

Appendix X.

**LAVO Preliminary 2007 NVCS Vegetation Classification
and Vegetation Descriptions**

LAVO Comparative Vegetation Mapping Project

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Lassen Volcanic National Park Preliminary NVCS Vegetation Classification and Vegetation Descriptions

Original clustering by AS - (08/03/2007)

Revised by GRS - (03/28/2008)

Introduction

The 2007 Lassen Volcanic National Park (LAVO) Preliminary Vegetation Classification is an attempt to represent the variety of major vegetation types or associations that may be distinguished from each other based on differences of their vegetation characteristics. As these types were to be used in remote sensing efforts, greater significance was placed on cover data that was part of the overstory vegetation layer(s) rather than hidden in the understory. These proposed types are the result of an initial clustering of the field data using TWINSpan analysis by Dr. Solomeshch of U.C. Davis, followed by other forms of vegetation classification analysis and review. After these initial analyses, over 70 sites remained that were viewed by Dr. Solomeshch as outliers of the classification, primarily due to their low sample sizes (most often a single sample). These sites were all individually evaluated by Ken Stumpf of GRS. Ken compared them with all the other clustered vegetation classification data to find their most logical/reasonable fit into the successional/developmental vegetation type patterns manifested by the vegetation data that was collected.

In such a vegetation classification it is important to recognize that the many different types of vegetation and landscape features found at LAVO represent a multi-dimensional continuum in which there are transitions from completely barren recently disturbed areas representing lava flows, volcanic ash, rock slides/deposits, and forest fires to undisturbed areas having nearly 100-percent cover of trees, shrubs, or herbaceous plants of one single species or mixtures of two or more species. When reviewing the vegetation data it is readily apparent that the data represent a continuum of cover and many transitions of mixes of plant forms (tree, shrub, and herbaceous) in the multi-dimensional vegetation classification space; there are few clear decisive boundaries that separate these vegetation types from the many ecotones that represent the transitions from one vegetation type into another. In addition, the major herbaceous types that can be found without tree or shrub overstories are also found as components or associates of the many tree or shrub types. The major shrub types found without a tree overstory are also found as components or associates of the many tree types. The herbaceous and shrub types all tend to transition into types that are eventually dominated by trees or shrubs and become associates of those other lifeforms.

For this reason, a first step in this classification process was to look at the vegetation classification from the perspective of the lifeform, considering tree, shrub, and herbaceous populations that are found in the Park irrespective of the combinations of lifeforms that occurred together at the same field site. Each lifeform was identified by the presence of a minimum of 10% cover of the highest/tallest lifeform in order of trees, shrubs, and finally herbaceous plants.

For the purposes of assigning type names at the lifeform level, a type was designated as a pure type if the predominant species was at least 90% composition of the cover of that lifeform. A type would be a mixed type if more than 10% cover was comprised by other species of the same lifeform. A species was assigned as an associated species of the type name if the species comprised at least 5% composition of the cover and a minimum of 2% cover of the lifeform, or if the species was the 3rd (minor but present) species component of the type and was present in the type. No more than three species designations were assigned to any individual type.

The order of the species listed in any type mix does not indicate the relative magnitude of any one species, but rather the presence of the listed species in that type. Thus, an *Abies magnifica*-*Abies concolor* (AM-AC) mix represents a range of mixes from approximately 90% AM-10% AC to 10% AM-90% AC. The same is true of the mixes comprised of three listed species; these mixes indicate that no one species is > 90% composition and that the three listed species are all present in amounts that sum to > 90% cover

composition. In cases when a 4th species is present, that 4th species competed with the 3rd species for inclusion in the type designation (e.g. an *Abies magnifica*-*Pinus monticola* (AM-PM) type with both *Pinus contorta* (PC) and *Tsuga mertensiana* (TM) present) and the final species of the type was assigned by determining the competing species with the greater amount of cover (if TM > PC, then assign type AM-PM-TM, else assign type AM-PM-PC). The cover of other species that did not fit one of the more prevalent type combinations were designated to an "Other" category, such that the AM-Other type indicates that there is significant cover (greater than 10%) of "Other" tree species that do not comprise one of the recognized AM-based types.

Many tree and shrub species were found as "pure" types. However, several tree and shrub species never formed "pure" types and are only included as a named species component of a mixed type. Tree species such as *Calocedrus decurrens*, *Pinus monticola*, *Pinus lambertiana*, and *Pinus ponderosa* were such tree species. Shrubs such as *Ceanothus cordulatus*, *Ceanothus velutinus*, and *Prunus emarginata* were shrub species similarly treated as component species and never "pure" species types. If such a component shrub species were later found to occur in pure situations they were assigned to the "Other" shrub type class. In addition, some isolated species occurrences, such as *Salix arctica*, or mixes of *Salix* species were categorized into a generalized *Salix* genus shrub type to abbreviate the list of individually named types. An attempt was also made to recognize "other" shrub and/or herbaceous mixes as Dry, Mesic, Subalpine, or Wet mixes based on the nature of the individual species that comprised these mixed plant communities.

Lastly, due to the very low occurrence of *Pinus ponderosa* (PP) throughout the park, and it's similarity to *Pinus jeffreyi* (PJ), the *Pinus ponderosa* cover was reclassified and summed with the *Pinus Jeffreyi* cover; if both species were present at a site the PP cover was added to the PJ cover and treated as PJ cover for the purposes of this vegetation classification.

A review of the field data by lifeform results in recognition of the following pure and mixed species types:

Tree Lifeform Types (T#)

<u>Name</u>	<u>Occurrences</u>
1. <i>Pinus albicaulis</i>	2
2. <i>Pinus albicaulis-Tsuga mertensiana</i>	8
3. <i>Tsuga mertensiana</i>	6
4. <i>Abies magnifica</i>	7
5. <i>Abies magnifica-Tsuga mertensiana</i>	13
6. <i>Abies magnifica-Pinus monticola</i>	15
7. <i>Abies magnifica-Pinus monticola-Tsuga mertensiana</i>	8
8. <i>Abies magnifica-Pinus monticola-Pinus contorta</i>	29
9. <i>Abies magnifica-Pinus contorta</i>	4
10. <i>Abies magnifica-Pinus contorta-Pinus jeffreyi</i>	3
11. <i>Abies magnifica-(Pinus monticola)-Pinus Jeffreyi</i>	5
12. <i>Abies magnifica-Abies concolor-Pinus contorta</i>	14
13. <i>Abies magnifica-Abies concolor-Pinus Jeffreyi</i>	6
14. <i>Abies magnifica-Abies concolor-Pinus monticola</i>	4
15. <i>Abies magnifica-Abies concolor</i>	11
16. <i>Abies magnifica-Other conifer(s)</i>	1
17. <i>Abies concolor</i>	26
18. <i>Abies concolor-Calocedrus decurrens-(Pinus jeffreyi)</i>	11
19. <i>Abies concolor-Pinus Jeffreyi</i>	30
20. <i>Abies concolor-Pinus Jeffreyi-Pinus contorta</i>	5
21. <i>Abies concolor- Pinus Jeffreyi-Pinus monticola</i>	2
22. <i>Abies concolor-Other conifer(s)</i>	-
23. <i>Pinus contorta</i>	24
24. <i>Pinus Jeffreyi</i>	27
25. <i>Pinus Jeffreyi-Pinus contorta</i>	3
26. <i>Pinus Jeffreyi- Pinus contorta-Pinus monticola</i>	5

27. <i>Pinus Jeffreyi</i> - <i>Pinus monticola</i>	3
28. <i>Pinus Jeffreyi</i> -Other conifer(s)	3
29. <i>Cercocarpus ledifolius</i>	1
30. <i>Cercocarpus ledifolius</i> - <i>Pinus Jeffreyi</i>	3
31. <i>Populus tremuloides</i>	3
32. <i>Populus tremuloides</i> - <i>Pinus contorta</i>	1
33. <i>Salix lucida</i>	2

Total Tree Lifeform Occurrences **277**

Shrub Lifeform Types (S#)

<u>Name</u>	<u>Occurrences</u>
38. <i>Arctostaphylos nevadensis</i>	42
42. <i>Arctostaphylos nevadensis</i> - <i>Chrysolepis sempervirens</i> - <i>Holodiscus microphyllus</i>	7
43. <i>Arctostaphylos nevadensis</i> -Mix	46
44. <i>Arctostaphylos patula</i>	4
45. <i>Arctostaphylos patula</i> - <i>Ceanothus cordulatus</i>	2
49. <i>Arctostaphylos patula</i> -Mix	42
50. <i>Chrysolepis sempervirens</i>	3
51. <i>Quercus vacciniifolia</i>	1
54. <i>Quercus vacciniifolia</i> -Mix	13
55. <i>Ericameria bloomeri</i>	3
56. <i>Ericameria bloomeri</i> -Mix	5
57. <i>Holodiscus microphyllus</i>	5
58. <i>Alnus incana</i>	7
61. <i>Alnus incana</i> -Mix	4
64. <i>Salix</i> -(Mix) shrub	8
66. Dry Other Mix shrub	6
67. Dry Other shrub	3
68. Other Mix shrub	7
69. Other Shrub	2

Total Shrub Lifeform Occurrences **210**

Herbaceous (Forb) Lifeform Types (H#)

<u>Name</u>	<u>Occurrences</u>
70. <i>Achnatherum occidentale</i> - <i>Elymus elymoides</i> -(Mix)	52
71. <i>Lupinus obtusifolius</i> - <i>Polygonum davisiae</i>	28
72. <i>Lupinus obtusifolius</i> - <i>Achnatherum occidentale</i> - <i>Elymus elymoides</i>	10
73. <i>Pteridium aquilinum</i>	1
74. <i>Wyethia mollis</i> - <i>Balsamorhiza sagittata</i>	12
75. Sedge Mixed Herbaceous Meadow	3
76. <i>Polygonum amphibium</i>	1
77. <i>Typha latifolia</i>	1
78. <i>Menyanthes trifoliata</i> - <i>Nuphar lutea</i> (Wet Herbaceous Marsh)	1
79. Dry Mixed Herbaceous	17
80. Dry Mixed Graminoid	3
82. Mesic Herbaceous Meadow/Complex	9
83. Subalpine Herbaceous Meadow	-
84. Subalpine Graminoid Meadow	-
85. Wet Herbaceous Meadow	28
86. Other Mixed Herbaceous	8
87. Other Mixed Graminoid	3

Total Herbaceous Lifeform Occurrences **177**

Other Landscape Feature Types (O#)

<u>Name</u>	<u>Occurrences</u>
88. Sparse Vegetation Woodland	2
89. Sparse Vegetation Shrubland	-
90. Sparse Vegetation Herbaceous	-
92. Barren Woodland	5
93. Barren Shrubland	1
94. Barren Herbaceous	5
95. Barren	37
97. Barren-other	-
96. Snow	3
98. Water	10

Total Other Landscape Feature Occurrences

63

Species that were associated with a predominant component which did not fit one of the more typical types were given a “-Other” or a “-Mix” designation depending on whether or not there were one or more associated species. Some mixed types were designated as Dry, Mesic, Subalpine, or Wet types depending on the species that comprised the mixtures.

Associations were formed by associating an overstory lifeform component with an understory lifeform component, if one was present. Only one understory component was associated with an overstory component. In cases when two different components could have been associated with an overstory component, the higher/taller component was associated with the overstory component. Significance in determining the association with an understory component was determined first by the presence of indicator species such as *Arctostaphylos nevadensis*, *Wyethia mollis*, and *Lupinus obtusifolius*, secondly by the lifeform of the component(s), and lastly by relative magnitude of cover of the component(s). After review of indicator species, shrub components took precedence over herbaceous components providing shrub cover contributed at least 10% cover and generally, but not always, at least as much shrub cover as would equal 50% of the herbaceous cover that was present.

In some cases the species or designations (e.g. “-Mix”) that were included in an Association name were not always present in areas named as that Association. Such species or designations were considered as optional species or designations and have been indicated as such by being embedded in “()”.

(Viewing the groupings of the field data by lifeform components was accomplished in the field data excel spreadsheets by sorting the field data from left to right by Row 9 for Trees, Row 10 for Shrubs, or Row 11 for Herbaceous plants and Other types. Such groupings tended to indicate fairly consistent relationships of the different species that occurred in the different types that have been identified in this classification effort.)

Lassen Volcanic National Park Alliances and Associations

The alliances and associations listed below often represent combinations of the aforementioned types that were identified by lifeform. Tree Alliances may have either a shrub or an herbaceous associate, if sufficient cover representative of the associate is present in combination with the Alliance. Similarly, Shrub Alliances may have an herbaceous associate, if sufficient cover representative of the associate is present. Alliances and their associate together form associations. These associations are typically listed as they might occur along an elevational gradient, from higher to lower elevation. A unique number has been assigned to each Alliance and Association and the number of occurrences of the type is indicated by the value of [x] immediately following the unique number. The type number is up to a 4-digit unique number in which the first two digits represent the numeric code of the overstory component of the association and the last two digits represent the numeric code of the associated understory vegetation component (these numeric 2-digit values are listed for the different association component names on pages 2-4). Tree type numbers start at number 100, shrub type numbers begin at number 3800, herbaceous type numbers begin at 7000, and “other” type numbers (representing landscape features) begin at number 8900.

I. Forests and Woodlands

Forest - Trees usually over five meters tall with their crowns interlocking (generally forming 60–100% cover). Woodland - Trees usually over five meters tall with their crowns interlocking (generally forming 25–59.9% cover). Sparse Woodland - Trees usually over five meters tall with their crowns not interlocking (generally forming 10–24.9% cover).

Sites in an association may bridge density classes when the association’s species composition did not differ significantly between the sites representing the different density classes. In such cases, multiple density classes were assigned to an association’s density designation. For associations whose average cover data fell within either the Sparse Woodland or Woodland density classes and the association is believed to occur both of these density classes, the “Sparse” density designation is listed and embedded in “()” as (Sparse).

I.A. Evergreen forests and woodlands

Evergreen species generally contribute at least 90 percent of the total tree cover.

I.A.1. Needle-leaved evergreen forests and woodlands

I.A.1.1. *PINUS ALBICAULIS* WOODLAND SPARSE ALLIANCE (Treeline communities)

171. [2] *Pinus albicaulis/Lupinus obtusilobus-Polygonum davisiae* Sparse Woodland

I.A.1.2. SUBALPINE MIXED NEEDLELEAF WOODLAND (SPARSE) ALLIANCE (Subalpine woodlands)

271. [8] *Pinus albicaulis-Tsuga mertensiana/Lupinus obtusilobus-Polygonum davisiae* (Sparse) Woodland

I.A.1.3. *TSUGA MERTENSIANA* WOODLAND (SPARSE) ALLIANCE (Subalpine and Upper woodlands)

338. [1] *Tsuga mertensiana/Arctostaphylos nevadensis* (Sparse) Woodland

371. [2] *Tsuga mertensiana/Lupinus obtusilobus-Polygonum davisiae* (Sparse) Woodland

372. [3] *Tsuga mertensiana/Lupinus obtusilobus-Achnatherum occidentale-Elymus elymoides* (Sparse) Woodland

**I.A.1.4. ABIES MAGNIFICA FOREST AND WOODLAND (SPARSE) ALLIANCE
(Upper- and Mid-montane forests and woodlands)**

400. [5] *Abies magnifica*/Sparse Understory Forest/(Sparse) Woodland
438. [2] *Abies magnifica*/*Arctostaphylos nevadensis* (Sparse) Woodland

**I.A.1.5. ABIES MAGNIFICA-MIXED NEEDLELEAF FOREST AND WOODLAND (SPARSE) ALLIANCE
(Upper- and Mid-montane forests and woodlands)**

500. [5] *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/Sparse Understory Forest/Woodland
538. [5] *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Arctostaphylos nevadensis* (Sparse) Woodland
542. [1] *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus* (Sparse) Woodland
570. [1] *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Sparse Woodland
571. [1] *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Lupinus obtusilobus*-*Polygonum davisiae* (Sparse) Woodland
574. [-] *Abies magnifica*-(*Pinus monticola*)-(*Tsuga mertensiana*)/*Wyethia mollis*-*Balsamorhiza sagittata* Sparse Woodland (see 1374, 2374, and 2474)
600. [1] *Abies magnifica*-*Pinus monticola*/Sparse Understory Woodland
642. [1] *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus* (Sparse) Woodland
643. [13] *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland
1143. [5] *Abies magnifica*-(*Pinus monticola*)-*Pinus Jeffreyi*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland
1643. [1] *Abies magnifica*-Other Conifer/*Arctostaphylos nevadensis*-Mix (Sparse) Woodland

**I.A.1.6. ABIES MAGNIFICA-PINUS CONTORTA-MIXED NEEDLELEAF FOREST AND WOODLAND
(SPARSE) ALLIANCE (Mid-montane forests and woodlands)**

800. [6] *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/Sparse Understory Forest/Woodland
838. [20] *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/*Arctostaphylos nevadensis* Forest/(Sparse) Woodland
843. [1] *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/*Arctostaphylos nevadensis*-Mix Sparse Woodland
870. [4] *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Forest/(Sparse) Woodland
879. [1] *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/Dry Mixed Herbaceous Forest/Woodland
882. [1] *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/Mesic Herbaceous Meadow (Sparse) Woodland
1000. [2] *Abies magnifica*-*Pinus contorta*-*Pinus Jeffreyi*/Sparse Understory Forest/Woodland
1043. [1] *Abies magnifica*-*Pinus contorta*-*Pinus Jeffreyi*/*Arctostaphylos nevadensis*-Mix (Sparse) Woodland

I.A.1.7. TRUE-FIR-MIXED NEEDLELEAF FOREST AND WOODLAND (SPARSE) ALLIANCE (Mid-montane forests and woodlands)

1500. [6] *Abies magnifica*-*Abies concolor*/Sparse Understory Forest/Woodland
1543. [1] *Abies magnifica*-*Abies concolor*/*Arctostaphylos nevadensis*-Mix (Sparse) Woodland
1549. [3] *Abies magnifica*-*Abies concolor*/*Arctostaphylos patula*-Mix Woodland
1570. [1] *Abies magnifica*-*Abies concolor*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Forest/Woodland

I.A.1.8. TRUE-FIR-LONG NEEDLE PINE-MIXED NEEDLELEAF FOREST AND WOODLAND (SPARSE) ALLIANCE (Mid-montane forests and woodlands)

1300. [3] *Abies magnifica-Abies concolor-Pinus Jeffreyi*/Sparse Understory Forest/Woodland
1343. [1] *Abies magnifica-Abies concolor-Pinus Jeffreyi/Arctostaphylos nevadensis*-Mix Woodland
1369. [1] *Abies magnifica-Abies concolor-Pinus Jeffreyi*/Other Shrub Sparse Woodland
1374. [1] *Abies magnifica-Abies concolor-Pinus Jeffreyi/Wyethia mollis-Balsamorhiza sagittata* Forest/Woodland
1400. [2] *Abies magnifica-Abies concolor-Pinus monticola*/Sparse Understory Forest/Woodland
1438. [2] *Abies magnifica-Abies concolor-Pinus monticola/Arctostaphylos nevadensis* (Sparse) Woodland

I.A.1.9. TRUE-FIR-LOGEPOLE PINE-MIXED NEEDLELEAF FOREST AND WOODLAND (SPARSE) ALLIANCE (Mid-montane forests and woodlands)

1200. [5] *Abies magnifica-Abies concolor-Pinus contorta*/Sparse Understory Forest
1238. [5] *Abies magnifica-Abies concolor-Pinus contorta/Arctostaphylos nevadensis* Forest/Woodland
1251. [1] *Abies magnifica-Abies concolor-Pinus contorta/Quercus vaccinifolia* Forest/Woodland
1255. [1] *Abies magnifica-Abies concolor-Pinus contorta/Ericameria bloomeri* Sparse Woodland
1270. [2] *Abies magnifica-Abies concolor-Pinus contorta/Achnatherum occidentale-Elymus elymoides*-(Mix) Forest/Woodland

I.A.1.10. ABIES CONCOLOR FOREST AND WOODLAND (SPARSE) ALLIANCE (Mid-montane forests and woodlands)

1700. [16] *Abies concolor*/Sparse Understory Forest/Woodland
1738. [1] *Abies concolor/Arctostaphylos nevadensis* Forest
1749. [4] *Abies concolor/Arctostaphylos patula*-Mix (Sparse) Woodland
1750. [2] *Abies concolor/Chrysolepis sempervirens* (Other Shrub) Forest
1754. [3] *Abies concolor/Quercus vaccinifolia*-(Mix) Woodland

I.A.1.11. ABIES CONCOLOR-MIXED NEEDLELEAF FOREST AND WOODLAND (SPARSE) ALLIANCE (Mid-montane forests and woodlands)

1800. [4] *Abies concolor-Calocedrus decurrens-Pinus jeffreyi*/Sparse Understory Forest/Woodland
1838. [1] *Abies concolor-Calocedrus decurrens-Pinus jeffreyi/Arctostaphylos nevadensis* Woodland
1854. [3] *Abies concolor-Calocedrus decurrens-Pinus jeffreyi/Quercus vaccinifolia*-(Mix) Forest/(Sparse) Woodland
1866. [1] *Abies concolor-Calocedrus decurrens-Pinus jeffreyi*/Dry Mixed Shrub (Sparse) Woodland
1867. [1] *Abies concolor-Calocedrus decurrens-Pinus jeffreyi*/Dry Other Shrub Forest/Woodland
1869. [1] *Abies concolor-Calocedrus decurrens-Pinus jeffreyi*/Other Shrub Forest
1900. [11] *Abies concolor-Pinus jeffreyi*/Sparse Understory Forest/Woodland
1943. [2] *Abies concolor-Pinus jeffreyi/Arctostaphylos nevadensis*-Mix Sparse Woodland
1945. [2] *Abies concolor-Pinus jeffreyi/Arctostaphylos patula-Ceanothus cordulatus* (Sparse) Woodland
1949. [7] *Abies concolor-Pinus jeffreyi/Arctostaphylos patula*-(Mix) (Sparse) Woodland
1950. [1] *Abies concolor-Pinus jeffreyi/Chrysolepis sempervirens* (Other Shrub) Forest/Woodland
1956. [1] *Abies concolor-Pinus jeffreyi/Ericameria bloomeri*-Mix Sparse Woodland
1968. [2] *Abies concolor-Pinus jeffreyi*/Other Mixed Shrub Forest/(Sparse) Woodland
1970. [2] *Abies concolor-Pinus jeffreyi/Achnatherum occidentale-Elymus elymoides*-(Mix) (Sparse) Woodland
1986. [1] *Abies concolor-Pinus jeffreyi*/Other Mixed Herbaceous Woodland
1987. [1] *Abies concolor-Pinus jeffreyi*/Other Mixed Graminoid Forest/Woodland
2043. [3] *Abies concolor-Pinus jeffreyi-Pinus contorta/Arctostaphylos nevadensis*-(Mix) Sparse Woodland
2070. [2] *Abies concolor-Pinus jeffreyi-Pinus contorta/Achnatherum occidentale-Elymus elymoides*-(Mix) Forest/Woodland
2100. [2] *Abies concolor-Pinus jeffreyi-Pinus monticola*/Sparse Understory Sparse Woodland

**I.A.1.12. *PINUS CONTORTA* VAR. *MURRAYANA* FOREST AND WOODLAND (SPARSE) ALLIANCE
(Mid-montane forests and woodlands)**

2300. [2] *Pinus contorta*/Sparse Understory Forest/Woodland
2343. [3] *Pinus contorta*/*Arctostaphylos nevadensis*-(Mix) Forest/Woodland
2355. [2] *Pinus contorta*/*Ericameria bloomeri* (Sparse) Woodland
2359. [2] *Pinus contorta*/*Alnus incana*-Mix (Sparse) Woodland
2368. [1] *Pinus contorta*/Other Mixed Shrub Sparse Woodland
2370. [10] *Pinus contorta*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Forest/Woodland
2374. [1] *Pinus contorta*/*Wyethia mollis*-*Balsamorhiza sagittata* Woodland
2380. [2] *Pinus contorta*/Dry Mixed Graminoid Woodland
2386. [1] *Pinus contorta*/Other Mixed Herbaceous Forest/Woodland

**I.A.1.13. *PINUS JEFFREYI* FOREST AND WOODLAND (SPARSE) ALLIANCE
(Upper- and Mid-montane forests and woodlands)**

2400. [4] *Pinus jeffreyi*/Sparse Understory Woodland
2443. [3] *Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix Sparse Woodland
2449. [9] *Pinus jeffreyi*/*Arctostaphylos patula*-(Mix) (Sparse) Woodland
2454. [2] *Pinus jeffreyi*/*Quercus vacciniifolia*-(Mix) Forest/Woodland
2457. [1] *Pinus jeffreyi*/*Holodiscus microphyllus* (Other Shrub) Sparse Woodland
2467. [1] *Pinus jeffreyi*/Dry Other Shrub Forest/Woodland
2470. [2] *Pinus jeffreyi*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Forest/Woodland
2473. [1] *Pinus jeffreyi*/*Pteridium aquilinum* Woodland
2474. [3] *Pinus jeffreyi*/*Wyethia mollis*-*Balsamorhiza sagittata* (Sparse) Woodland
2480. [1] *Pinus jeffreyi*/Dry Mixed Graminoid Forest/Woodland

**I.A.1.14. *PINUS JEFFREYI*-MIXED NEEDLELEAF WOODLAND (SPARSE) ALLIANCE
(Mid-montane forests and woodlands)**

2543. [2] *Pinus jeffreyi*-*Pinus contorta*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland
2587. [1] *Pinus jeffreyi*-*Pinus contorta*/Other Mixed Graminoid Sparse Woodland
2600. [5] *Pinus jeffreyi*-*Pinus contorta*-*Pinus monticola*/Sparse Understory (Sparse) Woodland
2749. [1] *Pinus jeffreyi*-*Pinus monticola*/*Arctostaphylos patula*-Mix (Sparse) Woodland
2757. [2] *Pinus jeffreyi*-*Pinus monticola*/*Holodiscus microphyllus* (Other Shrub) Sparse Woodland
2800. [1] *Pinus jeffreyi*-Other Conifer/Sparse Understory (Sparse) Woodland
2849. [1] *Pinus jeffreyi*-Other Conifer/*Arctostaphylos patula*-(Mix) Sparse Woodland
2870. [1] *Pinus jeffreyi*-Other Conifer/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) (Sparse) Woodland

I.A.2. Sclerophyllous xeromorphic evergreen woodlands

I.A.2.1. *CERCOCARPUS LEDIFOLIUS* WOODLAND (SPARSE) ALLIANCE

3186. [1] *Cercocarpus ledifolius*/Other Mixed Herbaceous Sparse Woodland
3257. [1] *Cercocarpus ledifolius*-*Pinus jeffreyi*/*Holodiscus microphyllus* (Other Shrub) Woodland
3266. [2] *Cercocarpus ledifolius*-*Pinus jeffreyi*/Dry Mixed Shrub (Sparse) Woodland

I.B. Deciduous forests and woodlands

Deciduous tree species generally contribute greater than 90 percent of the total tree cover

II.B.1. Seasonally flooded cold deciduous forests and woodlands

I.B.1.1. *SALIX LUCIDA* SSP. *LASIANDRA* FOREST AND WOODLAND ALLIANCE (not SHRUBLANDS)

3580. [1] *Salix lucida*/Dry Mixed Graminoid Forest/Woodland

3587. [1] *Salix lucida*/Other Mixed Graminoid Forest

I.B.2. Montane or boreal cold deciduous forests and woodlands

I.B.2.1. *POPULUS TREMULOIDES* FOREST AND WOODLAND ALLIANCE

3300. [1] *Populus tremuloides*/Sparse Understory Forest

3370. [2] *Populus tremuloides/Achnatherum occidentale-Elymus elymoides*-(Mix) Forest/Woodland

3465. [1] *Populus tremuloides-Pinus contorta/Salix (lemmonii)* Shrub Forest/Woodland

II. Shrubland

Shrubs or trees usually 0.5 to five meters tall with individuals or clumps not touching to interlocking (generally forming stands with a minimum of 10 percent canopy cover and less than 10% tree cover).

II.A. Evergreen shrubland

Evergreen species generally contribute greater than 90 percent of the total shrub cover.

II.A.1. Sclerophyllous temperate broad-leaved evergreen shrubland

II.A.1.1. *ARCTOSTAPHYLOS NEVADENSIS* SHRUBLAND ALLIANCE

3800. [3] *Arctostaphylos nevadensis* Shrubland

3870. [2] *Arctostaphylos nevadensis/Achnatherum occidentale-Elymus elymoides*-(Mix) Shrubland

4200. [3] *Arctostaphylos nevadensis-Chrysolepis sempervirens-Holodiscus microphyllus* Shrubland

4270. [1] *Arctostaphylos nevadensis-Chrysolepis sempervirens-Holodiscus microphyllus/Achnatherum occidentale-Elymus elymoides*-(Mix) Shrubland

4271. [1] *Arctostaphylos nevadensis-Chrysolepis sempervirens-Holodiscus microphyllus/Lupinus obtusilobus-Polygonum davisiae* Shrubland

4300. [5] *Arctostaphylos nevadensis*-Mix Shrubland

4370. [4] *Arctostaphylos nevadensis*-Mix/*Achnatherum occidentale-Elymus elymoides*-(Mix) Shrubland

4379. [1] *Arctostaphylos nevadensis*-Mix/Dry Mixed Herbaceous Shrubland

II.A.1.2. *ARCTOSTAPHYLOS PATULA* SHRUBLAND ALLIANCE

4400. [4] *Arctostaphylos patula* Shrubland

4900. [14] *Arctostaphylos patula*-Mix Shrubland

4970. [1] *Arctostaphylos patula*-Mix/*Achnatherum occidentale-Elymus elymoides*-(Mix) Shrubland

4979. [2] *Arctostaphylos patula*-Mix/Dry Mixed Herbaceous Shrubland

II.A.1.3. *QUERCUS VACCINIIFOLIA* SHRUBLAND ALLIANCE

5400. [4] *Quercus vacciniifolia*-Mix Shrubland

5479. [1] *Quercus vacciniifolia*-Mix/Dry Mixed Herbaceous Shrubland

II.A.1.4. ERICAMERIA BLOOMERI SHRUBLAND ALLIANCE

5670. [4] *Ericameria bloomeri*-(Mix)/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

II.A.1.5. DRY OTHER-(MIXED) SHRUBLAND ALLIANCE

6670. [2] Dry Other-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

6679. [1] Dry Other-Mix/Dry Mixed Herbaceous Shrubland

6700. [1] Dry Other Shrubland

II.A.1.6. OTHER MIXED SHRUBLAND ALLIANCE

6879. [2] Other-(*Chrysolepis sempervirens*)-Mix/Dry Mixed Graminoid Shrubland

6886. [2] Other-Mix/Other Mixed Herbaceous Shrubland

II.B. Deciduous shrubland.

Deciduous species generally contribute greater than 90 percent of the total shrub cover.

II.B.1. Temperate cold deciduous shrubland

II.B.1.1. HOLODISCUS MICROPHYLLUS SHRUBLAND ALLIANCE

5700. [1] *Holodiscus microphyllus* Shrubland

II.B.2. Seasonally flooded cold deciduous shrubland

II.B.2.1. ALNUS INCANA SHRUBLAND ALLIANCE

5800. [3] *Alnus incana* Shrubland

5882. [1] *Alnus incana*/Mesic Herbaceous Meadow Shrubland

5885. [2] *Alnus incana*/Wet Herbaceous Meadow Shrubland

5886. [1] *Alnus incana*/Other Mixed Herbaceous Shrubland

6179. [1] *Alnus incana*-*Salix* sp./Dry Mixed Herbaceous Shrubland

6185. [1] *Alnus incana*-*Salix* sp./Wet Herbaceous Meadow Shrubland

II.B.2.2. SALIX SHRUBLAND ALLIANCE

6475. [1] *Salix*-Mix/Sedge Mixed Herbaceous Meadow Shrubland

6482. [2] *Salix*-Mix/Mesic Herbaceous Meadow Shrubland

6485. [4] *Salix*-(Mix)/Wet Herbaceous Meadow Shrubland

III. Herbaceous vegetation

Graminoids and/or forbs (including ferns) greater than 10 percent cover with woody cover less than 10 percent.

III.A. Perennial forb vegetation

Perennial forbs generally contribute greater than 50 percent of total herbaceous cover.

III.A.1. Alpine, subalpine, and upper-montane perennial forb vegetation

III.A.1.1. LUPINUS OBTUSILOBUS PERENNIAL HERBACEOUS ALLIANCE

7100. [14] *Lupinus obtusilobus*-*Polygonum davisiae* (Mixed) Herbaceous

7200. [7] *Lupinus obtusilobus*-*Achnatherum occidentale*-*Elymus elymoides* Mixed Herbaceous

III.A.1.2. WYETHIA MOLLIS PERENNIAL HERBACEOUS ALLIANCE

7400. [7] *Wyethia mollis*-*Balsamorhiza sagittata* (Mixed) Herbaceous Meadow

III.A.2. Mid-montane perennial forb vegetation

III.A.2.1. PTERIDIUM AQUILINUM PERENNIAL HERBACEOUS ALLIANCE

7300. [-] *Pteridium aquilinum* Herbaceous

III.B. Perennial graminoid vegetation

Graminoids over one meter tall when inflorescences are fully developed, generally contributing to greater than 50 percent of total herbaceous cover.

III.B.1. Alpine, subalpine, and upper-montane bunch grassland

III.B.1.1. ACHNATHERUM OCCIDENTALIS-ELYMUS ELYMOIDES HERBACEOUS ALLIANCE

7000. [10] *Achnatherum occidentale*-*Elymus elymoides*-(Mix) Herbaceous

III.B.1.2. Other Graminoid dominated HERBACEOUS ALLIANCE

8000. [-] Dry Mixed Graminoid

8400. [-] Subalpine Graminoid Meadow

8700. [-] Other Mixed Graminoid Meadow

III.B.2. Alpine, subalpine, and upper-montane graminoid-forb mix

III.B.2.1. OTHER HERBACEOUS ALLIANCE

7900. [7] Dry Mixed Herbaceous

7500. [2] Sedge Mixed Herbaceous Meadow

8200. [5] Mesic Herbaceous Meadow/Complex

8300. [-] Subalpine Herbaceous Meadow

8500. [21] Wet Herbaceous Meadow

8600. [2] Other Mixed Herbaceous

III.C. Hydromorphic rooted vegetation

Nonemergent graminoids and forbs structurally supported by water and rooted in substrate (e.g., pond weeds and water lilies).

III.C.1. POLYGONUM AMPHIBIUM VAR. STIPULACEUM PERMANENTLY FLOODED ALLIANCE

7600. [1] *Polygonum amphibium* Herbaceous

III.C.2. TYPHA LATIFOLIA SATURATED ALLIANCE

7700. [1] *Typha latifolia* Mixed Herbaceous

III.C.3. MENYANTHES TRIFOLIATA-NUPHAR LUTEA SSP. POLYSEPALA SATURATED ALLIANCE

7800. [1] *Menyanthes trifoliata*-*Nuphar lutea* Mixed Herbaceous

IV. Sparse or Not vegetated – other feature types

Sparse types are $\geq 15\%$ cover vegetation and lifeform designation is based on presence of the lifeform in order of tree, shrub, and then herbaceous.

Barren types are $< 15\%$ cover vegetation and lifeform designation is based on presence of the lifeform in order of tree, shrub, and then herbaceous. Post Disturbance-fire designation assigned to recently burned or disturbed areas basically lacking vegetation. Painted Dunes designation assigned to barren areas within the vicinity of the Painted Dunes.

IV.A.1. SPARSELY VEGETATED LANDSCAPE FEATURE

8800. [2] – Sparse Vegetation Woodland Feature
8900. [-] – Sparse Vegetation Shrubland Feature
9000. [-] – Sparse Vegetation Herbaceous Feature

IV.A.2. BARREN LANDSCAPE FEATURE

9200. [5] - Barren Woodland Feature
9300. [1] - Barren Shrubland Feature
9400. [5] - Barren Herbaceous Feature
9500. [37] - Barren Feature

IV.A.3. SNOW (COVERED) LANDSCAPE FEATURE

9600. [3] – Snow Feature

IV.A.4. WATER LANDSCAPE FEATURE

9800. [10] – Water Features

Lassen Volcanic National Park Vegetation Descriptions

Vegetation descriptions for the Associations developed during the Vegetation Classification efforts have been developed based upon the field data that was developed to represent the different field sites visited during the 2006-2007 field data collection efforts.

All plants encountered at field sites were identified to genus and species, if possible. When field crew staff encountered any unknown plant species, the unknown species was collected for subsequent identification. In many cases photos were also taken of the plants in their native environment. The collected specimens were then reviewed by GRS field crew botanists upon their return from the field. Plants that were not immediately identifiable were placed in a plant press for subsequent identification by other knowledgeable botanists. In addition to GRS field crew botanists, Michelle Cox, Park Ecologist for Lassen Volcanic National Park, and Dr. Lawrence Janeway, curator of the California State University at Chico (CSUC) Herbarium, which houses the LAVO Plant Collection, reviewed and identified many of the remaining unknown plant specimens during December, 2006 and January, 2007. Nearly all unknown plant species were eventually identified, except those specimens that lacked sufficient plant material necessary to enable the identification of the specimen. Plants that were not identified to species are referenced by genus and the word "species" in the Vegetation Description tables.

The cover and frequency values included in the Vegetation Description tables are based upon only those field sites visited and the vegetation data collected during the 2006-2007 field data collection efforts and do not include any field data collected during the subsequent LAVO Accuracy Assessment efforts. Cover estimates reflect values and averages developed on the basis of all the field sites classified as members of a particular association. The "frequency" of any particular species or landscape feature is expressed as a percentage and based upon the number of field sites of a particular association on which that vegetation or landscape feature was observed relative to the total number of field sites of that association. Species and features are grouped by lifeform in the data tables. Species and features are listed in descending order of "Total" frequency and then average cover within each lifeform group, so the most frequently occurring species and features are listed first and the species and features with the greatest cover are listed first within species/features having the same frequency.

Each vegetation description includes the name of the association's Alliance and the number of field site samples that contributed to the Association's description. Each association's coded name, as found in the map data sets, is also listed. In addition, each vegetation description includes a reference to the same association or similar associations that have been identified and described at the NatureServe Explorer website under the Ecological Communities and Systems option at the following web address: <http://www.natureserve.org/explorer/servlet/NatureServe?init=Ecol>. Each referenced association's name and reference number are listed in the vegetation description so that these same or similar association may easily be accessed at this website and reviewed.

The coded association names include references to the vegetation genus and species, as well as to landscape features. The coding was intended to be intuitive with respect to what the codes represent; each letter has particular meaning with respect to the association name that the code(s) is used to represent. For tree and shrub components the coded values are comprised of two capitalized characters that represent the first letters of the genus and species. For example, the coded value for *Pinus albicaulis* is PA. In a few cases when this approach does not result in unique codes, the second letter of the species is included as a lower case character. For example, PTe represents *Populus tremuloides* whereas PTi would represent *Populus trichocarpa*. When multiple tree or shrub species comprise an association name they are separated by a dash (-). For herbaceous plants, the coded values represent the genus and species, but only the character representing the genus is capitalized while the character representing the species is lower case. For example, the coded value for *Typha latifolia* is Tl; the first letter of the genus is capitalized while the first letter of the species is lower case. In a few cases when this approach does not result in unique codes, the second letter of the species is included as a lower case character. As a result, the coded value for *Pteridium aquilinum* is Paq while the coded value for *Polygonum amphibium* is Pam. In a very few cases, the coded values are both capitalized and represent a combination of the first letter of the genera that are combined in the coded value (e.g. AE represents the combination of *Achnatherum*

occidentale and *Elymus elymoides*). These conventions were used to distinguish herbaceous codes that sometimes had the same two character codes as a tree or shrub code and to make the herbaceous plant codes more easily distinguishable from the tree or shrub codes. To further distinguish the herbaceous species codes, herbaceous combinations that occurred as an association of multiple plant species codes are listed without a dash (e.g. *Wyethia mollis-Balsamorhiza sagittata* is listed as WmBs). Lastly, the inclusion of a coded characteristic in parentheses “()” indicates that the presence of the characteristic is optional in that Association and may not always be present.

In addition to all the species codes there are also a few other codes that represent generalized tree or shrub mixes or landscape features; such codes may include a modifier like “Dry” that represents dry shrub species or a code like “Sal” that represents the truncated genus of a mix of *Salix* species. The following coded Associations represent names that are not species-specific named Associations:

<u>Coded Association Value</u>	<u>Meaning</u>
-Mix	Mixed
OtC:tree	Other Conifer
OtH:tree	Other Hardwood
DOth:shrub	Dry Other Shrub
DMix:shrub	Dry Mixed Shrub
SMix:shrub	Other Mixed Shrub
SOth:shrub	Other Shrub
HDG:herb	Dry Mixed Graminoid
HDX:herb	Dry Mixed Herbaceous
HOG:herb	Other Graminoid
HOX:herb	Other Mixed Herbaceous
HMM:herb	Mesic Herbaceous Meadow/Complex
HSG:herb	Subalpine Graminoid Meadow
HSM:herb	Sedge Mixed Herbaceous Meadow
HWM:herb	Wet Herbaceous Meadow
SVgW:other	Sparse Vegetation Woodland features
SVgS:other	Sparse Vegetation Shrubland features
SVgH:other	Sparse Vegetation Herbaceous features
BarW:other	Barren Woodland features
BarS:other	Barren Shrubland features
BarH:other	Barren Herbaceous features
Bar:other	Barren features
Snow:other	Snow features
H2O:other	Water features
UNK:other	Unknown feature

Any references to the LAVO Association Key that are made in the vegetation descriptions are indicated by the use of the word “Key” rather than “key”. All references to the word “cover” by itself refer to “Bird’s-eye view” cover. Whenever total cover is being described or referenced it will be preceded by the word “total” to distinguish it from the “Bird’s-eye view” cover.

For a description of how these sites were selected and sampled please see [Chapter 2 in the Lassen Volcanic National Park Comparative Mapping Project Report](#).

The Vegetation Descriptions that follow are found in the order listed above on [pages 231-238 in Appendix X](#).

Plant Association: *Pinus albicaulis/Lupinus obtusilobus–Polygonum davisiae*
Sparse Woodland

Plant Association Code: PA:tree/LoPd:herb

Alliance: *Pinus albicaulis* Woodland Sparse

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus albicaulis /Penstemon davidsonii* Woodland (1.B.2.Nd - CEGLO03134), has been described in the vicinity of Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2700 to 2900m (8800' to 9500'). Aspects were of a broad range, but most typically of a southerly direction on moderately steep slopes. Soils are characterized by a predominance of fine gravelly material and bare rock outcrops, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" and "Emeraldlake-Readingpeak-Terracelake-Rock outcrop complex, 30 to 95 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Pinus albicaulis was the dominant tree species with 100% frequency and average cover of 13.5%; cover estimates ranged from 10 to 17%. Common forb associates were *Lupinus obtusilobus*, with frequency of 100% and average cover of 16% with range of 10 to 22% and *Polygonum davisiae*, with frequency of 50% and average cover of 5%. No shrub associates were observed. No other understory herbaceous vegetation was observed. The tree form of the *Pinus albicaulis* was often shrublike, less than 20 feet tall. Litter accumulation was extremely sparse to absent. The ground surface was composed primarily of barren rock, having average cover of 38% and fine gravelly soil having average cover of 28%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 171: *Pinus albicaulis*/*Lupinus obtusilobus*-*Polygonum davisiae* Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Pinus albicaulis</i>	100	13.5	10	17	100	13.5	10	17
Total tree		13.5				13.5		
Total shrub		0				0		
<i>Lupinus obtusilobus</i>	100	16	10	22	100	16	10	22
<i>Polygonum davisiae</i>	50	5	10	10	50	5	10	10
Total herbaceous		21				21		
Total nonvascular		0				0		
Barren - rock	100	37.5	15	60	100	37.5	15	60
Barren - fine gravelly soil	100	27.5	20	35	100	27.5	20	35
Barren - litter	50	0.5	1	1	50	0.5	1	1
Total other		65.5				65.5		
Totals		100				100		

Plant Association: *Pinus albicaulis-Tsuga mertensiana/Lupinus obtusilobus-Polygonum davisiae* (Sparse) Woodland

Plant Association Code: PA-TM:tree/LoPd:herb

Alliance: Subalpine Mixed Needleleaf Woodland (Sparse)

Number of sites: 8

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Pinus albicaulis - Tsuga mertensiana* / Mixed Herbaceous Woodland (1.B.2.Nd - CEGLO03132), has been described in the vicinity of Yosemite National Park, California.



Environmental Characteristics

This association was typically found on the dry, rocky, upper slopes of Mt. Lassen, Brokeoff Mountain, and other high peaks within Lassen Volcanic National Park at elevations from approximately 2500m to 2800m (8200' to 9200'). Aspects were of a broad range but most commonly of a southerly to northwesterly direction on slopes ranging from gentle to steep. Soils are characterized by a codominance of fragmented rock and fine gravelly material, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" and "Emeraldlake-Readingpeak-Terracelake-Rock outcrop complex, 30 to 95 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was co-dominated by the tree species *Pinus albicaulis* and *Tsuga mertensiana*. *Pinus albicaulis* was found to have 100% frequency and average cover of 9%; cover estimates ranged from 2 to 15%. *Tsuga mertensiana* had 100% frequency and average cover of 13%; cover estimates ranged from 8 to 16%. Major forb associates were *Lupinus obtusilobus*, with frequency of 87% and average cover of 25% with range of 10 to 43%, and *Polygonum davisiae* with frequency of 87% and average cover of 6% with range of 1 to 10%. No shrub associates were observed. Litter accumulation had a frequency of 87% and average total cover of 11%; total cover estimates ranged from 1 to 34%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 271: *Pinus albicaulis*-*Tsuga mertensiana*/*Lupinus obtusilobus*-*Polygonum davisiae* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	100	12.8	8	16	100	14.1	8	22
<i>Pinus albicaulis</i>	100	9.3	2	15	100	9.8	2	15
Total tree		22.1				23.9		
Total shrub		0				0		
<i>Lupinus obtusilobus</i>	87.5	25	10	43	87.5	25.3	10	43
<i>Polygonum davisiae</i>	87.5	6.4	1	10	87.5	6.4	1	10
Graminoid - other	37.5	0.8	1	3.1	37.5	0.8	1	3.1
<i>Eriogonum marifolium</i>	25	0.6	2	3.1	37.5	0.6	2	3.1
<i>Carex</i> species	25	1.5	2	10.2	25	1.5	2	10.2
<i>Elymus Elymoides</i>	P	T	T	T	12.5	T	T	T
<i>Carex leptalea</i>	12.5	0.5	4.1	4.1	12.5	0.8	6.1	6.1
<i>Carex stramineiformis</i>	12.5	0.3	2	2	12.5	0.3	2	2
<i>Arabis</i> species	12.5	0.1	1	1	12.5	0.1	1	1
<i>Aster integrifolius</i>	12.5	0.1	1	1	12.5	0.1	1	1
<i>Calyptidium umbellatum</i>	12.5	0.5	4	4	12.5	0.5	4	4
<i>Castilleja</i> species	P	T	T	T	12.5	T	T	T
<i>Monardella odoratissima</i>	P	T	T	T	12.5	T	T	T
<i>Penstemon</i> species	P	T	T	T	12.5	T	T	T
<i>Polygonum shastense</i>	P	T	T	T	12.5	T	T	T
<i>Viola</i> species	P	T	T	T	12.5	T	T	T
Total herbaceous		35.8				36.4		
Lichen	12.5	0.3	2	2	12.5	0.3	2	2
Total nonvascular		0.3				0.3		
Barren - rock	100	25	6	50	100	28.6	8	50
Barren - fine gravelly soil	87.5	12.2	9	20.4	87.5	18.3	9	58
Barren - litter	87.5	2	1	6	87.5	10.9	1	34
Barren - bare soil	25	1.8	2	12	25	3	4.1	20
Barren - fine woody debris	25	0.5	2	2	25	0.6	2	3.1
Barren - gravel	12.5	0.3	2	2	12.5	0.8	6.1	6.1
Total other		41.8				62.2		
Totals		100				122.8		

Plant Association: *Tsuga mertensiana*/*Arctostaphylos nevadensis* (Sparse)
Woodland

Plant Association Code: TM:tree/AN:shrub

Alliance: *Tsuga mertensiana* Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Abies X shastensis* - *Tsuga mertensiana* / *Arctostaphylos nevadensis* (1.B.2.Nd - CEGLO00035), has been described in the western United States.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2400m to 2550m (7875' to 8375'). Aspects are generally of a southerly direction on moderate slopes. Soils are characterized by a dominance of bare rocks and boulders, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

Tsuga mertensiana was the dominant tree species found in this association with 100% frequency and cover of about 22%. A major Key shrub associate was *Arctostaphylos nevadensis*, with frequency of 100% and about 18% cover. Other common shrubs found were *Phyllodoce brewerii*, *Holodiscus microphyllus*, and *Chrysolepis sempervirens*. No major forb associates were found in this type. Litter accumulation had a frequency of 100% and total cover of about 44%. Duff, coarse woody debris, and fine woody debris also factored in the organic material found with about 16% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 338: *Tsuga mertensiana*/*Arctostaphylos nevadensis* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	100	22	22	22	100	36	36	36
<i>Pinus monticola</i>	P	T	T	T	100	T	T	T
Total tree		22				36		
<i>Arctostaphylos nevadensis</i>	100	18	18	18	100	18	18	18
<i>Phyllodoce breweri</i>	100	2	2	2	100	4	4	4
<i>Holodiscus microphyllus</i>	P	T	T	T	100	T	T	T
<i>Amelanchier pallida</i>	P	T	T	T	100	T	T	T
<i>Chrysolepis sempervirens</i>	P	T	T	T	100	T	T	T
Total shrub		20				22		
Graminoid - other	100	4	4	4	100	4	4	4
<i>Cheilanthes gracillima</i>	P	T	T	T	100	T	T	T
<i>Eriogonum</i> species	P	T	T	T	100	T	T	T
<i>Lupinus obtusilobus</i>	P	T	T	T	100	T	T	T
<i>Penstemon newberryi</i>	P	T	T	T	100	T	T	T
<i>Carex abrupta</i>	P	T	T	T	100	T	T	T
<i>Carex pachystachya</i>	P	T	T	T	100	T	T	T
Total herbaceous		4				4		
Moss	P	T	T	T	100	T	T	T
Total nonvascular		0				0		
Barren - litter	100	16	16	16	100	44	44	44
Barren - rock	100	28	28	28	100	40	40	40
Barren - duff	100	10	10	10	100	10	10	10
Barren - fine woody debris	P	P	P	P	100	4	4	4
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Total other		54				100		
Totals		100				162		

Plant Association: *Tsuga mertensiana*/*Lupinus obtusilobus*–*Polygonum davisiae*
(Sparse) Woodland

Plant Association Code: TM:tree/LoPd:herb

Alliance: *Tsuga mertensiana* Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Tsuga mertensiana* / *Arabis platysperma* Forest (1.B.2.Nd - CEGLO08686), has been described in the northern Sierra Nevada Range, California predominantly north of Kings River.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 2425m to 2650m (7950' to 8700'). Aspects were found to have a broad range, but most commonly fell into a southerly direction on gentle to moderate slopes. Soils are characterized by a dominance of fine gravelly soil, such as found in the "Xeric Vitricryands, tephra over till-Terracelake-Rock outcrop-Xeric Vitricryands, cirque floor, complex, 5 to 35 percent slopes" and the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was dominated by the tree species *Tsuga mertensiana*. *Tsuga mertensiana* was found to have 100% frequency and average cover of 31%; cover estimates ranged from 16 to 46%. Major forb associates were *Lupinus obtusilobus*, with frequency of 100% and average cover of 16% with range of 4 to 28% and *Polygonum davisiae*, with frequency of 50% and average cover of 5%. No shrub associates were observed. Litter accumulation had a frequency of 100% and average total cover of 32%; cover estimates ranged from 18 to 46%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 371: *Tsuga mertensiana*/*Lupinus obtusilobus*–*Polygonum davisiae* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	100	31	16	46	100	36	16	56
<i>Abies magnifica</i>	50	1	2	2	50	1	2	2
Total tree		32				37		
<i>Phyllodoce breweri</i>	P	T	T	T	50	T	T	T
Total shrub		0				0		
<i>Lupinus obtusilobus</i>	100	16	4	28	100	19	6	32
<i>Polygonum davisiae</i>	50	5	10	10	100	7	2	12
<i>Eriogonum marifolium</i>	100	2	2	2	100	2	2	2
<i>Achnatherum occidentale</i>	50	1	2	2	50	1	2	2
<i>Dodecatheon alpinum</i>	P	T	T	T	50	T	T	T
Total herbaceous		24				29		
Total nonvascular		0				0		
Barren - fine gravelly soil	100	25	8	42	100	43	24	62
Barren - litter	100	6	4	8	100	32	18	46
Barren - rock	100	7	6	8	100	8	6	10
Barren - fine woody debris	50	1	2	2	100	6	2	10
Barren - duff	50	3	6	6	50	4	8	8
Barren - coarse woody debris	50	2	4	4	50	2	4	4
Total other		44				95		
Totals		100				161		

Plant Association: *Tsuga mertensiana*/*Lupinus obtusilobus*–*Achnatherum occidentale*-*Elymus elymoides* (Sparse) Woodland

Plant Association Code: TM:tree/LoAE:herb

Alliance: *Tsuga mertensiana* Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Tsuga mertensiana* / *Arabis platysperma* Forest (1.B.2.Nd - CEGLO08686), has been described in the northern Sierra Nevada Range, California predominantly north of Kings River.



Environmental Characteristics

This association was typically found on dry gravelly and rocky sites within Lassen Volcanic National Park at elevations from approximately 2375m to 2600m (7800' to 8600'). Aspects were generally of a northerly direction on moderate to moderately steep slopes. Soils are characterized by a codominance of bare rocks and fine gravelly soil, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" and the "Xeric Vitricryands complex, 10 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Tsuga mertensiana was the dominant tree species found in this association with 100% frequency and average cover of 26%; cover estimates ranged from 14 to 42%. No major shrub associates were found in this type. Major forb associates were *Lupinus obtusilobus*, with frequency of 100% and average cover of 35% with range of 17 to 65%, and *Achnatherum occidentale* with frequency of 100% and average cover of 2% with range of 1 to 3%. Forb associates accounted for nearly 44% cover on average in these types. Litter accumulation had a frequency of 100% and an average total cover of 35%; cover estimates ranged from 8 to 64%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

**Type 372: *Tsuga mertensiana*/*Lupinus obtusilobus*–*Achnatherum occidentale*-*Elymus elymoides* (Sparse)
Woodland**

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	100	26	14	42	100	29.3	16	48
<i>Pinus monticola</i>	P	T	T	T	33.3	T	T	T
<i>Abies magnifica</i>	P	T	T	T	33.3	T	T	T
Total tree		26				29.3		
<i>Sambucus racemosa</i>	33.3	0.7	2	2	66.7	0.7	2	2
<i>Ribes montigenum</i>	P	P	P	P	33.3	3.3	10	10
<i>Ericameria bloomeri</i>	33.3	2.2	6.7	6.7	33.3	1.9	5.7	5.7
<i>Ribes nevadense</i>	33.3	0.7	2	2	33.3	0.7	2	2
<i>Holodiscus microphyllus</i>	P	T	T	T	33.3	T	T	T
<i>Phyllodoce breweri</i>	P	T	T	T	33.3	T	T	T
Total shrub		3.6				6.6		
<i>Lupinus obtusilobus</i>	100	34.7	17	65	100	38	19	69
<i>Achnatherum occidentale</i>	100	2	1	3	100	2.3	1	4
<i>Elymus Elymoides</i>	66.7	2.9	3	5.7	66.7	2.9	3	5.7
<i>Monardella odoratissima</i>	33.3	2.2	6.7	6.7	66.7	2.2	6.7	6.7
<i>Eriogonum marifolium</i>	33.3	1.3	4	4	33.3	1.3	4	4
<i>Aquilegia formosa</i>	33.3	0.3	1	1	33.3	0.3	1	1
<i>Streptanthus tortuosus</i>	33.3	0.3	1	1	33.3	0.3	1	1
<i>Carex stramineiformis</i>	P	T	T	T	33.3	T	T	T
<i>Carex species</i>	P	T	T	T	33.3	T	T	T
<i>Athyrium alpestre</i>	P	T	T	T	33.3	T	T	T
<i>Calyptidium umbellatum</i>	P	T	T	T	33.3	T	T	T
<i>Cryptogramma cascadenis</i>	P	T	T	T	33.3	T	T	T
<i>Polemonium californicum</i>	P	T	T	T	33.3	T	T	T
<i>Viola purpurea</i>	P	T	T	T	33.3	T	T	T
Total herbaceous		43.7				47.3		
Total nonvascular		0				0		
Barren - litter	66.7	9.3	4	24	100	35	8	64
Barren - rock	100	10	4	22	100	14.7	6	28
Barren - duff	33.3	0.7	2	2	100	2	2	2
Barren - fine gravelly soil	66.7	2.7	2	6	66.7	30.3	37	54
Barren - bare soil	33.3	1.3	4	4	66.7	6	2	16
Barren - fine woody debris	P	P	P	P	66.7	2.7	2	6
Barren - gravel	33.3	2	6	6	33.3	8	24	24
Barren - coarse woody debris	33.3	0.7	2	2	33.3	0.7	2	2
Total other		26.7				99.4		
Totals		100				182.6		

Plant Association: *Abies magnifica* / Sparse Understory Forest/(Sparse) Woodland

Plant Association Code: AM:tree

Alliance: *Abies magnifica* Forest and Woodland (Sparse)

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity

A very similar association, *Abies magnifica* / Sparse Understory Forest (1.B.2.Nd - CEGLO08609), has been previously described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, shaded sites within Lassen Volcanic National Park at elevations from approximately 2040m to 2300m (6700' to 7500'). Aspects were generally of a north to northwesterly direction on flat to moderate slopes. Soils are characterized by a dominance of organic material and loamy soil, such as found in the "Badgerflat-Cenplat complex, 10 to 60 percent slopes; Shadowlake gravelly ashy sandy loam, 2 to 30 percent slopes;" and "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

Abies magnifica (living) was the dominant tree species found in this association with 80% frequency and average cover of 38%; cover estimates ranged from 8 to 68%. Standing dead *Abies magnifica* had a frequency of 100% and accounted for another 9% average cover; estimates ranged from 2 to 24%. Other conifers contributed insignificant cover. No major shrub associates were found in this type. No major forb associates were found in this type. Litter accumulation had a frequency of 100% and an average total cover of 59%; cover estimates ranged from 43 to 78%. Duff, coarse woody debris, and fine woody debris also factored in the organic material found with 30% total cover. Stands having sparse cover were typically found in recently disturbed/burned areas.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 400: *Abies magnifica* / Sparse Understory Forest/Woodland (Sparse)

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i> (dead)	100	9.3	2	24	100	9.9	2	26
<i>Abies magnifica</i>	80	37.7	8	68	80	45.1	8	88
<i>Pinus monticola</i>	20	0.8	4	4	60	1.6	8	8
<i>Pinus jeffreyi</i>	P	P	P	P	20	0.4	2	2
<i>Abies concolor</i>	20	0.4	2	2	20	0.4	2	2
<i>Tsuga mertensiana</i>	20	0.2	1	1	20	0.2	1	1
Total tree		48.4				57.6		
<i>Arctostaphylos nevadensis</i>	P	T	T	T	40	T	T	T
<i>Ceanothus velutinus</i>	20	0.4	2	2	20	0.4	2	2
<i>Ribes cereum</i>	P	T	T	T	20	T	T	T
Total shrub		0.4				0.4		
<i>Achnatherum occidentale</i>	P	T	T	T	40	0.4	2	2
<i>Lupinus obtusilobus</i>	20	0.2	1	1	20	0.6	3	3
<i>Chimaphila</i> species	P	P	P	P	20	0.2	1	1
<i>Arabis platysperma</i>	P	T	T	T	20	T	T	T
<i>Aster</i> species	P	T	T	T	20	T	T	T
<i>Erigeron lassenianus</i>	P	T	T	T	20	T	T	T
<i>Penstemon gracilentus</i>	P	T	T	T	20	T	T	T
<i>Pyrola picta</i>	P	T	T	T	20	T	T	T
Total herbaceous		0.2				1.2		
Lichen	P	T	T	T	20	T	T	T
Total nonvascular		0				0		
Barren - litter	100	29.6	12	56	100	58.8	43	78
Barren - fine woody debris	100	9.8	6	14	100	20.8	8	34
Barren - bare soil	80	7	4	14	80	8.4	5	15
Barren - duff	60	2.2	1	6	60	5	4	17
Barren - coarse woody debris	60	1.2	1	3	60	3.6	3	8
Barren - organic ash	40	1.2	2	4	40	2	4	6
Total other		51				98.6		
Totals		100				157.8		

Plant Association: *Abies magnifica*/*Arctostaphylos nevadensis* (Sparse) Woodland

Plant Association Code: AM:tree/AN:shrub

Alliance: *Abies magnifica* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity

A very similar association, *Abies magnifica* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08611), has been previously described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 2000m to 2250m (6600' to 7400'). Aspects were found to have a wide range in this association but generally fell into a northerly direction on flat to moderate slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the “Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes” and “Buttelake ashy sand, 3 to 35 percent slopes” 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Abies magnifica was the dominant tree species found in this association with 50% frequency and average cover of 8%. Standing dead *Abies magnifica* had a frequency of 100% and accounted for another 9% average cover; cover estimates ranged from 2 to 16%. A major shrub associate was *Arctostaphylos nevadensis*, with frequency of 100% and 8% cover; cover estimates ranged from 6 to 10%. No major forb associates were found in this type. Litter accumulation had a frequency of 100% and an average total cover of 42%; cover estimates ranged from 22 to 62%. Duff and fine woody debris also factored in the organic material found with 25% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 438: *Abies magnifica*/*Arctostaphylos nevadensis* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i> (dead)	100	9	2	16	100	9	2	16
<i>Abies magnifica</i>	50	8	16	16	50	8	16	16
<i>Pinus monticola</i>	P	T	T	T	50	T	T	T
<i>Abies concolor</i>	P	T	T	T	50	T	T	T
Total tree		17				17		
<i>Arctostaphylos nevadensis</i>	100	7	6	8	100	8	6	10
Total shrub		7				8		
<i>Achnatherum occidentale</i>	50	11	22	22	50	13	26	26
<i>Arabis platysperma</i>	P	T	T	T	50	T	T	T
<i>Penstemon gracilentus</i>	P	T	T	T	50	T	T	T
Total herbaceous		11				13		
Total nonvascular		0				0		
Barren - litter	100	30	8	52	100	42	22	62
Barren - bare soil	100	18	14	22	100	27	20	34
Barren - fine woody debris	100	5	4	6	100	6	6	6
Barren - duff	50	9	18	18	50	19	38	38
Barren - organic ash	50	3	6	6	50	4	8	8
Total other		65				98		
Totals		100				136		

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/
Sparse Understory Forest/Woodland

Plant Association Code: AM-(PM)-TM:tree

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica*-*Pinus monticola* Forest (1.B.2.Nd - CEGL008613), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2200m to 2375m (7200' to 7800'). Aspects were generally of a northerly direction on gentle slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Typic Dystroxerepts, landslides, 10 to 50 percent slopes" and "Xeric Vitricryands, tephra over till-Terracelake-Rock outcrop-Xeric Vitricryands, cirque floor, complex, 5 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association was codominated by the tree species *Abies magnifica* and *Tsuga mertensiana*. *Abies magnifica* was found to have 100% frequency and average cover of 30%; cover estimates ranged from 12 to 50%. *Tsuga mertensiana* had 100% frequency and average cover of 15%; cover estimates ranged from 2 to 26%. *Pinus monticola* was often an associated conifer species with 80% frequency and average cover of 3%; cover estimates ranged from 1 to 6%. No Key shrub associates were observed. No major forb associates were observed. Litter accumulation had a frequency of 100% and average total cover of 60%; cover estimates ranged from 34 to 90%. Duff, coarse woody debris, and fine woody debris also factored in the organic material found with 28% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 500: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	29.9	12	50	100	33.7	14	62
<i>Tsuga mertensiana</i>	100	14.9	2	26	100	20.5	3	35
<i>Pinus monticola</i>	80	3.2	1	6	80	3.2	1	6
<i>Abies magnifica</i> (dead)	40	0.6	1	2	40	0.8	1	3
<i>Pinus contorta</i> var. <i>murrayana</i>	20	0.2	1	1	20	0.2	1	1
Total tree		48.8				58.4		
<i>Phylodoce breweri</i>	20	0.4	2	2	20	0.4	2	2
Total shrub		0.4				0.4		
<i>Calyptidium umbellatum</i>	20	0.4	2	2	40	0.4	2	2
<i>Chimaphila menziesii</i>	T	T	T	T	40	T	T	T
<i>Juncus parryi</i>	20	0.4	2	2	20	0.4	2	2
Carex species	20	0.4	2	2	20	0.2	1	1
<i>Elymus elymoides</i>	T	T	T	T	20	T	T	T
<i>Achnatherum occidentale</i>	T	T	T	T	20	T	T	T
<i>Carex multicostrata</i>	T	T	T	T	20	T	T	T
<i>Botrychium</i> species	T	T	T	T	20	T	T	T
<i>Lupinus obtusilobus</i>	T	T	T	T	20	T	T	T
<i>Penstemon newberryi</i>	T	T	T	T	20	T	T	T
<i>Penstemon</i> species	T	T	T	T	20	T	T	T
<i>Pyrola picta</i>	T	T	T	T	20	T	T	T
Total herbaceous		1.2				1		
Moss	P	P	P	P	20	0.2	1	1
Total nonvascular		0				0.2		
Barren - litter	100	26.7	14	55	100	60.3	34	90
Barren - fine woody debris	100	8.3	3.5	16	100	16.3	8	33
Barren - duff	80	5.8	4	12	80	9.6	4	18
Barren - bare soil	80	3	1	8	80	3.4	1	10
Barren - coarse woody debris	40	2	2	8	60	2.4	1	9
Barren - rock	40	2	2	8	40	5.2	6	20
Barren - fine gravelly soil	20	1.8	9	9	20	1.8	9	9
Total other		49.6				99		
Totals		100				159		

Variants of this Association: AM-TM:tree
AM-PM-TM:tree

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/
Arctostaphylos nevadensis (Sparse) Woodland

Plant Association Code: AM-(PM)-TM:tree/AN:shrub

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGL008615), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2250m to 2500m (7400' to 8200'). Aspects were observed in all directions, but most commonly in an easterly direction on gentle to moderately steep slopes. Soils are characterized by a dominance of organic material along with bare rock and fine gravelly soil, such as found in the "Terracelake-Acroph-Rock outcrop-Shadowlake complex, 15 to 80 percent slopes" and "Terracelake-Emeraldlake-Readingpeak-Rock Outcrop complex, 15 to 65 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association was co-dominated by the tree species *Abies magnifica* and *Tsuga mertensiana*. *Abies magnifica* was found to have 80% frequency and average cover of 14%; cover estimates ranged from 2 to 31%. *Tsuga mertensiana* had 100% frequency and average cover of 10%; cover estimates ranged from 2 to 23%. *Pinus monticola* was often an associated conifer species with 60% frequency and average cover of 3.6%; cover estimates ranged from 8 to 10%. A major shrub associate is *Arctostaphylos nevadensis*, with frequency of 100% and average cover of 22%; cover estimates ranged from 4 to 66%. No major forb associates were found, but *Lupinus obtusilobus* did occur with 60% frequency and average cover of 7%; cover estimates ranged from 1 to 32%. Litter accumulation had a frequency of 100% and average total cover of 43%; cover estimates ranged from 28 to 59%. Duff, coarse woody debris, and fine woody debris also factored in the organic material found with 23% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 538: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Arctostaphylos nevadensis* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Tsuga mertensiana</i>	100	9.8	2	23	100	11	2	25
<i>Abies magnifica</i>	80	14.2	2	31	80	16.8	2	37
<i>Pinus monticola</i>	40	3.6	8	10	40	3.6	8	10
<i>Abies magnifica</i> (dead)	20	0.2	1	1	20	0.2	1	1
Total tree		27.8				31.6		
<i>Arctostaphylos nevadensis</i>	100	22.4	4	66	100	26.8	4	77
<i>Ribes nevadense</i>	P	P	P	P	20	0.6	3	3
<i>Holodiscus microphyllus</i> var. g	T	T	T	T	20	T	T	T
<i>Ericameria bloomeri</i>	T	T	T	T	20	T	T	T
Total shrub		22.4				27.4		
<i>Lupinus obtusilobus</i>	60	7.2	1	32	60	7.6	1	34
<i>Elymus elymoides</i>	20	0.6	3	3	40	0.6	3	3
Grass - other	T	T	T	T	40	0.6	3	3
<i>Achnatherum</i> species	20	1.2	6	6	20	1.2	6	6
<i>Achnatherum occidentale</i>	20	0.8	4	4	20	0.8	4	4
Rush - other	20	0.4	2	2	20	0.8	4	4
<i>Carex</i> species	20	0.4	2	2	20	0.4	2	2
<i>Monardella odoratissima</i>	20	0.4	2	2	20	0.4	2	2
<i>Penstemon newberryi</i>	P	P	P	P	20	0.4	2	2
<i>Arabis platysperma</i>	T	T	T	T	20	T	T	T
Total herbaceous		11				12.8		
Lichen	20	0.8	4	4	20	0.8	4	4
Total nonvascular		0.8				0.8		
Barren - litter	100	11.4	2	29	100	42.7	28	59
Barren - rock	80	9.2	2	20	100	19	3	34
Barren - duff	80	7.2	2	16	100	11.8	4	20
Barren - fine woody debris	80	2.6	2	5	100	8.5	4	14.5
Barren - fine gravelly soil	80	4	2	12	80	8	2	22
Barren - coarse woody debris	40	1.6	2	6	80	3.2	2	6
Barren - gravel	20	1.2	6	6	20	2	10	10
Barren - sand	20	0.8	4	4	20	2	10	10
Barren - bare soil	P	P	P	P	20	0.8	4	4
Barren - silty soil	P	P	P	P	20	0.2	1	1
Total other		38				98.2		
Totals		100				170.8		

Variants of this Association: AM-TM:tree/AN:shrub and
AM-PM-TM:tree/AN:shrub

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/
Arctostaphylos nevadensis-*Chrysolepis sempervirens*-
Holodiscus microphyllus (Sparse) Woodland

