Ecological site AX001X04X001
Mesic Udic Riparian Forest

Last updated: 5/07/2024
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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 long and narrow resource area stretches along the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. The area is bounded by the Olympic Mountains on the north and the Klamath Mountains on the south. Most of the area consists of hills and low mountains with gentle to steep slopes. The parent materials are composed primarily of young Tertiary sedimentary rocks with some minor volcanic rocks. Glacial till and outwash deposits are found in the northern half of the area within Washington. In the far southern portion of the area, near the Klamath Mountains, the sedimentary rocks are older and some have been metamorphosed. The average annual precipitation ranges from 60 to 200 inches, increasing with elevation.
The dominant soil orders in this MLRA are Andisols, Inceptisols, and Ultisols. Soil depth ranges from shallow to very deep. While most soils in the area are well drained and occur on foothills, mountain slopes and ridges, floodplain and depressional soils can range from well drained to very poorly drained. Soil textures are typically medial, loamy, or clayey. The dominant soils in the area have a mesic or frigid soil temperature regime and a udic soil moisture regime; however, soils with an aquic soil moisture regime or cryic soil temperature regime do occur.

LRU notes

The Southern Pacific Coast Range land resource unit (LRU 4) of MLRA 1 is located in central to southern Oregon State. The LRU extends from the Siletz River to the Rogue River and is bounded on the west by MLRA 4a Sitka Spruce Belt and MLRA 2 Willamette and Puget Sound Valleys to the east. Several major rivers carved valleys through the landscape depositing more recent alluvium. These include the Alsea, Coos, Coquille, Green, Yachats, Siletz, Siuslaw, Umpqua, and Rogue Rivers.

Ecological site concept

This ecological site is found on the western Coast Range in the Pacific Northwest from central to southern Oregon. It is found at low to middle elevations in narrow to wide riparian corridors on moderate to steeper gradient streams. These areas are subject to stream overflow. Riparian ecological sites typically differ in topography, vegetation, geomorphology, and microclimate from the surrounding uplands of the forest ecosystem (Dwire, 2003).
The most common overstory species are bigleaf maple (Acer macrophyllum), red alder (Alnus rubra), and cascara (Frangula purshiana). California laurel (*Umbellularia californica*), tanoak (Notholithocarpus desiflorus), and California live oak (*Quercus chrysolepis*) occur south of the Alsea River, at times quite prolifically (Pabst, 1999). Black cottonwood (Populus balsamifera spp. trichocarpa) is not present, or less than 5% cover. Douglas-fir (Pseudotsuga menziesii) is the most common conifer component, but typically limited to less than 25% cover (Hibbs, 2000). Regeneration is restricted by canopy cover and often limited to gaps where sunlight is most available and mineral soil is exposed from scouring (Pabst, 1999). Understory species diversity is greatest near the streams as a result of erosion and deposition creating openings for opportunistic species as well as the abundance of microsites which create unique environments (Spies, et. al, 2002). Common understory species include salmonberry (Rubus spectabilis), stink currant (Ribes bracteosum), thimbleberry (Rubus parviflorus), elderberry (Sambucus racemosa), vine maple (Acer circinatum), western swordfern (Polystichum munitum), and Oregon oxalis

(Oxalis oregana).
The most common natural disturbance is flooding, with the volume and longevity of the flooding determining the effect on the dynamics of the forest. Although wildfire is uncommon in this ecological site (greater than 450-year return interval) when it does occur, it may be stand replacing (Balian, 2005). Fallen trees with exposed root systems and large woody debris is common.

Associated sites

AX001X04X002	**Mesic Udic Flood Plain Forest** Mesic Udic Flood Plain Forest is located in broad flood plain corridors of large river systems. Mesic Udic Riparian Forest is often found along the tributaries that lead to Mesic Udic Flood Plain Forest river systems.

Table 1. Dominant plant species

Tree	(1) *Acer macrophyllum* (2) *Alnus rubra*
Shrub	(1) *Rubus spectabilis* (2) *Rubus parviflorus*
Herbaceous	(1) *Polystichum munitum* (2) *Oxalis oregana*

Legacy ID

F001XD001OR

Physiographic features

This ecological site is found at low to middle elevations in narrow to wide riparian corridors on moderate to steeper gradient streams.

