

Ecological site group R007XG988WA

Wetland Complex

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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): 007X – Columbia Basin

LRU – Common Resource Areas (CRA):

7.1 – Sandy Missoula Flood Deposits

7.2 – Silty Missoula Flood Deposits

7.3 – Dry Loess Islands

7.4 – Dry Yakima Folds

7.5 – Yakima Valley – Pleistocene Lake Basins

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 ecological sites occur as a patchwork – Loamy Bottom, Alkali Terrace, Sodic Flat, Wetland Complex and Riparian Complex. These ecological sites may need to be mapped as a complex when doing resource inventory.

Diagnostics:

Wetland Complex ecological site in MLRAs 007X, 008X, & 009X 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 ecological site 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 the Wetland Complex ecological site. 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 at elevations of 300 to 1,500 feet. 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.

Physiographic Division: Intermontane Plateau

Physiographic Province: Columbia Plateau

Physiographic Sections: Walla Walla Plateau Section

Landscapes: hills and plateaus

Landform: bottoms, floodplains, basins and depressions

Elevation: Dominantly 300 to 1,500 feet

Slope: Total range: 0 to 5 percent

Central tendency: 0 to 3 percent

Aspect: Occurs on all aspects

Geology:

This is almost entirely underlain by Miocene basalt flows. Columbia River basalt is covered in most areas with as much as 200 feet of eolian, lacustrine, and alluvial deposits. This basin generally corresponds to the vast temporary lakes created by floodwaters from glacial Lakes Missoula and Columbia. Most of the fluvial and lacustrine sediments were deposited about 16,000 years ago, when an ice dam on the ancient Columbia River burst and when glacial Lake Missoula periodically emptied, creating catastrophic floods.

Climate

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. This MLRA is the warmest and driest MLRA within the Columbia Plateau geographic area. Seventy to seventy-five percent of the precipitation comes late-October through March as a mixture of rain and snow. Precipitation that comes after March is not as effective for plant growth, but June through early-October can be dry. Freezing temperatures generally occur from late-October through early-April. Temperature extremes are -10 degrees Fahrenheit in winter and 110 degrees Fahrenheit in summer.

Mean Annual precipitation
Range: 6 - 10 inches
Soil moisture regime is aquic.

Mean Annual Air Temperature
Range: 48 to 54 F
Central Tendency: 50 – 52 F
Soil temperature regime is mesic.

Frost-free period (days)
Total range: 140 to 200
Central tendency: 150 to 180
The growing season for the Wetland complex ecological site 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 to fine sands that are saturated and thus hydric. Wetland complex ecological site commonly occurs adjacent to Alkali Terrace, Sodic Flat, Loamy Bottom and Riparian Complex ecological sites.

REPRESENTATIVE SOIL FEATURES

Dominantly wetlands occur as spot symbols on soil map there isn't much soils information for them. What we do have for this ecological site soil components are dominantly Fluvaquents and Psammaquents great groups of the Entisol taxonomic order. Soils in the Histosols taxonomic order should exist in this ecological site, but a map unit hasn't been large enough to map. Soils are deep and very deep. Average available water capacity of about 18 inches (45.7 cm) in the 0 to 40 inches (0 to 100 cm) depth range.

Soil parent material is dominantly alluvium derived from mixed sources with possibly minor amounts of ash in the upper part of the soil.

The associated soils are Wanser, Fluvaquents and similar soils.

Dominant soil surface is silt loam to fine sand.

Dominant particle-size class is coarse-silty to sandy skeletal

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

Minimum: 0
Maximum: 2
Average: 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: 1

Subsurface fragments > 3 inches (% Volume)

Minimum: 0
Maximum: 10
Average: 2

Subsurface fragments ≤ 3 inches (% Volume):

Minimum: 0
Maximum: 15
Average: 5

Drainage Class: Dominantly very poorly drained to poorly drained.
Water table depth: 0 to 12 inches

Flooding:
Frequency: None to occasional

Ponding:
Frequency: None

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

Depth to root-restricting feature (inches):
Minimum: Dominantly greater than 60, but strongly contrasting textural stratification can occur up to 20 inches
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: 6.6 to 7.9
10 - 40 inches: 6.6 to 7.9

Available Water Capacity (inches, 0 – 40 inches depth)
Minimum: 12
Maximum: 24
Average: 18

Vegetation dynamics

ECOLOGICAL DYNAMICS:

Vegetation Dynamics:

The Wetland Complex ecological site in MLRA 007X produces about 10,000 pounds per 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 in 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 to 99 percent 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 the herbaceous community of the Wetland Complex ecological site 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 ecosystem provide habitat for a variety of wetland and upland wildlife species.

Supporting Information

Associated Sites:

Wetland Complex ecological site is associated with other ecological sites in bottoms and basin areas of MLRA 007X, including Loamy Bottom, Alkali Terrace, Sodic Flat and Riparian Complex. The Wetland Complex ecological site is also associated with upland sites such as Loamy, Stony, and Cool Loamy.

Similar sites:

MLRA 008X Columbia Plateau & 009X Palouse Prairie have the same Wetland Complex ecological site.

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

State Correlation: Washington

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

Site Development and Testing Plan

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

Major Land Resource Area

MLRA 007X
Columbia Basin

Subclasses

- R007XY988WA–Wetland Complex

Stage

Provisional

Contributors

Provisional Site Author: Kevin Guinn

Technical Team: K. Moseley, G. Fults, R. Fleenor, W. Keller, K. Bomberger, C. Gaines, K. Paup-Lefferts

State and transition model

Reference State

Community Phase 1.1

Complex or monoculture of Native Species
Native Sedges, Rushes, Forbs, Grasses

T1

State 2 – Altered State

Community Phase 2.1

Intensive Disturbance
Wetland drained or filled
Vegetation displaced by invasive species
Vegetation killed
Excessive grazing

Reference Community 1.1 for Wetland Complex

Percentages for plant species composition below are an approximated weight. The composition of pristine sites can vary somewhat due to variations in site conditions.

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
GLCR	American mannagrass
GLST	fowl mannagrass

Native Sedges:

CAUT	Northwest Territory sedge
CANE2	Nebraska sedge
CAPE42	wooly sedge

Native rushes:

SCAC	hardstem bulrush
SCTA	softstem bulrush
SCMI	panicled bulrush
JUBA	Baltic rush

Native forbs:

TYLA	cattails
POLYG	smartweed

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. Reference Community 1.1 for Wetland Complex ecological site Percentages for plant species composition below are an approximated weight. The composition of pristine sites can vary somewhat due to variations in site conditions. 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 percent cattails, others 100 percent bulrush, and other areas 100 percent Nebraska sedge, etc. Native Grasses: BESY American sloughgrass GLCR American mannagrass GLST fowl mannagrass Native Sedges: CAUT Northwest Territory sedge CANE2 Nebraska sedge CAPE42 wooly sedge Native rushes: SCAC hardstem bulrush SCTA softstem bulrush SCMI panicled bulrush JUBA Baltic rush Native forbs: TYLA cattails POLYG smartweed Pathways within State 1 (Reference State) None as there is only one community in Reference State.

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 There is a need to explore recovery processes

Citations