Plant Association Code: AM-(PM)-TM:tree/AN-CS-HM:shrub

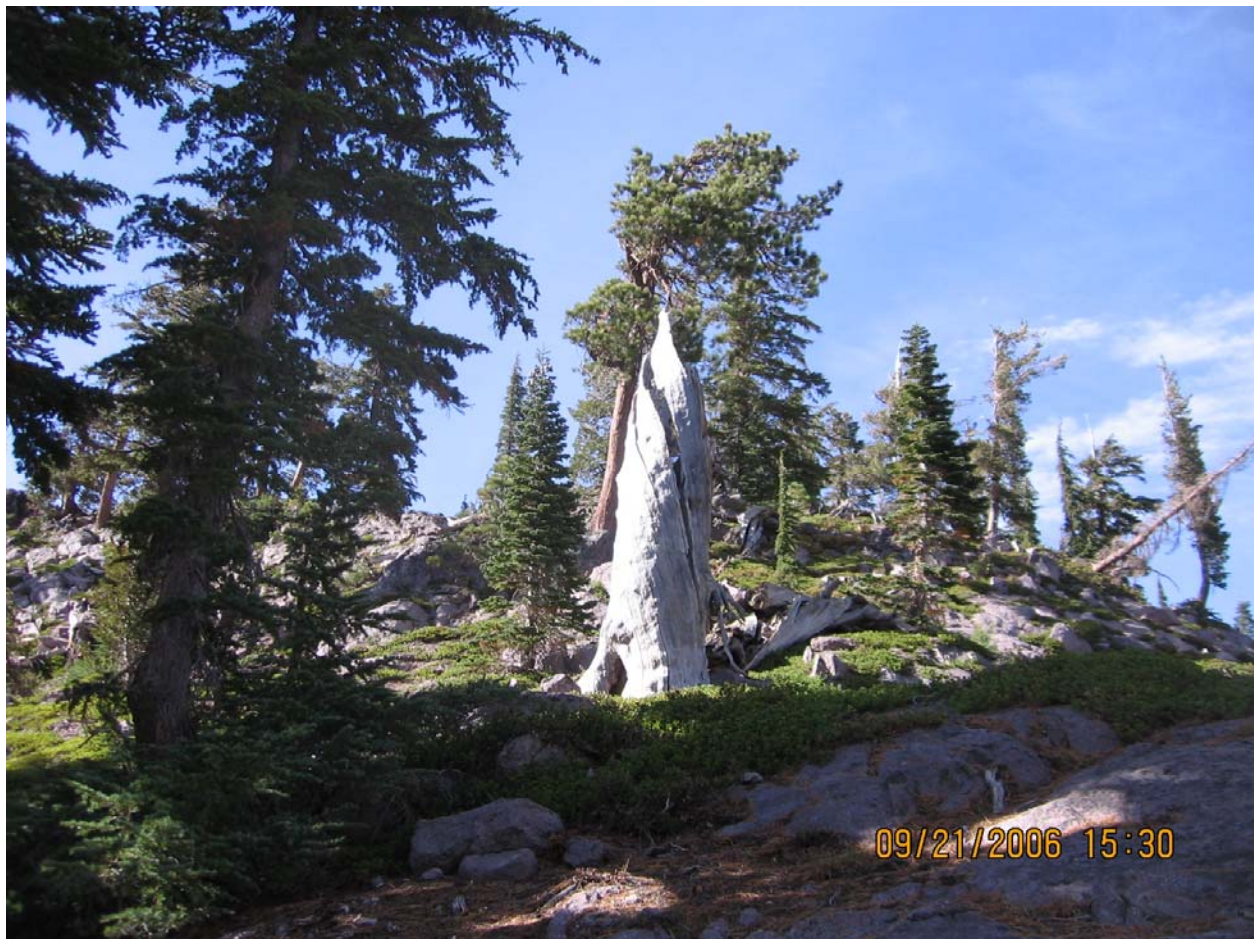
Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGL008615), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2300m to 2400m (7500' to 7900'). Aspects were variable, but generally of a southeasterly direction on moderate slopes. Soils are characterized by a codominance of fragmented rock and organic material, such as found in the "Terracelake-Acroph-Rock outcrop-Shadowlake complex, 15 to 80 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of *Tsuga mertensiana*, *Abies magnifica*, and *Pinus monticola*. *Tsuga mertensiana* had 100% frequency and cover of about 12%. *Abies magnifica* had 100% frequency and cover of about 2%. *Pinus monticola* had 100% frequency and cover of about 5%. A key shrub associate is *Arctostaphylos nevadensis* with 100% frequency and cover of about 31%. Other shrubs observed include *Holodiscus microphyllus* var. *glabrescens* and *Chrysolepis sempervirens*, both had cover of about 2%. No Key forb associates were observed, but *Penstemon newberryi* had about 3% cover. Litter had a frequency of 100% and total cover of about 37%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with about 8% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 542: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	100	12	12	12	100	18	18	18
<i>Pinus monticola</i>	100	5	5	5	100	5	5	5
<i>Abies magnifica</i>	100	2	2	2	100	2	2	2
Total tree		19				25		
<i>Arctostaphylos nevadensis</i>	100	31	31	31	100	35	35	35
<i>Holodiscus microphyllus</i> var. g	100	2	2	2	100	2	2	2
<i>Chrysolepis sempervirens</i>	100	2	2	2	100	2	2	2
<i>Phyllodoce breweri</i>	T	T	T	T	100	T	T	T
Total shrub		35				39		
<i>Penstemon newberryi</i>	100	3	3	3	100	3	3	3
<i>Potentilla</i> species	T	T	T	T	100	T	T	T
Total herbaceous		3				3		
Lichen	100	2	2	2	100	2	2	2
Total nonvascular		2				2		
Barren - rock	100	14	14	14	100	37	37	37
Barren - litter	100	10	10	10	100	37	37	37
Barren - fine gravelly soil	100	13	13	13	100	15	15	15
Barren - duff	P	P	P	P	100	4	4	4
Barren - fine woody debris	100	2	2	2	100	2	2	2
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Total other		41				97		
Totals		100				166		

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/
Achnatherum occidentale-*Elymus elymoides*-(Mix)
Sparse Woodland

Plant Association Code: AM-(PM)-TM:tree/AoEe-(Mix):herb

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica*-*Pinus monticola* Forest (1.B.2.Nd - CEGLO08613), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky and fine gravelly sites within Lassen Volcanic National Park at elevations from approximately 2300m to 2400m (7500' to 7900'). Aspects were generally of a southerly direction on moderate slopes. Soils are characterized by a codomination of fragmented rock and fine gravelly soil, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of *Tsuga mertensiana* and *Abies magnifica*. *Abies magnifica* had 100% frequency and cover of about 10%. *Tsuga mertensiana* had 100% frequency and cover of about 4%. No major shrub associates were observed in this type. Three Key forb associates in this type were *Lupinus arbustus*, *Elymus elymoides*, and *Monardella odoratissima* resulting in the designation of the AoEe-(Mix) for this association. *Lupinus arbustus* had 100% frequency and cover of about 20%. *Monardella odoratissima* had 100% frequency and cover of about 1%. *Elymus elymoides* had 100% frequency and cover of about 3%. In addition, an unidentified species of *Arnica* was observed with cover of about 27%. Litter had a frequency of 100% and total cover of about 37%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with about 8% total cover. Fine gravelly soil, bare soil, and rock had frequency of 100% and accounted for about 64% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 570: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana* /*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	10	10	10	100	10	10	10
<i>Tsuga mertensiana</i>	100	4	4	4	100	8	8	8
Total tree		14				18		
<i>Sambucus nigra</i>	P	T	T	T	100	T	T	T
Total shrub		0				0		
<i>Arnica</i> species	100	24	24	24	100	26.7	26.7	26.7
<i>Lupinus arbustus</i>	100	20	20	20	100	20	20	20
<i>Monardella odoratissima</i>	100	1	1	1	100	5.7	5.7	5.7
<i>Elymus Elymoides</i>	100	3	3	3	100	3	3	3
Graminoid - other	100	2	2	2	100	2	2	2
<i>Lupinus obtusilobus</i>	100	2	2	2	100	2	2	2
Herbaceous - other	100	2	2	2	100	2	2	2
<i>Juncus nevadensis</i>	100	2	2	2	100	1	1	1
<i>Mimulus guttatus</i>	P	P	P	P	100	1	1	1
<i>Hackelia micrantha</i>	P	P	P	P	100	0.7	0.7	0.7
<i>Carex multcostata</i>	P	T	T	T	100	T	T	T
<i>Arabis lyallii</i> var. <i>lyallii</i>	P	T	T	T	100	T	T	T
Total herbaceous		56				64.1		
Total nonvascular		0				0		
Barren - litter	100	4	4	4	100	22	22	22
Barren - rock	100	8	8	8	100	20	20	20
Barren - fine gravelly soil	100	8	8	8	100	18	18	18
Barren - fine woody debris	100	6	6	6	100	18	18	18
Barren - bare soil	P	P	P	P	100	6	6	6
Barren - gravel	P	P	P	P	100	2	2	2
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Barren - duff	100	2	2	2	100	2	2	2
Total other		30				90		
Totals		100				172.1		

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Lupinus obtusilobus*–*Polygonum davisiae* (Sparse) Woodland

Plant Association Code: AM-(PM)-TM:tree/LoPd:herb

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica*-*Pinus monticola* Forest (1.B.2.Nd - CEG008613), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky and fine gravelly sites within Lassen Volcanic National Park at elevations from approximately 2350m to 2500m (7700' to 8200'). Aspects were generally of an easterly direction on gentle to moderately steep slopes. Soils are characterized by a codominance of bare rock and talus, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" and "Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystrocherepts, debris flows-Typic Dystrocherepts complex, 10 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory layer was distinguished by the presence of *Abies magnifica*, *Pinus monticola*, and *Tsuga mertensiana*. *Pinus monticola* was found to have 100% frequency and cover of about 6%. *Abies magnifica* had 100% frequency and cover of about 2%. *Tsuga mertensiana* had 100% frequency and cover of about 6%. Key forb associates were *Lupinus obtusilobus*, with frequency of 100% and cover of about 26%, and *Polygonum davisiae*, with frequency of 100% and cover of about 7%. No shrub associates were observed. Litter accumulation had a frequency of 100% and total cover of about 24%. Rock and fine gravelly soil had frequency of 100% and total cover of about 70%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 571: *Abies magnifica*-(*Pinus monticola*)-*Tsuga mertensiana*/*Lupinus obtusilobus*-*Polygonum davisiae* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	100	6	6	6	100	12	12	12
<i>Pinus monticola</i>	100	6	6	6	100	6	6	6
<i>Abies magnifica</i>	100	2	2	2	100	2	2	2
Total tree		14				20		
<i>Spiraea splendens</i>	100	2	2	2	100	2	2	2
<i>Ribes montigenum</i>	T	T	T	T	100	T	T	T
Total shrub		2				2		
<i>Lupinus obtusilobus</i>	100	26	26	26	100	28	28	28
<i>Polygonum davisiae</i>	100	7	7	7	100	7	7	7
<i>Eriogonum marifolium</i>	100	4	4	4	100	4	4	4
<i>Monardella odoratissima</i>	100	2	2	2	100	4	4	4
<i>Elymus elymoides</i>	100	2	2	2	100	2	2	2
<i>Phlox diffusa</i>	100	2	2	2	100	2	2	2
<i>Eriogonum umbellatum</i>	100	1	1	1	100	1	1	1
<i>Achnatherum occidentale</i>	T	T	T	T	100	T	T	T
<i>Carex multicosata</i>	T	T	T	T	100	T	T	T
<i>Calyptidium umbellatum</i>	T	T	T	T	100	T	T	T
Total herbaceous		44				48		
Total nonvascular		0				0		
Barren - rock/talus	100	26	26	26	100	52	52	52
Barren - litter	100	6	6	6	100	24	24	24
Barren - fine gravelly soil	100	6	6	6	100	18	18	18
Barren - rock	100	2	2	2	100	6	6	6
Total other		40				100		
Totals		100				170		

Plant Association: *Abies magnifica*-*Pinus monticola*/Sparse Understory Woodland

Plant Association Code: AM-PM:tree

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica*-*Pinus monticola* Forest (1.B.2.Nd - CEG008613), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky and fine gravelly sites within Lassen Volcanic National Park at elevations from approximately 2000m to 2250m (6600' to 7400'). Aspects were generally of a northerly direction on gentle to moderate slopes. Soils are characterized by a codominance of organic material along with bare rock and fine gravelly soil, such as found in the "Cenplat ashy loamy sand, 0 to 15 percent slopes" and "Shadowlake-Terracelake-Acroph-Rock outcrop complex, 15 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association was co-dominated by the tree species *Abies magnifica* and *Pinus monticola*. *Abies magnifica* was found to have 100% frequency and cover of about 32% (30% alive and 2% standing dead). *Pinus monticola* had 100% frequency and cover of about 6% (4% alive and 2% standing dead). No Key shrub associates were observed. No Key forb associates were observed. The understory was distinguished by a large accumulation of organic material. Litter had a frequency of 100% and total cover of about 48%. Duff and fine woody debris also factored in the organic material found with about 18% total cover. Rock and fine gravelly soil accounted for total cover of 34%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 600: *Abies magnifica*-*Pinus monticola*/Sparse Understory Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	30	30	30	100	32	32	32
<i>Pinus monticola</i>	100	4	4	4	100	6	6	6
<i>Pinus monticola</i> (dead)	100	2	2	2	100	2	2	2
<i>Abies magnifica</i> (dead)	100	2	2	2	100	2	2	2
<i>Tsuga mertensiana</i>	T	T	T	T	100	T	T	T
Total tree		38				42		
<i>Arctostaphylos nevadensis</i>	T	T	T	T	100	T	T	T
Total shrub		0				0		
<i>Penstemon gracilentus</i>	100	2	2	2	100	2	2	2
<i>Achnatherum occidentale</i>	T	T	T	T	100	T	T	T
Total herbaceous		2				2		
Total nonvascular		0				0		
Barren - litter	100	22	22	22	100	48	48	48
Barren - rock	100	12	12	12	100	18	18	18
Barren - fine gravelly soil	100	16	16	16	100	16	16	16
Barren - fine woody debris	100	6	6	6	100	10	10	10
Barren - duff	100	4	4	4	100	8	8	8
Total other		60				100		

Plant Association: *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus*
(Sparse) Woodland

Plant Association Code: AM-PM:tree/AN-CS-HM:shrub

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis* Forest (1.B.2.Nd - C EGL008615), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2075m to 2450m (6800' to 8000'). Aspects were generally of a northwesterly direction on gentle to steep slopes. Soils are characterized by a codominance of organic material and bare rock, such as found in the "Badgerflat-Cenplat complex, 10 to 60 percent slopes" and "Bearthrubble-Rubble land complex, 8 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association's overstory was characterized by the presence of *Abies magnifica* and *Pinus monticola*. The dominant conifer, *Pinus monticola* was found to have 100% frequency and cover of about 15%; *Abies magnifica* was observed as a Trace species present at the site. Key shrub associates included *Arctostaphylos nevadensis* with cover of about 30%, and *Holodiscus microphyllus* var. *glabrescens* with cover of about 5%. Other common shrub forms found include *Chrysolepis sempervirens*, *Ceanothus velutinus*, and *Chrysothamnus nauseosus*. No major forb associates were found in this type. Litter accumulation had a frequency of 100% and total cover of about 20%. Rock and fine gravelly soil had frequency of 100% and total cover of about 70%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 642: *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus monticola	100	15	15	15	100	15	15	15
Abies magnifica	T	T	T	T	100	T	T	T
Total tree		15				15		
Arctostaphylos nevadensis	100	30	30	30	100	35	35	35
Holodiscus microphyllus var. g	100	5	5	5	100	12.5	12.5	12.5
Ceanothus velutinus	100	5	5	5	100	5	5	5
Chrysothamnus nauseosus ssp	P	P	P	P	100	5	5	5
Chrysolepis sempervirens	100	5	5	5	100	5	5	5
Arctostaphylos patula	100	5	5	5	100	2.5	2.5	2.5
Total shrub		50				65		
Eriogonum ursinum	P	P	P	P	100	5	5	5
Penstemon newberryi	P	P	P	P	100	5	5	5
Angelica breweri	T	T	T	T	100	T	T	T
Arabis breweri	T	T	T	T	100	T	T	T
Cheilanthes gracillima	T	T	T	T	100	T	T	T
Total herbaceous		0				10		
Total nonvascular		0				0		
Barren - rock	100	15	15	15	100	50	50	50
Barren - fine gravelly soil	100	15	15	15	100	20	20	20
Barren - litter	100	5	5	5	100	20	20	20
Barren - rock/talus	P	P	P	P	100	5	5	5
Barren - fine woody debris	P	P	P	P	100	5	5	5
Total other		35				100		
Totals		100				190		

Plant Association: *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis*-
(Mix) (Sparse) Woodland

Plant Association Code: AM-PM:tree/AN-(Mix):shrub

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 13

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGL008615), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2000m to 2225m (6600' to 7300'). Aspects have a broad range for this association, but were most commonly of a northerly direction on flat to moderate slopes. Soils are characterized by an abundance of organic material, along with bare soil and fragmented rock, such as found in the "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes;" and "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies magnifica* and *Pinus monticola*. *Abies magnifica* (living) had 85% frequency and average cover of 10%; cover estimates ranged from 2 to 30%. Standing dead *Abies magnifica* occurred with 61% frequency and approximately 3% average cover; cover estimates ranged from 1 to 10%. *Pinus monticola* had 85% frequency and average cover of 6%; cover estimates ranged from 3 to 12%. Standing dead *Pinus monticola* occurred with 23% frequency and approximately 1% average cover; cover estimates ranged from 3 to 4%. A Key shrub associate in this type was *Arctostaphylos nevadensis*, with frequency of 100% and 34% average cover; cover estimates ranged from 2 to 82%. Other common shrubs sometimes observed in this type included *Chrysolepis sempervirens* and *Arctostaphylos patula*. No major forb associates were defined for this type, but *Achnatherum occidentale* was a common herbaceous component with 38% frequency and average cover of 1%. Litter accumulation had a frequency of 100% and average total cover of 54%; cover estimates ranged from 9 to 86%. Fine woody debris and duff also factored in the organic material found with average total cover of 13%. Bare rock and various forms of bare soil amounted to approximately 30% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 643: *Abies magnifica*-*Pinus monticola*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	84.6	8.9	2	29.6	92.3	10.4	2	31.6
<i>Pinus monticola</i>	84.6	6.4	3	12.2	84.6	6.4	3	12.2
<i>Abies magnifica</i> (dead)	61.5	3	1	10	69.2	3.3	2	10
<i>Pinus monticola</i> (dead)	23.1	0.9	3	4.1	23.1	0.9	3	4.1
<i>Pinus contorta</i> var. <i>murrayana</i>	P	P	P	P	7.7	0.3	4	4
<i>Pinus jeffreyi</i>	7.7	0.2	2	2	7.7	0.2	2	2
<i>Tsuga mertensiana</i>	T	T	T	T	7.7	T	T	T
Total tree		19.4				21.5		
<i>Arctostaphylos nevadensis</i>	100	33.6	2	82	100	41.9	2	95
<i>Chrysolepis sempervirens</i>	23.1	0.6	2	4	23.1	0.6	2	4
<i>Arctostaphylos patula</i>	7.7	0.8	11	11	15.4	0.8	11	11
Total shrub		35				43.3		
<i>Achnatherum occidentale</i>	38.5	1.1	1	6	46.2	1.2	1	6
<i>Monardella odoratissima</i>	15.4	0.6	2	5.3	15.4	0.6	2	5.3
<i>Penstemon gracilentus</i>	7.7	0.3	4	4	15.4	0.3	4	4
<i>Arabis platysperma</i>	15.4	0.2	1	2	15.4	0.2	1	2
<i>Aster</i> species	7.7	0.1	0.7	0.7	15.4	0.1	0.7	0.7
<i>Elymus elymoides</i>	7.7	1.1	14.7	14.7	7.7	1.2	15.7	15.7
<i>Lupinus arbustus</i>	7.7	0.4	4.7	4.7	7.7	0.6	7.7	7.7
<i>Pyrola picta</i>	7.7	0.2	2	2	7.7	0.2	2	2
<i>Eriogonum</i> species	T	T	T	T	7.7	T	T	T
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	T	T	T	T	7.7	T	T	T
<i>Lupinus angustiflorus</i>	T	T	T	T	7.7	T	T	T
<i>Allium</i> species	T	T	T	T	7.7	T	T	T
<i>Penstemon</i> species	T	T	T	T	7.7	T	T	T
Total herbaceous		4				4.4		
Total nonvascular		0				0		
Barren - litter	100	14.2	2	46	100	54	9	86
Barren - bare soil	61.5	10.4	2	57	84.6	15	2	66
Barren - fine woody debris	46.2	2.2	2	8	84.6	5.5	2	16
Barren - duff	76.9	5.2	1	16	76.9	7.6	1	16
Barren - rock	61.5	2.5	2	10.2	76.9	6.5	2	22
Barren - fine gravelly soil	61.5	5.1	2	18	61.5	6.4	2	20
Barren - coarse woody debris	23.1	0.5	1	4.1	38.5	0.9	2	4.1
Barren - organic ash	23.1	1.5	4	12	23.1	2.3	6	16
Barren - silty soil	P	P	P	P	7.7	0.2	2	2
Total other		41.6				98.4		
Totals		100				167.6		

Variants of this Association: AM-PM:tree/AN:shrub
 AM-PM:tree/AN-AP:shrub
 AM-PM:tree/AN-CS:shrub
 AM-PM:tree/AN-Mix:shrub

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus jeffreyi*/
Arctostaphylos nevadensis-(Mix) (Sparse) Woodland

Plant Association Code: AM-(PM)-PJ:tree/AN-(Mix):shrub

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies magnifica* Woodland (1.B.2.Nd - CEGLO08636), has been described on eastern slopes of the upper montane of the Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2400m (5900' to 7900'). Aspects generally fell into all directions from south to north on gentle to moderate slopes. Soils are characterized by a codominance of organic material along with rock and gravelly soil, such as found in the "Chaos extremely gravelly ashy coarse sand, 2 to 30 percent slopes; Bearrubble-Rubble land complex, 8 to 40 percent slopes; Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes;" and "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of *Abies magnifica* and *Pinus jeffreyi* and sometimes *Pinus monticola*. *Pinus jeffreyi* has 100% frequency and average cover of approximately 8%; cover estimates ranged from 2 to 21%. *Abies magnifica* has 100% frequency and average cover of 8%; cover estimates ranged from 4 to 15%. Another commonly occurring conifer is *Pinus monticola* with 60% frequency and average cover of 2%; cover estimates ranged from 2 to 5% on sites having this species. A major Key shrub associate is *Arctostaphylos nevadensis*, with frequency of 100% and average cover of 26%, cover estimates ranged from 3 to 47%. *Chrysolepis sempervirens* was also observed with 60% frequency and 16% average cover, cover estimates ranged from 22 to 32% on sites having this species. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 59%; cover estimates ranged from 32 to 84%. Duff and fine woody debris also factored in the organic material found with average total cover of 8%; cover estimates ranged from 4 to 12%. Bare rock, and different types of bare soil accounted for an additional 27% of total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1143: *Abies magnifica*-(*Pinus monticola*)-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	8.3	2	21	100	8.8	2	23
Abies magnifica	100	7.6	4	14.7	100	7.9	4	15.7
Pinus monticola	60	1.8	2	5	60	1.9	2	4.5
Pinus lambertiana	20	2.4	12	12	20	2.6	13	13
Abies magnifica (dead)	20	0.6	2.9	2.9	20	0.6	2.9	2.9
Pinus contorta var. murrayana	20	0.4	2	2	20	0.6	3	3
Pinus jeffreyi (dead)	20	0.2	1	1	20	0.2	1	1
Pinus monticola (dead)	20	0.2	1	1	20	0.2	1	1
Total tree		21.4				22.8		
Arctostaphylos nevadensis	100	25.8	3	46.9	100	39.3	4	66.7
Chrysolepis sempervirens	60	16.4	21.6	32	60	19.7	24.5	40
Arctostaphylos patula	20	1.7	8.5	8.5	20	1.6	8	8
Ceanothus prostratus	20	0.2	1	1	20	0.4	2	2
Total shrub		44.1				61		
Arabis sparsiflora	40	2	2	8	40	2.4	2	10
Monardella odoratissima	40	1.2	2	4	40	1.6	2	6
Elymus elymoides	20	3.2	16.3	16.3	20	3.3	16.3	16.3
Angelica breweri	20	0.4	2	2	20	0.8	4	4
Carex species	20	0.2	1	1	20	0.3	1.5	1.5
Penstemon gracilentus	T	T	T	T	20	T	T	T
Total herbaceous		7.0				8.4		
Lichen	20	1.6	8	8	20	2	10	10
Total nonvascular		1.6				2		
Barren - litter	80	9.4	2	33	100	58.9	32	84
Barren - duff	80	1.6	2	2	100	3.6	2	4
Barren - rock	60	7.7	5	26	80	19.1	1	52
Barren - bare soil	80	2.4	2	4	80	4.4	2	8
Barren - fine woody debris	40	1.2	2	4	80	4	2	8
Barren - gravel	40	2.2	1	10.2	40	3.9	2	17.3
Barren - coarse woody debris	40	0.8	2	2	40	1.2	2	4
Barren - organic ash	20	0.8	3.9	3.9	20	2	9.8	9.8
Total other		26.0				97.1		
Totals		100.0				191.3		

Variants of this Association: AM-PJ:tree/AN-CS:shrub
 AM-PM-PJ:tree/AN-CS:shrub
 AM-PM-PJ:tree/AN-(Mix):shrub

Plant Association: *Abies magnifica*-Other Conifer/*Arctostaphylos nevadensis*-Mix
(Sparse) Woodland

Plant Association Code: AM-OtC:tree/AN-Mix:shrub

Alliance: *Abies magnifica*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Abies magnifica* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGL008611), has been previously described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 2165m to 2285m (7000' to 7500'). Aspects were found to have a northeasterly direction on moderate slopes. Soils are characterized by a dominance of organic material accompanied by some bare soil, such as found in the "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory is distinguished by the presence of *Abies magnifica* and a mix of other conifers contributing small amounts of cover. *Abies magnifica* has 100% frequency and cover of about 12%. The presence of *Pinus monticola*, *Pinus jeffreyi*, *Pinus contorta* var. *murrayana*, and *Abies concolor* were also observed in this association, but not in a substantial enough amount of cover to be named as a part of the Association designation. Major shrub associates included *Arctostaphylos nevadensis*, with frequency of 100% and about 7% cover; *Ceanothus velutinus*, with frequency of 100% and about 20% cover; and *Arctostaphylos patula*, with frequency of 100% and about 12% cover. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 42%. Coarse woody debris, duff, and fine woody debris also factored in the organic material found with about 37% total cover. Fine gravelly soil and bare soil accounted for about 17% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1643: *Abies magnifica*-Other Conifer/*Arctostaphylos nevadensis*-Mix (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	12.5	12.5	12.5	100	15.5	15.5	15.5
<i>Pinus jeffreyi</i>	100	1	1	1	100	1	1	1
<i>Pinus contorta</i> var. <i>murrayana</i>	100	1	1	1	100	1	1	1
<i>Abies concolor</i>	100	1	1	1	100	1	1	1
<i>Pinus monticola</i>	P	P	P	P	100	0.5	0.5	0.5
Total tree		15.5				19		
<i>Ceanothus velutinus</i>	100	20.5	20.5	20.5	100	20	20	20
<i>Arctostaphylos patula</i>	100	12	12	12	100	13.5	13.5	13.5
<i>Arctostaphylos nevadensis</i>	100	7	7	7	100	11	11	11
<i>Ribes roezlii</i>	100	3	3	3	100	4	4	4
<i>Chrysolepis sempervirens</i>	100	2	2	2	100	2.5	2.5	2.5
Total shrub		44.5				51		
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	100	7.5	7.5	7.5	100	42.3	42.3	42.3
Barren - duff	100	13	13	13	100	18.3	18.3	18.3
Barren - fine woody debris	100	6.5	6.5	6.5	100	14.3	14.3	14.3
Barren - bare soil	100	5	5	5	100	10	10	10
Barren - fine gravelly soil	100	3	3	3	100	7	7	7
Barren - coarse woody debris	100	5	5	5	100	5	5	5
Total other		40				96.9		
Totals		100				166.9		

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/
Sparse Understory Forest/Woodland

Plant Association Code: AM-(PM)-PC:tree

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 6

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGL008616), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1850m to 2200m (6100' to 7200'). Aspects were generally of a northerly direction on flat to gentle slopes. Soils are characterized by an abundance of organic material, along with gravelly soil and bare rock, such as found in the "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" and "Vitrandic Xerorthents, debris fan, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association's overstory was characterized by a codominance of *Abies magnifica* and *Pinus contorta* var. *murrayana*. *Abies magnifica* has 100% frequency and average cover of 34%; cover estimates ranged from 6 to 68%. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 26%; cover estimates ranged from 6 to 60%. Another common conifer in this type was *Pinus monticola* with a frequency of 83% and average cover of 6%; cover estimates ranged from 4 to 14%. No major understory associates were found in this type, although remnants of *Arctostaphylos nevadensis* were found in the understory that are likely being shaded out by the increasing conifer overstory. Litter accumulation had a frequency of 100% and average total cover of 59%; cover estimates ranged from 42 to 72%. Rock and forms of bare soil contributed about 12% total cover of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Table 800: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Abies magnifica</i>	100	33.6	6	68	100	44.3	6	90
<i>Pinus contorta</i> var. <i>murrayana</i>	100	26.4	6	60	100	29	6	74
<i>Pinus monticola</i>	83.3	5.8	4	14	83.3	6.5	4	16
<i>Abies magnifica</i> (dead)	50	2.2	2	9	83.3	3.7	2	11
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	66.7	1.7	2	4	66.7	1.6	2	3.5
<i>Tsuga mertensiana</i>	16.7	0.3	2	2	33.3	0.3	2	2
<i>Pinus jeffreyi</i>	16.7	0.3	2	2	16.7	0.7	4	4
<i>Abies concolor</i>	16.7	0.3	2	2	16.7	0.7	4	4
Total tree		70.6				86.8		
<i>Arctostaphylos nevadensis</i>	P	P	P	P	50	2.7	2	10
<i>Ericameria bloomeri</i>	P	P	P	P	16.7	0.3	2	2
<i>Holodiscus microphyllus</i> var. <i>glabrescens</i>	T	T	T	T	16.7	T	T	T
<i>Ribes roezlii</i>	T	T	T	T	16.7	T	T	T
Total shrub		0				3		
<i>Achnatherum occidentale</i>	16.7	0.3	2	2	33.3	2	4	8
<i>Elymus elymoides</i>	T	T	T	T	33.3	0.3	2	2
<i>Juncus parryi</i>	16.7	0.3	2	2	33.3	0.3	2	2
<i>Monardella odoratissima</i>	T	T	T	T	33.3	0.2	1	1
<i>Lupinus angustiflorus</i>	T	T	T	T	33.3	T	T	T
<i>Lupinus arbustus</i>	16.7	0.3	2	2	16.7	0.7	4	4
Grass - other	16.7	0.3	2	2	16.7	0.3	1.5	1.5
<i>Lupinus</i> species	P	P	P	P	16.7	0.3	1.5	1.5
<i>Pyrola picta</i>	P	P	P	P	16.7	0.3	2	2
<i>Carex</i> species	T	T	T	T	16.7	T	T	T
<i>Anaphalis margaritacea</i>	T	T	T	T	16.7	T	T	T
<i>Aster</i> species	T	T	T	T	16.7	T	T	T
<i>Hieracium horridum</i>	T	T	T	T	16.7	T	T	T
<i>Pedicularis semibarbata</i>	T	T	T	T	16.7	T	T	T
<i>Penstemon gracilentus</i>	T	T	T	T	16.7	T	T	T
<i>Penstemon newberryi</i>	T	T	T	T	16.7	T	T	T
<i>Polygonum davisiae</i>	T	T	T	T	16.7	T	T	T
Total herbaceous		1.2				4.4		
Moss	T	T	T	T	16.7	T	T	T
Total nonvascular		0				0		
Barren - litter	100	15.3	2	30	100	58.5	42	72
Barren - fine woody debris	83.3	3.3	2	6	83.3	16.8	12	36
Barren - coarse woody debris	83.3	2.5	2	5	83.3	4.7	2	8
Barren - duff	33.3	1	2	4	83.3	4.2	1	10
Barren - rock	33.3	1.7	4	6	50	4.8	2	17
Barren - bare soil	33.3	1.8	5	6	33.3	2	6	6
Barren - gravel	16.7	2.3	14	14	16.7	5.8	35	35
Barren - fine gravelly soil	16.7	0.3	2	2	16.7	0.3	2	2
Total other		28.2				97.1		
Totals		100				191.3		

Variants of this Association: AM-PC:tree
AM-PM-PC:tree

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/
Arctostaphylos nevadensis Forest/(Sparse) Woodland

Plant Association Code: AM-(PM)-PC:tree/AN:shrub

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 20

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGLO08616), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1900m to 2250m (6200' to 7400'). Aspects covered a broad range of directions for this association on flat to gentle slopes. Soils are characterized by an abundance of organic material, along with bare soil and bare rock, such as found in the "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes;" and "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies magnifica*, *Pinus contorta* var. *murrayana*, and *Pinus monticola*. *Abies magnifica* has 100% frequency and average cover of 14%; cover estimates ranged from 2 to 34%. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 14%; cover estimates ranged from 2 to 40%. *Pinus monticola* has 100% frequency and average cover of 6%; cover estimates ranged from 2 to 14%. A Key shrub associate was *Arctostaphylos nevadensis*, with frequency of 100% and 24% average cover; cover estimates ranged from 1 to 56%. While a number of forb species were present, no major forb associates were found in this type. Litter accumulation had a frequency of 100% and average total cover of 63%; cover estimates ranged from 42 to 77%. Fine woody debris also factored in the organic material found with 100% frequency and average total cover of 9%; cover estimates ranged from 1 to 23%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 838: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta* /*Arctostaphylos nevadensis* Forest/(Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	13.7	2	34	100	17.4	2	49.8
<i>Pinus contorta</i> var. <i>murrayana</i>	100	14.5	2	40.2	100	15	2	43.9
<i>Pinus monticola</i>	100	6.2	2	13.5	100	6.4	2	13
<i>Abies magnifica</i> (dead)	60	1.3	1	5	60	1.4	1	6
<i>Tsuga mertensiana</i>	20	0.3	1	2.5	40	0.5	1	6.5
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	15	0.1	1	1	20	0.3	1	2
<i>Pinus Jeffreyi</i>	15	0.4	2	4	15	0.4	2	4
<i>Pinus monticola</i> (dead)	10	0.2	1	3.6	15	0.3	1	3.1
<i>Abies concolor</i>	5	0.1	1.5	1.5	10	0.3	1.5	4
Total tree		36.8				42		
<i>Arctostaphylos nevadensis</i>	100	24.5	1	56	100	32.4	1	76
<i>Chrysolepis sempervirens</i>	T	T	T	T	15	0.1	2	2
<i>Holodiscus microphyllus</i> var. <i>glabrescens</i>	5	0.1	2	2	10	0.1	2	2
<i>Arctostaphylos patula</i>	P	P	P	P	5	0.1	2	2
<i>Phyllodoce breweri</i>	T	T	T	T	5	T	T	T
<i>Sambucus</i> species	T	T	T	T	5	T	T	T
Total shrub		24.6				32.7		
<i>Elymus elymoides</i>	40	0.9	0.5	5	60	1.4	0.5	11
<i>Achnatherum occidentale</i>	25	0.6	1	4	35	1	1	7.5
<i>Carex</i> species	20	0.4	1.2	3.5	25	0.9	3.5	6
<i>Penstemon gracilentus</i>	15	0.2	1	2	25	0.4	1	4
<i>Monardella odoratissima</i>	10	0.1	1	2	25	0.3	1	2
<i>Calyptridium umbellatum</i>	15	0.3	1	2	20	0.3	1	3
<i>Lupinus arbustus</i>	10	1.2	12	12.2	15	1.5	13	17.1
<i>Aster</i> species	10	0.2	1.2	2	15	0.3	1.2	5
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	15	0.2	0.5	2.4	15	0.3	1.5	2.4
<i>Penstemon</i> species	T	T	T	T	15	T	T	T
<i>Juncus parryi</i>	5	0.7	14	14	10	0.7	1	12
<i>Phlox diffusa</i>	10	0.2	1	3	10	0.2	1	3
Grass - other	5	P	P	P	10	0.1	1	2
<i>Eriogonum umbellatum</i>	5	0.1	1.2	1.2	10	0.1	1.2	1.2
<i>Arabis platysperma</i>	T	T	T	T	10	T	T	T
<i>Lupinus</i> species	T	T	T	T	10	T	T	T
<i>Pedicularis semibarbata</i>	P	P	P	P	5	0.2	3.9	3.9
<i>Carex fracta</i>	5	0.1	1.2	1.2	5	0.1	1.2	1.2
<i>Luzula comosa</i>	P	P	P	P	5	0.1	1	1
<i>Achillea millefolium</i>	5	0.1	2	2	5	0.1	3	3
<i>Apocynum androsaemifolium</i>	P	P	P	P	5	0.1	2	2
<i>Aster integrifolius</i>	5	0.1	2.5	2.5	5	0.1	3	3
<i>Lupinus angustiflorus</i>	5	0.1	1	1	5	0.1	1	1
<i>Ranunculus</i> species	P	P	P	P	5	0.1	1	1
Herbaceous - other	5	0.1	1	1	5	0.1	1	1
<i>Corallorhiza</i> species	T	T	T	T	5	T	T	T
<i>Viola bakeri</i>	T	T	T	T	5	T	T	T
Total herbaceous		5.6				8.5		
Moss	5	0.1	2	2	15	0.3	1	3
Lichen	P	P	P	P	5	0.1	1	1
Total nonvascular		0.1				0.4		
Barren - litter	100	16.1	4	26	100	63.4	42	77
Barren - fine woody debris	80	3.7	1	11.8	100	8.9	1	23.5
Barren - duff	85	4.4	1	10	95	9.3	1	32
Barren - rock	60	1.7	1	10	90	4.3	1	22
Barren - bare soil	80	3.5	1	8	80	5.5	1	18
Barren - coarse woody debris	35	0.8	1	4	55	1.7	1	8
Barren - fine gravelly soil	30	1.9	3	14	40	3	1.2	14
Barren - gravel	20	0.7	1	8	20	1	1	10
Water	5	0.1	1	1	5	0.1	1	1
Total other		32.9				97.2		
Totals		100				180.8		

Variants of this Association: AM-PC:tree/AN:shrub
AM-PM-PC:tree/AN:shrub

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/
Arctostaphylos nevadensis-Mix Sparse Woodland

Plant Association Code: AM-(PM)-PC:tree/AN-Mix:shrub

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGLO08616), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2050m to 2250m (6700' to 7400'). Aspects were of a northerly direction on gentle slopes. Soils are characterized by a codominance of bare soil and fragmented rock, such as found in the "Rock Outcrop-Patio family association, 0 to 50 percent slopes" of the 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus contorta* var. *murrayana*, *Pinus monticola*, and *Abies magnifica*. *Pinus contorta* var. *murrayana* had 100% frequency and cover of about 10%. *Pinus monticola* had 100% frequency and cover of about 4%. *Abies magnifica* was found as a Trace species. A major Key shrub associate found in this type was *Arctostaphylos nevadensis*, which had 100% frequency and cover of about 28%. No major forb associates were defined but there was about 16% cover of forbs identified. Litter accumulation had a frequency of 100% and total cover of about 24%. Coarse woody debris factored in the organic material found with 100% frequency and total cover of about 2%. Duff and fine woody debris were not found. Bare soil and rock accounted for about 74% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 843: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/*Arctostaphylos nevadensis*-Mix Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	10	10	10	100	10	10	10
Pinus monticola	100	4	4	4	100	4	4	4
Abies magnifica	T	T	T	T	100	T	T	T
Total tree		14				14		
Arctostaphylos nevadensis	100	28	28	28	100	32	32	32
Spiraea splendens	100	6	6	6	100	8	8	8
Total shrub		34				40		
Juncus parryi	100	6	6	6	100	8	8	8
Grass - other	100	6	6	6	100	8	8	8
Achnatherum occidentale	100	2	2	2	100	2	2	2
Penstemon newberryi	100	2	2	2	100	2	2	2
Allium species	T	T	T	T	100	T	T	T
Arabis platysperma	T	T	T	T	100	T	T	T
Arenaria congesta	T	T	T	T	100	T	T	T
Aster species	T	T	T	T	100	T	T	T
Phlox diffusa	T	T	T	T	100	T	T	T
Elymus elymoides	T	T	T	T	100	T	T	T
Carex species	T	T	T	T	100	T	T	T
Total herbaceous		16				20		
Total nonvascular		0				0		
Barren - bare soil	100	10	10	10	100	40	40	40
Barren - rock	100	20	20	20	100	30	30	30
Barren - litter	100	2	2	2	100	24	24	24
Barren - fine gravelly soil	100	2	2	2	100	4	4	4
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Total other		36				100		
Totals		100				174		

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/
Achnatherum occidentale-*Elymus elymoides*-(Mix)
Forest/(Sparse) Woodland

Plant Association Code: AM-(PM)-PC:tree/AoEe-(Mix):herb

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGLO08616), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 2000m to 2250m (6500' to 7350'). Aspects were observed to be in all directions on flat to gentle slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Cenplat ashy loamy sand, 0 to 15 percent slopes" and "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies magnifica* (live and standing dead), *Pinus contorta* var. *murrayana* (live and standing dead), and *Pinus monticola*. *Pinus contorta* var. *murrayana* (live) was the most common tree species found with 75% frequency and average cover of 25%; cover estimates ranged from 4 to 52% on sites where it was found. *Abies magnifica* (live) had 50% frequency and average cover of 3%; cover estimates ranged from 4 to 9% on sites where it was found. *Pinus monticola* had 50% frequency and average cover of 3%; cover estimates ranged from 2 to 7% on sites where it was found. No major shrub associates were found. Three major forb associates were found. Key forb species were observed in this type. *Achnatherum occidentale* had frequency of 75% and average cover of 12%; cover estimates ranged from 5 to 36% on sites where it was found. *Penstemon gracilentus*, had frequency of 75% and average cover of 3%; cover estimates ranged from 1 to 7% on sites where it was found. Litter accumulation had a frequency of 100% and an average total cover of 44%; cover estimates ranged from 18 to 64%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with total cover of about 18%; cover estimates ranged from 7 to 32% on sites where it was found. Bare rock and various forms of bare soil accounted for average total cover of 37%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

**Type 870: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix)
Forest/(Sparse) Woodland**

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Pinus contorta</i> var. <i>murrayana</i>	75	25	4	52	75	29.3	4	63
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	50	1.3	2.1	3	75	1.8	2	3
<i>Abies magnifica</i>	50	3.3	4	9	50	7	13	15
<i>Abies magnifica</i> (dead)	25	4.7	18.8	18.8	50	5.2	2	18.8
<i>Pinus monticola</i>	50	2.3	2	7	50	2.3	2	7
<i>Abies concolor</i>	25	0.5	2	2	50	1	2	2
Total tree		37.1				46.6		
<i>Arctostaphylos nevadensis</i>	T	T	T	T	50	T	T	T
<i>Ceanothus velutinus</i>	P	P	P	P	25	0.5	2.1	2.1
<i>Symphoricarpos albus</i>	P	P	P	P	25	0.2	0.7	0.7
<i>Ericameria bloomeri</i>	T	T	T	T	25	T	T	T
Total shrub		0				0.7		
<i>Achnatherum occidentale</i>	75	12	5	36	75	13.4	6	38.5
<i>Penstemon gracilentus</i>	75	3	1	7	75	4.4	0.7	13
<i>Elymus elymoides</i>	25	1.3	5	5	50	2.3	9	9
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	50	2.1	2	6.3	50	2	3	5.2
<i>Arabis platysperma</i>	50	0.5	1	1	50	0.6	1	1.5
<i>Lupinus arbustus</i>	25	3.4	13.5	13.5	25	4.1	16.3	16.3
<i>Apocynum androsaemifolium</i>	25	1	4.2	4.2	25	1	4.2	4.2
<i>Stephanomeria</i> species	25	1	4.2	4.2	25	1	4.2	4.2
<i>Carex</i> species	25	0.8	3	3	25	0.8	3	3
<i>Eriogonum umbellatum</i>	P	P	P	P	25	0.5	2	2
<i>Phacelia</i> species	25	0.5	2.1	2.1	25	0.5	2.1	2.1
<i>Carex rossii</i>	T	T	T	T	25	T	T	T
<i>Lupinus angustiflorus</i>	T	T	T	T	25	T	T	T
<i>Monardella odoratissima</i>	T	T	T	T	25	T	T	T
<i>Phlox diffusa</i>	T	T	T	T	25	T	T	T
Total herbaceous		25.6				30.6		
Moss	T	T	T	T	25	T	T	T
Total nonvascular		0				0		
Barren - litter	100	11.8	6	18.8	100	43.8	18	64
Barren - bare soil	100	13.8	4	31	100	31.7	4	69
Barren - fine woody debris	100	5.1	2	8.3	100	10.6	2	16
Barren - coarse woody debris	75	2.5	2	6	75	5.5	2	12
Barren - organic ash	50	2.8	5	6.3	50	2.8	5	6.3
Barren - duff	25	0.5	2	2	50	1.8	3	4
Barren - rock	50	0.8	1	2	50	1.3	1	4
Barren - fine gravelly soil	P	P	P	P	25	0.5	2	2
Total other		37.3				98		
Totals		100				175.9		

Variants of this Association: AM-PC:tree/AoEe-(Mix):forb
AM-PM-PC:tree/AoEe-(Mix):forb

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/Dry Mixed Herbaceous Forest/Woodland

Plant Association Code: AM-(PM)-PC:tree/HDX:herb

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGLO08616), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1950m to 2100m (6400' to 6900'). Aspects were generally a westerly direction on flat to gentle slopes. Soils are characterized by a dominance of organic material over bare soil, such as found in the "Vitrixerands gravelly ashy loamy coarse sand, 1 to 15 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica* and *Pinus contorta* var. *murrayana*. *Abies magnifica* has 100% frequency and cover of about 40%. *Pinus contorta* var. *murrayana* has 100% frequency and cover of about 21%. No major shrub associates were found in this type. A mix of non-Key dry forb associates (a mix that does not key out to a specific named herbaceous association) was commonly found in this association that amounted to about 8% cover. Litter accumulation had a frequency of 100% and total cover of about 43%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with 50% total cover. Bare soil and rock accounted for an additional 7% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 879: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta* / Dry Mixed Herbaceous Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	40	40	40	100	60	60	60
<i>Pinus contorta</i> var. <i>murrayana</i>	100	21	21	21	100	27	27	27
<i>Pinus monticola</i>	100	2	2	2	100	2	2	2
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	100	1	1	1	100	1	1	1
Total tree		64				90		
Total shrub		0				0		
<i>Deschampsia</i> species	100	4	4	4	100	8	8	8
<i>Pedicularis semibarbata</i>	100	4	4	4	100	4	4	4
<i>Penstemon gracilentus</i>	P	P	P	P	100	2	2	2
<i>Pyrola picta</i>	T	T	T	T	100	T	T	T
<i>Viola</i> species	T	T	T	T	100	T	T	T
<i>Corallorhiza</i> species	T	T	T	T	100	T	T	T
<i>Erythronium purpurascens</i>	T	T	T	T	100	T	T	T
Total herbaceous		8				14		
Total nonvascular		0				0		
Barren - litter	100	6	6	6	100	43	43	43
Barren - fine woody debris	100	9	9	9	100	30	30	30
Barren - duff	100	8	8	8	100	18	18	18
Barren - bare soil	100	1	1	1	100	3	3	3
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Barren - rock	100	2	2	2	100	4	4	4
Total other		28				100		
Totals		100				204		

Plant Association: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta*/
Mesic Herbaceous Meadow (Sparse) Woodland

Plant Association Code: AM-(PM)-PC:tree/HMM:herb

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGL008616), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found in mesic sites within Lassen Volcanic National Park at elevations from approximately 1950m to 2075m (6400' to 6800'). Aspects were of a broad range of directions on flat to gentle slopes. Soils are characterized by a dominance of organic material, such as found in the "Duric Vitraquands-Typic Endoaquands-Aquandic Cryaquents complex, 0 to 8 percent slopes" and "Humic Haploxerands, lake terrace-Typic Endoaquands complex, 1 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was codominated by *Abies magnifica* and *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* was found to have 100% frequency and cover of about 16%. *Abies magnifica* has 100% frequency and cover of about 6%. No major shrub associates were found in this type. Major forb associates in this mesic meadow association were *Veratrum californicum*, with frequency of 100% and cover of about 16%; *Senecio triangularis*, with frequency of 100% and cover of about 4.7%; and *Lupinus polyphyllus*, with frequency of 100% and cover of about 7%. Other forbs found in this type accounted for about 80% of total ground cover. Litter accumulation, where it could be observed, had a frequency of 100% and cover of about 24%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 882: *Abies magnifica*-(*Pinus monticola*)-*Pinus contorta* / Mesic Herbaceous Meadow (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	16	16	16	100	22	22	22
Abies magnifica	100	6	6	6	100	6	6	6
Total tree		22				28		
Total shrub		0				0		
Veratrum californicum	100	45.5	45.5	45.5	100	16.3	16.3	16.3
Achillea millefolium	100	0.7	0.7	0.7	100	9.3	9.3	9.3
Erigeron peregrinus	P	P	P	P	100	7.3	7.3	7.3
Agrostis species	100	4.7	4.7	4.7	100	7.2	7.2	7.2
Lupinus polyphyllus	100	7	7	7	100	7.2	7.2	7.2
Carex heteroneura	100	3	3	3	100	5.8	5.8	5.8
Carex abrupta	100	2	2	2	100	4.3	4.3	4.3
Mimulus primuloides	P	P	P	P	100	4.1	4.1	4.1
Trifolium species	P	P	P	P	100	3.7	3.7	3.7
Elymus glaucus	100	3	3	3	100	3.5	3.5	3.5
Galium bifolium	P	P	P	P	100	3.4	3.4	3.4
Senecio triangularis	100	4.7	4.7	4.7	100	2.9	2.9	2.9
Perideridia species	100	1.7	1.7	1.7	100	2.7	2.7	2.7
Viola bakeri	P	P	P	P	100	2.6	2.6	2.6
Hordeum species	100	2	2	2	100	2.4	2.4	2.4
Phleum pratense	P	P	P	P	100	2.3	2.3	2.3
Bromus species	P	P	P	P	100	1.7	1.7	1.7
Mimulus moschatus	P	P	P	P	100	1.7	1.7	1.7
Luzula subcongesta	100	0.7	0.7	0.7	100	1.6	1.6	1.6
Aquilegia formosa	P	P	P	P	100	1.3	1.3	1.3
Polygonum douglasii	P	P	P	P	100	1	1	1
Viola macloskeyi	P	P	P	P	100	0.8	0.8	0.8
Trisetum canescens	100	1	1	1	100	0.5	0.5	0.5
Penstemon species	P	P	P	P	100	0.5	0.5	0.5
Taraxacum officinale	P	P	P	P	100	0.5	0.5	0.5
Carex species	P	P	P	P	100	0.4	0.4	0.4
Aconitum columbianum	P	P	P	P	100	0.4	0.4	0.4
Monardella odoratissima	P	P	P	P	100	0.4	0.4	0.4
Veronica species	P	P	P	P	100	0.4	0.4	0.4
Herbaceous - other	P	P	P	P	100	0.3	0.3	0.3
Total herbaceous		76				96.5		
Moss	P	P	P	P	100	1.6	1.6	1.6
Total nonvascular		0				1.6		
Barren - litter	P	P	P	P	100	24	24	24
Barren - bare soil	P	P	P	P	100	2	2	2
Barren - fine woody debris	P	P	P	P	100	2	2	2
Barren - duff	100	2	2	2	100	2	2	2
Total other		2				30		
Totals		100				156.1		

Plant Association: *Abies magnifica*-*Pinus contorta*-*Pinus jeffreyi*/
Sparse Understory Forest/Woodland

Plant Association Code: AM-PC-PJ:tree

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two somewhat similar associations, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGLO08616) and *Pinus jeffreyi* - *Abies magnifica* Woodland (1.B.2.Nd - CEGLO08636) have been described in the Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1925m to 2050m (6300' to 6700'). Aspects generally fell into a northerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and fragmented rock, such as found in the "Vitrandic Xerorthents, debris fan, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by a dominance of *Pinus contorta* var. *murrayana*, *Pinus jeffreyi*, and *Abies magnifica*. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 24%; cover estimates ranged from 4 to 44%. *Pinus jeffreyi* has 100% frequency and average cover of 19%; cover estimates ranged from 6 to 32%. *Abies magnifica* has 100% frequency and average cover of 9%; cover estimates ranged from 8 to 10%. No major understory associates were observed in this type. Litter accumulation had a frequency of 100% and average total cover of 46%; cover estimates ranged from 42 to 50%. Bare soil, gravel, and rock accounted for about 54% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1000: *Abies magnifica*-*Pinus contorta*-*Pinus jeffreyi* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	24	4	44	100	24	4	44
Pinus jeffreyi	100	19	6	32	100	20	6	34
Abies magnifica	100	9	8	10	100	11	10	12
Pinus monticola	50	1	2	2	100	2	2	2
Tsuga mertensiana	50	1	2	2	100	2	2	2
Pinus sabiniana	T	T	T	T	50	T	T	T
Total tree		54				59		
Holodiscus microphyllus var. glabre	T	T	T	T	100	T	T	T
Arctostaphylos nevadensis	T	T	T	T	50	T	T	T
Arctostaphylos patula	T	T	T	T	50	T	T	T
Ericameria bloomeri	T	T	T	T	50	T	T	T
Total shrub		0				0		
Penstemon newberryi	T	T	T	T	100	T	T	T
Lupinus arbustus	50	1	2	2	50	3	6	6
Lupinus angustiflorus	50	1	2	2	50	2	4	4
Lupinus obtusilobus	P	P	P	P	50	1	2	2
Achnatherum occidentale	T	T	T	T	50	T	T	T
Calyptidium umbellatum	T	T	T	T	50	T	T	T
Hieracium horridum	T	T	T	T	50	T	T	T
Monardella odoratissima	T	T	T	T	50	T	T	T
Total herbaceous		2				6		
Moss	T	T	T	T	50	T	T	T
Total nonvascular		0				0		
Barren - litter	100	9	8	10	100	46	42	50
Barren - gravel	100	25	14	36	100	35	22	48
Barren - rock	100	10	6	14	100	17	10	24
Barren - bare soil	P	P	P	P	50	2	4	4
Total other		44				100		
Totals		100				165		

Plant Association: *Abies magnifica*-*Pinus contorta*-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix (Sparse) Woodland

Plant Association Code: AM-PC-PJ:tree/AN-Mix:shrub

Alliance: *Abies magnifica*-*Pinus contorta*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two somewhat similar associations, *Abies magnifica* - *Pinus monticola* - *Pinus contorta* var. *murrayana* Forest (1.B.2.Nd - CEGLO08616) and *Pinus jeffreyi* - *Abies magnifica* Woodland (1.B.2.Nd - CEGLO08636) have been described in the Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2000m to 2150m (6600' to 7100'). Aspects were generally in a southerly direction on flat to gentle slopes. Soils are characterized by a dominance of organic material along with rock and gravelly soil, such as found in the "Ashbutte-Vitrantic Xerorthents complex, 15 to 60 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of *Abies magnifica*, *Pinus jeffreyi*, and *Pinus contorta* var. *murrayana*. *Pinus jeffreyi* has 100% frequency and cover of about 7%. *Abies magnifica* has 100% frequency and cover of about 6%. *Pinus contorta* var. *murrayana* has 100% frequency and about 3% cover. A Key major shrub associate is *Arctostaphylos nevadensis*, with frequency of 100% and cover of about 12%. One other dry shrub, *Ceanothus cordulatus*, was observed in this type. Forbs found were *Elymus elymoides* and other grasses that totaled about 24% cover. Litter accumulation was very sparse. Duff was a major component of the organic material found with about 59% total cover. Bare soil, fine gravelly soil, and bare rock accounted for about 23% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1043: *Abies magnifica*-*Pinus contorta*-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	6	6	6	100	8	8	8
<i>Pinus jeffreyi</i>	100	7	7	7	100	7	7	7
<i>Pinus contorta</i> var. <i>murrayana</i>	100	3	3	3	100	3	3	3
Total tree		16				18		
<i>Arctostaphylos nevadensis</i>	100	12	12	12	100	16	16	16
<i>Ceanothus cordulatus</i>	100	2	2	2	100	2	2	2
Total shrub		14				18		
Grass - other	100	14	14	14	100	14	14	14
<i>Elymus elymoides</i>	100	10	10	10	100	10	10	10
Total herbaceous		24				24		
Total nonvascular		0				0		
Barren - duff	100	36	36	36	100	59	59	59
Barren - gravel	100	4	4	4	100	15	15	15
Barren - rock	100	2	2	2	100	4	4	4
Barren - bare soil	100	4	4	4	100	4	4	4
Barren - fine woody debris	P	P	P	P	100	4	4	4
Barren - litter	P	P	P	P	100	4	4	4
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Total other		46				92		
Totals		100				152		

Plant Association: *Abies magnifica*-*Abies concolor*/Sparse Understory Forest/Woodland

Plant Association Code: AM-AC:tree

Alliance: True-Fir-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 6

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - CEGLO08681), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1900m to 2100m (6200' to 6900'). Aspects were observed in all directions on gentle to moderate slopes. Soils are characterized by a dominance of organic material, such as found in the "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes" and "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica* and *Abies concolor*. *Abies concolor* had 100% frequency and average cover of 48%; cover estimates ranged from 22 to 69%. *Abies magnifica* had 100% frequency and average cover of 27%; cover estimates ranged from 8 to 52%. No major understory associates were found in this association. Litter accumulation had a frequency of 100% and an average total cover of 43%; cover estimates ranged from 35 to 60%. Coarse woody debris and fine woody debris factored in the organic material with a frequency of 100% and average total cover of 46%; cover estimates ranged from 24 to 60%. Bare soil and rock totaled on 2% average total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1500: *Abies magnifica*-*Abies concolor*/Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	48.3	22.5	69	100	64.1	31.5	98.5
<i>Abies magnifica</i>	100	26.8	8	52	100	32.3	10.5	55
<i>Abies concolor</i> (dead)	66.7	0.7	1	1	66.7	1.4	1	3.3
<i>Abies magnifica</i> (dead)	50	0.3	0.5	1	50	0.7	1	1.5
<i>Pinus monticola</i>	T	T	T	T	33.3	0.2	1	1
<i>Pinus contorta</i> var. <i>murrayana</i>	16.7	0.3	2	2	16.7	0.3	2	2
<i>Pinus jeffreyi</i>	16.7	0.2	1	1	16.7	0.2	1	1
<i>Pinus lambertiana</i>	16.7	0.1	0.3	0.3	16.7	0.1	0.3	0.3
Total tree		76.7				99.3		
<i>Arctostaphylos nevadensis</i>	P	P	P	P	16.7	0.3	2	2
<i>Ribes nevadense</i>	T	T	T	T	16.7	T	T	T
<i>Symphoricarpos albus</i>	T	T	T	T	16.7	T	T	T
<i>Chrysolepis sempervirens</i>	T	T	T	T	16.7	T	T	T
Total shrub		0				0.3		
<i>Pyrola picta</i>	T	T	T	T	66.7	0.3	1	1
<i>Chimaphila menziesii</i>	16.7	0.3	2	2	50	0.3	2	2
<i>Corallorhiza</i> species	16.7	0.2	1	1	33.3	0.2	1	1
Grass - other	P	P	P	P	16.7	0.3	2	2
<i>Carex rossii</i>	16.7	0.3	2	2	16.7	0.3	2	2
<i>Achnatherum occidentale</i>	16.7	0.2	1	1	16.7	0.2	1	1
<i>Carex brainerdii</i>	T	T	T	T	16.7	T	T	T
<i>Hieracium albiflorum</i>	T	T	T	T	16.7	T	T	T
<i>Phacelia</i> species	T	T	T	T	16.7	T	T	T
<i>Pterospora andromedea</i>	T	T	T	T	16.7	T	T	T
Total herbaceous		1				1.6		
Lichen	T	T	T	T	50	T	T	T
Moss	T	T	T	T	16.7	T	T	T
Total nonvascular		0				0		
Barren - litter	100	11	4	30	100	42.9	35.5	60
Barren - fine woody debris	83.3	6.2	4	11.1	100	41.3	22	50.5
Barren - coarse woody debris	100	1.3	1	2	100	4.6	2	8.9
Barren - duff	83.3	3	2	8	83.3	6.7	3	14.5
Barren - bare soil	50	0.8	1	2	66.7	1.7	1	4
Barren - rock	P	P	P	P	16.7	0.5	3	3
Total other		22.3				97.7		
Totals		100				198.9		

Plant Association: *Abies magnifica*-*Abies concolor*/*Arctostaphylos nevadensis*-Mix
(Sparse) Woodland

Plant Association Code: AM-AC:tree/AN-Mix:shrub

Alliance: True-Fir-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two somewhat similar associations, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - C EGL008682) and *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - C EGL008681), have been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1980m to 2190m (6500' to 7200'). Aspects were generally of an easterly direction on moderate slopes. Soils are characterized by a codominance of bare rock and organic material, such as found in the "Bearrubble-Rubble land complex, 8 to 40 percent slopes" and "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies magnifica* and *Abies concolor*. *Abies magnifica* was found to have 100% frequency with cover of about 13%. *Abies concolor* was found to have 100% frequency with cover of about 7%. Major shrub associates included *Arctostaphylos nevadensis*, with 100% frequency and cover of about 34%, and *Chrysolepis sempervirens*, with 100% frequency and cover of about 4%. No major forb associates were found in this type. Litter, duff and fine woody debris accumulation was found to have 100% frequency and total cover of about 44%. Rock was the predominant cover on the ground surface with 100% frequency and about 54% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1543: *Abies magnifica*-*Abies concolor*/*Arctostaphylos nevadensis*-Mix (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	13	13	13	100	13	13	13
<i>Abies concolor</i>	100	7	7	7	100	11	11	11
Total tree		20				24		
<i>Arctostaphylos nevadensis</i>	100	34	34	34	100	48	48	48
<i>Chrysolepis sempervirens</i>	100	4	4	4	100	4	4	4
<i>Ribes roezlii</i>	100	2	2	2	100	2	2	2
Total shrub		40				54		
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - rock	100	34	34	34	100	54	54	54
Barren - litter	100	2	2	2	100	36	36	36
Barren - fine woody debris	P	P	P	P	100	4	4	4
Barren - duff	100	4	4	4	100	4	4	4
Total other		40				98		
Totals		100				176		

Plant Association: *Abies magnifica*-*Abies concolor*/*Arctostaphylos patula*-Mix
Woodland

Plant Association Code: AM-AC:tree/AP-Mix:shrub

Alliance: True-Fir-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 2130m to as high as 2440m (7000' to 8000'). Aspects were found to range from southerly aspects at higher elevations to northerly at the lower range of the elevations on flat to gentle slopes. Soils are characterized by a dominance of organic material and bare gravelly soil, such as found in the "Sheld family, moderately deep-Lithic Xerumbrepts association, 0 to 35 percent slopes;" "Yallani-Sheld-Portola families association, 0 to 35 percent slopes;" and "Xeric Vitricryands-Rock outcrop complex, 10 to 45 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica* and *Abies concolor*. *Abies magnifica* has 100% frequency and average cover of 9%; cover estimates ranged from 4 to 12%. *Abies concolor* has 100% frequency and average cover of 25%; cover estimates ranged from 8 to 50%. A major shrub associate is *Arctostaphylos patula*, with frequency of 100% and average cover of 20%; cover estimates ranged from 4 to 48%. Other shrub associates included *Chrysolepis sempervirens* and *Ceanothus velutinus*. *Chrysolepis sempervirens* was observed with frequency of 100% and average cover of 13%; cover estimates ranged from 2 to 20%. *Ceanothus velutinus* was observed with frequency of 100% and average cover of 12%; cover estimates ranged from 11 to 24%. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 68%; cover estimates ranged from 30 to 98%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with average total cover of 15% on sites where they were found. Rock, fine gravelly soil, and bare soil accounted for average total cover of 16% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1549: *Abies magnifica*-*Abies concolor*/*Arctostaphylos patula*-Mix Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	24.8	8	50	100	27.2	8	51
<i>Abies magnifica</i>	100	8.8	4	11.5	100	9.8	4	13.5
<i>Abies concolor</i> (dead)	33.3	0.3	1	1	66.7	1	1	2
<i>Pinus jeffreyi</i>	33.3	0.3	1	1	66.7	0.3	1	1
<i>Pinus monticola</i>	T	T	T	T	66.7	T	T	T
<i>Abies magnifica</i> (dead)	P	P	P	P	33.3	0.7	2	2
Total tree		34.2				39		
<i>Arctostaphylos patula</i>	100	19.8	4	48	100	23.1	7.5	42.7
<i>Chrysolepis sempervirens</i>	100	12.7	2	20	100	16.8	2.5	26
<i>Ceanothus velutinus</i>	66.7	11.7	11	24	100	15.6	11.5	35.3
<i>Arctostaphylos nevadensis</i>	T	T	T	T	66.7	3	9	9
<i>Ribes roezlii</i>	33.3	3.2	9.5	9.5	33.3	3.5	10.5	10.5
<i>Ribes cereum</i>	P	P	P	P	33.3	0.3	1	1
<i>Ribes viscosissimum</i>	T	T	T	T	33.3	T	T	T
Total shrub		47.4				62.3		
<i>Pyrola picta</i>	T	T	T	T	33.3	T	T	T
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	66.7	6	6	12	100	68	30	98
Barren - fine woody debris	33.3	1.3	4	4	66.7	6.8	10	10.5
Barren - rock	33.3	0.7	2	2	66.7	4.7	2	12
Barren - bare soil	33.3	0.3	1	1	66.7	1.7	2	3
Barren - fine gravelly soil	33.3	6	18	18	33.3	10	30	30
Barren - coarse woody debris	33.3	3	9	9	33.3	4	12	12
Barren - duff	33.3	1	3	3	33.3	3.8	11.5	11.5
Total other		18.3				99		
Totals		99.9				200.3		

Variants of this Association: AM-AC:tree/AP-CS:shrub
AM-AC:tree/AP-CV-CS:shrub

Plant Association: *Abies magnifica*-*Abies concolor*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Forest/Woodland

Plant Association Code: AM-AC:tree/AoEe-(Mix):herb

Alliance: True-Fir-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - CEGLO08681), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This Association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1750m to 2000m (5800' to 6500'). Aspects were found to have a westerly to northerly direction on gentle to moderate slopes. Soils are characterized by a dominance of organic material, such as found in the "Buttelake-Sunhoff-Talved complex, 20 to 65 percent slopes" and "Juniperlake, bouldery, 10 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies concolor* and *Abies magnifica*. *Abies concolor* was the most common tree species found in this association with 100% frequency and cover of about 44%. *Abies magnifica* had 100% frequency and cover of about 11%. No major shrub associates were found in this type. Two Key forb associates of this type are present. *Monardella odoratissima* had 100% frequency and cover of about 5%. *Penstemon gracilentus* had 100% frequency and cover of about 3%. Litter accumulation had 100% frequency and cover of about 67%. Coarse woody debris, duff, and fine woody debris also factored in the organic material with 100% frequency and cover of about 33%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1570: *Abies magnifica-Abies concolor/Achnatherum occidentale-Elymus elymoides* - (Mix) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	43.5	43.5	43.5	100	47.5	47.5	47.5
<i>Abies magnifica</i>	100	10.5	10.5	10.5	100	10.5	10.5	10.5
<i>Pinus jeffreyi</i>	100	2.5	2.5	2.5	100	3	3	3
<i>Pinus jeffreyi</i> (dead)	P	P	P	P	100	0.5	0.5	0.5
<i>Abies concolor</i> (dead)	100	0.5	0.5	0.5	100	0.5	0.5	0.5
Total tree		57				62		
Total shrub		0				0		
<i>Monardella odoratissima</i>	100	5	5	5	100	5	5	5
<i>Penstemon gracilentus</i>	100	3	3	3	100	4	4	4
Total herbaceous		8				9		
Total nonvascular		0				0		
Barren - litter	100	22	22	22	100	67	67	67
Barren - fine woody debris	100	6	6	6	100	18	18	18
Barren - duff	100	6	6	6	100	14	14	14
Barren - coarse woody debris	100	1	1	1	100	1	1	1
Total other		35				100		
Totals		100				171		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi*/
Sparse Understory Forest/Woodland

Plant Association Code: AM-AC-PJ:tree

Alliance: True-Fir-Long Needle Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two somewhat similar associations, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682) and *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - CEGLO08681), have been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2100m (5900' to 6900'). Aspects for this type were found to have a broad range, but most commonly fell into a northwesterly direction on slopes ranging from flat to moderate. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Cenplat ashy loamy sand, 0 to 15 percent

2007 LAVO Vegetation Classification

slopes” and “Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes” 2011 LAVO SSURGO soil classifications.

Vegetation

This association’s overstory was dominated by *Abies magnifica*, *Abies concolor* and *Pinus jeffreyi*. *Abies concolor* has 100% frequency and average cover of 52%; cover estimates ranged from 16 to 76%. *Pinus jeffreyi* has 100% frequency and average cover of 13%; cover estimates ranged from 6 to 27%. *Abies magnifica* has 100% frequency and average cover of 4%; cover estimates ranged from 3 to 6%. There were no major shrub or forb associates observed. Litter accumulation had a frequency of 100% and an average total cover of 76%; cover estimates ranged from 64 to 86%. Fine woody debris also factored in the organic material found with a frequency of 100% and average total cover of 14%; cover estimates ranged from 8 to 26%. Bare soil and rock accounted for an average of only 7% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. “T” indicates the species is a Trace species, while “P” indicates the species is present in the type, but not a participant in the cover of the Bird’s-Eye View.

