USDA Natural Resources Conservation Service

Ecological site R043AY511ID
Frigid Aquic Organic Depressions and Seeps (CAREX/SPHAG)

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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): 043A–Northern Rocky Mountains

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.

Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook

LRU notes

Major land resource area (MLRA): 043A-Northern Rocky Mountains
Modal LRU – 43A10 Clearwater Mountains

This LRU is composed predominantly of low to high elevation canyons, escarpments, valley walls, mountain slopes, ridges, and basins. The soils tend to be loamy vitrands and cryands. Granite and other intrusive material are the dominant parent materials, along with metasedimentary deposits. Soil climate is a frigid to cryic temperature regime and udic moisture regime with average annual precipitation around 1,330 mm (52 inches).

Others where occurring – 43A07 - Eastern Columbia Plateau Embayments
43A09 - Western Bitterroot Foothills
43A11 - Bitterroot Metasedimentary Zone

Classification relationships

This ES group fits into the National Vegetation Standard's Northern Rocky Mountain Acidic Fen group. (Compare to previous range site (used in Idaho): R009XY601WA, 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. Soils have thick organic surface layers (mucky).

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix*
Herbaceous	(1) *Carex* (2) *Sphagnum*

Physiographic features

This ecological site occurs mainly on flood plains, valley floors, depressions, drainageways. Parent materials are herbaceous and/or woody organic material.

Landscapes: Valleys
Landforms: Depressions, flood plains, valley floors, drainageways, bogs

Elevation:
Total range = 615 to 1830 m
(2,020 to 6,005 feet)
Central tendency = 820 to 1370 m
(2,690 to 4,495 feet)

Slope (percent):
Total range = 0 to 3 percent
Central tendency = 0 to 1 percent

Water Table Depth: 0 - 60 cm
(0 - 24 inches)

Flooding:
Frequency: none to frequent
Duration: none to long

Ponding:
Frequency: none to frequent
Duration: none to long

Aspect: NA

Table 2. Representative physiographic features

Landforms	(1) Valley > Flood plain (2) Valley > Depression (3) Valley > Drainageway
Flooding duration	Long (7 to 30 days)
Flooding frequency	Frequent
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	820–1,370 m
Slope	0–1%
Water table depth	15 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Flooding duration	Long (7 to 30 days)
Flooding frequency	Frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	616–1,830 m
Slope	0–2%

Water table depth	0–61 cm

Climatic features

The climate of this portion of the MLRA is controlled by a combination of large-scale and small-scale factors. The large-scale factors here include latitude, relative position on the North American continent, prevailing hemispheric wind patterns, and extensive mountain barriers. Small-scale or local factors include the topographic setting and position (valley, slope, or ridge location), as well as orientation or aspect, and vegetative cover. Elevation may cover various scales. Broadly, the climate is transitional between a northern Pacific coastal type and a continental type. The Pacific influence is noted particularly by the late autumn and winter maximum in cloudiness and precipitation; also in the relatively moderate average winter temperatures, compared with areas east of the Rocky Mountains. Summer is characteristically sunny and dry, though July and August are the only distinct summer months. July and August are thus also the peak fire-danger months. Annual precipitation (rain and melted snow) averages as little as 10 inches at the lowest canyon floors; over 100 inches at the highest elevations. Wettest months are normally November, December, and January. Close to 60 percent of the annual total occurs during the period November through March. A slight, secondary peak in precipitation normally appears in May and June, followed by a sharp decrease in July. Snowfall accounts for more than 50 percent of the total precipitation at elevations above 4,800 ft. Snow cover usually persists in the mid elevation valleys from early December through the end of March. High-elevation snowpack reaches a depth of 5 ft (1.5 m) or more in March and April and may linger into June. The main season of lightning (or thunderstorm) activity extends from late May through August. Storms occur on an average of 3 or 4 days each in June, July, and August. Monthly mean temperatures in populated valley locations range from 24 F (-4 C) in January to 65 F (18 C) in July; these are midpoint values between the average daily maximum and minimum temperatures. The annual mean is 43 F (6 C). A large diurnal range occurs in summer. Extreme temperatures have been as high as 103" to 105" F (about 40" C) and as low as -36" F (-38" C). Temperature inversions are commonplace, particularly on the clear summer and early autumn nights. The frost-free season, defined as the period with minimum temperatures staying above 32" F (0" C), varies widely with elevation and topographic position. The season is generally longer at lower elevation locations and on slope positions in the "thermal belt" around 3,500 ft. The season is shorter in positions affected by cold air drainage and slopes above the “thermal belt” at elevations >5,500 ft. Relative humidity is usually high throughout the day in late autumn and winter, averaging 70 to 80 percent or higher in midafternoon. In July and August, afternoon values average near 35 percent in the mid elevation valleys and 45 percent at 5,500 ft. Summer nighttime humidity in these valleys typically recovers to over 90 or 95 percent by dawn. On the slopes above the temperature inversion, at the same time, humidity may average only 50 to 60 percent. Winds have a prevailing (most frequent) direction from the southwest during all or most of the year. Local terrain effects modify the larger-scale wind that occurs in the adjacent free atmosphere. A nighttime drainage effect is common. Sunshine duration is at a minimum in December, when it may average only 20 percent of the maximum possible. July has close to 80 percent of the maximum possible.