Table 2. Representative physiographic features

Landforms	(1) River valley > Flood plain (2) River valley > Stream terrace
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	3–366 m
Slope	0–3%
Water table depth	0–183 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The climate has hot, moist summers and warm, wet winters. Mean annual precipitation ranges from 60 to 130 inches. Snowfall is rare, but when it does occur, is not persistent. Mean annual temperatures range from 44 to 54 degrees F (PRISM Climate Group, 2019). The mild temperatures, abundant precipitation, and long growing season result in highly productive forestlands.

Table 3. Representative climatic features

Frost-free period (characteristic range)	145-265 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	1,524-3,302 mm

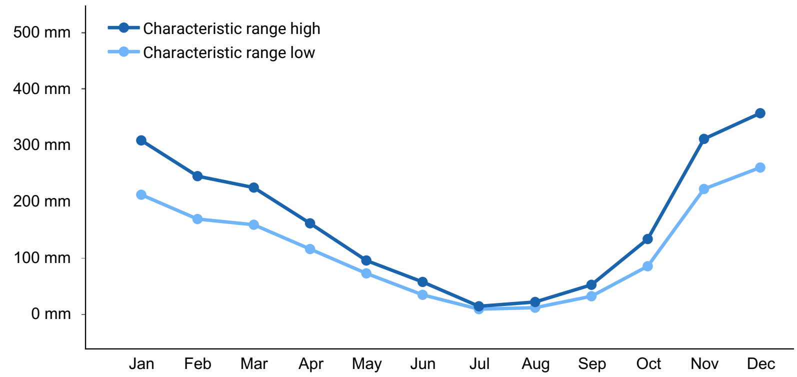


Figure 1. Monthly precipitation range

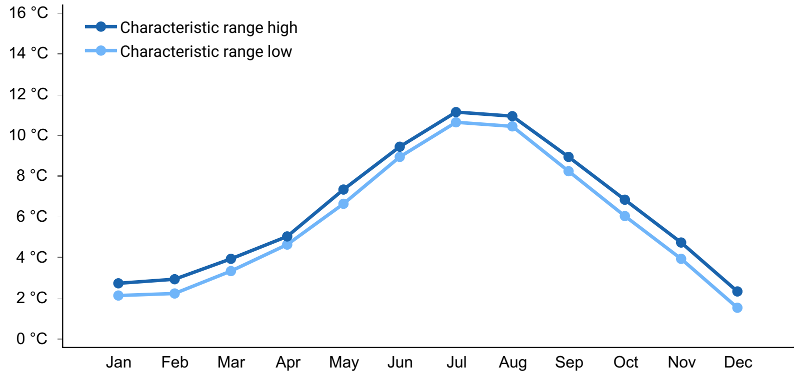


Figure 2. Monthly minimum temperature range

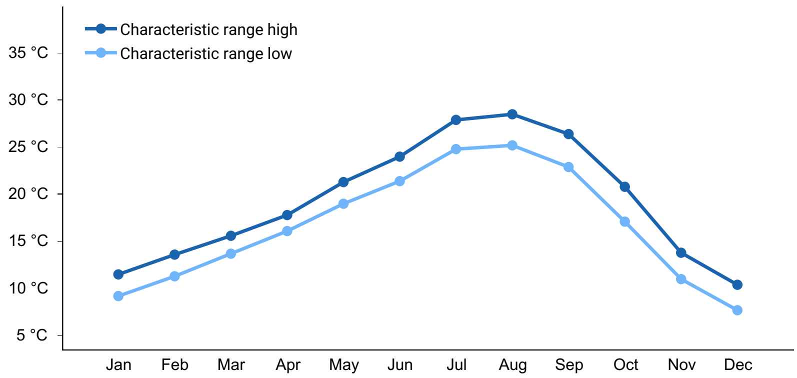


Figure 3. Monthly maximum temperature range

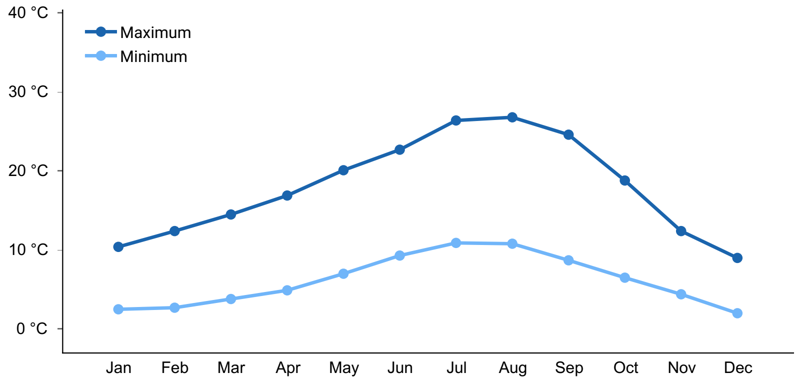


Figure 4. Monthly average minimum and maximum temperature

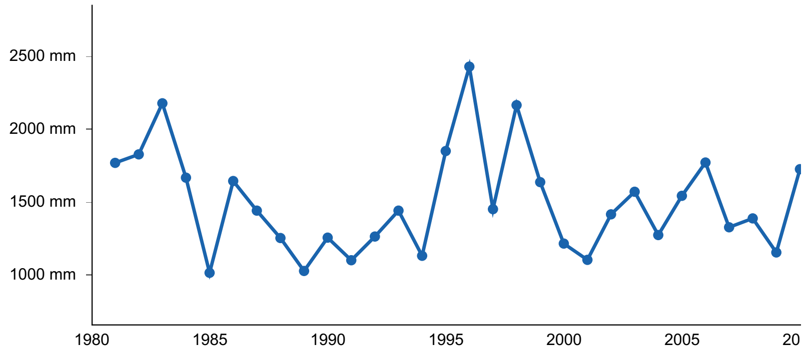


Figure 5. Annual precipitation pattern

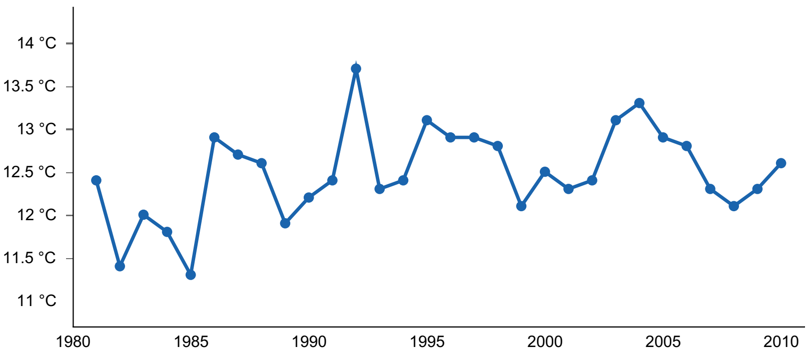


Figure 6. Annual average temperature pattern

Climate stations used

- (1) POWERS [USC00356820], Powers, OR
- (2) ELKTON 3 SW [USC00352633], Elkton, OR
- (3) ALSEA FH (FALL CREEK) [USC00350145], Alsea, OR

Influencing water features

This site does not experience ponding. Flooding frequency is rare to frequent, and 100 or 500-year floods may dramatically alter the landscape.

Soil features

Soils that support this ecological site occur in the mesic soil temperature regime and the udic soil moisture regime. They are formed in alluvium on flood plain step and steam terrace positions. Soil moisture is not a limiting factor to forest growth due to the abundance of precipitation and summer fog. These soils are typically subject to flood events from November to April. The smaller, more frequent flood events typically only cause minor scouring in comparison with greater-magnitude 100- to 500-year floods. Soils of this ecological site are weakly developed Inceptisols due to their young age and association with active floodplains.

