Ecological site group R008XG988WA
Wetland Complex

Last updated: 09/21/2023
Accessed: 05/10/2025

Key Characteristics

None specified

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Physiography

Hierarchical Classification
Major Land Resource Area (MLRA): 8 – Columbia Plateau

LRU – Common Resource Areas (CRA):
8.1 - Channeled Scablands
8.2 - Loess Islands
8.3 - Okanogan Drift Hills
8.4 - Moist Pleistocene Lake Basins
8.5 - Moist Yakima Folds
8.6 - Lower Snake and Clearwater Canyons
8.7 - Okanogan Valley

Site Concept Narrative:

In the upland setting ecological sites are often expansive, and thus, can be delineated and separated on aerial photos. But in the landscape position of bottoms, basins and depressions this is rarely the case as small changes in soil chemistry, the water table and elevation or aspect results in significant changes in plant community composition. In short distances there are often big swings of available water holding capacity, and soils can go from hydric to non-hydric, or from saline-sodic to not. So, in bottoms, riparian areas and depressions, ecological sites and community phases occur as small spots, strips and patches, or as narrow rings around vernal ponds. And generally, in a matter of steps one can walk across several ecological sites. On any given site location, two or more of these sites occur as a patchwork – Loamy Bottom, Alkali Terrace, Sodic Flat, Wet Meadow, Wetland Complex and Riparian Complex. These ecological sites may need to be mapped as a complex when doing resource inventory.

Diagnostics:

Wetland Complex in MLRAs 7, 8, & 9 is a bottomland site, is the “classic wetland” and is characterized by two conditions – hydric soil and aquatic plants. This small patch ecosystem sits on the lowest position of the landscape, on landforms such as depressions, bottoms, floodplains and basins. Wetland Complex also occurs on pond and lake fringes, and along slow-moving streams and rivers. These sites are so small they are indicated on a soil map as a spot symbol.

Wetland Complex is part of the lentic (standing water) ecosystem. Wetlands are frequently or continually inundated by up to two feet of water. Water level fluctuations support the development of different wetland zones (floating, submergent, emergent). This ecological site only considers the emergent vegetative zone of the wetland (where

plants rise above the water surface). The floating and submergent zones are not considered in this description.

Soils are saturated to the surface or there is standing water for an extended portion of the growing season. Thus, the soils show all the signs of hydric soils such as mottling and greying. These saturated wetland soils are not saline or sodic but, are hydric. The soils are moderately deep to deep, silt loam or sandy loam texture.

These plant communities are exclusively herbaceous (non-woody) and predominately wetland obligate species. Cattails, bulrush, sedges, wetland grasses and Baltic rush are major species. Wetlands often have low species diversity as many of the dominant species form dense monocultures. Wetland Complex remains wet all season and rarely, if ever, burn.

A subset of this ecological site occurs around the edge of basalt pothole ponds. In addition to the herbaceous species, this subset can have woody species such as aspen, coyote willow, wood rose and hawthorn.

Principle Vegetative Drivers:

Prolonged saturated and anaerobic soil conditions drive the vegetative expression of Wetland Complex. Seasonal fluctuations in water levels control vegetation patterns. This site is dominated by hydrophytic species.

Influencing Water Features:

A plant's ability to grow on a site and overall plant production is determined by soil-water-plant relationships:
1. Whether rain and melting snow run off-site or infiltrate into the soil
2. Whether soil condition remain aerobic or become saturated and anaerobic
3. How quickly the soil reaches the wilting point

Water is at or above the surface for most of the growing season. Seasonal flooding, runoff and discharging groundwater maintain saturated and anaerobic soil conditions.

Physiographic Features:

The landscape is part of the Columbia basalt plateau. This ecological site sits on the lowest position on the landscape on landforms such as bottoms, floodplains, basins & depressions. Wetland Complex also occurs as fringes around ponds and lakes. In the upland setting ecological sites are often expansive, and thus, can be delineated and separated on aerial photos. But in the landscape position of bottoms, basins and depressions this is rarely the case as small changes in soil chemistry, the water table and elevation or aspect results in significant changes in plant community composition. In short distances there are often big swings of available water holding capacity, and soils can go from hydric to non-hydric, or from saline-sodic to not. So, in bottoms, riparian areas and depressions, ecological sites and community phases occur as small spots, strips and patches, or as narrow rings around vernal ponds. Generally, in a matter of steps one can walk across several ecological sites. On any given site location, two or more of these sites occur as a patchwork – Loamy Bottom, Alkali Terrace, Sodic Flat, Wet Meadow, Wetland Complex and Riparian Complex. These ecological sites may need to be mapped as a complex when doing resource inventory.

