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NATIONAL WETLANDS INVENTORY

NOTES TO USERS

PUGET TROUGH

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MAP PREPARATION

The U.S. Fish and Wildlife Service, Office of Habitat Resources, is conducting an inventory of the wetlands of the United States. The National Wetlands Inventory (NWI) is establishing a wetland data base in both map and computer forms for the entire country. The NWI information will serve to identify the current status of U.S. wetlands and can be used as a reference point from which future changes in wetlands can be evaluated.

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

Specific wetland map delineations and classification are the product of photo-interpretation of high altitude aerial photography, supported by preliminary field reconnaissance and aided by the use of collateral information (County Soil Surveys, USGS quadrangles, etc.). The system for wetlands classification is in accordance with "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et. al., 1979).

The photography used for photointerpretation was National High Altitude color infrared at a scale of 1:58,000. Photography was taken on five different dates. For the study area, 26.7% of the coverage was flown on July 26, 1981; 61.6% was flown on three days in August 1981; and 11.7% was flown on August 6, 1982.

GEOGRAPHY

The mapping area is located in the portion of Washington state known as the Puget Trough. This is the north-south depression between the Coast Range and the Cascade Mountains. As the eastern edge of the mapping area is approached, the foothills and portions of the Cascade Mountain Range are encountered. Mount St. Helens is located within the study area near this eastern edge. Portions of the Snoqualmie and Gifford Pinchot National Forests fall within the study area.

Bailey's Ecoregion Classification (1980) identifies two distinct zones within the mapping area. The first of these ecoregions is the Humid Temperate Domain, Marine Division, Willamette-Puget Forest Province. This area is the Puget Trough proper and occupies a north-south depression between the Coast Range and Cascade Mountains. Elevations range from sea level to 3,000 feet within the study area. This valley is a moderately dissected tableland covered by glacial till, glacial outwash and lacustrine deposits. The characteristic vegetation of this ecoregion is a dense coniferous forest of Douglas-fir (Pseudotsuga menzeisii), western redcedar (Thuja plicata) and western hemlock (Tsuga heterophylla). Where these forests have been logged, deciduous

trees such as red alder (Alnus rubra), bigleaf maple (Acer macrophyllum), Oregon ash (Fraxinus latifolia) and black cottonwood (Populus balsamifera) become established. Prairies support open stands of grasses, conifers and oaks (Quercus spp.). Poorly drained sites with swamp or bog communities are common. Many areas within river floodplains and valleys have been cleared for agriculture and livestock production.

The second ecoregion is the Humid Temperate Domain, Marine Division, Pacific Forest Province, Silver Fir-Douglas-fir Forest Section. This area covers the foothills and western side of the Cascade Mountain Range. It is a series of steep, rugged mountains. Elevations range from 1000 to 8500 feet within the study area. The common forest tree species are Douglas-fir, western redcedar, western hemlock, black cottonwood, grand fir (Abies grandis) and silver fir (Abies amabilis). Many species of shrubs grow exceptionally well in and around the forests making them practically impenetrable in many places.

CLIMATE

The Puget Trough portion of the study area is characterized by a mild climate with temperatures averaging 48°F to 55°F. Rainfall is also moderate with averages ranging from 15 to 60 inches. The majority of rainfall comes in winter. Summers are drier and moisture deficits may occur.

The Cascade Mountains and foothills also have a mild climate. Temperatures in this portion of the study area average 35°F to 50°F. Rainfall in this region is heavy, however, with averages ranging from 30 to 150 inches. As in the Puget Trough, maximum precipitation occurs during the winter but, due to higher elevations involved, some or all may be in the form of snow.

SOILS

Soil is a major factor in any plant community. Its properties become a major determining factor in hydric conditions and soils are, therefore, one of the criteria used to determine and define wetlands.