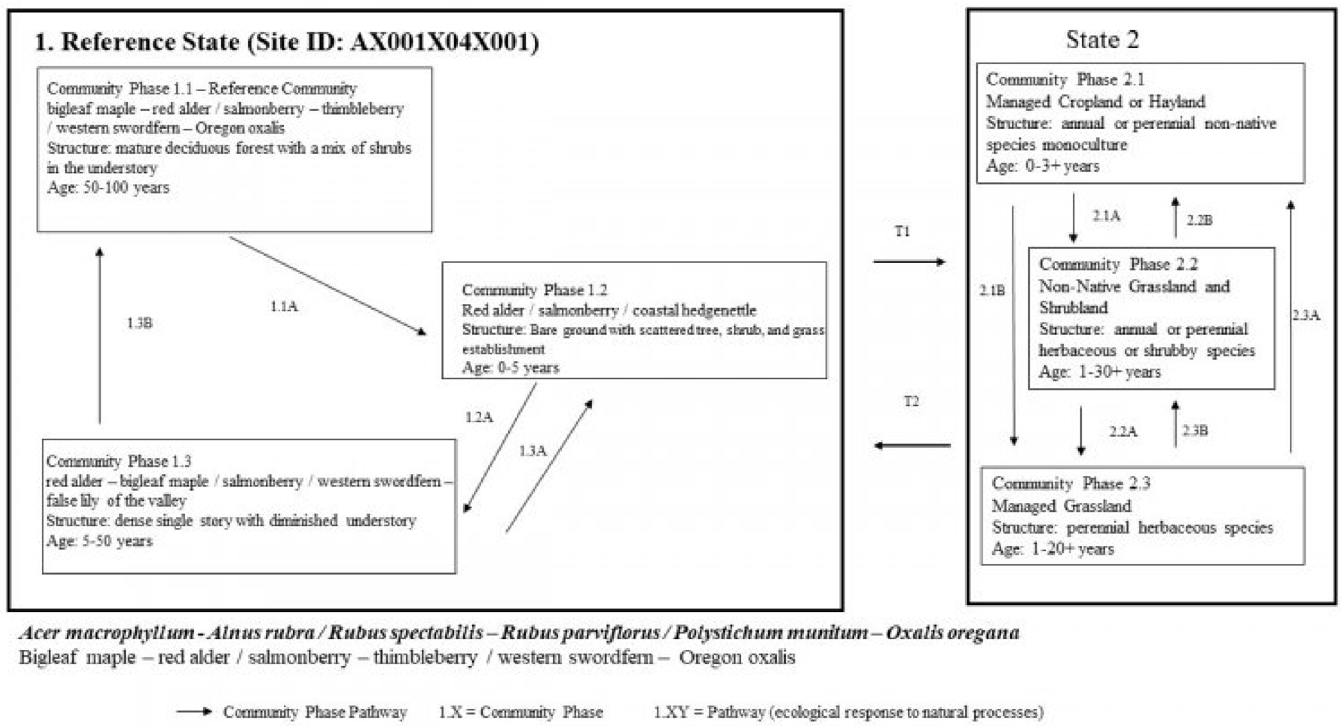
Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock (2) Alluvium–sandstone and siltstone
Surface texture	(1) Silt loam (2) Loam
Drainage class	Poorly drained to well drained
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Clay content (0-20.3cm)	11–24%
Subsurface fragment volume <=3" (2.5-152.4cm)	0–5%
Subsurface fragment volume >3" (2.5-152.4cm)	0%

Ecological dynamics

State and transition model



State 1
Reference State

Community 1.1
Bigleaf maple – red alder / salmonberry – thimbleberry / western swordfern – Oregon oxalis

Bigleaf maple – red alder / salmonberry – thimbleberry / western swordfern – Oregon oxalis Structure: mature deciduous forest with a mix of shrubs in the understory Bigleaf maple and red alder are the most dominant overstory species in the reference community. California laurel (*Umbellularia californica*), tanoak (Notholithocarpus desiflorus), and California live oak (*Quercus chrysolepis*) occur south of the Alsea River, at times quite prolifically (Pabst, 1999). Douglas-fir may also represent a portion of the overstory, however the frequency of flooding lends to hardwood regeneration. Conifer regeneration will increase in abundance further from the active stream channel (Wimberly, 2001). Regeneration is restricted by canopy cover and often limited to gaps where sunlight and exposed mineral soil is most available. The reference community represents a lack of major flooding for at least 75 years, allowing the pioneering species to form a mature canopy. The lack of flooding also allows the growth of a robust understory of shrubs including salmonberry, vine maple, stink currant, thimbleberry, and snowberry (*Symphoricarpos albus*). Forbs such as western swordfern, false lily of the valley (*Maianthemum dilatatum*), ladyfern (*Athyrium filix-femina*), and Oregon oxalis are also common. Common disturbances include small gap dynamics (1/2 acre openings or smaller) following the decline of the red alder canopy, minor scouring from flooding, and mass movement. Soil deposition following minor scouring from smaller scale and periodic flooding temporarily affects the understory community, but it does not alter the composition of the overstory. In addition, beaver (Castor canadensis) activity can by a significant driver in small scale disturbances, hydrologic morphology, and contribute to large woody debris in riparian edges and corridors.