(from Finklin, A. 1983. Climate of Priest River Experimental Forest, Northern Idaho.GTR-INT-159)

Frost-free period (days):
Total range = 91 to 129 days
Central tendency = 93 to 113 days

Mean annual precipitation (cm):
Total range = 545 to 1530 mm
(21 to 60 inches)
Central tendency = 800 to 1160 mm
(31 to 46 inches)
MAAT (C)
Total range = 3.5 to 8.9
(38 to 48 F)
Central tendency = 5.5 to 7.5
(42 to 46 F)

Climate stations: none

Influencing water features

Water Table Depth: 0 - 60 cm
(0 - 24 inches) medina = 6 inches

Flooding:
Frequency: none to frequent
Duration: none to long

Ponding:
Frequency: none to frequent
Duration: none to long

Soil features

This ecological site is associated with several soil components (Beaverpass, Pywell, DeVoignes). These components can be grouped into the soil subgroups Terric Cryosaprists, Typic Haplosaprists, Histic Humaquepts, Typic Borosaprists. These soils are composed of herbaceous and/or woody organic material and may have layers of mineral soil derived from alluvium.

Parent Materials:
Kind: Organic material
Origin: Herbaceous and/or woody

Surface Texture:
(1) Muck
(2) Mucky-Silt Loam

Table 4. Representative soil features

Parent material	(1) Organic material (2) Alluvium
Surface texture	(1) Mucky peat (2) Mucky silt loam
Drainage class	Very poorly drained
Permeability class	Moderate
Depth to restrictive layer	0 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	44.96 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	6.4
Subsurface fragment volume <=3" (25.4-152.4cm)	0%
Subsurface fragment volume >3" (25.4-152.4cm)	0%

Table 5. Representative soil features (actual values)

Drainage class	Very poorly drained to poorly drained
Permeability class	Moderate
Depth to restrictive layer	0 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	11.43–44.96 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	4.5–7.3
Subsurface fragment volume <=3" (25.4-152.4cm)	0%
Subsurface fragment volume >3" (25.4-152.4cm)	0%

