

Ecological site F220XY327AK Maritime Forest Gravelly Alluvial Fan

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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.

Ecological site concept

This is a high gradient floodplain ecosite located on alluvial fans. Alluvial Fans are typically found where steep mountain drainages emerge onto flatter plains. As the stream gradient decreases, it drops its coarse-grained sediment load. This reduces the capacity of the channel to transmit water and forces the stream to change direction this is known as channel avulsion. As the channel moves back and forth across the fan depositing its load it gradually builds up a mounded, shallow conical fan shape.

Three different land form segments have been identified on this ecosite: 1) the active channel, 2) adjacent floodplain, and 3) the fan terrace. The active channels are the current conduits for the stream to flow down the fan, during periods of high rainfall or snow melt these areas may experience some localized flooding which affects the fans floodplains. The majority of the spatial extent of the alluvial fan is characterized by the fan terrace. The climax plant community on the fan terrace is a closed Sitka spruce forest with an understory of moss and forbs.

Anthropogenic disturbance from forest management practices may also influence the successional dynamics on this site.

Fan terraces are relatively free of flooding unless the channel deposition or flow become such that there is an avulsion event. At this point, water will simply find a new path down the fan and establish a new active channel and adjacent floodplain. The recently abandoned channels will begin to establish a Balsam Poplar forest with little understory cover. With time, Sitka Spruce and Western Hemlock will establish in the canopy on the abandoned channels.

Development of the new channel and floodplain will depend entirely on the size and velocity of the flooding event. The soils on the alluvial fans are coarse grained and gravelly showing little development in the floodplains or burring older pedogenic horizons that formed on the terrace. Terrace soils are also gravelly but are usually stable for long enough periods of time to experience podzolization a process resulting from the mobilization and precipitation of dissolved organic matter, iron and aluminum.

Table 1. Dominant plant species

Tree	(1) <i>Tsuga heterophylla</i> (2) <i>Picea sitchensis</i>
Shrub	(1) <i>Viburnum edule</i>
Herbaceous	(1) <i>Gymnocarpium dryopteris</i>