Dominant plant species

- bigleaf maple (*Acer macrophyllum*), tree
- red alder (*Alnus rubra*), tree
- California laurel (*Umbellularia californica*), tree
- tanoak (*Notholithocarpus densiflorus*), tree
- canyon live oak (*Quercus chrysolepis*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- Cascara buckthorn (*Frangula purshiana*), tree
- salmonberry (*Rubus spectabilis*), shrub
- thimbleberry (*Rubus parviflorus*), shrub
- common snowberry (*Symphoricarpos albus*), shrub
- vine maple (*Acer circinatum*), shrub
- stink currant (*Ribes bracteosum*), shrub
- red elderberry (*Sambucus racemosa*), shrub
- western swordfern (*Polystichum munitum*), other herbaceous
- redwood-sorrel (*Oxalis oregana*), other herbaceous
- common ladyfern (*Athyrium filix-femina*), other herbaceous
- false lily of the valley (*Maianthemum dilatatum*), other herbaceous

Community 1.2
Red alder / salmonberry / coastal hedgenettle

Red alder / salmonberry / coastal hedgenettle Structure: Bare ground with scattered tree, shrub, and grass establishment Community phase 1.2 represents a riparian forest that is undergoing regeneration or stand initiation immediately following flooding disturbance. The soil surface is gravelly and highly variable depending on the intensity, frequency, and aggradation of the flooding event (Fonda, 1974). There may be scattered remnant mature trees in some areas and an abundance of woody debris. Successful regeneration is dependent on the local seed source, adequate seed bed, and sufficient light and water (Nierenberg, 2000). Red alder has several competition advantages and can establish quickly, relative to conifers. Red alder can sprout and establish in full sunlight and fixes nitrogen in poorly developed alluvial soils providing an early competitive advantage (Villarin, 2009). In addition, the deciduous species seeds are light and can be transported long distances by wind and water, allowing for rapid recolonization. Salmonberry and coastal hedgenettle (Stacys chamissonis) are often established within this community phase.

Dominant plant species

- red alder (*Alnus rubra*), tree
- salmonberry (*Rubus spectabilis*), shrub
- coastal hedgenettle (*Stachys chamissonis*), other herbaceous

Community 1.3
Red alder – bigleaf maple/ salmonberry / western swordfern – false lily of the valley

Red alder – bigleaf maple/ salmonberry / western swordfern – false lily of the valley Structure: dense single story with diminished understory Community phase 1.3 is an early seral forest in regeneration, possibly with scattered remnant mature trees. There is increased competition among individual trees for available water, light, and nutrients. Red alder tends to dominate the overstory, however red alder will begin to die between 40-70 years following disturbance and allow more light to penetrate the newly nitrogen rich soil (Naiman, 2009). If there is a presence of red alder regeneration within this community phase, it may be inferred that frequent minor flooding has been influencing site dynamics (Nierenberg, 2000). Shade tolerant forbs such as western swordfern and false lily of the valley establish during this phase.

Dominant plant species

- red alder (*Alnus rubra*), tree
- bigleaf maple (*Acer macrophyllum*), tree
- salmonberry (*Rubus spectabilis*), shrub
- false lily of the valley (*Maianthemum dilatatum*), other herbaceous
- western swordfern (*Polystichum munitum*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents a stand replacing wildfire, catastrophic windstorm, a major 100 or 500-year flood event, or mass movement which scours the stream channel, removes understory and overstory vegetation, and may alter the stream flow. This type of disturbance may completely reconfigure sediment loads and dramatically reduce or eliminate the forest overstory.

Pathway 1.2A
Community 1.2 to 1.3

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

Pathway 1.3B
Community 1.3 to 1.1

Red alder – bigleaf maple/ salmonberry / western swordfern – false lily of the valley

Bigleaf maple – red alder / salmonberry – thimbleberry / western swordfern – Oregon oxalis

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

Pathway 1.3A
Community 1.3 to 1.2

This pathway represents a stand replacing wildfire, catastrophic windstorm, a major 100 or 500-year flood event, or mass movement which scours the stream channel, removes understory and overstory vegetation, and may alter the stream flow. This type of disturbance may completely reconfigure sediment loads and dramatically reduce or eliminate the forest overstory.

