USDA Natural Resources
Conservation Service

Ecological site R004AB008OR
Aquic Flood Plain

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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): 004A–Sitka Spruce Belt

This resource area is along the coast of the Pacific Ocean. It is characterized by a marine climate and coastal fog belt. The parent material is primarily glacial, marine, or alluvial sediment and some scattered areas of Tertiary sedimentary rock and organic deposits. Glacial deposits are dominant in the northern part of the MLRA in Washington; marine and alluvial deposits and eolian sand are dominant along the southern part of the Washington coast and extending into Oregon. The mean annual precipitation ranges from 52 to 60 inches near the beaches to more than 190 inches in the inland areas of the MLRA.
Andisols and Inceptisols are the dominant soil orders in the MLRA, but Spodosols, Entisols, and Histosols are also present. The soils are shallow to very deep and very poorly drained to somewhat excessively drained. They are on hilly marine terraces and drift plains; coastal uplands, hills, and foothills; flood plains; and coastal dunes, marshes, and estuaries.
The soil temperature regimes of MLRA 4A are moderated by the proximity to the Pacific Ocean, which eases the differences between the mean summer and winter temperatures. The seasonal differences in temperature are more pronounced in adjacent MLRAs further inland. Included in MLRA 4A are soils in cooler areas at higher elevations or on northerly aspects that have an isofrigid temperature regime.
The soil moisture regimes of MLRA 4A are typified by soils that do not have an extended dry period during normal years. Many of the soils further inland in MLRA 2 have a dry period in summer. Soils in low-lying areas and depressions of MLRA 4A are saturated in the rooting zone for extended periods due to a high water table or long or very long periods of flooding or ponding.

MLRA 4A Soil Temperature Regimes
Isomesic The mean annual soil temperature (measured at a depth of 20 inches) is 46 to 59 degrees F, and the difference between the mean winter and summer temperatures is less than 11 degrees. The seasonal soil temperatures and difference between the mean winter and summer temperatures are moderated by the proximity to the ocean and the effects of fog in summer.
Isofrigid The mean annual soil temperature (measured at a depth of 20 inches) is 32 degrees F to less than 46 degrees, and the difference between the mean winter and mean summer temperatures is less than 11 degrees. The seasonal soil temperatures and difference between the mean winter and summer temperatures are moderated by the proximity to the ocean and the effects of fog in summer. The temperatures are cooler than in surrounding lowlands because of the higher elevation and differences in slope and aspect.
MLRA 4A Soil Moisture Regimes
Udic The soil rooting zone is not dry in any part for more than 90 cumulative days in normal years. Soil moisture does not limit plant growth because of the fog in summer.
Aquic The soil is virtually free of dissolved oxygen due to saturation of the rooting zone. The soils are saturated for extended periods during the growing season and may be subject to long or very long periods of ponding and flooding.
Refer to Keys to Soil Taxonomy for complete definitions of the soil temperature and moisture regimes.

LRU notes

The Central Sitka Spruce Belt land resource unit (LRU B) of MLRA 4A is along the west coast of Washington and Oregon. The LRU extends from the Chehalis River in Washington to South Slough in Oregon, and it is bounded on the west by the Pacific Ocean. This area consists of sand dunes, flood plains, and marine terraces that extend a few miles east and are parallel to the Pacific Ocean, and it transitions to steeper and higher elevation ridges and mountainsides of the western slopes of the Coast Range in Oregon. Near the shore in coastal lowland areas, the parent material is dominantly eolian (wind-deposited) sand, alluvium, and marine sediment. Residuum, colluvium, and landslide deposits derived from sedimentary and basaltic sources are on the coastal foothills and mountains, and minor additions of recent alluvium are along the river valleys. Several major rivers carved steep, narrow valleys through the coastal mountains and foothills before entering broader coastal valleys. Subduction zones along the Pacific Coast may cause significant earthquakes and tsunamis, which would disrupt the ecological processes beyond what is described in this ecological site description.

