Ecological site AX001X01X002
Mesic Udic Flood Plain 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): 001X–Northern Pacific Coast Range, Foothills, and Valleys

This area consists of a long and narrow range of mountains with associated foothills and valleys that parallels the Pacific Ocean. This area is entirely within the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. MLRA 1 is bounded on the north by the highest elevations of the Olympic Mountains and the strait of Juan de Fuca, and by the Klamath Mountains on the south. The Washington portion of this MLRA is primarily composed of young Tertiary sedimentary rocks (siltstone and sandstone) mixed with some volcanic rocks of the same age. Glacial till and outwash deposits are also found in the northern half of this area in Washington. Much of this area is accreted terrane formed by tectonic processes. The average annual precipitation ranges from 60 to 200 inches (1,525 to 5,580 millimeters), increasing with elevation. Most of the precipitation in this area occurs during low-intensity, Pacific frontal storms and is evenly distributed throughout fall, winter, and spring. The dominant soil orders in this MLRA are Andisols, Inceptisols, and Ultisols. Soil depths broadly range from shallow to very deep. Soils are primarily well drained, however poorly drained soils may be found in depressional areas and on alluvial flood plains. Surface textures are typically medial and loamy or clayey. Soils in this area dominantly have a mesic or frigid temperature regime and a udic moisture regime. Soils with aquic moisture regimes and cryic temperature regimes also occur.

Ecological site concept

Mesic Udic Flood Plain Forest sites occur on low terraces in river valleys. These sites are rarely flooded, i.e., the average probability of flooding is between one and five percent for every year. Mesic Udic Flood Plain Forests are characterized by a dense overstory of western hemlock (Tsuga heterophylla) and bigleaf maple (Acer macrophyllum). Western hemlock is a shade-tolerant species, and may continually regenerate in the shaded understory, but deciduous tree regeneration is generally limited to canopy gaps. The understory shrub layer is dominated by salmonberry (Rubus spectabilis) and vine maple (Acer circinatum). The forb layer is typically composed of western swordfern (Polystichum munitum), small enchanter's nightshade (Circaea alpina), threepetal bedstraw (Galium trifidum), redwood-sorrel (Oxalis oregana), and coastal hedgenettle (Stachys cooleyae).

Associated sites

F004AA001WA	**Udic Flood Plain Forest** Isomesic Udic Flood Plain Forests occur at lower elevations in the Sitka Spruce belt. Isomesic Udic Flood Plain Forests are readily distinguished by the presence of Sitka spruce (Picea sitchensis).

Similar sites

AX001X01X003	**Mesic Udic Alluvial Terrace Forest** Mesic Udic Alluvial Terraces occur on higher terraces above Mesic Udic Flood Plain Forests. Plant communities in Mesic Udic Alluvial Terrace Forests more closely resemble those of upland forests.

AX001X01X001	**Temperate Flood Plain Shrubland** Temperate Flood Plain Shrublands occur between stream channels and adjacent Mesic Udic Flood Plain Forest sites. Temperate Flood Plain Shrublands have higher shrub cover versus tree cover than Mesic Udic Flood Plain Forests.
AX001X01X200	**Temperate Wet Meadow** Temperate Wet Meadow sites occur on depressions and seeps adjacent to or surrounded by Mesic Udic Flood Plain Forests. Temperate Wet Meadow sites lack tree cover.

Table 1. Dominant plant species

Tree	(1) *Tsuga heterophylla* (2) *Acer macrophyllum*
Shrub	(1) *Rubus spectabilis* (2) *Acer circinatum*
Herbaceous	(1) *Polystichum munitum* (2) *Circaea alpina*

Legacy ID

F001XA002WA

Physiographic features

This site primarily occurs on terraces on river valleys. Mesic Udic Flood Plain Forest sites occur on higher flood plain positions and low alluvial terraces. These sites only flood occasionally. As a result, these flood plain forest sites support mature trees and are not subject to as frequent severe disturbance from intense flood events.

Table 2. Representative physiographic features

Landforms	(1) River valley > Terrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	100 – 500 m
Slope	0 – 20 %
Water table depth	150 cm

Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

This site occurs in a mesic temperature regime, and udic moisture regime. Precipitation arrives mostly via low-intensity, Pacific frontal storms. Precipitation is unevenly distributed, with the lowest amounts on the leeward side of the Coast Range mountains. Precipitation falls largely as snow in higher elevations. Precipitation is evenly distributed throughout the fall, winter, and spring, while summers are dry. Air temperatures vary significantly along the elevation gradient.

Table 3 Representative climatic features

Frost-free period (characteristic range)	180-240 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	1,750-2,740 mm

Influencing water features

This site occurs along stream channels. Mesic Udic Flood Plain Forest sites are subject to rare or occasional, brief flooding. Flooding intensity varies along with interannual variation in precipitation amounts.

Soil features

The soils that support this ecological site occur in the mesic soil temperature regime and the udic soil moisture regime. Lowdivide soils are well drained, very deep, formed from mixed geology alluvium, and are found on alluvial terraces in river valleys. Saturated hydraulic conductivity is high or very high throughout. These soils have occasional or rare flooding potential in January, February, March, and April. These soils have a texture of silt loam or loam in the upper 20 to 30 inches, and loamy sand or sand with greater than 35 percent rock fragments below that. Flooding frequency is a limiting factor for plant growth. 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
Surface texture	(1) Silt loam (2) Loam (3) Sandy loam
Drainage class	Well drained
Depth to restrictive layer	150 cm
Surface fragment cover <=3"	0 – 10 %

Surface fragment cover >3"	Not specified
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

Plant community dynamics of Mesic Udic Flood Plain Forest sites are driven primarily by the frequency and intensity of flooding events. Alpine snowmelt from high elevation generates large amounts of water and may result in high-intensity flood events. Rarely, flood waters will exceed the capacity of the flood plain and will breach the terrace riser. This ecological site is situated in the transition zone between flood plain shrublands and upland forests. Dominant species in the reference community are generally tolerant of rare flooding events.

High force windstorms are a major source of large-scale disturbance to these riparian forests. Blowdown events are often severe and may be stand replacing. (Van Pelt, 2007). Wildfires are an additional source of disturbance, though they occur much less frequently. The fire regime of this forest type is characterized by infrequent, severe fire events. The fire return interval is very high, 100 to nearly 1,000 years (FEIS, 2012). Major 100 to 500-year flood events may remove litter and scour the mineral soil surface. Windstorms, intense floods, and stand-replacing fire events are all capable of inducing high woody species mortality on these sites. The removal of overstory species will generally favor the regeneration of shade-intolerant species in the aftermath of extreme disturbance events. Stand-replacing disturbance events provide a major source of instream wood recruitment in these riparian systems (Martens et al., 2020).

In the immediate aftermath of a major disturbance event, willow species (Salix spp.) are generally the first to recruit to the site. The most common willow species found on this site are Scouler’s willow (Salix scouleriana) and Sitka willow (Salix sitchensis). Along with willow the sparse understory of the early seral stage consists primarily of western swordfern (Polystichum munitum) and stinging nettle (Urtica dioica). Within a few years, red alder (Alnus rubra) and black cottonwood (Populus balsamifera ssp. trichocarpa) will recruit to the site. As time passes, Western hemlock (Tsuga heterophylla) and bigleaf maple (Acer macrophyllum) will begin to regenerate in the understory. At this point, the forest consists of a single-story canopy with a diminished understory. Western hemlock and bigleaf maple will eventually replace black cottonwood and red alder as the dominant tree species. Individual tree mortality due to windthrow and continual shade-tolerant species regeneration creates a varied-age stand with small canopy gaps.

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 (%)

Table 8. Community 1.4 plant community composition

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

Table 9. Community 1.5 plant community composition

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

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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	09/24/2026
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:**