USDA Natural Resources
Conservation Service

Ecological site R010XY004OR
Meadow

Accessed: 05/11/2025

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.

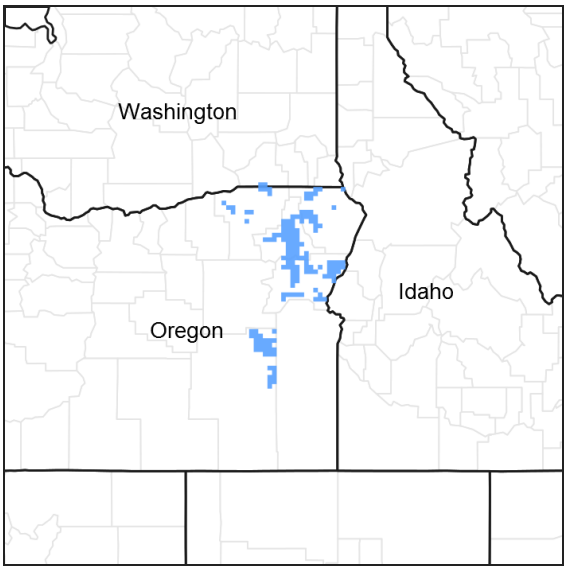


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R010XY001OR	**Cold Wet Meadow** Cold Wet Meadow (cryic/frigid soil temperature, hydric soil, lower topographic position, longer duration seasonal water table, anaerobic conditions, different composition – CAREX-DECE association)
R010XY003OR	**Wet Meadow** Wet Meadow (hydric soil, lower topographic position, longer duration seasonal water table, anaerobic conditions, different composition – CAREX-DECE association)
R010XY005OR	**Loamy Bottom** Loamy Bottom (greater depth to water table, higher terrace, different composition – basin wildrye strongly dominant)
R010XY006OR	**Mountain Loamy Bottom** Mountain Loamy Bottom (frigid soil temperature, greater depth to water table, higher terrace, different composition – basin wildrye strongly dominant)
R010XY010OR	**Coyote Willow Riparian** Willow Riparian Complex (Narrowleaf {coyote}Willow) – (stream channel & bank position, early succession state, mesic to frigid near mesic temperature regime, different composition– SAEX/CAREX complex)
R010XY011OR	**Cottonwood-Willow-Riparian** Black Cottonwood-Willow Riparian Complex (gravelly floodplain position, mesic temperature regime, different composition – POBAT-SALIX/LECI4 complex)

R011XY012OR	**Silty 8-11 PZ** Willow Riparian Complex (Booth-Yellow Willow) - (stream channel & bank position, mesic near frigid temperature regime, different composition– SABO2-SALU2/CAREX complex)

Similar sites

R010XY003OR	**Wet Meadow** Wet Meadow (hydric soil, lower topographic position, longer duration seasonal water table, anaerobic conditions, different composition – CAREX-DECE association)
R010XY001OR	**Cold Wet Meadow** Cold Wet Meadow (cryic/frigid soil temperature, hydric soil, lower topographic position, longer duration seasonal water table, anaerobic conditions, different composition – CAREX-DECE association)
R010XY006OR	**Mountain Loamy Bottom** Mountain Loamy Bottom (frigid soil temperature, greater depth to water table, higher terrace, different composition – basin wildrye strongly dominant)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Deschampsia caespitosa* (2) *Carex*

Physiographic features

This meadow site occurs on depositional floodplain areas in river valley bottoms and along stream corridors. The site typically occurs on low terraces adjacent to wet meadow depression areas, primary and secondary overflow channels and swales. It also occurs near marsh areas and on upland areas adjacent to springs and seeps. When located near active stream channels it is subject to frequent seasonal flooding and sediment deposition. In original or high seral states the floodplain is well connected to the primary channel with a depth to the channel bottom of two feet or less on small streams and greater on larger streams and rivers. Subsurface water is near the surface throughout the majority of the growing season. Historically, the hydrology, soil formation and biotic processes were often influenced by the presence of beaver. Slopes range from 0 to 4 percent. Elevations vary from 500 to 4,700 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace (3) Valley floor
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Elevation	500–4,000 ft
Slope	0–4%
Water table depth	12–24 in
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 9 to 18 inches, most of which occurs in the form of rain and snow during the months of November through March. Frequent surface flows and long duration seasonal sub-surface flows from adjacent perennial and seasonal streams and associated uplands augment the precipitation. The soil temperature regime is mesic to frigid near mesic with a mean air temperature of 47 degrees F. Temperature extremes range from 100 to -10 degrees F. The frost free period ranges from less than 90 to 150 days. The optimum growth period for plant growth is April through mid August.

Table 3. Representative climatic features

Frost-free period (average)	150 days
Freeze-free period (average)	0 days
Precipitation total (average)	18 in

Influencing water features

Soil features

The soils of this site are recent, deep to very deep and somewhat poorly drained. Depth to alluvial sediments averages 30 to over 40 inches. The surface layer is typically a silt loam to silty clay loam about 20 inches thick. The subsoil is a silt loam to gravelly silt loam over 20 inches thick. Permeability is moderate. The available water holding capacity (AWC) is about 6 to 8 inches for the profile. Perennial to near perennial subsurface flow augments the available water. The high water table typically fluctuates between 12 and 24 inches from March through July. Spring flooding is frequent. Soils are inheritably unstable due to prolonged saturated conditions. The erosion potential is moderate to severe.

Table 4. Representative soil features

Parent material	(1) Alluvium–rhyolite (2) Loess–acidic tuff (3) Volcanic ash–basalt
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained
Permeability class	Moderate to moderately slow
Soil depth	40–60 in
Available water capacity (0-40in)	6–8 in

Ecological dynamics

The potential native plant community is strongly dominated by tufted hairgrass. Sedges are common. Rushes, camas and a variety of forbs are present. Nebraska, Northwest Territory (beaked), Sheldon’s, clustered field and smallwing sedge are some of the common sedges. Long duration anaerobic and saturated conditions preclude the establishment of willows. Even though willows tolerate periods of inundation they require aeration in the upper root zone and cannot survive on the poorly drained soils of this site. Vegetative composition of the community is approximately 98 percent grasses and grass-like plants and two percent forbs. Approximate ground cover is 90 to 120 percent (basal and crown). The site typically occurs in association with wet meadow, willow riparian and loamy bottom sites. In the Cowardian system the potential native plant community is classified as a palustrine emergent wetland.

Range in Characteristics:
The extent and duration of surface and subsurface flows have a major affect on site composition and production. Sedge production and composition increase when surface flows and water tables are at or near the surface well into the growing season. Tufted hairgrass increases where subsurface flows are present near the surface until mid summer. Just slight differences in subsurface water elevations of one foot or less produce these effects. This is most apparent on active floodplains where slight elevation differences in secondary channels, sloughs, terraces and distance from streams produce these affects. At the outlets of meadow and wet meadow overflow channels willows increase along channels where there is adequate aeration. Initially narrowleaf (coyote) a rhizomatous species increases. The scattered presence of willows along with massive deep rooted sedges are critical in maintaining soil

stability and controlling head cutting in the meadow drainage system. In a high seral state the tufted hairgrass dominated meadow sites are intermixed with sedge dominated wet meadow sites and discontinuous groupings of willow riparian sites.

Response to Disturbance - States:
When the condition of the site deteriorates as a result of over grazing tufted hairgrass and sedges decrease and rushes increase. The decrease in tufted hairgrass and sedges accelerates under saturated conditions when the sod is disturbed and broken by hoof action. Meadow foxtail invades along with lesser amounts of reed canarygrass. As the soil stabilization function of tufted hairgrass and dense sedge roots is lost the natural drainage pattern of meadows is subject to down-cutting. Incision of the drainage pattern is accentuated on meadows with higher gradients and where a degraded primary channel provides a low elevation outlet. Subsurface flows are affected. The water table drops and storage of water for late season flows is reduced. Quackgrass and sod bluegrasses invade as the site becomes drier. With continued drying and lowering of the water table annuals, forbs, basin big sagebrush and other drought tolerant plants invade and production drops.