Classification relationships

National vegetation classification: G284 North Pacific Bog and Acidic Fen Group; A2514 Bog and Acidic Fen Alliance
Ecological Systems of Washington State community type: North Pacific Bog and Fen
Plant associations of the Oregon Dunes National Recreation Area: Slough Sedge Seasonally Flooded Herbaceous Alliance; Hooker Willow Saturated Shrubland Alliance

Ecological site concept

This ecological site is on the western coastline of the Pacific Northwest, from southern Washington through central Oregon. It is at low elevations (less than 1,500 feet) that receive abundant precipitation and persistent fog in summer. It is in oxbows, backswamps, and abandoned channels of flood plains that have a high water table. The site is strongly influenced by hydrology. Ponding commonly occurs during the growing season, and flooding occurs in winter and early in spring.
The maritime climate is characterized by cool, moist summers and cool, wet winters. The mean annual precipitation is 70 to 130 inches. Coastal fog provides supplemental moisture in summer. Snowfall is rare, and it is not persistent when it occurs. The mean annual air temperature is 48 to 52 degrees F.
This site typically is in areas that are subject to residual ponding from overbank flooding or a seasonal high water table. The water table commonly is near the surface or above it much of the growing season, and the rate of organic decomposition is slow due to the anaerobic conditions. Organic decomposition may also be slowed by the acidic conditions in bogs. These conditions result in a lack of nutrient availability in soils that formed in organic material and may be underlain by fine textured alluvium. The seasonal high water table and ponding dynamics may be altered by artificial drainage of the site or adjacent areas.
The duration and frequency of ponding directly influence the plant community. The vegetation in this site is well adapted to abundant soil moisture, ponding, and acidic soils. Common plants include Douglas spirea (Spirea douglasii), American skunkcabbage (Lysichiton americanus), slough sedge (Carex obnupta), and rush (Juncus).
The most common natural disturbances are ponding and flooding. The volume and longevity of the disturbance determine the effect on the dynamics of the forest. Minor flooding and ponding events may affect the understory through scouring and sediment deposition but leave the overstory essentially intact. If the hydrological system is altered or restricted, the site will dry over time and mature into a shrub-dominant one. Beaver (Castor canadensis) activity may by a significant driver in small-scale disturbances and hydrologic morphology.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Spiraea douglasii*
Herbaceous	(1) *Lysichiton americanus* (2) *Carex obnupta*

