USDA Natural Resources Conservation Service

Ecological site R004AC411OR
Coastal Bluff

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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 Southern Sitka Spruce Belt land resource unit (LRU C) of MLRA 4A is along the west coast of Oregon. This LRU extends from the northern edge of South Slough to the Chetco River, and it is bounded on the west by the Pacific Ocean. The 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, higher elevation ridges and foothills of the western slopes of the Coast Range. The soils in the coastal lowland areas dominantly formed in eolian (wind-deposited) sand, alluvium, and marine sediment. The soils in the coastal foothills formed in residuum, colluvium, and landslide deposits derived from sedimentary and basaltic rock. Minor additions of recent alluvium are along the river valleys. Several major rivers that have headwaters in the coastal mountains carved steep, narrow valleys through the foothills before entering the 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: G488 Southern Vancouverian Shrub & Herbaceous Bald, Bluff & Prairie Group; A3739 Exposed Coastal Headland Red Fescue-Pacific Reedgrass Grassland Alliance

Ecological site concept

This ecological site is on the western coastline of the Pacific Northwest, from central to southern Oregon. The site includes bluffs, balds, and prairies 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. Areas of this site commonly have very steep slopes and south or southwest aspects.

The maritime climate is characterized by cool, moist summers and cool, wet winters. The mean annual precipitation is 55 to 90 inches. Coastal fog provides supplemental moisture in summer. The mean annual temperature is 50 to 54 degrees F.

The soils that support this ecological site generally formed in colluvium and residuum derived dominantly from volcanic, basaltic, or metasedimentary rock. Areas of soils that are shallow to bedrock or are skeletal and have a high content of rock fragments and areas of rock outcroppings are on the steeper slopes. These areas can be significant locally.

The vegetation is dominantly dwarf shrubs, forbs, and bunchgrasses that are well adapted to wind pruning, salt spray, low nutrient availability, and wind desiccation. The most common species include kinnikinnick (*Arctostaphylos uva-ursi*), black crowberry (*Empetrum nigrum*), Canada goldenrod (*Solidago canadensis*), cascade desertparsley (Lomatium matindalei), Pacific reedgrass (*Calamagrostis nutkaensis*), and red fescue (*Festuca rubra*).

The historical natural disturbance for this ecological site was fire, which limited the establishment and encroachment of conifer trees. Landslides may occur along the steep coastal hillslopes. Unnatural disturbances include grazing, urban sprawl, and establishment of non-native species.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Arctostaphylos uva-ursi* (2) *Empetrum nigrum*
Herbaceous	(1) *Solidago canadensis* (2) *Lomatium martindalei*

