



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

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## NATIONAL WETLAND INVENTORY

### NOTES TO USERS

PUGET SOUND, WASHINGTON

1:100,000 SCALE MAPS COVERED

Bellingham	-	<u>Victoria NE</u>
Port Townsend	-	<u>Victoria SE</u>
Seattle	-	Seattle NE
Tacoma	-	Seattle SE

# NATIONAL WETLAND INVENTORY

## NOTES TO USERS

### Puget Sound, Washington

#### 1. PURPOSE

The purpose of Notes to Users is to provide general information regarding the production of National Wetlands Inventory (NWI) maps and wetlands found within a relatively similar geographic area. Notes to Users are not intended to include descriptions of all wetlands found in the area nor provide complete plant species information.

#### 2. AREA COVERED

The area covered is defined by the Bellingham, Port Townsend, Seattle, and Tacoma 1:100,000 intermediate scale maps (see attached index maps). The area extends from approximately Olympia, Washington (47° N latitude), north to the United States/Canada border (49° N latitude) and is bounded on the east and west by 123° W longitude and 124° W longitude respectively.

According to Bailey's ecoregions, the area is in the Humid Temperate Domain, Marine Division, Willamette-Puget Forest Province. The climate is generally mild throughout the year. Annual temperatures average 48° to 50° F. (9° to 13° C.). The moderate rainfall reaches its maximum in winter; summer has a slight moisture deficit. Average annual rainfall ranges from 15 to 60 in. (380 to 1,525 mm.); but in much of the area, the range is from 30 to 45 in. (760 to 1,120 mm.). Coastal mountains are responsible for the drier and less muted climate. Fog partially compensates for the summer drought.

#### 3. MAP PREPARATION

Wetland classification for the NWI maps is in accordance with "Classification of Wetlands and Deep-Water Habitats of the United States (An Operational Draft)," Cowardin, et al, 1977.1/

Wetland classification and delineations were produced by air photointerpretation of high level aerial photography. The aerial photography used was color infrared at a scale of 1:130,000 taken in July, 1973.

1/The classification system was published in 1979: Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States, Fish and Wildlife Service, U. S. Department of the Interior, Washington, DC, December 1979.

Limited field reconnaissance was conducted during the fall and winter of 1980.

Stereoscopically reviewed aerial photographs had wetland boundaries and labels delineated on the photographs. Delineations were enlarged to a scale of 1:24,000 using a zoom-transfer scope and fitted to USGS 7 1/2 minute topographic maps. The 1:100,000 scale wetland maps were prepared from the 7 1/2 minute series. Large scale NWI wetland maps (1:24,000 scale) are available for the USGS 7 1/2 minute topographic sheets indicated on the attached index map.

The Project Officer for production of the wetland maps was Dennis Peters, Regional Wetlands Coordinator, U. S. Fish and Wildlife Service, Region 1, Lloyd 500 Building, 500 NE Multnomah Street, Portland, Oregon 97232, telephone (503) 231-6154. Aerial photo interpretation was completed by Area Information Systems (AIS), Crestline, California. Maps were prepared by Martel Laboratories, Inc., and the NWI National Team in St. Petersburg, Florida.

#### 4. USER CAUTION

The map documents were prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography. The aerial photographs typically reflected conditions during the specific year and season when they were taken. In addition, there is a margin of error inherent in the use of aerial photographs. Thus a detailed on-the-ground and historical analysis of a single site may result in revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included in the map document.

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define limits of proprietary jurisdiction of any federal, state, or local government or to establish the geographical scope of regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specific agency regulatory programs and proprietary jurisdictions that may affect such activities.

## 5. WETLAND COMMUNITIES

All five wetland systems, Marine, Estuarine, Lacustrine, Riverine, and Palustrine are represented in the subject area. Deepwater habitats are areas that are permanently flooded (except during periods of extreme drought) and are characterized by open water on the aerial photography. These habitats are present in the Marine system (M1OW), Estuarine system (E1OW), Riverine system (R1OW, R2OW), Lacustrine system (L1OW) and Palustrine system (POW).

Aquatic beds (AB) present in the Marine and Estuarine systems are composed of eel grass beds (Zostera spp.) or algal mats (Ulva spp.) Aquatic beds in the Lacustrine, Riverine, and Palustrine system commonly include species such as pond lily (Nuphar sp.), pond weeds (Potamogetan spp.) or duck weeds (Lemna spp.).

Unvegetated wetlands, present in all systems, include the classes beach/bar (BB) and flats (FL).

Emergent wetlands (persistent) are present in the Estuarine and Palustrine system. Estuarine intertidal emergent wetlands (E2EM) are often referred to as salt marshes. The dominant plant species characterizing these communities are pickleweed or glass worts (Salicornia spp.), saltgrass (Distichlis spicata), cordgrass (Spartina spp.), jaumea (Jaumea spp.), hairgrass (Deschampsia spp.), and saltmarsh aster (Aster spp.).