Physiographic features

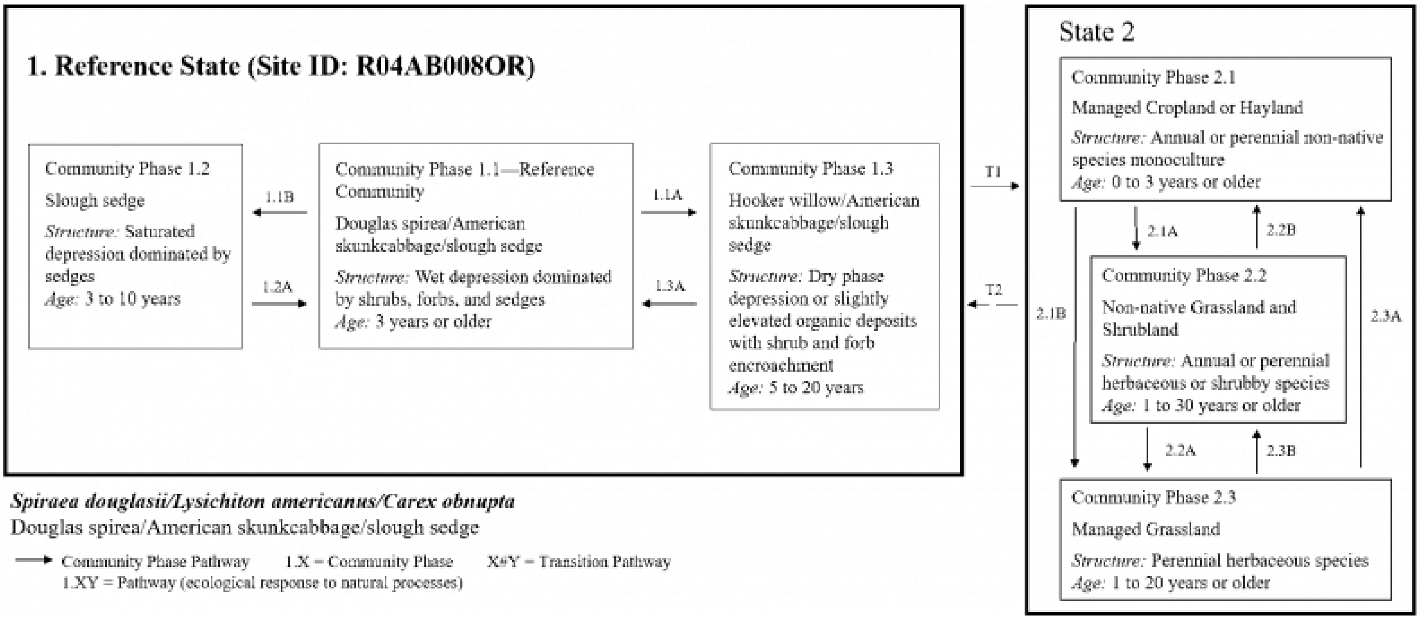
Climatic features

Influencing water features

Soil features

Ecological dynamics

State and transition model



State 1
Reference

Community 1.1
Douglas Spirea, American skunkcabbage, and Slough Sedge

Structure: Wet depression dominated by shrubs, forbs, and sedges The reference community is a meadow consisting dominantly of shrubs, forbs, sedges, and rushes that is influenced by a water table near the surface or above it much of the growing season. The soils associated with this site are acidic and very poorly drained, which restrict plant growth to uniquely adapted species. Common plants include Douglas spirea, Labrador tea (*Ledum groenlandicum*), common ladyfern (*Athyrium filix-femina*), American skunkcabbage, deer fern (*Blechnum spicant*), slough sedge, and rush (Juncus). Salal (*Gaultheria shallon*), salmonberry (*Rubus spectabilis*), and twinberry (*Lonicera involucrata*) may be on hummocks or in drier areas. Slough sedge covers much of the site. The sedges are sod-forming species that create dense thickets as a result of the rhizomatous root system. They are shade-intolerant species, but they may be at multiple stages of succession (Hauser, 2006).

Community 1.2
Slough Sedge

Structure: Saturated depression dominated by sedges Community phase 1.2 represents a plant community of sedges and rushes that is influenced by a water table above the soil surface during the growing season. Extended ponding restricts the diversity of plants to water- and peat-adapted species such as water sedge and slough sedge. The rhizomatous nature of sedges makes these species successful colonizers in disturbed environments (Hauser, 2006). Both species adapt to a decrease in the depth to the water table. They are early seral species under excessively wet conditions (Tesky, 1992).

Community 1.3
Hooker Willow, American Skunkcabbage, and Slough Sedge

Structure: Dry phase depression or slightly elevated organic deposits with shrub and forb encroachment Community phase 1.3 represents a plant community of shrubs, forbs, grasses, and sedges that is influenced by a water table at or below the soil surface during the growing season or by a buildup of organic matter above the soil surface. This community is influenced by below-average ponding and precipitation for several consecutive years. The drier conditions restrict the regeneration of wetland species such as water sedge. Species that inhabit the edges of the reference site and ecotone, such as salal, Hooker willow (*Salix hookeriana*), and Oregon crabapple (*Malus fusca*), will begin to encroach on the open meadow and become more dominant.

