

Ecological site R044AY501WA

Mesic, Aquic, Organic Depressions and Seeps

Last updated: 9/07/2023
Accessed: 05/10/2025

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): 044A–Northern Rocky Mountain Valleys

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Description of MLRAs can be found in: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

LRU notes

Major land resource area (MLRA): 044A-Northern Rocky Mountain Valleys

Modal LRU – 44A01 - Spokane-Rathdrum Outwash Plains

This LRU is composed predominantly of low foothills, outwash plains and valley floors. The soils tend to be loamy to sandy andisols, inceptisols, and mollisols with mixed or distinct ash surfaces. Recent alluvium, till, outwash and residuum from granitic or metamorphic rock are the dominant parent materials. Soil climate is a mesic temperature regime and xeric moisture regime with average annual precipitation around 525 mm (21 inches).

Classification relationships

This ES group fits into the National Vegetation Standard's Northern Rocky Mountain Acidic fen group and is most closely related to Washington State's Natural Heritage Program's Rocky Mountain Subalpine-Montane Fen but occurs at a lower elevation than is typical. (Compare to previous Washington range site: R044XY601WA, Wet Meadow 16-24 PZ)

Ecological site concept

This ES is distinguished by a persistent high water table and a plant community dominated by sedges, mosses and only scattered woody species.

Associated sites

F044AY502WA	Warm Mesic Xeric Sandy Hill slopes and Outwash terraces (Ponderosa Pine/Shrub) Pinus Ponderosa /Symphoricarpos albus, Pinus Ponderosa / Physocarpus malvaceus Found on floodplains and in drainageways. Water table at depth of 20 to 30 inches with loamy surface texture. Site vegetation is typified by Calamagrostis canadensis and Galium trifidum.
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F043AY509WA	Warm, Xeric, Sandy, Outwash Terraces and Plains (Ponderosa Pine/Dry Grass) <i>Pinus ponderosa</i> / <i>Pseudoroegneria spicata</i> , <i>Pinus ponderosa</i> / <i>Festuca idahoensis</i> This site is found on terraces, alluvial fans and outwash plains. They have sandy soil materials and lack a high water table. Overstory species are <i>Pinus ponderosa</i> with some individuals of <i>Pseudotsuga menziesii</i> var. <i>glauca</i> . The understory is dominated by <i>Festuca idahoensis</i> and/or <i>Pseudoroegneria spicata</i> .
F043AY511WA	Warm, Xeric, Loamy Hillsides, Mixed ash surface (Ponderosa Pine/Dry Grass) <i>Pinus ponderosa</i> / <i>Pseudoroegneria spicata</i>, <i>Pinus ponderosa</i> / <i>Festuca idahoensis</i> This site occurs on glaciated hillslopes, low mountain slopes, till plains and outwash plains. They are generally on south to west aspects on moderate slopes. The sites have loamy soil material and lack a high water table. Overstory species are <i>Pinus ponderosa</i> with some individuals of <i>Pseudotsuga menziesii</i> var. <i>glauca</i> . The understory is dominated by <i>Festuca idahoensis</i> and/or <i>Pseudoroegneria spicata</i> .

Similar sites

R043AY511ID	Organic Depressions 19-24" PZ Frigid Clearwater Mountains Found on floodplains and seeps at cooler higher elevation locations. Confined to depressions and other areas of water accumulation. Have mucky surface textures. Found where MLRA 44A transitions to MLRA 43A in upper reaches of valleys. Site vegetation is dominated by a mix of wetland adapted species including <i>Salix</i> , <i>Carex</i> , and <i>Sphagnum</i>
R043AY510ID	Poorly Drained Floodplains 23-25" PZ Mesic Columbia-Colville Valleys Found on floodplains and in drainageways. Water table within 30 inches of the surface for some time during spring and summer. They have loamy surface textures. Found in locations where MLRA 44A transitions to MLRA 43A at valley margins and upper reaches. Site vegetation is typified by <i>Carex</i> and <i>Calamagrostis stricta</i> .
F044AY502WA	Warm Mesic Xeric Sandy Hill slopes and Outwash terraces (Ponderosa Pine/Shrub) <i>Pinus Ponderosa</i> / <i>Symphoricarpos albus</i>, <i>Pinus Ponderosa</i> / <i>Physocarpus malvaceus</i> Found on floodplains and in drainageways. Water table at depth 20 to 30 inches with loamy surface texture. Site vegetation is typified by <i>Calamagrostis canadensis</i> and <i>Galium trifidum</i> .

