

Ecological site R022BI217CA

Frigid Lacustrine Flat

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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 shared water table and/or small E type stream channel. Slopes: Generally between 0 to 3 percent. Landform: Relict glacial lakes and lake terraces Soils: Very deep, poorly to very poorly drained soils that formed in volcanic ash over glaciolacustrine deposits or in stream channel alluvium over glaciolacustrine deposits. There are stratified layers of fine and coarse sediments. Gleyed soil colors are present below the organic horizons. Temp regime: Frigid. MAAT: 41 to 44 degrees F (5.0 to 6.6 degrees C). MAP: 37 to 65 inches (940 to 1,651 mm). Soil texture: Herbaceous peat and herbaceous mucky slightly decomposed plant material. Surface fragments: 0 Vegetation: Several graminoid meadow communities.

Associated sites

F022BI102CA	Frigid Bouldery Glacially Scoured Ridges Or Headlands This open red fir forest site is found on the hillslopes nearby.
F022BI108CA	Frigid Moist Sandy Lake Or Stream Terraces This is a wet Sierra lodgepole pine site on stream and lake terraces adjacent to the meadows.
F022BI112CA	Frigid Sandy Loam Moraines Or Lake Terraces This dense red fir- white fir forest is found on deeper soils on the nearby hillslopes.

Similar sites

R022BI202CA	Frigid Alluvial Flat This meadow is associated with stream alluvium and has significant water inflow from springs.
R022BI206CA	Cryic Lacustrine Flat This site is also associated with relict glacial lakes but is cryic and has an E channel.

Table 1. Dominant plant species

Tree	Not specified
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Shrub	Not specified
Herbaceous	(1) <i>Carex nebrascensis</i> (2) <i>Carex vesicaria</i>

Physiographic features

This ecological site is found on wet meadows that formed on relict glacial lakes and lake terraces. The elevation range for this site is from 5,960 and 6,760 feet. Slopes are between 0 and 3 percent.

This area is frequently flooded and/or ponded. The water table remains at or near the surface throughout the year in the wetter areas of the meadow. In topographically higher or drier areas of the meadow, the water table may drop to below 55 inches during October, November, and December.

Table 2. Representative physiographic features

Landforms	(1) Glacial lake (relict) (2) Lake terrace
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Rare to frequent
Elevation	1,820 – 2,060 m
Slope	0 %
Ponding depth	0 – 20 cm
Water table depth	0 – 150 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 37 to 65 inches (940 to 1,651 mm) and the mean annual temperature ranges from 41 to 44 degrees F (5.0 to 6.6 degrees C). The frost free (>32F) season is 60 to 85 days. The freeze free (>28F) season is 75 to 190 days.

Table 3 Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	190 days
Precipitation total (average)	1,650 mm

Influencing water features

This site is associated with palustrine emergent wetlands that occasionally have an E or a C type stream channel, which enters or exits the lake basin. This site is also associated with upland areas that do not have wetland characteristics.

Soil features

This site is associated with the Histic Humaquepts, Lake Sediments and Histic Humaquepts, Frequently Flooded soil components. The Histic Humaquepts, Lake Sediments component consists of very deep, poorly drained soils that formed in volcanic ash over glaciolacustrine deposits. The Histic Humaquepts, Frequently Flooded component consists of very deep, very poorly drained soils that formed in stream channel alluvium over glaciolacustrine deposits. These soils have several organic horizons of herbaceous peat and herbaceous muck that ranges in total depth from 5 to 14 inches. There is fair amount of organic material but the soil pits do not meet the organic soil depth criteria of 16 inches (40 cm) to be considered a fen. These soils have stratified layers of fine and coarse sediments. Textures include ashy silt loams, ashy coarse sandy loams, and ashy loamy sand, among others. The AWC is moderate in the upper 60 inches of soil. There are gleyed colors below the organic horizons. Free water can occur in the coarse textured horizons, creating an artesian aquifer.

This ecological site has been correlated with the following map units and components within the CA789 Soil Survey Area:

DMU Component percent

105 Histic Humaquepts, Lake Sediments 1

130 Histic Humaquepts, Lake Sediments 55

130 Histic Humaquepts, Frequently Flooded 30

148 Histic Humaquepts, Lake Sediments 2

148 Histic Humaquepts, Frequently Flooded 1

Table 4. Representative soil features

Surface texture	(1) Mucky (2) Peaty
Family particle size	(1) Loamy
Drainage class	Poorly drained to very poorly drained
Permeability class	Moderately slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified

Available water capacity (0-101.6cm)	11.94 – 23.04 cm
Soil reaction (1:1 water) (0-101.6cm)	5.6 – 7.3
Subsurface fragment volume <=3" (Depth not specified)	0 – 50 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This ecological site is found in meadows and along channels in relict glacial lakes. These lakes formed from glacial melt water that allowed fine clay and silts to settle out. There are coarse textured layers intermixed with fine layers. The coarse layers may have been deposits from stream channel alluvium, wave action or difference in melt water velocities over time. Finer sediments are often above coarser buried profiles that represent the different depositional environments as the lakes filled in (NRCS, 2010). They have experienced gradual lowering of lake levels, because of reduced water input since post glacial melt water filled these basins. Infilling of these lakes is also occurring from continued lacustrine sediment deposition and accumulation of organic matter. Aquatic and emergent palustrine plant communities establish in shallow areas near shore. The vegetation produces organic matter from dead plant material and live root mats. Vegetation also traps sediment with leaves and roots. The lake margins fill with material that eventually supports drier meadow communities. Over time vegetation continues to expand into the shallow lakes and areas of open water diminish. The degree of infill is related to the size and depth of the lake. This process also occurs on shallow inlets of larger lakes. The seasonal fluctuation of lake levels determines the growing season and distribution of vegetation. These lakes and meadows receive water from upstream channels and have outlet channels. The water flow goes subsurface through the meadow or mixes with the open water of the lake. In larger drainages a defined stream channel may dissect the meadow on its' course to the lake, but the composition and spatial distribution of the majority of plant communities is related more to lake levels than to stream channel dynamics.

