Ecological site group R009XG988WA
Wetland Complex

Last updated: 11/22/2023
Accessed: 10/12/2024

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): 9 – Palouse and Nez Perce Prairie

LRU – Common Resource Areas (CRA):
9.1 - Channeled Scablands
9.12 - Moist Loess Islands
9.2 - Palouse Hills
9.3 - Dissected Loess Uplands
9.4 - Deep Loess Foothills
9.5 - Warm Canyons and Dissected Uplands

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 Woody Riparian. These ecological sites may need to be mapped as a complex when doing resource inventory. Very general.

Diagnostics:

Wetland complex 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 vegetation 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). 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. Herbaceous Wetland 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 plateaus and Northern Rocky foothills. MLRA 9 is south of the Okanogan Highlands and Spokane Valley, east of the Columbia Basin, includes only the wet end of the Channeled Scablands and forms a horseshoe around the Blue Mtns.

MLRA 9 has three geographical regions:
(1) the Palouse Hills on the east side
(2) the loess hills to the south and west
(3) the Channeled Scabland-loess islands in the northwest

Physiographic Division: Intermontane Plateau and Northern Rocky Mountain System
Physiographic Province: Columbia Plateau and Northern Rocky Mountains
Physiographic Sections: Walla Walla Plateau and Blue Mountain Section

Landscapes: hills and plateaus
Landform: floodplains, drainageways on concave positions

Elevation: Dominantly 1,000 to 4,000 feet
Slope: Total range: 0 to 5 percent
Central tendency: 0 to 3 percent
Aspect: Occurs on all aspects

Geology:

MLRA 9 is almost entirely underlain by Miocene basalt flows. Columbia River basalts are covered by wind-blown loess and volcanic ash with a thickness up to 250 feet thick. The oldest layer of loess accumulated between 2 and 1 million years ago, while the uppermost layers of Palouse Loess accumulated between 15,000 years ago and modern times. The mid layers of loess were deposited episodically between 77,000 years and 16,000 years ago. During the Pleistocene era the channeled scablands, the northwest portion of MLRA 9, were scoured of topsoil by the Lake Missoula Floods about 15,000-17,000 years ago. Flows removed topsoil from exposed ridges and basalt rims in canyons.

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 primarily a xeric moisture regime and mesic temperature regime but includes frigid temperature regime as well.

Mean Annual Precipitation:
Range: 16 – 28 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: 42 to 52 F
Central Tendency: 47 – 50 F
Freezing temperatures generally occur from late-October through early-April. Temperature extremes are -10 degrees in winter and 100 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: 60 to 180
Central tendency: 100 to 140
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 Loamy bottom and Riparian complex ecological sites. It also occurs with upland sites such as Loamy, Stony and Cool Loamy sites.

Representative Soil Features:

This ecological site components are dominantly Typic Haplosaprists taxonomic subgroups of Histosols taxonomic order but may also include the Aquic subgroup of Mollisols. Soils are dominantly very deep but can get as shallow as moderately deep. Average available water capacity of about 18 inches (45.7 cm) in the 0 to 40 inches (0-100 cm) depth range.

Soil parent material is dominantly decomposed organic herbaceous material.

The associated soils are Saltese, Aquolls and similar soils.

Dominate soil surface is muck to silt. Rock fragments may or may not be present.

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

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

Fragments within surface horizon ≤ 3 inches (% Volume):
Minimum: 0
Maximum: 10
Average: 0

Subsurface fragments > 3 inches (% Volume):
Minimum: 0
Maximum: 10
Average: 0

Subsurface fragments ≤ 3 inches (% Volume):
Minimum: 0
Maximum: 15
Average: 0

Drainage Class: Very poorly drained
Water table depth: 0 to 10 inches

Flooding:
Frequency: None to Occasional

Ponding:
Frequency: None to frequent

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 occurrences
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: 4.5 to 7.3
10 - 40 inches: 4.5 to 7.3

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

Vegetation dynamics

Ecological Dynamics:

Wetland complex in MLRA 9 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 Wetland complex 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 is associated with other ecological sites in bottoms and basin areas of MLRA 9, including Loamy Bottom and Riparian Complex. Loamy Bottom is also associated with upland sites such as Loamy, Stony and Cool Loamy sites.