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Spiraea</i> (2) <i>Alnus viridis</i>
Herbaceous	(1) <i>Carex</i> (2) <i>Sphagnum</i>

Physiographic features

This ecological site occurs mainly on very poorly drained depression and seeps on floodplains and alluvial fans. Parent materials are primarily organic materials with some mineral layers derived from mixed volcanic ash alluvium.

Elevation:

Total range = 565 to 725 m

(1,855 to 2,380 feet)

Central tendency = 620 to 670 m

(2,035 to 2,195 feet)

Water Table Depth:

0 to 15 cm (median= 8 cm)

(0 to 6 inches; median = 3 inches)

Table 2. Representative physiographic features

Landforms	(1) Valley > Flood plain (2) Valley > Depression (3) Foothills > Flood plain (4) Foothills > Alluvial cone
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Flooding duration	Not specified
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	2,035–2,195 ft
Slope	0–3%
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	1,855–2,380 ft
Slope	0–18%

Climatic features

During the spring and summer, a circulation of air around a high-pressure center brings a prevailing westerly and northwesterly flow of comparatively dry, cool and stable air into the region. As the air moves inland, it becomes warmer and drier which results in a dry season beginning in the late spring and reaching a peak in mid-summer. In the fall and winter, a circulation of air around two pressure centers over the ocean brings a prevailing southwesterly and westerly flow of air into the Pacific Northwest. This air from over the ocean is moist and near the temperature of the water. Condensation occurs as the air moves inland over the cooler land and rises along the windward slopes of the mountains or highlands. This results in a wet season beginning in October, reaching a peak in winter, then gradually decreasing in the spring.

The elevation within the LRU varies from approximately 1,500 feet in the lower river valleys to about 3,500 feet on foothills. The annual precipitation increases from 15 inches in the valleys to over 39 inches on higher foothills. Winter season snowfall averages about 43 inches. Both rainfall and snowfall increase with elevation. Snow can be expected after the first of November and to remain on the ground from the first of December until March or April.

In January, the average maximum temperature is near 34° F and the minimum temperature is 23° F. Minimum temperatures from -1° to -20°F are recorded almost every winter and temperatures ranging to -25° F have been recorded. In July, the average maximum temperature is 83° and the minimum temperature 46° F. Maximum temperatures reach 100° F on a few afternoons each summer and temperatures as high as 108° F have been recorded. The average date of the last freezing temperatures can be expected by early-May and after early-October in the warmer areas.

(Compiled from WRCC: Climate of Washington and available station data)

Mean annual precipitation (cm):

Total range = 350 to 1000 mm

(14 to 39 inches)

Central tendency = 555 to 735 mm

(22 to 29 inches)

MAAT (C)

Total range = 5.6 to 9.5

(42 to 49 F)

Central tendency = 7.2 to 8.3

(45 to 47 F)

Climate stations: none

Table 4. Representative climatic features

Frost-free period (characteristic range)	115-130 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	22-29 in
Frost-free period (actual range)	90-140 days
Freeze-free period (actual range)	
Precipitation total (actual range)	14-39 in

Influencing water features

Water Table Depth:

0 to 15 cm (median= 8 cm)

(0 to 6 inches; median = 3 inches)

Flooding:

Frequency: None to frequent

Duration: None to long

Ponding:

Frequency: None to frequent

Duration: None to long

Soil features

Representative Soil Features

This ecological site is associated with the Saltese and Bossburg series. The soils are Typic Haplosaprists or Histic Vitraquands. These soils have developed in deep organic materials or thinner organic deposits over mixed ash alluvium.