Hydric soils in the study area are Entisols, Alfisols, Mollisols, Histosols, Inceptisols and Spodosols. Imperfectly drained or poorly drained upland* or terrace soils include Bellingham, Edmonds, Everson, McKenna, Norma and Tisch Series. Very poorly-drained and poorly-drained organic soils include the Greenwood, Mukilteo, Rifle, Semiahmoo, Tacoma and Carbondale series. Somewhat excessively to well-drained soils underlain by coarse-textured materials of bottomlands and alluvial fans are the Newberg and Columbia series. Poorly drained or imperfectly

*As defined by U.S.D.A. Soil Conservation Service.

drained soils of bottomlands are the Puget, Reed, Snohomish, Wapato and Cove series. Poorly-drained soils of old terraces are represented by the Klaber and Lacamas series. Imperfectly drained and poorly drained soils of younger terraces and bottomlands are in the Kosmos and Schooley series. Nearly level, poorly drained and somewhat poorly-drained alluvial soils of flood plains are represented by the Caples series. Finally, nearly level, somewhat poorly-drained alluvial soils of old stream and lake terraces are in the Minniece series.

Wetlands can and do occur on other soil associations within the study area, as these are broad associations and not a list of all hydric soils of the area. Other associations not listed here have hydric soils as small inclusions within otherwise well drained groups of soils.

USER CAUTION

The map document was prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with "Classification of Wetlands and Deep Water Habitats of the United States", Cowardin, et al, 1979. 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 on 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 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 area should seek the advice of appropriate Federal, State, or local agencies concerning specific agency regulatory programs and proprietary jurisdictions that may affect such activities.

Additional information regarding this map or other National Wetland Inventory activities may be obtained by contacting:

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Aerial photo interpretation was completed by Martel Laboratories, Inc., St. Petersburg, Florida. Maps were prepared by NWI National Team in St. Petersburg, Florida.

WETLAND COMMUNITIES AND DEEP WATER HABITATS

Of the five wetland systems, only three, the Riverine, Palustrine and Lacustrine were found in the study area. The Estuarine and Marine systems do not occur in this portion of the Puget Trough.

RIVERINE SYSTEM

In the Riverine system, perennial and intermittent subsystems were represented. Virtually all perennial rivers and creeks are upper perennial. These rivers are fast-flowing with a very high dissolved oxygen content and, for the most part, have a steep gradient (minor areas of lower gradient may occur). The substrate is generally rubble, cobble-gravel, sand or in some places bedrock. Medium to large named rivers in the study area include the Nisqually, the Puyallup, the Deschutes, the Skookumchuck, the Newaukum, the Cowlitz, the Green, the Kalama and the Toutle.

Portions of the river substrate exposed during low flows are generally sand or cobble-gravel and occur within the channel or along the edges of the river or stream. These are classified as Riverine, upper perennial, unconsolidated shore, temporarily or seasonally flooded (R3USA or R3USC).

Lower perennial streams were very rare in occurrence and were restricted to broad agricultural valleys mainly in the northern portions of the study area. Gradients around Tumwater, Washington and the Fort Lewis Military Reservation are low enough to be considered lower perennial.

When riverine systems and their adjacent vegetated wetlands were too narrow to be mapped separately at this scale, the vegetation took precedence. Water regime for these communities was determined based on the class of stream on the U.S.G.S. topographic maps. Wetland vegetation occurring along perennial streams was given the seasonally flooded water regime (C) while wetland vegetation occurring along intermittent streams was given the temporarily flooded water regime (A).

Intermittent riverine subsystems were based on the U.S.G.S. quadrangle information. Seasonal intermittents were well defined channels or streambeds (R4SBC) usually bright white and easily followed on the photography, or else in well vegetated valleys. Temporary streambeds (R4SBA) were more of a gray color and less distinct. Intermittent streams carry water for only part of the year and normally exist within the steep areas of the mountains.

LACUSTRINE SYSTEM

Lakes occurred as natural and impounded water bodies. The larger lakes were reservoirs or dammed rivers. These include Alder Lake, Mayfield Lake, Davisson Lake and Swift Reservoir. Natural lakes included Spirit Lake, Lake Lawrence, Offut Lake and Lake

Kapowsin. Smaller lakes are found and many of these are only large enough to qualify by definition (greater than 20 acres). Most of the lakes are deep, cold and have an unconsolidated bottom. These are classified as lacustrine, limnetic, unconsolidated bottom, permanently flooded (L1UBH). The impounded special modifier (h) is added to this when a dam is present. Substrates will undoubtedly range from silts and muds through bedrock.