Physiographic features

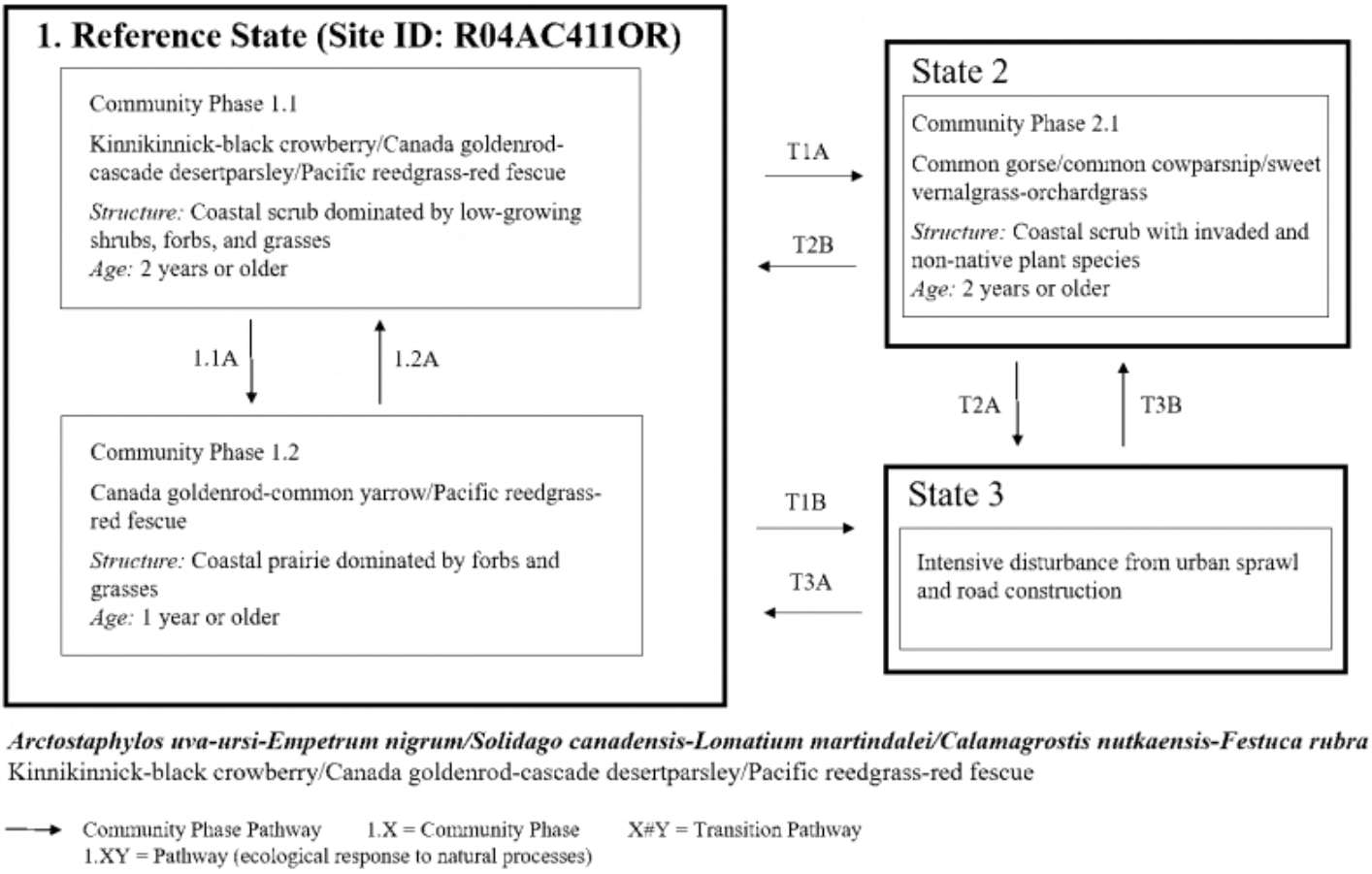
Climatic features

Influencing water features

Soil features

Ecological dynamics

State and transition model



State 1
Reference

Community 1.1
Kinnikinnick, Black Crowberry, Canada Goldenrod, Cascade Desertparsley, Pacific Reedgrass, and Red Fescue

Structure: Coastal scrub dominated by low-growing shrubs, forbs, and grasses The reference community is a mature coastal scrubland that has a mosaic of dwarfed shrubs, forbs, and grass. Areas vary in size and maturity depending on the position on the landscape, prevailing wind, and slope. The vegetation is tolerant of routine inputs of salt spray and drought in summer. This community represents a lack of major disturbance and unnatural modifications. The vegetation may fluctuate from sparse to full cover. The most common shrub species include multiple Arctostaphylos species, including kinnikinnick (*Arctostaphylos uva-ursi*), pinemat manzanita (*Arctostaphylos nevadensis*), and hairy manzanita (*Arctostaphylos columbiana*). Dwarfed salal (*Gaultheria shallon*), black crowberry (*Empetrum nigrum*), common juniper (*Juniperus communis*), salmonberry (*Rubus spectabilis*), and evergreen huckleberry (*Vaccinium ovatum*) may be present. The herb layer typically is diverse and covers the majority of the site. The most common species include Canada goldenrod (*Solidago canadensis*), cascade desertparsley (Lomatium matindalei), common cowparsnip (*Heracleum maximum*), coastal manroot (*Marah oreganus*), coastal wormwood (*Artemisia suksdorfii*), western brackenfern (*Pteridium aquilinum*), western swordfern (Polystitum munitum), beach strawberry (*Fragaria chiloensis*), false lily of the valley (*Maianthemum dilatatum*), Douglas iris (*Iris douglasiana*), and common yarrow (*Achillea millefolium*). Grasses include Pacific reedgrass (*Calamagrostis nutkaensis*) and red fescue (*Festuca rubra*).

Community 1.2
Canada goldenrod, Common Yarrow, Pacific Reedgrass, and Red Fescue

Structure: Coastal prairie dominated by forbs and grasses Community phase 1.2 represents a plant community that has been affected by fire and is at the initiation phase of regeneration. Grasses and herbaceous species recover very rapidly following disturbance. The cover may return to 100 percent within the first growing season if a seed source is available and moisture conditions are suitable. Common yarrow is a successful early colonizer on recently disturbed sites, but it will decrease in prominence as the vegetation fully recovers. Minimizing disturbance (natural and unnatural) is important for the vegetative recovery of the site. Monitoring for establishment of non-native species is imperative for a successful native plant community.

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents a major disturbance from a fire that removes most, if not all, of the existing vegetation.

Pathway 1.2A
Community 1.2 to 1.1

This pathway represents a transition toward a mature community as described for the reference state.

State 2
Altered

Community 2.1
Common Gorse, Common Cowparsnip, Giant Vetch, Sweet Vernalgrass, and Orchardgrass

Structure: Coastal scrub with invaded and non-native plant species Community phase 2.1 represents a plant community that has been susceptible to an influx of non-native species as a result of grazing. Common gorse (*Ulex europaeus*) and Scotch broom (*Cytisus scoparius*) are invasive species that are particularly successful at colonizing in disturbed environments. Introduced grasses such as sweet vernalgrass (*Anthoxanthum odoratum*), common velvetgrass (*Holcus lanatus*), and orchardgrass (*Dactylis glomerata*) may be established for forage, and they have the potential to inhibit establishment of native bunchgrass and forbs (Ripley, 1984). Some remnant native species are likely to remain as part of this community; however, the richness and diversity of those species is likely to be reduced as non-native and invasive species increase in prominence.

State 3
Developed

This state represents a full departure from the native reference state as a result of human-caused disturbances. Urban sprawl and construction of roadways will increase the susceptibility to non-native species, restrict natural disturbances, and reduce habitat.

Transition T1A
State 1 to 2

This pathway represents a major disturbance from a high intensity grazing management system. This disturbance restricts establishment of most, if not all, of the existing native vegetation. This pathway also represents a transition from a native plant community to a non-native, invaded plant community. Non-native seed disbursement is introduced (intentionally or unintentionally), which alters the reference community.

Transition T1B
State 1 to 3

This pathway represents a human-influenced disturbance from urban sprawl or other development or from excessive use of recreational off-road vehicles. The stabilized dunes and habitat are diminished or completely lost.

Transition T2B
State 2 to 1

This pathway represent restoration of the native plant community. It is extraordinarily difficult to successfully remove non-native and invasive species once they are established. Native seed sources and extensive management and mitigation of brush and non-native species are needed to restore the community.

Transition T2A
State 2 to 3

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

Transition T3A
State 3 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.

Transition T3B
State 3 to 2

This pathway represents removal of man-made structures. Non-native seed disbursement is introduced (intentionally or unintentionally), which changes the reference 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:**