# Classification of the Vegetation Alliances and Associations of the Northern Sierra Nevada Foothills, California

## Volume 2 of 2 – Vegetation Descriptions

**By**
**Anne Klein**
**Josie Crawford**
**Julie Evens**
**Vegetation Program**
**California Native Plant Society**

**Todd Keeler-Wolf**
**Diana Hickson**
**Vegetation Classification and Mapping Program**
**Biogeographic Data Branch**
**California Department of Fish and Game**



**For the**
**Resources Management and Policy Division**
**California Department of Fish and Game**
**Contract Number: P0485520**


**December**
**2007**

This report consists of two volumes. Volume 1 contains the project introduction, methods, and results, as well as literature cited, and appendices. This volume (Volume 2) includes descriptions of the vegetation alliances and associations defined for this project.

This classification report covers vegetation associations and alliances attributed to the northern Sierra Nevada Foothills, California. This classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. Comments and suggestions regarding the contents of this subset should be directed to:


Anne Klein
Vegetation Ecologist
California Dept. of Fish and Game
Sacramento, CA
<aklein@dfg.ca.gov>

Julie Evens
Senior Vegetation Ecologist
California Native Plant Society
Sacramento, CA
<jevens@cnps.org>

Todd Keeler-Wolf
Senior Vegetation Ecologist
California Dept. of Fish and Game
Sacramento, CA
<tkwolf@dfg.ca.gov>



Copyright © 2007 California Native Plant Society, 2707 K Street, Suite 1
Sacramento, CA 95816, U.S.A. All Rights Reserved.


**Citation:**
*The following citation should be used in any published materials that reference this report:*

Klein, A., J. Crawford, J. Evens, T. Keeler-Wolf, and D. Hickson. 2007. Classification of the vegetation alliances and associations of the northern Sierra Nevada Foothills, California. Report prepared for California Department of Fish and Game. California Native Plant Society, Sacramento, CA.


**Restrictions on Use:** Permission to use, copy and distribute these data is hereby granted under the following conditions:

1. The above copyright notice must appear in all documents and reports;
2. Any use must be for informational purposes only and in no instance for commercial purposes;
3. Some data may be altered in format for analytical purposes, however the data should still be referenced using the citation above.

Any rights not expressly granted herein are reserved by the California Native Plant Society (CNPS). Except as expressly provided above, nothing contained herein shall be construed as conferring any license or right under any CNPS copyright.

**Information Warranty Disclaimer:** All data are provided as is without warranty as to the currentness, completeness, or accuracy of any specific data. The absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present. CNPS hereby disclaims all warranties and conditions with regard to these data, including but not limited to all implied warranties and conditions of merchantability, fitness for a particular purpose, and non-infringement. In no event shall CNPS be liable for any special, indirect, incidental, consequential damages, or for damages of any kind arising out of or in connection with the use of these data. Because the data supporting this is continually being updated, it is advisable to check for data and classification revisions at least once a year after receipt.

**TABLE OF CONTENTS**

**TREE DESCRIPTIONS** ..... **1**

***Acer macrophyllum* Woodland/Forest Alliance** ..... ***2***
*Acer macrophyllum* Association (Provisional) ..... 2
*Acer macrophyllum - Pseudotsuga menziesii* / *Dryopteris arguta* Association (Provisional) ..... 5
***Aesculus californica* Woodland/Forest Alliance** ..... ***7***
*Aesculus californica* / *Toxicodendron diversilobum* / Moss Association ..... 7
*Aesculus californica* Riparian Association (Provisional) ..... 10
***Alnus rhombifolia* Woodland/Forest Alliance** ..... ***13***
*Alnus rhombifolia - Quercus chrysolepis* Association ..... 13
*Alnus rhombifolia - Salix laevigata* Association ..... 16
*Alnus rhombifolia - Salix laevigata - Platanus racemosa* Association ..... 18
*Alnus rhombifolia* / *Carex* Association ..... 20
*Alnus rhombifolia* / *Darmera peltata* Association ..... 22
*Alnus rhombifolia* / *Salix exigua* Association ..... 24
***Arbutus menziesii* Woodland/Forest Alliance** ..... ***26***
*Arbutus menziesii* Alliance (no Associations defined) ..... 26
***Calocedrus decurrens* Woodland/Forest Alliance** ..... ***28***
*Calocedrus decurrens - Alnus rhombifolia* Association ..... 28
***Cupressus macnabiana* Woodland/Forest Alliance** ..... ***32***
*Cupressus macnabiana* / *Arctostaphylos viscida* Association (Provisional) ..... 32
***Fraxinus latifolia* Woodland/Forest Alliance** ..... ***35***
*Fraxinus latifolia - Alnus rhombifolia* Association ..... 35
***Juglans hindsii* Woodland/Forest Semi-Natural Stands** ..... ***38***
*Juglans hindsii* Woodland Semi-Natural Stands (no Associations defined) ..... 38
***Pinus ponderosa* Woodland/Forest Alliance** ..... ***40***
*Pinus ponderosa* Stream Terrace Association (Provisional) ..... 40
*Pinus ponderosa* / *Arctostaphylos viscida* Association (Provisional) ..... 43
***Pinus sabiniana* Woodland/Forest Alliance** ..... ***45***
*Pinus sabiniana* / *Adenostoma fasciculatum* Association ..... 45
*Pinus sabiniana* / *Arctostaphylos viscida* Association (Provisional) ..... 48
*Pinus sabiniana* / *Ceanothus cuneatus* Association ..... 50
*Pinus sabiniana* / *Ceanothus cuneatus* / *Plantago erecta* Serpentine Association (Provisional) ..... 52
*Pinus sabiniana* / *Rhamnus tomentella* Association (Provisional) ..... 55
***Platanus racemosa* Woodland/Forest Alliance** ..... ***57***
*Platanus racemosa* Alliance (no Associations defined) ..... 57
***Populus fremontii* Woodland/Forest Alliance** ..... ***61***
*Populus fremontii - Salix laevigata* Association ..... 61
*Populus fremontii* / *Vitis californica* Association ..... 64
***Pseudotsuga menziesii* Woodland/Forest Alliance** ..... ***66***
*Pseudotsuga menziesii* Association ..... 66
*Pseudotsuga menziesii - Quercus chrysolepis* Association ..... 70
***Quercus chrysolepis* Woodland/Forest Alliance** ..... ***72***
*Quercus chrysolepis* Association ..... 72
*Quercus chrysolepis* / *Arctostaphylos viscida* Association ..... 75
*Quercus chrysolepis - Pinus ponderosa* Association ..... 77
*Quercus chrysolepis - Quercus kelloggii* Association ..... 79
*Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum* Association (Provisional) ..... 82
*Quercus chrysolepis - Quercus lobata* / *Vitis californica* Association ..... 84
*Quercus chrysolepis - Quercus wislizeni* Association ..... 86
*Quercus chrysolepis - Umbellularia californica* Association ..... 88
*Quercus chrysolepis - Umbellularia californica* / *Vitis californica* Riparian Association ..... 91

***Quercus douglasii* Woodland/Forest Alliance ..... *94***
*Quercus douglasii* / Annual Grass - Forb Sub-Alliance ..... 94
*Quercus douglasii* / Perennial Grass - Forb Sub-Alliance ..... 97
*Quercus douglasii* / *Selaginella hansenii - Navarretia pubescens* Association (Provisional) ..... 99
*Quercus douglasii* / *Arctostaphylos manzanita* / Herbaceous Association ..... 101
*Quercus douglasii* / *Ceanothus cuneatus* / Herbaceous Association ..... 104
*Quercus douglasii* / *Juniperus californica - Ceanothus cuneatus* Association (Provisional) ..... 106
*Quercus douglasii - Aesculus californica* / Herbaceous Association ..... 109
*Quercus douglasii - Pinus sabiniana* / *Arctostaphylos viscida* / Herbaceous Association ..... 112
*Quercus douglasii - Pinus sabiniana* / Herbaceous Association ..... 115
*Quercus douglasii - Quercus lobata* / Herbaceous Association ..... 118
*Quercus douglasii - Quercus wislizeni* / Herbaceous Association ..... 121
***Quercus kelloggii* Woodland/Forest Alliance ..... *123***
*Quercus kelloggii* / *Arctostaphylos viscida* Association (Provisional) ..... 123
*Quercus kelloggii* / *Ceanothus integerrimus* Association ..... 126
*Quercus kelloggii* / *Toxicodendron diversilobum - Styrax officinalis* / *Triteleia laxa* Association ..... 128
*Quercus kelloggii* / *Toxicodendron diversilobum* / Grass Association ..... 131
*Quercus kelloggii - Pinus ponderosa* Association ..... 134
*Quercus kelloggii - Pinus ponderosa* / *Arctostaphylos viscida* Association ..... 136
*Quercus kelloggii - Pinus ponderosa* / *Ceanothus integerrimus* Association ..... 139
*Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica* Association (Provisional) ..... 141
*Quercus kelloggii - Quercus chrysolepis* / *Toxicodendron diversilobum* Association ..... 143
***Quercus lobata* Woodland/Forest Alliance ..... *145***
*Quercus lobata* / Herbaceous Semi-Riparian Association ..... 145
*Quercus lobata* / *Rhus trilobata* Association (Provisional) ..... 148
*Quercus lobata* / *Rubus discolor* Association ..... 150
*Quercus lobata - Alnus rhombifolia* Association ..... 152
*Quercus lobata - Quercus wislizeni* Association ..... 154
***Quercus wislizeni* Woodland/Forest Alliance ..... *156***
*Quercus wislizeni* / *Arctostaphylos viscida* Association ..... 156
*Quercus wislizeni* / *Heteromeles arbutifolia* Association ..... 159
*Quercus wislizeni* / *Toxicodendron diversilobum* Association ..... 162
*Quercus wislizeni* Mixed Shrub Association (Provisional) ..... 165
*Quercus wislizeni - Salix laevigata* / *Rhamnus tomentella* Association ..... 167
*Quercus wislizeni - Aesculus californica* Association ..... 169
*Quercus wislizeni - Pinus ponderosa* Association ..... 171
*Quercus wislizeni - Pinus sabiniana* Association ..... 173
*Quercus wislizeni - Pinus sabiniana* / *Arctostaphylos manzanita* Association ..... 175
*Quercus wislizeni - Quercus douglasii - Aesculus californica* Association ..... 177
*Quercus wislizeni - Quercus douglasii - Pinus sabiniana* Association ..... 179
*Quercus wislizeni - Quercus douglasii* / Herbaceous Association ..... 182
*Quercus wislizeni - Quercus kelloggii* Association ..... 185
***Salix gooddingii* Woodland/Forest Alliance ..... *188***
*Salix gooddingii* Association (Provisional) ..... 188
***Salix laevigata* Woodland/Forest Alliance ..... *191***
*Salix laevigata* Association ..... 191
*Salix laevigata* / *Salix lasiolepis* Association ..... 193
***Umbellularia californica* Woodland/Forest Alliance ..... *195***
*Umbellularia californica - Alnus rhombifolia* Association (Provisional) ..... 195
*Umbellularia californica - Quercus wislizeni* Association ..... 199

**SHRUB DESCRIPTIONS** ..... **201**

***Adenostoma fasciculatum* Shrubland Alliance** ..... ***202***
*Adenostoma fasciculatum* Association ..... 202
*Adenostoma fasciculatum* / Herbaceous Association ..... 205
*Adenostoma fasciculatum - Arctostaphylos manzanita* Association (Provisional) ..... 208
*Adenostoma fasciculatum - Arctostaphylos viscida* Association ..... 210
*Adenostoma fasciculatum - Eriodictyon californicum - Lotus scoparius* Association ..... 212
***Arctostaphylos viscida* Shrubland Alliance** ..... ***214***
*Arctostaphylos viscida* Association ..... 214
*Arctostaphylos viscida* / *Salvia sonomensis* Association (Provisional) ..... 217
(*Arctostaphylos viscida - Adenostoma fasciculatum*) / *Salvia sonomensis* Association ..... 219
*Arctostaphylos viscida - Quercus wislizeni* Association ..... 222
***Ceanothus cuneatus* Shrubland Alliance** ..... ***224***
*Ceanothus cuneatus* / Herbaceous Association ..... 224
*Ceanothus cuneatus* / *Plantago erecta* Association ..... 227
*Adenostoma fasciculatum - Ceanothus cuneatus* Association ..... 230
*Ceanothus cuneatus - Eriodictyon californicum* - (*Fremontodendron californicum*) Association (Provisional) ..... 234
***Ceanothus integerrimus* Shrubland Alliance** ..... ***237***
*Ceanothus integerrimus* Association ..... 237
*Ceanothus integerrimus - Quercus garryana* var. *breweri* Association (Provisional) ..... 241
***Cephalanthus occidentalis* Shrubland Alliance** ..... ***243***
*Cephalanthus occidentalis* Association ..... 243
***Cercocarpus betuloides* Shrubland Alliance** ..... ***246***
*Cercocarpus betuloides* Association ..... 246
*Cercocarpus betuloides - Ceanothus cuneatus* Association (Provisional) ..... 251
***Cornus sericea* Shrubland Alliance** ..... ***254***
*Cornus sericea* Alliance (no Associations defined) ..... 254
***Eriodictyon californicum* Shrubland Alliance** ..... ***257***
*Eriodictyon californicum* / Herbaceous Association ..... 257
***Heteromeles arbutifolia* Shrubland Alliance** ..... ***260***
*Heteromeles arbutifolia Serpentine* Association (Provisional) ..... 260
***Juniperus californica* Shrubland Alliance** ..... ***264***
*Juniperus californica* / Herbaceous Association ..... 264
***Quercus berberidifolia* Shrubland Alliance** ..... ***267***
*Quercus berberidifolia - Ceanothus cuneatus* Association ..... 267
*Quercus berberidifolia - Fraxinus dipetala - Heteromeles arbutifolia* Association ..... 270
***Quercus durata* Shrubland Alliance** ..... ***273***
*Quercus durata* Association (Provisional) ..... 273
*Quercus durata - Adenostoma fasciculatum* / *Salvia sonomensis* Association (Provisional) ..... 275
***Quercus garryana var. breweri* Shrubland Alliance (Provisional)** ..... ***277***
*Quercus garryana* var. *breweri* Association (Provisional) ..... 277
***Frangula californica* (=*Rhamnus tomentella*) Shrubland Alliance** ..... ***280***
*Rhamnus tomentella - Hoita macrostachya* Association (Provisional) ..... 280
***Rubus discolor* Shrubland Semi-Natural Stands** ..... ***284***
*Rubus discolor* Association ..... 284
***Salix exigua* Shrubland Alliance** ..... ***287***
*Salix exigua* Association ..... 287
*Salix exigua - Brickellia californica* Association (Provisional) ..... 290
***Salix lasiolepis* Shrubland Alliance** ..... ***292***
*Salix lasiolepis* / *Rubus* spp. Association ..... 292
***Tamarix sp.* Shrubland Semi-Natural Stands** ..... ***296***
*Tamarix* spp. Shrubland Semi-Natural Stands (no Associations defined) ..... 296
***Toxicodendron diversilobum* Shrubland Alliance** ..... ***298***
*Toxicodendron diversilobum* / Herbaceous Association ..... 298

**HERB DESCRIPTIONS** ..... **301**

***Avena* (*barbata, fatua*) Herbaceous Semi-Natural Stands** ..... ***302***
*Avena barbata - Bromus hordeaceus* Herbaceous Association (Provisional) ..... 302
***Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Semi-Natural Stands** ..... ***305***
*Brachypodium distachyon - Bromus diandrus* / (*Quercus douglasii*) Sub-Alliance ..... 305
*Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus* Herbaceous Association ..... 308
*Bromus hordeaceus - Leontodon taraxacoides* Herbaceous Association ..... 310
*Bromus hordeaceus - Lupinus nanus - Trifolium* spp. Herbaceous Association (Provisional) ..... 313
*Trifolium hirtum - Bromus hordeaceus* Herbaceous Association (Provisional) ..... 316
***Bromus hordeaceus* - (*Holocarpha virgata*) Herbaceous Alliance** ..... ***318***
*Holocarpha virgata - Bromus hordeaceus - Taeniatherum caput-medusae* Herbaceous Association ..... 318
***Bromus hordeaceus* - (*Plagiobothrys nothofulvus*) Herbaceous Alliance** ..... ***321***
*Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus* Herbaceous Association ..... 321
***Carex barbarae* Herbaceous Alliance** ..... ***324***
*Carex barbarae* Herbaceous Association (Provisional) ..... 324
***Carex nudata* Herbaceous Alliance** ..... ***327***
*Carex nudata* Herbaceous Association ..... 327
***Carex serratodens* Herbaceous Alliance** ..... ***330***
*Carex serratodens* Herbaceous Association (Provisional) ..... 330
***Centaurea* (*melitensis, solstitialis*) Herbaceous Semi-Natural Stands** ..... ***332***
*Centaurea solstitialis* Herbaceous Association (Provisional) ..... 332
***Eleocharis acicularis* Herbaceous Alliance (Provisional)** ..... ***335***
*Eleocharis acicularis - Eryngium castrense* Herbaceous Association (Provisional) ..... 335
***Eleocharis macrostachya* Herbaceous Alliance** ..... ***337***
*Eleocharis macrostachya* Herbaceous Association ..... 337
*Eleocharis macrostachya* - (*Pleuropogon californicus*) Herbaceous Association (Provisional) ..... 339
*Eleocharis macrostachya - Marsilea vestita* Herbaceous Association (Provisional) ..... 341
***Juncus* (*balticus, mexicanus*) Herbaceous Alliance** ..... ***343***
*Juncus balticus* Herbaceous Association ..... 343
*Juncus balticus - Carex praegracilis* Herbaceous Association (Provisional) ..... 345
***Juncus* (*oxymeris, xiphioides*) Herbaceous Alliance** ..... ***347***
*Juncus oxymeris* Herbaceous Association (Provisional) ..... 347
*Juncus xiphioides* Herbaceous Association (Provisional) ..... 349
***Juncus effusus* Herbaceous Alliance** ..... ***351***
*Juncus effusus* Herbaceous Association ..... 351
***Lasthenia fremontii - Downingia* (*bicornuta*) Herbaceous Alliance** ..... ***354***
*Downingia* (*cuspidata*, *bicornuta*) Herbaceous Association ..... 354
*Downingia bicornuta - Lasthenia fremontii* Herbaceous Association ..... 356
*Downingia ornatissima - Lasthenia fremontii* Herbaceous Association ..... 358
*Eryngium* (*vaseyi*, *castrense*) Herbaceous Association ..... 360
*Lasthenia fremontii* Herbaceous Association (Provisional) ..... 362
***Layia fremontii* Herbaceous Alliance** ..... ***364***
*Layia fremontii - Lasthenia californica - Achyrachaena mollis* Herbaceous Association ..... 364
*Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei* Herbaceous Association ..... 368
*Plagiobothrys austiniae - Achyrachaena mollis* Herbaceous Association ..... 371
***Lolium multiflorum* Herbaceous Semi-Natural Stands** ..... ***374***
*Lolium multiflorum - Centaurium muehlenbergii* Herbaceous Association ..... 374
***Lolium multiflorum* (*Zigadenus fremontii*) Herbaceous Alliance (Provisional)** ..... ***377***
*Zigadenus fremontii* Herbaceous Association (Provisional) ..... 377

***Mimulus guttatus* Herbaceous Alliance (Provisional)** ..... ***380***
*Mimulus guttatus - Vulpia microstachys* Serpentine Herbaceous Association (Provisional) ..... 380
***Muhlenbergia rigens* Herbaceous Alliance** ..... ***383***
*Muhlenbergia rigens* Herbaceous Association ..... 383
***Nassella pulchra* Herbaceous Alliance** ..... ***386***
*Nassella pulchra* Herbaceous Association ..... 386
*Nassella pulchra - Leontodon taraxacoides* Herbaceous Association ..... 389
***Phalaris aquatica* Herbaceous Semi-Natural Stands** ..... ***392***
*Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis* Herbaceous Association ..... 392
***Schoenoplectus* (=*Scirpus*) *acutus* Herbaceous Alliance** ..... ***395***
*Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis* Herbaceous Association ..... 395
*Schoenoplectus* (=*Scirpus*) *acutus - Typha domingensis* Herbaceous Association ..... 397
***Trifolium variegatum* Herbaceous Alliance** ..... ***399***
*Trifolium variegatum* Herbaceous Association ..... 399
*Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides* Herbaceous Association ..... 402
*Trifolium variegatum - Vulpia bromoides* - (*Hypochaeris glabra - Leontodon taraxacoides*) Herbaceous Association ..... 405
(*Trifolium variegatum - Vulpia bromoides*) - *Hypochaeris glabra - Leontodon taraxacoides* Herbaceous Association ..... 408
***Typha* (*angustifolia, domingensis, latifolia*) Herbaceous Alliance** ..... ***411***
*Typha latifolia* Herbaceous Association ..... 411
***Vulpia microstachys-Lasthenia californica-Plantago erecta* Herbaceous Alliance** ..... ***414***
*Selaginella hansenii - Vulpia microstachys* Herbaceous Association ..... 414
*Selaginella hansenii - Vulpia microstachys - Lupinus nanus* Herbaceous Association (Provisional) 417
*Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis* Herbaceous Association (Provisional) ..... 420
*Vulpia microstachys - Elymus elymoides - Achnatherum lemmonii* Herbaceous Association (Provisional) ..... 422
*Vulpia microstachys - Lasthenia californica - Agrostis elliottiana* Herbaceous Association ..... 424
*Vulpia microstachys - Lasthenia californica - Parvisedum pumilum* Herbaceous Association ..... 427
*Vulpia microstachys - Navarretia tagetina* Herbaceous Association ..... 430
*Vulpia microstachys - Plantago erecta - Calycadenia* (*truncata*, *multiglandulosa*) Herbaceous Association ..... 433

**TREE DESCRIPTIONS**

A stand representing the *Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum* Provisional Forest Association. Photo taken in the fall, on a north-facing slope above the Yuba River, Nevada County.