State 2
Converted State

Community 2.1
Managed Cropland or Hayland

Managed Cropland or Hayland Structure: Annual or perennial non-native species Community Phase 2.1 may consist of a range of crops, including annually planted species, short-lived perennials, and more permanent shrubby crops. Hayland and grass-legume silage crops are also included in this community phase.

Community 2.2
Non-Native Grassland and Shrubland

Non-Native Grassland and Shrubland Structure: Annual or perennial herbaceous or shrubby species Community phase 2.2 is characterized by a low level of agronomic or management inputs such as added fertility, intensive grazing management, regular mowing or weed control. This plant community is often dominated by introduced weedy species. Sites with extremely low fertility or heavy grazing pressure will have a higher proportion of annual, stoloniferous or rhizomatous species. Wetland areas are often dominated by non-native rhizomatous grasses. This plant community can include remnants of commonly seeded introduced pasture species.

Community 2.3
Managed Grassland

Managed Grassland Structure: perennial herbaceous species Community phase 2.3 receives regular agronomic inputs, including adding soil nutrients and other soil amendments such as lime, implementing grazing management plans, regular mowing, controlling weeds, and reseeding as needed. This plant community typically includes introduced perennial pasture and hay species that commonly are seeded. In areas of historic native grassland, mixtures of perennial and annual native species may be seeded and managed by appropriate agronomic and livestock management activities. Minor amounts of introduced species that commonly are in non-native grassland and shrubland communities (community phase 2.2) are in this phase.

Pathway 2.1A
Community 2.1 to 2.2

In the absence of the following agronomic and livestock management activities, seeds from surrounding weedy plant communities will be transported to the site through factors such as wind, flood water, animals or vehicle traffic where adapted species will become established. Management activities could include tillage, addition of significant fertility or other soil amendments such as lime, mowing, burning, harvest or chemical control of vegetation, planting the site to desirable herbaceous species and implementation of grazing management plans.

Pathway 2.1B
Community 2.1 to 2.3

Agronomic and livestock management activities such as tillage, addition of significant fertility or other soil amendments such as lime, mowing, burning, harvest or chemical control of vegetation, planting the site to desirable herbaceous species and implementation of grazing management plans.

Pathway 2.2B

Community 2.2 to 2.1

Agronomic activities such as tillage, addition of significant fertility or other soil amendments such as lime, mowing, burning, harvest or chemical control of vegetation, and planting the site to desirable crop species.

Pathway 2.2A
Community 2.2 to 2.3

Agronomic and livestock management activities such as tillage, addition of significant fertility or other soil amendments such as lime, mowing, burning, harvest or chemical control of vegetation, planting the site to desirable herbaceous species and implementation of grazing management plans.

Pathway 2.3A
Community 2.3 to 2.1

Agronomic activities such as tillage, addition of significant fertility or other soil amendments such as lime, mowing, burning, harvest or chemical control of vegetation, and planting the site to desirable crop species.

Pathway 2.3B
Community 2.3 to 2.2

In the absence of the following agronomic and livestock management activities, seeds from surrounding weedy plant communities will be transported to the site through factors such as wind, flood water, animals or vehicle traffic where adapted species will become established. Management activities could include tillage, addition of significant fertility or other soil amendments such as lime, mowing, burning, harvest or chemical control of vegetation, planting the site to desirable herbaceous species and implementation of grazing management plans.

Transition T1
State 1 to 2

This pathway represents a change in land use. Land management changes include modifications to the hydrologic function to develop pasture and agriculture. Non-native seed disbursement is introduced (intentionally or unintentionally) which alters the reference community.

Transition T2
State 2 to 1

This pathway represents a transition to restore the natural hydrologic function and native plant habitat. Native seed sources are necessary to restore the community as well as extensive brush and invasive species management and mitigation.

Additional community tables

Inventory data references

Other Established Classifications for Ecological Site

National Vegetation Classification Group: G851 North Central Pacific Lowland Riparian Forest and Woodland Group and the A3745 Bigleaf Maple – Red Alder Riparian Forest Alliance

Other references

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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	12/16/2021
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:**

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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:**
