USDA Natural Resources Conservation Service

Ecological site F004AA402WA
Coastal Headland

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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.

LRU notes

The Northern Sitka Spruce Belt land resource unit (LRU A) of MLRA 4A is along the northwest coast of the Olympic Peninsula to the Chehalis River in Washington State. The parent material is dominantly glacial deposits derived from continental or alpine sources. This LRU extends from the northwesternmost corner of the Olympic Peninsula south to the northern edge of Grays Harbor. It is bounded on the west by the Pacific Ocean and on the east by the Olympic Mountains. Several major rivers carved valleys through the glacially derived landscape and deposited more recent alluvium. These include the Sol Duc, Bogachiel, Hoh, Queets, Quinault, and Humptulips Rivers.

Ecological site concept

This ecological site is on the western coastline of Washington in the Pacific Northwest. This site includes coastal headlands that are on plains, hills, and terraces along the coast of the Pacific Ocean. The site is exposed to extremely high winds and salt spray. It commonly is on very steep slopes that have south or southwesterly aspects. The vegetation is dominantly trees, shrubs, and forbs that are well adapted to wind pruning, salt spray, low nutrient availability, and wind desiccation. The most common tree species are stunted and dwarfed krummholz Sitka spruce (Picea sitchensis) and shore pine (Pinus contorta var. contorta). The dominant shrubs are salal (Gaultheria shallon), evergreen huckleberry (Vaccinium ovatum), and salmonberry (*Rubus spectabilis*). Forbs and grasses are less prevalent in mature stands, but they may include false lily of the valley (Maianthemum dilatatum), western

brackenfern (Pteridium aquilinum), western swordfern (*Polystichum munitum*), and Pacific reedgrass (Calamagrostis nutkaensis). Lichen and moss commonly are abundant and diverse.
The most common disturbance on this site is windthrow following large coastal storms, which creates pockets of forest openings. Landslides may occur along the steep coastal hillslopes. Although wildfire is uncommon in this ecological site, it will limit the establishment and encroachment of conifer trees and maintain a coastal prairie community. Unnatural disturbances include grazing, urban sprawl, and establishment of non-native species.

Table 1. Dominant plant species

Tree	(1) *Picea sitchensis* (2) *Pinus contorta var. contorta*
Shrub	(1) *Gaultheria shallon* (2) *Vaccinium ovatum*
Herbaceous	(1) *Maianthemum dilatatum* (2) *Pteridium aquilinum*

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Terrace (2) Coastal plain > Hill (3) Coastal plain > Plain
Aspect	W, NW, S, SW

Climatic features

The maritime climate is characterized by cool, moist summers and cool, wet winters. The mean annual precipitation is 75 to 185 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 47 to 51 degrees F.