## *Acer macrophyllum* Woodland/Forest Alliance
## Big-leaf Maple Woodland/Forest Alliance

As defined in the state, *Acer macrophyllum* is dominant or co-dominant in the tree canopy with *Abies concolor*, *Alnus rhombifolia*, *Calocedrus decurrens*, *Cornus nuttallii*, *Pinus ponderosa*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Q. kelloggii*, *Q. lobata*, *Taxus brevifolia*, *Tsuga heterophylla*, or *Umbellularia californica*. The canopy is typically intermittent or continuous, and the shrub and herb layers are sparse to abundant. Stands occur along raised stream benches, terraces, and on lower slopes. Soils may be rocky. The alliance is relatively rare in the state, previously known from the northern California Coast, where it exists on alluvial terraces, including locations that have been cleared in the past for agriculture. Mixed stands of *Pseudotsuga menziesii* and *Acer macrophyllum* occur at higher elevations in the Klamath Mountains and North Coast Ranges, and stands in Redwood National Park and in Prairie Creek and Jedediah Smith Redwoods state parks are not currently described (Sawyer et al. 2007 MS).

Stands of the Big-leaf Maple Alliance are uncommon in the Sierra Nevada Foothills, but they become more frequent at elevations above the Foothills boundary. Two associations were classified in the study area and are described below. The stands were found in canyons and along riparian terraces.

## *Acer macrophyllum* Association (Provisional)
## Big-leaf Maple Association (Provisional)

### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Acer macrophyllum* at 10-47% cover. Other trees such as *Quercus chrysolepis* and *Quercus lobata* were characteristically present. The shrub layer was open with *Rhamnus tomentella* and *Toxicodendron diversilobum* often present. The herbaceous layer was open and often included *Cynosurus echinatus*, *Elymus glaucus*, *Melica torreyana*, *Sanicula bipinnatifida*, and *Torilis arvensis*.

This association was sampled infrequently in the study area within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on volcanic, basalt, and sandstone substrates. They occupied bottom to middle slopes that were gentle to moderate. Big-leaf Maple stands are usually associated with springs or riparian zones.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte County, within the Shingletown-Paradise (M261Dl) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997). Most stands sampled occurred in the Big Chico Creek Ecological Reserve.

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 65 | 34-93 | - |
| Herb | 12 | 1-27 | variable |
| Shrub | 3.8 | 0-6 | <5 |
| Low Tree/Tall Shrub | 10 | 0-40 | 10-15 |
| Hardwood | 49.5 | 25-70 | 10-35 |
| Conifer | 2.6 | 0-10 | 5->35 |
| Relative non-native to native cover | 11 | 0-27 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (2), SW (1), SE (1)
Macrotopography: bottom (1), bottom to lower slope (1), lower slope (1), middle slope (1)
Microtopography: concave (2), convex (1)
Parent Material: volcanic (2), basalt (1), sandstone (1)
Soil Texture: silt or silt loam (2), clay or clay loam (1), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1486 ft. | 970-2000 ft. |
| Slope | 7.5º | 3-11º |
| Large rock cover | 7% | 1-13% |
| Small rock cover | 5% | 3-9% |
| Bare ground cover | 4.6% | <1-10% |
| Litter cover | 75% | 50-92% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0553, SNNR0567, SNNR0713, SNNR1120

**Rank:** G4S3

**GLOBAL DISTRIBUTION**
This association is being described for the first time for the Sierra Nevada and southern Cascade Range based on data collected for this project. Similar stands were mapped (but not sampled) on north-facing talus cones in Yosemite Valley.

**STAND TABLE**
***Acer macrophyllum* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ACMA3-T | *Acer macrophyllum* | 100 | 34.0 | 10 | 47 | X | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 13.3 | 5 | 30 | | | X | |
| | QULO-T | *Quercus lobata* | 75 | 0.6 | 0.2 | 1 | | | X | |
| | QUKE-T | *Quercus kelloggii* | 50 | 2.5 | 4 | 6 | | | | |
| | UMCA-T | *Umbellularia californica* | 50 | 1.1 | 0.2 | 4 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 25 | 2.5 | 10 | 10 | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 25 | 2.5 | 10 | 10 | | | | |
| | CADE27-L | *Calocedrus decurrens* | 25 | 1.0 | 4 | 4 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 25 | 0.3 | 1 | 1 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 25 | 0.3 | 1 | 1 | | | | |
| | UMCA-L | *Umbellularia californica* | 25 | 0.3 | 1 | 1 | | | | |
| | UMCA-M | *Umbellularia californica* | 25 | 0.3 | 1 | 1 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PSME-L | *Pseudotsuga menziesii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PSME-M | *Pseudotsuga menziesii* | 25 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Acer macrophyllum* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | QULO-M | *Quercus lobata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 50 | 1.5 | 1 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 50 | 0.5 | 1 | 1 | | | | |
| | CONU4 | *Cornus nuttallii* | 25 | 10.0 | 40 | 40 | | | | |
| | VICA5 | *Vitis californica* | 25 | 0.3 | 1 | 1 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | RIBES | *Ribes* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 75 | 5.5 | 3 | 15 | | | X | X |
| | ELGL | *Elymus glaucus* | 75 | 0.4 | 0.2 | 1 | | | X | |
| | CYEC | *Cynosurus echinatus* | 50 | 3.0 | 2 | 10 | | | | X |
| | METO | *Melica torreyana* | 50 | 0.3 | 0.2 | 1 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MELIC | *Melica* | 25 | 2.0 | 8 | 8 | | | | |
| | POACXX | Poaceae | 25 | 1.3 | 5 | 5 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 25 | 0.8 | 3 | 3 | | | | |
| | SMILA2 | *Smilax* | 25 | 0.5 | 2 | 2 | | | | |
| | LILIXX | *Liliaceae* | 25 | 0.3 | 1 | 1 | | | | |
| | NEHE | *Nemophila heterophylla* | 25 | 0.3 | 1 | 1 | | | | |
| | PTAQ | *Pteridium aquilinum* | 25 | 0.3 | 1 | 1 | | | | |
| | RAOC | *Ranunculus occidentalis* | 25 | 0.3 | 1 | 1 | | | | |
| | TRLA6 | *Trientalis latifolia* | 25 | 0.3 | 1 | 1 | | | | |
| | AGRE | *Agoseris retrorsa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CALOC | *Calochortus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CHPO3 | *Chlorogalum pomeridianum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPA5 | *Claytonia parviflora* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | GERAN | *Geranium* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | NAPU4 | *Nassella pulchra* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PITR3 | *Piperia transversa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POMU | *Polystichum munitum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SCCA3 | *Scutellaria californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SMCA2 | *Smilax californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | VICIA | *Vicia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Epiphyte** | | | | | | | | | | |
| | PHVI9 | *Phoradendron villosum* | 25 | 0.3 | 1 | 1 | | | | |

***Acer macrophyllum - Pseudotsuga menziesii* / *Dryopteris arguta* Association (Provisional)**
**Big-leaf Maple - Douglas-fir / Wood Fern Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Pseudotsuga menziesii* at 25-35% cover. Other trees such as *Acer macrophyllum*, *Quercus chrysolepis*, and *Umbellularia californica* were characteristically present. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant. The herbaceous layer was open with abundant and characteristic taxa such as *Adiantum jordanii*, *Dryopteris arguta*, and *Melica torreyana*.

This association was sampled infrequently in the study area within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on volcanic substrates. They occupied lower to upper slopes that were steep. Stands of Big-leaf Maple - Douglas-fir / Wood Fern occurred along riparian corridors or on mesic, north-facing canyon slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 81 | 77-85 | - |
| Herb | 25 | 20-30 | variable |
| Shrub | 33 | 26-40 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 38.5 | 32-45 | 10-20 |
| Conifer | 35.5 | 28-43 | 10->35 |
| Relative non-native to native cover | 2.1 | 0-4 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (2)
Macrotopography: lower to middle slope (1), upper slope (1)
Microtopography: concave (1), undulating (1)
Parent Material: volcanic (2)
Soil Texture: sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1486 ft. | 1410-1562 ft. |
| Slope | 37.5º | 35-40º |
| Large rock cover | 5% | 5-5% |
| Small rock cover | 2% | 2-2% |
| Bare ground cover | 8% | 8-8% |
| Litter cover | 80% | 80-80% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0534, SNNR0776

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
Stands with an overstory dominated by *Pseudotsuga menziesii* and *Acer macrophyllum* are known from Oregon, Washington, and British Columbia (NatureServe 2007a). This association has only been described for the Sierra Nevada and southern Cascade Ranges. It is also likely to occur in the North Coast Ranges and the eastern Klamath Mountains of California.

**STAND TABLE**

***Acer macrophyllum - Pseudotsuga menziesii / Dryopteris arguta* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 100 | 30.0 | 25 | 35 | | X | X | |
| | ACMA3-T | *Acer macrophyllum* | 100 | 23.5 | 12 | 35 | | X | X | |
| | UMCA-T | *Umbellularia californica* | 100 | 10.0 | 10 | 10 | | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 4.5 | 4 | 5 | | | X | |
| | QUKE-T | *Quercus kelloggii* | 50 | 8.5 | 17 | 17 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 50 | 4.0 | 8 | 8 | | | | |
| | PIPO-T | *Pinus ponderosa* | 50 | 2.5 | 5 | 5 | | | | |
| | AECA-M | *Aesculus californica* | 50 | 1.0 | 2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 8.0 | 6 | 10 | | | X | |
| | CAOC5 | *Calycanthus occidentalis* | 50 | 6.0 | 12 | 12 | | | | |
| | COSE16 | *Cornus sericea* | 50 | 5.0 | 10 | 10 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 5.0 | 10 | 10 | | | | |
| | VICA5 | *Vitis californica* | 50 | 3.0 | 6 | 6 | | | | |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 50 | 2.5 | 5 | 5 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 50 | 1.0 | 2 | 2 | | | | |
| | ARCA10 | *Aristolochia californica* | 50 | 0.5 | 1 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | DRAR3 | *Dryopteris arguta* | 100 | 5.0 | 2 | 8 | | | X | |
| | ADJO | *Adiantum jordanii* | 100 | 4.5 | 4 | 5 | | | X | |
| | METO | *Melica torreyana* | 100 | 3.1 | 0.2 | 6 | | | X | |
| | ASHA | *Asarum hartwegii* | 50 | 2.0 | 4 | 4 | | | | |
| | CYEC | *Cynosurus echinatus* | 50 | 2.0 | 4 | 4 | | | | X |
| | BRLA3 | *Bromus laevipes* | 50 | 0.5 | 1 | 1 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.5 | 1 | 1 | | | | X |
| | TRLA6 | *Trientalis latifolia* | 50 | 0.5 | 1 | 1 | | | | |
| | HEMI7 | *Heuchera micrantha* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | IRIS | *Iris* | 50 | 0.1 | 0.2 | 0 | | | | |

## *Aesculus californica* Woodland/Forest Alliance
## California Buckeye Woodland/Forest Alliance

As defined in the state, *Aesculus californica* is dominant or co-dominant in the tree canopy with *Fraxinus dipetala*, *Heteromeles arbutifolia*, *Pinus sabiniana*, *Prunus ilicifolia*, *Quercus agrifolia*, *Q. douglasii*, *Q. wislizeni*, and *Umbellularia californica*. The canopy is open to continuous, and is one or two-tiered. Stands of *Aesculus californica* occur on varied slopes and topography. Soils are shallow and moderately to excessively drained.

In the study area, California buckeye often forms stands on middle to lower, steep riparian terraces and on rocky volcanic slopes. As described below, two associations of the California Buckeye Alliance were classified. Additional variation was found in one stand (SNNR0849), which lacked *Toxicodendron diversilobum* and moss. This stand was classified to the alliance level only.

### *Aesculus californica* / *Toxicodendron diversilobum* / Moss Association
### California Buckeye / Poison-oak / Moss Association

**SUMMARY**
In the stands sampled, the canopy was typically open to intermittent and dominated by *Aesculus californica* at 10-77% cover (combined cover in the tree overstory and/or understory layers). *Quercus wislizeni* was characteristically present as a tree and/or shrub. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant. The herbaceous layer was sparse to intermittent and often included *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Melica californica*, and *Torilis arvensis*. Moss was often present in the understory cryptogam layer, with an average cover higher than the shrub or herb layers.

In the study area, this association was sampled commonly within the central Sierra Nevada Foothills and less frequently in the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands often occurred on volcanic (including basalt) substrates, and occurred less frequently on metamorphic (including slate), and ultramafic substrates. They occupied slope positions from bottom to ridgetop. Slopes varied from moderate to steep. These California Buckeye / Poison-oak / Moss stands occurred in somewhat mesic, upland settings, often associated with a creek or river.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Calaveras, Mariposa, Nevada, Sacramento, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.7 | 44-85 | - |
| Herb | 25.8 | 0-65 | variable |
| Shrub | 30.6 | 0-78 | <5 |
| Low Tree/Tall Shrub | 9.2 | 0-65 | 5-10 |
| Hardwood | 15.6 | 0-60 | 5-20 |
| Conifer | 0.1 | 0-1 | 10-20 |
| Relative non-native to native cover | 23.5 | 0-66 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (4), N (4), E (3), W (1), Variable (1), SW (1)
Macrotopography: bottom to lower slope (1), lower slope (4), lower to middle slope (1), middle slope (4), upper slope (3), ridgetop (1)
Microtopography: undulating (10), concave (2), flat (1), convex (1)
Parent Material: volcanic (5), metamorphic (3), basalt (2), slate (2), limestone (1), ultramafic (1)
Soil Texture: loam or sandy loam (6), clay or clay loam (2), sand (1), silt or silt loam (1), unknown (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1118 ft. | 300-1785 ft. |
| Slope | 29.7º | 14-45º |
| Large rock cover | 37.1% | <1-97% |
| Small rock cover | 12.4% | 0-33% |
| Bare ground cover | 6% | 0-20% |
| Litter cover | 39.3% | 0-88% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0057, SNNR0077, SNNR0200, SNNR1112, SNNR1212, SNNR1336, SNNR1454, SNNR1470, SNNR1472 **Relevés:** SNFN0213, SNFN0643, SNFN0648, SNFN0678, SNFN0684

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. It is likely to occur in the Northern California Interior Coast Ranges, the Central California Coast Ranges, and the Eastern Klamath Mountains as well.