Shallow areas supported aquatic bed communities dominated by water lily (Nymphaea sp.) and spatterdock (Nuphar luteum). These areas are classified as lacustrine, littoral, aquatic bed, permanently flooded (L2ABH). These areas are rarely only semi-permanently flooded (F).

Drawdown areas or flats within lakes or along their shores are generally sands, muds, silts or cobble-gravel. These areas are exposed during annual low water periods and are classified as lacustrine, littoral, unconsolidated shore, seasonally flooded, or temporarily flooded (L2USC or L2USA).

Palustrine System

Ponds exist within the study area as natural bodies of water as well as impoundments. These bodies of water are strikingly similar to lakes in every respect except size. Classifications of these are palustrine, unconsolidated bottom, permanently flooded or semi-permanently flooded (PUBH or PUBF). Impounded ponds have the impounded special modifier (h) added also. Shallower areas might be found supporting aquatic bed communities. Dominant species here include water lily and spatterdock as in lakes but also occurring are milfoil (Myriophyllum sp.), duck weed (Lemna sp.) and pondweed (Potamogeton sp.). These communities are classified as palustrine, aquatic bed, permanently flooded or semi-permanently flooded (PABH or PABF).

Herbaceous wetlands occurred as wet pastures, wet meadows, shallow marshes and in isolated depressions. The most common of these occurred as seasonally flooded communities. These were classified as palustrine, emergent, seasonally flooded (PEMC). Dominant species of these communities are reed canary grass (Phalaris arundinacea), soft rush (Juncus effusus) and slough sedge (Carex obnupta). Temporarily flooded communities were next most frequent. These communities contained mainly soft rush and reed canary grass. There were also a few examples of semi-permanently flooded marsh. These communities contain mainly cattail (Typha latifolia), bulrush (Scirpus spp.), water sedge (Carex aquatilis) and slough sedge.

Shrub wetlands occurred as shrub swamps or thickets, along rivers or creeks, on lake margins or along the edges of herbaceous

communities. Seasonally flooded communities (PSSC) again dominated in frequency of occurrence. The dominant species in these wetlands were willow (Salix spp.), hardhack (Spiraea douglasii) and red alder (Alnus rubra). Temporarily flooded shrub communities (PSSA) were next in frequency with the same species being present, but with rose (Rosa spp.), salmonberry (Rubus spectabilis) and blackberry (Rubus spp.) being more common. There were very few semi-permanently flooded (PSSF) examples of shrub wetlands. Where they did occur, willow was usually dominant.

Along rivers and creeks redosier dogwood (Cornus stolonifera) is often common. Herbeaceous understory plants include reed canary grass, water sedge, slough sedge, soft rush and skunk cabbage (Lysichiton americanum). These communities were classified as palustrine, scrub-shrub, seasonally flooded, temporarily flooded or semi-permanently flooded (PSSC, PSSA or PSSF respectively).

Palustrine forested communities occur in similar situations to the shrub communities. The most common were depressional or within a drainage. These communities were most often seasonally flooded (PFOC). Characteristic species include red alder, black cottonwood, western redcedar and Oregon ash. The understory in these communities is composed of various shrub species which include overstory saplings, hardhack and willow. Herbaceous understory components include reed canary grass, sedges, rushes and skunk cabbage. In temporarily flooded forested communities (PFOA) generally found along rivers or drainage ways and around lakes or ponds or within wet pastures, the characteristic species include those previously mentioned together with western hemlock and bigleaf maple. The understory components are also similar but the composition is generally more rose, salmonberry, blackberry, snowberry (Symphoricarpos sp.), viburnum (Viburnum sp.) and vine maple (Acer circinatum). Herbaceous species are more rushes and grasses with ferns becoming prelevant.

Many of the plant species growing in wetlands can also grow in non-wetlands. Because of this, location relative to topography and hydrology is very important in determining wetland boundaries and water regimes.

TABLE 1: WETLAND COMMUNITIES

NWI CODE	NWI DESCRIPTION	COMMON DESCRIPTION	VEGETATION/SUBSTRATE
R3UB	Riverine, Upper Perennial, Unconsolidated Bottom	River, Stream or Creek	Unvegetated; Sand, Cobble-Gravel or Rubble
R2UBH	Riverine, Lower Perennial, Unconsolidated Bottom	River, Creek or Ditch	Unvegetated; Sand, Mud or Cobble-Gravel
R4SB	Riverine, Intermittent, Stream Bed	Stream or Creek	Unvegetated; Sand, Cobble-Gravel or Rubble
R3US	Riverine, Upper Perennial, Unconsolidated Shore	River Bar or Gravel Bar	Unvegetated; Sand, Cobble-Gravel or Rubble
L1UB	Lacustrine, Limnetic, Unconsolidated Bottom	Lake or Reservoirs	Unvegetated; Sand, Mud, Silt or Cobble-Gravel
L2US	Lacustrine, Littoral, Unconsolidated Shore	Lake Shore, Beach or Impoundment Drawdown Zone	Unvegetated; Sand, Mud, Silt or Cobble-Gravel
L2AB	Lacustrine, Littoral, Aquatic Bed	Lake Marsh or Deep Marsh	Spatterdock (<u>Nuphar luteum</u>) Water lily (<u>Nymphaea</u> sp.)
POB	Palustrine, Unconsolidated Bottom	Pond, Impoundment or Stock Pond	Unvegetated; Sand or Mud
PUS	Palustrine, Unconsolidated Shore	Pond Shore or Intermittent Pond	Unvegetated; Sand
PAB	Palustrine, Aquatic Bed	Pond or Deep Marsh	Water lily (<u>Nymphaea</u> sp.) Spatterdock (<u>Nuphar luteum</u>) Duck weed (<u>Lemna</u> sp.) Pond weed (<u>Potamogeton</u> sp.) Water milfoil (<u>Myriophyllum</u> sp.)

NWI CODE	NWI DESCRIPTION	COMMON DESCRIPTION	VEGETATION/SUBSTRATE
PEM	Palustrine Emergent	Wet Pasture, Wet Meadow, Depression, Lake Shore, Pond Shore, River Bank, Marsh or Shallow Marsh	Soft rush (<u>Juncus effusus</u>) Slough sedge (<u>Carex obnupta</u>) Reed canary grass (<u>Phalaris arundinacea</u>) Water sedge (<u>Carex aquatilis</u>) Cattail (<u>Typha latifolia</u>) Skunk cabbage (<u>Lysichiton americanum</u>) Common reed (<u>Phragmites communis</u>) Water parsley (<u>Oenanthe sarmentosa</u>) Bulrush (<u>Scirpus</u> spp.)
PSS	Palustrine Scrub-Shrub	Shrub Swamp, Shrub Thicket, Riparian, Flood Plain Thicket, River Bar Thicket or Swamp	Red alder (<u>Alnus rubra</u>) Willow (<u>Salix</u> , spp.) Hard hack (<u>Spiraea douglasii</u>) Redosier dogwood (<u>Cornus stolonifera</u>) Rose (<u>Rosa</u> spp.) Salmonberry (<u>Rubus spectabilis</u>) Blackberry (<u>Rubus</u> spp.) Snowberry (<u>Symphoricarpos</u> sp.) Viburnum (<u>Viburnum</u> sp.) Vine maple (<u>Acer circinatum</u>)