Physiographic features

Climatic features

Influencing water features

Soil features

Ecological dynamics

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State and transition model

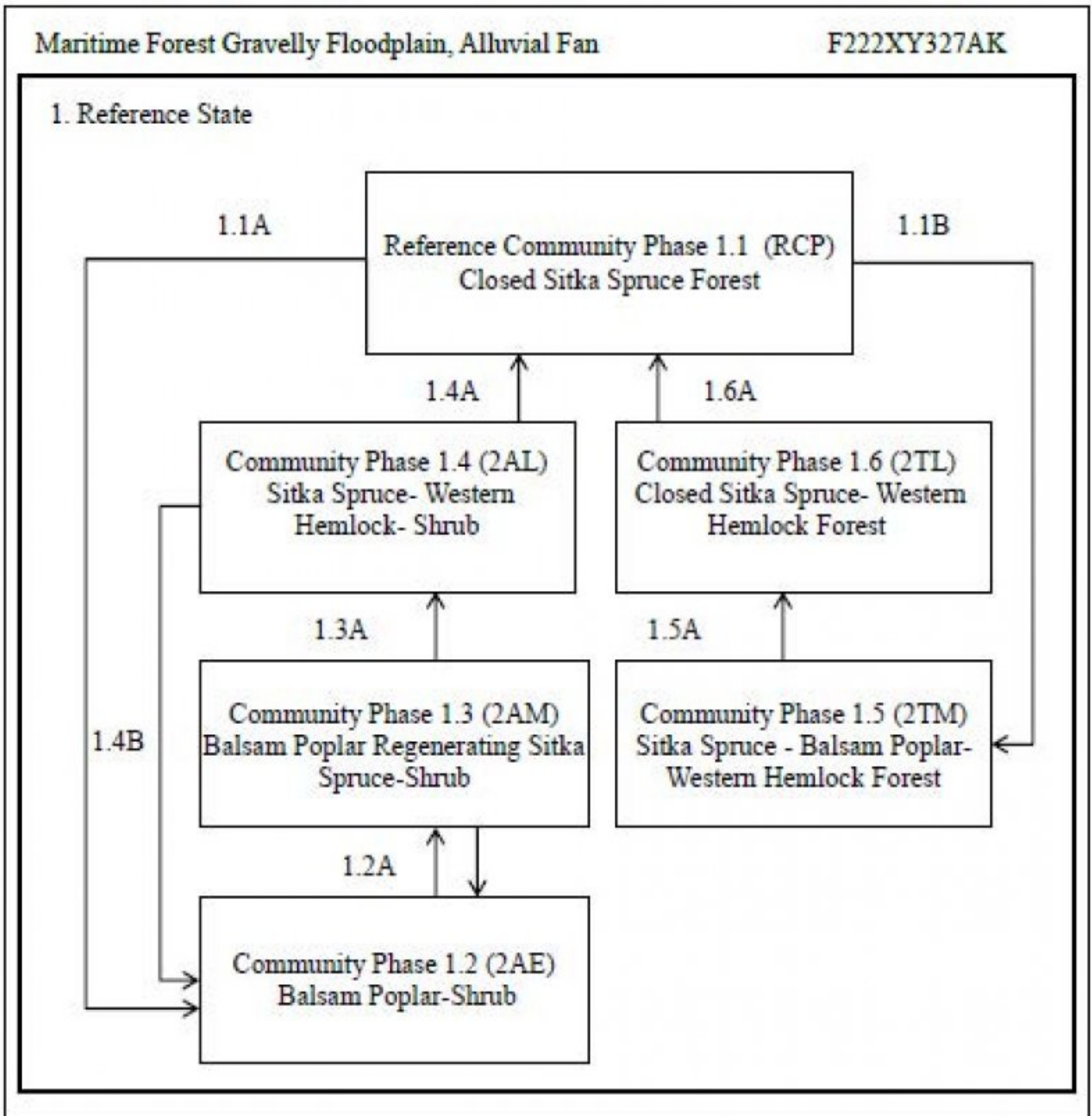


Figure 1. STM

State 1 Reference State

Community 1.1 Closed Sitka Spruce Forest

This is the reference plant community for a Maritime Forest Gravelly Floodplain, Alluvial Fan. The majority of this alluvial fan ecosite is characterized by the fan terrace, which supports a closed *Picea sitchensis* forest. The tree canopy cover is dominated by tall *Picea sitchensis* with a smaller proportion of medium to tall *Tsuga heterophylla* (western hemlock) and tall *Populus balsamifera* (balsam poplar). The understory is dominated by approximately 40% moss cover and 40% forb cover. Forb species may include *Osmorhiza berteroi* (sweetcicely), *Athyrium filix-femina* (common ladyfern), *Gymnocarpium dryopteris* (western oakfern), and *Dryopteris expansa* (spreading woodfern).

Community 1.2 Balsam Poplar-Shrub



Figure 2. community phase 1.2

This is an early sere flood sere plant community. Following flood, a *Populus balsamifera* forest establishes with minimal understory vegetation. The forest canopy may have up to 40% tall *Populus balsamifera*, with regenerating to medium sized *Tsuga heterophylla*, *Abies lasiocarpa* (subalpine fir) and *Picea sitchensis*. *Alnus viridis* ssp. *Sinuata* is the dominant shrub species.

Community 1.3 Balsam Poplar Regenerating Sitka Spruce-Shrub Community



Figure 3. community phase 1.3

This mid succession community phase is characterized by 25-50% forest cover. Tree species include mature *Populus balsamifera* and regenerating to medium sized *Picea sitchensis*. Below the canopy, a shrub-graminoid layer with up to 70% cover is comprised of *Gymnocarpium dryopteris*, *Oplopanax horridus*, *Aruncus dioicus* (bride's feathers), and small proportion of *Alnus viridis* ssp. *Sinuata*.