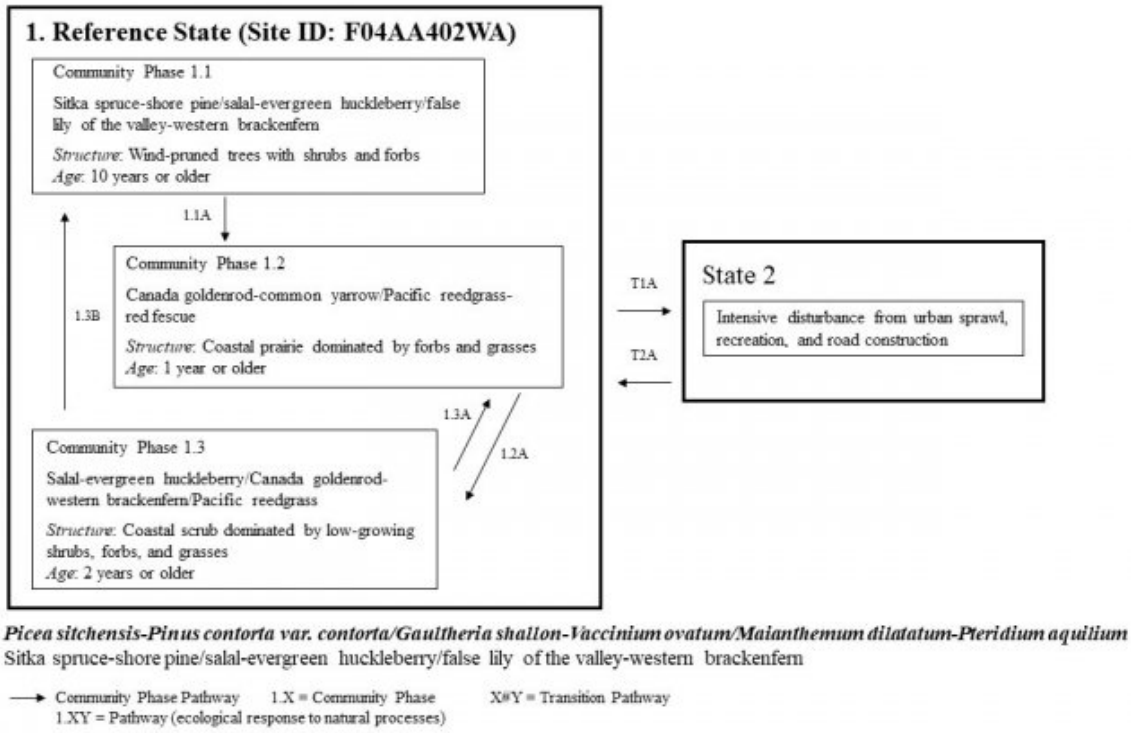
Influencing water features

Soil features

The soils that support this ecological site formed primarily in colluvium and residuum derived from bedrock. Productivity and rooting depth may be affected by areas of soils that are less than 20 inches to bedrock or are skeletal and have a high volume of rock fragments and areas of rock outcroppings on steeper slopes. The moisture available to plants is impacted by exposure to the prevailing coastal winds. Loss of moisture is moderated somewhat by the addition of silty marine loess during the last glaciation when the sea level was considerably lower.

Ecological dynamics

State and transition model



State 1
Reference State

Community 1.1
Sitka spruce-shore pine/salal-evergreen huckleberry/false lily of the valley-western brackenfern

Structure: Wind-pruned trees with shrubs and forbs The reference community is a mature coastal forest and scrub landscape. It commonly is dominantly krummholz conifers that have been sculpted and pruned by wind. Depending on tree density, a mosaic of shrubs, forbs, and grasses is common. The vegetation varies in size and maturity depending on the position on the landscape, prevailing winds, and slope. It is tolerant of routine salt spray and strong winds. This community represents a lack of major disturbance and unnatural modifications. The cover may vary from sparse to full. The dominant conifers are Sitka spruce and shore pine, but Douglas-fir (*Pseudotsuga menziesii*) and red alder (*Alnus rubra*) may be present. The dominant shrubs are salal and evergreen huckleberry. Other shrubs may include salmonberry (*Rubus spectabilis*) and trailing blackberry (*Rubus ursinus*). Forbs and grasses are less prevalent in mature stands, but they may include Canada goldenrod (*Solidago canadensis*), goat's beard (*Aruncus dioicus*), common yarrow (*Achillea millefolium*), Nootka lupine (*Lupinus nootkatensis*), western brackenfern, false lily of the valley, horsetail (Equisetum sp.), western swordfern (*Polystichum munitum*), Pacific

reedgrass, and red fescue (*Festuca rubra*).

Dominant plant species

- Sitka spruce (*Picea sitchensis*), tree
- beach pine (*Pinus contorta var. contorta*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- red alder (*Alnus rubra*), tree
- salal (*Gaultheria shallon*), shrub
- California huckleberry (*Vaccinium ovatum*), shrub
- salmonberry (*Rubus spectabilis*), shrub
- California blackberry (*Rubus ursinus*), shrub
- Pacific reedgrass (*Calamagrostis nutkaensis*), grass
- red fescue (*Festuca rubra*), grass
- false lily of the valley (*Maianthemum dilatatum*), other herbaceous
- western brackenfern (*Pteridium aquilinum*), other herbaceous
- Canada goldenrod (*Solidago canadensis*), other herbaceous
- bride's feathers (*Aruncus dioicus*), other herbaceous
- common yarrow (*Achillea millefolium*), other herbaceous
- Nootka lupine (*Lupinus nootkatensis*), other herbaceous
- western swordfern (*Polystichum munitum*), other herbaceous