Nebraska sedge (*Carex nebrascensis*), Northwest Territory sedge (*Carex utriculata*) and/or blister sedge (*Carex vesicaria*) dominate this site. Tufted hairgrass (*Deschampsia cespitosa*) is more prevalent in drier areas. Willows (*Salix* spp.) are generally restricted to the perimeter of the meadow or are along a stream channel. A moist lodgepole pine site is found on drier lake terraces. See the Sierra lodgepole pine/California false hellebore - blue wildrye (F022B1108CA) ecological site for more information regarding this forest site. In the open water, aquatic plants such as yellow pond-lily (*Nuphar lutea*) and watershield (*Brasenia schreberi*) may be present.

This ecological site is a complex of riparian plant community components 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 gradual infilling, rather than focusing on the succession of one plant community after disturbance. 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 et al. 2003, Bestelmeyer et al. 2009, and Stringham and Shaver 2003.

State and transition model

Figure 3. Frigid Lacustrine Flat Model

Additional community tables

Table 5. Community 1.1 plant community composition

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

1	Grass/grasslike			308-1749	
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	135-336	10-25
	blister sedge	CAVE6	<i>Carex vesicaria</i>	45-336	5-20
	Northwest Territory sedge	CAUT	<i>Carex utriculata</i>	45-252	5-15
	tufted hairgrass	DECE	<i>Deschampsia cespitosa</i>	7-219	1-10
	Howell's rush	JUHO	<i>Juncus howellii</i>	6-168	1-15
	capitate sedge	CACA13	<i>Carex capitata</i>	56-168	5-15
	sedge	CAREX	<i>Carex</i>	11-112	3-8
	mountain rush	JUARL	<i>Juncus arcticus ssp. littoralis</i>	4-45	1-8
	swordleaf rush	JUEN	<i>Juncus ensifolius</i>	0-34	0-5
	toad rush	JUBU	<i>Juncus bufonius</i>	0-11	0-5
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	0-11	0-2
	smooth brome	BRIN2	<i>Bromus inermis</i>	0-7	0-2
	Raynolds' sedge	CARA6	<i>Carex raynoldsii</i>	0-6	0-2
	analogue sedge	CASI2	<i>Carex simulata</i>	0-6	0-2
	small floating mannagrass	GLBO	<i>Glyceria borealis</i>	0-6	0-2
	meadow barley	HOBR2	<i>Hordeum brachyantherum</i>	0-6	0-2
	Sierra rush	JUNE	<i>Juncus nevadensis</i>	0-6	0-1
	golden sedge	CAAU3	<i>Carex aurea</i>	0-4	0-2
	spikerush	ELEOC	<i>Eleocharis</i>	0-3	0-1
	slenderbeak sedge	CAAT3	<i>Carex athrostachya</i>	0-3	0-1
Forb					
1	Forbs			13-333	
	tundra aster	ORALA2	<i>Oreostemma alpigenum var. alpigenum</i>	13-157	2-20
	western mountain aster	SYSPS	<i>Symphyotrichum spathulatum var. spathulatum</i>	0-123	0-10
	alpine gentian	GENE	<i>Gentiana newberryi</i>	0-9	0-3
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0-6	0-2
	ash penstemon	PECI2	<i>Penstemon cinicola</i>	0-6	0-2
	Lemmon's yampah	PELE5	<i>Perideridia lemmonii</i>	0-4	0-2
	Drummond's cinquefoil	PODR	<i>Potentilla drummondii</i>	0-4	0-2
	sticky cinquefoil	POGL9	<i>Potentilla glandulosa</i>	0-4	0-2
	slender cinquefoil	POGR9	<i>Potentilla gracilis</i>	0-4	0-2
	Oregon saxifrage	SAOR2	<i>Saxifraga oregana</i>	0-4	0-2
	willowherb	EPILO	<i>Epilobium</i>	0-2	0-2
	longstalk clover	TRLO	<i>Trifolium longipes</i>	0-2	0-1
	violet	VIOLA	<i>Viola</i>	0-2	0-1
	Oregon checkerbloom	SIORS	<i>Sidalcea oregana ssp. spicata</i>	0-2	0-1
	tinker's penny	HYAN2	<i>Hypericum anagalloides</i>	0-1	0-1

Table 6. Community 1.2 plant community composition

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

This site provides valuable wildlife resources such as water and cover. In addition, wildlife and livestock depend on the leaves, stems, and seeds of Nebraska sedge, tufted hairgrass, and other various grasses and sedges as forage. The sedges and bunchgrasses provide nesting habitat for waterfowl and cover for small mammals.

Hydrological functions

The hydrological function of this meadow is to provide a catchment for water, sediments, and nutrients. The meadow allows sediment from melting spring snow to settle out and trap nutrients in surface and subsurface flows. This meadow also provides water storage, which is slowly released down the drainage throughout the year.

Recreational uses

This site provide beautiful open vistas with opportunities for wildflower and wildlife viewing. Trails should be constructed on drier ground bordering the meadow.

Inventory data references

The following NRCS vegetation plots were used to describe this ecological site: 789308- Type location 789376 789378 789392

Type locality

Location 1: Lassen County, CA	
Township/Range/Section	T30 N R6 E S3
UTM zone	N
UTM northing	4483390
UTM easting	643879
General legal description	The type location is about 1.1 miles north of Inspiration Point, in Lassen Volcanic National Park.

Other references

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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:

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:
