Ecological site F022BI108CA
Frigid Moist Sandy Lake Or Stream Terraces

Accessed: 04/20/2024

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 022B–Southern Cascade Mountains

Site concept:
Landform: (1) Lake terrace, (2) Stream terrace
Elevation (feet): 5,960-6,900
Slope (percent): 0-8
Water Table Depth (inches): 0-60
Flooding-Frequency: Rare to Frequent
Ponding-Frequency: None
Aspect: No Influence on this site
Mean annual precipitation (inches): 35-65
Primary precipitation: Winter months in the form of snow
Mean annual temperature: 41-44 degrees F (5-7 degrees C)
Restrictive Layer: Duripan or petroferric contact at 40 inches to greater than 60 inches
Temperature Regime: Frigid
Moisture Regime: Aquic
Parent Materials: Alluvium from volcanic rocks
Surface Texture: (1) Gravelly medial sandy loam
Surface Fragments <=3" (% Cover): 0-5
Surface Fragments > 3" (% Cover): 0-0

Soil Depth (inches): 40-60+
Vegetation: Sierra lodgepole pine (*Pinus contorta* var. murrayana) is dominant with approximately 40 percent canopy cover. The lush understory has a variety of species, and dominants vary by microclimate. Common plants are blue wildrye (*Elymus glaucus*), bluejoint (Calamagrostis Canadensis), tufted hairgrass (*Deschampsia cespitosa*), meadow barley (*Hordeum brachyantherum*), bigleaf lupine (*Lupinus polyphyllus*), common yarrow (*Achillea millefolium*), arrowleaf ragwort (*Senecio triangularis*), longstalk clover (*Trifolium longipes*), and California false hellebore (*Veratrum californicum* var. californicum).
Notes: This is a moist Sierra lodgepole pine site found on stream or lake terraces. It is often adjacent to a meadow community.

Classification relationships

Forest Alliance = *Pinus contorta* ssp. murrayana – Lodgepole pine forest; Association = (no matching species). (Sawyer, John O., Keeler-Wolf, Todd, and Evens, Julie M. 2009. A Manual of California Vegetation. 2nd ed. California Native Plant Society Press. Sacramento, California.)

Associated sites

F022BI112CA	**Frigid Sandy Loam Moraines Or Lake Terraces** This is a red fir forest on drier slopes.
F022BI117CA	**Frigid Coarse Glaciolacustrine Gentle Slopes** This is a drier lodgepole pine site, which is replaced by red fir over time.
R022BI206CA	**Cryic Lacustrine Flat** The lodgepole pine surrounds this cryic meadow at upper elevations.
R022BI217CA	**Frigid Lacustrine Flat** The lodgepole pine surrounds this frigid meadow site at lower elevations.

Similar sites

F022BI125CA	**Cold Frigid Tephra Over Outwash Plains Or Lake Terraces** This is a lodgepole pine forest found in cold air drainages and drier flats.
F022BI126CA	**Cold Frigid Tephra Over Moraine Slopes** This is a lodgepole pine forest with a grassy understory, which is eventually replaced by Jeffrey pine and ponderosa pine.
F022BI120CA	**Frigid Gravelly Sandy Loam Outwash-Stream Terraces** This is a moist white fir-lodgepole pine forest.
F022BI123CA	**Frigid Flat Outwash Terraces** This is a lodgepole pine forest with a grassy understory, which is eventually replaced by white fir.

Table 1. Dominant plant species

Tree	(1) *Pinus contorta var. murrayana*
Shrub	Not specified
Herbaceous	(1) *Veratrum californicum var. californicum* (2) *Elymus glaucus*

Physiographic features

The majority of this site is found between 5,960 and 6,900 feet, but it has been associated with minor components which are mapped between 5,500 and 8,000 feet in elevation. Slopes are generally between 0 to 8 percent.

This site has a seasonal water table that may be at the surface to around 60 inches.