Type 1300: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	51.8	16	76.5	100	66.8	16	93
<i>Pinus jeffreyi</i>	100	13.2	6	27	100	13.2	6	27
<i>Abies magnifica</i>	100	4	3	6	100	6.7	3	14
<i>Abies concolor</i> (dead)	66.7	2.3	3	4	66.7	8	10	14
<i>Pinus lambertiana</i>	P	P	P	P	33.3	1.3	4	4
<i>Pinus monticola</i>	33.3	0.3	1	1	33.3	1	3	3
<i>Pinus jeffreyi</i> (dead)	33.3	0.7	2	2	33.3	0.7	2	2
Total tree		72.3				97.7		
<i>Ericameria bloomeri</i>	33.3	0.7	2	2	33.3	0.7	2	2
<i>Arctostaphylos patula</i>	P	P	P	P	33.3	0.7	2	2
<i>Symphoricarpos albus</i>	T	T	T	T	33.3	T	T	T
<i>Chrysolepis sempervirens</i>	T	T	T	T	33.3	T	T	T
<i>Ribes roezlii</i>	T	T	T	T	33.3	T	T	T
<i>Arctostaphylos nevadensis</i>	T	T	T	T	33.3	T	T	T
Total shrub		0.7				1.4		
<i>Achnatherum occidentale</i>	P	P	P	P	33.3	0.7	2	2
<i>Apocynum androsaemifolium</i>	P	P	P	P	33.3	0.7	2	2
Aster species	33.3	0.7	2	2	33.3	0.7	2	2
<i>Chimaphila menziesii</i>	T	T	T	T	33.3	T	T	T
<i>Monardella odoratissima</i>	T	T	T	T	33.3	T	T	T
<i>Penstemon gracilentus</i>	T	T	T	T	33.3	T	T	T
Carex species	T	T	T	T	33.3	T	T	T
Total herbaceous		0.7				2.1		
Total nonvascular		0				0		
Barren - litter	100	18.7	9	33	100	75.7	64	86
Barren - fine woody debris	100	2.7	1	4	100	14.3	8	26
Barren - bare soil	100	3.7	1	8	100	4	2	8
Barren - rock	33.3	1.3	4	4	66.7	3	1	8
Barren - duff	P	P	P	P	33.3	0.3	1	1
Total other		26.4				97.3		
Totals		100.1				198.5		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix Woodland

Plant Association Code: AM-AC-PJ:tree/AN-Mix:shrub

Alliance: True-Fir-Long Needle Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1950m to 2100m (6400' to 6900'). Aspects were generally of a southerly direction on flat to moderate slopes. Soils are characterized by a dominance of organic material and bare soil, such as found in the "Cenplat ashy loamy sand, 0 to 15 percent slopes" and "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by a combination of *Abies concolor*, *Abies magnifica*, and *Pinus jeffreyi*. The most abundant conifer was *Abies concolor* with frequency of 100% and cover of about 32%. *Pinus jeffreyi* and *Abies magnifica* were observed with frequency of 100% and accounted for approximately 5 and 2% average cover, respectively. Major shrub associates included *Arctostaphylos nevadensis*, with frequency of 100% and about 12% cover, and *Chrysolepis sempervirens*, with 100% frequency and about 9% cover. Other common shrubs observed included *Arctostaphylos patula*. No major forb associates were found in this type. Litter accumulation had a frequency of 100% and total cover of about 60%. Duff, coarse woody debris, and fine woody debris accounted for about 26% total cover. Bare soil and rock totaled about 14% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1343: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	32	32	32	100	38	38	38
<i>Pinus jeffreyi</i>	100	5	5	5	100	5	5	5
<i>Abies magnifica</i> (dead)	100	2	2	2	100	2	2	2
<i>Abies magnifica</i>	100	2	2	2	100	1.5	1.5	1.5
Total tree		41				46.5		
<i>Arctostaphylos nevadensis</i>	100	12	12	12	100	20	20	20
<i>Chrysolepis sempervirens</i>	100	9	9	9	100	17.5	17.5	17.5
<i>Arctostaphylos patula</i>	100	2	2	2	100	2	2	2
Total shrub		23				39.5		
<i>Lupinus</i> species	T	T	T	T	100	T	T	T
<i>Monardella odoratissima</i>	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	100	8	8	8	100	60	60	60
Barren - duff	100	8	8	8	100	16	16	16
Barren - bare soil	100	12	12	12	100	12	12	12
Barren - fine woody debris	100	4	4	4	100	6	6	6
Barren - coarse woody debris	100	4	4	4	100	4	4	4
Barren - rock	P	P	P	P	100	2	2	2
Total other		36				100		
Totals		100				186		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi*/Other Shrub
Sparse Woodland

Plant Association Code: AM-AC-PJ:tree/SOth:shrub

Alliance: True-Fir-Long Needle Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2100m (6000' to 6900') in areas recently (10-20 years ago) disturbed by fire. Aspects were found to have a westerly direction on flat to gentle slopes. Soils are characterized by a dominance of organic material and bare soil, such as found in the "Buttelake ashy sand, 3 to 35 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory vegetation was dead (fire killed) and codominated by *Abies magnifica*, *Abies concolor* and *Pinus jeffreyi* snags. *Abies magnifica* has 100% frequency and cover of about 4%. *Abies concolor* has 100% frequency and cover of about 4%. *Pinus jeffreyi* has 100% frequency and cover of about 2%. Major shrub associates observed were *Ceanothus velutinus*, with frequency of 100% and cover of about 67% and *Chrysolepis sempervirens*, with frequency of 100% and about 4% cover. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 28%. Duff, coarse woody debris, and fine woody debris also factored in the organic material found with 36% average total cover. Bare soil accounted for about 32% total cover of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1369: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi* / Other Shrub Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus jeffreyi (dead)	100	4	4	4	100	4	4	4
Abies concolor (dead)	100	4	4	4	100	4	4	4
Abies magnifica (dead)	100	2	2	2	100	2	2	2
Total tree		10				10		
Ceanothus velutinus	100	66	66	66	100	67	67	67
Chrysolepis sempervirens	P	P	P	P	100	4	4	4
Arctostaphylos patula	100	2	2	2	100	3	3	3
Total shrub		68				74		
Apocynum androsaemifolium	100	4	4	4	100	8	8	8
Nama lobbbii	P	P	P	P	100	2	2	2
Total herbaceous		4				10		
Total nonvascular		0				0		
Barren - bare soil	100	4	4	4	100	32	32	32
Barren - litter	P	P	P	P	100	28	28	28
Barren - fine woody debris	100	2	2	2	100	16	16	16
Barren - duff	100	8	8	8	100	15	15	15
Barren - coarse woody debris	100	4	4	4	100	5	5	5
Total other		18				96		
Totals		100				190		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus jeffreyi*/
Wyethia mollis-*Balsamorhiza sagittata* Forest/Woodland

Plant Association Code: AM-AC-PJ:tree/WmBs:herb

Alliance: True-Fir-Long Needle Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - C EGL008682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, gravelly sites, possibly subject to recent fire within the past 5-20 years, within Lassen Volcanic National Park at elevations from approximately 1950m to 2100m (6400' to 6900'). Aspects were of a southwesterly direction on gentle to steep slopes. Soils are characterized by a codominance of organic material and fine gravelly soil, such as found in the "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" and "Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxepts, debris flows-Typic Dystroxepts complex, 10 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies concolor* with 100% frequency and cover of about 46%. *Abies concolor* (dead) was found with 100% frequency and cover of about 6%. Two other Key conifers observed in this type are *Pinus jeffreyi* and *Abies magnifica*, with 100% frequency and cover of about 4 and 2%, respectively. No shrub associates were observed in this type. Key forb associates found in this type were *Wyethia mollis* and/or *Balsamorhiza sagittata* with about 4% cover. Litter accumulation had a frequency of 100% and total cover of about 56%. Duff, coarse woody debris and fine woody debris also factored in the organic material with a frequency of 100% and total cover of about 14%. Fine gravelly soil accounted for total cover of 16%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1374: *Abies magnifica-Abies concolor-Pinus jeffreyi/Wyethia mollis-Balsamorhiza sagittata* Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	46	46	46	100	54	54	54
<i>Abies concolor</i> (dead)	100	6	6	6	100	12	12	12
<i>Pinus jeffreyi</i>	100	4	4	4	100	8	8	8
<i>Abies magnifica</i>	100	2	2	2	100	2	2	2
Total tree		58				76		
Total shrub		0				0		
<i>Wyethia mollis</i>	100	4	4	4	100	4	4	4
<i>Monardella odoratissima</i>	100	3	3	3	100	2.7	2.7	2.7
<i>Hackelia californica</i>	100	2	2	2	100	2	2	2
<i>Achnatherum occidentale</i>	100	1	1	1	100	0.7	0.7	0.7
<i>Pedicularis semibarbata</i>	P	P	P	P	100	0.7	0.7	0.7
<i>Elymus elymoides</i>	T	T	T	T	100	T	T	T
Grass - other	T	T	T	T	100	T	T	T
<i>Arabis holboellii</i>	T	T	T	T	100	T	T	T
<i>Arabis sparsiflora</i>	T	T	T	T	100	T	T	T
Total herbaceous		10				10.1		
Total nonvascular		0				0		
Barren - litter	100	10	10	10	100	56	56	56
Barren - fine gravelly soil	100	6	6	6	100	16	16	16
Barren - organic ash	100	8	8	8	100	12	12	12
Barren - fine woody debris	100	4	4	4	100	10	10	10
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Barren - duff	100	2	2	2	100	2	2	2
Total other		32				98		
Totals		100				184.1		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus monticola*/
Sparse Understory Forest/Woodland

Plant Association Code: AM-AC-PM:tree

Alliance: True-Fir-Long Needle Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - CEGLO08681), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1860m to 2075m (6100' to 6800'). Aspects were of a broad range in this type but most commonly of a northwesterly direction on gentle to moderate slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Shadowlake-Terracelake-Acroph-Rock outcrop complex, 15 to 80 percent slopes" and "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica* and *Abies concolor*. *Abies magnifica* was found to have 100% frequency and average cover of 30%; cover estimates ranged from 25 to 34%. Standing dead *Abies magnifica* was found to have 100% frequency and average cover of 8%; cover estimates ranged from 2 to 14%. *Abies concolor* was found to have 100% frequency and average cover of 12%; cover estimates ranged from 3 to 22%. *Pinus monticola* was also observed, either alive or standing dead, with a 100% frequency and average cover of 3%; cover estimates ranged from 2 to 12% on sites where it was found. No major shrub or forb associates were found in this association. Litter accumulation had a frequency of 100% and an average total cover of 48%; cover estimates ranged from 42 to 54%. Coarse woody debris, fine woody debris also factored in the organic material found with a frequency of 100% and average cover of 34%; cover estimates ranged from 18 to 50%. Bare soil and rock accounted for an average of 12% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1400: *Abies magnifica-Abies concolor-Pinus monticola* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	29.5	25	34	100	36	25	47
<i>Abies concolor</i>	100	12.5	3	22	100	16	3	29
<i>Abies magnifica</i> (dead)	100	8	2	14	100	11	4	18
<i>Pinus monticola</i>	50	6	12	12	50	6	12	12
<i>Pinus monticola</i> (dead)	50	1	2	2	50	1	2	2
Total tree		57				70		
<i>Arctostaphylos nevadensis</i>	P	P	P	P	50	1	2	2
Total shrub		0				1		
<i>Pyrola picta</i>	T	T	T	T	50	T	T	T
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	100	14	6	22	100	48	42	54
Barren - fine woody debris	100	14	12	16	100	30	16	44
Barren - bare soil	100	9	2	16	100	11	2	20
Barren - coarse woody debris	100	3	2	4	100	4	2	6
Barren - organic ash	50	2	4	4	50	3	6	6
Barren - duff	50	1	2	2	50	3	6	6
Barren - rock	P	P	P	P	50	1	2	2
Total other		43				100		
Totals		100				171		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus monticola*/
Arctostaphylos nevadensis (Sparse) Woodland

Plant Association Code: AM-AC-PM:tree/AN:shrub

Alliance: True-Fir-Long Needle Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1950m to 2130m (6400' to 7000'). Aspects were found to generally have an easterly direction on gentle to moderate slopes. Soils are characterized by a codominance of organic material and bare rock, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes; Terracelake-Acroph-Rock outcrop-Shadowlake complex, 15 to 80 percent slopes;" and "Cascadesprings gravelly ashy loamy coarse sand, 5 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica* and *Abies concolor*. *Abies magnifica* had 100% frequency and average cover of 17%; cover estimates ranged from 6 to 28%. *Abies concolor* had 100% frequency and average cover of 9%; cover estimates ranged from 4 to 14%. *Pinus monticola* was also observed in this association with 100% frequency and average cover of 4%. A major shrub associate is *Arctostaphylos nevadensis*, with 100% frequency and average cover of 40%; cover estimates ranged from 36 to 44%. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 66%; cover estimates ranged from 58 to 74%. Other organic material accounted for an average of 13% total cover. Rock and bare soil accounted for an average of 21% total ground surface condition.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1438: *Abies magnifica*-*Abies concolor*-*Pinus monticola*/*Arctostaphylos nevadensis* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	100	17	6	28	100	20	6	34
<i>Abies concolor</i>	100	9	4	14	100	10	4	16
<i>Pinus monticola</i>	100	4	4	4	100	4	4	4
<i>Abies magnifica</i> (dead)	50	1	2	2	50	1	2	2
Total tree		31				35		
<i>Arctostaphylos nevadensis</i>	100	40	36	44	100	58	52	64
<i>Chrysolepis sempervirens</i>	100	4	4	4	100	5	4	6
Total shrub		44				63		
Carex species	50	1	2	2	50	1	2	2
Total herbaceous		1				1		
Total nonvascular		0				0		
Barren - litter	100	9	4	14	100	66	58	74
Barren - rock	50	10	20	20	100	19	6	32
Barren - fine woody debris	50	1	2	2	100	8	8	8
Barren - duff	100	2	2	2	100	4	2	6
Barren - bare soil	50	2	4	4	50	2	4	4
Barren - coarse woody debris	P	P	P	P	50	1	2	2
Total other		24				100		
Totals		100				199		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/
Sparse Understory Forest

Plant Association Code: AM-AC-PC:tree

Alliance: True-Fir-Lodgepole Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two somewhat similar associations, *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - C EGL008681) and *Abies magnifica* - *Abies concolor* - *Pinus lambertiana* / Sparse Understory Forest(1.B.2.Nd - C EGL008683), have been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2050m (6000' to 6700'). Aspects were found to have a broad range but generally fell into a somewhat northerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" and "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was codominated by *Abies magnifica*, *Abies concolor*, and *Pinus contorta* var. *murrayana*. *Abies magnifica* has 100% frequency and average cover of 22%; cover estimates ranged from 8 to 57%. *Abies concolor* has 100% frequency and average cover of 21%; cover estimates ranged from 1 to 37%. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 20%; cover estimates ranged from 5 to 32%. No major shrub associates were found. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 44%; cover estimates ranged from 36 to 52%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with average total cover of 52%; cover estimates ranged from 34 to 69%. Bare soil and rock contributed only 2% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1200: *Abies magnifica*-*Abies concolor*-*Pinus contorta* / Sparse Understory Forest

Detailed Alliance	Bird's-Eye Frequency	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species	(%)	Cover	Cover	Cover	(%)	Cover	Cover	Cover
<i>Abies magnifica</i>	100	21.7	8	57.3	100	31.5	12	84.7
<i>Abies concolor</i>	100	20.7	0.6	37	100	29.8	1.8	49
<i>Pinus contorta</i> var. <i>murrayana</i>	100	20.2	5	32	100	22.6	5	37
<i>Abies magnifica</i> (dead)	80	3	1.8	8	80	4.5	3	8
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	20	0.8	4	4	60	2.9	3.6	7
<i>Pinus monticola</i>	20	1.8	9	9	20	1.8	9	9
<i>Pinus lambertiana</i>	20	0.4	2	2	20	0.4	2	2
<i>Abies concolor</i> (dead)	P	P	P	P	20	0.2	1.2	1.2
Total tree		68.6				93.7		
Total shrub		0				0		
Grass - other	20	0.4	2	2	60	2.2	2	4.8
<i>Carex</i> species	T	T	T	T	60	0.2	1.2	1.2
<i>Chimaphila menziesii</i>	T	T	T	T	60	T	T	T
<i>Pedicularis semibarbata</i>	T	T	T	T	60	T	T	T
<i>Achillea millefolium</i>	20	0.5	2.4	2.4	40	0.6	3	3
<i>Luzula comosa</i>	T	T	T	T	40	0.4	2	2
<i>Achnatherum</i> species	P	P	P	P	20	0.8	4	4
<i>Hieracium albiflorum</i>	20	0.4	2	2	20	0.8	4	4
<i>Carex spissa</i>	20	0.4	2	2	20	0.4	2	2
<i>Hieracium</i> species	P	P	P	P	20	0.4	2	2
Herbaceous - other	P	P	P	P	20	0.1	0.6	0.6
<i>Carex brainerdii</i>	T	T	T	T	20	T	T	T
<i>Carex whitneyi</i>	T	T	T	T	20	T	T	T
<i>Pteridium aquilinum</i>	T	T	T	T	20	T	T	T
<i>Arabis platysperma</i>	T	T	T	T	20	T	T	T
<i>Epilobium</i> species	T	T	T	T	20	T	T	T
<i>Gilia leptalea</i>	T	T	T	T	20	T	T	T
<i>Lupinus angustiflorus</i>	T	T	T	T	20	T	T	T
<i>Osmorhiza chilensis</i>	T	T	T	T	20	T	T	T
<i>Pyrola picta</i>	T	T	T	T	20	T	T	T
<i>Silene</i> species	T	T	T	T	20	T	T	T
<i>Thalictrum</i> species	T	T	T	T	20	T	T	T
<i>Trifolium</i> species	T	T	T	T	20	T	T	T
Herbaceous - other	T	T	T	T	20	T	T	T
Total herbaceous		1.7				5.9		
Moss	T	T	T	T	40	T	T	T
Lichen	20	0.2	1.2	1.2	20	0.2	1.2	1.2
Total nonvascular		0.2				0.2		
Barren - litter	100	10.5	2.4	14	100	44.4	36	52
Barren - fine woody debris	100	10.3	3.6	14	100	30.6	22	39
Barren - duff	80	3.9	2	8	100	10.8	6	16
Barren - coarse woody debris	80	4	2	8	100	10.4	6	14
Barren - bare soil	20	0.4	2	2	40	0.6	1.2	2
Barren - fine gravelly soil	20	0.4	2	2	20	0.8	4	4
Barren - rock	P	P	P	P	20	0.4	2	2
Total other		29.5				98		
Totals		100				197.8		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/
Arctostaphylos nevadensis Forest/Woodland

Plant Association Code: AM-AC-PC:tree/AN:shrub

Alliance: True-Fir-Lodgepole Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2100m (6000' to 6900'). A broad range of aspects were observed on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" and "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica*, *Abies concolor*, and *Pinus contorta* var. *murrayana*. *Abies magnifica* has 100% frequency and average cover of 23%; cover estimates ranged from 7 to 36%. *Abies concolor* has 100% frequency and average cover of 17%; cover estimates ranged from 2 to 31%. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 16%; cover estimates ranged from 10 to 24%. A major Key shrub associate is *Arctostaphylos nevadensis*, with frequency of 100% and average cover of 7%; cover estimates ranged from 2 to 12%. No major forb associates were found. Litter accumulation had a frequency of 100% and an average total cover of 52%; cover estimates ranged from 36 to 59%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with average total cover of 38%; cover estimates ranged from 20 to 66%. Rock, bare soil, and fine gravelly soil accounted for approximately 5% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1238: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/*Arctostaphylos nevadensis* Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species	(%)	Cover	Cover	Cover	(%)	Cover	Cover	Cover
<i>Abies magnifica</i>	100	22.7	7	36	100	29.1	7	43
<i>Abies concolor</i>	100	16.7	2	31	100	21.3	2	37
<i>Pinus contorta</i> var. <i>murrayana</i>	100	16.3	10	24	100	17.9	10	28
<i>Abies concolor</i> (dead)	40	1.1	1	4.5	60	2.1	2	4.5
<i>Abies magnifica</i> (dead)	60	1.4	1	4	60	1.4	2	3
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	60	1	1	2	60	1	1	2
Total tree		59.2				72.8		
<i>Arctostaphylos nevadensis</i>	100	7.2	2	12	100	14.1	6	30
Total shrub		7.2				14.1		
Herbaceous - other	T	T	T	T	60	0.1	0.5	0.5
Grass - other	40	1.7	2	6.5	40	3.3	4	12.5
<i>Hieracium albiflorum</i>	20	0.6	3	3	40	1.2	6	6
<i>Achnatherum occidentale</i>	40	0.8	1	3	40	1	2	3
<i>Elymus elymoides</i>	20	0.4	2	2	40	0.4	2	2
<i>Carex spissa</i>	20	0.8	4	4	20	1.2	6	6
<i>Carex rossii</i>	20	0.2	1	1	20	0.8	4	4
<i>Monardella odoratissima</i>	20	0.6	3	3	20	0.6	3	3
<i>Aster</i> species	20	0.2	1	1	20	0.4	2	2
<i>Hieracium</i> species	20	0.4	2	2	20	0.4	2	2
<i>Lupinus arbustus</i>	20	0.1	0.5	0.5	20	0.3	1.5	1.5
<i>Juncus parryi</i>	P	P	P	P	20	0.2	1	1
<i>Achillea millefolium</i>	P	P	P	P	20	0.1	0.5	0.5
<i>Stephanomeria</i> species	P	P	P	P	20	0.1	0.5	0.5
<i>Luzula comosa</i>	T	T	T	T	20	T	T	T
<i>Chimaphila menziesii</i>	T	T	T	T	20	T	T	T
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	T	T	T	T	20	T	T	T
<i>Gilia leptalea</i>	T	T	T	T	20	T	T	T
<i>Pedicularis semibarbata</i>	T	T	T	T	20	T	T	T
<i>Penstemon davidsonii</i> var. <i>davidsonii</i>	T	T	T	T	20	T	T	T
<i>Viola purpurea</i>	T	T	T	T	20	T	T	T
Total herbaceous		5.8				10.1		
Lichen	P	P	P	P	40	0.6	1	2
Moss	T	T	T	T	20	T	T	T
Total nonvascular		0				0.6		
Barren - litter	100	12.3	10	15	100	52.4	36.5	59.5
Barren - fine woody debris	100	4.1	2.5	6	100	18.3	12	24
Barren - duff	100	5.6	3	11	100	14.4	7	34
Barren - coarse woody debris	100	3.4	1	6	100	5.4	1	8
Barren - bare soil	40	0.8	2	2	80	1.6	1	3
Barren - rock	40	1.2	1	5	60	3.1	1	13
Barren - fine gravelly soil	20	0.4	2	2	20	0.4	2	2
Total other		27.8				95.6		
Totals		100				193.2		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/
Quercus vaccinifolia Forest/Woodland

Plant Association Code: AM-AC-PC:tree/QV:shrub

Alliance: True-Fir-Lodgepole Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations in the vicinity of 1800m to 2000m (5900' to 6600'). Aspects were found to have a northerly direction on gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of the three Key species *Abies magnifica*, *Abies concolor*, and *Pinus contorta* var. *murrayana*. *Abies concolor* had frequency of 100% and cover of about 38%. *Pinus contorta* var. *murrayana* had frequency of 100% and cover of about 10%. *Abies magnifica* had frequency of 100% and cover of about 2%. One other conifer observed was *Tsuga mertensiana* with frequency of 100% and cover of about 3%. Standing dead *Abies concolor* and *Pinus contorta* var. *murrayana* had frequency of 100% and combined cover of about 10%. One major dry shrub associate was found. *Quercus vacciniifolia* had frequency of 100% and cover of about 24%. No major forb associates were found. Litter accumulation had a frequency of 100% and total cover of about 54%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with a frequency of 100% and total cover of about 38%. Rock and bare soil accounted for about 4% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1251: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/*Quercus vacciniifolia* Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	37.7	37.7	37.7	100	36.7	36.7	36.7
<i>Pinus contorta</i> var. <i>murrayana</i>	100	10	10	10	100	10	10	10
<i>Abies concolor</i> (dead)	100	6	6	6	100	6	6	6
<i>Tsuga mertensiana</i>	100	2.7	2.7	2.7	100	4.7	4.7	4.7
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	100	3.7	3.7	3.7	100	3.7	3.7	3.7
<i>Abies magnifica</i>	100	2	2	2	100	2	2	2
Total tree		62.1				63.1		
<i>Quercus vacciniifolia</i>	100	24	24	24	100	51	51	51
Total shrub		24				51		
<i>Achnatherum occidentale</i>	T	T	T	T	100	T	T	T
<i>Chimaphila menziesii</i>	T	T	T	T	100	T	T	T
<i>Hieracium albiflorum</i>	T	T	T	T	100	T	T	T
Herbaceous - other 8	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Moss	T	T	T	T	100	T	T	T
Total nonvascular		0				0		
Barren - litter	100	8	8	8	100	54	54	54
Barren - fine woody debris	100	4	4	4	100	26	26	26
Barren - coarse woody debris	100	2	2	2	100	10	10	10
Barren - rock	P	P	P	P	100	2	2	2
Barren - bare soil	P	P	P	P	100	2	2	2
Barren - duff	P	P	P	P	100	2	2	2
Total other		14				96		
Totals		100.1				210.1		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/
Ericameria bloomeri Sparse Woodland

Plant Association Code: AM-AC-PC:tree/EB:shrub

Alliance: True-Fir-Lodgepole Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* - *Pinus jeffreyi* Sierran Montane Chaparral Forest (1.B.2.Nd - CEGLO08682), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, gravelly sites within Lassen Volcanic National Park at elevations from approximately 1900m to 2000m (6200' to 6600'). Aspects were found to have a northerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and gravelly soil, such as found in the "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" and "Typic Vitrixerands-Vitrandic Xerorthents, moraine, complex, 3 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of the three Key components *Abies magnifica*, *Abies concolor*, and *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* had 100% frequency and cover of about 8%, while *Abies magnifica* and *Abies concolor* both had 100% frequency and cover of about 2%. A major dry shrub associate in this type was *Ericameria bloomeri* with 100% frequency and cover of about 16%. A common forb observed in this type is *Achnatherum occidentale* with 100% frequency and cover of about 25%. Litter accumulation had 100% frequency and total cover of about 48%, while duff, coarse woody debris, and fine woody debris had 100% frequency and total cover of about 18%. Fine gravelly soil, rock, and gravel contributed about 34% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1255: *Abies magnifica-Abies concolor-Pinus contorta/Ericameria bloomeri* Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	8	8	8	100	8	8	8
Pinus Jeffreyi	100	2	2	2	100	2	2	2
Abies concolor	100	2	2	2	100	2	2	2
Abies magnifica	100	2	2	2	100	2	2	2
Total tree		14				14		
Ericameria bloomeri	100	16	16	16	100	18	18	18
Ribes cereum	T	T	T	T	100	T	T	T
Arctostaphylos patula	T	T	T	T	100	T	T	T
Total shrub		16				18		
Achnatherum occidentale	100	25	25	25	100	25	25	25
Monardella odoratissima	100	2	2	2	100	2	2	2
Herbaceous - other	100	1	1	1	100	1	1	1
Elymus elymoides	T	T	T	T	100	T	T	T
Carex species	T	T	T	T	100	T	T	T
Penstemon species	T	T	T	T	100	T	T	T
Total herbaceous		28				28		
Total nonvascular		0				0		
Barren - litter	100	10	10	10	100	48	48	48
Barren - fine gravelly soil	100	20	20	20	100	28	28	28
Barren - duff	100	10	10	10	100	10	10	10
Barren - coarse woody debris	P	P	P	P	100	4	4	4
Barren - fine woody debris	P	P	P	P	100	4	4	4
Barren - rock	100	2	2	2	100	4	4	4
Barren - gravel	P	P	P	P	100	2	2	2
Total other		42				100		
Totals		100				160		

Plant Association: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/

Achnatherum occidentale-*Elymus elymoides*-(Mix) Forest/Woodland

Plant Association Code: AM-AC-PC:tree/AoEe-(Mix):herb

Alliance: True-Fir-Lodgepole Pine-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* - *Abies concolor* / Sparse Understory Forest (1.B.2.Nd - CEGLO08681), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1850m to 2050m (6100' to 6700'). Aspects were found to have a broad range of direction but most commonly fell into a westerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" and "Typic Xerorthents very gravelly ashy sand, 1 to 20 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies magnifica*, *Abies concolor*, and *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 42%; cover estimates ranged from 22 to 62%. *Abies magnifica* has 100% frequency and average cover of 21%; cover estimates ranged from 6 to 36%. *Abies concolor* has 100% frequency and average cover of 2%; cover estimates ranged from 2 to 3%. No major shrub associates were found. A major forb associate was *Achnatherum occidentale*, with frequency of 100% and average cover of 4%; cover estimates ranged from 3 to 5%. All other forb associates combined had average cover of 12%; cover estimates ranged from 20 to 21% on sites where they were found. Litter accumulation had 100% frequency and an average total cover of 56% cover estimates ranged from 37 to 74%. Duff, coarse woody debris and fine woody debris also factored in the organic material found with 100% frequency and average total cover of 32%; cover estimates ranged from 21 to 43%. Bare ground and rock accounted for only 7% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

**Type 1270: *Abies magnifica*-*Abies concolor*-*Pinus contorta*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix)
Forest/Woodland**

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	42	22	62	100	45.7	23	68.3
Abies magnifica	100	21.3	6	36.5	100	32.9	20.3	45.5
Abies concolor	100	2	1.5	2.5	100	4.7	3.8	5.5
Pinus contorta var. murrayana (dead)	100	3.8	3	4.5	100	3.8	3	4.5
Total tree		69.1				87.1		
Symphoricarpos albus	T	T	T	T	50	T	T	T
Total shrub		0				0		
Achnatherum occidentale	100	4	3	5	100	11.6	8.3	14.8
Achillea millefolium	50	2.1	4.2	4.2	100	4.2	2.5	5.9
Grass - other	100	3.3	2.5	4	100	3.8	3.7	4
Fragaria virginiana	P	P	P	P	100	1.3	1	1.5
Elymus elymoides	T	T	T	T	100	T	T	T
Viola purpurea	T	T	T	T	100	T	T	T
Herbaceous - other	50	1.4	3	3	50	6	12	12
Juncus parryi	50	0.3	0.5	0.5	50	2.5	5	5
Hieracium species	50	1	2	2	50	1	2	2
Lupinus lepidus	P	P	P	P	50	1	2	2
Trifolium species	50	0.4	0.8	0.8	50	0.8	1.5	1.5
Apiaceae	50	0.7	1.5	1.5	50	0.6	1.3	1.3
Aster species	50	0.5	1	1	50	0.6	1.2	1.2
Stachys ajugoides	50	0.5	1.3	1.3	50	0.6	1.3	1.3
Thalictrum species	P	P	P	P	50	0.6	1.3	1.3
Kelloggia galioides	P	P	P	P	50	0.5	1	1
Pedicularis semibarbata	P	P	P	P	50	0.5	1	1
Viola bakeri	50	0.5	1	1	50	0.5	1	1
Viola macloskeyi	P	P	P	P	50	0.5	1	1
Juncus howellii	50	0.5	1	1	50	0.3	0.5	0.5
Calyptridium umbellatum	P	P	P	P	50	0.3	0.5	0.5
Prunella vulgaris ssp. lanceolata	P	P	P	P	50	0.3	0.7	0.7
Juncus nevadensis	50	0.2	0.3	0.3	50	0.2	0.3	0.3
Perideridia species	50	0.3	0.5	0.5	50	0.2	0.3	0.3
Potentilla flabellifolia	50	0.2	0.3	0.3	50	0.2	0.3	0.3
Carex species	T	T	T	T	50	T	T	T
Corallorhiza species	T	T	T	T	50	T	T	T
Lupinus angustiflorus	T	T	T	T	50	T	T	T
Veratrum californicum	T	T	T	T	50	T	T	T
Total herbaceous		15.9				38.1		
Moss	50	0.5	1	1	50	1.4	2.8	2.8
Total nonvascular		0.5				1.4		
Barren - litter	100	5.5	4	7	100	55.5	37	74
Barren - fine woody debris	100	2.5	1	4	100	22	14	30
Barren - coarse woody debris	50	2	4	4	100	5	2	8
Barren - duff	100	1	1	1	100	5	5	5
Barren - bare soil	50	1	2	2	100	2	1	3
Barren - fine gravelly soil	50	1.5	3	3	50	3.5	7	7
Barren - rock	50	1	2	2	50	2	4	4
Total other		14.5				95		
Totals		100				221.6		

Plant Association: *Abies concolor*/Sparse Understory Forest/Woodland

Plant Association Code: AC:tree

Alliance: *Abies concolor* Forest and Woodland (Sparse)

Number of sites: 16

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies concolor* / *Chimaphila umbellata* Forest (1.B.2.Nd - CEGLO00015), has been described in the Oregon's Klamath-Siskiyou region, but *Pseudotsuga menziesii* is not present in this association.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1750m to 2050m (5700' to 6700'). Aspects observed in this type were of all directions on gentle to moderately steep slopes. Soils are characterized by a dominance of organic material, such as found in the "Sueredo bouldery ashy loamy coarse sand, 20 to 60 percent slopes;" "Juniperlake, bouldery, 10 to 35 percent slopes;" and "Typic Vitrixerands, bouldery-Typic Vitrixerands, tephra over colluvium-Rubble land complex, 15 to 60 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory is dominated by *Abies concolor*. *Abies concolor* has 100% frequency and average cover of 77%; cover estimates ranged from 52 to 91%. Standing dead *Abies concolor* was also observed with 81% frequency and average cover of 3%; cover estimates ranged from 1 to 8%. No major understory associates were found in this association and understory vegetation was extremely sparse due to the dense forest canopy. *Pyrola picta* was observed with a frequency of 50% making it a potential indicator of this association, as other herbaceous species were noted as Traces. The ground surface is dominated by litter and woody debris. Litter accumulation had a frequency of 100% and an average total cover of 50%; cover estimates ranged from 18 to 75%. Coarse woody debris and fine woody debris also factored in the organic material found with frequency of 100% and average total cover of 43%; cover estimates ranged from 17 to 94%. The extremely high amounts of woody debris and litter are strong indicators of this association.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1700: *Abies concolor* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	77.4	52	90.6	100	95.8	54	131.5
<i>Abies concolor</i> (dead)	81.3	2.8	1	8	93.8	6.5	1	14
<i>Pinus jeffreyi</i>	43.8	0.9	0.5	5.1	50	1	1	5.1
<i>Abies magnifica</i>	31.3	1	1	4.5	31.3	1.5	1	11
<i>Pinus lambertiana</i>	6.3	0.3	5.5	5.5	18.8	0.5	1	6.5
<i>Pinus jeffreyi</i> (dead)	6.3	0.1	1.8	1.8	12.5	0.2	1	2.8
<i>Calocedrus decurrens</i>	T	T	T	T	12.5	T	T	T
Total tree		82.5				105.5		
<i>Chrysolepis sempervirens</i>	12.5	0.3	2	2	25	0.6	1	4
<i>Arctostaphylos patula</i>	6.3	0.1	2	2	12.5	0.2	1	2
<i>Symphoricarpos albus</i>	T	T	T	T	12.5	T	T	T
<i>Amelanchier pallida</i>	P	P	P	P	6.3	0.1	1	1
<i>Quercus vacciniifolia</i>	P	P	P	P	6.3	0.1	1	1
<i>Salix scouleriana</i>	T	T	T	T	6.3	T	T	T
<i>Ribes roezlii</i>	T	T	T	T	6.3	T	T	T
<i>Sambucus</i> species	T	T	T	T	6.3	T	T	T
Total shrub		0.4				1		
<i>Pyrola picta</i>	T	T	T	T	50	0.1	1	1
<i>Chimaphila menziesii</i>	T	T	T	T	25	T	T	T
Grass - other	12.5	0.2	1	2	12.5	0.2	1	2
<i>Pterospora andromedea</i>	T	T	T	T	12.5	T	T	T
<i>Phacelia</i> species	6.3	0.1	2	2	6.3	0.1	2	2
Herbaceous - other	P	P	P	P	6.3	0.1	1	1
<i>Achnatherum</i> species	T	T	T	T	6.3	T	T	T
<i>Carex rossii</i>	T	T	T	T	6.3	T	T	T
<i>Carex</i> species	T	T	T	T	6.3	T	T	T
<i>Juncus articulatus</i>	T	T	T	T	6.3	T	T	T
<i>Chimaphila</i> species	T	T	T	T	6.3	T	T	T
<i>Corallorhiza</i> species	T	T	T	T	6.3	T	T	T
<i>Hieracium albiflorum</i>	T	T	T	T	6.3	T	T	T
<i>Penstemon</i> species	T	T	T	T	6.3	T	T	T
<i>Potentilla</i> species	T	T	T	T	6.3	T	T	T
<i>Silene</i> species	T	T	T	T	6.3	T	T	T
Total herbaceous		0.3				0.5		
Moss	T	T	T	T	18.8	0.3	4	4
Lichen	6.3	0.1	2	2	12.5	0.1	2	2
Total nonvascular		0.1				0.4		
Barren - litter	100	10.8	1	24	100	50.3	18	75
Barren - fine woody debris	81.3	3	1	6	100	37.4	16	74
Barren - coarse woody debris	62.5	0.9	1	2	100	5.8	1	20
Barren - rock	31.3	0.6	1	3	50	1.8	1	10
Barren - duff	31.3	0.8	1	6	43.8	1.8	1	8
Barren - bare soil	25	0.6	1	5	25	1	2	7
Total other		16.7				98.1		
Totals		100				205.5		

Plant Association: *Abies concolor*/*Arctostaphylos nevadensis* Forest

Plant Association Code: AC:tree/AN:shrub

Alliance: *Abies concolor* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies concolor* / *Ceanothus cordulatus* Forest (1.B.2.Nd - C EGL008608), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1900m to 2075m (6300' to 6800'). Aspects were found to be generally of a southerly direction on flat to moderate slopes. Soils are characterized by a codominance of organic material and ashy loam, such as found in the "Prospectpeak, ashy coarse sand, 10 to 30 percent slopes" and "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies concolor*. *Abies concolor* has 100% frequency and cover of about 73%. Standing dead *Abies concolor* was also observed with 100 % frequency and cover of about 9%. A Key shrub associate of this type was *Arctostaphylos nevadensis* observed with 100 % frequency and cover of about 1%. No major forb associates were found. Litter accumulation had 100 % frequency and total cover of about 55%. Duff, organic ash, and fine woody debris also factored in the organic material found with 100 % frequency and total cover of about 39%. Rock, fine gravelly soil, and bare soil amounted to about 5% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1738: *Abies concolor*/*Arctostaphylos nevadensis* Forest

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	73.2	73.2	73.2	100	86.4	86.4	86.4
<i>Abies concolor</i> (dead)	100	8.6	8.6	8.6	100	29.8	29.8	29.8
<i>Pinus Jeffreyi</i>	T	T	T	T	100	T	T	T
Total tree		81.8				116.2		
<i>Arctostaphylos nevadensis</i>	100	1	1	1	100	1	1	1
Total shrub		1				1		
<i>Monardella odoratissima</i>	T	T	T	T	100	T	T	T
<i>Pyrola picta</i>	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	100	5.1	5.1	5.1	100	54.5	54.5	54.5
Barren - organic ash	100	5.1	5.1	5.1	100	23.2	23.2	23.2
Barren - fine woody debris	100	3	3	3	100	14.1	14.1	14.1
Barren - rock	P	P	P	P	100	3	3	3
Barren - duff	100	2	2	2	100	2	2	2
Barren - fine gravelly soil	100	1	1	1	100	1	1	1
Barren - bare soil	100	1	1	1	100	1	1	1
Total other		17.2				98.8		
Totals		100				216		

Plant Association: *Abies concolor*/*Arctostaphylos patula*-Mix (Sparse) Woodland

Plant Association Code: AC:tree/AP-Mix:shrub

Alliance: *Abies concolor* Forest and Woodland (Sparse)

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies concolor* / *Ceanothus velutinus* Forest (1.B.2.Nd - CEG000246), has been identified in the northern Sierra Nevada Range, California and the Cascades of southern Oregon.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2050m (5900' to 6700'). Aspects were found to be generally of an easterly direction on gentle to moderate slopes. Soils are characterized by a codominance of fine gravelly soil and ashy loam, such as found in the "Summertown gravelly ashy loamy coarse sand, 5 to 35 percent slopes" and "Humic Haploxerands-Typic Haploxerands-Bearrubble-Rubble land complex, 5 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory is dominated by *Abies concolor*. *Abies concolor* had 100% frequency and average cover of 26%; cover estimates ranged from 18 to 35%. *Pinus jeffreyi* was a common Trace species in this type with 50% frequency; cover estimates ranged from 1 to 2% on sites it was observed. Two Key shrub associates of this type were observed. *Arctostaphylos patula* had 100% frequency and average cover of 24%; cover estimates ranged from 8 to 43%. *Chrysolepis sempervirens* had 100% frequency and average cover of 30%; cover estimates ranged from 13 to 39%. No major forb associates were found. Litter accumulation was the major ground cover with a frequency of 100% and an average total cover of 92%; cover estimates ranged from 81 to 99%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1749: *Abies concolor*/*Arctostaphylos patula*-Mix (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	26.3	18	35	100	27.4	15.7	35.8
<i>Pinus jeffreyi</i>	50	0.7	1	1.9	75	0.7	1	1.9
<i>Abies magnifica</i>	25	0.5	2	2	25	0.5	2	2
Total tree		27.5				28.6		
<i>Chrysolepis sempervirens</i>	100	30.3	13.2	39.7	100	46.9	13.2	75.2
<i>Arctostaphylos patula</i>	100	23.9	7.5	42.6	100	30.3	5.5	61
<i>Ceanothus velutinus</i>	100	7.1	5.9	8	100	8.3	6	9.8
<i>Prunus emarginata</i>	100	8.5	2.5	17.6	100	5.8	1.7	12
Total shrub		69.8				91.3		
<i>Lilium washingtonianum</i>	T	T	T	T	50	0.5	2	2
Total herbaceous		0				0.5		
Total nonvascular		0				0		
Barren - litter	75	2.5	1.9	6	100	91.7	81.5	99
Barren - fine woody debris	P	P	P	P	25	0.9	3.7	3.7
Barren - coarse woody debris	P	P	P	P	25	0.7	2.9	2.9
Barren - rock	25	0.3	1	1	25	0.3	1	1
Total other		2.8				93.6		
Totals		100.1				214		

Plant Association: *Abies concolor/Chrysolepis sempervirens* (Other Shrub) Forest

Plant Association Code: AC:tree/CS:shrub

Alliance: *Abies concolor* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies concolor / Ceanothus cordulatus* Forest (1.B.2.Nd - CEGLO08608), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association is typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2150m (6000' to 7100'). Aspects were found to be of a broad range in all directions on moderate to moderately steep slopes. Soils are characterized by a dominance of organic material, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" and "Typic Vitrixerands, bouldery-Typic Vitrixerands, tephra over colluvium-Rubble land complex, 15 to 60 percent slopes" 20211 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory is characterized by a combination of standing dead and live *Abies concolor*. Live *Abies concolor* had a frequency of 100% and average cover of 76%; cover estimates ranged from 72 to 81%. Standing dead *Abies concolor* had a frequency of 50% and average cover of 2%; cover estimates were about 12% on sites where it was found. A major shrub associate observed was *Chrysolepis sempervirens*, with frequency of 100% and average cover of 4%; observed cover estimates were also 4%. *Chrysolepis sempervirens* appears to be a remnant shrub species from earlier stages of stand development when tree cover was less; it is gradually being shaded out by the dense canopy. No major forb associates were found in this type. Litter accumulation had a frequency of 100% and an average total cover of 59%; cover estimates ranged from 54 to 64%. Fine woody debris also factored in the organic material found with a frequency of 100% and an average total cover of 29%; cover estimates ranged from 24 to 34%. Coarse woody debris also factored in the organic material found with a frequency of 50% and an average total cover of 5% and was observed at 10% total cover on the site it was found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1750: *Abies concolor*/*Chrysolepis sempervirens* (Other Shrub) Forest

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	76.5	72	81	100	99	91	107
<i>Abies concolor</i> (dead)	50	2	4	4	50	6	12	12
<i>Pinus jeffreyi</i>	50	4	8	8	50	4	8	8
<i>Pinus monticola</i>	50	1	2	2	50	1	2	2
<i>Abies magnifica</i>	50	0.5	1	1	50	0.5	1	1
Total tree		84				110.5		
<i>Chrysolepis sempervirens</i>	100	4	4	4	100	9	4	14
<i>Arctostaphylos patula</i>	P	P	P	P	50	2.5	5	5
Total shrub		4				11.5		
<i>Pyrola picta</i>	P	P	P	P	50	1	2	2
Total herbaceous		0				1		
Lichen	P	P	P	P	50	1	2	2
Total nonvascular		0				1		
Barren - litter	100	6	4	8	100	59	54	64
Barren - fine woody debris	100	5	2	8	100	29	24	34
Barren - rock	P	P	P	P	100	2	2	2
Barren - coarse woody debris	50	1	2	2	50	5	10	10
Total other		12				95		
Totals		100				219		

Plant Association: *Abies concolor/Quercus vacciniifolia*-(Mix) Woodland

Plant Association Code: AC:tree/QV-(Mix):shrub

Alliance: *Abies concolor* Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies concolor / Ceanothus cordulatus* Forest (1.B.2.Nd - CEGLO08608), has been described in the central and southern Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1740m to 2190m (5700' to 7200'). Aspects were observed in all directions with the southerly aspects at higher elevations and more northerly aspects at lower elevations on gentle to moderately steep slopes. Soils are characterized by a codominance of litter and other organic material with some bare soil and rock, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" and "Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor*. *Abies concolor* was found to have 100% frequency and average cover of 35%; cover estimates ranged from 24 to 42%. One major shrub associate was observed. *Quercus vaccinifolia* had 100% frequency and average cover of 35%; cover estimates ranged from 5 to 56%. A mixture of eight other shrub species having low frequencies of no more than 33% were also observed in combination with the *Quercus vaccinifolia*. No major forb associates were found in this type. Litter and fine woody debris accumulation was found to have 100% frequency and average total cover of 82%; cover estimates ranged from 66 to 95%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1754: *Abies concolor/Quercus vaccinifolia*-(Mix) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	34.8	24	42	100	37.8	25	46.5
<i>Calocedrus decurrens</i>	66.7	1.7	2	3	66.7	2	3	3
<i>Pinus lambertiana</i>	33.3	0.3	1	1	33.3	0.3	1	1
<i>Abies concolor</i> (dead)	33.3	0.3	1	1	33.3	0.3	1	1
<i>Pinus contorta</i> var. <i>murrayana</i>	T	T	T	T	33.3	T	T	T
Total tree		37.1				40.4		
<i>Quercus vaccinifolia</i>	100	34.5	5	56	100	50.2	10.7	78
<i>Symphoricarpos albus</i>	P	P	P	P	66.7	5.7	6	11
<i>Chrysolepis sempervirens</i>	33.3	4.7	14	14	33.3	11.4	34.3	34.3
<i>Arctostaphylos patula</i>	33.3	5.3	16	16	33.3	6.7	20	20
<i>Ceanothus velutinus</i>	33.3	2.7	8	8	33.3	2.6	7.7	7.7
<i>Prunus emarginata</i>	33.3	3.7	11	11	33.3	2.4	7.3	7.3
<i>Arctostaphylos nevadensis</i>	33.3	1.3	4	4	33.3	1.3	4	4
<i>Ceanothus prostratus</i>	33.3	0.7	2	2	33.3	0.7	2	2
<i>Amelanchier pallida</i>	P	P	P	P	33.3	0.2	0.5	0.5
Total shrub		52.9				81.2		
<i>Carex</i> species	33.3	0.7	2	2	66.7	0.7	2	2
<i>Allium</i> species	T	T	T	T	66.7	T	T	T
<i>Lilium</i> species	P	P	P	P	33.3	0.7	2	2
<i>Silene</i> species	P	P	P	P	33.3	0.7	2	2
Grass - other	T	T	T	T	33.3	T	T	T
Total herbaceous		0.7				2.1		
Moss	T	T	T	T	33.3	T	T	T
Total nonvascular		0				0		
Barren - litter	100	6	2	10	100	65.5	52	74
Barren - fine woody debris	66.7	1.3	2	2	100	16.5	14	21.5
Barren - bare soil	33.3	0.7	2	2	100	5	3	8
Barren - duff	P	P	P	P	66.7	3	3	6
Barren - coarse woody debris	33.3	0.7	2	2	33.3	3.7	11	11
Barren - rock	33.3	0.7	2	2	33.3	3	9	9
Total other		9.4				96.7		
Totals		100.1				220.4		

Plant Association: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi*/
Sparse Understory Forest/Woodland

Plant Association Code: AC-CD-PJ:tree

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies concolor* - *Pinus lambertiana* - *Pinus jeffreyi* / Sparse Understory (1.B.2.Nd - CEGLO03115), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1675m to 1900m (5500' to 6200'). Aspects were observed in all directions on gentle to moderate slopes. Soils are characterized by a dominance of organic material, such as found in the "Sheld family, moderately deep-Lithic Xerumbrepts association, 0 to 35 percent slopes; Yallani-Sheld families complex, 35 to 50 percent slopes;" and "Sheld family, moderately deep-Sheld family-Rock Outcrop complex, 0 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies concolor*, *Calocedrus decurrens*, and often *Pinus jeffreyi*. *Abies concolor* had 100% frequency and average cover of 27%; cover estimates ranged from 17 to 35%. *Calocedrus decurrens* had 100% frequency and average cover of 17%; cover estimates ranged from 6 to 44%. The presence of *Pinus jeffreyi* (live and dead) was also observed with 50% frequency and average cover of 15%; cover estimates ranged from a Trace to 37%. *Pinus jeffreyi* (live and dead) was observed at 100% frequency when considering total cover in all canopy layers with average total cover averaging 18%. There were no major shrub or forb associates observed. Litter accumulation had a frequency of 100% and average total cover of 46%; cover estimates ranged from 25 to 68%. Fine woody debris, coarse woody debris, and duff also factored in the organic material found with 100% frequency and average cover of 44%; cover estimates ranged from 8 to 71%. Rock and various types of bare soil accounted for an average of 10% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1800: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi*/Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	26.8	17	35	100	32.8	26	37
<i>Calocedrus decurrens</i>	100	17.3	6	44	100	26.3	6	77
<i>Pinus jeffreyi</i>	50	15	23	37	75	17.5	2	43
<i>Abies concolor</i> (dead)	50	3	2	10	75	4.5	2	14
<i>Pinus lambertiana</i>	25	0.5	2	2	50	2	8	8
<i>Pinus jeffreyi</i> (dead)	P	P	P	P	25	0.5	2	2
<i>Abies magnifica</i>	T	T	T	T	25	T	T	T
Total tree		62.6				83.6		
<i>Arctostaphylos patula</i>	25	0.5	2	2	25	0.5	2	2
<i>Ceanothus velutinus</i>	T	T	T	T	25	T	T	T
<i>Ribes roezlii</i>	T	T	T	T	25	T	T	T
<i>Arctostaphylos nevadensis</i>	T	T	T	T	25	T	T	T
<i>Prunus emarginata</i>	T	T	T	T	25	T	T	T
Total shrub		0.5				0.5		
<i>Carex</i> species	50	1	2	2	50	1.5	2	4
<i>Achnatherum occidentale</i>	P	P	P	P	25	0.5	2	2
<i>Carex brainerdii</i>	P	P	P	P	25	0.5	2	2
<i>Pteridium aquilinum</i>	25	0.5	2	2	25	0.5	2	2
<i>Pyrola picta</i>	25	0.5	2	2	25	0.5	2	2
<i>Achnatherum</i> species	T	T	T	T	25	T	T	T
<i>Carex whitneyi</i>	T	T	T	T	25	T	T	T
<i>Arabis</i> species	T	T	T	T	25	T	T	T
<i>Goodyera oblongifolia</i>	T	T	T	T	25	T	T	T
<i>Hieracium albiflorum</i>	T	T	T	T	25	T	T	T
<i>Silene</i> species	T	T	T	T	25	T	T	T
Total herbaceous		2				3.5		
Total nonvascular		0				0		
Barren - litter	100	10.3	3	14	100	46.3	25	68
Barren - fine woody debris	100	9.3	2	18	100	28.8	4	45
Barren - duff	75	3	2	8	100	7.8	2	14
Barren - coarse woody debris	75	5.5	4	10	100	7	2	12
Barren - rock	50	2.5	2	8	50	4.5	6	12
Barren - bare soil	50	3	6	6	50	3.5	6	8
Barren - fine gravelly soil	25	1	4	4	25	1	4	4
Barren - gravel	25	0.5	2	2	25	0.8	3	3
Total other		35.1				99.7		
Totals		100.2				187.3		

Plant Association: *Abies concolor-Calocedrus decurrens-Pinus jeffreyi/*
Arctostaphylos nevadensis Woodland

Plant Association Code: AC-CD-PJ:tree/AN:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi - Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2225m (6000' to 7300'). Aspect was observed in a westerly direction on gentle slopes. Soils are characterized by a dominance of organic material, such as found in the "Andic Fragiumbrepts-Sheld family, moderately deep, glacial association, 0 to 35 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies concolor*, *Calocedrus decurrens*, and *Pinus jeffreyi*. *Abies concolor* has 100% frequency and cover of about 17%. *Calocedrus decurrens* has 100% frequency and cover of about 9%. *Pinus jeffreyi* was also observed with 100% frequency and cover of about 4%. The major shrub associate was *Arctostaphylos nevadensis*, observed with 100% frequency and about 8% cover. Seven different grasses and forbs were observed that totaled about 18% cover. Litter accumulation had a frequency of 100% and an average total cover of 44%. Fine woody debris, coarse woody debris and duff also factored in the organic material found with 34% average total cover. Rock and bare gravelly soil accounted for about 22% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1838: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi* /*Arctostaphylos nevadensis* Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	17	17	17	100	21	21	21
<i>Calocedrus decurrens</i>	100	9	9	9	100	12	12	12
<i>Pinus jeffreyi</i>	100	4	4	4	100	4	4	4
<i>Pinus contorta</i> var. <i>murrayana</i>	100	2	2	2	100	3	3	3
Total tree		32				40		
<i>Arctostaphylos nevadensis</i>	100	8	8	8	100	8	8	8
<i>Amelanchier pallida</i>	T	T	T	T	100	T	T	T
Total shrub		8				8		
Grass - other	100	4	4	4	100	8	8	8
<i>Achnatherum occidentale</i>	100	8	8	8	100	7	7	7
<i>Elymus elymoides</i>	100	3	3	3	100	5	5	5
Aster species	P	P	P	P	100	4	4	4
<i>Allium</i> species	100	3	3	3	100	3	3	3
<i>Apocynum androsaemifolium</i>	P	P	P	P	100	1	1	1
<i>Linanthus ciliatus</i>	P	P	P	P	100	1	1	1
<i>Calyptidium umbellatum</i>	T	T	T	T	100	T	T	T
<i>Potentilla drummondii</i>	T	T	T	T	100	T	T	T
Total herbaceous		18				29		
Moss	P	P	P	P	100	1	1	1
Total nonvascular		0				1		
Barren - litter	100	8	8	8	100	44	44	44
Barren - fine woody debris	100	16	16	16	100	20	20	20
Barren - fine gravelly soil	100	4	4	4	100	16	16	16
Barren - duff	100	8	8	8	100	10	10	10
Barren - rock	100	4	4	4	100	6	6	6
Barren - coarse woody debris	100	2	2	2	100	4	4	4
Total other		42				100		
Totals		100				178		

Plant Association: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi*/
Quercus vaccinifolia-(Mix) Forest/(Sparse) Woodland

Plant Association Code: AC-CD-PJ:tree/QV-(Mix):shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEG008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1700m to 2125m (5600' to 7000'). Aspects were of a broad range, but most commonly of a southwesterly direction on moderately steep to steep slopes. Soils are characterized by a codominance of organic material along with fragmented rock and fine gravelly soil, such as found in the "Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" and "Sheld family, moderately deep-Sheld family-Rock Outcrop complex, 0 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*, *Abies concolor*, and *Calocedrus decurrens*. *Pinus jeffreyi* had 100% frequency and average cover of 14%; cover estimates ranged from 11 to 18%. *Abies concolor* had 100% frequency and average cover of 8%; cover estimates ranged from 2 to 17%. *Calocedrus decurrens* had 100% frequency and average cover of 7%; cover estimates ranged from 2 to 10%. *Pinus lambertiana* was also observed with 66% frequency and average cover of 11%; cover estimates on sites where it was found ranged from 6 to 26%. A major shrub associate was observed. *Quercus vaccinifolia* had 100% frequency and average cover of 14%; cover estimates ranged from 6 to 28%. *Arctostaphylos patula* was observed with 67% frequency and average cover of 6%; cover estimates ranged from 6 to 12% on sites where it was found. No forb associates were observed in this type. Litter accumulation had a frequency of 100% and an average total cover of 61%; cover estimates ranged from 40 to 80%. Rock and various types of bare soil accounted for an average of 29% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1854: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi*/*Quercus vaccinifolia*-(Mix) Forest and (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species	(%)	Cover	Cover	Cover	(%)	Cover	Cover	Cover
Pinus Jeffreyi	100	13.7	11	18	100	15	11	22
Abies concolor	100	8.3	2	17	100	11.6	2	22
Calocedrus decurrens	100	6.7	2	10	100	8.2	2	12.7
Pinus lambertiana	66.7	10.7	6	26	66.7	11.3	6	28
Abies concolor (dead)	33.3	1.3	4	4	33.3	1.3	4	4
Total tree		40.7				47.4		
Quercus vaccinifolia	100	14	6	28	100	23.7	9	33
Arctostaphylos patula	66.7	6	6	12	66.7	6.3	5	14
Ceanothus velutinus	33.3	6	18	18	33.3	6.6	19.7	19.7
Chrysolepis sempervirens	33.3	1.3	4	4	33.3	2.7	8	8
Ribes roezlii	33.3	0.7	2	2	33.3	1	3	3
Amelanchier pallida	P	P	P	P	33.3	0.3	1	1
Ceanothus prostratus	T	T	T	T	33.3	T	T	T
Purshia tridentata	T	T	T	T	33.3	T	T	T
Symphoricarpos albus	T	T	T	T	33.3	T	T	T
Total shrub		28				40.6		
Galium bolanderi	T	T	T	T	66.7	T	T	T
Penstemon newberryi	T	T	T	T	66.7	T	T	T
Carex brainerdii	33.3	2	6	6	33.3	3.3	10	10
Achnatherum occidentale	33.3	1.3	4	4	33.3	1.3	4	4
Calystegia malacophylla	P	P	P	P	33.3	0.7	2	2
Eriogonum nudum	33.3	0.7	2	2	33.3	0.7	2	2
Apocynum androsaemifolium	T	T	T	T	33.3	T	T	T
Asclepias cordifolia	T	T	T	T	33.3	T	T	T
Cycladenia humilis var. humilis	T	T	T	T	33.3	T	T	T
Epilobium species	T	T	T	T	33.3	T	T	T
Nama lobbiai	T	T	T	T	33.3	T	T	T
Pellaea brachyptera	T	T	T	T	33.3	T	T	T
Pyrola picta	T	T	T	T	33.3	T	T	T
Total herbaceous		4				6		
Total nonvascular		0				0		
Barren - litter	100	10	2	20	100	60.7	40	80
Barren - rock	66.7	2.7	2	6	100	7.3	2	16
Barren - fine gravelly soil	66.7	8.7	2	24	66.7	14.7	2	42
Barren - fine woody debris	33.3	2	6	6	66.7	6	4	14
Barren - duff	66.7	1.3	2	2	66.7	1.3	2	2
Barren - rock/talus	33.3	1.3	4	4	33.3	4	12	12
Barren - bare soil	33.3	1.3	4	4	33.3	3.3	10	10
Barren - coarse woody debris	P	P	P	P	33.3	0.7	2	2
Total other		27.3				98		
Totals		100				192		

Plant Association: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi*/
Dry Mixed Shrub (Sparse) Woodland

Plant Association Code: AC-CD-PJ:tree/DMix:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEG008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1675m to 2225m (5500' to 7300'). Aspects were of a broad range of directions on moderate slopes. Soils are characterized by a codominance of bare soil and fragmented rock, such as found in the "Sheld family-Sheld family, moderately deep complex, 35 to 50 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of *Abies concolor*, *Pinus jeffreyi*, and *Calocedrus decurrens*. *Abies concolor* had 100% frequency and cover of about 12%. *Calocedrus decurrens* had 100% frequency and cover of about 6%. *Pinus jeffreyi* was also observed with 100% frequency and cover of about 2%. The understory was dominated by four shrubs with 100% frequency and cover of about 40%. The two most common Dry shrubs were *Chrysothamnus nauseosus* and *Ribes roezlii*. *Chrysothamnus nauseosus* had 100% frequency and cover of about 26%. *Ribes roezlii* had 100% frequency and cover of about 10%. Litter accumulation had a frequency of 100% and total cover of about 27%. Fine woody debris, coarse woody debris and duff also factored in the organic material found with a frequency of 100% and total cover of about 25%. Rack and bare soils accounted for an additional 38% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1866: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi* / Dry Mixed Shrub (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Abies concolor</i>	100	11.8	11.8	11.8	100	11.8	11.8	11.8
<i>Calocedrus decurrens</i>	100	5.9	5.9	5.9	100	4.9	4.9	4.9
<i>Pinus jeffreyi</i>	100	2	2	2	100	2	2	2
Total tree		19.7				18.7		
<i>Chrysothamnus nauseosus</i> ssp	100	25.5	25.5	25.5	100	25.5	25.5	25.5
<i>Ribes roezlii</i>	100	9.8	9.8	9.8	100	15.7	15.7	15.7
<i>Rubus parviflorus</i>	100	2	2	2	100	3.9	3.9	3.9
<i>Sambucus nigra</i>	100	2	2	2	100	2.9	2.9	2.9
<i>Ribes viscosissimum</i>	P	P	P	P	100	2	2	2
<i>Ceanothus velutinus</i>	T	T	T	T	100	T	T	T
Total shrub		39.3				50		
Grass - other	100	9.8	9.8	9.8	100	16.7	16.7	16.7
<i>Gayophytum diffusum</i> ssp. diff	100	3.9	3.9	3.9	100	3.9	3.9	3.9
<i>Apocynum androsaemifolium</i>	100	2	2	2	100	2	2	2
<i>Eriogonum nudum</i>	100	2	2	2	100	2	2	2
<i>Phacelia</i> species	P	P	P	P	100	1	1	1
<i>Carex fracta</i>	T	T	T	T	100	T	T	T
<i>Hackelia micrantha</i>	T	T	T	T	100	T	T	T
Total herbaceous		17.7				25.6		
Total nonvascular		0				0		
Barren - litter	P	P	P	P	100	27.5	27.5	27.5
Barren - bare soil	100	9.8	9.8	9.8	100	20.6	20.6	20.6
Barren - rock	100	3.9	3.9	3.9	100	11.8	11.8	11.8
Barren - duff	100	5.9	5.9	5.9	100	11.8	11.8	11.8
Barren - fine woody debris	100	2	2	2	100	9.8	9.8	9.8
Barren - gravel	P	P	P	P	100	5.9	5.9	5.9
Barren - coarse woody debris	100	2	2	2	100	2.9	2.9	2.9
Total other		23.6				90.3		
Totals		100.3				184.6		

Plant Association: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi*/
Dry Other Shrub Forest/Woodland

Plant Association Code: AC-CD-PJ:tree/DOth:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1525m to 2010m (5000' to 6600'). Aspects were of a westerly direction on moderate slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Sheld family, moderately deep-Sheld family-Rock Outcrop complex, 0 to 35 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was distinguished by the presence of *Abies concolor*, *Calocedrus decurrens*, and *Pinus jeffreyi*. *Abies concolor* had 100% frequency and cover of about 51%. *Calocedrus decurrens* had 100% frequency and cover of about 10%. *Pinus jeffreyi* had 100% frequency and was observed as a Trace species. Dry shrub associates found with this type were *Ribes roezlii*, *Ceanothus cordulatus*, and *Amelanchier pallida*. *Ribes roezlii* had 100% frequency and cover of about 6%. *Ceanothus cordulatus*, and *Amelanchier pallida* had 100% frequency and were observed as Trace species. Litter accumulation had a frequency of 100% and total cover of about 45%. Fine woody debris, coarse woody debris and duff also factored in the organic material found with a frequency of 100% and total cover of about 43%. Bare soil and rock accounted for about 12% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1867: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi* / Dry Other Shrub Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	51	51	51	100	71.4	71.4	71.4
<i>Calocedrus decurrens</i>	100	10.2	10.2	10.2	100	10.2	10.2	10.2
<i>Abies concolor</i> (dead)	P	P	P	P	100	2	2	2
<i>Pinus jeffreyi</i>	T	T	T	T	100	T	T	T
Total tree		61.2				83.6		
<i>Ribes roezlii</i>	100	6.1	6.1	6.1	100	6.1	6.1	6.1
<i>Ceanothus cordulatus</i>	T	T	T	T	100	T	T	T
<i>Amelanchier pallida</i>	T	T	T	T	100	T	T	T
<i>Symphoricarpos albus</i>	T	T	T	T	100	T	T	T
Total shrub		6.1				6.1		
<i>Achnatherum occidentale</i>	100	4.1	4.1	4.1	100	4.1	4.1	4.1
<i>Carex brainerdii</i>	100	4.1	4.1	4.1	100	4.1	4.1	4.1
<i>Pyrola picta</i>	P	P	P	P	100	2	2	2
<i>Pteridium aquilinum</i>	T	T	T	T	100	T	T	T
<i>Apocynum androsaemifolium</i>	T	T	T	T	100	T	T	T
<i>Corallorhiza</i> species	T	T	T	T	100	T	T	T
Total herbaceous		8.2				10.2		
Lichen	100	2	2	2	100	2	2	2
Total nonvascular		2				2		
Barren - litter	100	6.1	6.1	6.1	100	44.9	44.9	44.9
Barren - fine woody debris	100	4.1	4.1	4.1	100	30.6	30.6	30.6
Barren - bare soil	100	6.1	6.1	6.1	100	10.2	10.2	10.2
Barren - duff	100	4.1	4.1	4.1	100	10.2	10.2	10.2
Barren - rock	P	P	P	P	100	2	2	2
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Total other		22.4				99.9		
Totals		99.9				201.8		

Plant Association: *Abies concolor-Calocedrus decurrens-Pinus jeffreyi*/
Other Shrub Forest

Plant Association Code: AC-CD-PJ:tree/SOth:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2010m (6000' to 6600'). Aspects were found to have a southwesterly direction on moderate slopes. Soils are characterized by a codominance of organic material along with fragmented rock, such as found in the "Humic Haploxerands-Typic Haploxerands-Bearrubble-Rubble land complex, 5 to 40 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the combination of *Pinus jeffreyi*, *Abies concolor*, and *Calocedrus decurrens*. *Pinus jeffreyi* had 100% frequency and cover of about 55%. *Abies concolor* had 100% frequency and cover of about 5%. *Calocedrus decurrens* had 100% frequency and cover of about 5%. A major shrub associate was *Ceanothus prostratus* with 100% frequency and cover of about 13%. There was no major forb associate observed. Litter accumulation had a frequency of 100% and total cover of about 81%. Fine woody debris, coarse woody debris and duff also factored in the organic material found with frequency of 100% and total cover of about 11%. Bare soil and rock accounted for about 5% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1869: *Abies concolor*-*Calocedrus decurrens*-*Pinus jeffreyi* / Other Shrub Forest

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	54.7	54.7	54.7	100	56.7	56.7	56.7
Abies concolor	100	5	5	5	100	10	10	10
Pinus lambertiana	100	6	6	6	100	7	7	7
Calocedrus decurrens	100	5.3	5.3	5.3	100	6.3	6.3	6.3
Pseudotsuga menziesii	100	3	3	3	100	3	3	3
Total tree		74				83		
Ceanothus prostratus	100	13	13	13	100	39.5	39.5	39.5
Arctostaphylos nevadensis	P	P	P	P	100	1	1	1
Total shrub		13				40.5		
Grass - other	P	P	P	P	100	1	1	1
Chimaphila menziesii	P	P	P	P	100	0.5	0.5	0.5
Pterospora andromedea	T	T	T	T	100	T	T	T
Total herbaceous		0				1.5		
Lichen	100	1	1	1	100	1	1	1
Total nonvascular		1				1		
Barren - litter	100	10	10	10	100	81	81	81
Barren - fine woody debris	P	P	P	P	100	8	8	8
Barren - rock	100	1	1	1	100	4	4	4
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Barren - bare soil	100	1	1	1	100	1	1	1
Barren - duff	P	P	P	P	100	1	1	1
Total other		12				97		
Totals		100				223		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/Sparse Understory
Forest/Woodland

Plant Association Code: AC-PJ:tree

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 11

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Abies concolor* - *Pinus lambertiana* - *Pinus jeffreyi* / Sparse Understory Forest (1.B.2.Nd - CEG003155), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, sandy sites within Lassen Volcanic National Park at elevations from approximately 1600m to 2225m (5300' to 7300'). Aspects were found to be in all directions, usually on gentle to moderate slopes. Soils are characterized by a dominance of organic material, such as found in the "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes; Inville-Yallani families complex, 0 to 35 percent slopes; Buttelake-Sunhoff-Talved complex, 20 to 65 percent slopes" and "Prospectpeak, ashy coarse sand, 10 to 30 percent slopes" 2011 LAVO SSURGO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Abies concolor* and *Pinus jeffreyi*. *Abies concolor* has 100% frequency and average cover of 31%; cover estimates ranged from 1 to 57%. *Pinus jeffreyi* has 100% frequency and average cover of 16%; cover estimates ranged from 4 to 46%. The understory vegetation was sparse. Of the shrubs and forbs found on these sites most were Trace species and no major associates of this type were found in sufficient quantities or frequency to justify their designation as part of the type name. The most commonly occurring shrub was *Chrysolepis sempervirens* with only 18% frequency and average cover estimate of less than 1%. Litter accumulation had a frequency of 100% and an average total cover of 55%; cover estimates ranged from 38 to 77%. Fine woody debris, coarse woody debris, organic ash, and duff also factored in the organic material found with an average total cover of 37% on sites where they were found. Bare soil and rock accounted for about 5% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1900: *Abies concolor*-*Pinus jeffreyi* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Abies concolor	100	31	1	57	100	38.1	1	82
Pinus jeffreyi	100	15.7	4	46	100	16.4	4	46
Abies concolor (dead)	63.6	3.8	2	16.7	63.6	5.1	2	17
Pinus jeffreyi (dead)	45.5	3.5	0.5	25	45.5	3.7	0.5	26
Calocedrus decurrens	P	P	P	P	9.1	0.2	2	2
Pinus monticola	9.1	0.1	1	1	9.1	0.1	1	1
Pinus lambertiana	T	T	T	T	9.1	T	T	T
Total tree		54.1				63.6		
Chrysolepis sempervirens	18.2	0.4	2	2	18.2	0.5	2	4
Symphoricarpos albus	9.1	0.2	2	2	18.2	0.2	2	2
Arctostaphylos patula	9.1	0.2	2	2	9.1	0.4	4	4
Ceanothus velutinus	9.1	0.1	1	1	9.1	0.1	1	1
Ceanothus cordulatus	T	T	T	T	9.1	T	T	T
Ribes roezlii	T	T	T	T	9.1	T	T	T
Arctostaphylos nevadensis	T	T	T	T	9.1	T	T	T
Total shrub		0.9				1.2		
Achnatherum occidentale	18.2	0.4	2	2	36.4	0.4	2	2
Monardella odoratissima	9.1	0.1	1	1	27.3	0.1	1	1
Grass - other	9.1	0.4	4	4	18.2	0.5	6	6
Gayophytum diffusum ssp. dif	18.2	0.3	1	2	18.2	0.3	1	2
Penstemon species	T	T	T	T	18.2	0.2	2	2
Arabis species	9.1	0.1	1	1	18.2	0.1	1	1
Elymus elymoides	T	T	T	T	18.2	T	T	T
Carex species	T	T	T	T	18.2	T	T	T
Pyrola picta	T	T	T	T	18.2	T	T	T
Stephanomeria species	9.1	0.1	1	1	9.1	0.2	2	2
Arabis holboellii	T	T	T	T	9.1	T	T	T
Aster species	T	T	T	T	9.1	T	T	T
Collomia tinctoria	T	T	T	T	9.1	T	T	T
Corallorhiza species	T	T	T	T	9.1	T	T	T
Eriogonum species	T	T	T	T	9.1	T	T	T
Erysimum capitatum var. capit	T	T	T	T	9.1	T	T	T
Hieracium species	T	T	T	T	9.1	T	T	T
Smilacina species	T	T	T	T	9.1	T	T	T
Total herbaceous		1.4				1.8		
Lichen	9.1	0.1	1	1	36.4	0.8	2	4
Total nonvascular		0.1				0.8		
Barren - litter	100	23.4	10	39.5	100	54.8	38	77
Barren - fine woody debris	81.8	6.4	1	24	100	17	2	42
Barren - duff	54.5	2.6	2	10	81.8	6.6	2	20
Barren - coarse woody debris	72.7	3.6	1	12	81.8	6.3	1	16
Barren - bare soil	63.6	1.2	1	2	72.7	2.1	2	4
Barren - rock	45.5	1.4	1	4	54.5	2.5	1	8
Barren - organic ash	36.4	3.4	4	20.2	36.4	7.1	9	30
Barren - fine gravelly soil	18.2	1.6	6	12	18.2	2.2	6	18
Total other		43.6				98.6		
Totals		100.1				166		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix
Sparse Woodland