Physiographic Division: Intermontane Plateau
Physiographic Province: Columbia Plateau
Physiographic Sections: Walla Walla Plateau Section

Landscapes: Valleys, hills and plateaus
Landform: floodplains, depressions

Elevation: Dominantly 1,000 to 2,500 feet
Slope: Total range: 0 to 1 percent
Central tendency: 0 percent
Aspect: Occurs on all aspects

Geology:

This MLRA is almost entirely underlain by Miocene basalt flows. Columbia River basalt is covered in many areas with as much as 200 feet of loess and volcanic ash. Small areas of sandstones, siltstones, and conglomerates of the Upper Tertiary Ellensburg Formation are along the western edge of this area. Some Quaternary glacial drift covers the northern edge of the basalt flows, and some Miocene-Pliocene continental sedimentary deposits occur south of the Columbia River, in Oregon.

A wide expanse of scablands in the eastern portion of this MLRA, in Washington, was deeply dissected about 16,000 years ago, when an ice dam that formed ancient glacial Lake Missoula was breached several times, creating catastrophic floods. The geology of the northernmost part of this MLRA is distinctly different from that of the rest of the area. Alluvium, glacial outwash, and glacial drift fill the valley floor of the Okanogan River and the side valleys of tributary streams. The fault parallel with the valley separates pre-Tertiary metamorphic rocks on the west, in the Cascades, from older, pre-Cretaceous metamorphic rocks on the east, in the Northern Rocky Mountains. Mesozoic and Paleozoic sedimentary rocks cover the metamorphic rocks for most of the length of the valley on the west.

Climate

The climate is characterized by moderately cold, wet winters, and hot, dry summers, with limited precipitation due to the rain shadow effect of the Cascades. Taxonomic soil climate is either xeric (12 – 16 inches PPT) or aridic moisture regimes (10 – 12 inches PPT) with a mesic temperature regime.

Mean Annual Precipitation:
Range: 10 – 16 inches
Seventy to seventy-five percent of the precipitation comes late October through March as a mixture of rain and snow. June through early October is mostly dry.

Mean Annual Air Temperature:
Range: 46 to 54 F
Central Tendency: 48 – 52 F
Freezing temperatures generally occur from late-October through early-April. Temperature extremes are 0 degrees in winter and 110 degrees in summer. Winter fog is variable and often quite localized, as the fog settles on some areas but not others.

Frost-free Period (days):
Total range: 100 to 180
Central tendency: 110 to 160
The growing season for Wetland Complex is March through September.

Soil features

Edaphic:

Usually these soils are not mapped. Wetlands appear mostly as spot symbols. Soils are moderately deep to deep silt loam that are saturated and thus hydric. Wetland Complex commonly occurs adjacent to Alkali Terrace, Sodic Flat, Loamy Bottom, Wet Meadow and Riparian Complex ecological sites. It also occurs with upland sites such as Loamy, Stony, and Cool Loamy.

Representative Soil Features:

This ecological site components are dominantly Typic taxonomic subgroup of Haplosaprists great group of the Histosols taxonomic order. Soils are dominantly very deep. Average available water capacity of about 18 inches (45.8 cm) in the 0 to 40 inches (0-100 cm) depth range.

Soil parent material is herbaceous organic material.

The associated soils are Saltese and similar soils.

Dominate soil surface is muck.

Dominant particle-size class is not used since it’s a Histosol.

Fragments on surface horizon > 3 inches (% Volume):
Minimum: 0
Maximum: 0

Fragments within surface horizon > 3 inches (% Volume):
Minimum: 0
Maximum: 5
Average: 0

Fragments within surface horizon ≤ 3 inches (% Volume):
Minimum: 0
Maximum: 5
Average: 0

Subsurface fragments > 3 inches (% Volume):
Minimum: 0
Maximum: 5
Average: 0

Subsurface fragments ≤ 3 inches (% Volume):
Minimum: 0
Maximum: 5
Average: 0

Drainage Class: Very poorly drained
Water table depth: 0 to 5 inches

Flooding:
Frequency: Rare to frequent

Ponding:
Frequency: None to frequent

Saturated Hydraulic Conductivity Class:
0 to 10 inches: Moderately high
10 to 40 inches: Moderately high

Depth to root-restricting feature (inches):
Minimum: Dominantly greater than 60
Maximum: greater than 60

Electrical Conductivity (dS/m):
Minimum: 0
Maximum: 0

Sodium Absorption Ratio:
Minimum: 0
Maximum: 0

Calcium Carbonate Equivalent (percent):
Minimum: 0

Maximum: 0

Soil Reaction (pH) (1:1 Water):
0 - 10 inches: 5.1 to 8.4
10 - 40 inches: 5.6 to 7.8

Available Water Capacity (inches, 0 – 40 inches depth):
Minimum: 15.0
Maximum: 22.0
Average: 18.0

Vegetation dynamics

Ecological Dynamics:

Wetland Complex produces about 10,000 pounds/acre of biomass annually.

Almost all wetlands have been impacted by widespread degradation from (1) hydrologic alteration, (2) invasion by invasive weeds such as reed canarygrass, or (3) excessive grazing. Many wetlands are completely dominated by invasive species.

Cattails are aquatic, perennial plants found in a variety of wetland habitats. These are often the first wetlands plants to colonize areas of newly exposed wet mud, with their abundant wind-dispersed seeds. Cattails also spread by rhizomes, forming large interconnected stands.

Hardstem bulrush is a perennial, heavily rhizomatous wetland plant. It forms large stands with young plants on the outside and the older plants toward the center. It is generally found is areas of standing water ranging from 4 inches to 6 feet in depth but does not tolerate long periods of deep water.

Reed canarygrass is a circumboreal species, native to north-temperate regions. It grows in wet areas such as edges of lakes, ponds, ditches and creeks, often forming dense stands, in some areas it is a problematic weed. North American populations may be a mix of native strains, European strains and agronomic cultivars. Reed canarygrass frequents saturated soils but, cannot survive extended periods of standing water. Rated FACW 67-99% occurrence in wetlands

American mannagrass is a perennial wetland plant that approaches six feet in height. American sloughgrass is an annual or short-lived perennial.

Nebraska sedge grows in wetlands across central and western US. It tolerates submersion for long periods and, also, alkaline conditions. Nebraska sedge has bluish leaves and produces a dense network of rhizomes.

Most freshwater marshes and wetlands experience seasonal and episodic flooding. Water level fluctuations support the development of different marsh zones. Seasonal fluctuations in water levels control vegetation patterns and invertebrate communities. Often Herbaceous Wetland has low species diversity as many of the dominant species form dense monocultures.

Wetlands almost never burn and because of standing water receives limited grazing pressure.

In Washington, wetland communities in a sagebrush steppe or grassland ecosystem provide habitat for a variety of wetland and upland wildlife species.

Supporting Information:

Associated Sites:
Wetland Complex is associated with other ecological sites in bottoms and basin areas of MLRA 8, including Loamy Bottom, Alkali Terrace, Sodic Flat, Wet Meadow and Riparian Complex. Wetland Complex is also associated with upland sites such as Loamy, Stony, and Cool Loamy.

Similar Sites:
MLRAs 7, 8 & 9 share the same Wetland Complex ecological site description.

Inventory Data References (narrative):
Data to populate Reference Community came from several sources: (1) NRCS ecological sites from 2004, (2) Soil Conservation Service range sites from 1980s and 1990s, (3) Daubenmire's habitat types, and (4) ecological systems from Natural Heritage Program

Major Land Resource Area

MLRA 008X
Columbia Plateau

Subclasses

- R008XY988WA–Wetland Complex

Stage

Provisional

Contributors

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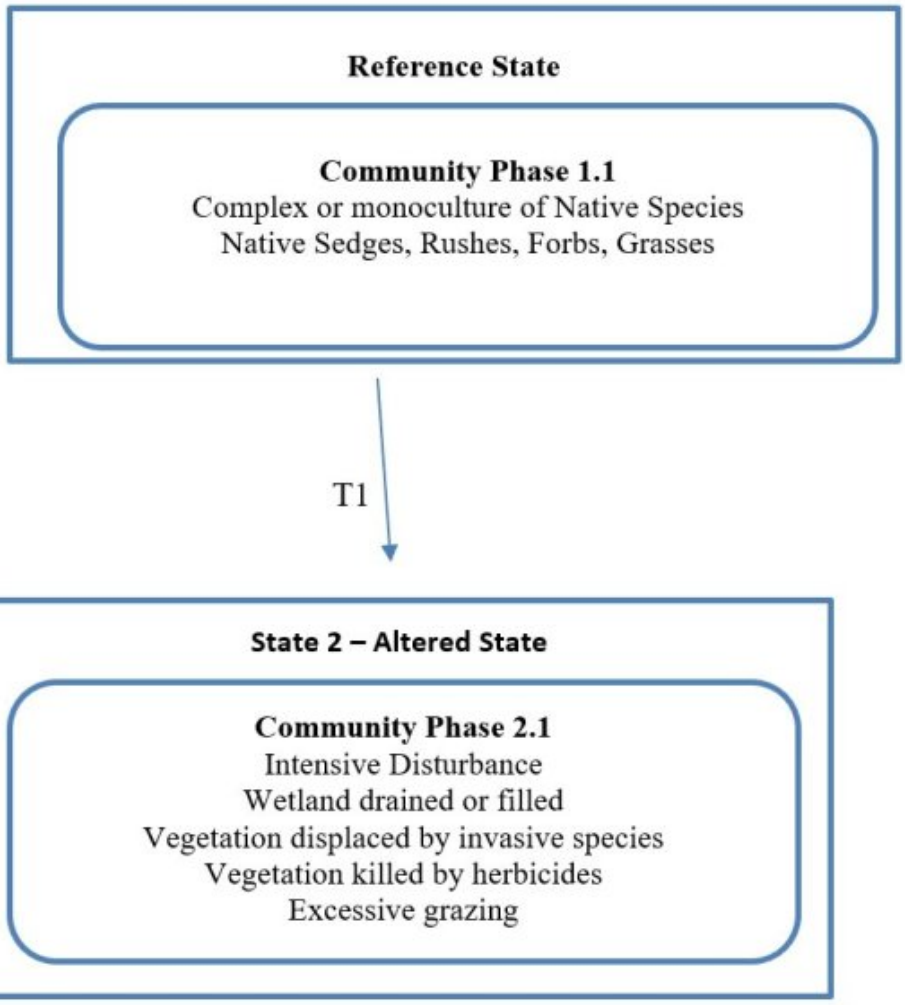
State and transition model