Ecological dynamics

Fens are primarily dominated by graminoids, which may constitute 40-100% of the herbaceous layer. Species such as *Carex aquatilis* var. aquatilis, *C. utriculata*, *C. lasiocarpa*, *C. scopulorum* var. prionophylla, *Carex buxbaumii*, *C. limosa*, *C. saxatilis*, *C. simulata*, Eriophorum spp., *Calamagrostis canadensis* are common dominants. *Carex limosa*, *Rhynchospora alba*, *Eriophorum angustifolium* ssp. subarcticum, *Menyanthes trifoliata*, *Comarum palustre*, *Scheuchzeria palustris* are limited to soaks, floating mats, and shorelines of lakes and ponds. *Eleocharis quinqueflora* is also found in soaks or areas where there is strong upwelling groundwater. A variety of forbs are also found in this system. Shrubs such as *Betula glandulosa*, Alnus, incana, A. viridis ssp. sinuata, *Salix planifolia*, *S. pedicellaris*, *S. drummondiana*, and *S. farriae* are also common. These shrublands generally have an open canopy so that graminoids and forb diversity is high. Occasional trees such as *Pinus contorta* var. latifolia and *Picea engelmannii* may be scattered or form woodlands (i.e. treed fens). The trees can be stunted relative to their growth forms in upland. Peatlands can form floating mats along lake/pond shorelines and along very slow moving streams, in confined basins, or in areas of groundwater discharge. Basins fens (those associated with shorelines or confined basins) are most common in areas with past glaciation or river valleys. They occur in depressions where surface water and/or upwelling groundwater provide continual saturation of the substrate. Sloping fens occur on or at the base of slopes where groundwater discharges due to a break in the topography, a change in geology, or in valley bottoms where alluvial groundwater supports peat formation. (from Rocchio and Crawford, 2015)

State and transition model

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 sparginieum. Potomogeton 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 araundinacia can have exponenetial 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.

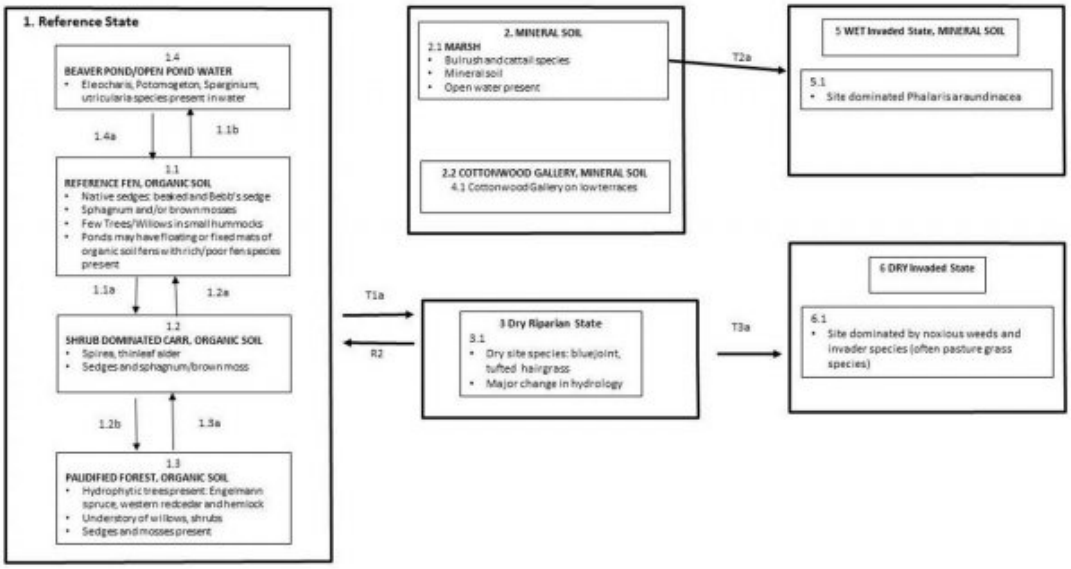
R2 Improved grazing practices (change of season of use, conservative stocking rates), cessation of draining/ditching practices or logging practices in watershed to improve hydrology of site.

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 INVADED STATE: Marsh dominated by Phalaris araundinacea due to increase in nutrients.

6.1 DRY INVADED 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, houndstounge, 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.



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/.

Finklin, A.I. 1983. Climate of Priest River Experimental Forest, northern Idaho. Gen. Tech. Rep. INT-159. U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 53.

Jim Cornwell. 2009. NRCS Idaho Draft Range Site Descriptions.

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

Stephanies Shoemaker

Brian Gardner

Approval

Curtis Talbot, 10/15/2020

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	05/18/2024
Approved by	Curtis Talbot
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):**

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

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

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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:

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

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

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

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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:**