Community 1.4 Sitka Spruce- Western Hemlock- Shrub



Figure 4. community phase 1.4

This late succession community phase is characterized by 40% or greater forest cover. Tree species include tall *Tsuga heterophylla* and *Picea sitchensis* with a smaller proportion of medium sized *Tsuga heterophylla* and *Picea sitchensis*. Below the canopy, shrub cover consists of *Menziesia ferruginea* (rusty menziesia), *Vaccinium ovalifolium* (oval-leaf blueberry), *Viburnum edule* (squashberry), *Oplopanax horridus* (devilsclub), and *Cornus Canadensis* (bunchberry dogwood). Moss cover may be up to 80%.

Community 1.5 Sitka Spruce- Balsam Poplar- Western Hemlock Forest



Figure 5. community phase 1.5

This amid succession community phase that is recovering from forest management. This plant community is characterized by approximately 50% forest cover. Tree cover is dominated by tall *Picea sitchensis*, few tall *Populus balsamifera*, and regenerating to medium sized *Picea sitchensis*. Below the canopy, a shrub- graminoid layer with up to 70% cover is comprised of shrubs such as *Oplopanax horridus* and *Viburnum edule*, forbs such as *Gymnocarpium dryopteris*. Moss cover is approximately 30%.

Community 1.6 Closed Sitka Spruce- Western Hemlock Forest



Figure 6. community phase 1.6

This late succession community phase recovering from timber management is characterized by a closed canopy of *Picea sitchensis* and *Tsuga heterophylla*. Tree species include mature *Populus balsamifera* and regenerating to medium sized *Picea sitchensis*. The understory is comprised of 60-70% moss cover with trace lichen and forbs such as *Polypodium glycyrrhiza* (licorice fern) and *Orthilia secunda* (sidebells wintergreen).

Pathway 1.1A
Community 1.1 to 1.2

Occasional and brief flooding on a high gradient floodplain. When the water flows over the floodplain channel, a new channel may form on the alluvial fan. When this happens, the understory vegetation in the climax plant community is removed, and the tree canopy structure shifts from a Sitka spruce forest to a community of mostly bare ground with *Populus balsamifera* and *Alnus viridis* ssp. *Sinuata* (sitka alder).

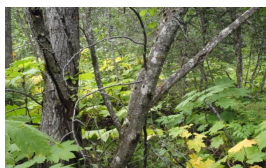
Pathway 1.1B
Community 1.1 to 1.5

Brush management and tree removal.

Pathway 1.2A
Community 1.2 to 1.3



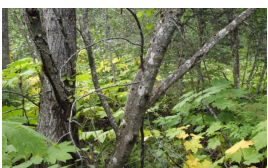
Balsam Poplar-Shrub



Balsam Poplar Regenerating
Sitka Spruce-Shrub
Community

Time since flood.

Pathway 1.3B
Community 1.3 to 1.2



Balsam Poplar Regenerating
Sitka Spruce-Shrub
Community



Balsam Poplar-Shrub

Occasional and brief flooding. Flowing water may remove regenerating tree and understory cover. If the water flow

or deposition event is great enough, the flow will breach the channel and create a new channel. See community pathway 1.1A.

Pathway 1.3A Community 1.3 to 1.4



Balsam Poplar Regenerating
Sitka Spruce-Shrub
Community



Sitka Spruce- Western
Hemlock- Shrub

Time since flooding.

Pathway 1.4A Community 1.4 to 1.1

Time since flooding.

Pathway 1.4B Community 1.4 to 1.2



Sitka Spruce- Western
Hemlock- Shrub



Balsam Poplar-Shrub

Occasional and brief flooding on a high gradient floodplain.

Pathway 1.5A Community 1.5 to 1.6



Sitka Spruce- Balsam Poplar-
Western Hemlock Forest



Closed Sitka Spruce- Western
Hemlock Forest

Time since brush management or tree removal.

Pathway 1.6A Community 1.6 to 1.1

Time since brush or tree removal.

Additional community tables

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	
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:**
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17. **Perennial plant reproductive capability:**
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