Table 2. Representative physiographic features

Landforms	(1) Lake terrace (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	5,500–8,000 ft
Slope	0–8%
Water table depth	0–60 in
Aspect	Aspect is not a significant factor

Climatic features

This ecological site receives most of its annual precipitation in the winter months in the form of snow. The mean annual precipitation is ranges from 35 to 65 inches (889 to 1,651 mm) and the mean annual temperature is about 41 degrees F (5 degrees C). The frost free (>32 degrees F) season is 60 to 85 days. The freeze free (>28 degrees F) season is 75 to 190 days.

There are no representative climate stations for this site.

Table 3. Representative climatic features

Frost-free period (average)	85 days
Freeze-free period (average)	190 days
Precipitation total (average)	65 in

Influencing water features

This ecological site is often found adjacent to stream channels and along lake margins.

Soil features

This site is associated with the Typic Endoaquands soil component, which consists of deep and very deep, poorly drained soils that formed in alluvium from volcanic rocks. There are a couple inches of organic pine needles and muck over an A horizon. The A and B horizons have gravelly medial sandy loam textures with 12 to 15 percent clay and 20 to 25 percent gravel. The C horizons have coarse sandy loam and loamy coarse sand textures with 1 to 2 percent clay, 50 to 60 percent gravel, and 10 percent cobbles. These soils on average have low AWC in the upper 60 inches of soil. There are masses of oxidized iron around rock fragments below 29 inches, and a duripan or petroferric contact at 40 inches to greater than 60 inches. The iron concentrations indicate prolonged saturation, due to a water table perched above the duripan or petroferric layer.

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

DMU Component Percent
103 Typic Endoaquands 2
104 Typic Endoaquands 2
105 Typic Endoaquands 2
117 Typic Endoaquands 5
130 Typic Endoaquands 15
134 Aquepts 3
139 Typic Endoaquands 20
142 Aquepts 3
145 Aquepts 2

148 Typic Endoaquands 15
163 Typic Endoaquands 2
171 Typic Endoaquands 5
172 Typic Endoaquands 1
173 Typic Endoaquands 8

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam
Family particle size	(1) Sandy
Drainage class	Poorly drained
Permeability class	Rapid to moderate
Soil depth	40–80 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1.71–7.33 in
Soil reaction (1:1 water) (0-40in)	5.1–6.5
Subsurface fragment volume <=3" (Depth not specified)	25–70%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Ecological dynamics

This is a moist Sierra lodgepole pine site found on stream or lake terraces. It is often adjacent to a meadow community. Sierra lodgepole pine (*Pinus contorta* var. murrayana) is dominant with approximately 40 percent canopy cover. The lush understory has a variety of species, and dominants vary by microclimate. Common plants are blue wildrye (*Elymus glaucus*), bluejoint (Calamagrostis Canadensis), tufted hairgrass (*Deschampsia cespitosa*), meadow barley (*Hordeum brachyantherum*), bigleaf lupine (*Lupinus polyphyllus*), common yarrow (*Achillea millefolium*), arrowleaf ragwort (*Senecio triangularis*), longstalk clover (*Trifolium longipes*), and California false hellebore (*Veratrum californicum* var. californicum).

Sierra lodgepole pine is more tolerant of wet soil conditions than other conifers in the area, so it dominates in these wet meadow margins. White fir (*Abies concolor*) or California red fir (*Abies magnifica*) are occasionally found in these forests, but they will not replace lodgepole pine due to the wetness. Sierra lodgepole pine can be long-lived, and some trees on this site are almost 200 years old. Sierra lodgepole pine does not usually gain much in girth, with older trees averaging 16 to 21 inch diameters. Its thin bark and shallow roots make it susceptible to fire. It grows tall and narrow with short branches and 1.2 to 2.4 inch needles in fascicles of two. Sierra lodgepole pine is the only non-serotinous lodgepole pine. Therefore it does not need fire to open its cones to release seeds.

This ecological site is on alluvial stream terraces with water tables at the surface during snow melt, then dropping throughout the season. There is a root restrictive layer below 40 inches, which may perch water for a short period. The roots of Sierra lodgepole pine are generally shallow, enabling them to grow on this site. Sierra lodgepole pine produces a taproot, but it may atrophy or grow horizontally in cases of high water table or a root restrictive layer.

Several sampled trees are older than 150 years, which indicates that lodgepole pine was present at some of these sites prior to the encroachment period documented by Taylor (Taylor, 1990). A younger stratum of trees sampled meets the profile of Taylor’s encroachment period. Taylor identified a period between 1905 and 1955 when most of the lodgepole pine became established within the meadows of Lassen Volcanic National Park. The study was unable to identify a single cause for encroachment but selected a combination of factors, such as the cessation of grazing and the practice of fire suppression. In Yosemite National Park, pulses of lodgepole pine encroachment were related to multiple years of warmer than normal summers with lower than normal precipitation. Taylor found that this did not apply to this area, and wetter than normal conditions prevailed during periods of encroachment. More research is needed to determine if (or how much) this ecological site has encroached into meadow habitat due to human caused triggers.

The cessation of grazing has an immediate affect on conifer survival because herbivores browse on young seedlings. Secondary to seedling survival is the removal of competing vegetation and the creation of open patches of bare soil that is ideal for lodgepole pine establishment. In meadow systems with a stream, grazing may have caused bank instability causing channel confinement and incision. A deeper water table could result from an altered channel, which would create a drier meadow more suitable for conifer encroachment. On a longer time scale, many of these meadows are on the fringes of relict glacial lakes that are slowly filling with organic matter and sediments. Please refer to the meadow ecological sites for more information on hydrologic dynamics (R022BI217CA and R022BI206CA). A high mortality fire or mountain pine beetle infestation could result in up to 30 percent more water being released into the watershed since the trees are not using the water. This could raise the water table in the meadow, making it less desirable for lodgepole pine.

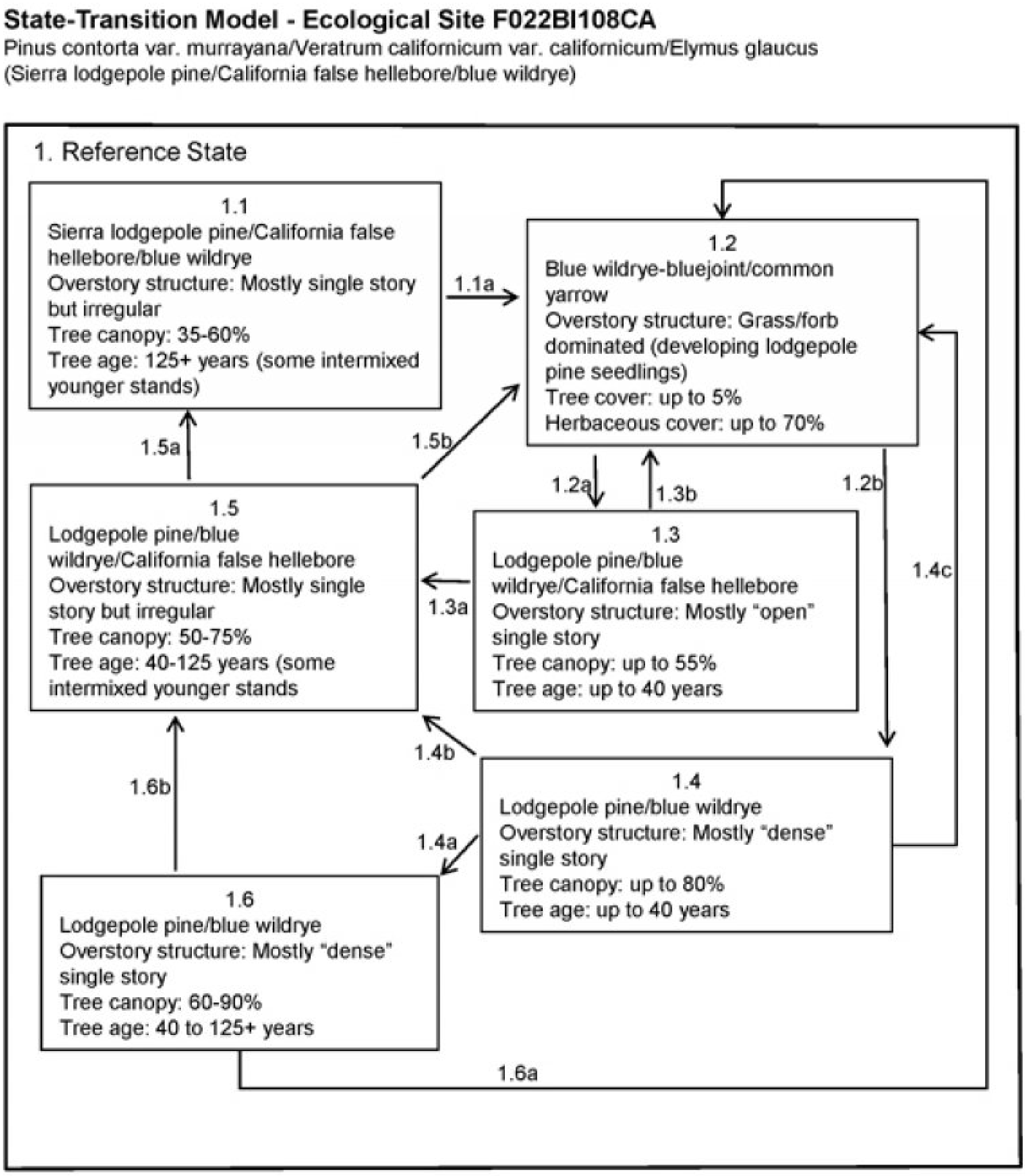
Sierra lodgepole pine has a complex disturbance regime which includes cyclic beetle infestations and fire. Fire studies in the lodgepole pine forest of the Caribou Wilderness report a fire return interval of 67 years between 1735 and 1929. Even low intensity fires resulted in high mortality rates of the lodgepole pine (Taylor and Solem, 1995). Sierra lodgepole pine regenerates prolifically after fire and evenly aged stands are formed. As the canopy closes the moderately shade intolerant pines go through an extended period of self-thinning. The mountain pine beetle (Dendroctonus ponderosae) is a natural pest that can kill a significant portion of the larger trees in a stand. Infestations can last for several years and often return in 20 to 40 year cycles (Cope, 1993). After an outbreak the forest may be dominated by standing dead trees. These trees eventually fall, creating layers of overlapping logs. Fuel loads are high, but the downed logs burn slowly. Low intensity fires can cause damage to live trees, however, and fire damaged trees are more susceptible for the next beetle attack. Pine beetle infestations, wind throw and other small scale disturbances create gaps for Sierra lodgepole pine regeneration. Over time these gaps break up the uniformity of the evenly aged stand that formed after the last large fire event. Old growth lodgepole pine that has not experience severe fire has an irregular forest structure and is able to regenerate in canopy gaps created by disturbances.

Other pathogens that affect Sierra lodgepole pine include insects such as the pine engraver (Ips pini), lodgepole terminal weevil (Pissodes terminalis), Warren's collar weevil (Hylobius warreni), weevil (Magdalis gentiles), pine needle scale (Chionaspis pinifoliae), black pineleaf scale (Nuculaspis californica), spruce spider mite (Oligonychus ununguis), lodgepole sawfly (Neodiprion burkei), lodgepole needle miner (Coleotechnites milleri), sugar pine tortrix (Choristoneura lambertiana), pine tube moth (Argyrotaenia pinatubana), and the pandora moth (Coloradia pandora). The pine engraver commonly develops in windthrows and logging slash, especially slash that is shaded and cannot dry quickly. Prompt slash disposal is an effective control measure. Fungal diseases that affect lodgepole pine productivity include the stem cankers caused by atropelius canker (Atropellis piniphilia), comandra blister rust (Cronartium comandrae), and western gall rust (Peridermium harknessii). The honey mushroom (Armillaria mellea) and annosus root disease (Heterobasidion annosum) are sources of root rot, and wood decay is caused by such fungi as red rot (Phellinus pini) and red heart wood stain (Peniophora pseudo-pini). Dwarf mistletoe (*Arceuthobium americanum*) is a common parasite that can affect large areas of lodgepole pine (Lotan and Critchfield, 1990).

The reference state consists of the most successionally advanced community phase (numbered 1.1) as well as other community phases which result from natural and human disturbances. Community phase 1.1 is deemed the phase representative of the most successionally advanced pre-European plant/animal community including periodic natural surface fires that influenced its composition and production. Because this phase is determined from the oldest modern day remnant forests and/or historic literature, some speculation is necessarily involved in describing it.

All tabular data listed for a specific community phase within this ecological site description represent a summary of one or more field data collection plots taken in communities within the community phase. Although such data are valuable in understanding the phase (kinds and amounts of ground and surface materials, canopy characteristics, community phase overstory and understory species, production and composition, and growth), it typically does not represent the absolute range of characteristics nor an exhaustive listing of species for all the dynamic communities within each specific community phase.

State and transition model



State 1
Reference

Community 1.1
Sierra lodgepole pine/California false hellebore/blue wildrye

This mature Sierra lodgepole pine forest develops with continual small scale disturbances which create gaps in the canopy. It is considered the most successionally advanced community phase. These gaps (single tree fall to .25

acre in size) provide suitable sites for Sierra lodgepole pine regeneration, and over time, create uneven forest structure and composition. Several age classes of Sierra lodgepole pine are present.

Forest overstory. The forest overstory has 35 to 60 percent cover from almost exclusively Sierra lodgepole pine. White fir and California red fir are often in the adjacent drier forests but seldom within this wet site. The upper canopy height ranges from 80 to 100 feet. Basal area is between 100 and 160 ft/acre. Several age classes are present, with gaps of young seedlings and saplings. Diameter at breast height for the overstory trees ranges from 15 to 19 inches.

Forest understory. There is high cover and production of hydrophytic vegetation in the understory. Grasses are mixed and include alpine bentgrass (Agrostis humilis), bluejoint (Calamagrostis Canadensis), blue wildrye (Elymus glaucus), alpine timothy (Phleum alpinum), muhly (Muhlenbergia spp.) and meadow barley (Hordeum brachyantherum). A variety of sedges (Carex spp.) may be present in small amounts. Other plants on this site are common yarrow (Achillea millefolium), tinker's penny (Hypericum anagalloides), bigleaf lupine (Lupinus polyphyllus), monkeyflower (Mimulus spp.), sweetcicely (Osmorhiza berteroi), whitestem gooseberry (Ribes inerme), arrowleaf ragwort (Senecio triangularis), longstalk clover (Trifolium longipes), and California false hellebore (Veratrum californicum var. californicum). Total understory production is around 800 to 1,000 pounds per acre.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	30	522	1161
Forb	19	191	340
Shrub/Vine	0	45	220
Tree	2	5	8
Total	**51**	**763**	**1729**

Community 1.2
Blue wildrye-bluejoint/common yarrow

This post-fire meadow community phase may persist for 1 to 2 years. With an absence of conifers and a subsequent increase in watershed release, the site could become wetter and this community phase may persist longer. Data is lacking for this post-fire community, but most of the understory species listed above would return quickly after fire. Some species such as common yarrow (*Achillea millefolium*) and blue wildrye (*Elymus glaucus*) proliferate after disturbance. Rhizomatous species such as common yarrow and bluejoint (Calamagrostis Canadensis) can resprout from undamaged rhizomes after fire. Other species may be top-killed and resprout from tubers or root caudices. All species can regenerate from on or off-site seed sources. Sierra lodgepole pine will germinate from wind blown seed. It may take a few years for the young seedlings to establish due to competition from the grasses and forbs.

Community 1.3
Lodgepole pine/blue wildrye/California false hellebore

This Sierra lodgepole pine regeneration community phase is defined by the density of the seedling establishment. This site generally has less than 500 stems per acre, and develops into a relatively open forest. The seedlings develop into pole sized trees, with up to 55 percent canopy cover. The understory cover and diversity remains high.

Community 1.4
Lodgepole pine/blue wildrye

This regeneration community phase is defined by dense seedling establishment. More research is needed to determine the cause of dense versus open seedling recruitment, and appropriate indicators to define the two regeneration patterns. For now, it has been observed that more than 500 to 700 stems of Sierra lodgepole pine per acre can cause stagnant forest growth. There are many variables which influence seedling density. Sierra lodgepole pine produces good seed crops every 1 to 3 years, and seeds are dispersed from late August to mid October. These seeds can be stored in the soil for several years, but tend to regenerate from wind dispersed seeds deposited after the fire. Therefore, the season of burn and timing in relation to seed crop cycles may affect seedling density. Smaller fires may have higher seedling density, due to the proximity of an available seed source. Fires leave bare soil and disturbed duff with open sunlight, which are ideal conditions for Sierra lodgepole pine seed germination. Seasonal precipitation patterns and air temperatures, during the season and germination, influence the survival of seedlings. As the seedlings develop they form dense thickets. The trees thin out their lower branches as they grow tall and thin. They self thin to some extent, but most trees persist even with limited sunlight on their canopy. Growth becomes stagnant, due to competition for light, water and nutrients. After a certain point in development Sierra lodgepole pine may not respond to competitive release from thinning, disease, or fire.

Community 1.5
Lodgepole pine/blue wildrye/California false hellebore

This forest is multi-aged with an irregular canopy distribution due to small scale or patchy disturbances. Shallow roots, which make lodgepole pine susceptible to wind throw, can produce canopy gaps, but mountain pine beetle infestations are the most significant disturbances to create openings. After a pest infestation, patches of the stand die, leaving gaps for lodgepole pine regeneration. Low intensity fire is often fatal to mature lodgepole pine, so even a low severity fire can be a stand replacing event. It would be uncommon for a fire event to create small gaps or openings, however low intensity smoldering fires have been documented that spread through downed trees after a mountain pine beetle infestation. Trees damaged by fire are more susceptible to mountain pine beetle attack to the next cycle of mountain pine beetles. In all likelihood fire would not ignite easily in the moist understory of this site or in the nearby meadow until the end of summer.

Community 1.6
Lodgepole pine/blue wildrye

This forest develops in the absence of canopy disturbance. It remains evenly aged with a high basal area of tall thin trees. The forest is stagnant. Only the upper crowns get sunlight, and the understory branches die back. The self-thinning process is slow and does not eliminate competition. There is almost no regeneration due to the lack of openings in the forest. Understory production and cover decreases due to the lack of sunlight. The potential for a severe pest infestation or disease is high because the trees are stressed from competition for sunlight, water, and nutrients. The close proximity of the trees will enable the pathogens to spread quickly. Severe fire is likely during this phase because of the high accumulation of fuels on the forest floor.

Pathway 1.1a
Community 1.1 to 1.2

A high tree mortality fire leads to the grass and forb community phase 1.2.

Pathway 1.2a
Community 1.2 to 1.3

With time and the establishment and growth of the Sierra lodgepole pine seedlings, Community Phase 1.3 develops.

Pathway 1.2b
Community 1.2 to 1.4

In some cases, the establishment of seedlings is extremely dense, and Community Phase 1.4 develops.

