Ecological site R022BI210CA
Frigid Loamy Flood Plains

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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): 022B–Southern Cascade Mountains

Site Concept – Riparian Complex: Hydrologically connected by a “C” type stream channel. Slopes: 0 to 3 percent Landform: Flood plain, but also includes dynamics involving the associated stream channel and stream terrace. Soils: Very deep, poorly drained soils that formed in alluvium from volcanic rocks. Temp regime: Frigid. MAAT: 42 to 43 degrees F (5.5 to 6.1 degrees C). MAP: 45 to 87 inches (1,143 to 2,210 mm). Soil texture: Stony ashy loam. Surface fragments: 0 to 21 percent composed of: 5 percent subrounded fine gravel, 5 percent subrounded medium and coarse gravel, and 5 percent subrounded stones. Vegetation: Several riparian stream communities including a pioneer forb community, a thinleaf alder community and a Sierra lodgepole pine forest.

Associated sites

F022BI120CA	**Frigid Gravelly Sandy Loam Outwash-Stream Terraces** This white fir-Sierra lodgepole pine forest is found on adjacent old terraces and hillslopes.

Similar sites

R022BI215CA	**Frigid Gravelly Flood Plains** This riparian ecological site is associated with larger stream flow with a C to D type channel succession.
R022BI213CA	**Frigid Sandy Flood Plains** This riparian site is associated with smaller, B type channels.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Alnus incana ssp. tenuifolia* (2) *Salix lemmonii*
Herbaceous	(1) *Carex angustata* (2) *Carex nebrascensis*

Physiographic features

This site encompasses the stream channel, its associated flood plains and lower terraces. This site is found between 5,240 and 6,460 feet in elevation. Slopes range from 0 to 3 percent.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	1,600 – 1,970 m
Slope	0 %
Water table depth	0 – 130 cm
Aspect	Aspect is not a significant factor

Climatic features

This ecological site receives most of its annual precipitation during winter months in the form of snow. The mean annual precipitation ranges from 45 to 87 inches (1,143 to 2,210 mm) and the mean annual temperature ranges from 42 to 43 degrees F (5.5 to 6.1 degrees C). The frost free (>32F) season is 70 to 90 days. The freeze free (>28F) season is 85 to 200 days.

There are no representative climate stations for this site.

Table 3 Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	200 days
Precipitation total (average)	2,210 mm

Influencing water features

This ecological site is associated with small stream channels and the associated flood plains and lower terraces.

Soil features

The Aquandic Humaquepts, Flood Plains soil component is associated with this site. It consists of very deep, poorly drained soils that formed in alluvium from volcanic rocks. The A horizons have a stony ashy loam texture with medium subsurface textures and a high

percentage of rock fragments. Redoximorphic features including masses of oxidized iron and gleyed soil colors are present 7 inches below the surface. The water table is high after spring snow melt but drops quickly.

This ecological site has been correlated with the following map units and soil components:

Map Unit/ Component /Component percent
789125 Aquandic Humaquepts, flood plains/ 40

Table 4. Representative soil features

Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Moderate
Soil depth	150 cm
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	7.77 – 21.74 cm
Soil reaction (1:1 water) (0-101.6cm)	4.5 – 6.5
Subsurface fragment volume <=3" (Depth not specified)	0 – 30 %
Subsurface fragment volume >3" (Depth not specified)	0 – 30 %

Ecological dynamics

This site is associated with alluvial deposits from Holocene age stream processes, and a Rosgen “C” type channel. These channels are in lower gradient, glacially carved U shaped valleys, where deposition occurs to form flood plains. The alluvial deposits and channel migration are restricted to the valley floors. As the channels migrate in the confined corridors, former channels are buried with overbank deposits from subsequent channel courses and typically form soil profiles with coarser channel deposits under finer overbank deposits. As down cutting occurred (likely due to uplift) the streams cut down into the original flood plain surfaces and transformed them into stream terraces and formed new flood plains at the lower channel level (NRCS, 2010).

This site supports a "C" type channel according to the Rosgen classification scheme. A "C" type channel is a slightly entrenched single thread meandering channel with a well defined floodplain. The channel has moderate to high sinuosity generally with less than 2 percent gradient, but it can range from 2 to 3.9 percent (b modifier) . These channel types generally have a width to depth ratio greater than 12,

which means they are wide and shallow. They are often found in broad valleys with well developed alluvial floodplain terraces and such channels typically flood over bank two years out of three. In an undegraded state, a 50 year flood event should overflow onto the floodplain.

C type channels are constantly in the process or transporting and storing sediments from upstream sources or bank erosion. As the particle size of the channel bottom material decreases, the sediment supply generally increases and so does the erosion potential. The channel on this site supports cobble- bottom (C3), gravel-bottom (C4), and sand bottom (C5) reaches which have moderate to very high erosion potentials, respectively. The sensitivity to disturbance is very high for both C4 and C5 types, and moderate for C3. Vegetation exerts a very high controlling influence on stream dynamics in all three types (Rosgen, 1994).

The plant community along the channel occurs in distinct zones related to variable water table depth and disturbance events. A shrub community comprised of thinleaf alder or a mix of thinleaf alder and Lemmon's willow dominates the site in an undisturbed state. The riparian shrub community requires seasonal flooding and a water table that normally remains within 3 feet of the surface. Both thinleaf alder and Lemmon's willow are flood and shade tolerant and act as an important stabilizing component of the streambank. Streambanks anchored by these shrubs are stable and can withstand relatively severe spring runoff and flooding. As alder and willow thickets develop after floods finer fluvial deposits are trapped within the extensive root networks, facilitating sediment accumulation. Thus the coarse channel deposits of cobble, gravel or sand, where thinleaf alder and willow typically establish, eventually develop a loam or sandy loam surface soil texture from overbank deposits overlaying the coarser channel deposits. In addition, thinleaf alder improves soil fertility through the addition of nitrogen to the soil from nitrogen-fixing root nodules and a nitrogen-rich leaf litter. The finer sediment (overbank deposits) and increased fertility enables establishment and retention of a native herbaceous community that provides valuable forage and habitat for wildlife. At this site, the adjacent upland habitat is a coniferous forest of Sierra lodgepole pine and white fir.

C type channels can become unstable due to disturbances which impact the stream bank vegetation, change the flow regime, or alter the channel morphology. Overgrazing and excessive trampling by livestock can seriously reduce streambank stability. Continued disturbance can entrench the stream, disconnecting it from its floodplain and creating a deeply incised G or F type channel. These channels ("G" and "F") generally lose the wetland obligate species and become dominated by upland grass, shrub and/or forest plant communities. Eventually, a new entrenched "C" type channel may form that resembles the original "C" type channel. The entrenched channel supports wetland plant communities but it is constrained by terraces to the lower floodplain where a lower water table supports a greater proportion of upland plants.

This ecological site is a complex of riparian plant communities that are interrelated by hydrology. This is a relatively new concept for ecological sites. The state and transition diagram below illustrates the change in plant community component composition as a result of disturbance, rather than focusing on the succession of one plant community. Although there is considerable qualitative experience supporting the pathways and transitions within the State and Transition Model (STM), there is no quantitative information to specifically identify threshold parameters that distinguish between natural equilibrium and altered states in this ecological site. For information on STMs, see the following citations: Bestelmeyer el al. 2003, Bestelmeyer et al. 2009, and Stringham and Shaver 2003.

State and transition model

Figure 3. Frigid Loamy Floodplains 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 2.1 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Table 10. Community 3.2 plant community composition

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

Table 11. Community 3.3 plant community composition

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

Animal community

This site provides valuable wildlife resources such as water and cover. Thinleaf alder and willow communities often serve as travel corridors for big game animals such as deer and many bird species utilize these riparian corridors for nesting and brood rearing. Overhanging alder and willow branches provide shade and cover for salmonids. In addition, wildlife and livestock depend on the leaves, stems, and seeds of Nebraska sedge, and other various grasses and sedges as forage. The sedges and bunchgrasses provide nesting habitat for waterfowl and cover and forage for small mammals.

Hydrological functions

The hydrological function of the flood plain is to provide a catchment for water, sediments, and nutrients. Floodplains may also provide water storage, which is slowly released down the drainage throughout the year.

Recreational uses

These streams provide scenic hiking corridors with wildlife viewing, fishing and photographic opportunities.

Wood products

N/A

Inventory data references

The following NRCS plots were used to describe this ecological site: 789167- stream terrace 789205 789206- Soil type location 789206b 789206c

Type locality

Location 1: Plumas County, CA	
Township/Range/Section	T30 N R6 E S40
UTM zone	N
UTM northing	4477086
UTM easting	638897
General legal description	The type location is about 0.38 miles west of Kelly Camp, just inside the Lassen Volcanic National Park Boundary.

Other references

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Bozeman, Tandy. A History in Photographs, Drakesbad Guest Ranch, Lassen Volcanic National Park. http://www.drakesbad.com/DB%20Web%20Pictorial/DB.htm

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USDA, NRCS. 2003. National Range and Pasture Handbook. Available online at: http://www.glti.nrcs.usda.gov/technical/publications/nrph.html

Weixelman, Dave; Weis, Sue; Linton, Fletcher; and Swartz, Heather; 2007. DRAFT: Condition Checklist for Fens in the Montane and Subalpine Zones of the Sierra Nevada and Southern Cascade Ranges, CA.

Contributors

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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	
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:

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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:**