Plant Association Code: AC-PJ:tree/AN-Mix:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found in dry, recently burned areas within Lassen Volcanic National Park at elevations from approximately 1825m to 2250m (6000' to 7400'). Aspects were found to be varied on gentle to moderate slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Buttelake-Sunhoff-Talved complex, 20 to 65 percent slopes" and "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*, both live and standing dead. *Abies concolor* live and standing dead had 100% frequency and average cover of 5% on sites where they were found. Standing dead *Pinus jeffreyi* had 100% frequency and average cover of 5%; cover estimates ranged from 4 to 6%. Two major shrub associates found were *Ceanothus velutinus* and *Arctostaphylos nevadensis*. *Ceanothus velutinus* had 100% frequency and average cover of 16%; cover estimates ranged from 2 to 31%. *Arctostaphylos nevadensis* had 100% frequency and average cover of 6%; cover estimates ranged from 1 to 12%. No major forb associates were observed. Litter accumulation had a frequency of 100% and average total cover of 13%; cover estimates ranged from 12 to 15%. Fine woody debris, coarse woody debris, and duff also factored in the organic material found with frequency of 100% and average total cover of 43%; cover estimates ranged from 32 to 53%. Bare soil accounted for average total cover of 42%; cover estimates ranged from 30 to 54%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1943: *Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus jeffreyi (dead)	100	5	4	6	100	5	4	6
Abies concolor	50	3	6	6	50	3	6	6
Abies concolor (dead)	50	2	4	4	50	2	4	4
Pinus Jeffreyi	P	P	P	P	50	0.5	1	1
Total tree		10				10.5		
Ceanothus velutinus	100	16.5	2	31	100	18.3	2	34.5
Arctostaphylos nevadensis	100	6.5	1	12	100	6.5	1	12
Chrysolepis sempervirens	50	3.5	7	7	50	3.8	7.5	7.5
Arctostaphylos patula	50	1	2	2	50	1	2	2
Ribes roezlii	50	0.5	1	1	50	0.5	1	1
Total shrub		28				30.1		
Gayophytum diffusum ssp. diff	50	0.5	1	1	50	0.5	1	1
Kelloggia galioides	50	0.5	1	1	50	0.5	1	1
Stephanomeria species	50	0.5	1	1	50	0.5	1	1
Total herbaceous		1.5				1.5		
Total nonvascular		0				0		
Barren - bare soil	100	33.5	19	48	100	42	30	54
Barren - fine woody debris	100	14	12	16	100	29.5	28	31
Barren - litter	100	4.5	1	8	100	13.5	12	15
Barren - coarse woody debris	100	5	2	8	100	6.5	2	11
Barren - duff	100	3.5	2	5	100	6.5	2	11
Barren - rock	P	P	P	P	50	0.5	1	1
Total other		60.5				98.5		
Totals		100				140.6		

2007 LAVO Vegetation Classification

Plant Association: *Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos patula*-
Ceanothus cordulatus (Sparse) Woodland

Plant Association Code: AC-PJ:tree/AP-CC:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1675m to 1890m (5500' to 6200'). Aspects were found varied on gentle slopes. Soils are characterized by a codominance of organic material along with bare soil and fine gravelly soil, such as found in the "Sheld family, moderately deep-Lithic Xerumbrepts association, 0 to 35 percent slopes" and "Yallani-Sheld families complex, 35 to 50 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*. *Abies concolor* had 100% frequency and average cover of 7%; cover estimates ranged from 4 to 10%. *Pinus jeffreyi* had 100% frequency and average cover of 11%; cover estimates ranged from 2 to 20%. Two major shrub associates found were *Ceanothus cordulatus* and *Arctostaphylos patula*. *Ceanothus cordulatus* had 100% frequency and average cover of 38%; cover estimates ranged from 27 to 49%. *Arctostaphylos patula* had 100% frequency and average cover of 12%; cover estimates ranged from 10 to 13%. One common forb observed was *Achnatherum occidentale* with 100% frequency and average cover of 9%; cover estimates ranged from 2 to 16%. Litter accumulation had a frequency of 100% and average total cover of 57%; cover estimates ranged from 41 to 73%. Fine woody debris, coarse woody debris and duff also factored in the organic material found with a frequency of 100% and average total cover of 23%; cover estimates ranged from 11 to 34%. Bare soils had a frequency of 100% and average total cover of 9%; cover estimates ranged from 8 to 10%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1945: *Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos patula*-*Ceanothus cordulatus* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	11	2	20	100	11	2	20
Abies concolor	100	7	4	10	100	7	4	10
Calocedrus decurrens	T	T	T	T	100	T	T	T
Pinus lambertiana	50	1	2	2	50	1	2	2
Pinus contorta var. murrayana	50	0.5	1	1	50	0.5	1	1
Total tree		19.5				19.5		
Ceanothus cordulatus	100	38	27	49	100	44.5	29	60
Arctostaphylos patula	100	11.5	10	13	100	12	10	14
Symphoricarpos albus	T	T	T	T	100	1.5	3	3
Ribes roezlii	T	T	T	T	100	1	2	2
Prunus emarginata	50	0.5	1	1	100	0.5	1	1
Chrysolepis sempervirens	50	1.5	3	3	50	1.5	3	3
Ceanothus prostratus	P	P	P	P	50	1	2	2
Arctostaphylos nevadensis	P	P	P	P	50	0.5	1	1
Ribes nevadense	T	T	T	T	50	T	T	T
Total shrub		51.5				62.5		
Achnatherum occidentale	100	9	2	16	100	23.4	20.7	26
Grass - other	P	P	P	P	100	1.5	1	2
Hackelia species	50	1	2	2	100	1	2	2
Pteridium aquilinum	50	6	12	12	50	9.4	18.7	18.7
Carex fracta	50	3	6	6	50	3	6	6
Achnatherum species	P	P	P	P	50	1.5	3	3
Elymus glaucus	P	P	P	P	50	1	2	2
Chimaphila umbellata	P	P	P	P	50	0.5	1	1
Kelloggia galioides	P	P	P	P	50	0.5	1	1
Carex brainerdii	P	P	P	P	50	0.3	0.7	0.7
Elymus elymoides	T	T	T	T	50	T	T	T
Apocynum androsaemifolium	T	T	T	T	50	T	T	T
Phacelia species	T	T	T	T	50	T	T	T
Pterospora andromedea	T	T	T	T	50	T	T	T
Total herbaceous		19				42.1		
Total nonvascular		0				0		
Barren - litter	100	3	2	4	100	57	41	73
Barren - fine woody debris	50	4	8	8	100	14.5	4	25
Barren - fine gravelly soil	50	1	2	2	100	5	4	6
Barren - bare soil	P	P	P	P	100	4	4	4
Barren - duff	50	1	2	2	100	4	4	4
Barren - coarse woody debris	50	1	2	2	100	3.5	3	4
Barren - rock	P	P	P	P	50	2	4	4
Barren - gravel	P	P	P	P	50	2	4	4
Total other		10				92		
Totals		100				216.1		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos patula*-(Mix)
(Sparse) Woodland

Plant Association Code: AC-PJ:tree/AP-(Mix):shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 7

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1650m to 2195m (5400' to 7200'). Aspects were found in all directions on flat to moderately steep slopes. Soils are characterized by a codominance of organic material along with fragmented rock and bare soil, such as found in the "Humic Haploxerands-Typic Haploxerands-Bearrubble-Rubble land complex, 5 to 40 percent slopes; Sheld-Yallani families, moderately deep-Sheld family complex, stony, 15 to 50 percent slopes;" and Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*. *Abies concolor* had 100% frequency and average cover of 16%; cover estimates ranged from 4 to 39%. *Pinus jeffreyi* had 100% frequency and average cover of 10%; cover estimates ranged from 4 to 25%. Five other tree species were observed with a frequency of only 14%. Two major shrub associates found were *Arctostaphylos patula* and *Ceanothus velutinus*. *Arctostaphylos patula* had 100% frequency and average cover of 32%; cover estimates ranged from 7 to 63%. *Ceanothus velutinus* had 86% frequency and average cover of 16%; cover estimates ranged from 1 to 42%. No major forb associate was observed. Litter accumulation had a frequency of 100% and an average total cover of 72%; cover estimates ranged from 21 to 94%. Fine woody debris, coarse woody debris and duff were a minor component of the organic material found with average total cover of 8% on sites where they were found. Rock and bare soils accounted for an average of 14% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1949: *Abies concolor*-*Pinus jeffreyi*/*Arctostaphylos patula*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	15.8	4	39	100	19	2	50.2
<i>Pinus jeffreyi</i>	100	10.1	4	25	100	10.8	4	25
<i>Abies concolor</i> (dead)	14.3	0.3	2	2	28.6	0.2	0.5	1
<i>Pseudotsuga menziesii</i>	14.3	1.4	10	10	14.3	1.4	10	10
<i>Pinus ponderosa</i>	14.3	1.1	8	8	14.3	1.3	9	9
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	14.3	0.7	5	5	14.3	0.7	5	5
<i>Pinus lambertiana</i>	P	P	P	P	14.3	0.3	2	2
<i>Pinus monticola</i>	14.3	0.3	2	2	14.3	0.3	2	2
<i>Populus tremuloides</i>	14.3	0.3	2	2	14.3	0.3	2	2
<i>Pinus jeffreyi</i> (dead)	P	P	P	P	14.3	0.2	1.5	1.5
<i>Calocedrus decurrens</i>	T	T	T	T	14.3	T	T	T
Total tree		30				34.5		
<i>Arctostaphylos patula</i>	100	31.7	7.3	63	100	31.8	15	66
<i>Ceanothus velutinus</i>	85.7	15.8	0.7	42	85.7	17.3	0.7	44
<i>Chrysolepis sempervirens</i>	42.9	8.9	2	33	42.9	15.4	2	63
<i>Prunus emarginata</i>	14.3	0.6	4	4	42.9	0.9	6	6
<i>Symphoricarpos albus</i>	T	T	T	T	28.6	1.6	11	11
<i>Ceanothus prostratus</i>	P	P	P	P	14.3	1	7	7
<i>Ceanothus cordulatus</i>	14.3	0.3	2	2	14.3	0.6	4	4
<i>Salix scouleriana</i>	14.3	0.6	4	4	14.3	0.4	3	3
<i>Holodiscus microphyllus</i> var. <i>glabrescens</i>	P	P	P	P	14.3	0.1	1	1
<i>Ribes roezlii</i>	P	P	P	P	14.3	0.1	1	1
Total shrub		57.9				69.2		
<i>Monardella odoratissima</i>	14.3	0.3	2	2	28.6	1.4	2	8
<i>Kelloggia galioides</i>	P	P	P	P	14.3	0.9	6	6
<i>Smilacina species</i>	P	P	P	P	14.3	0.6	4	4
<i>Pyrola picta</i>	P	P	P	P	14.3	0.3	2	2
<i>Penstemon gracilentus</i>	P	P	P	P	14.3	0.1	1	1
Grass - other	T	T	T	T	14.3	T	T	T
Carex species	T	T	T	T	14.3	T	T	T
<i>Chimaphila menziesii</i>	T	T	T	T	14.3	T	T	T
Total herbaceous		0.3				3.3		
Moss	T	T	T	T	14.3	T	T	T
Total nonvascular		0				0		
Barren - litter	57.1	3.4	2	9	100	71.9	21.5	94
Barren - rock	42.9	4.1	2	25	71.4	9.5	2	42.5
Barren - fine woody debris	42.9	1.3	1	6	71.4	6.7	2	19
Barren - bare soil	28.6	1.1	4	4	28.6	2.4	5	12
Barren - fine gravelly soil	28.6	1.4	2	8	28.6	2.3	2	14
Barren - duff	14.3	0.1	1	1	28.6	0.6	2	2
Barren - coarse woody debris	14.3	0.3	2	2	14.3	0.4	3	3
Total other		11.7				93.8		
Totals		99.9				200.8		

Variants of this Association: AC-PJ:tree/AP:shrub
AC-PJ:tree/AP-CS:shrub
AC-PJ:tree/AP-CV:shrub
AC-PJ:tree/AP-CV-CS:shrub

Plant Association: *Abies concolor*-*Pinus jeffreyi*/*Chrysolepis sempervirens*
(Other Shrub) Forest/Woodland

Plant Association Code: AC-PJ:tree/CS:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGLO08630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1675m to 2195m (5500' to 7200'). Aspects were found to be of all directions on gentle to moderate slopes. Soils are characterized by a codomination of bare soil and fragmented rock, such as found in the "Prospectpeak, ashy coarse sand, 10 to 30 percent slopes; Typic Vitrixerands, bouldery-Typic Vitrixerands, tephra over colluvium-Rubble land complex, 15 to 60 percent slopes;" and "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*, both live and standing dead. *Abies concolor* had 100% frequency and cover of about 27%; standing dead *Abies concolor* had 100% frequency and cover of about 12%. *Pinus jeffreyi* had 100% frequency and cover of about 15%; standing dead *Pinus jeffreyi* had 100% frequency and cover of about 3%. The Key shrub associate observed was *Chrysolepis sempervirens*, with 100% frequency and cover of about 4%. No major forb associates were observed. Litter accumulation had a frequency of 100% and cover of about 64%. Fine woody debris, coarse woody debris and duff also factored in the organic material found with a frequency of 100% and cover of about 4%. Bare soil and organic ash were found with a frequency of 100% and cover of about 28%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1950: *Abies concolor*-*Pinus jeffreyi*/*Chrysolepis sempervirens* (Other Shrub) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	27	27	27	100	33.8	33.8	33.8
<i>Abies concolor</i> (dead)	100	12	12	12	100	18.3	18.3	18.3
<i>Pinus jeffreyi</i>	100	15	15	15	100	16	16	16
<i>Pinus jeffreyi</i> (dead)	100	3	3	3	100	4	4	4
Total tree		57				72.1		
<i>Chrysolepis sempervirens</i>	100	4	4	4	100	4.8	4.8	4.8
<i>Ceanothus velutinus</i>	T	T	T	T	100	T	T	T
<i>Ribes cereum</i>	T	T	T	T	100	T	T	T
Total shrub		4				4.8		
<i>Apocynum androsaemifolium</i>	100	1	1	1	100	2	2	2
<i>Arabis platysperma</i>	100	1	1	1	100	1	1	1
<i>Achnatherum occidentale</i>	T	T	T	T	100	T	T	T
<i>Monardella odoratissima</i>	T	T	T	T	100	T	T	T
Total herbaceous		2				3		
Total nonvascular		0				0		
Barren - litter	100	14	14	14	100	64	64	64
Barren - bare soil	100	10	10	10	100	16	16	16
Barren - organic ash	100	10	10	10	100	12	12	12
Barren - rock	100	1	1	1	100	2	2	2
Barren - fine woody debris	P	P	P	P	100	2	2	2
Barren - coarse woody debris	100	1	1	1	100	1	1	1
Barren - duff	100	1	1	1	100	1	1	1
Total other		37				98		
Totals		100				177.9		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/*Ericameria bloomeri*-Mix
Sparse Woodland

Plant Association Code: AC-PJ:tree/EB-Mix:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGLO08630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, recently burned areas within Lassen Volcanic National Park at elevations from approximately 1825m to 2010m (6000' to 6600'). Aspects were generally of an easterly direction on moderate slopes. Soils are characterized by a dominance of bare soil, such as found in the "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of standing dead *Abies concolor* and *Pinus jeffreyi*. Standing dead *Abies concolor* had 100% frequency and cover of about 5%. Standing dead *Pinus jeffreyi* had 100% frequency and cover of about 6%. The Key shrub associate observed in this type is *Ericameria bloomeri* with 100% frequency and cover of about 12%. No major forb associates were observed, but common forbs included *Gayophytum diffusum*, *Achnatherum occidentale*, and *Monardella odoratissima* each with 100% frequency and cover between 2 and 4%. Litter, duff, organic ash, and fine woody debris accumulation had 100% frequency and total cover of about 16%. Bare soil amounted to about 77% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1956: *Abies concolor*-*Pinus jeffreyi*/*Ericameria bloomeri*-Mix Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus jeffreyi (dead)	100	6	6	6	100	6	6	6
Abies concolor (dead)	100	5	5	5	100	5	5	5
Total tree		11				11		
Ericameria bloomeri	100	12	12	12	100	12.5	12.5	12.5
Ribes cereum	100	3	3	3	100	3	3	3
Chrysolepis sempervirens	100	2	2	2	100	2	2	2
Total shrub		17				17.5		
Gayophytum diffusum ssp. diffusum	100	1.5	1.5	1.5	100	3.5	3.5	3.5
Stephanomeria species	100	3.5	3.5	3.5	100	3.5	3.5	3.5
Achnatherum occidentale	100	3.5	3.5	3.5	100	3	3	3
Chamaesaracha nana	100	2	2	2	100	3	3	3
Monardella odoratissima	100	3	3	3	100	3	3	3
Elymus elymoides	100	1.5	1.5	1.5	100	1.5	1.5	1.5
Apocynum androsaemifolium	100	1	1	1	100	1	1	1
Penstemon gracilentus	100	1	1	1	100	1	1	1
Cirsium vulgare	T	T	T	T	100	T	T	T
Cycladenia humilis var. humilis	T	T	T	T	100	T	T	T
Total herbaceous		17				19.5		
Total nonvascular		0				0		
Barren - bare soil	100	45	45	45	100	77	77	77
Barren - organic ash	100	8	8	8	100	8	8	8
Barren - duff	100	2	2	2	100	4	4	4
Barren - litter	P	P	P	P	100	3	3	3
Barren - rock	P	P	P	P	100	1	1	1
Barren - fine woody debris	P	P	P	P	100	1	1	1
Total other		55				94		
Totals		100				142		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/Other Mixed Shrub
Forest /(Sparse) Woodland

Plant Association Code: AC-PJ:tree/SMix:shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGLO08630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2195m (6000' to 7200'). Aspects were generally of a westerly direction on moderate slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Typic Vitrixerands, bouldery-Typic Vitrixerands, tephra over colluvium-Rubble land complex, 15 to 60 percent slopes; Humic Haploxerands-Typic Haploxerands-Bearrubble-Rubble land complex, 5 to 40 percent slopes;" and "Buttelake-Sunhoff-Talved complex, 20 to 65 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the combination of *Pinus jeffreyi* and *Abies concolor*, both living and standing dead. *Pinus jeffreyi* (live) had 50% frequency and average cover of 32%; cover of about 65% on sites where it was found. *Abies concolor* (live) had 50% frequency and average cover of 6%; cover of about 13% on sites where it was found. Standing dead *Abies concolor* and *Pinus jeffreyi* both averaged about 3% cover. Two major shrub associates found in this type were *Ceanothus velutinus* and *Chrysolepis sempervirens*. *Ceanothus velutinus* had 100% frequency and average cover of 10%; cover estimates ranged from 4 to 16%. *Chrysolepis sempervirens* had 100% frequency and average cover of 11%; cover estimates ranged from 2 to 20%. No Key forb associates were observed in this type. Litter accumulation and fine woody debris had a frequency of 100% and average total cover of 67%; cover estimates ranged from 34 to 100%. Coarse woody debris and duff also factored in the organic material found with a frequency of 50% and average total cover of 14% on sites where they were found. Bare soil and rock averaged about 15% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1968: *Abies concolor*-*Pinus jeffreyi*/Other Mixed Shrub Forest/(Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	50	32.5	65	65	50	38.5	77	77
Abies concolor	50	6.5	13	13	50	9.5	19	19
Pinus jeffreyi (dead)	50	3	6	6	50	3	6	6
Abies concolor (dead)	50	3	6	6	50	3	6	6
Total tree		45				54		
Chrysolepis sempervirens	100	10	4	16	100	17.5	16	19
Ceanothus velutinus	100	11	2	20	100	13.5	8	19
Arctostaphylos patula	T	T	T	T	50	T	T	T
Total shrub		21				31		
Nama lobbii	50	2	4	4	50	2	4	4
Total herbaceous		2				2		
Lichen	P	P	P	P	50	2	4	4
Total nonvascular		0				2		
Barren - litter	100	6	4	8	100	53	24	82
Barren - fine woody debris	100	10	6	14	100	14	10	18
Barren - bare soil	50	5	10	10	50	14	28	28
Barren - duff	50	8	16	16	50	12	24	24
Barren - coarse woody debris	50	2	4	4	50	2	4	4
Barren - rock	50	1	2	2	50	1	2	2
Total other		32				96		
Totals		100				185		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) (Sparse) Woodland

Plant Association Code: AC-PJ:tree/AoEe-(Mix):herb

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGLO08630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, sandy sites within Lassen Volcanic National Park at elevations from approximately 1650m to 2010m (5400' to 6600'). Aspects observed were of a broad range, but most commonly fell in a northerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Buttewash ashy coarse sand, 0 to 15 percent slopes; Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes;" and "Buttelake ashy sand, 3 to 35 percent slopes," 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*, both live and standing dead. Live *Abies concolor* had 100% frequency and average cover of 25%; cover estimates ranged from 6 to 44%. Live *Pinus jeffreyi* had 100% frequency and cover of 6%. Standing dead *Abies concolor* and *Pinus jeffreyi* both had a 50% frequency and average cover of about 3% on sites where they were found. No major shrub associates were observed in this type. Key forb associates in this type included *Achnatherum occidentale* and *Monardella odoratissima* with 100% frequency and combined cover of 11%; cover estimates ranged from 4 to 18%. Litter accumulation had a frequency of 100% and average total cover of 54%; cover estimates ranged from 43 to 66%. Fine woody debris and duff also factored in the organic material found with a frequency of 100% and average total cover of 23%; cover estimates ranged from 14 to 33%. Coarse woody debris had a frequency of 50% and average cover of 4%; cover estimates were about 8% on sites where it was found. Bare soil and rock accounted for about 14% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1970: *Abies concolor*-*Pinus jeffreyi*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	25	6	44	100	31	6	56
<i>Pinus jeffreyi</i>	100	6	6	6	100	6	6	6
<i>Pinus jeffreyi</i> (dead)	50	3	6	6	100	4	2	6
<i>Abies concolor</i> (dead)	50	2	4	4	50	2	4	4
Total tree		36				43		
<i>Ericameria bloomeri</i>	50	1	2	2	50	1	2	2
<i>Arctostaphylos patula</i>	T	T	T	T	50	T	T	T
<i>Amelanchier pallida</i>	T	T	T	T	50	T	T	T
<i>Chrysolepis sempervirens</i>	T	T	T	T	50	T	T	T
Total shrub		1				1		
<i>Achnatherum occidentale</i>	100	5	2	8	100	8	8	8
<i>Monardella odoratissima</i>	100	6	2	10	100	6	2	10
<i>Elymus elymoides</i>	50	1	2	2	100	1	2	2
<i>Penstemon gracilentus</i>	50	4	8	8	50	4	8	8
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	50	1	2	2	50	2	4	4
<i>Carex rossii</i>	P	P	P	P	50	1	2	2
Grass - other	T	T	T	T	50	T	T	T
<i>Carex brainerdii</i>	T	T	T	T	50	T	T	T
<i>Carex whitneyi</i>	T	T	T	T	50	T	T	T
<i>Apocynum androsaemifolium</i>	T	T	T	T	50	T	T	T
<i>Arabis platysperma</i>	T	T	T	T	50	T	T	T
<i>Eriogonum nudum</i>	T	T	T	T	50	T	T	T
<i>Hieracium albiflorum</i>	T	T	T	T	50	T	T	T
Total herbaceous		17				22		
Lichen	P	P	P	P	50	1	2	2
Total nonvascular		0				1		
Barren - litter	100	23	14	32	100	54.5	43	66
Barren - fine woody debris	100	4	4	4	100	14.5	10	19
Barren - bare soil	100	10	4	16	100	12	8	16
Barren - duff	100	4	4	4	100	9	4	14
Barren - coarse woody debris	50	2	4	4	50	4	8	8
Barren - organic ash	50	2	4	4	50	2	4	4
Barren - rock	50	1	2	2	50	2	4	4
Total other		46				98		
Totals		100				165		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/Other Mixed Herbaceous Woodland

Plant Association Code: AC-PJ:tree/HOX:herb

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGLO08630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, recently disturbed (burned within past 5 years) sites within Lassen Volcanic National Park at elevations from approximately 1950m to 2100m (6400' to 6900'). Aspects observed were of a southeasterly direction on gentle slopes. Soils are characterized by a dominance of organic material and organic ash, such as found in the "Prospectpeak, ashy coarse sand, 10 to 30 percent slopes," LAVO 2011 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*, as both live and standing dead trees. *Pinus jeffreyi* has 100% frequency and cover of about 12%. Standing dead *Pinus jeffreyi* has 100% frequency and cover of about 19%. *Abies concolor* has 100% frequency and cover of about 6%. No major shrub associates were observed in this type. About 5% cover of a mix of non-Key forb species was observed that included *Arabis sp.* and *Pyrola picta*; both species' presence appeared to be related to the recent burn. Litter accumulation had a frequency of 100% and total cover of about 61%. Fine woody debris, coarse woody debris, organic ash, and duff also factored in the organic material found amounting to about 37% total cover. There was basically no bare soil or rock observed.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1986: *Abies concolor*-*Pinus jeffreyi* / Other Mixed Herbaceous Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus jeffreyi (dead)	100	19	19	19	100	18.5	18.5	18.5
Pinus jeffreyi	100	12.5	12.5	12.5	100	12.5	12.5	12.5
Abies concolor	100	6.5	6.5	6.5	100	6.5	6.5	6.5
Total tree		38				37.5		
Sambucus species	P	P	P	P	100	0.5	0.5	0.5
Total shrub		0				0.5		
Pyrola picta	100	5	5	5	100	2	2	2
Arabis sp.	T	T	T	T	100	T	T	T
Total herbaceous		5				2		
Lichen	100	3	3	3	100	4	4	4
Total nonvascular		3				4		
Barren - litter	100	31	31	31	100	61	61	61
Barren - organic ash	100	10.5	10.5	10.5	100	17.5	17.5	17.5
Barren - duff	100	3.5	3.5	3.5	100	8.5	8.5	8.5
Barren - coarse woody debris	100	4	4	4	100	6	6	6
Barren - fine woody debris	100	5	5	5	100	5	5	5
Total other		54				98		
Totals		100				142		

Plant Association: *Abies concolor*-*Pinus jeffreyi*/Other Mixed Graminoid Forest/Woodland

Plant Association Code: AC-PJ:tree/HOG:herb

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1700m to 2010m (5500' to 6600'). Aspects were generally of a southerly direction on gentle slopes. Soils are characterized by a dominance of organic material over fine gravelly soil, such as found in the "Humic Haploxerands, strath terrace-Aquepts complex, 5 to 50 percent slopes" 2011 LAVO SSURGO soil classification.

Vegetation

This association's overstory was characterized by the presence of *Abies concolor* and *Pinus jeffreyi*, both live and standing dead. *Abies concolor* had 100% frequency and cover of about 45%. *Pinus jeffreyi* had 100% frequency and cover of about 5%. Standing dead *Pinus jeffreyi* had 100% frequency and cover of about 10%. No major shrub associates were observed in this type. The understory was found to consist mostly of grasses. *Carex whitneyi* and *Carex rossii* had 100% frequency and combined cover of 4%. The Key species *Achnatherum occidentale* was observed with 2% cover, but this density was not sufficient to name this type as an /AoEe-(Mix) associate. Litter accumulation had frequency of 100% and total cover of about 26%. Fine woody debris, coarse woody debris, and duff also factored in the organic material found with a frequency of 100% and total cover of about 68%. Fine gravelly soil was observed with about 2% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 1987: *Abies concolor*-*Pinus jeffreyi* / Other Mixed Graminoid Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Abies concolor</i>	100	45	45	45	100	45	45	45
<i>Pinus jeffreyi</i> (dead)	100	10	10	10	100	10	10	10
<i>Pinus jeffreyi</i>	100	5	5	5	100	5	5	5
<i>Abies concolor</i> (dead)	P	P	P	P	100	4	4	4
<i>Calocedrus decurrens</i>	P	P	P	P	100	2	2	2
Total tree		60				66		
<i>Ceanothus cordulatus</i>	P	P	P	P	100	2	2	2
<i>Ribes roezlii</i>	T	T	T	T	100	T	T	T
Total shrub		0				2		
<i>Carex whitneyi</i>	100	2	2	2	100	6	6	6
<i>Achnatherum occidentale</i>	100	2	2	2	100	4	4	4
<i>Carex rossii</i>	100	2	2	2	100	2	2	2
<i>Elymus elymoides</i>	T	T	T	T	100	T	T	T
<i>Elymus glaucus</i>	T	T	T	T	100	T	T	T
Grass - other	T	T	T	T	100	T	T	T
<i>Eriogonum marifolium</i>	T	T	T	T	100	T	T	T
<i>Gayophytum diffusum</i> ssp. diff	T	T	T	T	100	T	T	T
<i>Penstemon newberryi</i>	T	T	T	T	100	T	T	T
<i>Phacelia</i> species	T	T	T	T	100	T	T	T
Herbaceous - other	T	T	T	T	100	T	T	T
Total herbaceous		6				12		
Total nonvascular		0				0		
Barren - fine woody debris	100	11	11	11	100	49	49	49
Barren - litter	100	8	8	8	100	26	26	26
Barren - coarse woody debris	100	9	9	9	100	13	13	13
Barren - duff	100	4	4	4	100	6	6	6
Barren - fine gravelly soil	100	2	2	2	100	2	2	2
Total other		34				96		
Totals		100				176		

Plant Association: *Abies concolor*-*Pinus jeffreyi*-*Pinus contorta*/
Arctostaphylos nevadensis-(Mix) Sparse Woodland

Plant Association Code: AC-PJ-PC:tree/AN-(Mix):shrub

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2070m (5900' to 6800'). Aspects were observed in nearly all directions, but were generally of a northerly direction on gentle to moderate slopes. Soils are characterized by a codominance of bare soil and fine gravelly soil, such as found in the "Bearrubble-Rubble land complex, 8 to 40 percent slopes; Sheld family, moderately deep-Sheld family-Rock Outcrop complex, 35 to 70 percent slopes;" and "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor*, *Pinus contorta* var. *murrayana*, and *Pinus jeffreyi*. *Abies concolor* was the most common conifer with 100% frequency and cover of 6%; cover estimates ranged from 4 to 8%. *Pinus jeffreyi* had 100% frequency and average cover of 4%; cover estimates ranged from 1 to 11%. *Pinus contorta* var. *murrayana* had 100% frequency and average cover of 3%; cover estimates ranged from 2 to 5%. A Key shrub associate found was *Arctostaphylos nevadensis*, occurring with 100% frequency and average cover of 25%; cover estimates ranged from 3 to 45%. Other common shrub associates found in this type were *Arctostaphylos patula*, *Ceanothus cordulatus*, *Symphoricarpos albus*, and *Chrysolepis sempervirens*. *Arctostaphylos patula* had 66% frequency and average cover of 22%; cover estimates ranged from 18 to 49% on sites where it was found. The most common forbs found in this type were *Achnatherum occidentale* and *Elymus elymoides* with combined average cover of 6%; cover estimates ranged from 5 to 12% on sites where they were found. Litter accumulation had a frequency of 66% and an average total cover of 72%; cover estimates ranged from 52 to 82% on sites where it was found. Fine woody debris also factored in the organic material found with 66% frequency and average total cover of 7%; cover estimates ranged from 8 to 13% on sites where it was found. Bare soil had frequency of 100% and average total cover of 13%; cover estimates ranged from 8 to 16%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2043: *Abies concolor*-*Pinus jeffreyi*-*Pinus contorta*/*Arctostaphylos nevadensis*-(Mix) Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Abies concolor	100	6	4	8	100	8	8	8
Pinus Jeffreyi	100	4.3	1	11	100	4.3	1	11
Pinus contorta var. murrayana	100	3.3	2	5	100	3.3	2	5
Pinus contorta var. murrayana (dead)	33.3	0.7	2	2	33.3	0.7	2	2
Abies concolor (dead)	33.3	0.2	0.7	0.7	33.3	0.2	0.7	0.7
Calocedrus decurrens	T	T	T	T	33.3	T	T	T
Total tree		14.5				16.5		
Arctostaphylos nevadensis	100	25.3	3	45	100	42	7	74
Arctostaphylos patula	66.7	22.4	18	49.3	66.7	23.6	21	49.7
Ceanothus cordulatus	33.3	7.7	23	23	33.3	9.7	29	29
Symphoricarpos albus	33.3	1.2	3.7	3.7	33.3	3.9	11.7	11.7
Chrysolepis sempervirens	33.3	1.7	5	5	33.3	1.7	5	5
Holodiscus microphyllus var. glabrescens	33.3	0.7	2	2	33.3	1.2	3.7	3.7
Amelanchier pallida	P	P	P	P	33.3	0.3	1	1
Ceanothus velutinus	T	T	T	T	33.3	T	T	T
Ribes roezlii	T	T	T	T	33.3	T	T	T
Total shrub		59				82.4		
Elymus elymoides	66.7	1	1	2	100	2.7	1	7
Achnatherum occidentale	66.7	4.7	4	10	66.7	7.7	4	19
Monardella odoratissima	T	T	T	T	66.7	T	T	T
Grass - other	33.3	1.6	4.7	4.7	33.3	2.6	7.7	7.7
Potentilla species	33.3	0.6	1.7	1.7	33.3	1.2	3.7	3.7
Carex species	P	P	P	P	33.3	0.7	2	2
Allium species	33.3	0.3	1	1	33.3	0.7	2	2
Aster species	P	P	P	P	33.3	0.7	2	2
Fragaria virginiana	P	P	P	P	33.3	0.7	2	2
Gayophytum diffusum ssp. diffusum	33.3	0.7	2	2	33.3	0.7	2	2
Achnatherum species	T	T	T	T	33.3	T	T	T
Arabis species	T	T	T	T	33.3	T	T	T
Lupinus angustiflorus	T	T	T	T	33.3	T	T	T
Phlox diffusa	T	T	T	T	33.3	T	T	T
Silene species	T	T	T	T	33.3	T	T	T
Herbaceous - other	T	T	T	T	33.3	T	T	T
Total herbaceous		8.9				17.7		
Moss	T	T	T	T	33.3	T	T	T
Total nonvascular		0				0		
Barren - bare soil	66.7	7	6	15	100	13	8	16
Barren - litter	33.3	1.3	4	4	66.7	72.3	52	82
Barren - fine woody debris	33.3	4.3	13	13	66.7	7	8	13
Barren - fine gravelly soil	33.3	2	6	6	33.3	4	12	12
Barren - duff	33.3	1.7	5	5	33.3	1.7	5	5
Barren - rock	33.3	0.7	2	2	33.3	1.3	4	4
Barren - coarse woody debris	33.3	0.7	2	2	33.3	0.7	2	2
Total other		17.7				100		
Totals		100.1				216.6		

Variants of this Association: AC-PJ-PC:tree/AN:shrub
AC-PJ-PC:tree/AN-AP-CC:shrub
AC-PJ-PC:tree/AN-AP:shrub

Plant Association: *Abies concolor*-*Pinus jeffreyi*-*Pinus contorta*/
Achnatherum occidentale-*Elymus elymoides*-(Mix)
Forest/Woodland

Plant Association Code: AC-PJ-PC:tree/AoEe-(Mix):herb

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - C EGL008630), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1770m to 2010m (5800' to 6600'). Aspects were observed in nearly all directions, but were generally of a northerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Badgerwash very bouldery medial loamy coarse sand, 1 to 10 percent slopes" and "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Abies concolor*, *Pinus contorta* var. *murrayana*, and *Pinus jeffreyi*. *Pinus contorta* var. *murrayana* was the most common conifer with 100% frequency and average cover of 32%; cover estimates ranged from 3 to 62%. *Pinus jeffreyi* had 100% frequency and average cover of 11%; cover estimates ranged from 4 to 18%. *Abies concolor* had 100% frequency and average cover of 4%; cover estimates ranged from 3 to 6%. Thirteen other forb associates were observed as Traces on sites where they were found. No major shrub associates were observed in this type. The most common forb associates in this type were Key species *Achnatherum occidentale* and *Elymus elymoides*. *Elymus elymoides* had 100% frequency and average cover of 3%; cover estimates ranged from 2 to 4%. *Achnatherum occidentale* had 100% frequency and average cover of 4%; cover estimates ranged from 2 to 7%. Litter accumulation had a frequency of 100% and average total cover of 54%; cover estimates were consistent at 54%. Fine woody debris and coarse woody debris also factored in the organic material found with a frequency of 100% and average total cover of 13%; cover estimates ranged from 6 to 20%. Bare soil was observed with a frequency of 100% and average total cover of 26%; estimates ranged from 18 to 34%

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

**Type 2070: *Abies concolor*-*Pinus jeffreyi*-*Pinus contorta*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix)
Forest/Woodland**

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Pinus contorta</i> var. <i>murrayana</i>	100	32.5	3	62	100	36.5	3	70
<i>Pinus jeffreyi</i>	100	11	4	18	100	10.5	3	18
<i>Abies concolor</i>	100	4.5	3	6	100	10	3	17
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	50	1	2	2	50	1	2	2
<i>Abies concolor</i> (dead)	50	1	2	2	50	1	2	2
Total tree		50				59		
<i>Ericameria bloomeri</i>	50	0.5	1	1	50	0.5	1	1
<i>Ceanothus velutinus</i>	T	T	T	T	50	T	T	T
<i>Ribes cereum</i>	T	T	T	T	50	T	T	T
Total shrub		0.5				0.5		
<i>Elymus elymoides</i>	100	3	2	4	100	9	2	16
<i>Achnatherum occidentale</i>	100	4.5	2	7	100	8	2	14
<i>Lupinus angustiflorus</i>	50	2.5	5	5	50	6.5	13	13
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	50	2	4	4	50	4	8	8
<i>Penstemon gracilentus</i>	P	P	P	P	50	2	4	4
<i>Eriogonum nudum</i>	50	1	2	2	50	1	2	2
<i>Pedicularis semibarbata</i>	P	P	P	P	50	1	2	2
<i>Phlox</i> species	P	P	P	P	50	0.5	1	1
<i>Viola bakeri</i>	50	0.5	1	1	50	0.5	1	1
<i>Apocynum androsaemifolium</i>	T	T	T	T	50	T	T	T
<i>Arabis platysperma</i>	T	T	T	T	50	T	T	T
<i>Lupinus arbustus</i>	T	T	T	T	50	T	T	T
<i>Lupinus lepidus</i>	T	T	T	T	50	T	T	T
<i>Phacelia</i> species	T	T	T	T	50	T	T	T
<i>Stephanomeria</i> species	T	T	T	T	50	T	T	T
Total herbaceous		13.5				32.5		
Total nonvascular		0				0		
Barren - litter	100	16	2	30	100	54	54	54
Barren - bare soil	100	13	2	24	100	26	18	34
Barren - fine woody debris	100	2	2	2	100	10	4	16
Barren - coarse woody debris	50	1	2	2	100	3	2	4
Barren - organic ash	50	2	4	4	50	2	4	4
Barren - fine gravelly soil	50	1	2	2	50	1	2	2
Barren - rock	50	1	2	2	50	1	2	2
Barren - duff	P	P	P	P	50	1	2	2
Total other		36				98		
Totals		100				190		

Plant Association: *Abies concolor*-*Pinus jeffreyi*-*Pinus monticola*/
Sparse Understory Sparse Woodland

Plant Association Code: AC-PJ-PM:tree

Alliance: *Abies concolor*-Mixed Needleleaf Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two somewhat similar associations, *Pinus jeffreyi* - *Abies concolor* Woodland (1.B.2.Nd - CEG008630) and *Abies concolor* - *Pinus lambertiana* - *Pinus jeffreyi* / Sparse Understory Forest (1.B.2.Nd - CEG003155), have been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2010m (6000' to 6600'). Aspects observed were generally of a westerly direction on gentle slopes. Soils are characterized by a dominance of fragmented rock and gravelly soil, such as found in the "Chaos extremely gravelly ashy coarse sand, 2 to 30 percent slopes" and "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by a variety of conifers, but most commonly *Abies concolor*, *Pinus monticola*, and *Pinus jeffreyi*. *Pinus monticola* had 100% frequency and average cover of 6%; cover estimates ranged from 4 to 7%. *Pinus jeffreyi* had 100% frequency and average cover of 6%; cover estimates ranged from 5 to 6%. *Abies concolor* had 100% frequency and average cover of 5% cover estimates ranged from 4 to 6%. A very sparse understory, with no major shrub or forb associates was observed. Litter accumulation had a frequency of 100% and an average total cover of 17%; cover estimates ranged from 15 to 20%. A minimal amount of fine woody debris was found with a frequency of 100%; cover estimates ranged from 1 to 2%. Bare rock dominated the ground surface with average total cover of 80%; cover estimates ranged from 77 to 83%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2100: *Abies concolor*-*Pinus jeffreyi*-*Pinus monticola*/Sparse Understory Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	100	5.6	5	6.1	100	6.6	6.1	7
Pinus monticola	100	5.8	4.5	7	100	6.3	5.6	7
Abies concolor	100	5.1	4.5	5.6	100	5.1	4.5	5.6
Pseudotsuga menziesii	50	1	2	2	50	1	2	2
Pinus ponderosa	50	0.5	1	1	50	0.5	1	1
Pinus lambertiana	50	0.5	1	1	50	0.5	1	1
Total tree		18.5				20		
Holodiscus microphyllus var. g	100	0.8	0.5	1	100	0.8	0.5	1
Total shrub		0.8				0.8		
Pyrola picta	P	P	P	P	50	0.5	1	1
Total herbaceous		0				0.5		
Lichen	50	1	2	2	50	1	2	2
Total nonvascular		1				1		
Barren - rock	100	71.7	67	76.8	100	80.2	77	83.3
Barren - litter	100	7	4	10	100	17.3	14.6	20
Barren - fine woody debris	50	1	2	2	100	1.5	1	2
Total other		79.7				99		
Totals		100				121.3		

Plant Association: *Pinus contorta*/Sparse Understory Forest/Woodland

Plant Association Code: PC:tree

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

Two similar associations, *Pinus contorta* var. *murrayana* / Sparse Understory Forest (1.B.2.Ng - CEGLO03069) and *Pinus contorta* var. *murrayana* / Sparse Understory Woodland (1.B.2.Ng - CEGLO03070), have been described in the upper montane region of the Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, sometimes recently burned sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2010m (5900' to 6600'). Aspects were observed in northwesterly to easterly directions on flat to gentle slopes. Soils are characterized by a codominance of ashy soil and fine gravelly soil, such as found in the "Badgerwash very bouldery medial loamy coarse sand, 1 to 10 percent slopes" and "Vitrandic Xerofluvents, debris flows-Typic Endoaquents complex, 0 to 8 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory is dominated by *Pinus contorta* var. *murrayana*, both live and standing dead. *Pinus contorta* var. *murrayana* had 50% frequency and average cover of 42%; cover estimates were about 84% on sites where it was found. Standing dead *Pinus contorta* var. *murrayana* had 100% frequency and average cover of 16%; cover estimates ranged from 2 to 30%. No Key shrub or forb associates were observed in this type resulting in the /Sparse Understory type designation. Litter accumulation had a frequency of 50% and an average total cover of 45%; cover estimates were about 94% on sites where it was found. Duff, fine woody debris, and coarse woody debris also factored in the organic material found with frequency of 100% and average total cover of 8%; cover estimates ranged from 5 to 11%. Fine gravelly soil was observed with frequency of 50% and average total cover of 21%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2300: *Pinus contorta* / Sparse Understory Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana (dead)	100	16	2	30	100	16	2	30
Pinus contorta var. murrayana	50	42	84	84	50	47	94	94
Total tree		58				63		
Salix lemmonii	P	P	P	P	50	4	8	8
Ribes montigenum	T	T	T	T	50	T	T	T
Ericameria bloomeri	T	T	T	T	50	T	T	T
Total shrub		0				4		
Lupinus lepidus	50	1	2	2	100	2	2	2
Grass - other	50	1	2	2	50	4.5	9	9
Deschampsia species	50	0.5	1	1	50	1.5	3	3
Antennaria rosea	P	P	P	P	50	1	2	2
Herbaceous - other	50	0.5	1	1	50	0.5	1	1
Achnatherum occidentale	T	T	T	T	50	T	T	T
Boraginaceae	T	T	T	T	50	T	T	T
Eriogonum species	T	T	T	T	50	T	T	T
Penstemon species	T	T	T	T	50	T	T	T
Total herbaceous		3				9.5		
Moss	P	P	P	P	50	1.5	3	3
Total nonvascular		0				1.5		
Barren - fine woody debris	100	2	2	2	100	3.7	2	5.3
Barren - duff	50	2	4	4	100	3	2	4
Barren - coarse woody debris	50	0.5	1	1	100	1.5	1	2
Barren - litter	50	3.5	7	7	50	44.8	89.7	89.7
Barren - organic ash	50	18	36	36	50	25	50	50
Barren - fine gravelly soil	50	13	26	26	50	21	42	42
Total other		39				99		
Totals		100				177		

Plant Association: *Pinus contorta*/*Arctostaphylos nevadensis*-(Mix)
Forest/Woodland

Plant Association Code: PC:tree/AN-(Mix):shrub

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta* / *Arctostaphylos nevadensis* Forest (1.B.2.Nb - CEGLO00133), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2010m to 2250m (6600' to 7400'). Aspects were generally of a westerly or southeasterly direction on gentle slopes. Soils are characterized by a codominance of fragmented rock and bare soil, such as found in the "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes; Sheld family, moderately deep-Lithic Xerumbrepts association, 0 to 35 percent slopes;" and the "Rock Outcrop-Patio family association, 0 to 50 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* had frequency of 100% and average cover of 38%; cover estimates ranged from 22 to 57%. Three other tree species were found with only a frequency of 33%. A major shrub associate found in this type was *Arctostaphylos nevadensis* with 100% frequency and average cover of 25%; cover estimates ranged from 6 to 38%. A mix of nineteen forbs was observed in this type that averaged a combined cover of 7% on sites where they were found. Litter accumulation had a frequency of 100% and average total cover of 64%; cover estimates ranged from 46 to 75%. Fine woody debris had a frequency of 100% and average total cover of 5%; cover estimates ranged from 2 to 10%. Duff and coarse woody debris also factored in the organic material found with 67% frequency and average cover of 4%; cover estimates ranged from 5 to 7% on sites where they were found. Bare soil had a frequency of 100% and average total cover of 14%; cover estimates ranged from 2 to 6%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2343: *Pinus contorta*/Arctostaphylos nevadensis-(Mix) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	38.3	22	56.6	100	41.8	22	65.5
Abies magnifica	33.3	1.7	5.1	5.1	33.3	2.7	8.2	8.2
Abies concolor	33.3	0.7	2	2	33.3	1.3	4	4
Pinus monticola	33.3	0.7	2	2	33.3	0.7	2	2
Pinus contorta var. murrayana(dead)	33.3	0.7	2	2	33.3	0.7	2	2
Total tree		42.1				47.2		
Arctostaphylos nevadensis	100	24.6	6.1	37.7	100	42.8	22.7	58
Spiraea splendens	T	T	T	T	66.7	0.3	1	1
Ceanothus prostratus	33.3	0.3	1	1	33.3	0.3	1	1
Holodiscus microphyllus var. glabrescens	T	T	T	T	33.3	T	T	T
Symphoricarpos albus	T	T	T	T	33.3	T	T	T
Total shrub		24.9				43.4		
Grass - other	66.7	2.2	0.7	6	66.7	2.6	1.7	6
Aster species	33.3	1.3	4	4	66.7	2.2	6.6	6.6
Carex species	66.7	1.2	1	2.7	66.7	1.7	1.5	3.7
Allium species	66.7	1	1	2	66.7	1.3	2	2
Elymus elymoides	33.3	0.3	1	1	66.7	0.7	2	2
Juncus parryi	33.3	0.3	1	1	66.7	0.7	1	1
Arabis platysperma	T	T	T	T	66.7	T	T	T
Achnatherum occidentale	33.3	0.7	2	2	33.3	1.7	5.1	5.1
Fragaria virginiana	P	P	P	P	33.3	0.7	2	2
Monardella odoratissima	33.3	0.3	1	1	33.3	0.7	2	2
Herbaceous - other 6	P	P	P	P	33.3	0.3	1	1
Antennaria rosea	T	T	T	T	33.3	T	T	T
Calyptidium umbellatum	T	T	T	T	33.3	T	T	T
Cheilanthes gracillima	T	T	T	T	33.3	T	T	T
Eriogonum umbellatum	T	T	T	T	33.3	T	T	T
Hieracium species	T	T	T	T	33.3	T	T	T
Penstemon newberryi	T	T	T	T	33.3	T	T	T
Phlox diffusa	T	T	T	T	33.3	T	T	T
Herbaceous - other	T	T	T	T	33.3	T	T	T
Total herbaceous		7.3				12.6		
Moss	P	P	P	P	33.3	0.2	0.5	0.5
Total nonvascular		0				0.2		
Barren - litter	100	12	6	18	100	64.2	46	75
Barren - rock	100	5	3	6	100	12.4	5.1	22
Barren - fine woody debris	33.3	0.3	1	1	100	4.7	2	10.1
Barren - bare soil	66.7	1	1	2	100	4	2	6
Barren - fine gravelly soil	66.7	5.7	1	16	66.7	8.7	4	22
Barren - coarse woody debris	66.7	1	1	2	66.7	2	2	4
Barren - duff	33.3	0.7	2	2	66.7	2	3	3
Barren - gravel	P	P	P	P	33.3	0.7	2	2
Total other		25.7				98.7		
Totals		100				202.1		

Plant Association: *Pinus contorta/Ericameria bloomeri* (Sparse) Woodland

Plant Association Code: PC:tree/EB:shrub

Alliance: *Pinus contorta var. murrayana* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta var. murrayana* / *Artemisia tridentata* Forest (1.B.2.Nd - CEGL005182), has been described on the eastside of the Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2010m (6000' to 6600'). Aspects were most commonly of a northerly direction on flat to gentle slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Buttewash ashy coarse sand, 0 to 15 percent slopes" and "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* had 100% frequency and average cover of 21%; cover estimates ranged from 20 to 22%. The Key shrub associate found was *Ericameria bloomeri* with 100% frequency and average cover of 18%; cover estimates ranged from 15 to 20%. Common forbs found in this type included *Achnatherum occidentale*, *Elymus elymoides*, and *Lupinus lepidus* which were observed with frequency of 100% and combined average cover of 24%; cover estimates ranged from 19 to 33%. Litter accumulation had a frequency of 100% and average total cover of 18%; cover estimates ranged from 18 to 19%. Fine woody debris also factored in the organic material found with 50% frequency and average cover of 2%; cover was about 4% on sites where it was found. Bare soil had a frequency of 100% and average total cover of 78%; cover estimates ranged from 75 to 82%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2355: *Pinus contorta*/*Ericameria bloomer* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Pinus contorta</i> var. <i>murrayana</i>	100	21	20	22	100	21	20	22
Total tree		21				21		
<i>Ericameria bloomeri</i>	100	17.5	15	20	100	16.9	13.7	20
Total shrub		17.5				16.9		
<i>Elymus elymoides</i>	100	11.5	7	16	100	19.5	11	28
<i>Lupinus lepidus</i>	100	6.5	5	8	100	11.6	9	14.3
<i>Achnatherum occidentale</i>	100	8	7	9	100	11.5	11	12
<i>Eriogonum marifolium</i>	50	0.5	1	1	100	0.5	1	1
<i>Calyptidium umbellatum</i>	T	T	T	T	50	T	T	T
<i>Linanthus ciliatus</i>	T	T	T	T	50	T	T	T
Total herbaceous		26.5				43.1		
Total nonvascular		0				0		
Barren - bare soil	100	33	30	36	100	78.5	75	82
Barren - litter	50	2	4	4	100	18.5	18	19
Barren - fine woody debris	P	P	P	P	50	2	4	4
Total other		35				99		
Totals		100				180		

Plant Association: *Pinus contorta*/*Alnus incana*-Mix (Sparse) Woodland

Plant Association Code: PC:tree/AI-Mix:shrub

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta* (var. *latifolia*, var. *murrayana*) / *Vaccinium uliginosum* Forest (1.B.2.Ng - CEGL000171), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found in wet areas of a riparian nature within Lassen Volcanic National Park at elevations from approximately 1525m to 1710m (5000' to 5600'). Aspects were of a broad range, but most commonly were of a southerly direction on flat slopes. Soils are characterized by a codominance of wet soil and organic material, such as found in the "Aquolls, 0 to 15 percent slopes." and "Humic Haploxerands, stream terraces-Aquandic Humaquepts, flood plains, complex, 0 to 15 percent slopes" 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* has 100% frequency and average cover of 27%; cover estimates ranged from 20 to 34%. A Key shrub associate of this type is *Alnus incana* with frequency of 100% and average cover of 15%; cover estimates ranged from 10 to 20%. Other common shrubs observed included *Spiraea douglasii* and *Vaccinium uliginosum* ssp. *occidentale*. Common forbs observed in this type included three or more *Carex* species, with an average cover of 19%. Thirty eight other forbs had a combined average cover of 32% on sites where they were found. Litter accumulation had a frequency of 100% and average total cover of 15%; cover estimates ranged from 14 to 17%. Shallow water has 50% frequency and average total cover of 4%; cover estimates were about 8% on sites where it was found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2359: *Pinus contorta*/*Alnus incana*-Mix (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	27	20	34	100	35	28	42
Pinus contorta var. murrayana (dead)	50	3	6	6	50	3	6	6
Total tree		30				38		
Alnus incana	100	15	10	20	100	24.5	16	33
Spiraea douglasii	P	P	P	P	100	6.5	3	10
Vaccinium uliginosum ssp. occidentale	100	4.1	2.2	6	100	5.7	5.7	5.7
Salix laevigata	T	T	T	T	50	T	T	T
Total shrub		19.1				36.7		
Carex angustata	100	12.4	11	13.7	100	15.2	14	16.4
Carex species	100	6.7	5.3	8	100	12	6.7	17.3
Grass - other	100	5	2	8	100	7.2	6.3	8
Carex cusickii	50	2	4	4	100	4.9	0.5	9.3
Perideridia parishii ssp. latifolia	100	2.3	1	3.5	100	3.9	1.7	6.2
Aster species	100	1.6	1	2.3	100	2.6	0.7	4.5
Equisetum species	100	0.8	0.5	1	100	2.5	1.3	3.8
Potentilla species	P	P	P	P	100	2.2	1	3.4
Tofieldia occidentalis ssp. occidentalis	50	1.5	3	3	100	1.7	1.7	1.7
Juncus articulatus	100	1.9	1.7	2	100	1.4	1	1.7
Herbaceous - other	50	0.9	1.7	1.7	100	1.3	0.7	1.8
Hypericum anagalloides	50	0.5	1	1	100	1	0.7	1.2
Pyrola asarifolia ssp. asarifolia	P	P	P	P	100	0.9	0.7	1
Thalictrum species	P	P	P	P	100	0.8	0.5	1
Veronica species	T	T	T	T	100	0.5	1	1
Mimulus species	T	T	T	T	100	0.3	0.7	0.7
Carex utriculata	50	4.8	9.5	9.5	50	8.4	16.7	16.7
Scirpus microcarpus	P	P	P	P	50	4.6	9.2	9.2
Elymus glaucus	50	1	2	2	50	2.5	5	5
Rush - other	50	2.7	5.3	5.3	50	2	4	4
Luzula comosa	50	2.5	5	5	50	1.6	3.3	3.3
Scirpus species	50	1.5	3	3	50	1.4	2.7	2.7
Veratrum californicum	50	1	2	2	50	1.4	2.7	2.7
Iris tenuissima ssp. purdyiformis	50	0.5	1	1	50	1.1	2.3	2.3
Juncus howellii	50	0.6	1.3	1.3	50	1	2	2
Athyrium filix-femina	P	P	P	P	50	1	2	2
Prunella vulgaris ssp. lanceolata	50	0.5	1	1	50	0.6	1.3	1.3
Delphinium species	P	P	P	P	50	0.5	1	1
Galium triflorum	P	P	P	P	50	0.5	1	1
Pedicularis attollens	50	0.5	1	1	50	0.5	1	1
Herbaceous - other 1	P	P	P	P	50	0.5	1	1
Epilobium species	P	P	P	P	50	0.3	0.7	0.7
Polygonum bistortoides	P	P	P	P	50	0.3	0.7	0.7
Stellaria species	P	P	P	P	50	0.3	0.7	0.7
Luzula species	T	T	T	T	50	T	T	T
Angelica breweri	T	T	T	T	50	T	T	T
Botrychium species	T	T	T	T	50	T	T	T
Fragaria virginiana	T	T	T	T	50	T	T	T
Hieracium species	T	T	T	T	50	T	T	T
Piperia unalascensis	T	T	T	T	50	T	T	T
Senecio triangularis	T	T	T	T	50	T	T	T
Sphenosciadium capitellatum	T	T	T	T	50	T	T	T
Total herbaceous		51.2				86.9		
Moss	T	T	T	T	100	2.5	5	5
Total nonvascular		0				2.5		
Barren - litter	P	P	P	P	100	15.5	14	17
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Water - shallow	P	P	P	P	50	4	8	8
Barren - wet soil	P	P	P	P	50	2	4	4
Barren - duff	P	P	P	P	50	1	2	2
Barren - fine woody debris	P	P	P	P	50	0.5	1	1
Total other		0				25		
Totals		100.3				189.1		

Plant Association: *Pinus contorta*/Other Mixed Shrub Sparse Woodland

Plant Association Code: PC:tree/SMix:shrub

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta* var. *murrayana* / Sparse Understory Woodland (1.B.2.Nd - CEGL003070), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1890m to 2000m (6200' to 7200'). Aspects were observed in varied directions on gentle slopes. Soils are characterized by a codominance of bare gravelly soil and fragmented rock, such as found in the "Vitrandic Xerorthents, debris fan, 2 to 30 percent slopes; Scoured very bouldery medial loamy sand, 2 to 30 percent slopes;" and "Histic Humaquepts, lake sediments-Histic Humaquepts, frequently flooded-Typic Endoaquands complex, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* had 100% frequency and cover of about 13%. *Abies concolor* was also found with 100% frequency and cover of about 1%. Two Key shrub associates found were *Alnus incana* and *Salix jepsonii*, each having frequency of 100% and cover of about 1%. No forb associates were observed in this type. Litter accumulation had a frequency of 100% and cover of about 11%. No fine woody debris, coarse woody debris, or duff cover was observed. Bare soil, gravel and rock accounted for 87% total cover of the ground surface. Water had a frequency of 100% and cover of about 2%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2368: *Pinus contorta*/Other Mixed Shrub Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	13	13	13	100	13	13	13
Abies concolor	100	1	1	1	100	1	1	1
Total tree		14				14		
Alnus incana	100	1	1	1	100	1	1	1
Salix jepsonii	100	1	1	1	100	1	1	1
Total shrub		2				2		
Aster species	T	T	T	T	100	T	T	T
Eriogonum species	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - bare soil	100	38	38	38	100	39	39	39
Barren - rock	100	21	21	21	100	24	24	24
Barren - gravel	100	22	22	22	100	24	24	24
Barren - litter	100	1	1	1	100	11	11	11
Water	100	2	2	2	100	2	2	2
Total other		84				100		
Totals		100				116		

Plant Association: *Pinus contorta/Achnatherum occidentale-Elymus elymoides-*
(Mix) Forest/Woodland

Plant Association Code: PC:tree/AoEe-(Mix):herb

Alliance: *Pinus contorta var. murrayana* Forest and Woodland (Sparse)

Number of sites: 10

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta / Achnatherum occidentale* Woodland (1.B.2.Nb - CEG000165), has been described in the southern Cascade Range in Oregon and possibly northern California.



Environmental Characteristics

This association was typically found on dry, sometimes recently burned sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2195m (6000' to 7200'). Aspects were observed in all directions, but were most commonly found to be of a northerly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material along with bare soil and fine gravelly soil, such as found in the "Badgerwash very bouldery medial loamy coarse sand, 1 to 10 percent slopes; Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes;" and "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*, both live and standing dead. Standing dead *Pinus contorta* var. *murrayana* had 80% frequency and average cover of 14%; cover estimates ranged from 2 to 42% on sites where it was found. Live *Pinus contorta* var. *murrayana* had 70% frequency and average cover of 33%; cover estimates ranged from 30 to 66% on sites where it was found. No major shrub associates were observed, however *Ericameria bloomeri* was a common Trace with a frequency of 20%. Two common forb associates found included *Achnatherum occidentale* and *Elymus elymoides*. *Achnatherum occidentale* had 70% frequency and average cover of 5%; cover estimates ranged from 1 to 24% on sites where it was found. *Elymus elymoides* had 80% frequency and average cover of 4%; cover estimates ranged from 1 to 11% on sites where it was found. Litter accumulation had a frequency of 100% and an average total cover of 47%; estimates ranged from 2 to 75%. Fine woody debris, coarse woody debris, organic ash, and duff also factored in the organic material found with 70 to 90% frequency and average total cover of 26%; cover estimates ranged from 12 to 86% on sites where they were found. Bare soil and rock were observed as having average total cover of about 24%; cover estimates ranged from 4 to 100% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2370: *Pinus contorta/Achnatherum occidentale-Elymus elymoides*-(Mix) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana (dead)	80	13.7	2	42	90	15.5	2	44
Pinus contorta var. murrayana	70	33.4	30	66	70	35.8	30	68
Abies magnifica	30	0.9	1	6	30	1.6	2	10.5
Abies concolor	20	0.6	2	4	20	1.2	5.9	6
Pinus Jeffreyi	T	T	T	T	10	T	T	T
Total tree		48.6				54.1		
Ericameria bloomeri	20	0.4	2	2	70	0.7	1	4
Ceanothus velutinus	T	T	T	T	20	T	T	T
Ribes cereum	T	T	T	T	10	T	T	T
Total shrub		0.4				0.7		
Elymus elymoides	80	3.7	1	11	90	5.4	2	14
Achnatherum occidentale	70	5.3	1	24	70	8.7	1	28
Lupinus angustiflorus	20	1.1	1	10	50	1.4	1	10
Lupinus lepidus	30	0.5	1	2	50	0.9	1	4
Phlox diffusa	20	0.3	1	2	40	0.5	2	3
Monardella odoratissima	20	0.4	2	2	40	0.4	2	2
Eriogonum umbellatum	10	1	10	10	30	1.1	11	11
Carex species	20	0.5	2	3	30	1	4	6.4
Hackelia californica	10	0.2	2	2	30	0.2	2	2
Penstemon gracilentus	10	0.2	2	2	30	0.2	2	2
Lupinus arbustus	20	2.2	11	11	20	2.8	13	15
Eriogonum marifolium	20	0.8	2	6	20	1	2	8
Calyptidium umbellatum	10	0.1	1	1	20	0.3	1	2
Grass - other	10	P	P	P	10	0.3	3.5	3.5
Cirsium andersonii	10	0.2	2	2	10	0.2	2	2
Gayophytum diffusum ssp. diffusum	10	0.2	2	2	10	0.2	2	2
Trifolium species	P	P	P	P	10	0.2	2	2
Lupinus obtusilobus	10	0.1	1	1	10	0.1	1	1
Pedicularis semibarbata	P	P	P	P	10	0.1	1	1
Penstemon species	10	0.1	1	1	10	0.1	1	1
Allium species	T	T	T	T	10	T	T	T
Pedicularis species	T	T	T	T	10	T	T	T
Phacelia species	T	T	T	T	10	T	T	T
Pyrola picta	T	T	T	T	10	T	T	T
Stephanomeria species	T	T	T	T	10	T	T	T
Viola species	T	T	T	T	10	T	T	T
Wyethia mollis	T	T	T	T	10	T	T	T
Total herbaceous		16.9				25.1		
Moss	30	0.6	0.5	4	30	0.8	1.5	4
Total nonvascular		0.6				0.8		
Barren - litter	90	10.9	2	25	100	47.5	2	75
Barren - fine woody debris	60	1.9	1	7.9	90	8.5	3	22.8
Barren - coarse woody debris	80	3.5	2	8.9	80	5.7	3	15.8
Barren - duff	30	0.6	1	4	70	2.1	2	6
Barren - bare soil	40	6.5	2	32	60	14.4	1	70
Barren - organic ash	40	4.8	2	24	60	9.9	4	41
Barren - fine gravelly soil	60	4.3	1	15	60	7.9	2	28
Barren - rock	60	1	1	2	60	1.2	1	3
Total other		33.5				97.2		
Totals		100				177.9		

Plant Association: *Pinus contorta*/*Wyethia mollis*-*Balsamorhiza sagittata* Woodland

Plant Association Code: PC:tree/WmBs:herb

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Abies magnifica* / *Wyethia mollis* Forest (1.B.2.Nd - CEGL008610), has been described in the northern Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2010m (6000' to 6600'). Aspects were observed in a southwesterly direction on flat slopes. Soils are characterized by a codominance of organic material and fine gravelly soil, such as found in the "Vitrixerands, low elevation, 1 to 15 percent slopes" 2011 LAVO SSURGO soil classification.

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* had 100% frequency and cover of about 36%. No major shrub associates or Traces were observed in this type. Two key forb associates found in this type were *Wyethia mollis*, and *Balsamorhiza sagittata*. *Wyethia mollis* had 100% frequency and cover of about 22%. *Balsamorhiza sagittata* had 100% frequency and was found as a Trace species. Another common forb found in this type was *Achnatherum occidentale* with 100% frequency and cover of about 9%. Overall, forbs accounted for about 50% cover. Litter accumulation had a frequency of 100% and total cover of about 64%. Coarse woody debris, fine woody debris, and duff also factored in the organic material found with 100% frequency and total cover of about 16%. Bare soils and gravel accounted for about 16% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2374: *Pinus contorta*/*Wyethia mollis*-*Balsamorhiza sagittata* Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Pinus contorta</i> var. <i>murrayana</i>	100	36	36	36	100	38	38	38
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	100	2	2	2	100	2	2	2
<i>Populus tremuloides</i>	100	2	2	2	100	2	2	2
<i>Cercocarpus ledifolius</i>	T	T	T	T	100	T	T	T
Total tree		40				42		
Total shrub		0				0		
<i>Wyethia mollis</i>	100	22	22	22	100	23	23	23
<i>Achnatherum occidentale</i>	100	9	9	9	100	12	12	12
Grass - other	100	4	4	4	100	10	10	10
<i>Elymus elymoides</i>	100	2	2	2	100	7	7	7
<i>Hackelia micrantha</i>	100	6	6	6	100	6	6	6
<i>Penstemon gracilentus</i>	100	2	2	2	100	5	5	5
<i>Carex rossii</i>	P	P	P	P	100	3	3	3
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	100	4	4	4	100	3	3	3
<i>Lupinus lepidus</i>	P	P	P	P	100	2	2	2
Aster species	P	P	P	P	100	1	1	1
<i>Phacelia</i> species	100	1	1	1	100	1	1	1
Herbaceous - other	P	P	P	P	100	1	1	1
<i>Carex</i> species	T	T	T	T	100	T	T	T
<i>Allium</i> species	T	T	T	T	100	T	T	T
<i>Balsamorhiza sagittata</i>	T	T	T	T	100	T	T	T
<i>Castilleja</i> species	T	T	T	T	100	T	T	T
<i>Eriogonum umbellatum</i>	T	T	T	T	100	T	T	T
<i>Monardella odoratissima</i>	T	T	T	T	100	T	T	T
Herbaceous - other	T	T	T	T	100	T	T	T
Total herbaceous		50				74		
Total nonvascular		0				0		
Barren - litter	100	2	2	2	100	64	64	64
Barren - fine gravelly soil	P	P	P	P	100	8	8	8
Barren - fine woody debris	P	P	P	P	100	8	8	8
Barren - duff	100	2	2	2	100	6	6	6
Barren - bare soil	100	2	2	2	100	4	4	4
Barren - gravel	100	4	4	4	100	4	4	4
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Total other		10				96		
Totals		100				212		

Plant Association: *Pinus contorta*/Dry Mixed Graminoid Woodland

Plant Association Code: PC:tree/HDG:herb

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta* / *Achnatherum occidentale* Woodland (1.B.2.Nb - CEG000165), has been described in the southern Cascade Range in Oregon and possibly northern California.



Environmental Characteristics

This association was typically found on dry or mesic sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2100m (6000' to 6900'). Aspects were observed in several directions, but were most commonly found to be of a northeasterly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Vitrandic Xerofluvents, debris flows-Typic Endoaquents complex, 0 to 8 percent slopes" and "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*, both living and standing dead. Living *Pinus contorta* var. *murrayana* had 100% frequency and average cover of 26%; cover estimates ranged from 10 to 43%. Standing dead *Pinus contorta* var. *murrayana* had 50% frequency and average cover of 8%; cover was estimated at 15% on the site on which it was observed. No major shrub associates or Traces were observed in this type. The forb layer included a mix of dry grasses and other broadleaf herbaceous plants with average cover of 18%; cover estimates ranged from 6 to 29%. Litter accumulation had a frequency of 100% and an average total cover of 56%; cover estimates ranged from 25 to 87%. Coarse woody debris, fine woody debris, organic ash, and duff also factored in the organic material found with total cover of about 12%. Bare soil was observed having an average of 24% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2380: *Pinus contorta*/Dry Mixed Graminoid Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	26.5	10	43	100	27	10	44
Pinus contorta var. murrayana (dead)	50	7.5	15	15	100	8	1	15
Total tree		34				35		
Total shrub		0				0		
Grass - other	100	14.5	3	26	100	18.5	3	34
Carex species	50	1.5	3	3	50	1.5	3	3
Herbaceous - other	50	1.5	3	3	50	1.5	3	3
Total herbaceous		17.5				21.5		
Total nonvascular		0				0		
Barren - litter	100	15.7	10	21.5	100	56.3	25	87.5
Barren - coarse woody debris	100	4.3	3.5	5	100	3.8	2.5	5
Barren - bare soil	50	22	44	44	50	24.5	49	49
Barren - organic ash	50	5	10	10	50	5	10	10
Barren - duff	50	1.5	3	3	50	2.5	5	5
Barren - fine woody debris	P	P	P	P	50	0.5	1	1
Total other		48.5				92.6		
Totals		100				149.1		

Plant Association: *Pinus contorta*/Other Mixed Herbaceous Forest/Woodland

Plant Association Code: PC:tree/HOX:herb

Alliance: *Pinus contorta* var. *murrayana* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus contorta* / *Achnatherum occidentale* Woodland (1.B.2.Nb - CEGL000165), has been described in the southern Cascade Range in Oregon and possibly northern California.



Environmental Characteristics

This association was typically found on dry or mesic sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2075m (6000' to 6800'). Aspects were generally observed in a northeasterly direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and fine gravelly soil, such as found in the "Duric Vitraquands-Typic Endoaquands-Aquandic Cryaquents complex, 0 to 8 percent slopes" and "Badgerwash very bouldery medial loamy coarse sand, 1 to 10 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus contorta* var. *murrayana*. *Pinus contorta* var. *murrayana* had frequency of 100% and cover of about 53%. No major shrub associates were found in this type. Forbs accounted for combined cover of about 43%. The most common forbs observed were *Lupinus lepidus*, Aster species, and "other" grasses with 100% frequency and combined cover of about 26%. Litter accumulation had a frequency of 100% and total cover of about 59%. Duff, fine woody debris, and coarse woody debris also factored in the organic material found with a frequency of 100% and total cover of about 11%. Bare soils were observed with a frequency of 100% and total cover of about 23%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2386: *Pinus contorta* / Other Mixed Herbaceous Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	100	53	53	53	100	62	62	62
Pinus contorta var. murrayana (dead)	100	1	1	1	100	1	1	1
Total tree		54				63		
Ericameria bloomeri	T	T	T	T	100	T	T	T
Total shrub		0				0		
Grass - other	100	11.8	11.8	11.8	100	21.2	21.2	21.2
Lupinus lepidus	100	10.2	10.2	10.2	100	15.7	15.7	15.7
Aster species	100	4.4	4.4	4.4	100	11.1	11.1	11.1
Achillea millefolium	100	2.5	2.5	2.5	100	7.8	7.8	7.8
Horkelia fusca ssp. tenella	100	2.7	2.7	2.7	100	5.8	5.8	5.8
Phlox gracilis	100	3	3	3	100	4.5	4.5	4.5
Achnatherum occidentale	100	2.5	2.5	2.5	100	3.8	3.8	3.8
Senecio species	100	3.1	3.1	3.1	100	3.1	3.1	3.1
Elymus elymoides	100	0.6	0.6	0.6	100	2.6	2.6	2.6
Calyptidium umbellatum	100	0.5	0.5	0.5	100	1.5	1.5	1.5
Eriogonum marifolium	100	0.8	0.8	0.8	100	1.2	1.2	1.2
Achnatherum species	P	P	P	P	100	1	1	1
Gayophytum diffusum ssp. diffusum	100	1	1	1	100	1	1	1
Penstemon species	P	P	P	P	100	1	1	1
Agoseris grandiflora	T	T	T	T	100	T	T	T
Total herbaceous		43.1				81.3		
Moss	P	P	P	P	100	0.8	0.8	0.8
Total nonvascular		0				0.8		
Barren - litter	100	2	2	2	100	59	59	59
Barren - fine gravelly soil	P	P	P	P	100	16	16	16
Barren - fine woody debris	P	P	P	P	100	8	8	8
Barren - bare soil	P	P	P	P	100	7	7	7
Barren - duff	P	P	P	P	100	2	2	2
Barren - coarse woody debris	100	1	1	1	100	1	1	1
Total other		3				93		
Totals		100.1				238.1		

Plant Association: *Pinus jeffreyi*/Sparse Understory Woodland

Plant Association Code: PJ:tree

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus washoensis* Woodland (1.B.2.Nd - CEGLO03078), has been described on the eastside of northern Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, sometimes recently burned sites within Lassen Volcanic National Park at elevations from approximately 1825m to 2075m (6000' to 6800'). Aspects were observed having several directions, but most commonly fell into an easterly direction on gentle to moderate slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Buttelake ashy sand, 3 to 35 percent slopes" and "Typic Xerorthents very gravelly ashy sand, 1 to 20 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association's overstory was dominated by the Key conifer *Pinus jeffreyi*, both live and standing dead. Standing dead *Pinus jeffreyi* had 75% frequency and average cover of 19%; cover estimates ranged from 5 to 40% on sites where it was found. *Pinus jeffreyi* (live) had 75% frequency and average cover of 16%; cover estimates ranged from 2 to 35% on sites where it was found. No major understory associates were observed in this type. *Ericameria bloomeri*, *Ceanothus velutinus*, *Achnatherum occidentale*, and *Gayophytum diffusum* were Trace shrub species found on several of the sites, but having frequency of no more than 25%. Litter accumulation had a frequency of 100% and an average total cover of 58%; cover estimates ranged from 48 to 71%. Duff, fine woody debris, coarse woody debris, and organic ash also factored in the organic material found with average total cover of 14% on sites where they were found. Bare soil had frequency of 100% and accounted for average total cover of 25%; cover estimates ranged from 12 to 36%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2400: *Pinus jeffreyi* / Sparse Understory Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Pinus jeffreyi</i> (dead)	75	19	5	40	75	20	5	42
<i>Pinus jeffreyi</i>	75	16.3	2	35	75	17.3	2	39
<i>Abies concolor</i> (dead)	50	1	2	2	50	1.3	2	3
<i>Pinus ponderosa</i>	25	1	4	4	25	1	4	4
<i>Abies concolor</i>	25	0.5	2	2	25	0.5	2	2
Total tree		37.8				40.1		
<i>Ericameria bloomeri</i>	T	T	T	T	50	T	T	T
<i>Ceanothus velutinus</i>	25	0.5	2	2	25	0.5	2	2
<i>Ribes roezlii</i>	T	T	T	T	25	T	T	T
<i>Ribes viscosissimum</i>	T	T	T	T	25	T	T	T
Total shrub		0.5				0.5		
<i>Gayophytum diffusum</i> ssp. diff	25	0.3	1	1	50	0.8	1	2
<i>Achnatherum occidentale</i>	T	T	T	T	50	T	T	T
<i>Monardella odoratissima</i>	T	T	T	T	50	T	T	T
Aster species	25	0.5	2	2	25	0.5	2	2
Arabis species	25	0.3	1	1	25	0.3	1	1
<i>Penstemon gracilentus</i>	T	T	T	T	25	T	T	T
Phacelia species	T	T	T	T	25	T	T	T
<i>Pyrola picta</i>	T	T	T	T	25	T	T	T
Stephanomeria species	T	T	T	T	25	T	T	T
Total herbaceous		1.1				1.6		
Lichen	T	T	T	T	25	T	T	T
Total nonvascular		0				0		
Barren - litter	100	36.3	20	47.5	100	58.4	48	71.5
Barren - bare soil	100	15.7	9.5	24	100	24.8	12	36
Barren - fine woody debris	100	3	2	4	100	6.3	4	8
Barren - duff	50	2.3	3	6	50	3.8	7	8
Barren - organic ash	50	2	4	4	50	3.1	4	8.5
Barren - coarse woody debris	50	1.4	2	3.5	50	1.5	2	4
Total other		60.7				97.9		
Totals		100.1				140.1		

Plant Association: *Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix Sparse Woodland

Plant Association Code: PJ:tree/AN-Mix:shrub

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* / *Quercus vaccinifolia* Woodland (1.B.2.Nd - CEGLO08714), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky, and recently burned sites within Lassen Volcanic National Park at elevations from approximately 1770m to 2195m (5800' to 7200'). Aspects were observed in all directions, but most commonly fell into a south-southwesterly direction on flat to moderate slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Buttelake-Sunhoff-Talved complex, 20 to 65 percent slopes; Buttelake ashy sand, 3 to 35 percent slopes;" and "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi*, both live and standing dead. Live *Pinus jeffreyi* had frequency of 33% and average cover of about 3%; the cover estimate was 10% on the site where it was found. Standing dead *Pinus jeffreyi* has frequency of 67% and average cover of 7%; cover estimates were 10% on sites where it was found. A major shrub associate of this type was found. *Arctostaphylos nevadensis* had 100% frequency and average cover of 15%; cover estimates ranged from 2 to 28%. Other common shrub associates found in this type included *Ceanothus velutinus*, *Arctostaphylos patula*, *Ericameria bloomeri*, and *Ceanothus prostratus* with average cover of 39%; cover estimates ranged from 8 to 62% on sites where they were found. Common forbs found included *Penstemon gracilentus*, *Achnatherum occidentale*, and *Elymus elymoides* with average cover of 11%; cover estimates ranged from 7 to 27% on sites where they were found. Litter accumulation had a frequency of 100% and average total cover of 31%; cover estimates ranged from 14 to 44%. Duff, fine woody debris and coarse woody debris also factored in the organic material found with average total cover of about 23%; cover estimates ranged from 10 to 36% on sites where woody debris was found. Bare soil and rock had frequency of 100% and total cover of 32%; cover estimates ranged from 8 to 60%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2443: *Pinus jeffreyi*/*Arctostaphylos nevadensis*-Mix Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus jeffreyi (dead)	66.7	6.7	10	10	66.7	6.7	10	10
Pinus jeffreyi	33.3	3.3	10	10	33.3	4	12	12
Abies magnifica	P	P	P	P	33.3	0.2	0.5	0.5
Juniperus occidentalis	T	T	T	T	33.3	T	T	T
Total tree		10				10.9		
Arctostaphylos nevadensis	100	15	2	28	100	17.5	3.5	34
Ceanothus velutinus	66.7	21.7	8	57	66.7	23.8	8	63.5
Arctostaphylos patula	33.3	13.3	40	40	33.3	13.3	40	40
Ericameria bloomeri	33.3	1.5	4.5	4.5	33.3	4.2	12.5	12.5
Ceanothus prostratus	33.3	2	6	6	33.3	4	12	12
Total shrub		53.5				62.8		
Penstemon gracilentus	66.7	5.3	2	14	66.7	6.8	4.5	16
Achnatherum occidentale	66.7	5	4	11	66.7	4.7	4	10
Elymus elymoides	66.7	1	1	2	66.7	1.3	2	2
Gayophytum diffusum ssp. diffusum	33.3	0.7	2	2	66.7	1	1	2
Monardella odoratissima	33.3	0.8	2.5	2.5	33.3	1.8	5.5	5.5
Cirsium vulgare	T	T	T	T	33.3	T	T	T
Total herbaceous		12.8				15.6		
Total nonvascular		0				0		
Barren - litter	33.3	0.3	1	1	100	31.3	14	44
Barren - bare soil	66.7	10	10	20	100	24.3	4	46
Barren - duff	66.7	2.7	4	4	100	11.3	2	20
Barren - rock	100	2.3	1	4	100	8	4	14
Barren - fine woody debris	66.7	2.7	2	6	100	7.3	2	10
Barren - coarse woody debris	66.7	3	3	6	66.7	4	6	6
Barren - fine gravelly soil	33.3	2.7	8	8	33.3	10	30	30
Barren - gravel	P	P	P	P	33.3	1.3	4	4
Total other		23.7				97.5		
Totals		100				186.8		

Variants of this Association: PJ:tree/AN-AP:shrub and
PJ:tree/AN-Mix:shrub

Plant Association: *Pinus jeffreyi*/*Arctostaphylos patula*-(Mix) (Sparse) Woodland

Plant Association Code: PJ:tree/AP-(Mix):shrub

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 9

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Pinus jeffreyi* / *Arctostaphylos patula* Woodland (1.B.2.Nd - CEGL008627), has been described in mid to upper elevations of the Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within and near Lassen Volcanic National Park at elevations from approximately 1675m to 2200m (5500' to 7200'). Aspects were observed in all directions but most commonly were of a westerly direction on flat to moderate slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Humic Haploxerands-Typic Haploxerands-Bearrubble-Rubble land complex, 5 to 40 percent slopes; Yallani-Sheld-Portola families association, 0 to 35 percent slopes;" and "Buttelake ashy sand, 3 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*. *Pinus jeffreyi* was found to have 100% frequency and average cover of 22%; cover estimates ranged from 10 to 56%. A major shrub associate in this type was *Arctostaphylos patula* with frequency of 100% and average cover of 28%; cover estimates ranged from 5 to 83%. Other common shrub associates sometimes found in this type include *Ceanothus velutinus*, *Ericameria bloomeri*, and *Ceanothus prostratus*. Two common forbs sometimes observed in this type were *Achnatherum occidentale* and *Elymus elymoides*. Litter accumulation had a frequency of 100% and average total cover of 69%; cover estimates ranged from 30 to 100%. Duff, fine woody debris and coarse woody debris also factored in the organic material found with frequency of about 50% and average cover of 11% on sites where they were found. Bare soils and rock accounted for average total cover of 18% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2449: *Pinus jeffreyi*/Arctostaphylos patula-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	22.5	10	56	100	22	10	57
Pinus contorta var. murrayana	T	T	T	T	11.1	T	T	T
Abies concolor	T	T	T	T	11.1	T	T	T
Total tree		22.5				22		
Arctostaphylos patula	100	28.4	5	83.3	100	33.6	7	92.8
Ceanothus velutinus	66.7	8.3	1.5	40	66.7	9.4	1.5	40
Ericameria bloomeri	33.3	3.4	10	11	44.4	4.6	6	14
Ceanothus prostratus	33.3	1.2	1	8	33.3	2.4	1	11
Purshia tridentata	33.3	1.4	0.5	6	33.3	1.7	0.5	8
Ribes cereum	33.3	1	1	5	33.3	1.3	1	8
Chrysolepis sempervirens	22.2	1.2	1	10	22.2	1.2	1	10
Holodiscus microphyllus var. glabre	P	P	P	P	11.1	0.1	0.5	0.5
Ribes roezlii	P	P	P	P	11.1	0.1	1	1
Total shrub		44.9				54.4		
Elymus elymoides	33.3	2.6	4	11	55.6	5.4	1	24
Achnatherum occidentale	22.2	3	6	21	22.2	3	6	21
Grass - other	11.1	3.3	30	30	11.1	5.3	48	48
Aster species	P	P	P	P	11.1	0.1	1	1
Cryptogramma cascadenis	11.1	0.1	1	1	11.1	0.1	1	1
Penstemon species	P	P	P	P	11.1	0.1	1	1
Total herbaceous		9				14		
Total nonvascular		0				0		
Barren - litter	77.8	8.4	2	39	100	68.7	30	100
Barren - bare soil	77.8	8.4	2	26	77.8	16.9	4	42
Barren - fine woody debris	22.2	3.6	2	30	55.6	5.7	1	40
Barren - duff	55.6	2.6	2	9	55.6	5.1	6	12
Barren - coarse woody debris	33.3	0.6	1	2	44.4	0.7	1	2
Barren - rock	P	P	P	P	22.2	0.3	1	2
Barren - fine gravelly soil	P	P	P	P	11.1	0.2	2	2
Barren - gravel	P	P	P	P	11.1	0.2	2	2
Total other		23.6				97.8		
Totals		100				188.2		

Variants of this Association: PJ:tree/AP-CV-CS:shrub
PJ:tree/AP-CV:shrub
PJ:tree/AP-Mix:shrub

Plant Association: *Pinus jeffreyi/Quercus vacciniifolia*-(Mix) Forest/Woodland

Plant Association Code: PJ:tree/QV-(Mix):shrub

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Pinus jeffreyi / Quercus vacciniifolia* Woodland (1.B.2.Nd - CEGLO08714), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1700m to 2125m (5600' to 7000'). Aspects were generally observed in a southwesterly direction on moderate to moderately steep slopes. Soils are characterized by a codominance of bare soil and organic material, such as found in the "Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi*. *Pinus jeffreyi* was found to have frequency of 100% and average cover of 26%; cover estimates ranged from 2 to 49%. A Key shrub associate in this type was *Quercus vacciniifolia* with frequency of 100% and average cover of 32%; cover estimates ranged from 16 to 48%. Other common shrub associates found in this type included *Arctostaphylos patula*, *Ceanothus velutinus*, and *Ceanothus prostratus*. No major forbs were observed in this association. Litter accumulation had a frequency of 100% and average total cover of 77%; cover estimates ranged from 70 to 84%. Duff, fine woody debris and coarse woody debris were quite sparse or not present. Rock had a frequency of 100% and average total cover of 12%; cover estimates ranged from 10 to 14%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2454: *Pinus jeffreyi*/*Quercus vacciniifolia*-(Mix) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Pinus jeffreyi</i>	100	25.5	2	49	100	26.5	2	51
<i>Pinus lambertiana</i>	50	2.5	5	5	100	4.5	9	9
<i>Pinus ponderosa</i>	50	8	16	16	50	8	16	16
<i>Calocedrus decurrens</i>	50	1	2	2	50	1	2	2
Total tree		37				40		
<i>Quercus vacciniifolia</i>	100	32	16	48	100	45.8	24	67.7
<i>Arctostaphylos patula</i>	100	15.5	14	17	100	22.9	15.7	30
<i>Ceanothus velutinus</i>	50	2.5	5	5	50	2.3	4.7	4.7
<i>Ceanothus prostratus</i>	P	P	P	P	50	1	2	2
Total shrub		50				72		
<i>Carex brainerdii</i>	P	P	P	P	50	1	2	2
<i>Cheilanthes gracillima</i>	T	T	T	T	50	T	T	T
<i>Penstemon</i> species	T	T	T	T	50	T	T	T
Total herbaceous		0				1		
Lichen	50	1	2	2	100	2	2	2
Moss	P	P	P	P	50	1	2	2
Total nonvascular		1				3		
Barren - litter	50	6	12	12	100	77	70	84
Barren - rock	100	3	2	4	100	12	10	14
Barren - bare soil	50	3	6	6	50	4	8	8
Barren - fine woody debris	P	P	P	P	50	1	2	2
Total other		12				94		
Totals		100				210		

Plant Association: *Pinus jeffreyi*/*Holodiscus microphyllus* (Other Shrub)
Sparse Woodland

Plant Association Code: PJ:tree/HM:shrub

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within and near Lassen Volcanic National Park at elevations from approximately 2350m to 2525m (7700' to 8300'). Aspects were observed in southwestern and eastern directions on moderately steep slopes. Soils are characterized by a codominance of fine gravelly soil and fragmented rock, such as found in the "Ashbutte-Vitrantic Xerorthents complex, 15 to 60 percent slopes" and "Vitrantic Cryorthents-Readingpeak-Rock outcrop complex, 5 to 150 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi*. *Pinus jeffreyi* has frequency of 100% and cover of about 14%. *Pinus monticola* was also observed in this type with frequency of 100% and cover of about 1%. A major shrub associate in this type was *Holodiscus microphyllus* var. *glabrescens* with 100% frequency and cover of about 60%. A common forb observed, but having quite low cover in this type was *Elymus elymoides*. Litter accumulation was a very small part of ground cover in this type with only about 2% total cover. Bare rock and fine gravelly soils dominated the ground surface condition with about 98% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2457: *Pinus jeffreyi*/*Holodiscus microphyllus* (Other Shrub) Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	14	14	14	100	15.5	15.5	15.5
Pinus monticola	100	1	1	1	100	1	1	1
Total tree		15				16.5		
Holodiscus microphyllus var. g	100	60	60	60	100	73.5	73.5	73.5
Total shrub		60				73.5		
Elymus elymoides	P	P	P	P	100	2	2	2
Total herbaceous		0				2		
Lichen	100	5	5	5	100	5	5	5
Total nonvascular		5				5		
Barren - rock	100	10	10	10	100	65	65	65
Barren - fine gravelly soil	100	10	10	10	100	32.5	32.5	32.5
Barren - litter	P	P	P	P	100	2.5	2.5	2.5
Total other		20				100		
Totals		100				197		

Plant Association: *Pinus jeffreyi*/Dry Other Shrub Forest/Woodland

Plant Association Code: PJ:tree/DOth:shrub

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* / *Quercus vaccinifolia* Woodland (1.B.2.Nd - CEGLO08714), has been described in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1550m to 1980m (5100' to 6500'). Aspect was observed in a northeasterly direction on flat slopes. Soils are characterized by a dominance of organic material, such as found in the "Sadie-Washougal families, alluvial association, 0 to 15 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*. *Pinus jeffreyi* has frequency of 100% and cover of about 64%. A common shrub associate in this type was *Ribes cereum* with frequency of 100% and cover of about 4%. Litter accumulation was readily apparent in this type with a frequency of 100% and total cover of about 74%. Duff, fine woody debris and coarse woody debris also factored in the organic material found with a frequency of 100% and cover of about 25%. Bare soil and rock was not observed on the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2467: *Pinus jeffreyi* / Dry Other Shrub Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	100	64	64	64	100	75	75	75
Pinus jeffreyi (dead)	100	1	1	1	100	2	2	2
Abies concolor	P	P	P	P	100	1	1	1
Total tree		65				78		
Ribes cereum	100	4	4	4	100	4	4	4
Total shrub		4				4		
Sedge - other	100	1	1	1	100	1	1	1
Total herbaceous		1				1		
Total nonvascular		0				0		
Barren - litter	100	22	22	22	100	74	74	74
Barren - fine woody debris	100	4	4	4	100	15.5	15.5	15.5
Barren - coarse woody debris	100	3	3	3	100	5.5	5.5	5.5
Barren - duff	100	1	1	1	100	4	4	4
Total other		30				99		
Totals		100				182		

Plant Association: *Pinus jeffreyi*/*Achnatherum occidentale*-*Elymus elymoides*-
(Mix) Forest/Woodland

Plant Association Code: PJ:tree/AoEe-(Mix):herb

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* / *Symphoricarpos rotundifolius* / *Elymus elymoides* Woodland (1.B.2.Nd - CEGLO08631), has been described in Yosemite National Park in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within and near Lassen Volcanic National Park at elevations from approximately 1650m to 2070m (5400' to 6800'). Aspects were observed in all directions, but most commonly fell in a southerly, westerly to easterly direction on flat to moderate slopes. Soils are characterized by a dominance of organic material, such as found in the "Buttelake ashy sand, 3 to 35 percent slopes; Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes;" and "Typic Xerorthents very gravelly ashy sand, 1 to 20 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*. *Pinus jeffreyi* has 100% frequency and average cover of 57%; cover estimates ranged from 37 to 78%. No major shrub associates were observed in this type, but *Ericameria bloomeri* was a common Trace species with a frequency of 100%. Two common forb associates in this type are *Achnatherum occidentale* and *Elymus elymoides*. *Achnatherum occidentale* has 50% frequency and average cover of 6%; cover was about 12% on the site it was observed. *Elymus elymoides* has 50% frequency and average cover of 2%; cover was about 4% on the site it was observed. Another common forb observed in this type was *Penstemon* species with frequency of 50% and average cover of about 1%. Litter accumulation had a frequency of 100% and average total cover of 84%; cover estimates ranged from 76 to 93%. Duff, fine woody debris and coarse woody debris also factored in the organic material found with 10% average total cover on the site where they were found. Bare soils and rock accounted for an additional 5% total cover of the ground surface on the site where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2470: *Pinus jeffreyi/Achnatherum occidentale-Elymus elymoides*-(Mix) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	57.2	36.7	77.6	100	57.2	36.7	77.6
Pinus jeffreyi (dead)	100	2	2	2	100	3	2	4.1
Pinus contorta var. murrayana	50	1	2	2	50	1	2	2
Total tree		60.2				61.2		
Ericameria bloomeri	T	T	T	T	100	1	2	2
Ribes roezlii	50	1	2	2	50	1	2	2
Ceanothus velutinus	T	T	T	T	50	T	T	T
Total shrub		1				2		
Achnatherum occidentale	50	6.1	12.2	12.2	100	20.4	2	38.8
Wyethia mollis	P	P	P	P	50	5.6	11.2	11.2
Elymus elymoides	50	2	4.1	4.1	50	2	4.1	4.1
Penstemon species	50	1	2	2	50	1.5	3.1	3.1
Kelloggia galioides	P	P	P	P	50	1	2	2
Lupinus lepidus	50	1	2	2	50	1	2	2
Phacelia species	50	1	2	2	50	1	2	2
Carex rossii	T	T	T	T	50	T	T	T
Arabis sparsiflora	T	T	T	T	50	T	T	T
Aster species	T	T	T	T	50	T	T	T
Fragaria virginiana	T	T	T	T	50	T	T	T
Gayophytum diffusum ssp. diffusum	T	T	T	T	50	T	T	T
Pyrola picta	T	T	T	T	50	T	T	T
Total herbaceous		11.1				32.5		
Total nonvascular		0				0		
Barren - litter	100	18.5	4.1	32.7	100	84.2	75.5	92.9
Barren - fine woody debris	50	5.1	10.2	10.2	50	7.2	14.3	14.3
Barren - fine gravelly soil	50	1	2	2	50	2	4.1	4.1
Barren - bare soil	50	2.1	4.1	4.1	50	2	4.1	4.1
Barren - duff	50	1	2	2	50	2	4.1	4.1
Barren - rock	P	P	P	P	50	1	2	2
Barren - coarse woody debris	P	P	P	P	50	0.5	1	1
Total other		27.7				98.9		
Totals		100				194.6		

Plant Association: *Pinus jeffreyi*/*Pteridium aquilinum* Woodland

Plant Association Code: PJ:tree/Paq:herb

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus ponderosa* / *Pteridium aquilinum* Woodland (1.B.2.Nb - CEGLO02944), has been described in Arizona and Utah.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1900m to 2050m (6200' to 6700'). Aspects were observed in a southwesterly direction on moderate slopes. Soils are characterized by a codominance of fine gravelly soil and organic material, such as found in the "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes," 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*. *Pinus jeffreyi* has frequency of 100% and cover of about 40%. No major shrub associates were observed in this type. A major forb associate in this type is *Pteridium aquilinum* with frequency of 100% and cover of about 15%. No other forb associates were observed in this type. Litter accumulation had a frequency of 100% and total cover of about 88%. Rock and bare soil accounted for about 12% total cover of the ground surface. Duff, fine woody debris, and coarse woody debris were not observed in this type.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2473: *Pinus jeffreyi*/*Pteridium aquilinum* Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Pinus jeffreyi</i>	100	40	40	40	100	40	40	40
Total tree		40				40		
Total shrub		0				0		
<i>Pteridium aquilinum</i>	100	15	15	15	100	20	20	20
Total herbaceous		15				20		
Total nonvascular		0				0		
Barren - litter	100	39	39	39	100	88	88	88
Barren - fine gravelly soil	100	5	5	5	100	10	10	10
Barren - rock	100	1	1	1	100	2	2	2
Total other		45				100		
Totals		100				160		

Plant Association: *Pinus jeffreyi*/*Wyethia mollis*-*Balsamorhiza sagittata*
(Sparse) Woodland

Plant Association Code: PJ:tree/WmBs:herb

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus ponderosa* / *Wyethia mollis* Woodland (1.B.2.Nb - CEG000206), has been described as a very rare and very threatened type in Modoc County in northeastern California.



Environmental Characteristics

This association was typically found on dry and sometimes recently burned sites within and near Lassen Volcanic National Park at elevations from approximately 1800m to 1950m (5900' to 6400'). Aspects were observed in varied directions, but most commonly fell into a southwesterly to northwesterly direction on flat to gentle slopes. Soils are characterized by a codominance of bare soil and some organic material, such as found in the "Vitrixerands, low elevation, 1 to 15 percent slopes," and "Buttewash ashy coarse sand, 0 to 15 percent slopes," LAVO 2011 and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi*, both live and standing dead. Live *Pinus jeffreyi* has frequency of 66% and average cover of 27%; cover estimates ranged from 30 to 50% on sites where it was observed. Standing dead *Pinus jeffreyi* has frequency of 33% and average cover of 6%; cover was about 18% on the site it was observed. Three other conifers were observed with low frequencies, and in very low amounts of cover that did not even amount to 5%. No major shrub associates were observed in this type. One major forb associate recorded in this type was *Wyethia mollis*. *Wyethia mollis* has frequency of 100% and average cover of 12%; cover estimates ranged from 10 to 15%. Other common forbs observed in this type include *Achnatherum occidentale* and *Elymus elymoides*. Litter accumulation had a frequency of 100% and an average total cover of 48%; cover estimates ranged from 24 to 72%. Duff, fine woody debris and coarse woody debris also factored in the organic material found with 15% average total cover on sites where they were found. Bare soil has frequency of 100% and average total cover of 26%; cover estimates ranged from 4 to 37%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2474: *Pinus jeffreyi*/*Wyethia mollis*-*Balsamorhiza sagittata* (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	66.7	26.7	30	50	66.7	29.7	33	56
Pinus jeffreyi (dead)	33.3	6	18	18	33.3	6.7	20	20
Pinus contorta var. murrayana	P	P	P	P	33.3	1.3	4	4
Abies concolor	33.3	1.3	4	4	33.3	1.3	4	4
Pinus ponderosa	33.3	0.7	2	2	33.3	0.7	2	2
Pinus contorta var. murrayana (dead)	33.3	0.7	2	2	33.3	0.7	2	2
Cercocarpus ledifolius	T	T	T	T	33.3	T	T	T
Populus tremuloides	T	T	T	T	33.3	T	T	T
Total tree		35.4				40.4		
Ericameria bloomeri	33.3	2.7	8	8	33.3	3	9	9
Ribes cereum	33.3	0.7	2	2	33.3	0.7	2	2
Total shrub		3.4				3.7		
Wyethia mollis	100	12.3	10	15	100	15.3	10	21
Achnatherum occidentale	33.3	1.7	5	5	66.7	4.7	2	12
Elymus elymoides	66.7	1.7	2	3	66.7	2.7	3	5
Gayophytum diffusum ssp. diffusum	33.3	0.7	2	2	66.7	0.7	2	2
Carex rossii	33.3	2	6	6	33.3	2	6	6
Vicia americana var. americana	33.3	1.3	4	4	33.3	2	6	6
Grass - other	P	P	P	P	33.3	1.3	4	4
Carex species	T	T	T	T	33.3	T	T	T
Allium species	T	T	T	T	33.3	T	T	T
Balsamorhiza sagittata	T	T	T	T	33.3	T	T	T
Castilleja species	T	T	T	T	33.3	T	T	T
Cirsium vulgare	T	T	T	T	33.3	T	T	T
Eriogonum umbellatum	T	T	T	T	33.3	T	T	T
Hackelia micrantha	T	T	T	T	33.3	T	T	T
Lupinus lepidus	T	T	T	T	33.3	T	T	T
Monardella odoratissima	T	T	T	T	33.3	T	T	T
Penstemon gracilentus	T	T	T	T	33.3	T	T	T
Phacelia species	T	T	T	T	33.3	T	T	T
Herbaceous - other	T	T	T	T	33.3	T	T	T
Total herbaceous		19.7				28.7		
Total nonvascular		0				0		
Barren - litter	100	15	8	25	100	47.8	24	72
Barren - bare soil	100	15.3	2	30	100	25.8	4	37.5
Barren - fine woody debris	33.3	5.3	16	16	66.7	9.3	4	24
Barren - fine gravelly soil	33.3	2	6	6	33.3	4.7	14	14
Barren - coarse woody debris	33.3	2.7	8	8	33.3	3.3	10	10
Barren - duff	33.3	1.3	4	4	33.3	2	6	6
Total other		41.6				92.9		
Totals		100.1				165.7		

Plant Association: *Pinus jeffreyi*/Dry Mixed Graminoid Forest/Woodland

Plant Association Code: PJ:tree/HDG:herb

Alliance: *Pinus jeffreyi* Forest and Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Abies concolor* / *Symphoricarpos rotundifolius* / *Elymus elymoides* Woodland (1.B.2.Nd - CEGL008631), has been described in Yosemite National Park in the central Sierra Nevada Range in California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1600m to 1750m (5200' to 5700'). Aspects were observed in an easterly direction on flat to gentle slopes. Soils are characterized by a dominance of organic material, such as found in the "Yallani-Portola families association, 0 to 35 percent slopes" SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*. *Pinus jeffreyi* has frequency of 100% and cover of about 64%. No major shrub associates were observed in this type. The major forb associate observed in this type was "other [non-Key] grasses" with frequency of 100% and cover of about 6%. Other common forbs recorded included *Vicia americana* var. *americana* and *Penstemon gracilentus*, both had quite low cover. *Achnatherum occidentale* and *Elymus elymoides* were not observed at this site. Litter accumulation had a frequency of 100% and total cover of about 96%. Fine woody debris accounted for the other total cover of 4% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2480: *Pinus jeffreyi*/Dry Mixed Graminoid Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	100	64	64	64	100	66	66	66
Pinus jeffreyi (dead)	100	4	4	4	100	4	4	4
Total tree		68				70		
Total shrub		0				0		
Grasses - other	100	6	6	6	100	18	18	18
Vicia americana var. americana	P	P	P	P	100	4	4	4
Penstemon gracilentus	P	P	P	P	100	2	2	2
Total herbaceous		6				24		
Total nonvascular		0				0		
Barren - litter	100	24	24	24	100	96	96	96
Barren - fine woody debris	100	2	2	2	100	4	4	4
Total other		26				100		
Totals		100				194		

Plant Association: *Pinus jeffreyi*-*Pinus contorta*/*Arctostaphylos nevadensis*-(Mix)
(Sparse) Woodland

Plant Association Code: PJ-PC:tree/AN-(Mix):shrub

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2165m (5900' to 7100'). Aspects were observed in both westerly and northeasterly directions on gentle to moderate slopes. Soils are characterized by a codominance of bare soil and fragmented rock, such as found in the "Sheld family-Sheld family, moderately deep complex, glacial, 0 to 35 percent slopes" and "Rock Outcrop-Patio family association, 0 to 50 percent slopes" SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of both *Pinus jeffreyi* and *Pinus contorta* var. *murrayana*. *Pinus jeffreyi* has frequency of 100% and average cover of 11%; cover estimates ranged from 10 to 12%. *Pinus contorta* var. *murrayana* has frequency of 100% and average cover of 7%; cover estimates ranged from 2 to 12%. A major shrub associate in this type was *Arctostaphylos nevadensis* with frequency of 100% and average cover of 13%; cover estimates ranged from 8 to 18%. Other common shrubs observed with frequencies of 50% included *Ceanothus cordulatus* and *Arctostaphylos patula*. Common forbs found with frequencies of 50% in this type were *Achnatherum occidentale*, *Elymus elymoides*, and *Penstemon newberryi* which together averaged cover of 27%. Litter accumulation had a frequency of 100% and average total cover of 22%; cover estimates ranged from 16 to 28%. Duff and fine woody debris also factored in the organic material found with frequencies of 50% and average total cover of 14%; cover estimates ranged from 8 to 18% on sites where they were found. Bare soil had frequency of 100% and average total cover of 30%; cover estimates ranged from 22 to 38%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2543: *Pinus jeffreyi*-*Pinus contorta*/*Arctostaphylos nevadensis*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	11	10	12	100	11	10	12
Pinus contorta var. murrayana	100	7	2	12	100	6.5	2	11
Juniperus occidentalis	50	2	4	4	50	2	4	4
Pinus monticola	T	T	T	T	50	T	T	T
Total tree		20				19.5		
Arctostaphylos nevadensis	100	13	8	18	100	15	11	19
Ceanothus cordulatus	50	3.5	7	7	50	4.5	9	9
Arctostaphylos patula	50	2.5	5	5	50	4	8	8
Spiraea splendens	T	T	T	T	50	T	T	T
Total shrub		19				23.5		
Achnatherum occidentale	50	19.5	39	39	50	27	54	54
Elymus elymoides	50	6	12	12	50	8	16	16
Penstemon newberryi	50	2	4	4	50	2	4	4
Grass - other	50	1	2	2	50	1	2	2
Carex spissa	50	1	2	2	50	1	2	2
Carex species	50	1	2	2	50	1	2	2
Juncus parryi	50	1	2	2	50	1	2	2
Allium species	P	P	P	P	50	1	2	2
Gayophytum diffusum ssp. diffusum	50	0.5	1	1	50	1	2	2
Arenaria congesta	P	P	P	P	50	0.5	1	1
Juncus howellii	T	T	T	T	50	T	T	T
Aster species	T	T	T	T	50	T	T	T
Cheilanthes gracillima	T	T	T	T	50	T	T	T
Perideridia species	T	T	T	T	50	T	T	T
Total herbaceous		32				43.5		
Lichen	50	1	2	2	50	1	2	2
Moss	P	P	P	P	50	0.5	1	1
Total nonvascular		1				1.5		
Barren - bare soil	50	6	12	12	100	30	22	38
Barren - litter	50	2	4	4	100	22	16	28
Barren - rock	50	18	36	36	50	30	60	60
Barren - duff	P	P	P	P	50	9	18	18
Barren - fine woody debris	50	2	4	4	50	5	10	10
Total other		28				96		
Totals		100				184		

Plant Association: *Pinus jeffreyi*-*Pinus contorta*/Other Mixed Graminoid
Sparse Woodland

Plant Association Code: PJ-PC:tree/HOG:herb

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found in dry, recently burned areas within Lassen Volcanic National Park at elevations from approximately 1825m to 2375m (6000' to 7800'). Aspects were observed in both easterly and northwesterly directions on gentle to moderate slopes. Soils are characterized by a dominance of bare soil, such as found in the "Cenplat ashy loamy sand, 0 to 15 percent slopes" and "Xeric Vitricryands complex, 10 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of standing dead (recently burned) *Pinus jeffreyi* and *Pinus contorta* var. *murrayana*. Standing dead *Pinus jeffreyi* has frequency of 100% and cover of about 10%. Standing dead *Pinus contorta* var. *murrayana* has frequency of 100% and cover of about 2%. No major shrub associates were observed in this type. Several common forbs associated with this type were observed as Traces, including *Achnatherum occidentale*, *Arabis platysperma*, and *Monardella odoratissima*. Litter accumulation had a frequency of 100% and total cover of about 14%. Duff, organic ash, coarse woody debris, and fine woody debris also factored in the organic material found with frequency of 100% and total cover of about 18%. Bare soil was found with frequency of 100% and total cover of about 68%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2587: *Pinus jeffreyi*-*Pinus contorta* / Other Mixed Graminoid Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus jeffreyi (dead)	100	10	10	10	100	9.5	9.5	9.5
Pinus contorta var. murrayana (dead)	100	2	2	2	100	2	2	2
Total tree		12				11.5		
Ribes cereum	100	1	1	1	100	1.5	1.5	1.5
Ceanothus velutinus	T	T	T	T	100	T	T	T
Total shrub		1				1.5		
Achnatherum occidentale	100	2	2	2	100	2	2	2
Arabis platysperma	T	T	T	T	100	T	T	T
Cirsium vulgare	T	T	T	T	100	T	T	T
Gayophytum diffusum ssp. diffusum	T	T	T	T	100	T	T	T
Monardella odoratissima	T	T	T	T	100	T	T	T
Verbascum thapsus	T	T	T	T	100	T	T	T
Total herbaceous		2				2		
Total nonvascular		0				0		
Barren - bare soil	100	61	61	61	100	68	68	68
Barren - litter	100	7	7	7	100	14	14	14
Barren - organic ash	100	10	10	10	100	11	11	11
Barren - fine woody debris	100	3	3	3	100	3	3	3
Barren - coarse woody debris	100	2	2	2	100	2	2	2
Barren - duff	100	2	2	2	100	2	2	2
Total other		85				100		
Totals		100				115		

Plant Association: *Pinus jeffreyi*-*Pinus contorta*-*Pinus monticola*/
Sparse Understory (Sparse) Woodland

Plant Association Code: PJ-PC-PM:tree

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on rocky, gravelly sites within Lassen Volcanic National Park, most commonly within the vicinity of the Chaos Crags Jumble, at elevations from approximately 1825m to 2195m (6000' to 7200'). Aspects were observed in many directions, but most commonly fell into a west to northerly direction on flat to moderate slopes. Soils are characterized by a codominance of fragmented rock and organic material, such as found in the "Chaos extremely gravelly ashy coarse sand, 2 to 30 percent slopes; Vitrandic Xerorthents, debris fan, 2 to 30 percent slopes;" and "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the combined presence of *Pinus jeffreyi*, *Pinus monticola*, and *Pinus contorta* var. *murrayana*. *Pinus jeffreyi* has frequency of 100% and average cover of 14%; cover estimates ranged from 3 to 23%. *Pinus contorta* var. *murrayana* has frequency of 100% and average cover of 11%; cover estimates ranged from 2 to 23%. *Pinus monticola* has frequency of 100% and average cover of 11%; cover estimates ranged from 2 to 22%. No major understory associates were observed in this type. Other understory species observed as Traces included *Holodiscus microphyllus* var. *glabrescens*, *Arctostaphylos patula*, and *Pyrola picta*. Bare rock had a frequency of 100% and average total cover of 52%; cover estimates ranged from 14 to 80%. Litter accumulation had a frequency of 100% and average total cover of 41%; cover estimates ranged from 5 to 77%. Lichen growth was present with a frequency of 80% and total average cover of 10% of the barren rock ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2600: *Pinus jeffreyi*-*Pinus contorta*-*Pinus monticola*/Sparse Understory (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency	Bird's-Eye Average	Bird's-Eye Minimum	Bird's-Eye Maximum	Total Frequency	Total Average	Total Minimum	Total Maximum
Species	(%)	Cover	Cover	Cover	(%)	Cover	Cover	Cover
<i>Pinus jeffreyi</i>	100	14	3	22.7	100	14.5	3	23.7
<i>Pinus contorta</i> var. <i>murrayana</i>	100	11.3	2.5	23.2	100	12.1	2.5	24.2
<i>Pinus monticola</i>	100	10.6	2	22.2	100	11.3	2	26.3
<i>Abies concolor</i>	80	1	1	2	80	2	1	7.1
<i>Pinus lambertiana</i>	20	0.2	1	1	20	0.2	1	1
<i>Pinus jeffreyi</i> (dead)	20	0.2	1	1	20	0.2	1	1
<i>Tsuga mertensiana</i>	T	T	T	T	20	T	T	T
Total tree		37.3				40.3		
<i>Holodiscus microphyllus</i> var. <i>glabre</i>	20	0.2	1	1	40	0.2	1	1
<i>Arctostaphylos patula</i>	20	0.2	1	1	20	0.2	1	1
<i>Purshia tridentata</i>	T	T	T	T	20	T	T	T
<i>Chrysolepis sempervirens</i>	T	T	T	T	20	T	T	T
Total shrub		0.4				0.4		
<i>Pyrola picta</i>	T	T	T	T	40	0.2	1	1
<i>Polygonum</i> species	T	T	T	T	20	T	T	T
Total herbaceous		0				0.2		
Lichen	60	7.4	10	17	80	10.1	1	25
Total nonvascular		7.4				10.1		
Barren - rock	100	34.7	9.1	70	100	51.8	14.1	80
Barren - litter	100	16.9	5	26.3	100	40.9	5	76.8
Barren - fine woody debris	40	1.5	2.5	5.1	60	3.2	0.5	8.1
Barren - coarse woody debris	40	0.4	1	1	60	0.7	0.5	2
Barren - fine gravelly soil	40	1.2	1	5	40	1.2	1	5
Barren - bare soil	20	0.2	1	1	20	0.2	1	1
Total other		54.9				98		
Totals		100				149		

Plant Association: *Pinus jeffreyi*-*Pinus monticola*/*Arctostaphylos patula*-(Mix)
(Sparse) Woodland

Plant Association Code: PJ-PM:tree/AP-(Mix):shrub

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on gravelly sites within Lassen Volcanic National Park at higher elevations from approximately 2375m (7800') to 2500m (8200'). Aspect was observed in a westerly direction on moderately steep slopes. Soils are characterized by a codominance of fine gravelly soil and fragmented rock, such as found in the "Ashbutte-Vitrandid Xerorthents complex, 15 to 60 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Pinus jeffreyi*. *Pinus jeffreyi* had frequency of 100% and cover of about 22%. Another conifer observed in this type was *Pinus monticola*, with frequency of 100% and cover of about 5%. The Key shrub associate of this type was *Arctostaphylos patula* with frequency of 100% and cover of about 5%. Other shrub associates may include *Holodiscus microphyllus*, *Chrysolepis sempervirens*, *Ceanothus velutinus*, and *Artemisia tridentata* with frequencies of 100% and combined cover of about 35%. No common forbs were recorded in this type. Litter accumulation had a frequency of 100% and total cover of about 41%. Duff, fine woody debris, and coarse woody debris also factored in the organic material found with a frequency of 100% and total cover of about 5%. Rock and bare soils had a frequency of 100% and total cover of about 54%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2749: *Pinus jeffreyi*-*Pinus monticola*/*Arctostaphylos patula*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	100	22.5	22.5	22.5	100	22.5	22.5	22.5
Pinus monticola	100	5	5	5	100	4.2	4.2	4.2
Total tree		27.5				26.7		
Holodiscus microphyllus var. glabrescens	100	18.8	18.8	18.8	100	26.3	26.3	26.3
Chrysolepis sempervirens	100	7.5	7.5	7.5	100	10.8	10.8	10.8
Ceanothus velutinus	100	6.3	6.3	6.3	100	6.3	6.3	6.3
Arctostaphylos patula	100	5	5	5	100	5	5	5
Artemisia tridentata	100	2.5	2.5	2.5	100	2.5	2.5	2.5
Chrysothamnus nauseosus ssp. albicaulis	T	T	T	T	100	T	T	T
Total shrub		40.1				50.9		
Eriogonum nudum	T	T	T	T	100	T	T	T
Monardella odoratissima	T	T	T	T	100	T	T	T
Penstemon species	T	T	T	T	100	T	T	T
Phlox diffusa	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Lichen	100	5	5	5	100	5	5	5
Total nonvascular		5				5		
Barren - litter	100	2.5	2.5	2.5	100	41.3	41.3	41.3
Barren - rock	100	5	5	5	100	25	25	25
Barren - fine gravelly soil	100	15	15	15	100	21.3	21.3	21.3
Barren - bare soil	100	5	5	5	100	7.5	7.5	7.5
Barren - fine woody debris	P	P	P	P	100	2.5	2.5	2.5
Barren - coarse woody debris	P	P	P	P	100	2.5	2.5	2.5
Total other		27.5				100.1		
Totals		100.1				182.7		

Plant Association: *Pinus jeffreyi*-*Pinus monticola*/*Holodiscus microphyllus*
(Other Shrub) Sparse Woodland

Plant Association Code: PJ-PM:tree/HM:shrub

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park in the vicinity of the Chaos Crags Jumble at elevations from approximately 1825m to 2135m (6000' to 7000'). Aspects were generally of a west-southwesterly direction on gentle slopes. Soils are characterized by a dominance of fragmented rock, such as found in the "Chaos extremely gravelly ashy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi* and *Pinus monticola*. *Pinus jeffreyi* has 100% frequency and average cover of 7%; cover estimates ranged from 6 to 8%. *Pinus monticola* has 100% frequency and average cover of 4%; cover estimates ranged from 3 to 6%. *Pinus lambertiana* and *Abies concolor* were often recorded as Traces. A common shrub associate found was *Holodiscus microphyllus* var. *glabrescens* with frequency of 100% and average cover of 2%. No forb associates were observed in this type. Bare rock had a frequency of 100% and average total cover of 86%; cover estimates ranged from 81 to 90%. Litter accumulation had a frequency of 100% and average total cover of 12%; cover estimates ranged from 7 to 17%. Lichen had a frequency of 100% and average total cover of 13% of the barren rock ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2757: *Pinus jeffreyi*-*Pinus monticola*/*Holodiscus microphyllus* (Other Shrub) Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Pinus jeffreyi</i>	100	7	6	8	100	6.8	6	7.5
<i>Pinus monticola</i>	100	4.5	3	6	100	4.8	3	6.5
<i>Pinus lambertiana</i>	100	1	1	1	100	1	1	1
<i>Pinus jeffreyi</i> (dead)	50	0.5	1	1	50	0.5	1	1
<i>Abies concolor</i>	50	0.5	1	1	50	0.5	1	1
<i>Pinus contorta</i> var. <i>murrayana</i>	T	T	T	T	50	T	T	T
Total tree		13.5				13.6		
<i>Holodiscus microphyllus</i> var. <i>glabrescens</i>	100	2.5	2	3	100	3	2	4
<i>Ceanothus velutinus</i>	P	P	P	P	50	0.5	1	1
<i>Ericameria bloomeri</i>	P	P	P	P	50	0.5	1	1
<i>Chrysolepis sempervirens</i>	T	T	T	T	50	T	T	T
Total shrub		2.5				4		
<i>Eriogonum nudum</i>	50	1	2	2	50	1	2	2
<i>Lupinus obtusilobus</i>	T	T	T	T	50	T	T	T
Total herbaceous		1				1		
Lichen	100	11.5	1	22	100	13	2	24
Moss	P	P	P	P	50	0.5	1	1
Total nonvascular		11.5				13.5		
Barren - rock	100	64.8	53.5	76	100	85.8	81.5	90
Barren - litter	100	5.3	1	9.5	100	12.3	7	17.5
Barren - fine woody debris	100	1	1	1	100	1	1	1
Barren - duff	50	0.5	1	1	50	0.5	1	1
Total other		71.6				99.6		
Totals		100.1				131.7		

Plant Association: *Pinus jeffreyi*-Other Conifer/Sparse Understory
(Sparse) Woodland

Plant Association Code: PJ-OtC:tree

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on sandy, rocky sites within Lassen Volcanic National Park at elevations from approximately 1750m to 1850m (5700' to 6100'). Aspects were generally observed in a westerly direction on flat to gentle slopes. Soils are characterized by a codominance of fragmented rock and fine gravelly soil, such as found in the "Chaos extremely gravelly ashy coarse sand, 2 to 30 percent slopes," and "Vitrandic Xerofluvents-Typic Endoaquents complex, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi* and *Pinus lambertiana*. *Pinus jeffreyi* has frequency of 100% and cover of about 18%. *Pinus lambertiana* has frequency of 100% and cover of about 3%. The understory shrubs and forbs were absent as no understory associates or Trace species were observed in this type. Litter accumulation had a frequency of 100% and total cover of about 35%. Rock and Bare soil had a frequency of 100% and total cover of about 75% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2800: *Pinus jeffreyi*-Other Conifer / Sparse Understory (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	18	18	18	100	18	18	18
Pinus lambertiana	100	3	3	3	100	3	3	3
Total tree		21				21		
Total shrub		0				0		
Total herbaceous		0				0		
Lichen	100	10	10	10	100	10	10	10
Total nonvascular		10				10		
Barren - rock	100	25	25	25	100	40	40	40
Barren - fine gravelly soil	100	24	24	24	100	25	25	25
Barren - litter	100	20	20	20	100	35	35	35
Total other		69				100		
Totals		100				131		

Plant Association: *Pinus jeffreyi*-Other Conifer/*Arctostaphylos patula*-(Mix) Sparse Woodland

Plant Association Code: PJ-OtC:tree/AP-(Mix):shrub

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Pinus jeffreyi* - *Pinus monticola* / *Arctostaphylos nevadensis* Woodland (1.B.2.Nd - CEGLO00818), has been described in the Klamath-Siskiyou region of Oregon and may also occur in California.



Environmental Characteristics

This association was typically found on dry, rocky areas within Lassen Volcanic National Park at elevations from approximately 1925m to 2075m (6300' to 6800'). Aspects were generally of a southwesterly direction on moderately steep slopes. Soils are characterized by a codominance of fragmented rock and organic material, such as found in the "Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi* and *Calocedrus decurrens*. *Pinus jeffreyi* has frequency of 100% and cover of about 8%. *Calocedrus decurrens* has frequency of 100% and cover of about 2%. Major shrub associates of this type included *Ceanothus velutinus* and *Arctostaphylos patula*. *Ceanothus velutinus* has 100% frequency and cover of about 37%. *Arctostaphylos patula* has 100% frequency and cover of about 17%. Other common shrubs observed in this type were *Chrysolepis sempervirens*, *Ceanothus cordulatus*, and *Prunus emarginata* with frequency of 100% and combined cover of about 37%. No common forb associates were observed in this type other than as traces. Litter accumulation had a frequency of 100% and total cover of about 66%. Bare soils and rock had a frequency of 100% and total cover of about 32% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2849: *Pinus jeffreyi*-Other Conifer/*Arctostaphylos patula*-(Mix) Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus jeffreyi	100	8	8	8	100	8	8	8
Calocedrus decurrens	100	2	2	2	100	2	2	2
Total tree		10				10		
Ceanothus velutinus	100	37	37	37	100	44	44	44
Arctostaphylos patula	100	17	17	17	100	15	15	15
Chrysolepis sempervirens	100	14	14	14	100	14	14	14
Ceanothus cordulatus	100	4	4	4	100	9	9	9
Prunus emarginata	100	6	6	6	100	4	4	4
Ceanothus prostratus	T	T	T	T	100	T	T	T
Ribes roezlii	T	T	T	T	100	T	T	T
Symphoricarpos albus	T	T	T	T	100	T	T	T
Total shrub		78				86		
Grass - other	T	T	T	T	100	T	T	T
Apocynum androsaemifolium	T	T	T	T	100	T	T	T
Monardella odoratissima	T	T	T	T	100	T	T	T
Penstemon species	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	P	P	P	P	100	66	66	66
Barren - rock	100	6	6	6	100	22	22	22
Barren - bare soil	100	4	4	4	100	8	8	8
Barren - fine gravelly soil	P	P	P	P	100	2	2	2
Barren - fine woody debris	100	2	2	2	100	2	2	2
Total other		12				100		
Totals		100				196		

Plant Association: *Pinus jeffreyi*-Other Conifer/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) (Sparse) Woodland

Plant Association Code: PJ-OtC:tree/AoEe-(Mix):herb

Alliance: *Pinus jeffreyi* –Mixed Needleleaf Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Pinus jeffreyi* / *Purshia tridentata* Woodland (1.B.2.Nd - CEGLO08624), has been described in Yosemite National Park in the central Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on rocky, gravelly sites within Lassen Volcanic National Park at elevations from approximately 1675m to 1920m (5500' to 6300'). Aspects were generally of a northwesterly direction on flat slopes. Soils are characterized by a codominance of fragmented rock and fine gravelly soil, such as found in the "Chaos extremely gravelly ashy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi*, both live and standing dead. Live *Pinus jeffreyi* has frequency of 100% and cover of about 14%. Standing dead *Pinus jeffreyi* has frequency of 100% and cover of about 3%. No Key shrub associates were observed in this type. One Key forb associate observed in this type was *Elymus elymoides*, with frequency of 100% and cover of about 3%. Litter accumulation had a frequency of 100% and total cover of about 40%. Bare rock and fine gravelly soil had a frequency of 100% and total cover of about 60%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 2870: *Pinus jeffreyi*-Other Conifer/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	14	14	14	100	14	14	14
Pinus jeffreyi (dead)	100	3	3	3	100	3	3	3
Pinus lambertiana	100	2	2	2	100	2	2	2
Pinus contorta var. murrayana	100	1	1	1	100	1	1	1
Total tree		20				20		
Total shrub		0				0		
Elymus elymoides	100	3	3	3	100	3	3	3
Total herbaceous		3				3		
Lichen	100	10	10	10	100	10	10	10
Total nonvascular		10				10		
Barren - rock	100	19	19	19	100	30	30	30
Barren - litter	100	28	28	28	100	40	40	40
Barren - fine gravelly soil	100	20	20	20	100	30	30	30
Total other		67				100		
Totals		100				133		

Plant Association: *Cercocarpus ledifolius*/Other Mixed Herbaceous Sparse
Woodland

Plant Association Code: CL:tree/HOX:herb

Alliance: *Cercocarpus ledifolius* Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Pinus jeffreyi* / *Cercocarpus ledifolius* Woodland (1.B.2.Nd - CEGL008626), has been described in Yosemite National Park in the central Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, quite rocky sites often on old lava flows in and near the northern corner of Lassen Volcanic National Park at elevations from approximately 1675m to 1895m (5500' to 6200'). Aspects were generally of a northwesterly direction on flat to gentle slopes. Soils are characterized by a dominance of fragmented rock and lava, such as found in the "Lava flows" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Cercocarpus ledifolius*. *Cercocarpus ledifolius* has frequency of 100% and cover of about 12%. Some conifer species observed as Traces included *Abies concolor* and *Pinus jeffreyi*. No Key shrub or forb associates were observed in this type, other shrub and forbs were observed only as Traces. Fragmented rock was the majority of the surface layer with frequency of 100% and total cover of about 94%. Lichen growth was observed with frequency of 100% and growing on about 54% of the rock surface. Litter accumulation had a frequency of 100% and total cover of only about 6%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-eye View.

Type 3186: *Cercocarpus ledifolius*/Other Mixed Herbaceous Sparse Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Cercocarpus ledifolius</i>	100	12	12	12	100	12	12	12
<i>Pinus jeffreyi</i>	T	T	T	T	100	T	T	T
<i>Pinus lambertiana</i>	T	T	T	T	100	T	T	T
<i>Abies concolor</i>	T	T	T	T	100	T	T	T
Total tree		12				12		
<i>Ribes cereum</i>	T	T	T	T	100	T	T	T
<i>Chrysothamnus nauseosus</i> ssp. <i>albicaulis</i>	T	T	T	T	100	T	T	T
Total shrub		0				0		
<i>Ageratina occidentalis</i>	T	T	T	T	100	T	T	T
<i>Penstemon newberryi</i>	T	T	T	T	100	T	T	T
Total herbaceous		0				0		
Lichen	100	50	50	50	100	58	58	58
Moss	100	2	2	2	100	2	2	2
Total nonvascular		52				60		
Barren - rock	100	34	34	34	100	94	94	94
Barren - litter	100	2	2	2	100	6	6	6
Total other		36				100		
Totals		100				172		

Plant Association: *Cercocarpus ledifolius*-*Pinus jeffreyi*/*Holodiscus microphyllus*
(Other Shrub) Woodland

Plant Association Code: CL-PJ:tree/HM:shrub

Alliance: *Cercocarpus ledifolius* Woodland (Sparse)

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Pinus jeffreyi* /*Cercocarpus ledifolius* Woodland (1.B.2.Nd - CEG008626), has been described in Yosemite National Park in the central Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within the vicinity of the northeastern corner of Lassen Volcanic National Park at elevations from approximately 1770m to 1975m (5800' to 6500'). Aspects were generally of a northerly direction on flat to gentle slopes. Soils are characterized by a dominance of fragmented rock and organic material, such as found in the "Yallani-Sheld-Portola families association, 0 to 35 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by both *Cercocarpus ledifolius* and *Pinus jeffreyi*. *Cercocarpus ledifolius* has frequency of 100% and cover of about 42%. *Pinus jeffreyi* was observed with frequency of 100% and about cover of about 10%. A Key shrub associate of this type was *Holodiscus microphyllus* var. *glabrescens*, observed with frequency of 100% and cover of about 18%. Other common shrub species observed as Traces included *Purshia tridentata* and *Chrysothamnus nauseosus*. No common forbs were observed in this type. Lichen had frequency of 100% and cover of about 18% of the rock surface. Fragmented rock was a major part of the surface layer with frequency of 100% and total cover of about 59%. Litter accumulation had frequency of 100% and total cover of about 30%. Fine woody debris and coarse woody debris had frequency of 100% and combined total cover of only about 3%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3257: *Cercocarpus ledifolius*-*Pinus jeffreyi*/*Holodiscus microphyllus* (Other Shrub) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Cercocarpus ledifolius</i>	100	42	42	42	100	47	47	47
<i>Pinus jeffreyi</i>	100	10	10	10	100	10	10	10
Total tree		52				57		
<i>Holodiscus microphyllus</i> var. <i>glabrescens</i>	100	18	18	18	100	25	25	25
<i>Purshia tridentata</i>	T	T	T	T	100	T	T	T
<i>Chrysothamnus nauseosus</i> ssp. <i>albicaulis</i>	T	T	T	T	100	T	T	T
<i>Chamaebatiaria millefolium</i>	T	T	T	T	100	T	T	T
Total shrub		18				25		
Total herbaceous		0				0		
Lichen	100	4	4	4	100	18	18	18
Total nonvascular		4				18		
Barren - rock	100	18	18	18	100	59	59	59
Barren - litter	100	6	6	6	100	30	30	30
Barren - bare soil	100	2	2	2	100	2	2	2
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Barren - fine woody debris	P	P	P	P	100	1	1	1
Total other		26				94		
Totals		100				194		

Plant Association: *Cercocarpus ledifolius*-*Pinus jeffreyi*/Dry Mixed Shrub (Sparse)
Woodland

Plant Association Code: CL-PJ:tree/DMix:shrub

Alliance: *Cercocarpus ledifolius* Woodland (Sparse)

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Pinus jeffreyi* /*Cercocarpus ledifolius* Woodland (1.B.2.Nd - CEGLO08626), has been described in Yosemite National Park in the central Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within the vicinity of the northeastern corner of Lassen Volcanic National Park at elevations from approximately 1675m to 1825m (5500' to 6000'). Aspects were generally of a northerly direction on flat to gentle slopes. Soils are characterized by a dominance of fragmented rock and gravelly soil, such as found in the "Yallani-Sheld-Portola families association, 0 to 35 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was characterized by the presence of *Pinus jeffreyi* and *Cercocarpus ledifolius*. *Pinus jeffreyi* was observed with frequency of 100% and average cover of 10%; cover estimates were 10% at both sites. *Cercocarpus ledifolius* has frequency of 100% and average cover of 3%; cover estimates ranged from 2% to 4%. *Abies concolor* was observed with frequency of 50% and average cover of 4%; cover estimates were 8% on the site where it was found. Key shrub associates of this type included *Purshia tridentata*, *Ribes cereum*, *Leptodactylon pungens*, and *Chamaebatiaria millefolium*, all indicators of a dry mixed shrubland type. *Purshia tridentata* was observed with frequency of 100% and average cover of 20%; cover estimates ranged from 19 to 20%. *Ribes cereum* and *Leptodactylon pungens* both had frequency of 100% and average cover of 4 and 3% respectively. Common forbs observed in this type with frequency of 50% were *Achnatherum occidentale*, *Gayophytum diffusum*, and *Penstemon newberryi* with a combined average cover of only 4% on sites where they were found. Fragmented rock was a major part of the ground surface layer with frequency of 100% and average cover of 60%; cover estimates ranged from 54 to 65%. Litter accumulation, fine woody debris, and coarse woody debris had frequency of 100% and average total cover of 18%; cover estimates ranged from 13 to 24%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3266: *Cercocarpus ledifolius*-*Pinus jeffreyi* /Dry Mixed Shrub (Sparse) Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	100	10	10	10	100	10	10	10
Cercocarpus ledifolius	100	3	2	4	100	3	2	4
Abies concolor	50	4	8	8	50	4	8	8
Total tree		17				17		
Purshia tridentata	100	19.5	19	20	100	19.5	19	20
Ribes cereum	100	4	2	6	100	4	2	6
Leptodactylon pungens	100	3	2	4	100	3	2	4
Chamaebatiaria millefolium	100	1	2	2	100	1	2	2
Ribes viscosissimum	50	2.5	5	5	50	2	4	4
Arctostaphylos patula	50	1	2	2	50	1	2	2
Ribes roezlii	50	1	2	2	50	1	2	2
Ceanothus velutinus	P	P	P	P	50	0.5	1	1
Ericameria bloomeri	T	T	T	T	50	T	T	T
Prunus emarginata	T	T	T	T	50	T	T	T
Total shrub		32				32		
Achnatherum occidentale	50	1	2	2	50	3	6	6
Gayophytum diffusum ssp. diffusum	50	2	4	4	50	2	4	4
Penstemon newberryi	50	1	2	2	50	2	4	4
Grass other	50	1	2	2	50	1	2	2
Carex rossii	T	T	T	T	50	T	T	T
Aster species	T	T	T	T	50	T	T	T
Chaenactis douglasii var. douglasii	T	T	T	T	50	T	T	T
Eriogonum nudum	T	T	T	T	50	T	T	T
Total herbaceous		5				8		
Total nonvascular		0				0		
Barren - rock	100	23.5	14	33	100	59.5	54	65
Barren - litter	100	4	0	8	100	9.5	8	11
Barren - bare soil	100	5	4	6	100	8	6	10
Barren - fine woody debris	100	2	0	4	100	5.5	3	8
Barren - coarse woody debris	100	2.5	2	3	100	3.5	2	5
Barren - duff	50	5	10	10	50	6	12	12
Barren - gravel	50	3	6	6	50	7	14	14
Barren - organic ash	50	1	2	2	50	1	2	2
Total other		46				100		
Totals		100				157		

Plant Association: *Salix lucida*/Dry Mixed Graminoid Forest/Woodland

Plant Association Code: SL:tree/HDG:herb

Alliance: *Salix lucida ssp. lasiandra* Forest and Woodland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Salix lucida ssp. lasiandra* / *Salix fluviatilis* Woodland (1.B.3.Ng - CEGL000949), has been described for areas in Oregon and Washington.



Environmental Characteristics

This association was found on a mesic site subject possibly to seasonal flooding within Lassen Volcanic National Park at elevations from approximately 1770m to 1825m (5800' to 6000'). Aspects were variable but most commonly observed in a northwesterly direction on flat slopes. Soils are characterized by a codominance of sandy gravel and organic material, such as found in the "Typic Psammaquents ashy fine sand, 0 to 3 percent slopes" 2011 LAVO SSURGO soil classification.

Vegetation

2007 LAVO Vegetation Classification

This association's overstory was dominated by *Salix lucida ssp. lasiandra*. *Salix lucida ssp. lasiandra* has 100% frequency and cover of about 67%. Two conifers, *Pinus jeffreyi* and *Abies concolor*, were observed only as Trace species in this type. No shrub associates were observed in this type and shrub cover was sparse to absent. Common forb associates in this type were *Elymus elymoides*, *Carex athrostachya*, and "other" grasses. All herbaceous cover amounted to about 6%, with "other" non-Key grasses comprising the vast majority of the cover of this layer. Litter accumulation had a frequency of 100% and total cover of about 48%. Fine woody debris and coarse woody debris also factored in the organic material found with a frequency of 100% and total cover of about 35%. Fine gravelly soil and gravelly rock was found with a frequency of 100% and total cover of about 15%. No standing water was observed at the site.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3580: *Salix lucida*/Dry Mixed Graminoid Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Salix lucida ssp. lasiandra	100	67	67	67	100	83	83	83
Pinus jeffreyi	T	T	T	T	100	T	T	T
Abies concolor	T	T	T	T	100	T	T	T
Total tree		67				83		
Total shrub		0				0		
Grass - other	100	5	5	5	100	15	15	15
Elymus elymoides	P	P	P	P	100	2	2	2
Carex athrostachya	100	1	1	1	100	1	1	1
Cirsium species	T	T	T	T	100	T	T	T
Total herbaceous		6				18		
Total nonvascular		0				0		
Barren - litter	100	9	9	9	100	48.5	48.5	48.5
Barren - fine woody debris	100	6.5	6.5	6.5	100	30	30	30
Barren - sand	100	7	7	7	100	10	10	10
Barren - rock	100	3.5	3.5	3.5	100	5.5	5.5	5.5
Barren - coarse woody debris	100	1	1	1	100	5	5	5
Total other		27				99		
Totals		100				200		

Plant Association: *Salix lucida*/Other Mixed Graminoid Forest

Plant Association Code: SL:tree/HOG:herb

Alliance: *Salix lucida ssp. lasiandra* Forest and Woodland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Salix lucida ssp. lasiandra* / *Salix fluviatilis* Woodland (1.B.3.Ng - CEGL000949), has been described for areas in Oregon and Washington.



Environmental Characteristics

This association was found on a very wet site subject to seasonal flooding and a high water table near the shores of Manzanita Lake within Lassen Volcanic National Park at elevations from approximately 1770m to 1825m (5800' to 6000'). Aspects were variable but most commonly observed in a southwesterly direction on flat slopes. Soils are characterized by a dominance of sandy soil, under or near water, such as found in the "Typic Psammaquents ashy fine sand, 0 to 3 percent slopes" 2011 LAVO SSURGO soil classification.

Vegetation

This association's overstory was dominated by *Salix lucida ssp. lasiandra*. *Salix lucida ssp. lasiandra* has 100% frequency and dense cover of about 86%. The only shrub cover observed was *Alnus incana* as a Trace. The understory herbaceous layer was mostly a mixture of forbs and grasses. All herbaceous cover was about 9%. The most common species observed were *Carex athrostachya*, *Juncus nevadensis*, "other" *Carex sp.*, and "other" grasses, which made up the vast majority of the cover. Litter accumulation had a frequency of 100% and total cover of about 12%. Fine woody debris and coarse woody debris also factored in the organic material found with a frequency of 100% and total cover about 11%. About 15% total cover of the ground surface was fine wet, silty soil; water, both standing and silty, accounted for about 48% total cover of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3587: *Salix lucida*/Other Mixed Graminoid Forest

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Salix lucida ssp. lasiandra</i>	100	86	86	86	100	96	96	96
Total tree		86				96		
<i>Alnus incana</i>	T	T	T	T	100	T	T	T
Total shrub		0				0		
<i>Carex athrostachya</i>	100	4	4	4	100	9	9	9
<i>Carex species</i>	100	2	2	2	100	8	8	8
<i>Scirpus species</i>	P	P	P	P	100	4	4	4
<i>Juncus nevadensis</i>	100	2	2	2	100	4	4	4
<i>Veronica species</i>	P	P	P	P	100	3	3	3
<i>Glyceria elata</i>	P	P	P	P	100	2	2	2
Grass - other	100	1	1	1	100	2	2	2
<i>Juncus articulatus</i>	P	P	P	P	100	2	2	2
<i>Marchantia polymorpha</i>	P	P	P	P	100	1	1	1
<i>Arabis species</i>	T	T	T	T	100	T	T	T
<i>Equisetum species</i>	T	T	T	T	100	T	T	T
<i>Galium triflorum</i>	T	T	T	T	100	T	T	T
<i>Mimulus primuloides</i>	T	T	T	T	100	T	T	T
Total herbaceous		9				35		
Moss	100	1	1	1	100	13	13	13
Total nonvascular		1				13		
Water - shallow	P	P	P	P	100	42	42	42
Barren - silty soil	P	P	P	P	100	15	15	15
Barren - litter	100	4	4	4	100	12	12	12
Barren - fine woody debris	P	P	P	P	100	7	7	7
Water - silty/turbid	P	P	P	P	100	6	6	6
Barren - coarse woody debris	P	P	P	P	100	4	4	4
Total other		4				86		
Totals		100				230		

Plant Association: *Populus tremuloides*/Sparse Understory Forest

Plant Association Code: PTe:tree

Alliance: *Populus tremuloides* Forest and Woodland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Populus tremuloides* / *Monardella odoratissima* Forest (1.B.2.Nb - CEGLO03145), has been described throughout the southern and eastern portions of the Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry, well drained sites within Lassen Volcanic National Park at elevations from approximately 1770m to 1920m (5800' to 6300'). Aspects were observed in a southerly direction on flat to gentle slopes. Soils are characterized by a codominance of fine gravelly soil and organic material, such as found in the "Humic Haploxerands, lake terrace-Typic Endoaquands complex, 1 to 30 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's dense overstory was dominated by *Populus tremuloides*. *Populus tremuloides* has frequency of 100% and cover of about 83%. *Pinus contorta* var. *murrayana* (standing dead), *Abies concolor*, and *Pinus jeffreyi* were also observed with frequency of 100% and with minimal cover or Traces in this type. No major understory associates were observed in this type. One common shrub observed was *Ericameria bloomeri* with frequency of 100% and about 11% cover in the understory. Litter accumulation had a frequency of 100% and total cover of about 41%. Fine woody debris and coarse woody debris also factored in the organic material found with a frequency of 100% and total cover of about 22%. Sandy bare soil was found with a frequency of 100% and total cover of about 36%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3300: *Populus tremuloides*/Sparse Understory Forest

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Populus tremuloides</i>	100	83.3	83.3	83.3	100	100	100	100
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	P	P	P	P	100	5.6	5.6	5.6
<i>Abies concolor</i>	T	T	T	T	100	T	T	T
<i>Pinus jeffreyi</i>	T	T	T	T	100	T	T	T
Total tree		83.3				105.6		
<i>Ericameria bloomeri</i>	P	P	P	P	100	11.1	11.1	11.1
Total shrub		0				11.1		
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - litter	100	5.6	5.6	5.6	100	41.7	41.7	41.7
Barren - sand	100	5.6	5.6	5.6	100	36.1	36.1	36.1
Barren - fine woody debris	100	5.6	5.6	5.6	100	16.7	16.7	16.7
Barren - coarse woody debris	P	P	P	P	100	5.6	5.6	5.6
Total other		16.8				100.1		
Totals		100.1				216.8		

Plant Association: *Populus tremuloides/Achnatherum occidentale-Elymus
elymoides*-(Mix) Forest/Woodland

Plant Association Code: PTe:tree/AoEe-(Mix):herb

Alliance: *Populus tremuloides* Forest and Woodland

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Populus tremuloides / Monardella odoratissima* Forest (1.B.2.Nb - CEG003145), has been described throughout the southern and eastern portions of the Sierra Nevada Range, California.



Environmental Characteristics

This association was typically found on dry or mesic, well drained sites near streams or lakes within Lassen Volcanic National Park at elevations from approximately 1825m to 1975m (6000' to 6500'). Aspects were varied and observed in both a northerly and southerly direction on flat to gentle slopes. Soils are characterized by a codominance of fine gravelly soil and organic material, such as found in the "Vitrandic Xerorthents, debris fan, 2 to 30 percent slopes" and "Typic Vitrixerands-Vitrandic Xerorthents, moraine, complex, 15 to 60 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory was dominated by *Populus tremuloides*. *Populus tremuloides* has frequency of 100% and average cover of 61%; cover estimates ranged from 60 to 62%. Conifers observed in this type included *Pinus jeffreyi*, *Pinus contorta* var. *murrayana*, and *Abies magnifica*; however the maximum cover observed for any individual species was only 2%. A Key forb associate observed in this type was *Achnatherum occidentale*. *Achnatherum occidentale* has frequency of 100% and average cover of 12%; cover estimates ranged from 10 to 15%. Other herbaceous species had frequency of 100% and average cover of about 6%; cover estimates ranged from 2 to 10%. Litter accumulation had a frequency of 100% and average total cover of 40%; cover estimates ranged from 30 to 50%. Fine gravelly soil had a frequency of 100% and average total cover of 60%; cover estimates ranged from 50 to 70%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3370: *Populus tremuloides*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Populus tremuloides</i>	100	61	60	62	100	61	60	62
<i>Pinus jeffreyi</i>	100	1.5	1	2	100	1.5	1	2
<i>Abies magnifica</i>	100	1.5	1	2	100	1.5	1	2
<i>Pinus contorta</i> var. <i>murrayana</i>	100	1	1	1	100	1	1	1
Total tree		65				65		
Total shrub		0				0		
<i>Achnatherum occidentale</i>	100	12.5	10	15	100	12.5	10	15
Lupinus species	100	3	1	5	100	3	1	5
<i>Monardella odoratissima</i>	100	3	1	5	100	3	1	5
Total herbaceous		18.5				18.5		
Total nonvascular		0				0		
Barren - litter	100	11.5	5	18	100	40	30	50
Barren - gravel	100	5	5	5	100	60	50	70
Total other		16.5				100		
Totals		100				183.5		

Plant Association: *Populus tremuloides*-*Pinus contorta*/*Salix (lemmonii)* Shrub Forest/Woodland

Plant Association Code: PTe-PC:tree/Sal:shrub

Alliance: *Populus tremuloides* Forest and Woodland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Pinus contorta* var. *murrayana* - *Populus tremuloides* / *Spiraea douglasii* Forest (1.B.3.Nc - CEGLO0157), has been described for areas in Oregon and possibly portions of northern California.



Environmental Characteristics

This association was typically found on mesic or wet sites near water within Lassen Volcanic National Park at elevations from approximately 1825m to 1975m (6000' to 6500'). Aspects were observed in a northerly direction on flat to gentle slopes. Soils are characterized by a dominance of organic material, such as found in the "Humic Haploxerands, moist lake terrace, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's overstory is dominated by *Populus tremuloides*. *Populus tremuloides* has frequency of 100% and cover of about 33%. A common conifer observed in this type was *Pinus contorta* var. *murrayana*, both live and standing dead. Live *Pinus contorta* var. *murrayana* has frequency of 100% and about 12% cover while standing dead was *Pinus contorta* var. *murrayana* has frequency of 100% and cover of about 11%. A Key shrub associate in this type was *Salix lemmonii* with frequency of 100% and cover of about 22%. The understory of this type was represented by a dense mix of ten forbs and graminoids that totaled about 22% cover. The majority of this cover was *Carex pellita*, *Juncus articulatus*, and "other" grasses. Litter accumulation had a frequency of 100% and total cover of about 84%. Coarse woody debris and fine woody debris had a frequency of 100% and total cover of about 12%. Standing water had a frequency of 100% and total cover of about 4%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3465: *Populus tremuloides*-*Pinus contorta*/*Salix (lemmonii)* species Forest/Woodland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Populus tremuloides	100	29	29	29	100	33	33	33
Pinus contorta var. murrayana	100	12	12	12	100	16	16	16
Pinus contorta var. murrayana (dead)	100	11	11	11	100	11	11	11
Total tree		52				60		
Salix lemmonii	100	22	22	22	100	26	26	26
Total shrub		22				26		
Grass - other	100	10.7	10.7	10.7	100	44	44	44
Carex pellita	100	7.7	7.7	7.7	100	33.7	33.7	33.7
Scirpus species	P	P	P	P	100	4	4	4
Juncus articulatus	100	2.7	2.7	2.7	100	3.3	3.3	3.3
Aster species	100	1	1	1	100	2.7	2.7	2.7
Viola glabella	P	P	P	P	100	1	1	1
Achillea millefolium	P	P	P	P	100	0.7	0.7	0.7
Fragaria virginiana	P	P	P	P	100	0.7	0.7	0.7
Potentilla flabellifolia	T	T	T	T	100	T	T	T
Thalictrum species	T	T	T	T	100	T	T	T
Total herbaceous		22.1				90.1		
Total nonvascular		0				0		
Barren - litter	P	P	P	P	100	84	84	84
Barren - coarse woody debris	100	4	4	4	100	8	8	8
Barren - fine woody debris	P	P	P	P	100	4	4	4
Water	P	P	P	P	100	2	2	2
Water - shallow	P	P	P	P	100	2	2	2
Total other		4				100		
Totals		100.1				276.1		

Plant Association: *Arctostaphylos nevadensis* Shrubland

Plant Association Code: AN:shrub

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1980m to 2345m (6400' to 7700'). Aspects were variable but generally fell into a northeasterly to southwesterly direction on flat to steep slopes. Soils are characterized by a codominance of bare rock and fine gravelly soil, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes;" and "Cascadesprings gravelly ashy loamy coarse sand, 5 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's tree overstory was very sparse, with common species *Pinus jeffreyi*, *Pinus monticola*, and *Abies magnifica* observed at few sites with combined average tree cover of only 6%. The Key shrub component of this type is *Arctostaphylos nevadensis*, observed with frequency of 100% and average cover of 58%; cover estimates ranged from 20 to 82%. No other shrub species contributed significant cover to this type. No herbaceous associates were observed in this type and herbaceous cover was extremely sparse. Litter accumulation had a frequency of 100% and average total cover of 54%; cover estimates ranged from 17 to 80%. Bare rock and fine gravelly soil had a frequency of 100% and average total cover of 31%; cover estimates ranged from 8 to 73%. Duff, coarse woody debris, and fine woody debris also factored in the organic material found with average total cover of 8% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3800: *Arctostaphylos nevadensis* Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	33.3	2.6	8	8	33.3	2.7	8	8
Pinus monticola	33.3	1.3	4	4	33.3	1.3	4	4
Abies magnifica	33.3	1.3	4	4	33.3	1.3	4	4
Abies magnifica (dead)	33.3	0.7	2	2	33.3	0.7	2	2
Total tree		5.9				6		
Arctostaphylos nevadensis	100	58	20	82	100	60.3	20	86
Chrysolepis sempervirens	33.3	0.7	2	2	33.3	0.7	2	2
Total shrub		58.7				61		
Carex species	33.3	0.7	2	2	33.3	0.7	2	2
Eriogonum ursinum	33.3	0.7	2	2	33.3	0.7	2	2
Elymus elymoides	T	T	T	T	33.3	T	T	T
Cheilanthes gracillima	T	T	T	T	33.3	T	T	T
Eriogonum species	T	T	T	T	33.3	T	T	T
Penstemon newberryi	T	T	T	T	33.3	T	T	T
Total herbaceous		1.4				1.4		
Lichen	33.3	0.7	2	2	33.3	0.7	2	2
Total nonvascular		0.7				0.7		
Barren - litter	100	4.3	1	8	100	53.7	17	80
Barren - rock	100	16.6	2	46	100	23.3	4	60
Barren - fine gravelly soil	66.7	5.7	8	9	100	9	4	13
Barren - duff	100	3.7	2	7	100	5.3	1	11
Barren - coarse woody debris	33.3	0.3	1	1	66.7	1	1	2
Barren - gravel	33.3	2.7	8	8	33.3	2.7	8	8
Barren - fine woody debris	P	P	P	P	33.3	1.7	5	5
Total other		33.3				96.7		
Totals		100				165.8		

Plant Association: *Arctostaphylos nevadensis/Achnatherum occidentale-Elymus elymoides*-(Mix) Shrubland

Plant Association Code: AN:shrub/AoEe-(Mix):herb

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica - Pinus monticola / Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1980m to 2345m (6400' to 7700'). Aspects were variable but mostly of a westerly to southeasterly direction on gentle to moderate slopes. Soils are characterized by a mix of bare soil, fine gravel, and bare rock, such as found in the "Cascadesprings gravelly ashy loamy coarse sand, 5 to 30 percent slopes; Terracelake-Rock outcrop-Xeric Vitricryands, cirque floor, complex, 1 to 30 percent slopes;" and "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's tree overstory was very sparse, with common species *Pinus contorta* var. *murrayana*, *Pinus monticola*, and *Abies magnifica* observed with combined average tree cover of 4% on sites where they were found. The Key shrub component was *Arctostaphylos nevadensis*, with frequency of 100% and average cover of 53%; cover estimates ranged from 44 to 62%. Other shrubs observed were *Ceanothus velutinus*, *Ceanothus prostratus*, *Arctostaphylos patula*, and *Ericameria bloomeri*, with very sparse amounts of cover. Two Key herbaceous associates, *Elymus elymoides* and *Lupinus arbustus* had combined average cover of 6% on sites where they were found. All herbaceous cover averaged about 11% on sites where they were found. Litter accumulation had a frequency of 100% and average total cover of 60%. Bare soil had a frequency of 100% and average total cover of 14%; cover estimates ranged from 12 to 16%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 3870: *Arctostaphylos nevadensis/Achnatherum occidentale-Elymus elymoides*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	50	3	6	6	100	3	6	6
Pinus monticola	50	1	2	2	100	1	2	2
Abies magnifica	T	T	T	T	50	T	T	T
Total tree		4				4		
Arctostaphylos nevadensis	100	53	44	62	100	52.5	44	61
Ceanothus velutinus	50	1	2	2	50	1	2	2
Ceanothus prostratus	T	T	T	T	50	T	T	T
Arctostaphylos patula	T	T	T	T	50	T	T	T
Ericameria bloomeri	T	T	T	T	50	T	T	T
Total shrub		54				53.5		
Monardella odoratissima	T	T	T	T	100	T	T	T
Lupinus arbustus	50	4	8	8	50	7.5	15	15
Elymus elymoides	50	2	4	4	50	2.5	5	5
Phlox diffusa	50	2	4	4	50	2	4	4
Aster species	50	1	2	2	50	1	2	2
Gayophytum diffusum ssp. diffusum	50	1	2	2	50	1	2	2
Penstemon gracilentus	50	1	2	2	50	1	2	2
Grass - other	P	P	P	P	50	0.5	1	1
Eriogonum species	T	T	T	T	50	T	T	T
Eriogonum umbellatum	T	T	T	T	50	T	T	T
Penstemon species	T	T	T	T	50	T	T	T
Total herbaceous		11				15.5		
Total nonvascular		0				0		
Barren - litter	100	8	2	14	100	60	60	60
Barren - bare soil	100	11	8	14	100	14	12	16
Barren - rock	50	4	8	8	50	10	20	20
Barren - gravel	50	4	8	8	50	6	12	12
Barren - duff	50	1	2	2	50	4	8	8
Barren - fine gravelly soil	50	2	4	4	50	3	6	6
Barren - fine woody debris	50	1	2	2	50	1	2	2
Total other		31				98		
Totals		100				171		

Plant Association: *Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-
Holodiscus microphyllus Shrubland

Plant Association Code: AN-CS-HM:shrub

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at higher elevations from approximately 2425m to 2700m (8000' to 8900'). Aspects were variable, most frequently of a southerly direction, on gentle to steep slopes. Soils are characterized by a codominance of fine gravelly soil and bare rock, such as found in the "Xeric Vitricryands-Rock outcrop complex, 10 to 45 percent slopes" and "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's tree overstory was very sparse, with common species *Pinus jeffreyi*, *Pinus monticola*, *Tsuga mertensiana* and *Abies magnifica* observed as Traces at some of the sites. Combined tree cover was about 2% on sites where they were found. Shrub cover in this type was dense with combined cover of about 59%. Key shrubs observed in this type included *Arctostaphylos nevadensis*, *Chrysolepis sempervirens*, and *Holodiscus microphyllus* var. *glabrescens*. *Arctostaphylos nevadensis* had frequency of 100% and average cover of 26%; cover estimates ranged from 10 to 47%. *Chrysolepis sempervirens* had frequency of 100% and average cover of 13%; cover estimates ranged from 6 to 28%. *Holodiscus microphyllus* var. *glabrescens* had frequency of 100% and average cover of 8%; cover estimates ranged from 5 to 10%. Other shrubs observed included *Arctostaphylos patula*, *Leptodactylon pungens*, *Ericameria bloomeri*, and *Ceanothus velutinus*. The herbaceous understory was comprised of a mix of forbs; most common were *Penstemon newberryi*, *Eriogonum ursinum*, *Lupinus obtusilobus*, and *Angelica breweri*. Combined herbaceous cover averaged only 4%. Bare rock and fine gravelly soil comprised much of the surface layer with frequency of 100% and combined average total cover of 47%; cover estimates ranged from 28 to 62%. Litter accumulation had frequency of 100% and an average cover of about 40%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4200: *Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus* Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	33.3	0.7	2	2	66.7	0.7	2	2
Abies magnifica	33.3	0.7	2	2	66.7	0.7	2	2
Pinus monticola	33.3	0.3	1	1	66.7	0.3	1	1
Tsuga mertensiana	T	T	T	T	33.3	T	T	T
Total tree		1.7				1.7		
Arctostaphylos nevadensis	100	25.7	10	47	100	27.7	10	53
Chrysolepis sempervirens	100	13.3	6	28	100	13.3	6	28
Holodiscus microphyllus var. glabrescens	100	7.7	5	10	100	9	5	12
Arctostaphylos patula	66.7	2	2	4	66.7	2	2	4
Leptodactylon pungens	33.3	0.7	2	2	66.7	0.7	2	2
Ericameria bloomeri	33.3	5	15	15	33.3	5	15	15
Ceanothus velutinus	33.3	2	6	6	33.3	2	6	6
Ribes viscosissimum	33.3	2	6	6	33.3	2	6	6
Chrysothamnus nauseosus ssp. albicaulis	33.3	0.7	2	2	33.3	0.7	2	2
Total shrub		59.1				62.4		
Penstemon newberryi	66.7	1.7	1	4	100	1.3	1	3
Eriogonum ursinum	33.3	0.3	1	1	66.7	0.3	1	1
Lupinus obtusilobus	33.3	0.3	1	1	33.3	1.7	5	5
Angelica breweri	33.3	0.7	2	2	33.3	0.7	2	2
Eriogonum marifolium	33.3	0.7	2	2	33.3	0.7	2	2
Monardella odoratissima	33.3	0.3	1	1	33.3	0.3	1	1
Elymus elymoides	T	T	T	T	33.3	T	T	T
Arabis platysperma	T	T	T	T	33.3	T	T	T
Penstemon species	T	T	T	T	33.3	T	T	T
Polygonum shastense	T	T	T	T	33.3	T	T	T
Total herbaceous		4				5		
Lichen	66.7	5.3	4	12	66.7	5.7	5	12
Total nonvascular		5.3				5.7		
Barren - rock	100	17.3	6	40	100	30	18	40
Barren - fine gravelly soil	100	10	4	16	100	17.3	10	22
Barren - litter	P	P	P	P	100	40	40	40
Barren - bare soil	33.3	0.7	2	2	66.7	6.7	10	10
Barren - gravel	33.3	1.3	4	4	66.7	4	0	8
Barren - duff	33.3	0.7	2	2	33.3	2	6	6
Total other		30				100		
Totals		100.1				174.8		

Plant Association: *Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix)
Shrubland

Plant Association Code: AN-CS-HM:shrub/AoEe-(Mix):herb

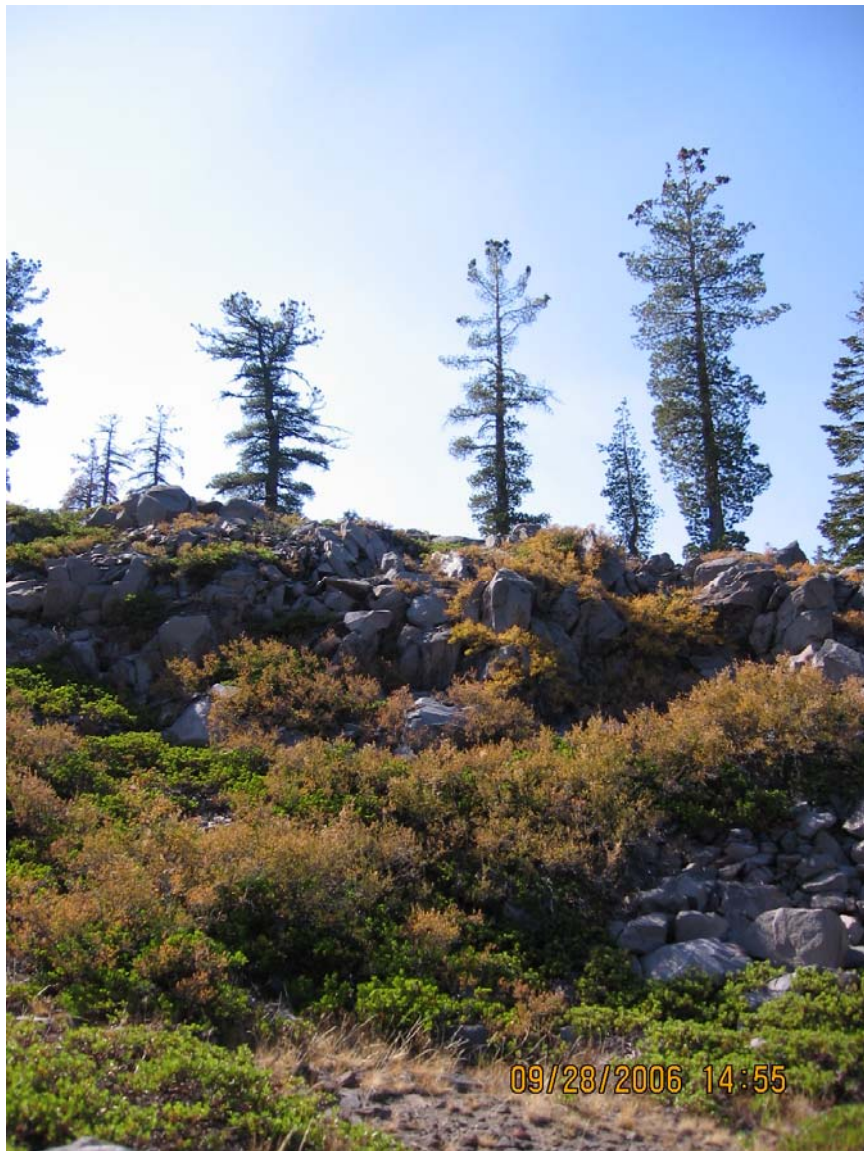
Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 2050m to 2275m (6700' to 7500'). Aspects were variable but most commonly of a northeasterly to easterly direction on gentle slopes. Soils are characterized by a codominance of bare rock and organic material, such as found in the "Bearrubble-Rubble land complex, 8 to 40 percent slopes" and "Vitrandic Cryorthents, debris flows, 10 to 80 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association's tree overstory was very sparse, with common species *Pinus monticola*, *Abies concolor* and *Abies magnifica* present as a Trace or with very low cover. Combined overstory tree cover was only about 6%. Shrub cover in this type was dense with combined cover of about 72%. Key shrub components of this type were *Arctostaphylos nevadensis*, *Chrysolepis sempervirens*, and *Holodiscus microphyllus* var. *glabrescens*. *Arctostaphylos nevadensis* was most abundant with frequency of 100% and cover of about 57%. *Chrysolepis sempervirens* had frequency of 100% and cover of about 10%. *Holodiscus microphyllus* var. *glabrescens* had frequency of 100% and cover of about 16%. Three Key herbaceous components of this type observed in the understory were *Achnatherum occidentale*, *Elymus elymoides*, and *Monardella odoratissima*; with frequency of 100% and combined cover of about 3%. All herbaceous cover was about 6% on sites where they were found. Litter accumulation had had frequency of 100% and total cover of about 54%. Bare soil and rock had frequency of 100% and total cover of about 40% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4270: *Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus*/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus monticola	100	4	4	4	100	4	4	4
Abies concolor	P	P	P	P	100	2	2	2
Abies magnifica	T	T	T	T	100	T	T	T
Total tree		4				6		
Arctostaphylos nevadensis	100	46	46	46	100	57	57	57
Holodiscus microphyllus var. g	100	16	16	16	100	18	18	18
Chrysolepis sempervirens	100	10	10	10	100	10	10	10
Total shrub		72				85		
Elymus elymoides	100	1	1	1	100	2	2	2
Penstemon newberryi	100	2	2	2	100	2	2	2
Achnatherum occidentale	100	1	1	1	100	1	1	1
Carex species	100	1	1	1	100	1	1	1
Monardella odoratissima	100	1	1	1	100	1	1	1
Grass - other	T	T	T	T	100	T	T	T
Calochortus species	T	T	T	T	100	T	T	T
Cheilanthes gracillima	T	T	T	T	100	T	T	T
Gilia leptalea	T	T	T	T	100	T	T	T
Phlox diffusa	T	T	T	T	100	T	T	T
Total herbaceous		6				7		
Total nonvascular		0				0		
Barren - litter	100	4	4	4	100	54	54	54
Barren - rock	100	10	10	10	100	30	30	30
Barren - bare soil	100	4	4	4	100	10	10	10
Barren - fine woody debris	P	P	P	P	100	6	6	6
Total other		18				100		
Totals		100				198		

Plant Association: *Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-
Holodiscus microphyllus/*Lupinus obtusilobus*-*Polygonum davisiae*
Shrubland

Plant Association Code: AN-CS-HM:shrub/LoPd:herb

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, quite rocky sites within Lassen Volcanic National Park at elevations from approximately 2425m to 2700m (8000' to 8900'). Aspects were of a southeasterly direction on gentle to steep slopes. Soils are characterized by a codominance of bare rock and fine gravelly soil, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association's tree overstory was very sparse, with only *Abies magnifica* observed having cover of about 2%. Combined shrub cover in this type was about 40%. Key shrub components of this type included *Arctostaphylos nevadensis*, *Chrysolepis sempervirens*, and *Holodiscus microphyllus* var. *glabrescens*. *Arctostaphylos nevadensis* had frequency of 100% and cover of about 22%. *Chrysolepis sempervirens* had frequency of 100% and cover of about 11%. *Holodiscus microphyllus* var. *glabrescens* had frequency of 100% and cover of about 3%. *Phyllodoce breweri* was also observed having cover of about 4%. Key herbaceous components observed in the understory were *Lupinus obtusilobus* and *Polygonum davisiae*. *Lupinus obtusilobus* was about 10%. Bare rock, gravel, and bare soils comprised about 74% of total surface cover. Litter accumulation had total surface cover of about 26%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4271: *Arctostaphylos nevadensis*-*Chrysolepis sempervirens*-*Holodiscus microphyllus*/*Lupinus obtusilobus*-*Polygonum davisiae* Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Abies magnifica</i>	100	2	2	2	100	2	2	2
Total tree		2				2		
<i>Arctostaphylos nevadensis</i>	100	22	22	22	100	24	24	24
<i>Chrysolepis sempervirens</i>	100	11	11	11	100	11	11	11
<i>Phyllodoce breweri</i>	100	4	4	4	100	4	4	4
<i>Holodiscus microphyllus</i> var. g	100	3	3	3	100	3	3	3
Total shrub		40				42		
<i>Lupinus obtusilobus</i>	100	10	10	10	100	10	10	10
<i>Calyptridium umbellatum</i>	T	T	T	T	100	T	T	T
<i>Cryptogramma cascadenis</i>	T	T	T	T	100	T	T	T
<i>Polygonum shastense</i>	T	T	T	T	100	T	T	T
Total herbaceous		10				10		
Total nonvascular		0				0		
Barren - rock	100	32	32	32	100	50	50	50
Barren - litter	100	2	2	2	100	26	26	26
Barren - gravel	100	4	4	4	100	12	12	12
Barren - fine gravelly soil	100	8	8	8	100	10	10	10
Barren - bare soil	100	2	2	2	100	2	2	2
Total other		48				100		
Totals		100				154		

Plant Association: *Arctostaphylos nevadensis*-Mix Shrubland

Plant Association Code: AN-Mix:shrub

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 5

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEG008615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky sites within Lassen Volcanic National Park at elevations from approximately 1830m to 2375m (6000' to 7800'). Aspects were variable but most commonly of a westerly to northeasterly direction on gentle to moderately steep slopes. Soils were varied, including bare soil, fine gravelly soil, and bare rock, accompanied by a high amount of organic material, such as found in the "Xeric Vitricryands complex, 10 to 80 percent slopes; Scoured very bouldery medial loamy sand, 2 to 30 percent slopes;" and "Berrubble-Rubble land complex, 8 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's tree overstory was very sparse, with very small amounts of cover of *Abies magnifica*, *Pinus monticola*, *Abies concolor*, *Pinus contorta* var. *murrayana*, and *Pinus jeffreyi* observed. Combined tree cover was only about 5% on sites where they were found. Combined shrub cover in this type was about 70%. The Key shrub species in this type was *Arctostaphylos nevadensis* with frequency of 100% and average cover of 42%; cover estimates ranged from 18 to 58%. *Arctostaphylos patula* had frequency of 100% and average cover of 21%; cover estimates ranged from 9 to 46%. Other common shrubs observed in this type included *Ceanothus velutinus*, *Ribes roezlii*, and *Chrysolepis sempervirens*, with combined average cover of about 6% on sites where they were found. A mix of fourteen perennial forbs and grasses made up the sparse herbaceous understory with a combined cover of only about 2%. Litter accumulation had a frequency of 100% and average total cover of 65%; cover estimates ranged from 21 to 90%. Duff, fine woody debris, and coarse woody debris also factored in the organic material found with average total cover of about 15% on sites where they were found. Bare soil had a frequency of 100% and average total cover of about 9%; cover estimates ranged from 2 to 20% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Table 4300: *Arctostaphylos nevadensis*-Mix Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies magnifica</i>	40	1	2	3	80	1.4	2	3
<i>Pinus monticola</i>	60	1.8	2	4	60	1.8	2	4
<i>Abies concolor</i>	40	0.8	2	2	60	1.4	2	3.1
<i>Pinus contorta</i> var. <i>murrayana</i>	40	0.8	2	2	60	0.8	2	2
<i>Pinus jeffreyi</i>	T	T	T	T	40	T	T	T
<i>Pinus monticola</i> (dead)	20	0.4	2	2	20	0.4	2	2
Total tree		4.8				5.8		
<i>Arctostaphylos nevadensis</i>	100	42.4	18	58	100	59.6	20	88
<i>Arctostaphylos patula</i>	100	21.4	9	46	100	23.8	8.5	46
<i>Ceanothus velutinus</i>	40	4.1	2	18.4	40	3.9	2	17.3
<i>Ribes roezlii</i>	20	0.8	4	4	20	0.8	4	4
<i>Chrysolepis sempervirens</i>	20	0.8	4.1	4.1	20	0.8	4.1	4.1
<i>Ceanothus prostratus</i>	20	0.2	1	1	20	0.4	2	2
<i>Quercus vaccinifolia</i>	P	P	P	P	20	0.1	0.5	0.5
Total shrub		69.7				89.4		
<i>Elymus elymoides</i>	20	0.2	1	1	80	1	1	2
<i>Achnatherum occidentale</i>	20	0.2	1	1	60	0.4	1	1
<i>Penstemon</i> species	T	T	T	T	60	T	T	T
<i>Lupinus arbustus</i>	20	0.6	3	3	20	2.2	11	11
Grass - other	P	P	P	P	20	0.4	2	2
<i>Penstemon gracilentus</i>	20	0.1	0.5	0.5	20	0.3	1.5	1.5
<i>Carex</i> species	20	0.2	1	1	20	0.2	1	1
<i>Allium</i> species	20	0.2	1	1	20	0.2	1	1
<i>Aster</i> species	T	T	T	T	20	T	T	T
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	T	T	T	T	20	T	T	T
<i>Gilia leptalea</i>	T	T	T	T	20	T	T	T
<i>Lupinus</i> species	T	T	T	T	20	T	T	T
<i>Phlox</i> species	T	T	T	T	20	T	T	T
<i>Phlox diffusa</i>	T	T	T	T	20	T	T	T
Total herbaceous		1.5				4.7		
Total nonvascular		0				0		
Barren - litter	80	5	2	11	100	64.9	21	90
Barren - bare soil	80	6.8	2	16	100	9	2	20
Barren - duff	40	6.4	10	22	80	9	2	28
Barren - fine woody debris	20	1.6	8	8	80	5.6	3	12.2
Barren - fine gravelly soil	40	3.2	4	12	40	4.4	6	16
Barren - coarse woody debris	20	0.2	1	1	40	0.6	1	2
Barren - rock	20	0.8	4.1	4.1	20	3.3	16.3	16.3
Total other		24				96.8		
Totals		100				196.7		

Variants of this Association: AN-Mix:shrub
AN-AP:shrub

Plant Association: *Arctostaphylos nevadensis*-Mix/*Achnatherum occidentale*-
Elymus elymoides-(Mix) Shrubland

Plant Association Code: AN-Mix:shrub/AoEe-(Mix):herb

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry sites within Lassen Volcanic National Park at elevations from approximately 1850m to 2375m (6100' to 7800'). Aspects were variable on gentle to moderate slopes. Soils are characterized by a dominance of organic material over a mix of bare soil and fine gravelly soil, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" and "Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association's tree overstory was very sparse, with small amounts of *Pinus jeffreyi*, *Pinus contorta* var. *murrayana*, *Pinus monticola*, *Abies magnifica*, *Abies concolor*, and *Calocedrus decurrens* observed. Combined overstory tree cover was only about 4% on sites where they were found. Combined shrub cover in this type was about 60%. The Key shrub species in this type was *Arctostaphylos nevadensis* observed with frequency of 100% and average cover of 33%; cover estimates ranged from 15 to 75%. Other common shrubs were observed with frequencies of 50% or less included *Arctostaphylos patula*, *Ceanothus cordulatus*, *Ceanothus velutinus*, *Ribes cereum*, and *Ribes roezlii* accounted for the remaining average cover of 27%. Two Key herbaceous components of this type observed in the understory were *Achnatherum occidentale* and *Elymus elymoides*, each with a frequency of 50% and combined average cover of 13% on sites where they were found. Total herbaceous cover was about 17% on sites where they were found. Litter accumulation had a frequency of 100% and average total cover of about 48%; cover estimates ranged from 28 to 64%. Duff, fine woody debris, and coarse woody debris also factored in the organic material found with total cover of about 20% on sites where they were found. Bare soil, fine gravelly soil, and rock had total cover of about 26% of the ground surface on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Table 4370: *Arctostaphylos nevadensis*-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	50	2.5	2	8	50	2.5	2	8
Pinus contorta var. murrayana	T	T	T	T	50	T	T	T
Pinus monticola	25	0.5	2	2	25	0.5	2	2
Abies magnifica	25	0.5	2	2	25	0.5	2	2
Abies concolor	T	T	T	T	25	T	T	T
Calocedrus decurrens	T	T	T	T	25	T	T	T
Total tree		3.5				3.5		
Arctostaphylos nevadensis	100	33.1	14.7	75	100	36.9	19.6	77
Arctostaphylos patula	50	6.3	8	17	75	8.5	11	23
Ceanothus cordulatus	50	14.2	9	48	50	14	9	47
Ceanothus velutinus	50	3	2	10	50	3	2	10
Ribes cereum	50	1	2	2	50	1	2	2
Ribes roezlii	25	2	7.8	7.8	25	2	7.8	7.8
Total shrub		59.6				65.4		
Elymus elymoides	50	4.9	2	17.6	75	6.7	4	18.6
Achnatherum occidentale	50	8	6	26	50	12	10	38
Penstemon gracilentus	25	0.3	1	1	50	0.3	1	1
Carex species	25	0.8	3	3	25	2	8	8
Achnatherum species	25	1.3	5	5	25	1.5	6	6
Monardella odoratissima	25	0.8	3	3	25	0.8	3	3
Grass - other	25	0.7	2.9	2.9	25	0.7	2.9	2.9
Allium species	T	T	T	T	25	T	T	T
Aster species	T	T	T	T	25	T	T	T
Total herbaceous		16.8				24		
Total nonvascular		0				0		
Barren - litter	75	4.3	2	9.8	100	47.8	28.4	64
Barren - bare soil	100	4	2	6	100	18	9.8	26
Barren - fine woody debris	50	1	2	2	100	7.7	2	21
Barren - fine gravelly soil	50	2	2	5.9	75	4.9	4	9.8
Barren - duff	50	4.8	2	17.6	50	9.1	4	32.4
Barren - coarse woody debris	50	3	5.9	6	50	3.5	6	7.8
Barren - rock	25	1	4	4	50	2.5	4	6
Total other		20.1				93.5		
Totals		100				186.4		

Plant Association: *Arctostaphylos nevadensis*-Mix/Dry Mixed Herbaceous Shrubland

Plant Association Code: AN-Mix:shrub/HDX:herb

Alliance: *Arctostaphylos nevadensis* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

It has partially been described as part of a somewhat similar association, *Abies magnifica* - *Pinus monticola* / *Arctostaphylos nevadensis* Forest (1.B.2.Nd - CEGLO08615), on both the east and west sides of the central and southern Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky sites on upper slopes within and near Lassen Volcanic National Park at elevations from approximately 1900m to 2275m (6200' to 7500'). Aspects were variable on gentle to moderate slopes. Soils are characterized by a dominance of organic material over a mix of bare soil and fragmented rock, such as found in the "Rock Outcrop-Rubble Land complex; Scoured very bouldery medial loamy sand, 2 to 30 percent slopes" and "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

No tree overstory Traces or components were observed in this association. The Key shrub species observed in this type was the indicator species *Arctostaphylos nevadensis* with 100% frequency and cover of about 2%. Other common shrubs observed with 100% frequency in this type included *Arctostaphylos patula* and *Ceanothus prostratus* with cover of about 58% and 6% respectively. Combined herbaceous cover was about 18% of which 16% of that cover was comprised of non-Key "other" grasses. Litter accumulation had a frequency of 100% and average total cover of about 32%. Fine woody debris comprised the organic material found with frequency of 100% and total cover of about 8%. Bare soil and rock had frequency of 100% and total cover of about 46% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Table 4379: *Arctostaphylos nevadensis*-Mix/Dry Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Arctostaphylos patula	100	58	58	58	100	58	58	58
Ceanothus prostratus	100	6	6	6	100	14	14	14
Arctostaphylos nevadensis	100	2	2	2	100	2	2	2
Total shrub		66				74		
Grass - other	100	16	16	16	100	23	23	23
Penstemon gracilentus	100	2	2	2	100	14	14	14
Phlox diffusa	P	P	P	P	100	1	1	1
Total herbaceous		18				38		
Total nonvascular		0				0		
Barren - bare soil	100	12	12	12	100	38	38	38
Barren - litter	P	P	P	P	100	32	32	32
Barren - rock	100	4	4	4	100	8	8	8
Barren - fine woody debris	P	P	P	P	100	8	8	8
Total other		16				86		
Totals		100				198		

Plant Association: *Arctostaphylos patula* Shrubland

Plant Association Code: AP:shrub

Alliance: *Arctostaphylos patula* Shrubland

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Arctostaphylos patula* Sierran Chaparral Shrubland (2.B.2.Nd - CEGLO05280), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry, rocky sites on upper slopes within and near Lassen Volcanic National Park at elevations from approximately 1775m to 2100m (5800' to 6900'). Aspects were variable, but often on more westerly aspects from south to north on gentle to moderately steep slopes. Soils are characterized by a dominance of organic material over a mix of fine gravelly soil and fragmented rock, such as found in the "Lithic Xerumbrepts-Rock Outcrop-Rubble Land association, 15 to 50 percent slopes" and "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Arctostaphylos patula* observed with frequency of 100% and average cover of 91%; cover estimates ranged from 85 to 98%. Other shrubs observed with frequency of 25% in this type included *Ceanothus velutinus* and *Chrysolepis sempervirens*. This association's tree overstory was very sparse, with combined average cover of less than 2%; cover estimates were about 7% on the site where they were found. Tree species observed included *Pinus jeffreyi*, *Abies concolor*, *Cercocarpus ledifolius*, *Pinus contorta* var. *murrayana*, and *Abies magnifica*. The herbaceous understory was even sparser with average cover of less than 1% and absent of any Key indicator species. Litter accumulation had a frequency of 100% and an average total cover of about 50%; cover estimates ranged from 4 to 100% on sites where it was found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4400: *Arctostaphylos patula* Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Pinus jeffreyi</i>	25	0.3	1	1	50	0.1	0.5	0.5
<i>Abies concolor</i>	25	1.2	5	5	25	0.4	1.7	1.7
<i>Cercocarpus ledifolius</i>	25	0.3	1	1	25	0.1	0.5	0.5
<i>Pinus contorta</i> var. <i>murrayana</i>	T	T	T	T	25	T	T	T
<i>Abies magnifica</i>	T	T	T	T	25	T	T	T
Total tree		1.8				0.6		
<i>Arctostaphylos patula</i>	100	91	85	98	100	92.7	88.3	98
<i>Ceanothus velutinus</i>	25	0.8	3	3	50	1.2	1.5	3.3
<i>Chrysolepis sempervirens</i>	25	1.3	5	5	25	0.4	1.7	1.7
Total shrub		93.1				94.3		
<i>Kelloggia galioides</i>	25	0.3	1	1	25	0.3	1	1
Total herbaceous		0.3				0.3		
Total nonvascular		0				0		
Barren - litter	75	3	2	6	100	50	4	100
Barren - fine gravelly soil	25	1.3	5	5	25	1.3	5	5
Barren - rock	25	0.3	1	1	25	0.3	1	1
Barren - bare soil	25	0.3	1	1	25	0.3	1	1
Total other		4.9				51.9		
Totals		100.1				147.1		

Plant Association: *Arctostaphylos patula*–Mix Shrubland

Plant Association Code: AP-Mix:shrub

Alliance: *Arctostaphylos patula* Shrubland

Number of sites: 14

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Arctostaphylos patula* Sierran Chaparral Shrubland (2.B.2.Nd - CEG005280), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry, rocky sites on upper slopes within and near Lassen Volcanic National Park at elevations from approximately 1675m to 2450m (5500' to 8000'). Aspects were variable but most commonly of a southeasterly to southwesterly direction on flat to moderately steep slopes. Soils are characterized by a dominance of organic material over a mix of fine gravelly soil, bare soil and fragmented rock, such as found in the "Lithic Humic Haploxerands-Typic Haploxerands-Bearrubble-Rubble land complex, 5 to 40 percent slopes; Sheld family, moderately deep-Lithic Xerumbrepts association, 0 to 35 percent slopes" and "Xeric Vitricryands complex, 10 to 80 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Arctostaphylos patula* observed with 100% frequency and average cover of about 59%; cover estimates ranged from 27 to 84%. Other shrub cover comprised more than 10% of the shrub composition resulting in a mixed shrub type. *Ceanothus velutinus* and *Chrysolepis sempervirens* were the other Key shrub components of this type, averaging about 17 and 15% cover, respectively on sites where they were found. Combined cover of all shrubs was about 93%, of which 2% was comprised of non-Key shrubs. This association's tree overstory was very sparse, with small amounts of cover of *Pinus jeffreyi*, *Abies concolor*, *Pinus monticola*, *Abies magnifica*, *Tsuga mertensiana*, and *Calocedrus decurrens* observed. Combined cover of tree overstory was about 2%. The herbaceous understory in this type was very sparse, with average cover of less than 1% and absent of any indicator species. Litter accumulation had a frequency of 100% and average total cover of about 85%. There was little organic matter present and the remainder of the ground surface condition was comprised of bare soils and rock, which accounted for a combined average total cover of about 6% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4900: *Arctostaphylos patula*–Mix Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	42.9	1.7	2	8	85.7	1.6	2	8
Abies concolor	14.3	0.2	1	2	50	0.4	1	2.5
Pinus monticola	7.1	0.3	4	4	28.6	0.3	4	4
Abies magnifica	T	T	T	T	28.6	T	T	T
Tsuga mertensiana	T	T	T	T	7.1	T	T	T
Calocedrus decurrens	T	T	T	T	7.1	T	T	T
Total tree		2.2				2.3		
Arctostaphylos patula	100	58.9	27.3	84	100	58.7	18.9	85.3
Ceanothus velutinus	92.9	16.8	9.1	60	92.9	16.8	9.3	60
Chrysolepis sempervirens	57.1	15	2	63.6	64.3	15.6	0.7	66.7
Prunus emarginata	14.3	0.9	4	8	35.7	1	1.9	8
Purshia tridentata	7.1	0.4	5	5	21.4	0.5	1.3	6
Ribes viscosissimum	7.1	0.4	5	5	21.4	0.4	1	4
Chrysothamnus nauseosus ssp. albicaulis	7.1	0.1	2	2	21.4	0.3	2	2
Ceanothus prostratus	7.1	0.1	2	2	14.3	0.9	2	10
Holodiscus microphyllus var. glabrescens	7.1	0.1	2	2	14.3	0.3	3.7	3.7
Ericameria bloomeri	T	T	T	T	14.3	0.3	4	4
Arctostaphylos nevadensis	P	P	P	P	7.1	0.4	5	5
Spiraea splendens	7.1	0.1	1	1	7.1	0.1	2	2
Alnus incana	T	T	T	T	7.1	T	T	T
Quercus vaccinifolia	T	T	T	T	7.1	T	T	T
Leptodactylon pungens	T	T	T	T	7.1	T	T	T
Symphoricarpos rotundifolius var. rotundifolius	T	T	T	T	7.1	T	T	T
Total shrub		92.8				95.3		
Monardella odoratissima	T	T	T	T	14.3	T	T	T
Achnatherum occidentale	P	P	P	P	7.1	0.1	2	2
Eriogonum umbellatum	7.1	0.1	2	2	7.1	0.1	2	2
Carex species	T	T	T	T	7.1	T	T	T
Eriogonum species	T	T	T	T	7.1	T	T	T
Linanthus harknessii	T	T	T	T	7.1	T	T	T
Lupinus obtusilobus	T	T	T	T	7.1	T	T	T
Penstemon rydbergii var. oreocharis	T	T	T	T	7.1	T	T	T
Herbaceous - other	T	T	T	T	7.1	T	T	T
Total herbaceous		0.1				0.2		
Lichen	7.1	0.1	2	2	7.1	0.1	2	2
Total nonvascular		0.1				0.1		
Barren - litter	50	2.6	2	10	100	85.4	10	100
Barren - rock	7.1	0.4	6	6	28.6	2.3	2	22
Barren - bare soil	14.3	0.4	2	4	28.6	1.3	2	10
Barren - fine gravelly soil	21.4	1.1	5	6	21.4	1.9	5	12
Barren - fine woody debris	7.1	0.1	2	2	14.3	0.4	2	4
Barren - gravel	P	P	P	P	7.1	0.4	5	5
Barren - sand	7.1	0.1	2	2	7.1	0.4	6	6
Total other		4.7				92.1		
Totals		99.9				190		

Plant Association: *Arctostaphylos patula*-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Plant Association Code: AP-Mix:shrub/AoEe-(Mix):herb

Alliance: *Arctostaphylos patula* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Arctostaphylos patula* Sierran Chaparral Shrubland (2.B.2.Nd - CEG005280), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry sites within and near Lassen Volcanic National Park at elevations from approximately 1675m to 2450m (5500' to 8000'). Aspects were generally in an eastern direction on flat to gentle slopes. Soils are characterized by a codominance of organic material and bare soil, such as found in the "Typic Xerorthents-Yallani family association, 35 to 50 percent slopes" 2011 LAVO and 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this shrub type was the indicator species *Arctostaphylos patula* observed with 100% frequency and cover of about 6%. Other common shrubs observed in this mixed type included *Ribes cereum*, *Ericameria bloomeri*, *Ceanothus velutinus*, *Ribes roezlii*, and *Arctostaphylos nevadensis*. Total combined shrub cover in this type was about 26%. This association's tree overstory was very sparse, with small amounts of cover of *Pinus jeffreyi*, *Abies magnifica*, and *Pinus contorta* var. *murrayana* observed. Overstory tree cover was about 4%. One Key indicator species observed in the herbaceous understory was *Elymus elymoides* observed with frequency of 100% and about 18% cover. Combined total herbaceous cover was about 24%. Litter accumulation had frequency of 100% and total cover of about 50%. Fine gravelly soil was the most common ground surface under the organic material with frequency of 100% and total cover of about 36%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4970: *Arctostaphylos patula*-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	100	2	2	2	100	2	2	2
Abies magnifica	100	2	2	2	100	2	2	2
Pinus contorta var. murrayana	T	T	T	T	100	T	T	T
Total tree		4				4		
Ribes cereum	100	18	18	18	100	18	18	18
Arctostaphylos patula	100	6	6	6	100	6	6	6
Ericameria bloomeri	100	2	2	2	100	2	2	2
Ceanothus velutinus	T	T	T	T	100	T	T	T
Ribes roezlii	T	T	T	T	100	T	T	T
Arctostaphylos nevadensis	T	T	T	T	100	T	T	T
Total shrub		26				26		
Elymus elymoides	100	18	18	18	100	22	22	22
Gayophytum diffusum ssp. diffusum	100	4	4	4	100	4	4	4
Penstemon species	100	2	2	2	100	2	2	2
Total herbaceous		24				28		
Total nonvascular		0				0		
Barren - litter	100	26	26	26	100	50	50	50
Barren - fine gravelly soil	100	18	18	18	100	36	36	36
Barren - rock	100	2	2	2	100	2	2	2
Barren - bare soil	P	P	P	P	100	2	2	2
Total other		46				90		
Totals		100				148		

Plant Association: *Arctostaphylos patula*-Mix/Dry Mixed Herbaceous Shrubland

Plant Association Code: AP-Mix:shrub/HDX:herb

Alliance: *Arctostaphylos patula* Shrubland

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Arctostaphylos patula* Sierran Chaparral Shrubland (2.B.2.Nd - CEG005280), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry, rocky sites on upper slopes within and near Lassen Volcanic National Park at elevations from approximately 1675m to 2450m (5500' to 8000'). Aspects were variable but most commonly of a southerly direction on gentle slopes. Soils are characterized by a dominance of fine gravelly soil, along with large amounts of organic material, such as found in the "Scoured-Juniperlake-Rock outcrop complex, 3 to 40 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Arctostaphylos patula* observed with frequency of 100% and cover of about 12%; cover estimates ranged from 11 to 12%. *Ceanothus velutinus* was also a Key shrub component of this type with 100% frequency and average cover of about 23%. Other common shrubs observed were *Ceanothus cordulatus*, *Chrysolepis sempervirens*, and *Quercus vacciniifolia*. Average total shrub cover was about 47%. This association's tree overstory was very sparse, with only *Abies concolor* observed as a Trace species. Total herbaceous cover was about 42%, of which 41% was comprised of the non-Key species, *Nama lobbii*; cover estimates ranged from 29 to 53%. Fine gravelly soil had frequency of 100% and average total cover of about 72%; cover estimates ranged from 66 to 78%. Litter accumulation had frequency of 100% and an average total cover of about 17%; cover estimates ranged from 14 to 20%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 4979: *Arctostaphylos patula*-Mix/Dry Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Abies concolor</i>	T	T	T	T	100	T	T	T
Total tree		0				0		
<i>Ceanothus velutinus</i>	100	23	23	23	100	21.5	21	22
<i>Arctostaphylos patula</i>	100	11.5	11	12	100	16	13	19
<i>Ceanothus cordulatus</i>	100	8	2	14	100	8	2	14
<i>Chrysolepis sempervirens</i>	100	3.5	2	5	100	3.5	2	5
<i>Quercus vacciniifolia</i>	50	1	2	2	50	1	2	2
Total shrub		47				50		
<i>Nama lobbii</i>	100	41	29	53	100	59	45	73
<i>Carex whitneyi</i>	50	0.5	1	1	100	0.5	1	1
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	50	0.5	1	1	50	0.5	1	1
<i>Carex</i> species	T	T	T	T	50	T	T	T
<i>Apocynum androsaemifolium</i>	T	T	T	T	50	T	T	T
Total herbaceous		42				60		
Total nonvascular		0				0		
Barren - fine gravelly soil	100	7	2	12	100	72	66	78
Barren - litter	P	P	P	P	100	17	14	20
Barren - coarse woody debris	50	1	2	2	100	2	2	2
Barren - duff	50	1	2	2	100	2	2	2
Barren - rock	50	2	4	4	50	2	4	4
Barren - bare soil	P	P	P	P	50	2	4	4
Barren - organic ash	P	P	P	P	50	1	2	2
Total other		11				98		
Totals		100				208		

Plant Association: *Quercus vaccinifolia*-Mix Shrubland

Plant Association Code: QV-Mix:shrub

Alliance: *Quercus vaccinifolia* Shrubland

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Quercus vaccinifolia* - *Arctostaphylos patula* Shrubland (2.B.2.Nd - CEGLO08697), has been identified in California.



Environmental Characteristics

This association was typically found on dry, rocky sites on upper slopes within and near Lassen Volcanic National Park at elevations from approximately 1725m to 2125m (5700' to 7000'). Aspects were somewhat variable but most commonly of a southerly direction on moderate to moderately steep slopes. Soils are characterized by a codominance of fine gravelly soil and fragmented rock, along with large amounts of organic material, such as found in the "Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" and "Barrubble-Rubble land complex, 8 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Quercus vaccinifolia* observed with frequency of 100% and average cover of 30%; cover estimates ranged from 20 to 45%. Other common indicator shrubs observed with frequency of 75% or less included *Arctostaphylos patula*, *Ceanothus prostratus*, *Ceanothus velutinus*, *Chrysolepis sempervirens* and *Arctostaphylos nevadensis*. Total average shrub cover was about 74%. This association's tree overstory was very sparse with frequency of 50% or less. *Abies concolor*, *Pinus jeffreyi*, *Pinus monticola*, *Pinus contorta* var. *murrayana*, *Abies magnifica*, *Pinus lambertiana*, and *Calocedrus decurrens* were observed. Total average tree overstory cover was about 3%; tree cover estimates ranged from 6 to 12% on sites where they were found. The herbaceous understory in this type was very sparse and absent of any indicator species. Total herbaceous cover averaged less than 1% and no individual species observation exceeded 1% on sites where they were found. Bare fragmented rock was the dominant surface layer with frequency of 100% and average total cover of about 22%; cover estimates ranged from 2 to 70%. Litter accumulation had frequency of 75% and average total cover of about 62%; cover estimates ranged from 80 to 86% on sites on where it was observed. Very little woody debris was present on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5400: *Quercus vaccinifolia*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Abies concolor	50	1.6	0.5	6	75	1.6	0.5	6
Pinus Jeffreyi	25	0.3	1	1	75	0.3	1	1
Pinus monticola	25	0.7	3	3	25	0.8	3	3
Pinus contorta var. murrayana	25	0.3	1	1	25	0.3	1	1
Abies magnifica	25	0.3	1	1	25	0.3	1	1
Pinus lambertiana	T	T	T	T	25	T	T	T
Calocedrus decurrens	T	T	T	T	25	T	T	T
Total tree		3.2				3.3		
Quercus vaccinifolia	100	30	20	45	100	35.9	25	55
Arctostaphylos patula	75	23	7.5	60	75	19	7.5	48.3
Ceanothus prostratus	50	2.8	5	6	50	6.3	5	20
Ceanothus velutinus	50	2.3	4	5	50	2.3	4	5
Chrysolepis sempervirens	50	0.8	1	2	50	2	1	7
Arctostaphylos nevadensis	25	12.2	49	49	25	19	76	76
Prunus emarginata	25	2.5	10	10	25	1.3	5	5
Holodiscus microphyllus var. glabrescens	25	0.8	3	3	25	0.8	3	3
Ceanothus cordulatus	T	T	T	T	25	T	T	T
Ribes cereum	T	T	T	T	25	T	T	T
Total shrub		74.4				86.6		
Penstemon species	25	0.1	0.5	0.5	50	0.3	1	1
Elymus elymoides	25	0.1	0.5	0.5	25	0.3	1	1
Achnatherum occidentale	25	0.3	1	1	25	0.3	1	1
Carex species	25	0.3	1	1	25	0.3	1	1
Rush - other	T	T	T	T	25	T	T	T
Total herbaceous		0.8				1.2		
Lichen	25	8.7	35	35	25	8.8	35	35
Total nonvascular		8.7				8.8		
Barren - rock	25	8.7	35	35	100	21.8	2	70
Barren - litter	25	0.5	2	2	75	62.3	80	86
Barren - fine gravelly soil	50	3	2	10	50	4.3	2	15
Barren - fine woody debris	25	0.5	2	2	50	1.3	1	4
Barren - bare soil	25	0.3	1	1	50	1	2	2
Barren - coarse woody debris	P	P	P	P	25	0.5	2	2
Total other		13				91.2		
Totals		100.1				191.1		

Plant Association: *Quercus vaccinifolia*-Mix/Dry Mixed Herbaceous Shrubland

Plant Association Code: QV-Mix:shrub/HDX:herb

Alliance: *Quercus vaccinifolia* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Quercus vaccinifolia* - *Arctostaphylos patula* Shrubland (2.B.2.Nd - CEGLO08697), has been identified in California.



Environmental Characteristics

This association was typically found on dry, rocky sites on upper slopes within Lassen Volcanic National Park at elevations from approximately 1725m to 2125m (5700' to 7000'). Aspects were somewhat variable but most commonly of a southerly direction on moderate to moderately steep slopes. Soils are characterized by a codominance of fine gravelly soil and fragmented rock, along with large amounts of organic material, such as found in the "Kingsiron-Dittmar-Rock outcrop complex, 20 to 80 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Quercus vacciniifolia* observed with frequency of 100% and cover of about 30%. Other common indicator shrubs observed in this type included *Arctostaphylos patula* with cover of about 26%, and *Ceanothus prostratus*, and *Ceanothus velutinus*, both with a cover of about 2%. Total average shrub cover was about 60%. This association's tree overstory was very sparse, with small amounts of cover of *Abies concolor*, *Pinus jeffreyi*, and *Pinus monticola* observed. Total tree overstory cover was about 4% and was mainly *Abies concolor*. Total combined herbaceous cover was about 8% of which 6% was comprised of the non-Key species, *Nama lobbii*. Fine gravelly soil was the dominant surface layer with frequency of 100% and total cover of about 48%. Litter accumulation had frequency of 100% and total cover of about 38%. Rock had frequency of 100% and cover of about 10% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5479: *Quercus vacciniifolia*-Mixed/Dry Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
<i>Abies concolor</i>	100	4	4	4	100	4	4	4
<i>Pinus jeffreyi</i>	T	T	T	T	100	T	T	T
<i>Pinus monticola</i>	T	T	T	T	100	T	T	T
Total tree		4				4		
<i>Quercus vacciniifolia</i>	100	30	30	30	100	32	32	32
<i>Arctostaphylos patula</i>	100	26	26	26	100	26	26	26
<i>Ceanothus prostratus</i>	100	2	2	2	100	12	12	12
<i>Ceanothus velutinus</i>	100	2	2	2	100	2	2	2
Total shrub		60				72		
<i>Nama lobbii</i>	100	6	6	6	100	8	8	8
<i>Achnatherum occidentale</i>	100	2	2	2	100	2	2	2
<i>Carex brainerdii</i>	T	T	T	T	100	T	T	T
<i>Apocynum androsaemifolium</i>	T	T	T	T	100	T	T	T
<i>Penstemon newberryi</i>	T	T	T	T	100	T	T	T
<i>Potentilla flabellifolia</i>	T	T	T	T	100	T	T	T
Total herbaceous		8				10		
Moss	100	2	2	2	100	2	2	2
Lichen	P	P	P	P	100	2	2	2
Total nonvascular		2				4		
Barren - fine gravelly soil	100	16	16	16	100	48	48	48
Barren - litter	100	4	4	4	100	38	38	38
Barren - rock	100	4	4	4	100	10	10	10
Barren - duff	100	2	2	2	100	2	2	2
Total other		26				98		
Totals		100				188		

Plant Association: *Ericameria bloomeri*-(Mix)/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Plant Association Code: EB-(Mix):shrub/AoEe-(Mix):herb

Alliance: *Ericameria bloomeri* Shrubland

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Artemisia tridentata* / *Ericameria nauseosa* Shrubland (3.B.1.Ne - CEG000998), has been described from western and northern Nevada and eastern California.



Environmental Characteristics

This association was typically found on dry, recently burned sites within Lassen Volcanic National Park at elevations from approximately 1800m to 2475m (5900' to 8100'). Aspects were variable on flat to moderate slopes. Soils are characterized by a mix of bare soil, fine gravelly soil, and organic ash, such as found in the "Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes" and "Buttelake ashy sand, 3 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Ericameria bloomeri* observed with frequency of 100% and average cover about 12%; cover estimates ranged from 5 to 17%. Other common shrubs observed in this type included *Leptodactylon pungens*, *Chrysolepis sempervirens*, and *Ribes cereum*, none having more than 25% frequency; cover estimates ranged from 2 to 10% on sites where they were found. Average total shrub cover was about 17%. This association's tree overstory was very sparse, consisting mostly of standing dead, fire-killed conifers with frequency of 50% or less, including *Pinus jeffreyi*, *Pinus contorta* var. *murrayana*, and *Abies magnifica*. Average tree overstory cover was about 4%. Two Key herbaceous understory components of this type observed were *Achnatherum occidentale* and *Elymus elymoides*. *Achnatherum occidentale* was observed with frequency of 100% and average cover of about 12%; cover estimates ranged from 1 to 26%. *Elymus elymoides* was observed with frequency of 75% and average cover of about 6%; estimates ranged from 3 to 14% on sites where it was found. *Monardella odoratissima* and *Gayophytum diffusum* ssp. *diffusum* were other common components of this recently disturbed association. Total herbaceous cover was about 38%. Bare soil and fine gravelly soils were the dominant surface layer component with average total cover of 56%; estimates ranged from 24 to 88% on sites where they were found. Litter accumulation had a frequency of 75% and an average total cover of about 8%. Duff, fine woody debris and coarse woody debris also factored in the organic material found with about 15% total cover on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5670: *Ericameria bloomeri*-(Mix)/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus jeffreyi (dead)	50	1.8	2	5	50	1.8	2	5
Pinus contorta var. murrayana (dead)	25	1	4	4	25	1	4	4
Abies magnifica (dead)	25	1	4	4	25	1	4	4
Pinus Jeffreyi	25	0.3	1	1	25	0.3	1	1
Total tree		4.1				4.1		
Ericameria bloomeri	100	11.6	5	17.3	100	10.7	3.3	15.3
Leptodactylon pungens	25	2	8	8	25	2.5	10	10
Chrysolepis sempervirens	25	2.5	10	10	25	2.5	10	10
Ribes cereum	25	0.5	2	2	25	0.5	2	2
Total shrub		16.6				16.2		
Achnatherum occidentale	100	12.1	1	26.3	100	12	1	25.3
Elymus elymoides	75	6.2	3	14	75	6.3	3	14
Monardella odoratissima	50	3	5.5	6.3	50	4.7	7.3	11.3
Gayophytum diffusum ssp. diffusum	50	2.5	4	6.5	50	2.5	4	6
Eriogonum marifolium	25	4.1	16.3	16.3	25	4.8	19.3	19.3
Apocynum androsaemifolium	25	2.9	11.5	11.5	25	3.8	15	15
Antennaria dimorpha	25	2.8	11	11	25	3	12	12
Eriogonum umbellatum	25	1	4	4	25	1	4	4
Cycladenia humilis var. humilis	25	0.9	3.5	3.5	25	0.9	3.5	3.5
Aster species	25	0.5	2	2	25	0.5	2	2
Calyptridium umbellatum	25	0.5	2	2	25	0.5	2	2
Lupinus angustiflorus	25	0.5	2	2	25	0.5	2	2
Carex nebrascensis	25	0.3	1	1	25	0.3	1	1
Erysimum capitatum var. capitatum	25	0.3	1.3	1.3	25	0.3	1.3	1.3
Lupinus obtusilobus	25	0.3	1	1	25	0.3	1	1
Cirsium vulgare	T	T	T	T	25	T	T	T
Penstemon species	T	T	T	T	25	T	T	T
Total herbaceous		37.9				41.4		
Lichen	25	1	4	4	25	1	4	4
Total nonvascular		1				1		
Barren - bare soil	75	19.2	12	41	75	37.8	27	82
Barren - litter	50	3.5	2	12	75	8.3	3	16
Barren - fine woody debris	75	2.7	1	6	75	6.8	1	20
Barren - coarse woody debris	75	3.7	1	12	75	4.8	1	14
Barren - duff	75	2.5	2	6	75	3.8	2	9
Barren - fine gravelly soil	50	7	4	24	50	28	24	88
Barren - organic ash	50	1.8	1	6	50	5.3	3	18
Barren - rock	P	P	P	P	25	1	4	4
Total other		40.4				95.8		
Totals		100				158.5		

**Plant Association: Dry Other-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix)
Shrubland**

Plant Association Code: DMix:shrub/AoEe-(Mix):herb

Alliance: Dry Other-(Mixed) Shrubland

Number of sites: 2

Other Studies

This association has not been previously described for the Lassen Volcanic National Park vicinity. It may represent a somewhat uncommon association having dry shrub vegetative cover that was found in or near Lassen Volcanic National Park, but was not described in one of the shrubland associations.

A somewhat similar association, *Purshia tridentata* / *Carex pensylvanica* - *Achnatherum occidentale* Shrub Herbaceous Vegetation (3.B.1.Ne. - CEGLO01492), has been described eastern side of the Cascades in southern Oregon.



Environmental Characteristics

This association was typically found on dry, rocky sites within and near Lassen Volcanic National Park at elevations from approximately 1675m to 2560m (5500' to 8400'). This type occurred on variable aspects but mostly of a southwesterly to northeasterly direction on flat to steep slopes. This association's soils are characterized by fragmented rock, such as found in the "Xeric Vitricryands-Rock outcrop complex, 10 to 45 percent slopes" and "Yallani-Sheld-Portola families association, 0 to 35 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

Vegetation

This association was characterized by the presence of dry shrub cover, but lacked any significant cover of Key indicator species. While dry shrub cover exceeded the 10% minimum required for classification as a shrubland type, none of the species observed at these sites comprised a dry shrub mix that had been recognized as an association at Lassen Volcanic National Park. In this case, *Purshia tridentata* was found having frequency of 100% and average cover of 28%; cover estimates ranged from 8 to 48%. In addition, *Ericameria bloomeri* was observed having frequency of 100% and average cover of 6%; cover estimates ranged from 2 to 9%. Total dry shrub cover was about 45% on sites where they were found. Tree cover was very sparse having frequency of 50% and average combined cover of about 5% of *Pinus jeffreyi* and *Pinus contorta* var. *murrayana*. Combined herbaceous cover averaged nearly 42%. This cover was comprised of Key species *Achnatherum occidentale* and *Elymus elymoides* which led to the assignment of the AoEe-(Mix) understory designation. *Achnatherum occidentale* and *Elymus elymoides* both had 100% frequency and average cover of 6 and 4% respectively. Sandy, bare soil had frequency of 50% and average total cover of 53%, while bare rock accounted for an additional 6% of average total cover. Litter had frequency of 100% and accounted for about 10% total cover while woody debris and duff each had frequency of 50% and average total cover of about 10%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6670: Dry Other-(*Purshia tridentata*)-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	50	2.5	5	5	50	2.5	5	5
Pinus contorta var. murrayana	50	2	4	4	50	2	4	4
Total tree		4.5				4.5		
Purshia tridentata	100	28	8	48	100	28	8	48
Ericameria bloomeri	100	5.6	2	9.2	100	7.1	2	12.2
Holodiscus microphyllus var. glabrescens	50	6.7	13.3	13.3	50	8.6	17.3	17.3
Ribes cereum	50	2.5	5	5	50	2.5	5	5
Ceanothus velutinus	50	1	2	2	50	1	2	2
Ribes viscosissimum	50	1	2	2	50	1	2	2
Ceanothus prostratus	P	P	P	P	50	0.9	1.7	1.7
Total shrub		44.8				49.1		
Achnatherum occidentale	100	6.1	4	8.2	100	10.4	7	13.9
Elymus elymoides	100	3.8	1.7	6	100	5.9	4.8	7
Eriogonum umbellatum	50	2.4	4.8	4.8	50	6.8	13.6	13.6
Penstemon gracilentus	50	4.8	9.7	9.7	50	5.8	11.7	11.7
Fragaria virginiana	50	2	4	4	50	4.8	9.7	9.7
Gayophytum diffusum ssp. diffusum	50	2.8	5.7	5.7	50	4	8	8
Epilobium species	50	3.5	7	7	50	3.5	7	7
Ranunculus species	50	2.8	5.7	5.7	50	3.5	7	7
Achillea millefolium	50	3	6	6	50	3.4	6.8	6.8
Linanthus harknessii	50	0.3	0.7	0.7	50	3.3	6.5	6.5
Poa species	50	3.3	6.5	6.5	50	2.8	5.7	5.7
Chamaesyce serpyllifolia ssp. serpyllifolia	50	1	2	2	50	1.5	3	3
Agrostis species	50	2	4	4	50	1.4	2.7	2.7
Juncus articulatus	50	1.3	2.5	2.5	50	0.9	1.8	1.8
Juncus howellii	50	1.3	2.5	2.5	50	0.6	1.2	1.2
Trifolium species	P	P	P	P	50	0.6	1.2	1.2
Cirsium species	P	P	P	P	50	0.5	1	1
Mimulus tilingii	P	P	P	P	50	0.5	1	1
Polygonum douglasii	50	0.5	1	1	50	0.5	1	1
Heterocodon rariflorum	50	0.5	1	1	50	0.3	0.7	0.7
Sidalcea species	P	P	P	P	50	0.3	0.5	0.5
Herbaceous - other	50	0.3	0.5	0.5	50	0.3	0.5	0.5
Aster species	T	T	T	T	50	T	T	T
Verbascum thapsus	T	T	T	T	50	T	T	T
Total herbaceous		41.7				61.6		
Total nonvascular		0				0		
Barren - litter	P	P	P	P	100	10.1	8.2	12
Barren - sand	50	4.1	8.2	8.2	50	34.7	69.4	69.4
Barren - bare soil	P	P	P	P	50	18	36	36
Barren - duff	50	2	4	4	50	7	14	14
Barren - rock	50	2	4.1	4.1	50	6.1	12.2	12.2
Barren - fine woody debris	P	P	P	P	50	2	4.1	4.1
Barren - coarse woody debris	50	1	2	2	50	1	2	2
Total other		9.1				78.9		
Totals		100.1				194.1		

Alternate Plant Association name: Dry Other-(*Purshia tridentata*)-Mix/*Achnatherum occidentale*-*Elymus elymoides*-(Mix) Shrubland

Plant Association: Dry Other-Mix/Dry Mixed Herbaceous Shrubland

Plant Association Code: DMix:shrub/HDX:herb

Alliance: Dry Other-(Mixed) Shrubland

Number of sites: 1

Other Studies

This association has not been previously described for the Lassen Volcanic National Park vicinity. It may represent a somewhat uncommon association having dry shrub vegetative cover that was found in or near Lassen Volcanic National Park, but was not described in one of the shrubland associations.