Community 1.2
Canada goldenrod-common yarrow/Pacific reedgrass-red fescue

Structure: Coastal prairie dominated by forbs and grasses Community phase 1.2 represents a site that has been disturbed and is in the initiation phase of regeneration. Grasses and herbaceous species recover very rapidly following disturbance. Cover may return to 100 percent within the first growing season, depending on available seed sources and moisture conditions. Common yarrow and Canada goldenrod are successful early colonizers on recently disturbed sites, but they will decrease in prominence as the vegetation fully recovers. Minimizing

disturbance (natural and unnatural) is important to the vegetative recovery of the site. Monitoring for establishment of non-native species is imperative for a successful native plant community.

Dominant plant species

- Pacific reedgrass (*Calamagrostis nutkaensis*), grass
- red fescue (*Festuca rubra*), grass
- Canada goldenrod (*Solidago canadensis*), other herbaceous
- common yarrow (*Achillea millefolium*), other herbaceous

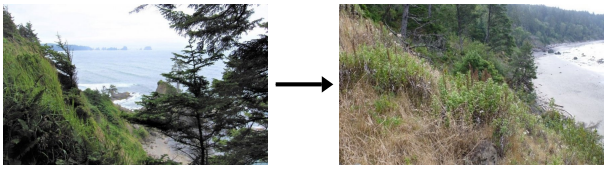
Community 1.3
Salal-evergreen huckleberry/Canada goldenrod-western brackenfern/Pacific reedgrass

Structure: Coastal scrub dominated by low-growing shrubs, forbs, and grasses Community phase 1.3 is a maturing coastal scrubland that has a higher diversity of plant life. Shrubs will begin to establish, including salal, evergreen huckleberry, salmonberry, and trailing blackberry. Dense forbs and grasses begin to diminish as a result of competition from the establishment of shrubs.

Dominant plant species

- salal (*Gaultheria shallon*), shrub
- California huckleberry (*Vaccinium ovatum*), shrub
- salmonberry (*Rubus spectabilis*), shrub
- California blackberry (*Rubus ursinus*), shrub
- Pacific reedgrass (*Calamagrostis nutkaensis*), grass
- Canada goldenrod (*Solidago canadensis*), other herbaceous
- western brackenfern (*Pteridium aquilinum*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2



Sitka spruce-shore pine/salal-evergreen huckleberry/false lily of the valley-western brackenfern

Canada goldenrod-common yarrow/Pacific reedgrass-red fescue

This pathway represents a major stand-replacing disturbance such as a high-intensity fire, a large-scale wind event, or large mass movement that leads to the stand initiation phase of forest development.

Pathway 1.2A
Community 1.2 to 1.3

This pathway represents growth over time with no further significant disturbance.

Pathway 1.3B
Community 1.3 to 1.1

This pathway represents growth over time with no further significant disturbance.

Pathway 1.3A
Community 1.3 to 1.2

This pathway represents a major stand-replacing disturbance such as a high-intensity fire, a large-scale wind event, or large mass movement that leads to the stand initiation phase of forest development.

State 2
Converted Disturbed State

This state represents a full departure from the native reference state as a result of human-caused impacts. Urban sprawl, logging, and roadway construction will increase susceptibility of the site to invasion by non-native species, impact slope stability, restrict natural disturbances, and reduce habitat.

Transition T1A
State 1 to 2

This pathway represents human-influenced disturbances from urban sprawl and other development and road construction. The plant community and habitat are diminished or completely lost.

Restoration pathway T2B
State 2 to 1

This pathway represents restoration of the native plant community and removal of artificial structures. Native seed sources and extensive management and mitigation of brush and non-native species are needed to restore the community.

Additional community tables

Inventory data references

National vegetation classification: G488 Southern Vancouverian Shrub & Herbaceous Bald, Bluff & Prairie Group; CEGL000972 Gaultheria shallon-Vaccinium ovatum/Pteridium aquilinum Shrubland Association
Ecological Systems of Washington State community type: North Pacific Hypermarine Shrub and Herbaceous Headland

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Approval

Kirt Walstad, 5/07/2024

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:**