Extensive hydrologic alteration impacts can also occur from a variety of on-site and off-site activities. On lower elevation bottomlands channel straightening, deepening and drainage practices are often implemented to use the excellent meadow soils for intense agriculture activities, transportation corridors and urban development. Upstream water storage and withdrawals for irrigation on the floodplain and adjoining terraces are often a part of these activities. Lowered primary channels isolate floodplains and provide outlets to drain meadow soils.

Restoration of floodplain meadow function and production is an excellent alternative in upland areas where intense agriculture practices are not feasible or desired. With good management and proper grazing use meadow function can slowly be restored. Initially the system goal is to develop a well vegetated stabile entrenched floodplain within the primary channel followed by slow aggregation and channel narrowing. Willows and a narrow meadow re-establish on the incised floodplain and with the maintenance of adequate fall vegetative cover sediment is retained during spring run-off. Banks are protected and in time with adequate upstream sediment delivery the initial wide floodplain is reconnected. With restoration of hydrology tufted hairgrass, camas and sedges can be reintroduced. If a productive native plant community is a goal the control of invasive meadow foxtail and reed canarygrass is often required.

States:
ALPR3-JUNCUS (loss of tufted hairgrass and sedges, channels unstable, floodplain becoming disconnected; water table present naturally or from irrigation)

ELRE4-POPR (lower water table often maintained by irrigation, primary and meadow channels becoming incised)

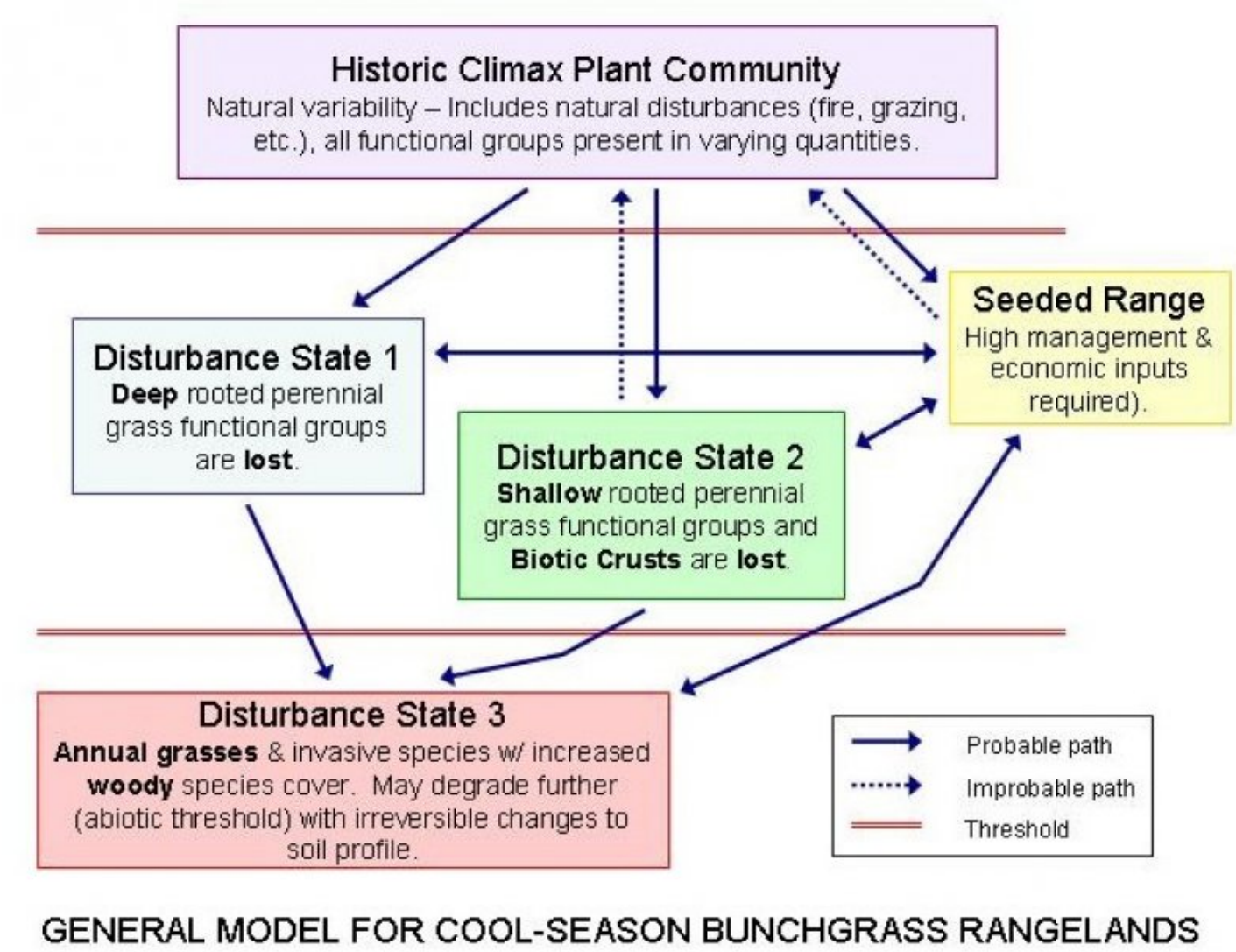
ARTRT/POPR-Annuals (primary channel incised, water table lowered, loss of floodplain connectivity and overland flows)