Similar Sites:
MLRAs 7 & 8 will have a similar Wetland complex ecological sites.

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 009X
Palouse and Nez Perce Prairies

Subclasses

- R009XY988WA–Wetland Complex

Stage

Provisional

Contributors

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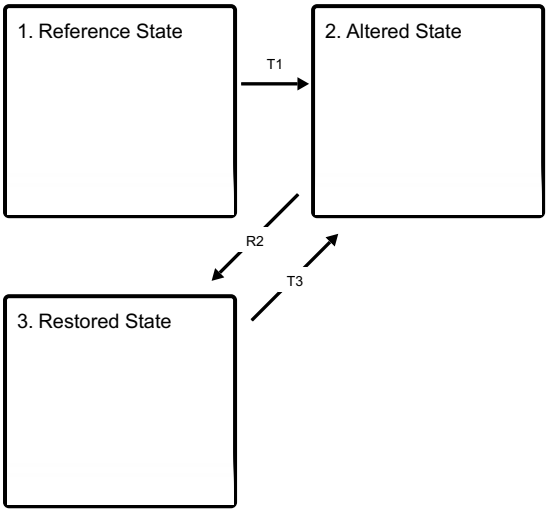
State and transition model

Ecosystem states

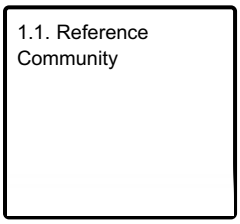


T1 - Intensive disturbance to hydrology, soils, or vegetative cover.

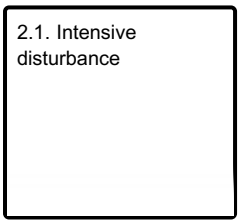
R2 - Repair of hydrologic processes, dredging, planting and weed control

T3 - lack of management, disturbance

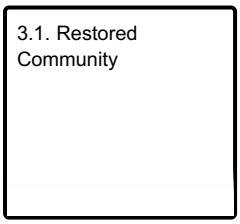
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



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 At-risk Communities: All communities in the reference state are at risk because of heavy grazing pressure and other human manipulations to wetlands.

Community 1.1
Reference Community

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

Reference Community 1.1 can be dominated by cattails or, bulrush or, Nebraska sedge or, American mannagrass or, Baltic rush. Complex or monoculture of Native species including native sedges, rushes, forbs, and grasses.

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

Community 2.1
Intensive disturbance

Intensive disturbance may include wetland drained or filled, vegetation displaced by invasive species, vegetation killed, and/or excessive grazing.

State 3
Restored State

Although rare, State 3 is a restored state. Wetlands are not commonly seeded, wetland restoration is a practice applied in conservation. Rhizomatous species readily sprout to make new shoots, so sprig planting is an option as part of wetland restoration.

Community 3.1
Restored Community

A combination of native or introduced varieties of grasses, sedges, rushes, forbs, and shrubs may be sprig or pole planted. In some instances seeding may occur. Weed control and grazing management is needed.

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.

Restoration pathway R2
State 2 to 3

R2 Result: Transition from Altered State 2 to Altered State 3. Ecological process: Wetland hydrology altered to resemble natural conditions, or improving wetland functions. Invasive species control and potentially grazing restriction to allow native vegetation or plantings to establish. Primary Trigger: Repair of hydrologic processes, dredging, planting and weed control. Indicators: treatment of and reduction of invasive species, sprig, pole, or seedling establishment improving cover of native or introduced species.

Transition T3
State 3 to 2

T3 Result: Transition from Restored 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. References: Boling M., Frazier B., Busacca, A., General Soil Map of Washington, Washington State University, 1998 Daubenmire, R., Steppe Vegetation of Washington, EB1446, March 1968 Davies, Kirk, Medusahead Dispersal and Establishment in Sagebrush Steppe Plant Communities, Rangeland Ecology & Management, 2008 Environmental Protection Agency, map of Level III and IV Ecoregions of Washington, June 2010 Miller, Baisan, Rose and Pacioretty, “Pre and Post Settlement Fire regimes in mountain Sagebrush communities: The Northern Intermountain Region Natural Resources Conservation Service, map of Common Resource Areas of Washington, 2003 Rapid Assessment Reference Condition Model for Wyoming sagebrush, LANDFIRE project, 2008 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