Pathway 1.1B
Community 1.1 to 1.2

This pathway represents a climatic change toward wetter conditions. If the site becomes wetter from increased precipitation, the depth to a water table will decrease and the duration of flooding or ponding will increase.

Pathway 1.1A
Community 1.1 to 1.3

This pathway represents a climatic change toward drier conditions. If the site becomes drier from reduced precipitation, the depth to a water table will increase and the duration of ponding will decrease.

Pathway 1.2A
Community 1.2 to 1.1

This pathway represents a climatic change toward drier conditions. If the site becomes drier from reduced precipitation, the depth to a water table will increase and the duration of ponding will decrease. This will increase the growing season for non-hydrophytic species and alter the plant community.

Pathway 1.3A
Community 1.3 to 1.1

This pathway represents a climatic change toward wetter conditions. If the site becomes wetter from increased precipitation, the depth to a water table will decrease and the duration of flooding or ponding will increase. This will alter the plant community.

State 2
Converted

Community 2.1
Managed Cropland or Hayland

Structure: Annual or perennial non-native species monoculture Community phase 2.1 may consist of a range of crops, including annually planted species, short-lived perennial species, and more permanent shrubby plants. Hay and grasses and legumes for silage are included in this community phase.

Community 2.2
Non-Native Grassland and Shrubland

Structure: Annual or perennial herbaceous or shrubby species Community phase 2.2 is characterized by low-level agronomic or management activity such as adding soil nutrients, intensive grazing management, regular mowing, or weed control. This plant community commonly consists dominantly of introduced weedy species. Areas that have extremely low fertility or are subject to heavy grazing pressure have a higher proportion of annual, stoloniferous, or rhizomatous species. Wetland areas commonly support dominantly non-native rhizomatous grasses. The plant community may include remnants of introduced pasture species that commonly are seeded.

Community 2.3
Managed Grassland

Structure: Perennial herbaceous species Community phase 2.3 receives regular agronomic inputs, including adding soil nutrients and other soil amendments such as lime, implementing grazing management plans, regular mowing, controlling weeds, and reseeding as needed. This plant community typically includes introduced perennial pasture and hay species that commonly are seeded. In areas of historic native grassland, mixtures of perennial and annual native species may be seeded and managed by appropriate agronomic and livestock management activities. Minor amounts of introduced species that commonly are in non-native grassland and shrubland communities (community phase 2.2) are in this phase.

Pathway 2.1A
Community 2.1 to 2.2

In the absence of agronomic and livestock management activities, seeds from surrounding weedy plant communities will be transported to the site by wind, floodwater, animals, or vehicle traffic. Adapted species will become established. Management activities include tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Pathway 2.1B
Community 2.1 to 2.3

This pathway represents agronomic and livestock management activities, including tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Pathway 2.2B
Community 2.2 to 2.1

This pathway represents agronomic activities such as tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, and planting to desirable crop species.

Pathway 2.2A
Community 2.2 to 2.3

This pathway represents agronomic and livestock management activities, including tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Pathway 2.3A
Community 2.3 to 2.1

This pathway represents agronomic activities, including tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, and planting to desirable crop species.

Pathway 2.3B
Community 2.3 to 2.2

In the absence of agronomic and livestock management activities, seeds from surrounding weedy plant communities will be transported to the area by wind, floodwater, animals, or vehicle traffic. Adapted species will become established. Management activities include tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Transition T1A

State 1 to 2

This pathway represents a change in land use. This includes modification of the hydrologic function to develop pasture and agriculture. Non-native seed disbursement is introduced (intentionally or unintentionally), which alters the reference community.

Transition T2A
State 2 to 1

This pathway represents restoration of the natural hydrologic function and native plant habitat. Native seed sources and extensive management and mitigation of brush and invasive species are needed to restore the community.

Additional community tables

Other references

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Approval

Kirt Walstad, 1/23/2025

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	05/07/2024
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:**

17. **Perennial plant reproductive capability:**