Pathway 1.3b
Community 1.3 to 1.2

Fire is unlikely at this point, but should it occur, the grass and forb community phase (Community Phase 1.2) will exist for a short period.

Pathway 1.3a

Community 1.3 to 1.5

With continued growth and small scale natural disturbances a multi-aged Sierra lodgepole pine forest (Community Phase 1.5) develops.

Pathway 1.4c
Community 1.4 to 1.2

This pathway is triggered by a high mortality fire, which initiates a grass and forb community phase (Community Phase 1.2).

Pathway 1.4b
Community 1.4 to 1.5

Although dense, over time natural small scale disturbances such as fire, beetle infestations, or wind-throw, can shift this community phase towards an open Sierra lodgepole pine forest (Community Phase 1.5).

Pathway 1.4a
Community 1.4 to 1.6

With time and growth in the absence of disturbance, the stand remains dense and evenly aged (Dense lodgepole pine forest, Community Phase 1.6).

Pathway 1.5a
Community 1.5 to 1.1

With time and growth and small scale disturbances, this forest continues to develop into an open Sierra lodgepole pine forest (community phase 1.1) with a multi-aged, complex forest structure.

Pathway 1.5b
Community 1.5 to 1.2

This pathway is triggered by a high mortality fire, which initiates a grass and forb community community (Community Phase 1.2).

Pathway 1,6a
Community 1.6 to 1.2

This pathway is triggered by a high mortality fire, which initiates a grass and forb community phase (Community Phase 1.2).

Pathway 1.6b
Community 1.6 to 1.5

This pathway is initiated by repeated small scale canopy disturbances caused by mountain pine beetle infestations, low-mortality fires, or wind throw. The forest becomes a more open Sierra lodgepole pine forest (Community Phase 1.5) with several age classes, with continued small scale disturbances and aging can eventually develop into Community Phase 1.1.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
0	**Tree (understory only)**			2–8	
	Sierra lodgepole pine	PICOM	*Pinus contorta var. murrayana*	2–8	1–5
Shrub/Vine					
0	**Shrub**			0–220	
	arrowleaf ragwort	SETR	*Senecio triangularis*	0–200	0–12
	whitestem gooseberry	RIIN2	*Ribes inerme*	0–20	0–2
Grass/Grasslike					
0	**Grass/Grasslike**			30–1161	
	bluejoint	CACA4	*Calamagrostis canadensis*	0–630	0–20
	blue wildrye	ELGL	*Elymus glaucus*	30–420	2–30
	meadow barley	HOBR2	*Hordeum brachyantherum*	0–70	0–5
	sedge	CAREX	*Carex*	0–15	0–5
	alpine bentgrass	AGHU	*Agrostis humilis*	0–10	0–5
	alpine timothy	PHAL2	*Phleum alpinum*	0–10	0–2
	muhly	MUHLE	*Muhlenbergia*	0–6	0–3
Forb					
0	**Forb**			19–340	
	California false hellebore	VECAC2	*Veratrum californicum var. californicum*	20–150	1–8
	common yarrow	ACMI2	*Achillea millefolium*	10–80	1–10
	bigleaf lupine	LUPO2	*Lupinus polyphyllus*	5–50	1–5
	longstalk clover	TRLO	*Trifolium longipes*	4–40	1–10
	sweetcicely	OSBE	*Osmorhiza berteroi*	0–15	0–2
	monkeyflower	MIMUL	*Mimulus*	0–5	0–1

Table 7. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
Sierra lodgepole pine	PICOM	*Pinus contorta var. murrayana*	Native	–	35–60	–	–