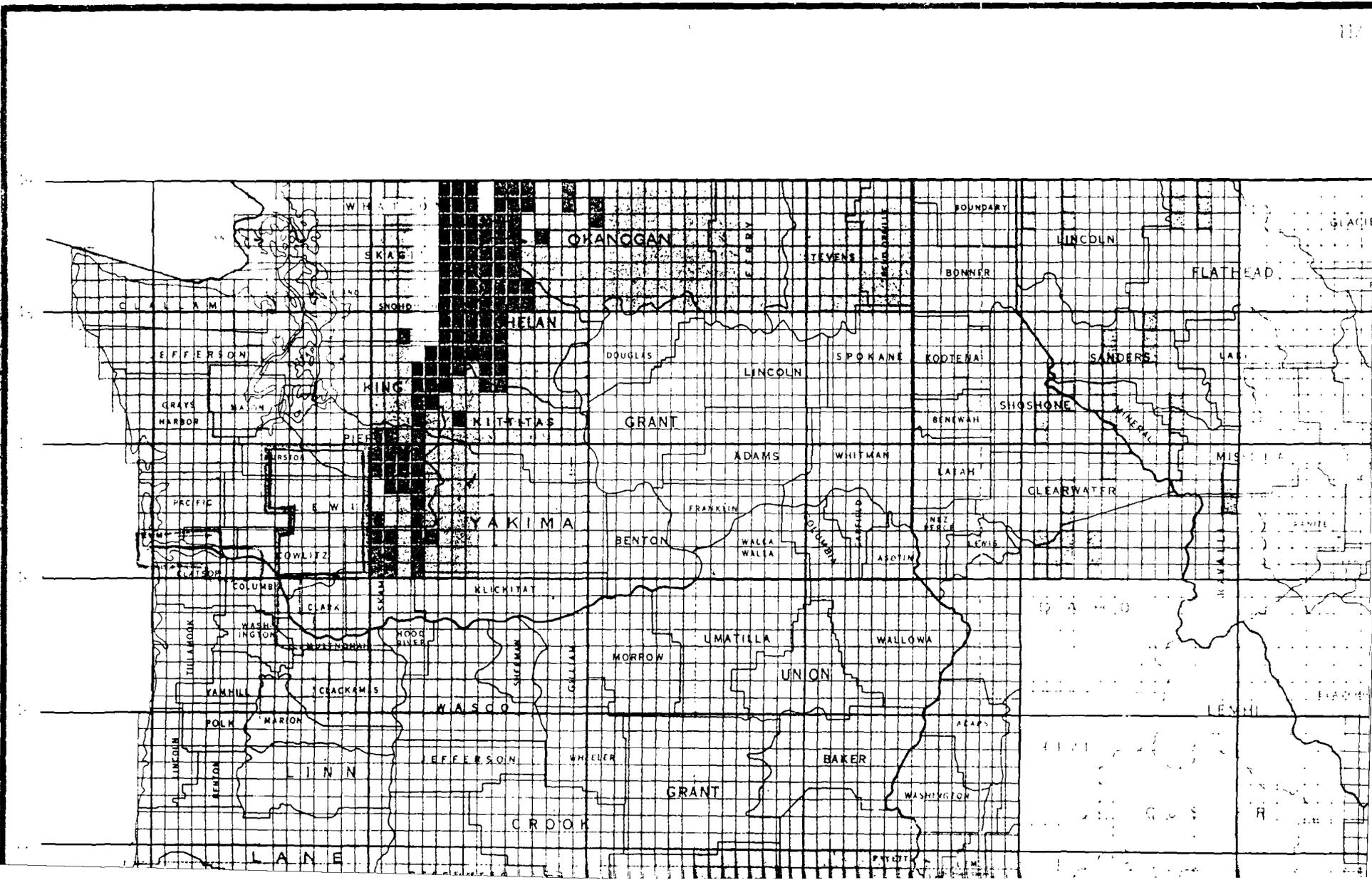
NWI CODE	NWI DESCRIPTION	COMMON DESCRIPTION	VEGETATION/SUBSTRATE
PFO	Palustrine, Forested	Swamp, Riparian, Wet Forest, Flood Plain Forest or River Bar Forest	Red alder (<u>Alnus rubra</u>) Black cottonwood (<u>Populus</u> <u>balsamifera</u>) Western redcedar (<u>Thuja plicata</u>) Western hemlock (<u>Tsuga heterophylla</u>) Bigleaf maple (<u>Acer macrophyllum</u>) Oregon ash (<u>Fraxinus latifolia</u>) Willow (<u>Salix</u> spp.)

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