regulated by DSL and the Corps of Engineers.

### Washington

In Washington, commercial forest operations on private land are regulated by the Washington Department of Natural Resources (DNR) under the state Forest Practices Act. The Department of Ecology also has regulatory authority over those forest practices which can affect water quality. Activities in or near

wetlands on forest land are regulated by a forest practices permit, which is processed by the DNR and distributed to other agencies.

When a change in forest land use (to a non-forestry use) is proposed, city or county government may require compliance with a clearing and grading ordinance or Shoreline Master Program. The Corps of Engineers may require another permit. Local planning and public works agencies can assist with determining local requirements.

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## Information Sources

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### References

Bigley, R.E. and S. W. Hull. 2000. Managing Wetlands on State Forest Lands in Washington. [http://www.dnr.wa.gov/htdocs/lm/field\\_guides/managing/acknowledge.html](http://www.dnr.wa.gov/htdocs/lm/field_guides/managing/acknowledge.html).

Brown, E. R., ed. 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. Portland, OR: USDA Forest Service Pacific Northwest Region, Publication No. R6-F&WL-192-1985.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Washington D.C.: U.S. Fish and Wildlife Service, Publication No. FWS/OBS-79/31.

Kovalchik, B. 1987. Riparian Zone Associations: Deschutes, Ochoco, Fremont, and Winema National Forests. Portland, OR: USDA Forest Service Pacific Northwest Region, Publication R6 ECOL TP-279-87.

Oregon Division of State Lands. 2000. Oregon Wetlands: Wetland Inventory User's Guide. Salem, OR.

Oregon Division of State Lands. 1996. Oregon Freshwater Wetland Assessment Methodology. Salem, OR.

Thomas, J.W. 1979. Wildlife Habitats in Managed Forests—the Blue Mountains of Oregon and Washington. Washington, D.C.: USDA Forest Service Handbook No. 553.

U.S. Army Corps of Engineers. 1984. Wetland Plants of the Pacific Northwest. Seattle District.

U.S. Fish and Wildlife Service. 1988. National List of Plant Species that Occur in Wetlands.

### Tools

#### **National Wetlands Inventory**

National Wetlands Inventory (NWI) maps are produced by the U.S. Fish and Wildlife

## Information Sources

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Service and are available for all of Oregon and Washington. Most NWI maps are at a 1:24,000 scale. Wetland information is displayed on a USGS topographic base map. The mapping is based on aerial photograph interpretation, with limited field checking. The inventory in itself is not sufficient to determine the precise boundaries or the resource values of a particular wetland. The NWI is perhaps least reliable in identifying forested wetlands, as these are among the most difficult to identify through air photo interpretations. You may obtain maps from the Department of State Lands or at <http://www.fws.gov/nwi/>.

### USGS Topographic Maps

These maps, at a scale of 1:24,000 or 1:62,500, are a source of topographic clues for wetlands location. Information about these maps is available on the USGS Website.

### Aerial Photographs

Aerial photographs are frequently very useful in identifying the boundaries of wetlands and are an important tool for evaluating large areas.

### County Soil Survey

County soil surveys are available for much of Oregon and Washington. Soil surveys include maps of major soil units and a vast amount of information about the soils. Hydric (wet) soil types are a clue in wetlands identification. Your local Natural Resources Conservation Service office can provide you with a survey (if available) and assist you in using it. They can also provide you with a list of hydric (wet) soils.

## OREGON AGENCIES

### Department of Forestry

2600 State St., Salem, OR 97310  
Phone: 503/945-7200

- Administers Forest Practices Act
- Provides forest management assistance

### Department of State Lands

775 Summer Street NE, Salem, OR 97301-1279  
Phone: 503/986-5200  
Eastern Region Office, Bend, OR  
Phone: 541/388-6112

- Administers state Removal-Fill Law
- Sources for National Wetlands Inventory maps
- Wetland identification assistance

### Department of Fish and Wildlife

3406 Cherry Ave. NE, Salem, OR 97303-4924  
Phone: 503/947-6000

- Assistance with management plans and habitat enhancement plans
- Wetland identification assistance
- Assistance with wetland restoration
- Administers state Endangered Species Act for wildlife and fish

### Soil and Water Conservation Districts, county offices

- Assistance with conservation projects

### Department of Agriculture, Natural Resources Division

635 Capitol Street NW, Room 212, Salem, OR 97310  
Phone: 503/378-3810

- Assistance with land management practices
- Administers State Endangered Species Act for plants

### Oregon State University, Extension Forestry

Peavy Hall 119, College of Forestry  
Oregon State University, Corvallis, OR 97331  
Phone: 503/737-3700