Palustrine emergent wetlands (PEM) are characterized by numerous and varied species; some of the most common being bullrush and threesquare (Scirpus spp.), sedges (Carex spp.), horsetails (Equisetum spp.), rushes (Juncus spp.), spike rushes (Eleocharis spp.), cattail (Typha spp.), dock (Rumex spp.), smartweeds (Polygonum spp.), and reed canary grass (Phalaris arundinacea).

Palustrine forested (PFO) and scrub shrub (PSS) wetlands are characterized by woody species. Common shrub species include willow (Salix spp.), red alder (Alnus rubra), hardhack (Spirea douglassi) and cascara (Rhamnus purshiana). Typical forest species are red alder, Oregon ash (Fraxinus latifolia), big leaf maple (Acer macrophyllum), sitka spruce (Picea sitchensis), western red cedar (Thuja plicata) and black cottonwood (Populus trichocarpa). The classification of forested or scrub/shrub wetlands is determined by height of woody vegetation - forested greater than 6 m. and scrub/shrub less than 6m.

The Riverine system includes the classes open water and flats. Open water and flats are restricted to the Riverine tidal (R1OW), lower (R2OW) and upper (R3OW) perennial subsystems. While the flats are not covered by a perennial flow, they are associated with the reach of the river that contains permanent water and are included in the perennial subsystems. In cases where streamside palustrine scrub/shrub or palustrine forested wetlands cannot be separately delineated from the riverine system, the wetlands are mapped as linear palustrine wetland features (PSS or PFO).

Natural or artificial basins or catchments larger than 20 acres are in the Lacustrine system. The Lacustrine system on the NWI maps includes the classes Lacustrine open water (L1OW, L2OW) and Lacustrine flat (L2FL). The open water areas are covered by water whereas the flats are exposed at some time during the year. Basins or catchments smaller than 20 acres are in the palustrine system and classified as Palustrine open water (POW) or Palustrine flat (PFL) if exposed at some time during the year.

### Modifiers

The small-scale (1:00,000) NWI maps' legends do not include water regime nor special modifiers. Mapping codes for these modifiers are indicated in parentheses in the discussion that follows.

Hydrologic characteristics are an important aspect of wetlands. The water regime modifiers describe in general terms the duration and timing of surface inundation, as well as groundwater fluctuations. These modifiers are grouped under two major headings: Tidal and Nontidal.

### Tidal

Subtidal (L). The substrate is permanently flooded with tidal water.

Irregularly Exposed (M). The land surface is exposed by tides less often than daily.

Regularly Flooded (N). Tidal water alternately floods and exposes the land surface at least once daily.

Irregularly Flooded (P). Tidal water floods the land surface less often than daily.

In Tidal Riverine, Lacustrine, and Palustrine areas, a nontidal modifier is used with a tidal suffix to describe the water regime more appropriately: Temporarily Flooded-Tidal (S), Seasonally Flooded-Tidal (R), Semipermanently Flooded-Tidal (T), or Permanently Flooded-Tidal (V).

### Nontidal

For the purpose of mapping, nontidal water regime modifiers have been lumped into three broad categories. These are:

Intermittently flooded-temporarily flooded (W). The substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity, or surface water is present for brief periods during the growing season.

Saturated/Seasonally-flooded/Semipermanently flooded (Y). The substrate is saturated to the surface for extended periods during the growing season, or surface water is present for extended periods especially early in the growing season but is absent by the end of the season in most years, or surface water persists throughout the growing season in most years.

Intermittently exposed/Permanently flooded (Z). Surface water is present throughout the year except in years of extreme drought, or water covers the land surface throughout the year in all years.

An artificially flooded (K) water regime modifier can be applied with all water regime modifiers. In this case, flooding is under the direct and purposeful control of man.

Special modifiers included on these 1:100,000 scale NWI maps, where applicable, are:

Diked/impounded (h). Created or modified by a barrier, dike, or dam which obstructs the inflow or outflow of water.

Excavated (x). Lies within a basin or channel excavated by man.

## 6. SOURCES OF ADDITIONAL INFORMATION

Since the purpose of the Notes to Users is to provide a general overview of a relatively large geographic area, in this case about 6,400 square miles, it is important to be aware of sources of additional information. The following is a list of reports providing information about the area of concern.

Bailey, Robert G. 1978. Description of the ecoregions of the United States. U. S. Forest Service, USDA, Ogden, Utah.

Booz Allen Energy and Environment Division. The Natural Resource Benefits of Freshwater Riverine Wetlands: A Literature Review, prepared for Davis G. Davis Office of Analysis and Evaluation, 1978.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1977. Classification of wetlands and deep-water habitats of the United States (An Operational Draft), U. S. Fish and Wildlife Service, October 1977.

King County Planning Division. 1982. Wetland Plants of King County and the Puget Sound Lowlands. King County Planning Division, Seattle, Washington.

Kozloff, Eugene N. Plants and Animals of the Pacific Northwest.  
University of Washington Press, Seattle, Washington. 1976.

Steward, Albert N., LaRea J. Dennis and Helen M. Gilkey. Aquatic  
Plants of the Pacific Northwest. Oregon State University  
Press, Corvallis, Oregon. 1963.



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