ARTRT(JUOC)/Annuals (water table lowered, primary channel deeply incised, floodplain disconnected)

Annuals-Deep rooted biennial & perennial forbs (water table lowered, primary channel deeply incised, floodplain disconnected)

Altered land use changes

State and transition model



GENERAL MODEL FOR COOL-SEASON BUNCHGRASS RANGELANDS

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference native plant community is strongly dominated by tufted hairgrass. Sedges are common. Rushes, camas and a variety of forbs are present. Nebraska, Northwest Territory (beaked), Sheldon's, clustered field and smallwing sedge are some of the common sedges. Long duration anaerobic and saturated conditions preclude the establishment of willows. Even though willows tolerate periods of inundation they require aeration in the upper root zone and cannot survive on the poorly drained soils of this site. Vegetative composition of the community is approximately 98 percent grasses and grass-like plants and two percent forbs. Approximate ground cover is 90 to 120 percent (basal and crown). The site typically occurs in association with wet meadow, willow riparian and loamy bottom sites. In the Cowardian system the potential native plant community is classified as a palustrine emergent wetland.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2940	3920	4900
Forb	60	80	100
Total	**3000**	**4000**	**5000**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant, moderate rooted bunchgrass**			2400–3000	
	tufted hairgrass	DECE	*Deschampsia cespitosa*	2400–3000	–
2	**Sub-dominant dense sedges**			600–1000	
	Sheldon's sedge	CASH	*Carex sheldonii*	0–800	–
	Northwest Territory sedge	CAUT	*Carex utriculata*	200–600	–
	Nebraska sedge	CANE2	*Carex nebrascensis*	200–600	–
	smallwing sedge	CAMI7	*Carex microptera*	0–400	–
	clustered field sedge	CAPR5	*Carex praegracilis*	0–400	–
	slenderbeak sedge	CAAT3	*Carex athrostachya*	0–400	–
	woollyfruit sedge	CALA11	*Carex lasiocarpa*	0–200	–
	bigleaf sedge	CAAM10	*Carex amplifolia*	0–200	–
	water sedge	CAAQ	*Carex aquatilis*	0–200	–
	woolly sedge	CAPE42	*Carex pellita*	0–200	–
	awlfruit sedge	CAST5	*Carex stipata*	0–200	–
4	**Common moderade rooted rush**			120–320	
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	120–320	–
5	**Other moderate rooted grasses**			120–240	
	American mannagrass	GLGR	*Glyceria grandis*	0–80	–
	fowl mannagrass	GLST	*Glyceria striata*	0–80	–
	bluegrass	POA	*Poa*	0–80	–
	Carolina foxtail	ALCA4	*Alopecurus carolinianus*	0–40	–
Forb					
7	**Common forbs**			80–200	
	small camas	CAQU2	*Camassia quamash*	40–120	–
	cinquefoil	POTEN	*Potentilla*	40–80	–
8	**Other forbs**			40–80	
	Rocky Mountain iris	IRMI	*Iris missouriensis*	0–10	–
	seep monkeyflower	MIGU	*Mimulus guttatus*	0–10	–
	cowparsnip	HERAC	*Heracleum*	0–10	–
	buttercup	RANUN	*Ranunculus*	0–10	–
	ragwort	SENEC	*Senecio*	0–10	–
	false hellebore	VERAT	*Veratrum*	0–10	–
	ballhead waterleaf	HYCA4	*Hydrophyllum capitatum*	0–5	–
	bay forget-me-not	MYLA	*Myosotis laxa*	0–5	–
	beardtongue	PENST	*Penstemon*	0–5	–
	white sagebrush	ARLUL2	*Artemisia ludoviciana ssp. ludoviciana*	0–5	–
	fringed willowherb	EPCI	*Epilobium ciliatum*	0–5	–
	marsh willowherb	EPPA	*Epilobium palustre*	0–5	–