- Technical assistance, publications, videos

## WASHINGTON AGENCIES

### Department of Natural Resources

Forest Practices Division  
1111 Washington St. SE  
P.O. Box 47012, Olympia, WA 98504-7012  
Phone: 360/902-1400

- Administers water quality provisions of the FPA

## Information Sources

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### Department of Fish and Wildlife

1111 Washington St. SE  
Olympia, WA 98501-1091  
Phone: 360/902-2200

- Protects food fish and their habitat
- Protects wildlife, gamefish, and bullfrogs and their habitat

### FEDERAL AGENCIES

#### U.S. Army Corp of Engineers

Portland District, Regulatory Program  
P.O. Box 2946, Portland, OR 97208-2946  
Phone: 503/808-2946

Seattle District, Regulatory Branch  
P.O. Box 3755, Seattle, WA 98124-3755  
Phone: 206/764-3495

- Administers federal Clean Water Act (wetland regulations)

#### U.S. Fish and Wildlife Service

Portland Field Office  
911 NE 11<sup>th</sup> Ave. #1, Portland, OR 97232  
Phone: 503/231-6121

Western Washington Fish and Wildlife Office

510 Desmond Dr., Lacey, WA 98503-1263  
Phone: 360/753-9440

Upper Columbia River Fish and Wildlife Office

11103 E. Montgomery Dr., Spokane, WA 99206-4779

Phone: 509/891-6839

- Assistance with habitat improvements and wetland restoration

#### U.S. Natural Resources Conservation Service

Oregon State Office  
1201 NE Lloyd Blvd., Suite 900  
Portland, OR 97232  
Phone: 503/414-3200

Washington State Office  
316 W. Boone Ave., Suite 450  
Spokane, WA 99201-2348  
Phone: 509/353-2900

- Assistance with conservation programs
- Assistance with soils

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## A Woodland Fish and Wildlife Project Publication

By

*Rosemary Mannix and Janet Morlan*

Oregon Department of Forestry, Oregon Division of State Lands.

Illustrations courtesy of Oregon Department Fish and Wildlife and U.S. Army Corps of Engineers.

The Woodland Fish and Wildlife Project is a cooperative effort among the World Forestry Center, Oregon State Department of Forestry, Oregon Department of Fish and Wildlife, Washington State Department of Natural Resources, University of Washington College of Forest Resources, Oregon State University Extension, Service, Washington State University Extension, Oregon Association of Conservation Districts, Oregon Small Woodlands Association, Washington Farm Forestry Association, Washington Department of Fish and Wildlife, USDA Natural Resources Conservation Service, USDA Forest Service, US Fish and Wildlife Service, and the Western Forestry and Conservation Association.

The Woodland Fish and Wildlife Project was initiated to provide information on fish and wildlife management to private woodland owners and managers. It is the intent of the organizations involved in this project to produce publications that will serve as practical guides to woodland owners.

Each publication is intended to be complete in itself. Users may find it convenient to *collect all publications in this series* in a three-ring binder to form a permanent reference file. Woodland Fish and Wildlife Project publications range from an overview of fish and wildlife opportunities on woodland properties to specific publications concerning techniques for managing individual species.

**Titles available in the Woodland Fish & Wildlife series:**

Is There a Place for Fish and Wildlife in Your Woodland?.....	MISC0132
Riparian Areas: Fish and Wildlife Havens .....	MISC0133
Managing Small Woodlands for Grouse .....	MISC0141
Wood Ducks on Small Woodlands .....	MISC0142
Managing Ponderosa Pine Woodlands for Fish and Wildlife.....	MISC0158
Managing Small Woodlands for Cavity-Nesting Birds .....	MISC0160
Trout in Small Woodlands.....	MISC0161
Managing Small Woodlands for Elk.....	MISC0164
Coastal Douglas-fir Forests and Wildlife .....	MISC0168
Hawk, Eagle and Osprey Management on Small Woodlands.....	MISC0169
Wetlands as Varied as our Region .....	MISC0179
Wildlife on White Oak Woodlands .....	MISC0180
Quail on Small Woodlands .....	MISC0187
Managing Deer on Small Woodlands .....	MISC0189
Beaver, Muskrat, and Nutria on Small Woodlands .....	MISC0196
Managing Forest Habitats for Neotropical Migrant Songbirds.....	MISC0198
Habitat Management for Bats on Small Woodlands.....	MISC0226
Managing Western Juniper for Wildlife .....	MISC0286
Wildlife in Broadleaf Forests of Oregon and Washington.....	MISC0534
Habitat Management for Turkeys on Small Woodlands .....	MISC0535

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