Surface Fragments

Table 5. Representative soil features

Parent material	(1) Organic material (2) Volcanic ash (3) Alluvium
Surface texture	(1) Mucky peat (2) Mucky silt loam
Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	7 in
Calcium carbonate equivalent (0-60in)	0%

Electrical conductivity (0-60in)	0 mmhos/cm
Sodium adsorption ratio (0-60in)	0
Soil reaction (1:1 water) (0-60in)	6.5

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained
Permeability class	Moderate
Depth to restrictive layer	0 in
Soil depth	0 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3.9–7 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0 mmhos/cm
Sodium adsorption ratio (0-60in)	0
Soil reaction (1:1 water) (0-60in)	4.5–7.8

Ecological dynamics

State and transition model

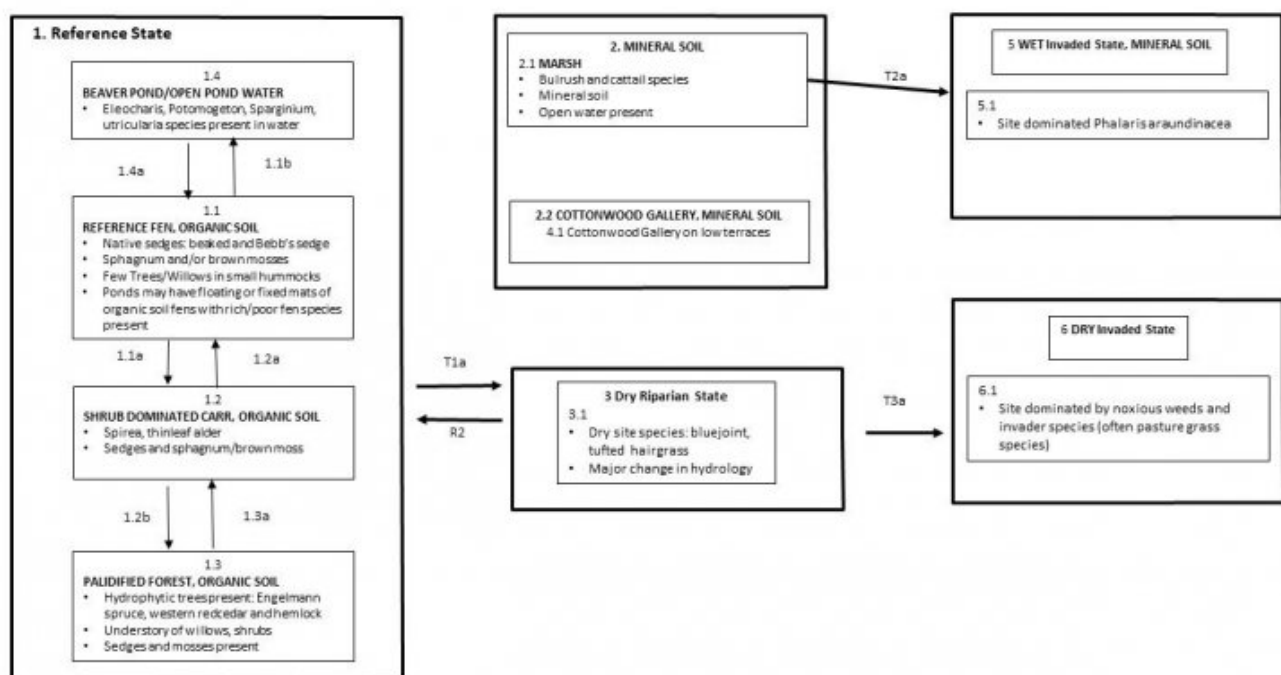


Figure 1. STM

1 Reference State. Due to the complexity of hydrologic dynamics within a riparian area, the reference state is composed of multiple communities that exist in a relatively small area. Riparian areas can include: organic rich and/or poor fens paludified forests, open water, mineral marshes and cottonwood galleries, and adjacent drier edge communities. Cottonwood galleries can exist on low terraces adjacent to the ponds, organic fens in depressions, shrubby carrs and paludified forests.

1.1 FEN. This plant community is primarily composed of sedge and mosses. Rich fens have higher cover of sedges and less sphagnum mosses, while the reverse is true for poor fens. Fens can either be basin filled, sloping flow-through type, or pioneering floating or fixed mats within a pond.

1.1a Shrub species establish, increase and dominate site with slight drying of soil.

1.1b Pond or beaver created pond exists, aquatic plant community establishes. This community may have pioneering fen floating or fixed mats within the pond.

1.2 CARR. This plant community contains a high diversity of willows, sedges and various sphagnum and brown mosses on organic soils.

1.2a Site experiences flooding and/or ponding that exceeds sustainability of shrub species. A return to herbaceous community.

1.2b Site has establishment, increase and dominance of trees species with drier site conditions from the carr community.

1.3a Site experiences flooding and/or ponding such that site returns to carr community.

1.3 PALUDIFIED FOREST. Composed of hydrophytic species (*Pinus engelmannii*, *Tsuga heterophylla*, *Thuja plicata*) with an understory of *Carex*, *Vaccinium*, sphagnum mosses.

1.4 POND/BEAVER POND. Existing or beaver created pond will have aquatic plants within the open water including *Sparganium*, *Potamogeton* and *Eleocharis* species. Floating or fixed mats of vegetation with fen vegetation can be present. These fen mats are in the pioneering stages of fen development.

1.4a Beavers extirpated from area and beaver dam removed causing a return to reference fen after pond water absorbed through vegetation community.

2.1 MARSH. Area of mineral soil, open water with cattails and bulrush species present.

T2a Marsh areas with *Phalaris arundinacea* can have exponential growth of this plant with an increase in nutrients, generally related to agricultural run-off or other modes of nutrient addition.

3.1 DRY RIPARIAN STATE. Wetland characteristics of site altered. Baltic rush and increaser species become prevalent. Site drying due to ditching, diversion or extended extreme drought conditions. Hummocking by livestock and extensive logging within watershed possible cause of dewatering of site.

T1a Improper grazing (overgrazing or repeated spring grazing), extended drought, ditching or draining or extensive logging within watershed upstream from fen.

R2 Improved grazing practices (change of season of use, conservative stocking rates), cessation of draining/ditching practices or logging practices in watershed to improve hydrology of site.

4.1 COTTONWOOD GALLERY. On drier areas on adjacent low terraces, cottonwood species with alder and birch present.

T3a Sites are invaded by noxious weeds or introduced pasture grasses. Pasture grasses may be planted or a result of invasion from neighboring sites. Improper grazing may be a trigger for invasion.

5.1 WET INVADDED STATE: Marsh dominated by *Phalaris arundinacea* due to increase in nutrients.

6.1 DRY INVADDED STATE. This occurs when weedy species invade the altered hydrological state and overtake native plants by increasing cover and sequestering nutrients, water or growing space. It includes many non-native species that have come to dominate riparian areas. Some species may include: orchard grass, timothy, Kentucky bluegrass, non-native thistles, Russian olive, leafy spurge, spotted knapweed, houndstongue, foxtail barley, whitetop mustard. Often sites are a combination both pasture grasses and invading weeds. Site is often a terminal state; meaning these sites are likely to never return to Reference regardless of management.

Figure 2. Narrative

References

- . USNVC [United States National Vegetation Classification]. 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.. USNVC: <http://usnvc.org/>.
- Gerald, R. 2004. NRCS - Washington; Interim Ecological Site Descriptions for Rangeland.
- Kovalchik, B.L. and R.R. Clausnitzer. 2004. Classification and Management of Aquatic, Riparian, and Wetland Sites on the National Forests of Eastern Washington: Series Description. General Technical Report PNW-GTR-593. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. 1–354.
- Rocchio, J.F. and R.C. Crawford. 2015. Ecological systems of Washington State. A guide to identification. Washington Department of Natural Resources.. Natural Heritage Report.. Washington Department of Natural Resources, Natural Heritage Program, Olympia, WA. 1–397.

Contributors

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Approval

Kirt Walstad, 9/07/2023

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	05/10/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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:**
-