Ecological site AX004A01X404
Isomesic Aquic Forest

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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 area consists of a long and narrow band of marine terraces, coastal estuaries, sand dunes, low relief hills, and mountain slopes that parallels the Pacific Ocean. This area is entirely within the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. In Washington, this area ranges in elevation from sea level to a maximum of 1800 feet (550 meters) inland. The portion of this area in northern Washington consists primarily of glacial deposits, with some scattered young Tertiary sedimentary rocks. The climate is cool and moist, with minimal changes between seasons. Summer temperatures are moderated by the proximity of cool ocean water and fog. Sitka spruce forests are characteristic of this area. The average annual precipitation is 52 to 60 inches (1,320 to 1,525 millimeters) near the beach and can be as much as about 150 inches (3,800 millimeters) at the higher elevations along the inland edge of the MLRA. Most of the rainfall occurs during low-intensity, Pacific frontal storms. Precipitation is evenly distributed throughout fall, winter, and spring; summers are cool and dry. Snowfall accumulation is rare on the ocean side of this area, but some snowfall occurs along the eastern boundary. This area lies within the coastal fog belt zone, and heavy fogs are common in summer. Supplemental moisture is provided by fog condensation. Dominant soil orders in this MLRA are Andisols, Inceptisols, Spodosols, and Entisols.

Ecological site concept

Isomesic Aquic Forest sites occur on depressions and swales on colluvial aprons in the isomesic fog belt. These sites receive run-on water from adjacent Isomesic Udic Forest, Isomesic Udic Moist Forest, Isomesic Udic Alluvial Terrace Forest, and Isomesic Udic Floodplain Forest sites. Additional run-on water causes these sites to occasionally or frequently pond. The somewhat poorly drained soils on this site support distinctive hydrophytic vegetation, such as devilsclub (Oplopanax horridus) and American skunkcabbage (Lysichiton americanus). Isomesic Aquic Forest sites are characterized by an overstory of Sitka spruce (Picea sitchensis) and western hemlock (Tsuga heterophylla), accompanied by an understory shrub community of salmonberry (Rubus spectabilis) and California huckleberry (Vaccinium ovatum). The herbaceous layer is primarily dominated by American skunkcabbage (Lysichiton americanus), common ladyfern (Athyrium filix-femina), and deer fern (Blechnum spicant). Abundance of western redcedar (Thuja plicata) is generally higher on this site than on adjacent sites.

Associated sites

AX001X01X200	**Temperate Wet Meadow** Temperate Wet Meadows may be found in mosaic with Isomesic Aquic Forest sites. Temperate Wet Meadows lack tree cover and are more frequently ponded.

Similar sites

AX001X01X004	**Mesic Aquic Forest** Mesic Aquic Forest sites are found at higher elevations and are indicated by the lack of Sitka spruce (Picea sitchensis).

AX001X01X108	**Frigid Aquic Forest** Frigid Aquic Forest sites are found at much higher elevations and support Pacific silver-fir (Abies amabilis).

Table 1. Dominant plant species

Tree	(1) *Picea sitchensis* (2) *Tsuga heterophylla*
Shrub	(1) *Rubus spectabilis* (2) *Vaccinium ovatum*
Herbaceous	(1) *Lysichiton americanus* (2) *Athyrium filix-femina*

Legacy ID

F004AA404WA

Physiographic features

This site primarily occurs on colluvial aprons on mountains. Isomesic Aquic Forest sites are found in topographic depression positions and receive a significant amount of run-on water from upslope sites.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Colluvial apron
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Very rare to rare
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	50 – 300 m
Slope	0 – 20 %
Water table depth	0 – 40 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

This site occurs in an isomesic temperature and aquic moisture regime. Precipitation arrives mostly via low-intensity, Pacific frontal storms. Precipitation mostly falls as rain, but some snowfall occurs along the eastern boundary of the area. Precipitation is evenly distributed throughout the fall, winter, and spring, while summers are dry. Heavy fog is very common in the summer, contributing supplemental moisture. The frost-free period of this area is strongly tied to ocean proximity; the eastern edge of the area has a significantly shorter growing season than the western edge. There is relatively little seasonal variation in air temperature due to Pacific ocean influence.

Table 3 Representative climatic features

Frost-free period (characteristic range)	180-240 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	2,010-3,000 mm

Influencing water features

Isomesic Aquic Forest sites occasionally pond and have high water tables throughout the growing season. Plants must be adapted to anaerobic growing conditions.

Soil features

The soils are very deep, have very high or high Ksat throughout, and are somewhat poorly drained. The soils are formed in mixed alluvium or colluvium derived from metasedimentary rock. The soil surface texture ranges from silt loam to loam. Clay content is eight to 17 percent throughout. The soil series for this ecological site is Rica. Although representative of this site, these soils may exist across multiple ecological sites because of naturally variable slope, texture, rock fragments, and pH. An on-site soil pit and the most current ecological site key are necessary to classify a site.

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Colluvium – metasedimentary rock
Surface texture	(1) Silt loam (2) Loam
Drainage class	Somewhat poorly drained
Soil depth	150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	0 – 10 %

Available water capacity (0-101.6cm)	20 – 20.07 cm
Soil reaction (1:1 water) (0-25.4cm)	4.5 – 5.5
Subsurface fragment volume <=3" (0-50.8cm)	0 – 10 %
Subsurface fragment volume >3" (0-50.8cm)	0 – 10 %

Ecological dynamics

Plant community dynamics on this site are primarily driven by a high water table which persists at or near the surface for much of the growing season. This site may also experience occasional ponding. Hydrophytic understory species dominate on this site. Conifers may not tolerate saturated soil conditions and are often limited to growing on higher elevation microsites or on nurse logs. Trees on this site are especially vulnerable to windthrow due to their shallow rooting depth. The high water table restricts the number and depth of sinker roots. Fallen trees create small canopy openings that allow sunlight to penetrate to the forest floor, promoting understory species productivity. High intensity coastal storms may generate stand replacing windthrow events. Fire occurs very infrequently on this site, on average once every 100 to 1,000 years (FEIS, 2012). High soil moisture and poor fuel conditions hinder fire. When wildfire does occur, it is likely to be during prolonged periods of drought and to be stand-replacing.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Other references

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Approval

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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	05/13/2025
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):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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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:

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

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