State and Transition Diagram for Wetland Complex in MLRA 8:

This state and transition model (STM) explains the general ecological dynamics for the Herbaceous Wetland ecological site. The STM illustrates the common plant communities that can occur on the site. Boxes around each state represent the ecological threshold, which if crossed, is not reversible without human intervention. Arrows within a state represent the pathway between plant communities, while the arrows between states represent the transition or recovery between the states. Plant species composition is represented as a percentage of total annual production (pounds). The composition of pristine sites can vary somewhat due to variations in site conditions.

Obligate species belong here. Some FACW species also
Low species diversity as many dominant species form dense monocultures



Altered State:

- Phragmites
- Purple loosestrife
- Reed canarygrass

Reference Community for Wetland Complex in MLRA 8

Plant species composition is represented as a percentage of total annual production (pounds). The composition of pristine sites can vary somewhat due to variations in site conditions.

2002 ESD: Wet Meadow species that are OBLIGATE went to this site

Often this site has low species diversity as many of the dominant species form dense monocultures. Some areas are 100% cattails, others 100% bulrush, and other areas 100% Nebraska sedge, etc.

Native Grasses:

BESY	American sloughgrass
GLGR	American mannagrass
GLST	fowl mannagrass

Native Sedges:

CAUT	Northwest Territory sedge
CANE2	Nebraska sedge
CAPE42	wooly sedge

Native rushes:

SCAC3	hardstem bulrush
SCTA2	softstem bulrush
SCMI2	panicled bulrush
JUBA	Baltic rush

Native forbs:

TYLA	cattails
POLYG	smartweed

Baltic rush was put in all three ESDs – Herbaceous Wetland, Wet Meadow, Riparian Woodland.

State 1
Reference State

State 1 Narrative: State 1 represents stable wetlands with no invasive or exotic weed species. Often this site has low species diversity as dominant species can form dense monocultures Reference Community 1.1 can be dominated by cattails or, bulrush or, Nebraska sedge or, American mannagrass or, Baltic rush. At-risk Communities: All communities in the reference state are at risk because of heavy grazing pressure and other human manipulations to meadows.

State 2
Altered State

State 2 Narrative: State 2 represents an altered state because of intensive disturbance. The wetland may have been drained or filled to convert to a different land use. Or, the wetland may have experienced excessive grazing. Invasive species such as phragmites, reed canarygrass, and purple loosestrife may dominate the plant community in the altered state. Community Phases for State 2: Can have several variations: Reed canarygrass Purple loosestrife Phragmites

Transition T1
State 1 to 2

T1 Result: Transition from Reference State to altered State 2 Ecological process: Wetland hydrology altered, and site may no longer have wetland functions. Invasive species colonize the site and over time dominate the stand. Primary Trigger: both deliberate and unintentional, human-caused, alterations such as drainage, filling the wetland with soil, herbicide drift, deliberate use of herbicides or grazing pressure. Indicators: occurrence of invasive species where there has been none. Declining cover of native species and increasing cover of invasive species. Site is much drier than previously. Recovery Need to explore wetland recovery processes References: Boling M., Frazier B., Busacca, A., General Soil Map of Washington, Washington State University, 1998 Crawford, Rex C., Riparian Vegetation Classification of the Columbia Basin, Washington, March 2003. Environmental Protection Agency, map of Level III and IV Ecoregions of Washington, June 2010 Natural Resources Conservation Service, map of Common Resource Areas of Washington, 2003 Rocchio, Joseph & Crawford, Rex C., Ecological Systems of Washington State. A Guide to Identification. Washington State Department of Natural Resources, October 2015. Pages 156-161 Inter-Mountain Basin Big Sagebrush. Rouse, Gerald, MLRA 8 Ecological Sites as referenced from Natural Resources Conservation Service-Washington FOTG, 2004 Soil Conservation Service, Range Sites for MLRA 8 from 1980s and 1990s

Citations