Animal community

Livestock Grazing:
This site is suitable for livestock grazing use in the late summer and fall under a planned grazing system. Use should be postponed until the soils are firm enough to prevent trampling damage and sod break-up. When grazed in the summer, grazing management should be keyed to tufted hairgrass with a grazing stubble height of 3 to 4 inches. This allows plenty of height for late summer regrowth and minimizes early use on adjacent wet meadow sites. Early season wet meadow use can easily cause trampling damage, sod breakup and accelerated erosion of the saturated wet meadow soil. Livestock prefer to utilize the higher drier soils and vegetation of the meadow site over the wet meadow site early in the season. In the fall, adequate grass and grass-like residue (6 to 8 inches) should be left on adjoining wet meadow sites to prevent erosion and retain sediments during spring high flow events. Deferred grazing or rest is recommended at least once every three years.

Wildlife:
This site is commonly used by beaver, muskrats, mule deer, rodents, wading birds, waterfowl, neo-tropical birds, amphibians and various predators. Waterfowl and wading birds make excellent use of this site for nesting, food and cover. Beaver presence assists in maintaining the hydrology, soil formation and biotic processes of the site.

Hydrological functions

The soils of this site are typically in a floodplain bottomland position. A high water table is present and overland flow occurs periodically during spring flow events when the hydrologic cover is high. They have uniform moderate to high runoff potential and moderate infiltration rates. Hydrologic cover is high when the shallow pattern wetland drainage system is intact and the grass-like and grass components are greater than 80 percent of potential. In an undrained state the soils are in hydrologic group D.

Other information

The soils of this site exhibit hydric soil characteristics. When incised channels are present and the meadow soil is drained, rehabilitation where feasible will markedly improve production and restore good hydrologic characteristics. On altered sites the reintroduction of tufted hairgrass, camas and sedges is needed to restore the site potential. With restoration of hydrology the control of meadow foxtail and reed canarygrass, aggressive invaders, is often required.

Contributors

J. Thompson, A. Bahn
J.Joye(OSU)
T.Bloomer & A.Bahn

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)	Jeff Repp
Contact for lead author	Oregon NRCS State Rangeland Management Specialist
Date	08/07/2012
Approved by	Bob Gillaspy
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None, moderate sheet & rill erosion hazard

2. **Presence of water flow patterns:** Frequent flooding with seasonal high water table

3. **Number and height of erosional pedestals or terracettes:** None

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0-5%

5. **Number of gullies and erosion associated with gullies:** Very poor resistance to erosion when cover is lacking. Subject to incision and downcutting

6. **Extent of wind scoured, blowouts and/or depositional areas:** None, slight wind erosion hazard

7. **Amount of litter movement (describe size and distance expected to travel):** Fine to moderately coarse - limited movement

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Moderately resistant to erosion with adequate cover: aggregate stability = 3-5

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Deep, very deep, somewhat poorly drained with a silt loam surface about 18" thick: Moderate to high OM (3-6%)

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Significant ground cover (90-100%) and very gentle slopes (0-3%) effectively limit rainfall impact and overland flow

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

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: Tufted hairgrass > sedges > rush > forbs = other grasses

Sub-dominant:

Other:

Additional:

---

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

---

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):** Favorable: 5000, Normal: 4000, Unfavorable: 3000 lbs/acre/year at high RSI (HCPC)

---

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:** Perennial forb and brush species will increase with deterioration of plant community. Kentucky bluegrass and meadow foxtail invade sites that have lost deep rooted native perennial grass functional groups.

---

17. **Perennial plant reproductive capability:** All species should be capable of reproducing annually

---