**STAND TABLE**
***Aesculus californica* / *Toxicodendron diversilobum* / Moss Association**

| **Lifeform** | **Code** | **Species Name** | **Con** | **Avg** | **Min** | **Max** | **D** | **cD** | **C** | **N** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | AECA-M | *Aesculus californica* | 79 | 21.4 | 5 | 77 | X | | X | |
| | QUWI2-T | *Quercus wislizeni* | 79 | 2.4 | 0.2 | 8 | | | X | |
| | QUDO-T | *Quercus douglasii* | 43 | 3.1 | 3 | 20 | | | | |
| | AECA-T | *Aesculus californica* | 36 | 12.7 | 5 | 60 | | | | |
| | AECA-L | *Aesculus californica* | 21 | 0.2 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 93 | 8.4 | 0.2 | 30 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 36 | 1.7 | 0.2 | 10 | | | | |
| | MIAU | *Mimulus aurantiacus* | 36 | 1.4 | 0.2 | 12 | | | | |
| | KEBR | *Keckiella breviflora* | 36 | 1.0 | 0.2 | 8 | | | | |
| | CEOCO | *Cercis occidentalis* | 21 | 1.9 | 0.2 | 25 | | | | |
| | SAME5 | *Sambucus mexicana* | 21 | 0.7 | 0.2 | 5 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 21 | 0.2 | 0.2 | 2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 21 | 0.2 | 0.2 | 2 | | | | |

**STAND TABLE continued**
***Aesculus californica* / *Toxicodendron diversilobum* / Moss Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 71 | 1.8 | 0.2 | 6 | | | | X |
| | TOAR | *Torilis arvensis* | 57 | 2.5 | 0.2 | 25 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 50 | 4.4 | 0.2 | 25 | | | | X |
| | AVBA | *Avena barbata* | 50 | 1.0 | 0.2 | 9 | | | | X |
| | MECA2 | *Melica californica* | 50 | 0.2 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 36 | 1.0 | 0.2 | 5 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 36 | 0.3 | 0.2 | 2 | | | | |
| | PETRT | *Pentagramma triangularis* subsp. *triangularis* | 36 | 0.2 | 0.2 | 2 | | | | |
| | PHCI | *Phacelia cicutaria* | 36 | 0.2 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 29 | 2.3 | 0.2 | 20 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 29 | 1.3 | 0.2 | 18 | | | | X |
| | VIVI | *Vicia villosa* | 29 | 0.9 | 0.2 | 5 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 29 | 0.5 | 0.2 | 3 | | | | X |
| | CLUN | *Clarkia unguiculata* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | DIVO | *Dichelostemma volubile* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | TRLA16 | *Triteleia laxa* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | AVFA | *Avena fatua* | 21 | 2.4 | 2 | 30 | | | | X |
| | CLPE | *Claytonia perfoliata* | 21 | 0.5 | 0.2 | 5 | | | | |
| | VUMY | *Vulpia myuros* | 21 | 0.2 | 0.2 | 1 | | | | X |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 21 | 0 | 0.2 | 0.2 | | | | |
| | COHE | *Collinsia heterophylla* | 21 | 0 | 0.2 | 0.2 | | | | |
| | DUCYC3 | *Dudleya cymosa* subsp. | 21 | 0 | 0.2 | 0.2 | | | | |
| | HERBAC | *unknown* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 71 | 15.2 | 1 | 80 | | | | |
| | SEHA2 | *Selaginella hansenii* | 36 | 1.2 | 0.2 | 8 | | | | |

***Aesculus californica* Riparian Association (Provisional)**
**California Buckeye Riparian Association (Provisional)**

**SUMMARY**
In the stands sampled, the canopy was typically open to intermittent and dominated by *Aesculus californica* at 17-52% cover (combined cover in the tree overstory and/or understory layers). *Quercus lobata* was often present in the overstory. The shrub layer was open to continuous with *Ficus carica*, *Rhamnus tomentella*, *Toxicodendron diversilobum*, and *Vitis californica* often present. The herbaceous layer was open to intermittent and often included *Carduus pycnocephalus*, *Claytonia perfoliata*, *Galium aparine*, *Geranium molle*, *Pentagramma triangularis*, *Sanicula crassicaulis*, *Sherardia arvensis*, *Stellaria media*, and *Torilis arvensis*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates and less frequently on basalt or mixed alluvium substrates. These California Buckeye Riparian stands occurred along riparian corridors and flood plains, and they usually occupied bottom to lower slopes or terraces that were moderate to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Calaveras, El Dorado, Mariposa, and Nevada Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 68.3 | 32-90 | - |
| Herb | 23.3 | 1-53 | variable |
| Shrub | 50.7 | 25-75 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 11.7 | 0-32 | 10-35 |
| Conifer | 0.5 | 0-3 | 20-35 |
| Relative non-native to native cover | 20.1 | 0-43 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: E (2), W (1), SW (1), S (1), N (1)
Macrotopography: bottom (1), lower slope (3), middle to upper slope (1), terrace (1)
Microtopography: undulating (4), flat (2)
Parent Material: metamorphic (4), basalt (1), mixed alluvium (1)
Soil Texture: loam or sandy loam (2), clay or clay loam (1), silt or silt loam (1), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 930 ft. | 499-1602 ft. |
| Slope | 16.7º | 6-45º |
| Large rock cover | 19.6% | <1-60% |
| Small rock cover | 3.6% | 0.4-10% |
| Bare ground cover | 3.1% | <1-10% |
| Litter cover | 69.3% | 11-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR1088, SNNR1333 **Relevés:** SNFN0021, SNFN0037, SNFN0051, SNFN0246

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described solely from the Sierra Nevada Foothills, although it may occur elsewhere in cismontane California, north of the Transverse Ranges.

**STAND TABLE**
***Aesculus californica* Riparian Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | AECA-M | *Aesculus californica* | 100 | 19.2 | 0.2 | 32 | X | | X | |
| | AECA-T | *Aesculus californica* | 67 | 13.5 | 2 | 45 | | | | |
| | QULO-T | *Quercus lobata* | 50 | 5.3 | 4 | 20 | | | | |
| | AECA-L | *Aesculus californica* | 50 | 1.4 | 0.2 | 7 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 1.2 | 1 | 4 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 33 | 1.8 | 4 | 7 | | | | |
| | QUDO-T | *Quercus douglasii* | 33 | 0.4 | 0.2 | 2 | | | | |
| | QULO-L | *Quercus lobata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 5.2 | 0.2 | 11 | | | X | |
| | RHTO6 | *Rhamnus tomentella* | 83 | 3.1 | 0.2 | 16 | | | X | |
| | VICA5 | *Vitis californica* | 50 | 0.7 | 0.2 | 3 | | | | |
| | FICA | *Ficus carica* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 33 | 7.5 | 5 | 40 | | | | |
| | RUDI2 | *Rubus discolor* | 33 | 0.9 | 2.2 | 3.2 | | | | X |
| | CLLA3 | *Clematis lasiantha* | 33 | 0.4 | 0.2 | 2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 33 | 0.2 | 0.2 | 1 | | | | |
| | HOMA4 | *Hoita macrostachya* | 33 | 0.2 | 0.2 | 1 | | | | |
| | LONIC | *Lonicera* | 33 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | SACR2 | *Sanicula crassicaulis* | 83 | 0.5 | 0.2 | 2 | | | X | |
| | GAAP2 | *Galium aparine* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 4.7 | 1 | 25 | | | | X |
| | GEMO | *Geranium molle* | 50 | 2.8 | 1 | 15 | | | | X |
| | CLPE | *Claytonia perfoliata* | 50 | 0.4 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 50 | 0.2 | 0.2 | 1 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | SHAR2 | *Sherardia arvensis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | STME2 | *Stellaria media* | 50 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Aesculus californica* Riparian Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 33 | 6.3 | 8 | 30 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 33 | 3.0 | 0.2 | 18 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 33 | 0.8 | 2 | 3 | | | | X |
| | VISA | *Vicia sativa* | 33 | 0.5 | 0.2 | 3 | | | | X |
| | ELGL | *Elymus glaucus* | 33 | 0.4 | 0.2 | 2 | | | | |
| | MIMUL | *Mimulus* | 33 | 0.2 | 0.2 | 1 | | | | |
| | ARDO3 | *Artemisia douglasiana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CAAL2 | *Calochortus albus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CAOL | *Cardamine oligosperma* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CHPO3 | *Chlorogalum pomeridianum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | DIVO | *Dichelostemma volubile* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LITHO2 | *Lithophragma* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POCA26 | *Polypodium calirhiza* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | SABI2 | *Sanicula bipinnata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 0.7 | 1 | 2 | | | | |

### *Alnus rhombifolia* Woodland/Forest Alliance
### White Alder Woodland/Forest Alliance

As defined in the state, *Alnus rhombifolia* is dominant or co-dominant in tree canopy with *Acer macrophyllum*, *Chamaecyparis lawsoniana*, *Fraxinus latifolia*, *Lithocarpus densiflorus*, *Platanus racemosa*, *Populus fremontii*, *P. balsamifera* subsp. *trichocarpa*, *Pseudotsuga menziesii*, *Quercus lobata*, and *Salix* spp. The canopy is open to continuous. The shrub layer is sparse to continuous and the herbaceous layer is variable. Stands occur along riparian corridors, incised canyons, seeps, stream banks, mid-channel bars, floodplains, and terraces.

In the study area, six associations of the White Alder Alliance were classified and are described below. Additional variation in five stands (SNNR0497, SNNR1237, SNNR1273, SNNR0711, SNNR0289) was due to co-dominance with the non-native *Ficus carica*, overstory presence of *Umbellularia californica* or *Cornus sericea*, or understory presence by the non-native invasives *Rubus discolor* or *Vinca major*. These stands were classified to the alliance level only.

---

### *Alnus rhombifolia* - *Quercus chrysolepis* Association
### White Alder - Canyon Live Oak Association

#### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Alnus rhombifolia* at 2-51% cover. *Quercus chrysolepis* was characteristically present in the overstory. The shrub layer was open to continuous with *Rubus discolor*, *Toxicodendron diversilobum*, and *Vitis californica* often present. The herbaceous layer was open with *Darmera peltata*, *Melica torreyana*, *Torilis arvensis*, and *Woodwardia fimbriata* occurring occasionally.

This association was sampled commonly in the study area with decreasing frequency in the northern Sierra Nevada Foothills, High Cascade Range, and Cascade Range Foothills Subregions (Hickman 1993). Stands sometimes occurred on volcanic (including basalt) and on metamorphic, and infrequently on granitic, mixed alluvium, or sedimentary substrates. They occupied bottom to middle slopes that were flat to steep. These White Alder - Canyon Live Oak stands occurred along riparian corridors and flood plains.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, Butte, Calaveras, Nevada, Placer, Shasta, and Tehama Counties and the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 71.8 | 46-92 | - |
| Herb | 5.9 | 0-20 | variable |
| Shrub | 35.5 | 15-79 | <5 |
| Low Tree/Tall Shrub | 3.2 | 0-20 | 5-10 |
| Hardwood | 46.7 | 16-85 | 5-20 |
| Conifer | 1.9 | 0-8 | 10-35 |
| Relative non-native to native cover | 16.2 | 0-54 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (4), W (3), Variable (3), S (2), NW (1), NE (1), Flat (1)
Macrotopography: bottom (11), bottom to lower slope (1), middle slope (3)
Microtopography: concave (9), flat (3), undulating (3)
Parent Material: volcanic (5), metamorphic (3), mixed alluvium (3), granitic (2), basalt (1), sedimentary (1)
Soil Texture: sand (10), silt or silt loam (2), loam or sandy loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1575 ft. | 694-2267 ft. |
| Slope | 6.4º | 0-32º |
| Large rock cover | 21.7% | <1-45% |
| Small rock cover | 18% | <1-45% |
| Bare ground cover | 10.4% | 1-33% |
| Litter cover | 33.7% | 5-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** SNNR0267, SNNR0353, SNNR0430, SNNR0506, SNNR0515, SNNR0582, SNNR0638, SNNR0749, SNNR1125, SNNR1243, SNNR1251, SNNR1260, SNNR1301, SNNR1364, SNNR1391

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, but it may also occur in the Klamath Mountains and the North Coast Ranges of California. Potter (2005) describes a *Quercus chrysolepis* / *Toxicodendron diversilobum* Association from the central and southern Sierra Foothills region, which he considers riparian. His type is broader (stands reach above the immediate riparian zone in many cases) and is largely dominated by *Q*. *chrysolepis*, with around one-third of the plots containing *A*. *rhombifolia*; however, it shares many species and characteristics with this association.

**STAND TABLE**
***Alnus rhombifolia* - *Quercus chrysolepis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 100 | 27.4 | 2 | 51 | | X | X | |
| | QUCH2-T | *Quercus chrysolepis* | 93 | 11.1 | 1 | 40 | | | X | |
| | UMCA-T | *Umbellularia californica* | 47 | 6.3 | 2 | 30 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 47 | 1.6 | 1 | 9 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 47 | 0.4 | 0.2 | 3 | | | | |
| | AECA-M | *Aesculus californica* | 47 | 0.3 | 0.2 | 2 | | | | |
| | SALA3-T | *Salix laevigata* | 40 | 0.6 | 0.2 | 5 | | | | |
| | QUKE-T | *Quercus kelloggii* | 33 | 1.2 | 0.2 | 8 | | | | |
| | PIPO-T | *Pinus ponderosa* | 33 | 0.7 | 0.2 | 5 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 27 | 1.7 | 1 | 10 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 80 | 4.8 | 0.2 | 14 | | | X | |
| | RUDI2 | *Rubus discolor* | 73 | 14.3 | 0.2 | 52 | | | | X |
| | VICA5 | *Vitis californica* | 60 | 4.2 | 0.2 | 25 | | | | |
| | CAOC5 | *Calycanthus occidentalis* | 40 | 2.7 | 1 | 15 | | | | |
| | RUUR | *Rubus ursinus* | 40 | 1.7 | 0.2 | 20 | | | | |
| | PHLE4 | *Philadelphus lewisii* | 33 | 0.4 | 0.2 | 2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 27 | 0.6 | 0.2 | 7 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 40 | 0.2 | 0.2 | 1 | | | | X |
| | DAPE | *Darmera peltata* | 27 | 0.3 | 0.2 | 3 | | | | |
| | METO | *Melica torreyana* | 27 | 0.2 | 0.2 | 1 | | | | |
| | WOFI | *Woodwardia fimbriata* | 27 | 0.1 | 0.2 | 1 | | | | |

## *Alnus rhombifolia* - *Salix laevigata* Association

**White Alder - Red Willow Association**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Alnus rhombifolia* at 1-50% cover. *Salix laevigata* was characteristically present in the overstory. The shrub layer was open to continuous with *Rubus discolor* dominant and with *Vitis californica* often present. The herbaceous layer was open to continuous with *Artemisia douglasiana*, *Juncus effusus*, *Melilotus albus*, and *Mentha* sp. occurring occasionally.