Similar associations have not been described in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within and near Lassen Volcanic National Park at elevations from approximately 1675m to 2560m (5500' to 8400'). This type occurred on variable aspects but mostly of a westerly to southeasterly direction on flat to moderate slopes. This association's soils are characterized by fragmented rock, such as found in the "Humic Haploxerands, colluvium, 10 to 40 percent slopes; Xeric Vitricryands-Rock outcrop complex, 10 to 45 percent slopes" and "Rock Outcrop-Rubble Land complex" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the presence of dry shrub cover, but lacked any significant cover of Key indicator species. While dry shrub cover exceeded the 10% minimum required for classification as a shrubland type, none of the species observed at these sites comprised a dry shrub mix that had been recognized as an association at Lassen Volcanic National Park. In this case, *Frangula rubra* was found at this site having frequency of 100% and cover of about 28%. In addition, *Chrysolepis sempervirens* was observed having frequency of 100% and cover of about 6%. Both tree cover and herbaceous understory were very sparse, each having cover of only about 4%. Bare rock from an old lava flow dominated the ground surface having frequency of 100% and total cover of about 88%. Litter had frequency of 100% and total cover of about 8% while fine woody debris and duff had frequency of 100% and total cover of about 4%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6679: Dry Other Mix / Other Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus monticola	100	4	4	4	100	4	4	4
Abies concolor	T	T	T	T	100	T	T	T
Abies magnifica	T	T	T	T	100	T	T	T
Total tree		4				4		
Frangula rubra	100	28	28	28	100	28	28	28
Chrysolepis sempervirens	100	6	6	6	100	6	6	6
Total shrub		34				34		
Angelica breweri	100	4	4	4	100	10	10	10
Total herbaceous		4				10		
Lichen	100	22	22	22	100	32	32	32
Total nonvascular		22				32		
Barren - rock	100	34	34	34	100	88	88	88
Barren - litter	P	P	P	P	100	8	8	8
Barren - fine woody debris	P	P	P	P	100	2	2	2
Barren - duff	100	2	2	2	100	2	2	2
Total other		36				100		
Totals		100				180		

Plant Association: Dry Other Shrubland

Plant Association Code: D0th:shrub

Alliance: Dry Other-(Mixed) Shrubland

Number of sites: 1

Other Studies

This association has not been previously described for the Lassen Volcanic National Park vicinity. It may likely represents a somewhat uncommon association having shrub vegetative cover that was found in or near Lassen Volcanic National Park, but was not described in one of the shrubland associations.

Similar associations have not been described in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within and near Lassen Volcanic National Park at elevations from approximately 1950m to 2070m (6400' to 6800'). This type occurred on a southwesterly aspect on a moderate slope. This association's soils are characterized by fragmented rock, such as found in the "Bearrubble-Rubble land complex, 8 to 40 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the presence of dry shrub cover, but lacked any significant cover of Key indicator species. While dry shrub cover exceeded the 10% minimum required for classification as a shrubland type, none of the species observed at these sites comprised a shrub type that had been recognized as an association at Lassen Volcanic National Park. *Frangula rubra* was found with frequency of 100% and having cover of about 16%. Both tree cover and herbaceous understory were absent. Bare rock from an old lava flow dominated the ground surface having total cover of about 100%. No other ground surface conditions were observed.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6700: (*Frangula rubra*) - Dry Other Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Frangula rubra	100	16	16	16	100	16	16	16
Total shrub		16				16		
Total herbaceous		0				0		
Lichen	100	18	18	18	100	18	18	18
Total nonvascular		18				18		
Barren - rock	100	66	66	66	100	100	100	100
Total other		66				100		
Totals		100				134		

Alternate Plant Association name: Dry Other-(*Frangula rubra*) Shrubland

Plant Association: Other-(Chrysolepis sempervirens)-Mix /Dry Mixed Herbaceous Shrubland

Plant Association Code: SMix:shrub/HDX:herb

Alliance: Other Mixed Shrubland

Number of sites: 2

Other Studies

This association has not been previously described for the Lassen Volcanic National Park vicinity. It may likely represent somewhat of a generalization of associations having mixed shrub vegetative cover that were found in Lassen Volcanic National Park, but were not described in one of the shrubland associations.

Similar associations have not been described in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within and near Lassen Volcanic National Park at elevations from approximately 2010m to 2530m (6600' to 8300'). This type occurred on southerly aspects on moderate to moderately steep slopes. This association's soils are characterized by fragmented rock, litter, and little bare soil, such as found in the "Bearrubble-Rubble land complex, 8 to 40 percent slopes; Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxerepts, debris flows-Typic Dystroxerepts complex, 10 to 80 percent slopes" or "Vitrandic Cryorthents-Readingpeak-Rock outcrop complex, 5 to 150 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the lack of any significant cover of Key indicator species. While shrub cover exceeded the 10% minimum required for classification as a shrubland type, none of the species observed at these sites were of a mix that had been recognized as an association at Lassen Volcanic National Park. Shrubs had average cover of about 66%; five different shrub species were observed. *Chrysolepis sempervirens* was observed having frequency of 100% and average cover of 47%; cover estimates ranged from 41 to 52%. *Prunus emarginata* was observed having frequency of 100% and average cover of 3%; cover estimates ranged from 2 to 3%. Tree cover was very sparse with *Abies concolor* having frequency of 50% and cover of about 2%. The herbaceous understory was represented by a mix of graminoids with some forbs. Herbaceous cover averaged about 13% with no single species having more than 50% frequency. The herbaceous cover was primarily comprised of “other” grasses with an average cover of 8%. Herbaceous forbs had average cover of about 6%. Litter had frequency of 100% and accounted for about 52% of the total cover; cover estimates ranged from 30 to 75%. Bare rock had frequency of 100% and average total cover of 40%; cover estimates ranged from 10 to 70%. Bare soil had frequency of 50% and average total cover of 5%. Fine woody debris had frequency of 50% and average cover of about 2% cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. “T” indicates the species is a Trace species, while “P” indicates the species is present in the type, but not a participant in the cover of the Bird’s-Eye View.

Type 6879: Other Other-(*Chrysolepis sempervirens*)-Mix / Other Mixed Graminoid Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Abies concolor	50	2	4	4	50	2	4	4
Abies magnifica	T	T	T	T	50	T	T	T
Total tree		2				2		
Chrysolepis sempervirens	100	46.8	41	52.5	100	53.3	48.7	57.9
Prunus emarginata	100	2.8	2.5	3	100	4.9	2.3	7.5
Acer glabrum	50	12.5	25	25	50	9.8	19.6	19.6
Rhamnus rubra	50	4	8	8	50	2.5	5	5
Ribes roezlii	T	T	T	T	50	T	T	T
Total shrub		66.1				70.5		
Grass - other	50	7.5	15	15	50	7.5	15	15
Ageratina occidentalis	50	2	4	4	50	4	8	8
Angelica breweri	50	1	2	2	50	3.5	7	7
Hackelia species	50	2.5	5	5	50	2.5	5	5
Monardella odoratissima	P	P	P	P	50	0.5	1	1
Smilacina species	T	T	T	T	50	T	T	T
Total herbaceous		13				18		
Lichen	50	6	12	12	50	7	14	14
Total nonvascular		6				7		
Barren - litter	P	P	P	P	100	52.5	30	75
Barren - rock	50	13	26	26	100	40	10	70
Barren - bare soil	P	P	P	P	50	5	10	10
Barren - fine woody debris	P	P	P	P	50	2.5	5	5
Total other		13				100		
Totals		100.1				197.5		

Plant Association: Other-Mix/Other Mixed Herbaceous Shrubland

Plant Association Code: SMix:shrub/HOX:herb

Alliance: Other Mixed Shrubland

Number of sites: 2

Other Studies

This association has not been previously described for the Lassen Volcanic National Park vicinity. It may likely represent somewhat of a generalization of associations having mixed shrub vegetative cover that were found in Lassen Volcanic National Park, but were not described in one of the shrubland associations.

Similar associations have not been described in California.



Environmental Characteristics

This association was typically found on dry, rocky sites within and near Lassen Volcanic National Park at elevations from approximately 1735m to 2195m (5700' to 7200'). This type occurred on southerly to easterly aspects on flat to steep slopes. This association's soils are characterized by bare soil and fragmented rock, such as found in the "Rubble land-Rock outcrop, cliffs-Emeraldlake association, 35 to 150 percent slopes; Humic Haploxerands-Typic Haploxerands-Bear rubble-Rubble land complex, 5 to 40 percent slopes" or "Chummy soils, 0 to 3 percent slopes" 2011 LAVO and 2009 SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the lack of any significant cover of Key indicator species. While shrub cover exceeded the 10% minimum required for classification as a shrubland type, none of the species observed at these sites were a mix that had been recognized as an association at Lassen Volcanic National Park. Shrub cover had frequency of 50% and average cover of 12%. Shrub species observed were *Amelanchier pallida*, *Spiraea douglasii*, *Sambucus nigra*, *Prunus emarginata*, *Vaccinium uliginosum ssp. occidentale*, and *Chrysolepis sempervirens*. Tree cover was very sparse with *Pinus contorta var. murrayana* having frequency of 50% and cover of only 1%. The herbaceous understory was represented by a mix of graminoids and forbs. Herbaceous cover averaged about 38%; no single species exhibited a frequency of more than 50%. This herbaceous cover was primarily comprised of “other” grasses with average cover of 11%, *Aster* sp. with average cover of 9%, and *Juncus articulatus* with average cover of 5%. Litter had frequency of 100% and total cover of about 16%; cover estimates ranged from 8 to 24%. Fine woody debris, organic ash, and duff had average total cover of about 8%; cover estimates ranged from 2 to 6% on the sites observed in this association. Bare rock and gravel had frequency of 50% and average total cover of 43%. Bare soils had combined frequency of 50% and average total cover of 19%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. “T” indicates the species is a Trace species, while “P” indicates the species is present in the type, but not a participant in the cover of the Bird’s-Eye View.

Type 6886: Other-Mix / Other Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	50	1	2	2	50	0.5	1	1
Total tree		1				0.5		
Amelanchier pallida	50	4	8	8	50	4	8	8
Spiraea douglasii	50	2	4	4	50	2.5	5	5
Sambucus nigra	50	2	4	4	50	2	4	4
Prunus emarginata	50	2	4	4	50	2	4	4
Vaccinium uliginosum ssp. occidentale	50	1	2	2	50	1	2	2
Chrysolepis sempervirens	50	1	2	2	50	1	2	2
Total shrub		12				12.5		
Grass - other	50	10.9	21.8	21.8	50	10.8	21.5	21.5
Aster species	50	9.4	18.8	18.8	50	9.3	18.5	18.5
Juncus articulatus	50	5.4	10.8	10.8	50	8.4	16.8	16.8
Pteridium aquilinum	50	3	6	6	50	3	6	6
Trifolium species	50	3	6	6	50	3	6	6
Potentilla millefolia	50	2.8	5.7	5.7	50	2.8	5.7	5.7
Ranunculus species	50	1.8	3.5	3.5	50	1.8	3.5	3.5
Mimulus species	50	1	2	2	50	1	2	2
Gentiana newberryi var. tiogana	50	0.6	1.3	1.3	50	0.6	1.3	1.3
Herbaceous - other	50	0.5	1	1	50	0.5	1	1
Juncus nevadensis	T	T	T	T	50	T	T	T
Hypericum anagalloides	T	T	T	T	50	T	T	T
Total herbaceous		38.4				41.2		
Moss	100	2.5	1	4	100	3.8	1.7	6
Lichen	50	32	64	64	50	33	66	66
Total nonvascular		34.5				36.8		
Barren - litter	100	6	6	6	100	16	8	24
Barren - fine woody debris	100	1.5	1	2	100	5	4	6
Barren - rock	50	4.5	9	9	50	43	86	86
Barren - bare soil	50	2	4	4	50	19	38	38
Barren - duff	P	P	P	P	50	2	4	4
Barren - organic ash	P	P	P	P	50	1	2	2
Total other		14				86		
Totals		99.9				177		

Plant Association: *Holodiscus microphyllus* Shrubland

Plant Association Code: HM:shrub

Alliance: *Holodiscus microphyllus* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Holodiscus discolor* - *Sambucus racemosa* Shrubland (2.B.2.Nd - CEGLO03130), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry, rocky sites, lava flows, and debris fields within and around Lassen Volcanic National Park at elevations from approximately 1800m to 2475m (5900' to 8100'). Aspects were variable on gentle to moderately steep slopes. Soils are characterized by a dominance of lava, boulders, and fragmented rock, such as found in the "Ashbutte-Vitrandidic Xerorthents complex, 15 to 60 percent slopes" or "Lava Fields" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Holodiscus microphyllus* var. *glabrescens* observed with frequency of 100% and cover of about 28%. The only other shrub observed in this type was the dry shrub *Artemisia tridentata* with frequency of 100% and cover of about 2%. No tree overstory was observed in this association. The herbaceous understory in this type was very sparse and absent of any indicator species. Boulders and fragmented rock dominated the ground surface layer with frequency of 100% and total cover of about 70%. Lichen was also prominent in this type with frequency of 100% and average total cover of 50% on the rocky ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5700: *Holodiscus microphyllus* Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Holodiscus microphyllus var. glabrescens	100	28	28	28	100	28	28	28
Artemisia tridentata	100	2	2	2	100	2	2	2
Total shrub		30				30		
Total herbaceous		0				0		
Lichen	100	50	50	50	100	50	50	50
Total nonvascular		50				50		
Barren - rock	100	20	20	20	100	70	70	70
Total other		20				70		
Totals		100				150		

Plant Association: *Alnus incana* Shrubland

Plant Association Code: Al:shrub

Alliance: *Alnus incana* Shrubland

Number of sites: 3

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Alnus incana* Shrubland (2.B.6.Nd - CEGLO01141), has been described in California.



Environmental Characteristics

This association was typically found in wet or damp riparian areas within and near Lassen Volcanic National Park at elevations from approximately 1575m to 2125m (5200' to 7000'). Aspects were variable but mostly of a northerly to easterly direction on gentle to moderate slopes. Soils are characterized by a combination of wet soil and silt usually covered by organic material, such as found in the "Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes" and "Humic Haploxerands, stream terraces-Aquandic Humaquepts, flood plains, complex, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this dense shrub association was the indicator species *Alnus incana*, observed with frequency of 100% and average cover of about 98%; cover estimates ranged from 94 to 100%. Other shrubs observed in this type with frequency of 33% or less, and having very sparse cover included *Sambucus racemosa* and *Ribes nevadense*. Total average shrub cover in this type was about 99%. This association's tree overstory was absent, with no Trace species observed. The herbaceous understory in this type lacked any indicator species and was absent of any "Bird's-eye" view cover, however it accounted for about 72% of the total cover. A *Smilacina* sp. was found as a trace with a frequency of 100%. Litter accumulation had a frequency of 100% and average total cover of about 64%; cover estimates ranged from 42 to 78%. Fine woody debris had frequency of 100% and average total cover of 16%; cover estimates ranged from 10 to 28%. Water and wet soil were observed each having frequencies of 33% and combined average total cover of about 10%; cover estimates ranged from 16 to 29% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5800: *Alnus incana* Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Alnus incana	100	98.1	94.3	100	100	96.6	94.8	100
Sambucus racemosa	33.3	0.6	1.7	1.7	66.7	0.4	1.2	1.2
Ribes nevadense	P	P	P	P	33.3	1.7	5	5
Total shrub		98.7				98.7		
Smilacina species	T	T	T	T	100	6.3	2.5	16.3
Grass - other	33.3	0.7	2	2	66.7	16.9	15	35.7
Athyrium filix-femina	P	P	P	P	66.7	13.8	19	22.5
Viola glabella	P	P	P	P	66.7	4.8	2.5	12
Senecio triangularis	P	P	P	P	66.7	2.9	3.7	5
Osmorhiza chilensis	P	P	P	P	66.7	1.9	0.7	5
Corydalis caseana ssp. caseana	P	P	P	P	33.3	5.4	16.3	16.3
Herbaceous - other	P	P	P	P	33.3	5	15	15
Dicentra formosa	P	P	P	P	33.3	3	9	9
Carex bolanderi	P	P	P	P	33.3	1.7	5	5
Carex species	P	P	P	P	33.3	1.7	5	5
Aconitum columbianum	P	P	P	P	33.3	1.7	5	5
Galium aparine	P	P	P	P	33.3	1.7	5	5
Stachys ajugoides	P	P	P	P	33.3	1.7	5	5
Stellaria species	P	P	P	P	33.3	1	3	3
Circaea alpina spp pacifica	P	P	P	P	33.3	0.8	2.5	2.5
Delphinium species	P	P	P	P	33.3	0.7	2	2
Mitella pentandra	P	P	P	P	33.3	0.4	1.3	1.3
Saxifraga odontoloma	P	P	P	P	33.3	0.4	1.3	1.3
Hackelia micrantha	P	P	P	P	33.3	0.3	1	1
Sphenosciadium capitellatum	P	P	P	P	33.3	0.3	1	1
Heracleum lanatum	T	T	T	T	33.3	T	T	T
Lilium species	T	T	T	T	33.3	T	T	T
Mimulus species	T	T	T	T	33.3	T	T	T
Platanthera sparsiflora	T	T	T	T	33.3	T	T	T
Viola species	T	T	T	T	33.3	T	T	T
Total herbaceous		0.7				72.4		
Moss	P	P	P	P	66.7	2	1	5
Total nonvascular		0				2		
Barren - litter	P	P	P	P	100	64.3	42.5	78
Barren - fine woody debris	P	P	P	P	100	15.8	10	27.5
Barren - wet soil	P	P	P	P	66.7	5.7	2	15
Barren - rock	P	P	P	P	33.3	4.2	12.5	12.5
Water - shallow	P	P	P	P	33.3	1.7	5	5
Barren - silty soil	P	P	P	P	33.3	1.7	5	5
Water	33.3	0.7	2	2	33.3	1.3	4	4
Barren - bare soil	P	P	P	P	33.3	0.7	2	2
Total other		0.7				95.4		
Totals		100.1				268.5		

Plant Association: *Alnus incana*/Mesic Herbaceous Meadow Shrubland

Plant Association Code: Al:shrub/HMM:herb

Alliance: *Alnus incana* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Alnus incana* Shrubland (2.B.6.Nd - CEG001141), has been described in California.



Environmental Characteristics

This association was typically found in seasonally wet or damp riparian areas within and near Lassen Volcanic National Park at elevations from approximately 1575m to 2285m (5200' to 7500'). Aspects were variable but mostly of a northwesterly to southeasterly direction on flat to moderate slopes. Soils are characterized by a combination of wet soil and silt usually covered by organic material, such as found in the "Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes; Histic Humaquepts, lake sediments-Histic Humaquepts, frequently flooded-Typic Endoaquands complex, 0 to 15 percent slopes" and "Humic Haploxerands, stream terraces-Aquandic Humaquepts, flood plains, complex, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Alnus incana*, observed with 100% frequency and cover of about 52%. No other shrub components were observed in this type. This association's tree overstory was absent, with no traces observed. The herbaceous understory in this type included Key indicator species *Senecio triangularis* and *Veratrum californicum*, resulting in the assignment of the Herbaceous Mesic Meadow understory designation. *Senecio triangularis* was observed with frequency of 100% and cover of about 38%. *Veratrum californicum* was observed with frequency of 100% and cover of about 3%. Other non-Key forbs recorded in this type included *Heracleum lanatum*, *Viola glabella*, and *Achillea millefolium*. Total understory herbaceous cover was about 48%, of which 40% was comprised of the two Key indicator species. Bare soil and rock were observed with frequency of 100% and total cover of about 44 and 10%, respectively. Litter accumulation had a frequency of 100% and total cover of about 38%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5882: *Alnus incana*/Mesic Herbaceous Meadow Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
<i>Alnus incana</i>	100	52	52	52	100	52	52	52
Total shrub		52				52		
<i>Heracleum lanatum</i>	100	7.7	7.7	7.7	100	39.3	39.3	39.3
<i>Senecio triangularis</i>	100	37.7	37.7	37.7	100	36.7	36.7	36.7
<i>Veratrum californicum</i>	100	2.7	2.7	2.7	100	5.7	5.7	5.7
<i>Viola glabella</i>	P	P	P	P	100	5.7	5.7	5.7
Apiaceae	P	P	P	P	100	2.7	2.7	2.7
<i>Achillea millefolium</i>	P	P	P	P	100	2	2	2
<i>Osmorhiza occidentalis</i>	P	P	P	P	100	1.7	1.7	1.7
Aster species	P	P	P	P	100	1.3	1.3	1.3
Thalictrum species	P	P	P	P	100	1	1	1
<i>Dicentra formosa</i>	T	T	T	T	100	T	T	T
<i>Lilium pardalinum</i> ssp. <i>shastense</i>	T	T	T	T	100	T	T	T
Total herbaceous		48.1				96.1		
Total nonvascular		0				0		
Barren - bare soil	P	P	P	P	100	44	44	44
Barren - litter	P	P	P	P	100	38	38	38
Barren - rock	P	P	P	P	100	10	10	10
Barren - fine woody debris	P	P	P	P	100	2	2	2
Total other		0				94		
Totals		100.1				242.1		

Plant Association: *Alnus incana*/Wet Herbaceous Meadow Shrubland

Plant Association Code: Al:shrub/HWM:herb

Alliance: *Alnus incana* Shrubland

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Alnus incana* Shrubland (2.B.6.Nd - CEG001141), has been described in California.



Environmental Characteristics

This association was typically found in seasonally wet or damp riparian areas within and near Lassen Volcanic National Park at elevations from approximately 1575m to 2225m (5200' to 7300'). Aspects were variable but most commonly of a northeasterly to southeasterly direction on flat to moderate slopes. Soils are characterized by a combination of bare, wet or damp soil, such as found in the "Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes" and "Aquepts-Typic Petraquepts, bedrock-Aquic Haploxerands-Typic Petraquepts complex, 4 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Alnus incana*, observed with frequency of 100% and average cover about 31%; cover estimates ranged from 25 to 36%. No other shrub components were observed having significant cover in this association. *Salix laevigata* and *Vaccinium uliginosum ssp. occidentale* were recorded as Trace species. This association's tree overstory was very sparse with frequency of 50%, and only 4% cover of both live and standing dead *Pinus contorta var. murrayana* observed. The herbaceous understory in this type primarily included a mix of wet herbaceous grasses and *Carex* species that averaged about 64% cover. "Other" grasses had frequency of 100% and average cover of 13%; cover estimates ranged from 9 to 16%. *Carex utriculata*, *Carex cusickii*, and *Carex angustata* contributed a combined average cover of about 18%. The non-Key species *Stachys ajugoides* and *Angelica breweri*, both with 100% frequency contributed a combined average cover of 5%. The dense herbaceous vegetation obscured most of the ground surface, however water had total cover of about 12%. Silty and wet bare soil accounted for average total cover of about 4% of the ground surface while coarse and fine woody debris contributed about 3% to the ground surface condition. Bare soil and rock were not observed as ground surface features and litter accumulation had very sparse average total cover of about 1%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5885: *Alnus incana*/Wet Herbaceous Meadow Shrubland

Detailed Alliance	Bird's-Eye	Bird's-Eye	Bird's-Eye	Bird's-Eye	Total	Total	Total	Total
Species	Frequency (%)	Average Cover	Minimum Cover	Maximum Cover	Frequency (%)	Average Cover	Minimum Cover	Maximum Cover
Pinus contorta var. murrayana	50	3	6	6	50	3	6	6
Pinus contorta var. murrayana (dead)	50	1	2	2	50	1	2	2
Total tree		4				4		
Alnus incana	100	30.5	25	36	100	31.5	27	36
Salix laevigata	50	0.5	1	1	50	0.5	1	1
Vaccinium uliginosum ssp. occidentale	P	P	P	P	50	0.5	1	1
Total shrub		31				32.5		
Grass - other	100	12.6	9.2	16	100	22	20.7	23.3
Carex cusickii	100	3.9	0.7	7.2	100	6.1	2.4	9.9
Stachys ajugoides	100	1.9	1.7	2	100	3.9	1.7	6.2
Angelica breweri	100	3.3	1.7	5	100	3.3	1.5	5.2
Mimulus species	P	P	P	P	100	1.2	1	1.4
Trifolium species	P	P	P	P	100	1.2	0.4	2
Epilobium species	P	P	P	P	100	0.8	0.5	1
Carex utriculata	50	9	18	18	50	8.4	16.9	16.9
Scirpus species	50	1	2	2	50	6.8	13.7	13.7
Carex angustata	50	5.7	11.3	11.3	50	6	12	12
Lotus species	50	4	8	8	50	5.8	11.5	11.5
Cirsium scariosum	50	4.2	8.3	8.3	50	3.4	6.8	6.8
Erythronium species	50	0.3	0.7	0.7	50	2.2	4.3	4.3
Aster frondosus	50	0.6	1.3	1.3	50	2.1	4.2	4.2
Juncus articulatus	50	3.3	6.7	6.7	50	1.8	3.6	3.6
Sphenosciadium capitellatum	50	2	4	4	50	1.7	3.4	3.4
Senecio triangularis	50	2.7	5.3	5.3	50	1.5	2.9	2.9
Aster species	50	2	4	4	50	1.4	2.7	2.7
Herbaceous - other	50	0.6	1.3	1.3	50	1.4	2.8	2.8
Heracleum lanatum	50	1	2	2	50	1.3	2.5	2.5
Stellaria species	P	P	P	P	50	1	2.1	2.1
Achillea millefolium	P	P	P	P	50	0.9	1.7	1.7
Athyrium filix-femina	50	0.9	1.7	1.7	50	0.9	1.7	1.7
Carex species	50	1.4	2.7	2.7	50	0.8	1.6	1.6
Solidago canadensis ssp. elongata	50	0.5	1	1	50	0.8	1.5	1.5
Tofieldia occidentalis ssp. occidentalis	50	0.6	1.3	1.3	50	0.8	1.6	1.6
Elymus glaucus	50	0.3	0.7	0.7	50	0.7	1.4	1.4
Galium triflorum	P	P	P	P	50	0.7	1.4	1.4
Thalictrum species	P	P	P	P	50	0.7	1.4	1.4
Hypericum species	P	P	P	P	50	0.6	1.2	1.2
Galium aparine	P	P	P	P	50	0.5	1	1
Lilium species	P	P	P	P	50	0.5	1	1
Scirpus microcarpus	50	0.5	1	1	50	0.4	0.9	0.9
Juncus nevadensis	P	P	P	P	50	0.3	0.7	0.7
Aquilegia formosa	P	P	P	P	50	0.3	0.5	0.5
Geum macrophyllum	P	P	P	P	50	0.3	0.7	0.7
Osmorhiza chilensis	50	0.3	0.7	0.7	50	0.3	0.7	0.7
Sidalcea species	50	0.3	0.5	0.5	50	0.3	0.5	0.5
Perideridia parishii ssp. latifolia	50	0.3	0.7	0.7	50	0.2	0.4	0.4
Stellaria media	50	0.3	0.5	0.5	50	0.2	0.4	0.4
Veratrum californicum	P	P	P	P	50	0.2	0.4	0.4
Juncus ensifolius	T	T	T	T	50	T	T	T
Delphinium species	T	T	T	T	50	T	T	T
Helenium bigelovii	T	T	T	T	50	T	T	T
Penstemon species	T	T	T	T	50	T	T	T
Platanthera leucostachys	T	T	T	T	50	T	T	T
Pyrola asarifolia ssp. asarifolia	T	T	T	T	50	T	T	T
Total herbaceous		63.5				93.7		
Moss	50	0.5	1	1	100	3.9	3.6	4.2
Total nonvascular		0.5				3.9		
Water - shallow	P	P	P	P	100	9	6	12
Water	50	1	2	2	100	3	2	4
Barren - fine woody debris	P	P	P	P	100	2	2	2
Barren - silty soil	P	P	P	P	50	2	4	4
Barren - wet soil	P	P	P	P	50	2	4	4
Barren - coarse woody debris	P	P	P	P	50	1	2	2
Barren - litter	P	P	P	P	50	1	2	2
Total other		1				20		
Totals		100				154.1		

Plant Association: *Alnus incana*/Other Mixed Herbaceous Shrubland

Plant Association Code: Al:shrub/HOX:herb

Alliance: *Alnus incana* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very similar association, *Alnus incana* Shrubland (2.B.6.Nd - CEG001141), has been described in California.



Environmental Characteristics

This association was typically found in seasonally wet or damp riparian areas within and near Lassen Volcanic National Park at elevations from approximately 1575m to 2010m (5200' to 6600'). Aspects were variable but most commonly of a northeasterly to southeasterly direction on flat to moderate slopes. Soils are characterized by a combination of bare, wet or damp soil, such as found in the "Scoured-Rock outcrop-Juniperlake complex, 3 to 40 percent slopes" and "Aeric Endoaquents-Humic Haploxerands, stream terraces-Riverwash complex, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this association was the indicator species *Alnus incana*, observed with frequency of 100% and cover of about 90%. No other shrub components were observed having significant cover in this type. This association's tree overstory was very sparse, with *Abies concolor* having frequency of 100% and cover of about 2%. *Pinus jeffreyi* and *Pinus contorta* var. *murrayana* were observed as Trace species. The herbaceous understory in this type included a mix of non-Key herbaceous graminoid and broadleaf species that had cover of about 6%. Understory herbaceous vegetation contributed about 77% to the total cover. Litter accumulation had frequency of 100% and total cover of about 68% and water features were observed with frequency of 100% and total cover of about 18% of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 5886: *Alnus incana*/Other Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species	(%)	Cover	Cover	Cover	(%)	Cover	Cover	Cover
Abies concolor	100	2	2	2	100	2	2	2
Pinus Jeffreyi	T	T	T	T	100	T	T	T
Pinus contorta var. murrayana	T	T	T	T	100	T	T	T
Total tree		2				2		
Alnus incana	100	90	90	90	100	92	92	92
Total shrub		90				92		
Grass - other	100	1	1	1	100	24.5	24.5	24.5
Athyrium filix-femina	P	P	P	P	100	9.7	9.7	9.7
Senecio triangularis	P	P	P	P	100	7.4	7.4	7.4
Stachys ajugoides	100	1	1	1	100	6.7	6.7	6.7
Smilacina species	P	P	P	P	100	5	5	5
Viola glabella	P	P	P	P	100	4.6	4.6	4.6
Heracleum lanatum	P	P	P	P	100	3.1	3.1	3.1
Dicentra formosa	P	P	P	P	100	3	3	3
Aconitum columbianum	P	P	P	P	100	2.3	2.3	2.3
Allium species	100	2	2	2	100	2	2	2
Hackelia micrantha	P	P	P	P	100	2	2	2
Lilium pardalinum ssp. shastense	P	P	P	P	100	2	2	2
Phacelia species	100	2	2	2	100	2	2	2
Osmorhiza occidentalis	P	P	P	P	100	1	1	1
Achillea millefolium	P	P	P	P	100	0.8	0.8	0.8
Thalictrum species	P	P	P	P	100	0.7	0.7	0.7
Aster species	T	T	T	T	100	T	T	T
Cirsium scariosum	T	T	T	T	100	T	T	T
Epilobium species	T	T	T	T	100	T	T	T
Galium aparine	T	T	T	T	100	T	T	T
Mimulus guttatus	T	T	T	T	100	T	T	T
Perideridia species	T	T	T	T	100	T	T	T
Veratrum californicum	T	T	T	T	100	T	T	T
Total herbaceous		6				76.8		
Moss	P	P	P	P	100	1.3	1.3	1.3
Total nonvascular		0				1.3		
Barren - litter	P	P	P	P	100	68	68	68
Water	100	2	2	2	100	10	10	10
Water - shallow	P	P	P	P	100	8	8	8
Barren - fine gravelly soil	P	P	P	P	100	4	4	4
Barren - wet soil	P	P	P	P	100	2	2	2
Barren - fine woody debris	P	P	P	P	100	2	2	2
Total other		2				94		
Totals		100				266.1		

Plant Association: *Alnus incana*-*Salix* sp./Dry Mixed Herbaceous Shrubland

Plant Association Code: Al-Sal:shrub/HDX:herb

Alliance: *Alnus incana* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very slightly similar association, *Alnus incana* - *Salix drummondiana* Shrubland (2.B.6.Nb - CEG002652), has been described in Colorado.



Environmental Characteristics

This association was typically found in riparian areas within and near Lassen Volcanic National Park at elevations from approximately 1575m to 2225m (5200' to 7300'). Aspects were observed in southerly to easterly directions on gentle slopes. Soils are characterized by a combination of bare, wet or damp soil, such as found in the "Scoured-Rock outcrop-Juniperlake complex, 3 to 40 percent slopes" and "Aeric Endoaquents-Humic Haploxerands, stream terraces-Riverwash complex, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

The Key shrub species in this association were the indicator species *Alnus incana* and *Salix laevigata*. *Alnus incana* was observed with frequency of 100% and cover of about 4%. *Salix laevigata* was observed with frequency of 100% and cover of about 22%. One other shrub component, *Chrysothamnus nauseosus ssp. albicaulis* was observed with frequency of 100% and cover of about 24%. This association's tree overstory was very sparse with about 8% cover. *Populus balsamifera ssp. trichocarpa* with frequency of 100% comprised about 6% of the tree cover while *Pinus jeffreyi* with frequency of 100% accounted for the other 2% tree cover. A trace amount of *Pinus contorta var. murrayana* was observed. The herbaceous understory in this type primarily included a mix of non-Key dry herbaceous broadleaf species that had a combined cover of about 20%. Rock and gravel had frequency of 100% and had total cover of about 58%. Sand had frequency of 100% and total cover of 20% the ground surface while litter accumulation had had frequency of 100% and total cover of about 12%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6179: *Alnus incana*-*Salix* sp. / Dry Mixed Herbaceous Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Populus balsamifera ssp. trichocarpa	100	6	6	6	100	8	8	8
Pinus Jeffreyi	100	2	2	2	100	2	2	2
Pinus contorta var. murrayana	T	T	T	T	100	T	T	T
Total tree		8				10		
Chrysothamnus nauseosus ssp. albicaulis	100	23.7	23.7	23.7	100	23.7	23.7	23.7
Salix laevigata	100	22	22	22	100	23	23	23
Alnus incana	100	4	4	4	100	5	5	5
Ceanothus cordulatus	P	P	P	P	100	2	2	2
Ceanothus velutinus	T	T	T	T	100	T	T	T
Total shrub		49.7				53.7		
Artemisia douglasiana	100	4.7	4.7	4.7	100	8.7	8.7	8.7
Eriogonum nudum	100	5	5	5	100	5	5	5
Lotus species	100	2	2	2	100	4	4	4
Gayophytum diffusum ssp. diffusum	100	3	3	3	100	3	3	3
Anaphalis margaritacea	100	2	2	2	100	2	2	2
Rumex species	100	2	2	2	100	2	2	2
Herbaceous - other	P	P	P	P	100	2	2	2
Linanthus species	100	1	1	1	100	1	1	1
Achillea millefolium	100	0.7	0.7	0.7	100	0.7	0.7	0.7
Elymus glaucus	T	T	T	T	100	T	T	T
Carex athrostachya	T	T	T	T	100	T	T	T
Allium species	T	T	T	T	100	T	T	T
Equisetum species	T	T	T	T	100	T	T	T
Gilia capillaris	T	T	T	T	100	T	T	T
Total herbaceous		20.4				28.4		
Total nonvascular		0				0		
Barren - gravel	100	16	16	16	100	38	38	38
Barren - rock	100	4	4	4	100	20	20	20
Barren - sand	100	2	2	2	100	20	20	20
Barren - litter	P	P	P	P	100	12	12	12
Barren - coarse woody debris	P	P	P	P	100	2	2	2
Barren - duff	P	P	P	P	100	2	2	2
Total other		22				94		
Totals		100.1				186.1		

Alternate Plant Association name: *Alnus incana*-*Salix* (*laevigata*)/Dry Mixed Herbaceous Shrubland

Plant Association: *Alnus incana*-*Salix* sp./Wet Herbaceous Meadow Shrubland

Plant Association Code: Al-Sal:shrub/HWM:herb

Alliance: *Alnus incana* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A very slightly similar association, *Alnus incana* - *Salix drummondiana* Shrubland (2.B.6.Nb - CEGLO02652), has been described in Colorado.



Environmental Characteristics

This association was typically found in riparian areas within Lassen Volcanic National Park at elevations from approximately 1615m to 2010m (5300' to 6600'). Aspects were observed in an easterly direction on gentle slopes. Soils are characterized by a combination of wet or damp silty soil and organic litter, such as found in the "Aquandic Humaquepts-Histic Humaquepts-Aquandic Endoaquepts-Terric Haplohemists complex, 1 to 5 percent slopes" and "Vitrandic Cryofluvents-Aquandic Cryaquepts complex, 0 to 8 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

The Key shrub species in this dense shrub association were the indicator species *Alnus incana* and *Salix lemmonii*. *Alnus incana* had frequency of 100% and cover of about 73%. *Salix lemmonii* had frequency of 100% and cover of about 15%. No other shrub components were observed in this type. This association's tree overstory was very sparse with cover of about 6%. *Pinus monticola* had frequency of 100% and cover of about 4% while *Abies magnifica* had frequency of 100% and cover of about 2%. The herbaceous understory in this association primarily included a mix of wet herbaceous grasses and *Carex* sp. that had a combined cover of about 6%. Herbaceous vegetation obscured most of the ground surface, however litter accumulation had had frequency of 100% and total cover of about 40% where it was visible. Silty soil and coarse woody debris were both observed with frequency of 100% and total cover of about 6% each of the ground surface.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6185: *Alnus incana*-*Salix* sp. / Wet Herbaceous Meadow Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Pinus monticola</i>	100	4	4	4	100	4	4	4
<i>Abies magnifica</i>	100	2	2	2	100	2	2	2
Total tree		6				6		
<i>Alnus incana</i>	100	73	73	73	100	76	76	76
<i>Salix lemmonii</i>	100	15	15	15	100	16	16	16
Total shrub		88				92		
<i>Carex</i> species	100	4	4	4	100	25	25	25
Grass - other	100	2	2	2	100	20	20	20
<i>Carex nebrascensis</i>	P	P	P	P	100	8	8	8
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	P	P	P	P	100	4	4	4
<i>Thalictrum</i> species	P	P	P	P	100	4	4	4
<i>Viola glabella</i>	P	P	P	P	100	2	2	2
<i>Veratrum californicum</i>	P	P	P	P	100	1	1	1
<i>Aconitum columbianum</i>	T	T	T	T	100	T	T	T
<i>Equisetum</i> species	T	T	T	T	100	T	T	T
<i>Galium aparine</i>	T	T	T	T	100	T	T	T
<i>Lilium pardalinum</i> ssp. <i>shastense</i>	T	T	T	T	100	T	T	T
<i>Mimulus guttatus</i>	T	T	T	T	100	T	T	T
<i>Smilacina</i> species	T	T	T	T	100	T	T	T
Total herbaceous		6				64		
Total nonvascular		0				0		
Barren - litter	P	P	P	P	100	40	40	40
Barren - silty soil	P	P	P	P	100	6	6	6
Barren - coarse woody debris	P	P	P	P	100	6	6	6
Total other		0				52		
Totals		100				214		

Plant Association: *Alnus incana-Salix (lemmonii)*/ Wet Herbaceous Meadow Shrubland

Plant Association: *Salix*-Mix/Sedge Mixed Herbaceous Meadow Shrubland

Plant Association Code: Sal-Mix:shrub/HSM:herb

Alliance: *Salix* Shrubland

Number of sites: 1

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Salix geyeriana* - *Salix lemmonii*/*Carex aquatilis* var. *dives* Shrubland (2.B.6.Nb - CEGLO01212), has been described as occurring in the southern portion of the eastern Cascades and is thought to possibly exist in California. In addition, a similar association, *Salix arctica* / *Carex nigricans* Dwarf-shrubland (4.B.1.Nb - CEGLO05878), has been described as occurring in Glacier National Park, Montana.



Environmental Characteristics

This association was typically found in riparian areas within Lassen Volcanic National Park at elevations from approximately 2225m to 2500m (7300' to 8200'). Aspects were observed in northeasterly to southeasterly directions on gentle slopes. Soils are characterized by a combination of bare, shallow, wet or damp soils and standing water, such as found in the "Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

The Key shrubs in this sparse shrub association were species of the indicator genus *Salix*. At this particular field site the species was *Salix arctica*, which had frequency of 100% and cover of about 11%. Other shrub species observed included *Kalmia polifolia ssp. microphylla* and *Phyllodoce breweri* observed with frequencies of 100% and having cover of about 10% and 3% respectively. Total shrub cover was about 24%. This association's tree overstory was very, very sparse as the only tree cover observed was *Tsuga mertensiana* as a Trace. The herbaceous vegetation in this type primarily included a mix of wet herbaceous graminoids and *Aster* species with a combined cover of about 56%. *Carex scopulorum var. bracteosa* had frequency of 100% and cover of about 33%. *Aster* sp. had frequency of 100% and cover of about 10% while "other" grasses had frequency of 100% and cover of about 7% and *Carex nigricans* had frequency of 100% and cover of about 3%. Water was observed with frequency of 100% and cover of about 18% of the ground surface. Bare and wet soil both had frequency of 100% and combined total cover of about 10% of the ground surface. Little organic material was present as litter contributed only about 2% total cover to the ground surface condition.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6475: *Salix*-Mix/ Sedge Mixed Herbaceous Meadow Shrubland

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	T	T	T	T	100	T	T	T
Total tree		0				0		
<i>Salix arctica</i>	100	11.3	11.3	11.3	100	12.7	12.7	12.7
<i>Kalmia polifolia</i> ssp. <i>microphylla</i>	100	10	10	10	100	11.3	11.3	11.3
<i>Phyllodoce breweri</i>	100	3	3	3	100	2.7	2.7	2.7
Total shrub		24.3				26.7		
<i>Carex scopulorum</i> var. <i>bracteosa</i>	100	33	33	33	100	28	28	28
<i>Aster</i> species	100	10.3	10.3	10.3	100	10	10	10
Grass - other	100	6.7	6.7	6.7	100	5.7	5.7	5.7
<i>Carex nigricans</i>	100	3.7	3.7	3.7	100	2.3	2.3	2.3
<i>Juncus mertensianus</i>	100	2	2	2	100	2	2	2
<i>Eleocharis pauciflora</i>	T	T	T	T	100	T	T	T
<i>Antennaria media</i>	T	T	T	T	100	T	T	T
<i>Arabis lemmonii</i> var. <i>lemmonii</i>	T	T	T	T	100	T	T	T
<i>Cassiope mertensiana</i>	T	T	T	T	100	T	T	T
<i>Castilleja lemmonii</i>	T	T	T	T	100	T	T	T
<i>Dodecatheon alpinum</i>	T	T	T	T	100	T	T	T
<i>Epilobium</i> species	T	T	T	T	100	T	T	T
<i>Hypericum anagalloides</i>	T	T	T	T	100	T	T	T
<i>Mimulus guttatus</i>	T	T	T	T	100	T	T	T
<i>Senecio</i> species	T	T	T	T	100	T	T	T
<i>Sparganium angustifolium</i>	T	T	T	T	100	T	T	T
Total herbaceous		55.7				48		
Moss	100	2	2	2	100	7.3	7.3	7.3
Total nonvascular		2				7.3		
Water	100	12	12	12	100	12	12	12
Water - shallow	P	P	P	P	100	6	6	6
Barren - bare soil	100	4	4	4	100	6	6	6
Barren - wet soil	P	P	P	P	100	4	4	4
Barren - litter	100	2	2	2	100	2	2	2
Total other		18				30		
Totals		100				112		

Plant Association: *Salix*-Mix/Mesic Herbaceous Meadow Shrubland

Plant Association Code: Sal-Mix:shrub/HMM:herb

Alliance: *Salix* Shrubland

Number of sites: 2

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Salix boothii* / Mesic Forbs Shrubland (2.B.6.Nb - CEGLO01180), has been described as occurring in California.



Environmental Characteristics

This association was typically found in riparian areas within Lassen Volcanic National Park at elevations from approximately 2100m to 2225m (6900' to 7300'). Aspects were observed in an easterly direction on gentle slopes. Soils are characterized by a combination of shallow, wet or damp soils, standing water, and organic material such as found in the "Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

The Key shrubs in this sparse shrub association were species of the indicator genus *Salix*. *Salix boothii*, *Salix lemmonii*, and *Salix jepsonii*, along with an unidentified *Salix* sp. were all observed with frequency of 50% and having average cover estimates that ranged from 2 to 21%. The combined *Salix* cover averaged about 32% on sites where they were found. Only one other shrub species was found, that being *Ribes nevadense* observed as a Trace species. This association's tree overstory was very, very sparse with *Pinus monticola* having frequency of 50% and cover of about 1%. *Abies magnifica* and *Pinus contorta* var. *murrayana* were found as Trace species. The herbaceous vegetation in this type included a dense mix of mesic herbaceous graminoids and forbs with a combined cover of about 66%. Three Key indicator species were present resulting in the assignment of the Mesic Herbaceous Meadow (HMM) understory designation. *Veratrum californicum* and *Lupinus polyphyllus* were observed having frequency of 100% and average cover of 4% and 7% respectively. *Senecio triangularis* was observed having frequency of 50% and average cover of about 1%. The dense shrub and herbaceous vegetation obscured most of the ground surface condition. Water was observed with frequency of 50% and having cover of about 9% of the ground surface. Bare wet soil had frequency of 100% and cover of about 4% of the ground surface. Little organic material was present as litter contributed only about 2% total cover to the ground surface condition.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6482: *Salix*-Mix/Mesic Herbaceous Meadow Shrubland

Detailed Alliance	Bird's-Eye	Bird's-Eye	Bird's-Eye	Bird's-Eye	Total	Total	Total	Total
Species	Frequency (%)	Average Cover	Minimum Cover	Maximum Cover	Frequency (%)	Average Cover	Minimum Cover	Maximum Cover
Pinus contorta var. murrayana	T	T	T	T	100	T	T	T
Pinus monticola	50	1	2	2	50	1	2	2
Abies magnifica	T	T	T	T	50	T	T	T
Total tree		1				1		
Salix species	50	21	42	42	50	21	42	42
Salix boothii	50	6	12	12	50	8	16	16
Salix lemmonii	50	3	6	6	50	3	6	6
Salix jepsonii	50	2	4	4	50	2	4	4
Ribes nevadense	T	T	T	T	50	T	T	T
Total shrub		32				34		
Lupinus polyphyllus	100	6.8	5.2	8.5	100	10.5	10.1	10.9
Carex nervina	100	6.3	0.7	11.9	100	7.3	0.7	13.8
Grass - other	100	7.7	5.5	9.9	100	6.8	3.3	10.4
Sphenosciadium capitellatum	100	3.5	3.5	3.5	100	5.1	4.4	5.8
Aster species	100	2	1.7	2.3	100	4.8	2.8	6.7
Veratrum californicum	100	3.5	2.3	4.7	100	4.1	2.9	5.2
Aconitum columbianum	100	0.8	0.7	0.9	100	3.5	2.6	4.4
Senecio triangularis	50	0.6	1.2	1.2	100	3.4	1.1	5.7
Herbaceous - other	50	0.3	0.5	0.5	100	1.6	0.4	2.7
Epilobium species	50	0.3	0.7	0.7	100	1.4	1	1.7
Carex species	50	5.3	10.5	10.5	50	10.8	21.6	21.6
Caltha leptosepala ssp. biflora	50	5.3	10.7	10.7	50	7.1	14.2	14.2
Carex scopulorum var. bracteosa	50	6.1	12.1	12.1	50	5.3	10.5	10.5
Elymus glaucus	50	5.7	11.3	11.3	50	4.2	8.3	8.3
Achillea millefolium	50	0.3	0.7	0.7	50	2.4	4.8	4.8
Juncus articulatus	50	1.4	2.7	2.7	50	2.1	4.2	4.2
Rush - other	50	1	2	2	50	2	4	4
Perideridia parishii ssp. latifolia	50	2.7	5.3	5.3	50	1.9	3.7	3.7
Juncus nevadensis	50	1.4	2.7	2.7	50	1.6	3.2	3.2
Trifolium species	50	0.3	0.7	0.7	50	1.6	3.2	3.2
Pedicularis attollens	50	1.1	2.2	2.2	50	1.5	2.9	2.9
Taraxacum officinale	50	0.3	0.7	0.7	50	1.4	2.7	2.7
Viola species	P	P	P	P	50	1.4	2.8	2.8
Perideridia species	50	1.4	2.7	2.7	50	1.1	2.3	2.3
Tofieldia occidentalis ssp. occidentalis	50	1	2	2	50	0.9	1.7	1.7
Mimulus primuloides	P	P	P	P	50	0.6	1.1	1.1
Phleum pratense	50	0.3	0.5	0.5	50	0.3	0.5	0.5
Scirpus congdonii	50	0.5	1	1	50	0.3	0.7	0.7
Delphinium species	50	0.3	0.7	0.7	50	0.3	0.7	0.7
Mimulus species	P	P	P	P	50	0.3	0.5	0.5
Osmorhiza chilensis	P	P	P	P	50	0.3	0.7	0.7
Saxifraga species	P	P	P	P	50	0.3	0.7	0.7
Herbaceous - other	P	P	P	P	50	0.3	0.5	0.5
Veronica species	P	P	P	P	50	0.2	0.3	0.3
Luzula subcongesta	T	T	T	T	50	T	T	T
Botrychium species	T	T	T	T	50	T	T	T
Corydalis caseana ssp. caseana	T	T	T	T	50	T	T	T
Pedicularis species	T	T	T	T	50	T	T	T
Piperia unalascensis	T	T	T	T	50	T	T	T
Total herbaceous		66.2				96.7		
Moss	50	1	2	2	100	4	3.5	4.5
Total nonvascular		1				4		
Barren - wet soil	P	P	P	P	100	4	2	6
Water - shallow	P	P	P	P	50	7	14	14
Water	P	P	P	P	50	2	4	4
Barren - litter	P	P	P	P	50	2	4	4
Total other		0				15		
Totals		100.2				150.7		

Plant Association: *Salix*-(Mix)/Wet Herbaceous Meadow Shrubland

Plant Association Code: Sal-(Mix):shrub/HWM:herb

Alliance: *Salix* Shrubland

Number of sites: 4

Other Studies

This plant association has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Salix boothii* - *Salix geyeriana* / *Carex angustata* Shrubland (2.B.6.Nb - CEGLO01185), has been described as occurring on the east slope of the Oregon Cascades.



Environmental Characteristics

This association was typically found in wet, riparian areas within and near Lassen Volcanic National Park at elevations from approximately 1555m to 2500m (5100' to 8200'). Aspects were observed in all directions on flat to gentle slopes. Soils are characterized by a combination of wet or damp soils, standing water, and organic material such as found in the "Vitrandic Cryofluvents-Aquandic Cryaquepts complex, 0 to 8 percent slopes; Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes" and "Aquolls, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

The Key shrubs in this sparse shrub association were species of the indicator genus *Salix*. *Salix lemmonii* was observed having frequency of 50% and average cover of 12%; cover ranged from 23 to 26% on the sites where it was found. *Salix laevigata*, *Salix boothii*, and an unidentified *Salix* sp. were each observed with frequency of 25% and cover of about 20, 15, and 25% respectively on the sites where they were found. Total *Salix* cover averaged about 29% on sites where they were found. *Kalmia polifolia* ssp. *microphylla* was found having frequency of 25% and cover of about 15% on the site where it was found. Several other riparian shrub species, including *Alnus incana* and *Spirea douglasii* were observed having very sparse amounts of cover. This association's tree overstory was very, very sparse as the only species observed was *Pinus contorta* var. *murrayana* with frequency of 25% and cover of about 1% on the site where it was found. The herbaceous understory in this association primarily included a mix of wet herbaceous grasses and *Carex* sp. that had a combined average cover of about 68%. *Carex* sp. and "other" grasses were observed having 75% frequency and average cover of 19 and 13% respectively; cover estimates ranged from 6 to 88% on the sites where these species were found. *Carex angustata* was observed having frequency of 50% and average cover of 9%. The dense shrub and herbaceous vegetation obscured most of the ground surface condition. Water was observed with frequency of 25% and combined total cover of about 6% of the ground surface. Bare wet soil had frequency of 75% and cover of about 6% of the ground surface. Little organic material was present as litter contributed only about 1% total cover to the ground surface condition.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 6485: *Salix*-(Mix)/Wet Herbaceous Meadow Shrubland

Detailed Alliance	Bird's-Eye	Bird's-Eye	Bird's-Eye	Bird's-Eye	Total	Total	Total	Total
Species	Frequency (%)	Average Cover	Minimum Cover	Maximum Cover	Frequency (%)	Average Cover	Minimum Cover	Maximum Cover
Pinus contorta var. murrayana	25	0.3	1	1	25	0.3	1	1
Total tree		0.3				0.3		
Salix lemmonii	50	12.3	23.1	26	50	12.1	22.2	26
Kalmia polifolia ssp. microphylla	25	3.8	15	15	25	7.5	30	30
Salix species	25	6.3	25	25	25	6.3	25	25
Salix laevigata	25	5	20	20	25	4.8	19	19
Salix boothii	25	3.7	14.8	14.8	25	3.7	14.8	14.8
Alnus incana	25	0.2	0.9	0.9	25	0.5	1.9	1.9
Spiraea douglasii	P	P	P	P	25	0.3	1	1
Ribes nevadense	T	T	T	T	25	T	T	T
Total shrub		31.3				35.2		
Carex species	75	19	5.9	59	75	20.3	11	59
Grass - other	75	13.1	9.8	29.3	75	11.8	12.2	22
Carex angustata	50	9.2	15.7	21.2	50	9.6	15.3	23
Rush - other	50	3.1	3.4	9	50	3.5	2.8	11
Juncus articulatus	50	1.3	0.5	4.7	50	1.4	0.5	5.2
Aster species	50	1.2	2	2.7	50	1.3	2.1	3.2
Trifolium species	25	0.3	1.4	1.4	50	0.7	1	1.8
Stachys ajugoides	P	P	P	P	50	0.6	0.9	1.5
Veratrum californicum	25	0.1	0.5	0.5	50	0.5	2	2
Scirpus microcarpus	25	1.9	7.6	7.6	25	9.5	38	38
Carex vesicaria var vesicaria	25	3.2	12.7	12.7	25	5.1	20.2	20.2
Typha latifolia	25	6.9	27.5	27.5	25	3	12	12
Carex utriculata	25	2.6	10.4	10.4	25	2.6	10.4	10.4
Equisetum species	25	0.4	1.5	1.5	25	2.5	9.8	9.8
Scirpus species	P	P	P	P	25	2	8	8
Carex simulata	25	1.3	5.1	5.1	25	1.2	4.9	4.9
Caltha leptosepala ssp. biflora	25	0.8	3.3	3.3	25	1.1	4.6	4.6
Lupinus polyphyllus	25	0.1	0.5	0.5	25	1	4.2	4.2
Senecio triangularis	25	0.5	2	2	25	1	4.1	4.1
Viola macloskeyi	P	P	P	P	25	0.9	3.8	3.8
Pedicularis attollens	25	0.3	1.4	1.4	25	0.8	3.2	3.2
Herbaceous - other	25	0.2	0.6	0.6	25	0.8	3.2	3.2
Carex nervina	25	0.2	0.7	0.7	25	0.5	2.1	2.1
Perideridia species	25	0.6	2.4	2.4	25	0.5	1.9	1.9
Scirpus congdonii	25	0.4	1.8	1.8	25	0.4	1.7	1.7
Aconitum columbianum	25	0.3	1	1	25	0.4	1.8	1.8
Galium aparine	P	P	P	P	25	0.4	1.5	1.5
Penstemon species	25	0.4	1.7	1.7	25	0.4	1.7	1.7
Veronica species	P	P	P	P	25	0.4	1.5	1.5
Carex abrupta	P	P	P	P	25	0.3	1	1
Juncus nevadensis	25	0.4	1.5	1.5	25	0.3	1.2	1.2
Mimulus species	25	0.1	0.5	0.5	25	0.3	1.2	1.2
Osmorhiza occidentalis	P	P	P	P	25	0.3	1	1
Ranunculus occidentalis	25	0.3	1	1	25	0.3	1	1
Achillea millefolium	P	P	P	P	25	0.2	0.9	0.9
Hypericum anagalloides	P	P	P	P	25	0.2	0.8	0.8
Polygonum bistortoides	25	0.2	0.7	0.7	25	0.2	0.7	0.7
Apiaceae	P	P	P	P	25	0.1	0.5	0.5
Horkelia fusca ssp. tenella	25	0.1	0.5	0.5	25	0.1	0.5	0.5
Epilobium species	T	T	T	T	25	T	T	T
Galium triflorum	T	T	T	T	25	T	T	T
Gnaphalium palustre	T	T	T	T	25	T	T	T
Mimulus guttatus	T	T	T	T	25	T	T	T
Total herbaceous		68.5				86.5		
Moss	P	P	P	P	25	0.9	3.6	3.6
Total nonvascular		0				0.9		
Barren - wet soil	P	P	P	P	75	5.8	2	13
Water - shallow	P	P	P	P	25	5	20	20
Barren - litter	P	P	P	P	25	1	4	4
Water	P	P	P	P	25	0.9	3.7	3.7
Total other		0				12.7		
Totals		100.1				135.6		

Plant Association: *Lupinus obtusilobus*–*Polygonum davisiae* (Mixed) Herbaceous

Plant Association Code: *LoPd:herb*

Alliance: *Lupinus obtusilobus* Perennial Herbaceous

Number of sites: 14

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Lupinus latifolius* Herbaceous Vegetation (2.B.2.Na. - CEGLO03491), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry, rocky areas within Lassen Volcanic National Park at elevations from approximately 2195m to 2835m (7200' to 9300'). This type occurred on all aspects, but most often of a southerly direction from west to east on flat to steep slopes. This association's soils are characterized by the dominance of rock and fine gravelly bare soil, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes; Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxerepts, debris flows-Typic Dystroxerepts complex, 10 to 80 percent slopes" or "Xeric Vitricryands, cirque floor-Humic Xeric Vitricryands complex, 1 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the presence of the Key indicator species *Lupinus obtusilobus* and/or *Polygonum davisiae* as either pure stands of either species or mixes of these two species. *Achnatherum occidentale* and/or *Elymus elymoides* were sometimes present, but never in amounts greater than the *Polygonum davisiae*. *Lupinus obtusilobus* was observed to have frequency of 93% and average cover of 39%; cover estimates ranged from 15 to 90%. *Polygonum davisiae* was observed with frequency of 50% and average cover of 9%; cover estimates ranged from 4 to 34% on sites where it was found. Tree cover was very sparse with maximum frequency of 21% and combined average cover of only 1.5%; the maximum tree cover observed was 6%. Shrub cover was even sparser, as it averaged less than 1% cover and maximum frequency of 7%. Fine, gravelly, and bare soils had combined frequency of 100% and average total cover of 60%; cover estimates ranged from 2 to 94%. Bare rock and talus had frequency of 93% and average total cover of 23%; cover estimates ranged from 2 to 88%. Litter had frequency of 43% and total cover of only about 2%. Woody debris and duff were not observed on sites in this association.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7100: *Lupinus obtusilobus*–*Polygonum davisiae* (Mixed) Herbaceous

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Tsuga mertensiana</i>	21.4	1.1	4	6	42.9	1.1	4	6
<i>Abies magnifica</i>	7.1	0.1	2	2	14.3	0.1	2	2
<i>Pinus monticola</i>	T	T	T	T	14.3	T	T	T
<i>Pinus contorta</i> var. <i>murrayana</i>	7.1	0.3	4	4	7.1	0.3	4	4
Total tree		1.5				1.5		
<i>Phyllodoce breweri</i>	7.1	0.3	4	4	21.4	0.3	4	4
<i>Arctostaphylos nevadensis</i>	7.1	0.4	6	6	7.1	0.4	6	6
<i>Holodiscus microphyllus</i> var. <i>glabrescens</i>	T	T	T	T	7.1	T	T	T
Total shrub		0.7				0.7		
<i>Lupinus obtusilobus</i>	92.9	38.6	15	90	92.9	38.6	15	90
<i>Polygonum davisiae</i>	50	9.1	4	34	64.3	9.4	4	34
<i>Eriogonum marifolium</i>	21.4	1.8	4	15	42.9	1.9	4	15
<i>Calyptidium umbellatum</i>	21.4	0.6	2	4	42.9	0.6	2	4
<i>Polygonum shastense</i>	7.1	0.2	3	3	28.6	0.2	3	3
<i>Carex breweri</i>	14.3	2.8	9	30	21.4	2.8	9	30
<i>Carex stramineiformis</i>	14.3	0.9	2	11	21.4	0.9	2	11
<i>Streptanthus tortuosus</i>	T	T	T	T	21.4	T	T	T
<i>Eriogonum umbellatum</i>	14.3	0.8	4	7	14.3	0.8	4	7
<i>Arabis platysperma</i>	14.3	0.2	1	2	14.3	0.2	1	2
<i>Achnatherum occidentale</i>	7.1	0.1	2	2	14.3	0.1	2	2
<i>Carex species</i>	7.1	0.1	1	1	14.3	0.1	1	1
<i>Monardella odoratissima</i>	7.1	0.1	2	2	14.3	0.1	2	2
<i>Eriogonum pyrolifolium</i>	T	T	T	T	14.3	T	T	T
<i>Phlox diffusa</i>	7.1	0.3	4	4	7.1	0.3	4	4
<i>Elymus elymoides</i>	T	T	T	T	7.1	T	T	T
<i>Juncus parryi</i>	T	T	T	T	7.1	T	T	T
<i>Chaenactis nevadensis</i>	T	T	T	T	7.1	T	T	T
<i>Cheilanthes gracillima</i>	T	T	T	T	7.1	T	T	T
<i>Cryptogramma cascadenis</i>	T	T	T	T	7.1	T	T	T
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	T	T	T	T	7.1	T	T	T
Total herbaceous		55.6				56		
Total nonvascular		0				0		
Barren - fine gravelly soil	85.7	18.3	2	50	92.9	44.3	2	94
Barren - rock	78.6	15.1	2	70	85.7	16.4	2	70
Barren - litter	7.1	0.1	2	2	42.9	2.3	2	12
Barren - gravel	21.4	3.7	10	22	21.4	10.7	30	64
Barren - rock/talus	7.1	3	42	42	7.1	6.3	88	88
Barren - bare soil	7.1	1.9	26	26	7.1	4.4	62	62
Barren - silty soil	P	P	P	P	7.1	0.1	2	2
Barren - fine woody debris	P	P	P	P	7.1	0.1	2	2
Total other		42.1				84.6		
Totals		99.9				142.8		

Plant Association: *Lupinus obtusilobus*–*Achnatherum occidentale*-*Elymus elymoides*
Mixed Herbaceous

Plant Association Code: LoAE:herb

Alliance: *Lupinus obtusilobus* Perennial Herbaceous

Number of sites: 7

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Lupinus latifolius* Herbaceous Vegetation (2.B.2.Na. - C EGL003491), has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on dry areas within Lassen Volcanic National Park at elevations from approximately 2225m to 2710m (7300' to 8900'). This type occurred on all aspects, often of an easterly direction on flat to moderately steep slopes. This association's soils are characterized by the dominance of fine gravelly bare soil, such as found in the "Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes; Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxerepts, debris flows-Typic Dystroxerepts complex, 10 to 80 percent slopes;" or "Xeric Vitricryands, cirque floor-Humic Xeric Vitricryands complex, 1 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the presence of the Key indicator species *Lupinus obtusilobus* and the presence of either *Achnatherum occidentale* or *Elymus elymoides*. Based on its composition, it may represent a transitional type between the lower elevation *Achnatherum occidentale*-*Elymus elymoides*-(Mix) Mixed Herbaceous and the *Lupinus obtusilobus*-*Polygonum davisiae* Mixed Herbaceous types. *Lupinus obtusilobus* was observed to have frequency of 100% and average cover of 32%; cover estimates ranged from 4 to 90%. *Elymus elymoides* was observed with frequency of 100% and average cover of 6%; cover estimates ranged from 1 to 13%. *Achnatherum occidentale* was observed with frequency of 43% and average cover of 9%; cover estimates ranged from 6 to 31% on sites where it was found. Of note is that *Polygonum davisiae* was not observed in this association. *Monardella odoratissima* was observed with frequency of 57% and average cover of 8%; cover estimates ranged from 8 to 19% on sites where it was found. Tree cover was very sparse with frequency of 14% and combined average cover of about 1%; the maximum tree cover observed was 2%. Shrub cover was nearly as sparse with combined average cover of 2.5% on sites where they were found. *Ericameria bloomeri* had frequency of 43% and average cover of about 2%; cover estimates ranged from 2 to 5% on sites where it was found. Fine, gravelly, and bare soils had combined frequency of 100% and average total cover of 56%; cover estimates ranged from 2 to 64%. Bare rock had frequency of 71% and average total cover of 9%; cover estimates ranged from 1 to 32%. Litter had frequency of 43% and average total cover of about 2%. Woody debris and duff had frequency of 29% and average cover of about 5%; cover estimates ranged from 11 to 31% on the sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7200: *Lupinus obtusilobus*–*Achnatherum occidentale*-*Elymus elymoides* Mixed Herbaceous

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus contorta var. murrayana	14.3	0.3	2	2	14.3	0.3	2	2
Abies magnifica	14.3	0.3	2	2	14.3	0.3	2	2
Tsuga mertensiana	14.3	0.3	2	2	14.3	0.3	2	2
Total tree		0.9				0.9		
Ericameria bloomeri	42.9	1.6	2	5	42.9	1.6	2	5
Sambucus racemosa	28.6	0.9	2	4	42.9	1.4	4	6
Total shrub		2.5				3		
Lupinus obtusilobus	100	32.3	4	90	100	32.3	4	90
Elymus elymoides	100	5.5	1	12.7	100	5.6	1	14.7
Monardella odoratissima	57.1	8.1	8	19	57.1	8.2	8	21
Achnatherum occidentale	42.9	5	6	21	42.9	5	6	21
Streptanthus tortuosus	14.3	0.6	4	4	42.9	0.9	2	4
Carex species	14.3	0.1	1	1	28.6	0.1	1	1
Achnatherum species	14.3	4.4	30.7	30.7	14.3	4.4	30.7	30.7
Grass - other	14.3	1.9	13	13	14.3	1.9	13	13
Carex spissa	14.3	0.4	3	3	14.3	0.4	3	3
Eriogonum species	14.3	0.4	3	3	14.3	0.4	3	3
Erysimum capitatum var. capitatum	14.3	0.4	3	3	14.3	0.4	3	3
Gayophytum diffusum ssp. diffusum	14.3	0.4	3	3	14.3	0.4	3	3
Carex multicosata	14.3	0.3	2	2	14.3	0.3	2	2
Eriogonum marifolium	14.3	0.1	1	1	14.3	0.1	1	1
Botrychium species	T	T	T	T	14.3	T	T	T
Cirsium species	T	T	T	T	14.3	T	T	T
Herbaceous - other	T	T	T	T	14.3	T	T	T
Total herbaceous		59.9				60.4		
Lichen	14.3	0.3	2	2	14.3	0.3	2	2
Total nonvascular		0.3				0.3		
Barren - fine gravelly soil	71.4	20	8	60	85.7	30.3	2	60
Barren - rock	71.4	4.1	1	10	71.4	9.3	1	32
Barren - bare soil	42.9	3.9	2	20	57.1	7	2	22
Barren - gravel	42.9	6	8	20	42.9	19.1	32	64
Barren - litter	14.3	0.1	1	1	42.9	1.7	1	6
Barren - fine woody debris	28.6	0.9	2	4	28.6	2.6	2	16
Barren - duff	14.3	0.3	2	2	28.6	1.4	2	8
Barren - coarse woody debris	14.3	1.1	8	8	14.3	1	7	7
Total other		36.4				72.4		
Totals		100				137		

Plant Association: *Wyethia mollis*-*Balsamorhiza sagittata* (Mixed)
Herbaceous Meadow

Plant Association Code: WmBs:herb

Alliance: *Wyethia mollis* Perennial Herbaceous

Number of sites: 7

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

This association has been described as an understory associate of a slightly similar association, *Abies magnifica* / *Wyethia mollis* Forest (1.B.2.Nd. - C EGL008610), for portions of the northern and central Sierra Nevada, California.



Environmental Characteristics

This association was typically found on dry, rocky areas within Lassen Volcanic National Park at elevations from approximately 1890m to 2380m (6200' to 7800'). This type occurred on southerly aspects from west to east on flat to steep slopes. This association's soils are characterized by the dominance fragmented rock and bare soil, such as found in the "Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxerepts, debris flows-Typic Dystroxerepts complex, 10 to 80 percent slopes; Badgerflat very gravelly ashy sandy loam, 1 to 30 percent slopes;" or "Typic Dystroxerepts, landslides, 10 to 50 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was characterized by the presence of two Key indicator species *Wyethia mollis* and *Balsamorhiza sagittata*, found either individually or in combination. *Balsamorhiza sagittata* was observed to have frequency of 100% and average cover of 25%; cover estimates ranged from 2 to 39%. *Wyethia mollis* was observed at 57% frequency and average cover of 18%; cover estimates ranged from 4 to 57%. Other herbaceous associates of this type included “other” grasses and *Elymus elymoides*. “Other” grasses were observed at 86% frequency and average cover of 8%; cover estimates ranged from 1 to 26%. *Elymus elymoides* was observed at 71% frequency and average cover of 2%; cover estimates ranged from 2 to 3%. Several other herbaceous associates that were found with about 43% frequency were *Perideridia* sp., *Artemisia douglasiana*, *Angelica breweri*, and *Monardella odoratissima*. Over thirty different herbaceous species were observed in this association. Tree cover was very sparse with combined cover of about 9% on the few sites where they were found. Shrub cover was also sparse with none of the observed species having frequency of greater than 15% or cover at any one site of greater than 6%. Combined shrub cover only averaged about 2%. Bare rock had frequency of 86% and average total cover of 16%; cover estimates ranged from 4 to 60%. Bare soils had combined frequency of 100% and average total cover of 59%; cover estimates ranged from 6 to 92%. Litter had frequency of 71% but accounted for only 13% of the total cover; cover estimates ranged from 2 to 38%. There was no woody debris observed in this association.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. “T” indicates the species is a Trace species, while “P” indicates the species is present in the type, but not a participant in the cover of the Bird’s-Eye View.

Type 7400: *Wyethia mollis*-*Balsamorhiza sagittata* (Mixed) Herbaceous Meadow

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Abies magnifica	28.6	0.9	2	4	42.9	0.9	2	4
Pinus monticola	14.3	0.9	6	6	14.3	0.9	6	6
Total tree		1.8				1.8		
Chrysolepis sempervirens	14.3	0.9	6.1	6.1	14.3	0.9	6.1	6.1
Holodiscus microphyllus var. glabrescens	14.3	0.3	2	2	14.3	0.6	4	4
Sambucus racemosa	14.3	0.3	2	2	14.3	0.3	2	2
Acer glabrum	T	T	T	T	14.3	T	T	T
Amelanchier pallida	T	T	T	T	14.3	T	T	T
Ericameria bloomeri	T	T	T	T	14.3	T	T	T
Total shrub		1.5				1.8		
Balsamorhiza sagittata	100	25	2.5	39.2	100	22.7	2.2	36.5
Grass - other	85.7	7.9	0.7	25.5	85.7	11.3	3.7	27.8
Elymus elymoides	71.4	1.6	2	3	85.7	2.3	2	3.7
Wyethia mollis	57.1	18.4	3.7	57.3	57.1	15.1	3.7	45.1
Orthocarpus cuspidatus ssp. cryptanthus	28.6	2.7	4.2	15	57.1	4.1	7.3	21.1
Perideridia species	42.9	1.2	0.7	4.7	57.1	1.8	2.7	5.2
Allium species	T	T	T	T	57.1	0.3	0.7	1
Artemisia douglasiana	42.9	4.2	5	17.3	42.9	4.5	5	19
Angelica breweri	42.9	4.9	8	17.7	42.9	4.2	6.7	14.8
Monardella odoratissima	42.9	2.5	1.7	8	42.9	2.9	2.3	9
Lupinus arbustus	28.6	0.7	1.7	3.5	42.9	1.4	3.3	6.5
Hackelia micrantha	28.6	0.2	0.7	1	42.9	0.3	0.7	1
Phacelia species	14.3	0.1	0.7	0.7	42.9	0.1	0.7	0.7
Pteridium aquilinum	28.6	3.8	4	22.8	28.6	3.9	4	23.5
Carex multcostata	28.6	0.7	1	4	28.6	0.7	1	4
Hackelia species	14.3	0.5	3.5	3.5	28.6	0.6	4.2	4.2
Corydalis caseana ssp. caseana	14.3	2.1	15	15	14.3	2.1	15	15
Senecio triangularis	14.3	1.4	10	10	14.3	0.7	4.8	4.8
Arabis platysperma	14.3	0.4	3.1	3.1	14.3	0.6	4.1	4.1
Achnatherum occidentale	14.3	0.3	2	2	14.3	0.3	2	2
Eriogonum species	14.3	0.3	2	2	14.3	0.3	2	2
Heracleum lanatum	14.3	0.3	2	2	14.3	0.3	2	2
Lupinus polyphyllus	14.3	0.2	1.3	1.3	14.3	0.3	1.8	1.8
Osmorhiza chilensis	14.3	0.2	1.7	1.7	14.3	0.3	2.3	2.3
Veratrum californicum	P	P	P	P	14.3	0.3	2.3	2.3
Aster occidentalis	P	P	P	P	14.3	0.2	1.2	1.2
Castilleja applegatei ssp. pinetorum	14.3	0.1	1	1	14.3	0.1	1	1
Gayophytum diffusum ssp. diffusum	P	P	P	P	14.3	0.1	0.7	0.7
Madia glomerata	P	P	P	P	14.3	0.1	1	1
Herbaceous - other	P	P	P	P	14.3	0.1	0.7	0.7
Eriogonum marifolium	T	T	T	T	14.3	T	T	T
Total herbaceous		79.7				82		
Total nonvascular		0				0		
Barren - rock	71.4	10	2	60	85.7	15.5	4	60
Barren - litter	P	P	P	P	71.4	12.9	2	37.5
Barren - fine gravelly soil	42.9	6.3	8	24	57.1	42.6	54	92
Barren - bare soil	28.6	0.6	2	2.1	42.9	16.1	6	65.3
Total other		16.9				87.1		
Totals		99.9				172.7		

Plant Association: *Achnatherum occidentale*–*Elymus Elymoides*-(Mix) Herbaceous

Plant Association Code: *AoEe*-(Mix):herb

Alliance: *Achnatherum occidentale*–*Elymus Elymoides* Herbaceous

Number of sites: 10

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Pinus monticola* / *Achnatherum occidentale* Woodland (1.B.2.Nd. - C EGL008622), having an understory of *Achnatherum occidentale* has been described in California.



Environmental Characteristics

This association was typically found on dry sites, often recently disturbed by fire, within Lassen Volcanic National Park at elevations from approximately 1615m to 2680m (5300' to 8800'). This type occurred on all aspects, often of an easterly direction on flat to moderately steep slopes. This association's soils are characterized by bare soil and small amounts of organic material, such as found in the "Badgerflat-Cenplat complex, 10 to 60 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes; Aquandic Humaquepts-Histic Humaquepts-Aquandic Endoaquepts-Terric Haplohemists complex, 1 to 5 percent slopes" or "Sueredo bouldery ashy loamy coarse sand, 2 to 30 percent slopes" 2011 LAVO SSURGO soil classifications.

Vegetation

This association was characterized by the presence of the Key indicator species *Achnatherum occidentale* and *Elymus elymoides*, either as pure stands of one of these two species or mixes of these two species. *Elymus elymoides* was observed with 60% frequency and average cover of 9%; cover estimates ranged from 5 to 32% on sites where it was found. *Achnatherum occidentale* was observed with 50% frequency and average cover of 15%; cover estimates ranged from 8 to 61% on sites where it was found. *Gayophytum diffusum ssp. diffusum* was observed with frequency of 50% and average cover of 3%; cover estimates ranged from 1 to 10% on sites where it was found. Several other herbaceous species were often observed in this association; these additional species were typically in areas that appeared to have developed for a longer period of time since the most recent disturbance (fire), leading to the addition of the "(Mixed)" designation for this herbaceous type. *Monardella odoratissima* was observed with frequency of 40% and average cover of 4%; cover estimates ranged from 4 to 24% on sites where it was found. *Lupinus angustiflorus* had frequency of 30% and average cover of 4%; cover estimates ranged from 5 to 20% on sites where it was found. Tree cover, mostly standing dead, was very sparse with maximum frequency of 30% and average cover of only about 3%; the maximum tree cover observed in this type was 6% and often represented standing dead fire-killed trees. *Abies magnifica*, *Abies concolor*, *Pinus contorta var. murrayana*, and *Pinus Jeffreyi* were the species found on some of this association's sites. Shrub cover was even sparser as it averaged a combined cover of only 2%; cover estimates ranged from 7 to 10% on sites where they were found. *Ericameria bloomeri* was the most frequently occurring shrub having frequency of 30% and average cover of about 2%; cover estimates ranged from 2 to 6% on sites where it was found. Bare soils had combined average total cover of 49%; cover estimates ranged from 2 to 88% on sites where they were found. Bare rock and gravel had frequency of 50% and average total cover of 6%; cover estimates ranged from 1 to 32%. Litter had frequency of 60% and average total cover of about 10%. Coarse and fine woody debris, organic ash, and duff had average cover of about 17%; cover estimates ranged from 2 to 20% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7000: *Achnatherum occidentale*-*Elymus Elymoides*-(Mix) Herbaceous

Detailed Alliance	Bird's-Eye Frequency	Bird's-Eye Average	Bird's-Eye Minimum	Bird's-Eye Maximum	Total Frequency	Total Average	Total Minimum	Total Maximum
Species	(%)	Cover	Cover	Cover	(%)	Cover	Cover	Cover
<i>Abies magnifica</i> (dead)	30	1.1	2	6	30	1.1	2	6
<i>Pinus jeffreyi</i> (dead)	30	0.7	1	4	30	0.7	1	4
<i>Pinus contorta</i> var. <i>murrayana</i> (dead)	20	0.6	2	4	20	0.6	2	4
<i>Abies magnifica</i>	20	0.5	2	3	20	0.5	2	3
<i>Pinus contorta</i> var. <i>murrayana</i>	10	0.4	4	4	10	0.4	4	4
<i>Pinus jeffreyi</i>	T	T	T	T	10	T	T	T
<i>Abies concolor</i>	T	T	T	T	10	T	T	T
Total tree		3.3				3.3		
<i>Ericameria bloomeri</i>	30	1.6	4	6	30	1.2	3	5
<i>Ceanothus velutinus</i>	T	T	T	T	30	T	T	T
<i>Arctostaphylos nevadensis</i>	20	0.3	1.5	2	20	0.5	1.5	3
<i>Ribes roezlii</i>	10	0.2	2	2	10	0.2	2	2
<i>Ribes cereum</i>	T	T	T	T	10	T	T	T
<i>Ribes viscosissimum</i>	T	T	T	T	10	T	T	T
<i>Chrysothamnus nauseosus</i> ssp. <i>albicaulis</i>	T	T	T	T	10	T	T	T
<i>Rubus leucodermis</i>	T	T	T	T	10	T	T	T
Total shrub		2.1				1.9		
<i>Gayophytum diffusum</i> ssp. <i>diffusum</i>	50	2.6	1	10	70	3	1	13
<i>Elymus elymoides</i>	60	9.2	5	32	60	7.7	5	33
<i>Achnatherum occidentale</i>	50	14.6	8	61	50	13.9	9	56
Grass - other	50	1.8	2	10	50	2	1	11
<i>Monardella odoratissima</i>	40	4.3	4	24	40	4.5	5	24
<i>Lupinus angustiflorus</i>	30	4.1	5	20	30	4.2	7	20
<i>Apocynum androsaemifolium</i>	30	0.5	1	2	30	0.5	1	2
<i>Chamaesaracha nana</i>	20	2.8	2	26	20	3.3	3	29.5
<i>Aster</i> species	20	2.2	2	19.7	20	2.7	2	25
<i>Lupinus lepidus</i>	20	0.9	3.7	5	20	1.4	5.7	8
<i>Penstemon gracilentus</i>	10	0.6	6	6	20	0.6	6	6
<i>Trifolium</i> species	10	2.2	21.7	21.7	10	3.5	34.6	34.6
<i>Carex rossii</i>	10	1.2	12	12	10	1.9	19	19
<i>Carex subfusca</i>	10	1.5	15	15	10	1.5	15	15
<i>Polygonum shastense</i>	10	0.8	8	8	10	0.8	8	8
<i>Galium grayanum</i> var. <i>grayanum</i>	10	0.7	7	7	10	0.7	7	7
<i>Carex douglasii</i>	10	0.2	2	2	10	0.6	6	6
<i>Castilleja</i> species	10	0.6	6	6	10	0.6	6	6
<i>Lupinus arbustus</i>	10	0.6	5.5	5.5	10	0.6	5.5	5.5
<i>Carex luzulifolia</i>	10	0.9	9.3	9.3	10	0.5	5.3	5.3
<i>Cycladenia humilis</i> var. <i>humilis</i>	10	0.5	5	5	10	0.5	5	5
<i>Phleum alpinum</i>	10	0.7	7.3	7.3	10	0.4	4	4
<i>Phacelia</i> species	10	0.4	4	4	10	0.4	4	4
<i>Juncus articulatus</i>	10	0.2	2	2	10	0.2	2	2
<i>Fragaria virginiana</i>	P	P	P	P	10	0.2	2	2
<i>Carex spissa</i>	10	0.1	1	1	10	0.1	1	1
<i>Calyptridium umbellatum</i>	P	P	P	P	10	0.1	0.7	0.7
<i>Horkelia fusca</i> ssp. <i>tenella</i>	10	0.1	1	1	10	0.1	1	1
<i>Kelloggia galioides</i>	10	0.1	1	1	10	0.1	1	1
<i>Penstemon</i> species	10	0.2	2	2	10	0.1	1	1
<i>Arnica</i> species	T	T	T	T	10	T	T	T
<i>Ericameria greenei</i>	T	T	T	T	10	T	T	T
<i>Eriogonum</i> species	T	T	T	T	10	T	T	T
Total herbaceous		54.6				56.7		
Moss	P	P	P	P	10	0.3	3	3
Total nonvascular		0				0.3		
Barren - bare soil	80	19.6	2	70	80	34.3	2	88
Barren - fine woody debris	60	2	1	6	70	6.8	3	20
Barren - litter	50	3.6	1	18	60	10.2	2	45
Barren - coarse woody debris	60	5	2	20	60	5.5	2	20
Barren - fine gravelly soil	40	4	2	20	40	14.6	12	58
Barren - rock	20	2.3	1	22	40	3.7	1	32
Barren - duff	30	1.1	3	4	40	2.6	2	12
Barren - organic ash	30	1.6	3	10	40	2.2	2	10
Barren - gravel	10	0.8	8	8	10	2.6	26	26
Total other		40				82.5		
Totals		100				144.7		

Plant Association: Dry Mixed Herbaceous

Plant Association Code: HDX:herb

Alliance: Other Herbaceous

Number of sites: 7

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It may likely represent somewhat of a generalization of associations having dry mixed herbaceous vegetative cover that were found in Lassen Volcanic National Park.

Another dry association of a vaguely similar nature, *Carex siccata* - *Carex rossii* Herbaceous Vegetation (2.B.6.Na. - CEGL005388), has been described in Grand Canyon National Park, Arizona.



Environmental Characteristics

This association was typically found on dry or seasonally mesic, rocky areas within and near Lassen Volcanic National Park at elevations from approximately 1585m to 2650m (5200' to 8700'). These types occurred on all aspects and were generally found on flat to moderately steep slopes. Soils in many of these areas are characterized by fragmented rock or fine gravelly soil and the lack of organic matter such as found in the "Xeric Vitricryands-Rock outcrop complex, 10 to 45 percent slopes; Sheld family-Sheld family, moderately deep complex, 0 to 35 percent slopes" and "Badgerflat-Cenplat complex, 10 to 60 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was noted for its absence of some of the common species that would have resulted in the assignment of a species-specific herbaceous association. This association was dominated by mixes of dry, herbaceous vegetation, both graminoids and forbs. No species had a frequency greater than 57% and the combined average cover of all herbaceous plants was 49%. "Other" grasses had the highest frequency with 57% and average cover of 8%; cover estimates ranged from 8 to 26%. *Aster* sp. had frequency of 43% with average cover of 4%; cover estimates ranged from 5 to 10%. *Eriogonum nudum* had frequency of 29% and average cover of 4%; cover estimates ranged from 4 to 25% on sites where it was observed. All other herbaceous plants were observed having frequency of less than 15%. Tree cover was generally lacking with a combined average cover of 3%; cover estimates ranged from 1 to 6% on sites where trees were observed. Shrub cover was also very sparse having average cover of less than 3% on sites where they were observed. Bare soil had frequency of 86% and average cover of 18%; cover estimates ranged from 2 to 84% on sites where it was found. Rock had frequency of 43% and average total cover of 30%; cover estimates ranged from 34 to 92% on sites where it was found. Litter had frequency of 43% and averaged only 2% total cover. Duff and woody debris had average total cover of 10%; cover estimates ranged from 15 to 41% on sites where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7900: Dry Mixed Herbaceous

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	28.6	0.7	1	4	57.1	0.7	1	4
Abies concolor	14.3	0.7	5	5	28.6	0.7	5	5
Pinus jeffreyi (dead)	14.3	0.9	6	6	14.3	0.9	6	6
Cercocarpus ledifolius	14.3	0.6	4	4	14.3	0.6	4	4
Pinus lambertiana	14.3	0.3	2	2	14.3	0.3	2	2
Calocedrus decurrens	14.3	0.1	1	1	14.3	0.1	1	1
Total tree		3.3				3.3		
Leptodactylon pungens	14.3	0.9	6	6	14.3	1.4	10	10
Ceanothus cordulatus	14.3	0.7	5	5	14.3	0.7	5	5
Chamaebatiaria millefolium	14.3	0.6	4	4	14.3	0.6	4	4
Ribes roezlii	14.3	0.3	2	2	14.3	0.3	2	2
Symphoricarpos albus	14.3	0.1	1	1	14.3	0.1	1	1
Ribes nevadense	T	T	T	T	14.3	T	T	T
Chrysothamnus nauseosus ssp. albicaulis	T	T	T	T	14.3	T	T	T
Total shrub		2.6				3.1		
Grass - other	57.1	8.2	7.7	26	57.1	8.2	7.7	26
Aster species	42.9	3.7	5	10.5	42.9	3.8	6	10.5
Eriogonum nudum	28.6	4.1	4	25	28.6	4.1	4	25
Carex species	14.3	10.8	75	75	14.3	10.8	75	75
Perideridia species	14.3	2.7	19	19	14.3	2.7	19	19
Trifolium species	14.3	2.7	19	19	14.3	2.7	19	19
Herbaceous - other	14.3	2.2	15.3	15.3	14.3	2.2	15.3	15.3
Polygonum douglasii	14.3	1.7	11.8	11.8	14.3	1.7	11.8	11.8
Phlox muscoides	14.3	1.4	10	10	14.3	1.4	10	10
Cycladenia humilis var. humilis	14.3	1.3	9	9	14.3	1.3	9	9
Penstemon newberryi	14.3	1.1	8	8	14.3	1	7	7
Carex phaeocephala	14.3	1.1	8	8	14.3	0.9	6	6
Lupinus lepidus	14.3	1	7	7	14.3	0.9	6	6
Mimulus torreyi	14.3	0.9	6	6	14.3	0.9	6	6
Stephanomeria species	14.3	0.6	4	4	14.3	0.9	6	6
Collomia linearis	14.3	0.6	4	4	14.3	0.6	4	4
Eriogonum ovalifolium var. nivale	14.3	0.7	5	5	14.3	0.6	4	4
Elymus elymoides	14.3	0.6	4	4	14.3	0.4	3	3
Antennaria dimorpha	14.3	0.4	3	3	14.3	0.4	3	3
Cirsium vulgare	14.3	0.4	3	3	14.3	0.4	3	3
Potentilla flabellifolia	14.3	0.4	2.8	2.8	14.3	0.4	2.8	2.8
Apocynum androsaemifolium	14.3	0.3	2	2	14.3	0.3	2	2
Gayophytum diffusum ssp. diffusum	14.3	0.3	2	2	14.3	0.3	2	2
Hulsea nana	14.3	0.3	2	2	14.3	0.3	2	2
Allium species	14.3	0.2	1.2	1.2	14.3	0.2	1.2	1.2
Achnatherum occidentale	14.3	0.1	1	1	14.3	0.1	1	1
Carex brainerdii	14.3	0.1	1	1	14.3	0.1	1	1
Carex whitneyi	14.3	0.1	1	1	14.3	0.1	1	1
Achillea millefolium	14.3	0.1	0.7	0.7	14.3	0.1	0.7	0.7
Arabis rectissima	14.3	0.1	1	1	14.3	0.1	1	1
Hackelia californica	14.3	0.1	1	1	14.3	0.1	1	1
Ivesia gordonii	14.3	0.1	1	1	14.3	0.1	1	1
Madia species	14.3	0.1	1	1	14.3	0.1	1	1
Phacelia species	14.3	0.1	1	1	14.3	0.1	1	1
Verbascum thapsus	14.3	0.1	1	1	14.3	0.1	1	1
Smilacina species	T	T	T	T	14.3	T	T	T
Total herbaceous		48.7				48.4		
Lichen	42.9	11.9	2	63	42.9	12.6	2	64
Moss	28.6	3.9	3	24	28.6	4.9	5	29
Total nonvascular		15.8				17.5		
Barren - bare soil	71.4	8.3	2	42	85.7	17.7	2	84
Barren - rock	42.9	11.4	6	60	42.9	29.7	34	92
Barren - fine woody debris	42.9	5.3	2	25	42.9	6.1	6	25
Barren - litter	28.6	1	2	5	42.9	1.6	2	5
Barren - duff	28.6	1.7	2	10	28.6	2	4	10
Barren - coarse woody debris	28.6	1.6	5	6	28.6	1.6	5	6
Barren - fine gravelly soil	14.3	0.3	2	2	14.3	0.3	2	2
Total other		29.6				59		
Totals		100				131.3		

Plant Association: Sedge Mixed Herbaceous Meadow

Plant Association Code: HSM:herb

Alliance: Other Herbaceous

Number of sites: 2

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Carex scopulorum* - *Caltha leptosepala* Herbaceous Vegetation (2.B.6.Nb. - C EGL001823), has been described in subalpine regions of Colorado.



Environmental Characteristics

This association was typically found on wet or mesic areas within Lassen Volcanic National Park at elevations from approximately 1615m to 2285m (5300' to 7500'). This meadow type occurred on all aspects on flat to gentle slopes in areas subject to seasonal flooding or dampness. This association's soils are characterized by the dominance of wet, mucky soil such as found in the "Vitrandic Cryofluvents-Aquandic Cryaquepts complex, 0 to 8 percent slopes; Shield family, 0 to 35 percent slopes;" or "Aquandic Humaquepts-Histic Humaquepts-Aquandic Endoaquepts-Terric Haplohemists complex, 1 to 5 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This aquatic association was identified based on the codominance of Key indicator species *Aster alpinus* and a mix of graminoids that included rushes, sedges, and grasses. *Aster alpinus* was observed to have frequency of 100% and average cover of 29%; cover estimates ranged from 18 to 41%. "Other" grasses were observed with frequency of 100% and average cover of 18%; cover estimates ranged from 7 to 29%. *Eleocharis pauciflora* was observed with frequency of 100% and average cover of 10%; cover estimates ranged from 9 to 10%. *Juncus articulatus* was observed with frequency of 100% and average cover of 11%; cover estimates ranged from 8 to 14%. Several *Carex* species were observed with a combined average cover of 19%. The combined cover of about twenty-two herbaceous species averaged about 98%. No trees were observed in this association. One shrub, *Kalmia polifolia* ssp. *microphylla* was observed with frequency of 50% and cover of only about 3%. Standing shallow water and wet soil had frequency of 50% and cover of about 20% on the site where they were found. Litter was very sparse with frequency of 50% and total cover of about 6% on the site where it was found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7500: Sedge Mixed Herbaceous Meadow

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Kalmia polifolia ssp. microphylla	50	1.5	3	3	50	0.9	1.7	1.7
Total shrub		1.5				0.9		
Aster alpinus	100	29.4	18	40.7	100	26.3	20.8	31.7
Grass - other	100	17.9	7	28.7	100	16.3	5.2	27.3
Eleocharis pauciflora	100	9.5	9	10	100	10.9	4.6	17.3
Juncus articulatus	100	11.1	7.7	14.5	100	7.3	4.5	10
Gentiana newberryi var. tiogana	P	P	P	P	100	2.3	2	2.7
Trifolium species	50	0.3	0.5	0.5	100	2.3	1.7	2.8
Carex scopulorum var bracteosa	50	14	28	28	50	10.6	21.3	21.3
Herbaceous - other	50	0.9	1.8	1.8	50	4.3	8.6	8.6
Carex abrupta	50	3.9	7.8	7.8	50	3	6.1	6.1
Carex nebrascensis	50	1	2	2	50	2.7	5.4	5.4
Rush - other	50	2.7	5.3	5.3	50	2.3	4.7	4.7
Juncus nevadensis	50	2.6	5.2	5.2	50	1.8	3.6	3.6
Carex species	50	0.3	0.7	0.7	50	1.1	2.2	2.2
Polygonum bistortoides	50	2.5	5	5	50	1	2.1	2.1
Pedicularis attollens	50	0.9	1.7	1.7	50	0.6	1.2	1.2
Scirpus congdonii	50	0.5	1	1	50	0.3	0.7	0.7
Viola macloskeyi	50	0.3	0.5	0.5	50	0.3	0.5	0.5
Botrychium species	T	T	T	T	50	T	T	T
Epilobium species	T	T	T	T	50	T	T	T
Mimulus species	T	T	T	T	50	T	T	T
Piperia unalascensis	T	T	T	T	50	T	T	T
Veratrum californicum	T	T	T	T	50	T	T	T
Total herbaceous		97.8				93.4		
Moss	P	P	P	P	50	4.8	9.7	9.7
Total nonvascular		0				4.8		
Barren - wet soil	P	P	P	P	50	7	14	14
Barren - silty soil	P	P	P	P	50	3	6	6
Barren - litter	P	P	P	P	50	3	6	6
Water - shallow	50	1	2	2	50	2	4	4
Barren - fine gravelly soil	P	P	P	P	50	1	2	2
Total other		1				16		
Totals		100.3				115.1		

Alternate Plant Association name: *Eleocharis pauciflora*-*Aster alpinus*-*Carex* sp. (Sedge) Mixed Herbaceous Meadow

Plant Association: Mesic Herbaceous Meadow/Complex

Plant Association Code: HMM:herb

Alliance: Other Herbaceous

Number of sites: 5

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It may likely represent somewhat of a generalization of associations having mesic mixed herbaceous vegetative cover that were found in Lassen Volcanic National Park.

A very similar association, *Senecio triangularis* - *Veratrum californicum* Herbaceous Vegetation (2.B.6.Nb. - CEGLO01989) has been described in Yosemite National Park, California.



Environmental Characteristics

This association was typically found on mesic and seasonally wet areas within Lassen Volcanic National Park at elevations from approximately 1920m to 2440m (6300' to 8000'). This mesic herbaceous type occurred on all aspects and was generally found on flat to moderately steep slopes. Soils in many of these areas are characterized by the presence of damp, sometimes mucky, soil and organic material, such as found in the "Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxepts, debris flows-Typic Dystroxepts complex, 10 to 80 percent slopes; Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes" and "Juniperlake gravelly medial sandy loam, 2 to 35 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was dominated by mesic herbaceous vegetation, both forbs and graminoids. A mix of three Key species was often characteristic of this type. *Veratrum californicum* had frequency of 100% and average cover of 17%; cover estimates ranged from 8 to 32%. *Senecio triangularis* had frequency of 100% and average cover of 21%; cover estimates ranged from 4 to 45%. *Lupinus polyphyllus* had frequency of 80% and average cover of 7%; cover estimates ranged from 2 to 18% on sites it was observed. In addition, a mix of "other" non-Key grasses had frequency of 100% and average cover of 14%; cover estimates ranged from 4 to 30%. *Carex* sp. had frequency of 40% and average cover of 16%; cover estimates ranged from 38 to 40% on sites it was observed. Tree cover was generally lacking except for an occasional *Pinus contorta* var. *murrayana* or *Tsuga mertensiana*, both observed with only 20% frequency and very sparse cover. Shrub cover was also very sparse, except for the riparian *Salix boothii* which had frequency of 20% and very sparse cover. The ground surface of this type was almost entirely occupied by growing herbaceous vegetation. In areas where vegetation was not present water, in one form or another, was observed with frequency of 40% and average total cover of 1.4%; cover estimates ranged from 1 to 6% on the sites where it was present. Different types of bare soils averaged 12% total cover, litter averaged only 1% total cover, and rock averaged only 0.6% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 8200: Mesic Herbaceous Meadow

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Tsuga mertensiana	20	0.4	2	2	20	0.4	2	2
Pinus contorta var. murrayana	20	0.2	1	1	20	0.2	1	1
Total tree		0.6				0.6		
Salix boothii	20	0.4	2	2	20	0.4	2	2
Total shrub		0.4				0.4		
Grass - other	100	13.7	3.8	30	100	14.1	4.7	30
Veratrum californicum	100	16.8	7.6	31.7	100	12.4	6.7	20
Senecio triangularis	100	21.3	4.5	44.7	100	11.5	3.1	24.8
Lupinus polyphyllus	80	7.4	2	17.5	80	7	2.7	15.5
Perideridia species	20	1.5	7.3	7.3	60	1.8	1.7	7.1
Mimulus primuloides	20	0.2	1	1	60	1.1	0.5	4.4
Carex species	40	15.8	38	40.9	40	15.3	38	38.3
Carex nervina	40	2.4	6	6.2	40	2.9	6.5	8
Carex pachystachya	20	0.9	4.7	4.7	40	1.7	2.4	6.2
Caltha leptosepala ssp. biflora	20	0.6	2.8	2.8	40	1.5	0.7	6.9
Trifolium species	20	0.4	2	2	40	1.1	0.5	4.9
Viola species	P	P	P	P	40	0.8	0.6	3.2
Epilobium species	20	0.1	0.7	0.7	40	0.3	0.5	1.2
Pedicularis attollens	40	0.3	0.6	0.7	40	0.2	0.4	0.7
Viola bakeri	T	T	T	T	40	0.1	0.5	0.5
Carex spectabilis	20	1.5	7.7	7.7	20	5.2	26	26
Perideridia bolanderi ssp. bolanderi	20	2.4	11.8	11.8	20	2.5	12.5	12.5
Herbaceous - other	20	1.4	7.2	7.2	20	1.9	9.4	9.4
Scirpus congdonii	20	1.8	9.1	9.1	20	1.8	9	9
Juncus articulatus	20	1.8	9	9	20	1.7	8.6	8.6
Heracleum lanatum	20	1	5.1	5.1	20	1.6	7.8	7.8
Stachys ajugoides	20	0.9	4.3	4.3	20	1.6	7.9	7.9
Aconitum columbianum	20	0.7	3.6	3.6	20	1.4	7	7
Carex luzulifolia	20	0.8	4.2	4.2	20	0.9	4.3	4.3
Carex stramineiformis	20	0.5	2.5	2.5	20	0.8	4	4
Carex angustata	20	0.8	4.1	4.1	20	0.7	3.6	3.6
Mimulus tilingii	P	P	P	P	20	0.7	3.4	3.4
Carex aquatilis	20	0.4	2	2	20	0.5	2.7	2.7
Aster species	P	P	P	P	20	0.5	2.7	2.7
Erigeron peregrinus	20	0.1	0.5	0.5	20	0.5	2.6	2.6
Hackelia micrantha	20	0.4	2	2	20	0.5	2.7	2.7
Sphenosciadium capitellatum	20	0.8	3.9	3.9	20	0.5	2.7	2.7
Sidalcea species	20	0.5	2.3	2.3	20	0.4	2.2	2.2
Viola macloskeyi	P	P	P	P	20	0.4	1.8	1.8
Apiaceae	P	P	P	P	20	0.3	1.5	1.5
Senecio scorzonella	20	0.2	1.2	1.2	20	0.3	1.6	1.6
Juncus nevadensis	20	0.4	2	2	20	0.3	1.4	1.4
Phleum alpinum	20	0.2	1.1	1.1	20	0.2	0.8	0.8
Carex hoodii	P	P	P	P	20	0.2	1	1
Achillea millefolium	P	P	P	P	20	0.2	1	1
Arnica mollis	20	0.1	0.7	0.7	20	0.2	1.2	1.2
Castilleja applegatei ssp. pinetorum	20	0.2	0.8	0.8	20	0.2	0.8	0.8
Juncus mertensianus	20	0.3	1.7	1.7	20	0.2	1.1	1.1
Equisetum species	P	P	P	P	20	0.1	0.7	0.7
Erigeron coulteri	20	0.1	0.3	0.3	20	0.1	0.3	0.3
Galium triflorum	P	P	P	P	20	0.1	0.7	0.7
Monardella odoratissima	20	0.1	0.5	0.5	20	0.1	0.5	0.5
Polygonum minimum	P	P	P	P	20	0.1	0.6	0.6
Rorippa curvisiliqua	P	P	P	P	20	0.1	0.3	0.3
Athyrium alpestre	T	T	T	T	20	T	T	T
Hypericum anagalloides	T	T	T	T	20	T	T	T
Lilium species	T	T	T	T	20	T	T	T
Rumex species	T	T	T	T	20	T	T	T
Total herbaceous		98.8				98.6		
Moss	P	P	P	P	80	1	0.5	2
Total nonvascular		0				1		
Barren - bare soil	P	P	P	P	60	8.6	2.9	26
Water - shallow	20	0.2	1	1	40	1.4	1	6.1
Barren - litter	P	P	P	P	40	0.8	2	2
Barren - wet soil	P	P	P	P	20	3.3	16.3	16.3
Barren - rock	P	P	P	P	20	0.6	2.9	2.9
Total other		0.2				14.7		
Totals		100				115.3		

Alternate Plant Association name: *Veratrum californicum*-*Senecio triangularis*-(*Lupinus polyphyllus*) Mesic Herbaceous Meadow/Complex

Plant Association: Wet Herbaceous Meadow

Plant Association Code: HWM:herb

Alliance: Other Herbaceous

Number of sites: 21

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It likely represents a generalization of associations having wet mixed herbaceous vegetative cover that were found in Lassen Volcanic National Park.

A slightly similar association, *Carex utriculata* Herbaceous Vegetation (2.B.6.Nb. - CEGLO01562) has been described in California and the western United States.



Environmental Characteristics

This association was typically found on damp, wet areas within and near Lassen Volcanic National Park at elevations from approximately 1555m to 2440m (5100' to 8000'). These wet meadow types occurred on all aspects and were generally on flat to gentle slopes. Soils in many of these areas are characterized by the presence of (standing) water and damp wet soil, such as found in the "Humic Haploxerands, stream terraces-Aquandic Humaquepts, flood plains, complex, 0 to 15 percent slopes; Aquandic Humaquepts-Histic Humaquepts-Aquandic Endoaquepts-Terric Haplohemists complex, 1 to 5 percent slopes;" and "Histic Humaquepts, lake sediments-Histic Humaquepts, frequently flooded-Typic Endoaquands complex, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association was dominated by wet herbaceous vegetation species, both graminoids and forbs, however no one species had a frequency of 100%. A mix of “other” non-Key grasses had the highest frequency of 71% and average cover of 14% on sites where they were found. *Carex utriculata* had frequency of 57% and average cover of 23%. *Juncus articulatus* had frequency of 48% and average cover of 10%. “Other” *Carex* species had frequency of 38% and average cover of 9%. *Aster* sp. had frequency of 29% and average cover of 1%. Five species had frequencies between 20 to 30%, four species had frequencies between 10 to 20%, and the remaining sixty-five or so species had frequencies of less than 10%. The combined herbaceous vegetation had an average cover of 97%. Tree cover was generally lacking except for an occasional *Pinus contorta* var. *murrayana*. Shrub cover was also very sparse, except for the riparian *Salix* sp., *Alnus incana*, *Kalmia polifolia* ssp. *microphylla*, or *Vaccinium uliginosum* ssp. *occidentale* which combined had frequency of 33% and average cover of only about 1% on sites where they were observed. The ground surface of this type was almost entirely occupied by growing herbaceous vegetation. In areas where vegetation was not present water (in one form or another) was observed with frequency of 52% and average total cover of 15% on the sites where it was present. Different types of bare soils had a combined average total cover of 10%, whereas litter and rock were almost absent.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. “T” indicates the species is a Trace species, while “P” indicates the species is present in the type, but not a participant in the cover of the Bird’s-Eye View.

Type 8500: Wet Herbaceous Meadow Vegetation

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus contorta var. murrayana	4.8	0.3	6	6	9.5	0.3	6	6
Pinus contorta var. murrayana (dead)	4.8	0.1	3	3	9.5	0.3	3	4
Pinus monticola	T	T	T	T	4.8	T	T	T
Tsuga mertensiana	T	T	T	T	4.8	T	T	T
Total tree		0.4				0.6		
Salix boothii	14.3	0.6	2	8	23.8	0.7	2	8
Salix lemmonii	T	T	T	T	19	0.1	1	2
Alnus incana	9.5	0.2	2	3	9.5	0.2	2	2
Kalmia polifolia ssp. microphylla	9.5	0.1	1	1	9.5	0.1	1	1
Vaccinium uliginosum ssp. occidentale	4.8	T	T	T	9.5	T	T	T
Holodiscus microphyllus var. glabrescens	T	T	T	T	4.8	T	T	T
Phyllodoce breweri	T	T	T	T	4.8	T	T	T
Spiraea douglasii	T	T	T	T	4.8	T	T	T
Ledum glandulosum	T	T	T	T	4.8	T	T	T
Total shrub		0.9				1.1		
Grass - other	71.4	14.2	1	52.7	76.2	12.8	2	41.3
Carex utriculata	57.1	23.4	1	85.7	57.1	21.7	1	85.7
Juncus articulatus	47.6	9.7	2.7	87	47.6	7.8	2.3	59
Carex species	38.1	9.1	0.7	70	38.1	8.7	0.7	70
Aster species	28.6	1.2	1.3	7.8	38.1	1.9	1.3	9.5
Herbaceous - other	23.8	3.8	1	65.7	33.3	3.9	0.7	65.7
Juncus nevadensis	28.6	3.6	3	28	33.3	3.4	2.2	28
Trifolium species	23.8	0.8	0.5	8.3	33.3	2.6	0.4	22.3
Rush - other	23.8	3.9	2	40	28.6	4.5	0.3	40
Carex angustata	23.8	2.6	0.7	31.5	23.8	2.4	0.5	31.6
Epilobium species	9.5	0.5	2	8.3	23.8	0.7	0.5	8.3
Hypericum anagalloides	P	P	P	P	23.8	0.3	0.7	2.3
Carex nebrascensis	19	1.6	2.5	24.5	19	1.5	2.3	19.8
Mimulus species	T	T	T	T	19	T	T	T
Carex simulata	14.3	1.1	4.7	9.2	14.3	1.3	4.7	13.6
Scirpus congdonii	14.3	0.8	2	9.1	14.3	0.8	1.2	8.9
Polygonum bistortoides	14.3	0.4	0.7	4.7	14.3	0.3	0.5	2.5
Polygonum douglasii	9.5	0.1	1	2	14.3	0.3	1.7	5
Galium triflorum	9.5	0.1	0.5	1.9	14.3	0.2	1	1.9
Veratrum californicum	4.8	0.1	2	2	14.3	0.1	1.7	1.7
Veronica species	4.8	0.1	1.4	1.4	14.3	0.1	0.7	1.4
Viola macloskeyi	P	P	P	P	14.3	0.1	0.3	1.2
Carex scopulorum var. bracteosa	9.5	4.4	4.7	87	9.5	4	2.2	82.7
Carex lasiocarpa	9.5	1.4	2.7	27.7	9.5	1.4	2.7	27.7
Phleum pratense	4.8	1.2	24.7	24.7	9.5	0.8	17.7	17.7
Eleocharis pauciflora	9.5	0.7	2.7	12	9.5	0.6	1.8	11.4
Carex leptalea	9.5	0.5	1.2	8.7	9.5	0.5	1.2	8.7
Gnaphalium palustre	4.8	0.4	7.5	7.5	9.5	0.4	0.7	7.9
Eleocharis suksdorfiana	9.5	0.4	1.7	5.7	9.5	0.3	1.5	4
Mimulus primuloides	4.8	0.1	2	2	9.5	0.3	1	5.4
Carex abrupta	4.8	0.2	5	5	9.5	0.2	0.7	3.8
Nuphar lutea ssp. polysepala	T	T	T	T	9.5	0.2	3.5	3.5
Perideridia parishii ssp. latifolia	9.5	0.1	1	1.3	9.5	0.2	1	4
Caltha leptosepala ssp. biflora	T	T	T	T	9.5	T	T	T
Cirsium scariosum	T	T	T	T	9.5	T	T	T
Penstemon species	T	T	T	T	9.5	T	T	T
Perideridia species	T	T	T	T	9.5	T	T	T
Stellaria species	T	T	T	T	9.5	T	T	T
Viola species	T	T	T	T	9.5	T	T	T
Herbaceous - other 1	P	P	P	P	4.8	4.8	0	0.3
Herbaceous - other 2	P	P	P	P	4.8	4.8	0	1
Eryngium alismifolium	4.8	2.6	55.3	55.3	4.8	2.6	55.3	55.3
Scheuchzeria palustris ssp. americana	4.8	2.3	49.3	49.3	4.8	2.3	49.3	49.3
Herbaceous - other 3	4.8	0.1	2	2	4.8	1.7	36	36
Dulichium arundinaceum	4.8	1	22	22	4.8	1	22	22
Potentilla millefolia	4.8	0.8	16.2	16.2	4.8	0.8	17.1	17.1
Luzula comosa	4.8	0.6	12	12	4.8	0.6	12.7	12.7
Asarum hartwegii	4.8	0.5	10	10	4.8	0.5	10	10
Carex nervina	4.8	0.6	13	13	4.8	0.4	8	8
Aster alpigenus var. andersonii	4.8	0.4	8	8	4.8	0.4	8.7	8.7
Gentiana newberryi var. tiogana	4.8	0.4	7.7	7.7	4.8	0.4	7.7	7.7
Achnatherum species	4.8	0.3	7	7	4.8	0.3	5.3	5.3
Galium species	P	P	P	P	4.8	0.3	5.7	5.7
Stellaria borealis ssp. sitchana	4.8	P	P	P	4.8	0.3	6.1	6.1
Eleocharis macrostachya	4.8	0.2	4	4	4.8	0.2	4	4
Carex vesicaria var. vesicaria	4.8	0.1	3	3	4.8	0.1	2	2
Menyanthes trifoliata	4.8	0.1	2.7	2.7	4.8	0.1	2.7	2.7
Porterella carnosula	4.8	0.1	2.7	2.7	4.8	0.1	2.7	2.7
Spiranthes porrifolia	4.8	0.1	1.7	1.7	4.8	0.1	1.2	1.2
Typha latifolia	4.8	0.1	2	2	4.8	0.1	2	2
Carex echinata ssp. echinata	4.8	0	0.7	0.7	4.8	0	0.7	0.7
Juncus howellii	4.8	0	1	1	4.8	0	0.4	0.4
Collomia tinctoria	P	P	P	P	4.8	0	1	1
Potentilla gracilis var. fastigiata	P	P	P	P	4.8	0	0.7	0.7
Potentilla palustris	4.8	0	1	1	4.8	0	0.5	0.5
Prunella vulgaris ssp. lanceolata	P	P	P	P	4.8	0	0.5	0.5
Senecio triangularis	4.8	0	1	1	4.8	0	1	1
Stellaria longipes var. longipes	P	P	P	P	4.8	0	0.5	0.5
Tofieldia occidentalis ssp. occidentalis	4.8	0	0.7	0.7	4.8	0	0.7	0.7
Juncus mertensianus	T	T	T	T	4.8	T	T	T
Achillea millefolium	T	T	T	T	4.8	T	T	T
Agoseris grandiflora	T	T	T	T	4.8	T	T	T
Castilleja lemmonii	T	T	T	T	4.8	T	T	T
Dodecatheon alpinum	T	T	T	T	4.8	T	T	T
Drosera rotundifolia	T	T	T	T	4.8	T	T	T
Fragaria virginiana	T	T	T	T	4.8	T	T	T
Gayophytum diffusum ssp. diffusum	T	T	T	T	4.8	T	T	T
Gentianopsis simplex	T	T	T	T	4.8	T	T	T
Pedicularis attollens	T	T	T	T	4.8	T	T	T
Rumex species	T	T	T	T	4.8	T	T	T
Utricularia vulgaris	T	T	T	T	4.8	T	T	T
Viola purpurea	T	T	T	T	4.8	T	T	T
Total herbaceous		96.8				106.2		
Moss	9.5	0.3	0.5	5	33.3	1.4	0.5	7.5
Total nonvascular		0.3				1.4		
Water - shallow	P	P	P	P	28.6	8.6	2	96
Water	9.5	0.7	4	10	23.8	6.6	2	90
Barren - bare soil	P	P	P	P	23.8	5.5	2	94
Barren - silty soil	4.8	0.1	2	2	23.8	2	2	20
Barren - litter	P	P	P	P	23.8	1	2	8
Barren - wet soil	P	P	P	P	14.3	1.5	2	26
Barren - fine gravelly soil	4.8	0.2	4	4	9.5	0.5	2	8
Barren - rock	9.5	0.3	2	4	9.5	0.3	2	4
Water - silty/turbid	9.5	0.2	2	3	9.5	0.2	2	3
Total other		1.5				26.2		
Totals		99.9				135.5		

Alternate Plant Association name: (*Carex utriculata*)-Wet Herbaceous Meadow

Plant Association: Other Mixed Herbaceous

Plant Association Code: HOX:herb

Alliance: Other Herbaceous

Number of sites: 2

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A slightly similar association, *Phleum alpinum* - *Achillea millefolium* Herbaceous Vegetation (6.B.2.Na. - CEG001920) has been described in California.



Environmental Characteristics

This association was typically found on mesic sites within and near Lassen Volcanic National Park at elevations from approximately 1525m to 2500m (5000' to 8200'). Aspects were observed in all directions, but most commonly fell into a northwesterly to southerly direction on gentle to moderately steep slopes. Soils are characterized by a codominance of organic material and fragmented rock, such as found in the “Chummy soils, 0 to 3 percent slopes; Aquepts-Typic Petraquepts, bedrock complex, 2 to 45 percent slopes” and “Diamondpeak-Brokeoff-Endoaquepts-Aquic Dystroxerepts, debris flows-Typic Dystroxerepts complex, 10 to 80 percent slopes” 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This association represents a dense mix of graminoids and broadleaved forbs. Four herbaceous species had 100% frequency; *Juncus articulatus*, *Achillea millefolium*, “other” non-Key grasses, and “other” herbaceous plants with a combined average cover of 38%; combined cover estimates ranged from 17 to 61%. All herbaceous species combined had average cover of 86% on sites where they were found. Several species contributed 8% cover or more on the sites where they were observed; these species were *Mimulus* sp., *Asclepias speciosa*, *Equisetum* sp., *Perideridia* sp., *Juncus nevadensis*, *Aster* sp., and *Stachys ajugoides*. This association lacked any significant tree and shrub cover, as only traces or very small amounts of *Pinus Jeffreyi*, *Calocedrus decurrens*, and *Ribes roezlii* were observed. Litter had a frequency of 100% and average total cover of 52%; cover estimates ranged from 43 to 61% of the ground surface. Rock had a frequency of 100% and average total cover of 18%; cover estimates ranged from 10 to 26%. Standing water was observed at one of the sample sites with cover estimate of only 2%.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. “T” indicates the species is a Trace species, while “P” indicates the species is present in the type, but not a participant in the cover of the Bird’s-Eye View.

Type 8600: Other Mixed Herbaceous Vegetation

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Pinus Jeffreyi	T	T	T	T	50	T	T	T
Calocedrus decurrens	T	T	T	T	50	T	T	T
Total tree		0				0		
Ribes roezlii	50	1	2	2	50	1	2	2
Total shrub		1				1		
Juncus articulatus	100	15.4	7	23.7	100	14.6	5.5	23.7
Grass - other	100	15.6	7.5	23.8	100	14.1	6.5	21.6
Herbaceous - other	100	5.6	2.3	8.8	100	5.2	1.6	8.8
Achillea millefolium	100	2.5	0.7	4.3	100	3.3	2.2	4.3
Sidalcea species	50	0.9	1.8	1.8	100	0.9	1.8	1.8
Mimulus species	50	7.5	15	15	50	7.5	15	15
Trifolium species	50	2.4	4.8	4.8	50	5.8	11.7	11.7
Asclepias speciosa	50	6	12	12	50	5.5	11	11
Equisetum species	50	6.3	12.6	12.6	50	5.5	11	11
Perideridia species	50	4.9	9.8	9.8	50	4.9	9.8	9.8
Juncus nevadensis	50	4.3	8.7	8.7	50	4.2	8.3	8.3
Aster species	50	4.7	9.3	9.3	50	4	7.9	7.9
Stachys ajugoides	50	4.1	8.2	8.2	50	3.8	7.6	7.6
Viola species	50	1.5	3.1	3.1	50	2.3	4.5	4.5
Carex luzulina var. ablata	50	0.9	1.8	1.8	50	0.9	1.8	1.8
Tofieldia occidentalis ssp. occidentalis	50	1.2	2.4	2.4	50	0.9	1.7	1.7
Veratrum californicum	50	1	2.1	2.1	50	0.9	1.9	1.9
Veronica sp.	50	0.5	1	1	50	0.5	1	1
Mimulus guttatus	50	0.3	0.7	0.7	50	0.3	0.7	0.7
Veronica species	P	P	P	P	50	0.3	0.5	0.5
Epilobium species	50	0.2	0.4	0.4	50	0.2	0.4	0.4
Total herbaceous		85.8				85.6		
Lichen	50	5	10	10	50	6	12	12
Moss	P	P	P	P	50	0.5	1	1
Total nonvascular		5				6.5		
Barren - litter	100	1	0	2	100	52	43	61
Barren - rock	100	5	2	8	100	18	10	26
Barren - bare soil	50	2	4	4	50	28	56	56
Water - shallow	P	P	P	P	50	1	2	2
Barren - silty soil	P	P	P	P	50	1	2	2
Total other		8				100		
Totals		99.8				193.1		

Alternate Plant Association name: *Juncus articulatus*-*Achillea millefolium* (Other Mixed) Herbaceous Vegetation

Plant Association: *Polygonum amphibium* Herbaceous

Plant Association Code: Pam:herb

Alliance: *Polygonum amphibium* var. *stipulaceum* Permanently Flooded

Number of sites: 1

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Polygonum amphibium* - (*Polygonum hydropiperoides*) Seasonally Flooded Herbaceous Vegetation (2.B.4.Na. - CEGLO04699), has been described as widespread across the United States.



Environmental Characteristics

This association (seen across the lake in the photo above) was found in the northwest corner of Butte Lake in Lassen Volcanic National Park across from the boat ramp at an elevation of approximately 1844m (6050'). This association's substrate was the uppermost water of the lake near shore as found in the "Water" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This aquatic association was identified based on the presence of the Key indicator species *Polygonum amphibium* var. *stipulaceum*. This species were observed to have frequency of 100% and average cover of 50%. No other aquatic plants were observed in this association. Water (Lake) was observed to occupy the other 50% total cover of the surface. No trees or shrubs were observed in this association.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7600: *Polygonum amphibium* var. *stipulaceum* Herbaceous Vegetation

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Total shrub		0				0		
Polygonum amphibium var. stipulaceum	100	50	50	50	100	50	50	50
Total herbaceous		50				50		
Total nonvascular		0				0		
Water	100	50	50	50	100	100	100	100
Total other		50				100		
Totals		100				150		

Plant Association: *Typha latifolia* Mixed Herbaceous

Plant Association Code: Tl:herb

Alliance: *Typha latifolia* Saturated

Number of sites: 1

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A similar association, *Typha (latifolia, angustifolia)* Western Herbaceous Vegetation (2.B.6.Nb. - CEGL002010), has been described as widespread across the western United States and western Great Plains occurring near streams, rivers, and ponds.



Environmental Characteristics

This association was typically found on wet, aquatic areas within and near Lassen Volcanic National Park at elevations from approximately 1645m to 1860m (5400' to 6100'). This aquatic type occurred on flat slopes in areas subject to flooding or having very shallow water. This association's soils are characterized by the dominance of wet, mucky soil such as found in the "Sheld family, 0 to 35 percent slopes" 2009 SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This aquatic association was identified based on the presence of the Key indicator species *Typha latifolia*. This species had frequency of 100% and cover of about 88%. Another aquatic species associated with this Key species was *Carex utriculata*, with a frequency of 100% and cover of about 9%. Combined aquatic herbaceous cover was 100%. Standing shallow water saturated with organic material had frequency of 100% and total cover of about 22% of the ground surface. No trees or shrubs were observed in this association.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7700: *Typha latifolia* Herbaceous Mix

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Total shrub		0				0		
Carex utriculata	100	8.8	8.8	8.8	100	47.3	47.3	47.3
Typha latifolia	100	88.4	88.4	88.4	100	41.2	41.2	41.2
Galium triflorum	P	P	P	P	100	4.4	4.4	4.4
Epilobium species	100	0.7	0.7	0.7	100	2.6	2.6	2.6
Potentilla palustris	100	0.5	0.5	0.5	100	2.4	2.4	2.4
Grass - other	100	1.5	1.5	1.5	100	1.5	1.5	1.5
Apiaceae	P	P	P	P	100	0.7	0.7	0.7
Equisetum species	T	T	T	T	100	T	T	T
Hippuris vulgaris	T	T	T	T	100	T	T	T
Total herbaceous		99.9				100.1		
Total nonvascular		0				0		
Water - shallow	P	P	P	P	100	22.4	22.4	22.4
Total other		0				22.4		
Totals		99.9				122.5		

Plant Association: *Menyanthes trifoliata-Nuphar lutea* Mixed Herbaceous

Plant Association Code: MtNI:herb

Alliance: *Menyanthes trifoliata-Nuphar lutea ssp. polysepala* Saturated

Number of sites: 1

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.

A somewhat similar association, *Nuphar polysepala* Herbaceous Vegetation (5.B.2.Na. - CEGL002001), has been described in Colorado.



Environmental Characteristics

This association was typically found on wet, aquatic areas within Lassen Volcanic National Park at elevations from approximately 1825m to 2010m (6000' to 6600'). This aquatic type occurred on flat slopes in wet areas subject to flooding or having very shallow water. This association's soils are characterized by the dominance of wet, mucky soil such as found in the "Histic Humaquepts, lake sediments-Histic Humaquepts, frequently flooded-Typic Endoaquands complex, 0 to 15 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

This aquatic association was identified based on the presence of Key indicator species *Menyanthes trifoliata* and *Nuphar lutea ssp. polysepala*. Both of these species were observed with frequency of 100% and average cover of about 5%. Another aquatic species associated with these Key species was *Rhynchospora alba*, observed with 100% frequency and cover of about 71%. Combined aquatic herbaceous cover was about 90%. Standing shallow water saturated with organic material had frequency of 100% and cover of about 60% of the ground surface. No trees or shrubs were observed in this association.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 7800: *Menyanthes trifoliata*-*Nuphar lutea ssp. polysepala* Herbaceous Mix

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Total tree		0				0		
Total shrub		0				0		
Rhynchospora alba	100	71	71	71	100	59.2	59.2	59.2
Potentilla palustris	P	P	P	P	100	8.2	8.2	8.2
Herbaceous - other	100	7	7	7	100	7	7	7
Menyanthes trifoliata	100	5	5	5	100	5	5	5
Nuphar lutea ssp. polysepala	100	5	5	5	100	5	5	5
Mimulus primuloides	P	P	P	P	100	3.2	3.2	3.2
Scheuchzeria palustris ssp. americana	100	2	2	2	100	2	2	2
Total herbaceous		90				89.6		
Moss	P	P	P	P	100	0.5	0.5	0.5
Total nonvascular		0				0.5		
Water - organic material	100	10	10	10	100	60	60	60
Total other		10				60		
Totals		100				150.1		

Plant Association: Sparse Vegetation Woodland Features

Plant Association Code: SvgW:other

Alliance: Sparsely Vegetated Landscape Feature

Number of sites: 2

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It likely represents a generalization of associations having only sparse vegetative cover that were found in Lassen Volcanic National Park.

A slightly similar association, *Pinus (ponderosa, jeffreyi)* Sparse Vegetation (6.C.2.Na. - CEGLO02741) has been described in Nevada.



Environmental Characteristics

This landscape feature was primarily observed in dry, rocky areas with sparse vegetative cover within Lassen Volcanic National Park at elevations from approximately 1830m to 2560m (6000' to 8400'). These Sparse Vegetation Woodland features occurred on all aspects and slopes, but were generally on flat to moderately steep slopes. Soils in many of these areas are characterized by the dominance of fine gravelly soil, cinder ash, or fragmented rock such as found in the "Typic Xerorthents, tephra-Typic Xerorthents, welded, complex, 2 to 50 percent slopes; Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes" and "Cinder land" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

This type represents areas that have a minimum of 15% vegetative cover, but not more than 10% of any one lifeform. Very sparse tree vegetation was present at the field sites that represent the Sparse Vegetation Woodland features. Three different conifer species were present in this type, with none having frequency of greater than 50%. Tree species included *Pinus jeffreyi* (live and standing dead), *Abies magnifica*, and *Pinus contorta* var. *murrayana*. Trees comprised a combined average cover of only 7% on sites where they were found. Several shrub species were present each having frequency of 50% and a combined average cover of only 6.5%. *Holodiscus microphyllus* var. *glabrescens* and *Ceanothus velutinus* were the two shrubs present with the highest average shrub cover with 2.5 and 1.5% respectively. Herbaceous cover, which provided cover of no more than 2% was primarily the grass *Achnatherum occidentale* with average cover of 1.5%. The ground surface of this type was comprised of fragmented rock, bare soil, and fine gravelly soil, which accounted for average total cover of 42%, 38%, and 1% respectively on sites where they were found. Litter accounted for total cover of 4% on the site where it was found, while woody debris and organic ash were observed with total cover of 12% on the site where they were found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 8800: Sparsely Vegetated Woodland Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Abies magnifica	50	3.5	7	7	50	3.5	7	7
Pinus jeffreyi (dead)	50	2.5	5	5	50	2.5	5	5
Pinus jeffreyi	50	0.5	1	1	50	0.5	1	1
Pinus contorta var. murrayana	50	0.5	1	1	50	0.5	1	1
Total tree		7				7		
Holodiscus microphyllus var. glabrescens	50	2.5	5	5	50	2.5	5	5
Ceanothus velutinus	50	1.5	3	3	50	1.5	3	3
Ribes cereum	50	1	2	2	50	1	2	2
Arctostaphylos nevadensis	50	1	2	2	50	1	2	2
Arctostaphylos patula	50	0.5	1	1	50	0.5	1	1
Total shrub		6.5				6.5		
Achnatherum occidentale	50	1.5	3	3	50	1.5	3	3
Arabis platysperma	T	T	T	T	50	T	T	T
Cirsium vulgare	T	T	T	T	50	T	T	T
Eriogonum nudum	T	T	T	T	50	T	T	T
Gayophytum diffusum ssp. diffusum	T	T	T	T	50	T	T	T
Monardella odoratissima	T	T	T	T	50	T	T	T
Total herbaceous		1.5				1.5		
Total nonvascular		0				0		
Barren - rock/talus	50	42.5	85	85	50	42.5	85	85
Barren - bare soil	50	34.5	69	69	50	38.5	77	77
Barren - organic ash	50	3.5	7	7	50	3.5	7	7
Barren - litter	50	0.5	1	1	50	2	4	4
Barren - fine woody debris	50	1.5	3	3	50	1.5	3	3
Barren - fine gravelly soil	50	0.5	1	1	50	1	2	2
Barren - coarse woody debris	50	1	2	2	50	1	2	2
Barren - duff	50	1	2	2	50	1	2	2
Total other		85				91		
Totals		100				106		

Plant Association: Barren Woodland Features

Plant Association Code: BarW:other

Alliance: Barren Landscape Feature

Number of sites: 5

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It likely represents a generalization of associations having only very sparse tree cover that were found in Lassen Volcanic National Park.

A slightly similar association, *Pinus (ponderosa, jeffreyi)* Sparse Vegetation (6.C.2.Na. - CEGLO02741) has been described in Nevada.



Environmental Characteristics

This landscape feature was primarily observed in dry areas generally lacking significant vegetative cover within Lassen Volcanic National Park at elevations from approximately 1705m to 2620m (5600' to 8600'). These Barren Woodland features occurred on all aspects and slopes, but were generally on flat to moderately steep slopes. Soils in many of these areas are characterized by the dominance of fine gravelly soil, cinder ash, or fragmented rock such as found in the "Typic Xerorthents, tephra-Typic Xerorthents, welded, complex, 2 to 50 percent slopes; Emeraldlake-Terracelake-Readingpeak-Rock Outcrop-Rubble land complex, 20 to 95 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes;" and "Cinder land" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Very sparse tree vegetation was present in the Barren Woodland features. Six different conifer species were present in this type, with none having frequency of greater than 40%; combined tree cover was less than 5% on sites where they were found. One hardwood species, *Cercocarpus ledifolius*, was also present with frequency of 20% and cover of about 8% on the site where it was found. Species included *Pinus albicaulis* at very high elevations, as well as *Abies concolor*, at the lower elevations. Tree species accounted for an average cover of only 2.8%. Few shrub species were observed and only noted as Traces. Herbaceous cover averaged only 8% on the site where it was found. The ground surface of this type was almost entirely comprised of fragmented rock, fine gravelly soil, and gravel. Lichen growth was observed with a frequency of 20% and cover of 64% on the site where it was found.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 9200: Barren Woodland Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	40	0.4	1	1	60	0.4	1	1
Tsuga mertensiana	40	0.4	1	1	40	0.4	1	1
Cercocarpus ledifolius	20	1.6	8	8	20	1.6	8	8
Pinus contorta var. murrayana	20	0.2	1	1	20	0.2	1	1
Pinus albicaulis	20	0.2	1	1	20	0.2	1	1
Pinus lambertiana	T	T	T	T	20	T	T	T
Abies concolor	T	T	T	T	20	T	T	T
Total tree		2.8				2.8		
Holodiscus microphyllus var. glabrescens	T	T	T	T	20	T	T	T
Ribes nevadense	T	T	T	T	20	T	T	T
Chrysothamnus nauseosus ssp. albicaulis	T	T	T	T	20	T	T	T
Total shrub		0				0		
Lupinus obtusilobus	20	0.6	3	3	20	0.6	3	3
Monardella odoratissima	20	0.4	2	2	20	0.4	2	2
Polygonum shastense	20	0.4	2	2	20	0.4	2	2
Eriogonum marifolium	20	0.2	1	1	20	0.2	1	1
Penstemon newberryi	T	T	T	T	20	T	T	T
Total herbaceous		1.6				1.6		
Lichen	20	12	60	60	20	12.8	64	64
Total nonvascular		12				12.8		
Barren - rock	100	22.4	1	41	100	35.6	1	98
Barren - gravel	80	22.4	2	64	80	22.4	2	64
Barren - fine gravelly soil	60	38.6	9	95	60	38.6	9	95
Barren - litter	20	0.2	1	1	40	0.6	1	2
Total other		83.6				97.2		
Totals		100				114.4		

Plant Association: Barren Shrubland Features

Plant Association Code: BarS:other

Alliance: Barren Landscape Feature

Number of sites: 1

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It likely represents a generalization of associations having only very sparse shrub cover that were found in Lassen Volcanic National Park.

A slightly similar association, *Holodiscus dumosus* Rock Outcrop Sparse Vegetation (6.B.2.Nb. - CEGL002801) has been described in Colorado.



Environmental Characteristics

This landscape feature was primarily observed in a dry, rocky area generally lacking significant vegetative cover within Lassen Volcanic National Park at elevations from approximately 1980m to 2620m (6500' to 8600'). These Barren Shrub features occurred on all aspects and slopes, but were generally on gentle to moderately steep slopes. Soils in many of these areas are characterized by the dominance of fragmented rock or lava, such as found in the "Bearrubble-Rubble land complex, 8 to 40 percent slopes; Emeraldlake-Readingpeak-Terracelake-Rock outcrop complex, 30 to 95 percent slopes" and "Vitrandic Cryorthents, debris flows, high elevation, 15 to 95 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Very sparse shrub vegetation was present at the field site that represented the Barren Shrub Features. *Chrysolepis sempervirens* was the Key shrub species observed with frequency of 100% and cover of about 8%. Herbaceous cover was represented by *Angelica breweri* with frequency of 100% and cover of about 6%. *Abies magnifica* was observed as a Trace species. This type was dominated by fragmented rock with frequency of 100% and total cover of about 94%. Bare soil had frequency of 100% and total cover of about 4% of the ground surface. Fine woody debris had frequency of 100%, but total cover was only about 2%. Lichen growth was observed on 16% of the surface area.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 9300: Barren Shrub Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
<i>Abies magnifica</i>	T	T	T	T	100	T	T	T
Total tree		0				0		
<i>Chrysolepis sempervirens</i>	100	8	8	8	100	8	8	8
Total shrub		8				8		
<i>Angelica breweri</i>	100	6	6	6	100	6	6	6
Total herbaceous		6				6		
Lichen	100	16	16	16	100	16	16	16
Total nonvascular		16				16		
Barren - rock	100	68	68	68	100	94	94	94
Barren - bare soil	100	2	2	2	100	4	4	4
Barren - fine woody debris	P	P	P	P	100	2	2	2
Total other		70				100		
Totals		100				130		

Plant Association: Barren Herbaceous Features

Plant Association Code: BarH:other

Alliance: Barren Landscape Feature

Number of sites: 5

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It likely represents a generalization of associations having only very sparse herbaceous cover that were found in Lassen Volcanic National Park.

A slightly similar association, *Eriogonum corymbosum* Cinder Sparse Vegetation (6.C.2.Na. - CEG005803) has been described in Colorado.



Environmental Characteristics

This landscape feature was primarily observed in dry, gravelly areas generally lacking significant vegetative cover within Lassen Volcanic National Park at elevations from approximately 1800m to 2955m (5900' to 9700'). These Barren Herbaceous features occurred on all aspects and slopes, but were generally on gentle to moderately steep slopes as found in the Painted Dunes, the Devastated Area, or on the slopes of the higher peaks including Mt. Lassen. Soils in many of these areas are characterized by a codominance of fine gravelly soil, gravel, and small fragmented rock, such as found in the "Typic Xerorthents, tephra, 2 to 20 percent slopes; Buttewash ashy coarse sand, 0 to 15 percent slopes; Cenplat ashy loamy sand, 0 to 15 percent slopes" and "Bearthrubble-Rubble land complex, 8 to 40 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Very sparse herbaceous vegetation was present at the field sites sampled to reflect the Barren Herbaceous Features. *Eriogonum marifolium*, *Eriogonum umbellatum*, *Eriogonum ursinum*, *Ageratina occidentalis*, *Polygonum davisiae*, and "Other" unidentified non-Key herbaceous vegetation were all observed with between only 1 and 2.5% cover at some of the different field sites that represent this type. Combined herbaceous cover averaged a very sparse 1.7%. The tree and shrub species were observed as Trace species present at only 20% of the field sites. These sites were predominantly comprised of fine gravelly soil, gravel, and bare soil, which combined had total average cover of 79.0%. Rock accounted for the other 20.2% total cover. Lichen growth was observed on 4.8% of the surface area.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 9400: Barren Herbaceous Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Pinus Jeffreyi	T	T	T	T	20	T	T	T
Pinus contorta var. murrayana	T	T	T	T	20	T	T	T
Abies concolor	T	T	T	T	20	T	T	T
Total tree		0				0		
Chrysolepis sempervirens	T	T	T	T	20	T	T	T
Shrub - other	T	T	T	T	20	T	T	T
Total shrub		0				0		
Eriogonum marifolium	20	0.2	1	1	40	0.2	1	1
Eriogonum umbellatum	20	0.5	2.5	2.5	20	0.5	2.5	2.5
Ageratina occidentalis	20	0.4	2	2	20	0.4	2	2
Eriogonum ursinum	20	0.2	1	1	20	0.2	1	1
Polygonum davisiae	20	0.2	1	1	20	0.2	1	1
Herbaceous - other	20	0.2	1	1	20	0.2	1	1
Grass - other	T	T	T	T	20	T	T	T
Arabis platysperma	T	T	T	T	20	T	T	T
Aster integrifolius	T	T	T	T	20	T	T	T
Chaenactis douglasii var. douglasii	T	T	T	T	20	T	T	T
Total herbaceous		1.7				1.7		
Lichen	20	4.8	24	24	20	4.8	24	24
Total nonvascular		4.8				4.8		
Barren - fine gravelly soil	60	52.2	75	98	60	52.7	77.5	98
Barren - rock	40	15	1	74	40	20.2	1	100
Barren - gravel	40	3.5	7.5	10	40	3.5	7.5	10
Barren - bare soil	40	22.8	15	99	20	22.8	15	99
Total other		93.5				99.2		
Totals		100				105.7		

Plant Association: Barren Features

Plant Association Code: Bar:other

Alliance: Barren Landscape Feature

Number of sites: 37

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity. It likely represents a generalization of associations basically lacking vascular vegetation that were found in Lassen Volcanic National Park.

A similar association, Sparse (on rock and unconsolidated substrates) Nonvascular Vegetation (6.D.2.Nb. - CEGLO02888) has been described in Colorado.



Environmental Characteristics

This landscape feature was primarily observed in dry, rocky areas lacking vegetative cover within Lassen Volcanic National Park at elevations from approximately 1585m to 3140m (5200' to 10300'). Barren features occurred on all aspects and slopes, but were generally on moderate to steep slopes. Soils in many of these areas are characterized by a dominance of fine gravelly soil, gravel, and fragmented rock, such as found in the "Rock outcrop-Emeraldlake-Rubble land-Readingpeak complex, 20 to 150 percent slopes; Emeraldlake-Readingpeak-Terracelake-Rock outcrop complex, 30 to 95 percent slopes; Lava flows; Cinder land;" and "Typic Xerorthents, tephra-Typic Xerorthents, welded, complex, 2 to 50 percent slopes" 2011 LAVO SSURGO soil classifications.

2007 LAVO Vegetation Classification

Vegetation

Vegetation was not present at the field sites sampled to reflect the Barren Features. These areas were predominantly comprised of fragmented rock, which averaged 94.6% total cover indicating that the truly barren areas were basically some type of fragmented rock or lava. Gravel and bare soil accounted for the other 5.4% total cover. Lichen growth was observed on 3.9% of the surface area. No other landscape features were observed at these sample sites.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 9500: Barren Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Species								
Total tree		0				0		
Total shrub		0				0		
Total herbaceous		0				0		
Lichen	18.9	3.9	5	36	18.9	3.9	5	36
Total nonvascular		3.9				3.9		
Barren - rock	94.6	90.7	64	100	94.6	94.6	100	100
Barren - gravel	2.7	2.7	100	100	2.7	2.7	100	100
Barren - bare soil	2.7	2.7	100	100	2.7	2.7	100	100
Total other		96.1				100		
Totals		100				103.9		

Plant Association: Snow Features

Plant Association Code: Snow:other

Alliance: Snow Landscape Feature

Number of sites: 3

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.



Environmental Characteristics

This landscape feature was primarily represented by snow fields within Lassen Volcanic National Park at elevations from approximately 2195m to 3140m (7200' to 10300'). Snow fields were sufficiently deep at certain times of the year to provide complete cover of the ground surface conditions present beneath the snow or the vegetation that would grow in that area. Snow features occurred on all aspects and slopes, but during the summer months mostly on northwesterly to northeasterly facing gentle to steep slopes. Soils in many of these areas are characterized by a codominance of fine gravelly soil and fragmented rock, such as found in the "Emeraldlake-Readingpeak-Terracelake-Rock outcrop complex, 30 to 95 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

Vegetation was not present at the field sites sampled to reflect the Snow Features. Snow was found providing average of 100% total cover. No other landscape features were observed at these sample sites.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-eye View.

Type 9600: Snow Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Total shrub		0				0		
Total herbaceous		0				0		
Total nonvascular		0				0		
Barren - snow	100	100	100	100	100	100	100	100
Total other		100				100		
Totals		100				100		

Plant Association: Water Features

Plant Association Code: H2O:other

Alliance: Hydrologic Landscape Feature

Number of sites: 10

Other Studies

This landscape feature has not been previously described for the Lassen Volcanic National Park vicinity.



Environmental Characteristics

This landscape feature was primarily represented by lakes within Lassen Volcanic National Park at elevations from approximately 1770m to 2530m (5800' to 8300'). Bodies of water were both shallow and deep water lakes that would include rocky and gravelly shallow areas that might be exposed during times when waters recede and shorelines are exposed. Most lakes occupy rocky areas scoured by glacial activity and support little growth of vegetation. A few lakes were formed by lava or debris flows that dammed streams. Soils are characterized by a codominance of fragmented rock, such as found in the "Vitrandic Cryofluvents-Aquandic Cryaquents complex, 0 to 8 percent slopes" 2011 LAVO SSURGO soil classification.

2007 LAVO Vegetation Classification

Vegetation

Vegetation was not present at the field sites sampled to reflect the Water Features. Water (deep) was observed to provide an average of 80% total cover, while shallow water accounted for 18.5% total cover. Bare rock accounted for an average of 1% total cover and coarse woody debris averaged 0.5% total cover.

The following table shows all species and associated features in this association and gives percent frequency, average percent cover, and range (minimum and maximum) in cover for the plots in which they occur. "T" indicates the species is a Trace species, while "P" indicates the species is present in the type, but not a participant in the cover of the Bird's-Eye View.

Type 9800: Water Features

Detailed Alliance	Bird's-Eye Frequency (%)	Bird's-Eye Average Cover	Bird's-Eye Minimum Cover	Bird's-Eye Maximum Cover	Total Frequency (%)	Total Average Cover	Total Minimum Cover	Total Maximum Cover
Total tree		0				0		
Total shrub		0				0		
Total herbaceous		0				0		
Total nonvascular		0				0		
Water	80	80	100	100	80	80	100	100
Water - shallow	20	18.5	85	100	20	18.5	85	100
Barren - rock	10	1	10	10	10	1	10	10
Barren - coarse woody debris	10	0.5	5	5	10	0.5	5	5
Total other		100				100		
Totals		100				100		