

Ecological site R004AB200OR

Tidal Marsh and Estuary

Last updated: 1/23/2025
Accessed: 08/28/2026

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.

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.

Ecological site concept

This ecological site is on the western coastline of the Pacific Northwest, from southern Washington through central Oregon. Marshes and estuaries are at low elevations that are tidally influenced. The areas are saline to brackish. Hydrology is the primary abiotic driver of the ecological site. The vegetation commonly is patchy. The distribution and diversity of the vegetation are influenced by freshwater inputs, tidal flooding, and evaporation. The soils associated with this site formed in mixed alluvium along tidally influenced flood plains, and they are subject to a high water table and flooding. Slopes range from 0 to 3 percent. The vegetation is well adapted to tidal fluctuations, salt spray, brackish water, and saltwater. The most common species include pickleweed (*Salicornia virginia*), Pacific silverweed (*Argentina egedii*), marsh jaumea (*Jaumea carnosa*), pursue seepweed (*Suaeda calceoliformis*), saltgrass (*Distichlis spicata*), tufted hairgrass (*Deschampsia cespitosa*), seaside arrowgrass (*Triglochin maritima*), common threesquare (*Schoenoplectus pungens*), and Lyngbye's sedge (*Carex lynbnyi*). The most common disturbance is alteration of the watershed and hydrologic system. Tidal inundation and channel flow may be altered by dams, dikes, and levees. Storm surges may flood the marsh and estuary causing movement of sediment and an increase in the amount of large driftwood on the site.

Figure 1. The area designated as “A” is the Foredune Scrub and Grassland site, “B” is the Dune Forest site, “C” is the Aquic Interdune site, and “D” is the Tidal Marsh and Estuary site.

Table 2. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Salicornia</i> (2) <i>Argentina egedii</i>

Physiographic features

Table 3. Representative physiographic features

Landforms	(1) Estuary > Tidal flat
Aspect	W, NW, N, S, SW

Climatic features

The maritime climate is characterized by cool, moist summers and cool, wet winters. The mean annual precipitation is 60 to 110 inches. Coastal fog provides supplemental moisture in summer. The mean annual air temperature is 48 to 52 degrees F.

Influencing water features

Soil features

The soils associated with this site formed in mixed alluvium along tidally influenced flood plains, and they are subject to a high water table and flooding. Slopes range from 0 to 3 percent.

Ecological dynamics

State and transition model

Additional community tables

Table 4. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 5. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Inventory data references

National vegetation classification: G499 Temperate Pacific Tidal Salt and Brackish Marsh Group Ecological Systems of Washington State
community type: Temperate Pacific Tidal Salt and Brackish Marsh Plant associations of the Oregon Dunes National Recreation Area:
Saltgrass-Pacific Silverweed Tidal Herbaceous Vegetation

Other references

Christy, J., J. Kagan, and A. Wiedemann. 1998. Plant associations of the Oregon Dunes National Recreation Area. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region Technical Paper R6-NR-ECOL-TP-09-98.

Franklin, J.F., and C.T. Dyrness. 1973. Natural vegetation of Oregon and Washington. Oregon State University Press, Corvallis, OR.

Peterson, E.B., N.M. Peterson, G.F. Weetman, and P.J. Martin. 1997. Ecology and management of Sitka spruce: Emphasizing its natural range in British Columbia. University of British Columbia Press, Vancouver, British Columbia.

Pojar, J., and A. MacKinnon. 1994. Plants of the Pacific Northwest coast. Lone Pine Publishing, Vancouver, British Columbia.

PRISM Climate Group. Oregon State University. <http://prism.oregonstate.edu>. Accessed February 2015.

Roccio, J., and R. Crawford. 2015. Ecological systems of Washington State. A guide to identification. Washington Department of Natural Resources, Natural Heritage Report 2015-04.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2014. Keys to soil taxonomy. 12th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

United States Department of Agriculture, Natural Resources Conservation Service. 2003. Soil Survey of Douglas County Area, Oregon.

United States Department of Agriculture, Natural Resources Conservation Service. 2013. Soil Survey of Tillamook County, Oregon.

United States National Vegetation Classification. 2016. United States national vegetation classification database, V2.0. Federal Geographic Data Committee, Vegetation Subcommittee, Washington, D.C. Accessed November 28, 2016.

Washington Department of Natural Resources, Natural Heritage Program. 2015. Ecological systems of Washington State. A guide to identification.

Contributors

Erin Kreutz
Erik Dahlke
Jason Martin
Marty Chaney

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	

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:
