USDA Natural Resources
Conservation Service

Ecological site R008XY988WA
Wetland Complex

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General information

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.

MLRA notes

Major Land Resource Area (MLRA): 008X–Columbia Plateau

MLRA 8 encompasses about 50,100 square kilometers mainly in Washington and Oregon, with a small area in Idaho. This MLRA is characterized by loess hills, surrounding scablands, and alluvial deposits. This MLRA consists mostly of Miocene Columbia River Basalt covered with up to 200 feet of loess and volcanic ash. The dominant soil order in this MLRA is Mollisols. Soils in this MLRA dominantly have a mesic temperature regime, a xeric moisture regime, and mixed minerology.

Classification relationships

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

Ecological site concept

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, and 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.

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, and 9 share the same Wetland Complex ecological site description.

Associated sites

R008XY980WA	**Wet Meadow**
R008XY720WA	**Riparian Complex**
R008XY930WA	**Loamy Bottom**
R008XY970WA	**Alkali Terrace**
R008XY978WA	**Sodic Flat**

Similar sites

R008XY980WA	**Wet Meadow**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Typha latifolia* (2) *Carex nebrascensis*

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, and 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 insignificant 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: flood plains, depressions

Table 2. Representative physiographic features

Landforms	(1) Valley (2) Hills (3) Plateau (4) Flood plain (5) Depression
Flooding frequency	Rare to frequent
Ponding frequency	None to frequent
Elevation	305–762 m
Slope	0–1%
Water table depth	0–13 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0–1%
Water table depth	Not specified

Climatic features

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 to 16 inches of precipitation) or aridic moisture regimes (10 to 12 inches of precipitation) with a mesic temperature regime.

Table 4. Representative climatic features

Frost-free period (characteristic range)	110-160 days
Freeze-free period (characteristic range)	

Precipitation total (characteristic range)	254-406 mm
Frost-free period (actual range)	100-180 days
Freeze-free period (actual range)	
Precipitation total (actual range)	

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 conditions 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.

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 zero to 40 inches (zero to 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.

Table 5. Representative soil features

Parent material	(1) Herbaceous organic material
Surface texture	(1) Muck
Drainage class	Very poorly drained
Depth to restrictive layer	152 cm
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Available water capacity (0-101.6cm)	45.72 cm
Calcium carbonate equivalent (Depth not specified)	0%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (0-25.4cm)	5.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Table 6. Representative soil features (actual values)

Drainage class	Not specified
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	38.1–55.88 cm
Calcium carbonate equivalent (Depth not specified)	Not specified
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified
Soil reaction (1:1 water) (0-25.4cm)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

Wetland Complex 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 is areas of standing water ranging from four inches to six 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 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.

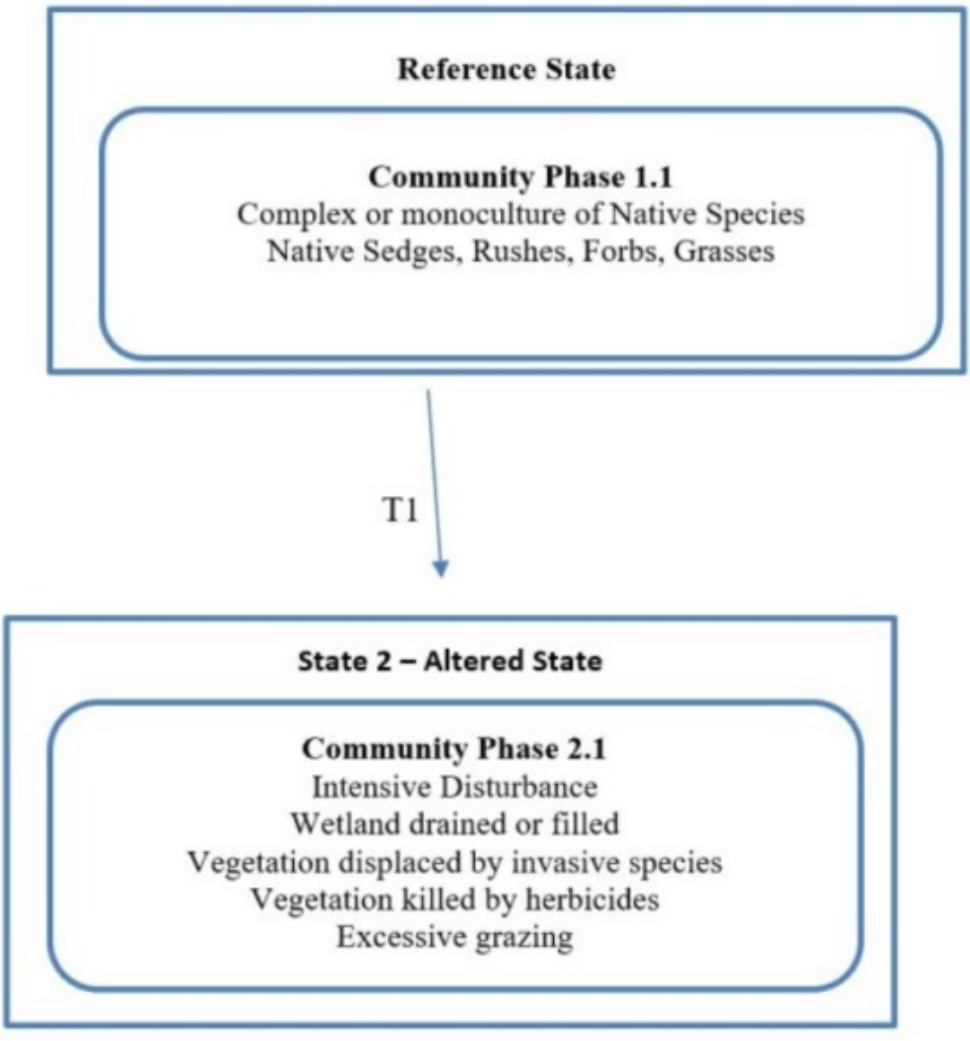
In Washington, wetland communities in a sagebrush steppe or grassland ecosystem provide habitat for a variety of wetland and upland wildlife species.

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

State 1

Reference

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.

Community 1.1
Native Sedges, Rushes, Forbs, and Grasses

Native Grasses: American sloughgrass American mannagrass fowl mannagrass Native Sedges: Northwest Territory sedge Nebraska sedge wooly sedge Native Rushes: herdstem bulrush softstem bulrush panicled bulrush Baltic rush Native Forbs: cattails smartweed

State 2
Altered

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
Altered

Intensive disturbance, wetland drained or filled, vegetation displaced by invasive species, vegetation killed by herbicide, or excessive grazing.

Transition T1A
State 1 to 2

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

Additional community tables

Other references

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Contributors

Kevin Guinn

Acknowledgments

Provisional Site Author: Kevin Guinn

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

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate.

Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	04/09/2026
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a**

dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

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17. **Perennial plant reproductive capability:**