Table 8. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
blue wildrye	ELGL	*Elymus glaucus*	Native	–	2–30
bluejoint	CACA4	*Calamagrostis canadensis*	Native	–	0–20
meadow barley	HOBR2	*Hordeum brachyantherum*	Native	–	0–5
bigleaf lupine	LUPO2	*Lupinus polyphyllus*	Native	–	1–5
sedge	CAREX	*Carex*	Native	–	0–5
alpine bentgrass	AGHU	*Agrostis humilis*	Native	–	0–4
muhly	MUHLE	*Muhlenbergia*	Native	–	0–3
alpine timothy	PHAL2	*Phleum alpinum*	Native	–	0–2
Forb/Herb					
longstalk clover	TRLO	*Trifolium longipes*	Native	–	1–10
common yarrow	ACMI2	*Achillea millefolium*	Native	–	1–10
California false hellebore	VECAC2	*Veratrum californicum var. californicum*	Native	–	1–8
sweetcicely	OSBE	*Osmorhiza berteroi*	Native	–	0–2
monkeyflower	MIMUL	*Mimulus*	Native	–	0–1
Shrub/Subshrub					
arrowleaf ragwort	SETR	*Senecio triangularis*	Native	–	0–12
whitestem gooseberry	RIIN2	*Ribes inerme*	Native	–	0–2
Tree					
Sierra lodgepole pine	PICOM	*Pinus contorta var. murrayana*	Native	–	1–5

Animal community

Sierra lodgepole pine forests provide food, cover and habitat for a variety of species. These forests have high productivity in the understory and abundant forage for wildlife. They are often adjacent to water bodies and open meadows that encourage an increase in wildlife activity. Thirty-one mammals and almost fifty bird species have been documented to use Sierra lodgepole pine forests. Snags and downed logs are important for cavity-nesting birds and mammals. Some animals forage on the Sierra lodgepole pine needles and consume the seeds (Cope, 1993).

Recreational uses

This site is usually adjacent to scenic meadows, lakes and streams and provides access to these areas. Care should be taken to avoid compaction or diversion of water flow since this area is seasonally wet.

Wood products

Sierra lodgepole pine wood is used for framing, paneling, trim, posts, and other construction products. The forests are often uniform is size, which makes harvesting easier. The wood tends to be light and straight grained with consistent texture (Cope 1993).

Other information

Site index documentation:

Alexander (1966) was used to determine forest site productivity for Sierra lodgepole pine. Low to High values of Site index and CMAI (culmination of mean annual increment) give an indication of the range of inherent productivity of this ecological site. Site index relates to height of dominant trees over a set period of time and CMAI relates to the average annual growth of wood fiber in the boles/trunks of trees. Site index and CMAI listed in the Forest Site

Productivity section are in units of feet and cubic feet/acre/year, respectively. Both site index and CMAI are estimates; on-site investigation is recommended for specific forest management units for each soil classified to this ecological site. The historical and actual basal area of trees within a growing stand will greatly influence CMAI.

Lodgepole pine appropriate for site index measurement typically occurs in community phases 1.5, and older stands of 1.3. They are selected according to guidance listed in the site index publication.

Table 9. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
Sierra lodgepole pine	*PICOM*	90	90	104	104	100	520	–	
Sierra lodgepole pine	*PICOM*	90	90	79	79	–	–	100TA	Alexander, Robert R. 1966. Site indexes for Lodgepole pine, with corrections for stand density: instructions for field use. USDA, Forest Service. Rocky Mountain Forest and Range Experiment Station Research Paper RM-24.

Inventory data references

The following NRCS vegetation plots were used to describe this ecological site:

789236- site location
789307
789309

Type locality

Location 1: Shasta County, CA	
Township/Range/Section	T31 N R5 E S32
UTM zone	N
UTM northing	4485342
UTM easting	631225
General legal description	The type location is about 0.78 miles east of Hat Lake, below Dersch Meadow in Lassen Volcanic National Park.

Other references

Agee, James K.1994. The Lodgepole Pine Series in Fire and Weather Disturbances in Terrestrial Ecosystems of the Eastern Cascades. From volume III:Assessment. USDA, Forest Service, Pacific Northwest Research Station. Gen. Tech. Report.

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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):

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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:**