In the study area, this association was sampled most commonly within the northern Sierra Nevada Foothills and less commonly in the central Sierra Nevada Foothills, Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands occurred most often on igneous (including volcanic and granitic), sometimes on metamorphic, and less frequently on mixed rock, sedimentary (including limestone), or mixed alluvium substrates. These White Alder - Red Willow stands occurred along riparian corridors and flood plains, including washes and terraces. They occupied bottom to middle slope positions that were gentle to moderately steep.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Calaveras, Mariposa, Placer, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 62.2 | 18-95 | - |
| Herb | 14.7 | 1-80 | variable |
| Shrub | 35.1 | 0-69 | <5 |
| Low Tree/Tall Shrub | 10.4 | 0-50 | 5-10 |
| Hardwood | 28.6 | 4-70 | 5-20 |
| Conifer | <1 | 0-2 | 5-35 |
| Relative non-native to native cover | 27.1 | 1-72 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (4), S (3), SE (2), Flat (2), W (1), NW (1), NE (1), E (1)
Macrotopography: bottom (8), lower slope (2), lower to middle slope (1), middle slope (1), terrace (2), wash (1)
Microtopography: flat (6), undulating (4), concave (4), convex (1)
Parent Material: metamorphic (4), volcanic (3), igneous (2), mixed rock (2), granitic (1), limestone (1), mixed alluvium (1), sedimentary (1)
Soil Texture: sand (6), clay or clay loam (3), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1208 ft. | 247-2711 ft. |
| Slope | 3.1º | 1-9º |
| Large rock cover | 23.3% | <1-50% |
| Small rock cover | 19.4% | 1.2-50% |
| Bare ground cover | 14.6% | 5-56% |
| Litter cover | 30.4% | 7-84% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** SNNR0182, SNNR0247, SNNR0295, SNNR0304, SNNR0345, SNNR0384, SNNR0589, SNNR0712, SNNR1044, SNNR1146, SNNR1185, SNNR1279
**Relevés:** SNFN0109, SNFN0566, SNFN0583

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. Potter (2005) defined this association from the central and southern Sierra Nevada. His sampling included stands in the foothills and montane zones, from elevations up to 4680 ft. Stands of this association may exist in other parts of cismontane California and Oregon.

**STAND TABLE**
***Alnus rhombifolia* - *Salix laevigata* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 87 | 18.5 | 1 | 50 | | X | X | |
| | SALA3-T | *Salix laevigata* | 87 | 10.9 | 1 | 45 | | | X | |
| | ALRH2-M | *Alnus rhombifolia* | 40 | 2.3 | 2 | 9 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 33 | 3.4 | 0.2 | 40 | | | | |
| | POFR2-T | *Populus fremontii* | 33 | 0.6 | 0.2 | 5 | | | | |
| | QULO-T | *Quercus lobata* | 27 | 1.6 | 3 | 10 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 27 | 1.0 | 1 | 8 | | | | |
| | AECA-M | *Aesculus californica* | 27 | 0.9 | 1 | 6 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 27 | 0.5 | 0.2 | 4 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 80 | 19.3 | 0.2 | 60 | X | | X | X |
| | VICA5 | *Vitis californica* | 73 | 3.3 | 0.2 | 10 | | | | |
| | SALA6 | *Salix lasiolepis* | 47 | 4.6 | 0.2 | 26 | | | | |
| | FICA | *Ficus carica* | 33 | 0.6 | 0.2 | 5 | | | | X |
| | BRCA3 | *Brickellia californica* | 33 | 0.1 | 0.2 | 1 | | | | |
| | SAEX | *Salix exigua* | 27 | 1.0 | 0.2 | 8 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 47 | 0.5 | 0.2 | 6 | | | | |
| | JUEF | *Juncus effusus* | 27 | 0.5 | 0.2 | 6 | | | | |
| | MEAL2 | *Melilotus albus* | 27 | 0.2 | 0.2 | 2 | | | | X |
| | MENTH | *Mentha* | 27 | 0.1 | 0.2 | 0.2 | | | | X |

***Alnus rhombifolia - Salix laevigata - Platanus racemosa* Association**

**White Alder - Red Willow - California Sycamore Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Alnus rhombifolia* at 4-55% cover. Other trees such as *Platanus racemosa* and *Salix laevigata* were characteristically present. The shrub layer was open to intermittent with *Calycanthus occidentalis* and *Rubus discolor* dominant and with *Ficus carica* and *Vitis californica* often present. The herbaceous layer was open and often included *Darmera peltata*.

In the study area, this association was sampled more commonly within the Cascade Range Foothills, and infrequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands sometimes occurred on sandy alluvium, metamorphic, or volcanic, and less frequently on mixed alluvium substrates. They usually occupied gentle slopes in canyon bottoms. These White Alder - Red Willow - California Sycamore stands occurred along riparian corridors and flood plains.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Placer, Tehama, and Yuba Counties and the Lower Foothills Metamorphic Belt (M261Fb), within the Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.5 | 47-90 | - |
| Herb | 5.8 | 1-19 | variable |
| Shrub | 36.4 | 15-61 | 1-5 |
| Low Tree/Tall Shrub | 12 | 0-45 | 5-15 |
| Hardwood | 36.4 | 6-70 | 5-35 |
| Conifer | 0.4 | 0-2 | 5-35 |
| Relative non-native to native cover | 22.6 | 8-33 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (3), W (2), SE (1), S (1), NW (1)
Macrotopography: bottom (7), terrace (1)
Microtopography: concave (3), flat (3), undulating (2)
Parent Material: sandy alluvium (3), metamorphic (2), volcanic (2), mixed alluvium (1)
Soil Texture: sand (4)

| | Mean | Range |
|---|---|---|
| Elevation | 519 ft. | 220-960 ft. |
| Slope | 2º | 1-4º |
| Large rock cover | 13.9% | 0-50% |
| Small rock cover | 22.3% | 0-76% |
| Bare ground cover | 10.6% | 4-20% |
| Litter cover | 34.1% | 5-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0248, SNNR1277, SNNR1281, SNNR1343, SNNR1345, SNNR1349, SNNR1352 **Relevés:** SNFN0256

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and adjacent low elevations of the Sierra Nevada Mountains. Potter (2005) described this association - his samples extend from the foothills to 3200 ft. elevation. This association may occur in some of the southern California Mountains, but it is unlikely that it extends beyond its sampled range.

**STAND TABLE**
***Alnus rhombifolia - Salix laevigata - Platanus racemosa* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 88 | 25.1 | 4 | 55 | | X | X | |
| | SALA3-M | *Salix laevigata* | 88 | 4.5 | 0.2 | 17 | | | X | |
| | PLRA-T | *Platanus racemosa* | 75 | 7.0 | 1 | 15 | | | X | |
| | SALA3-T | *Salix laevigata* | 75 | 5.4 | 0.2 | 15 | | | X | |
| | POFR2-T | *Populus fremontii* | 38 | 4.0 | 3 | 25 | | | | |
| | QULO-T | *Quercus lobata* | 38 | 1.9 | 3 | 8 | | | | |
| | PISA2-T | *Pinus sabiniana* | 38 | 0.5 | 1 | 2 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 25 | 1.1 | 1 | 8 | | | | |
| | PLRA-M | *Platanus racemosa* | 25 | 1.1 | 2 | 7 | | | | |
| | QULO-L | *Quercus lobata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | VICA5 | *Vitis californica* | 100 | 11.8 | 0.2 | 58 | | | X | |
| | RUDI2 | *Rubus discolor* | 88 | 17.6 | 0.4 | 35 | | X | X | X |
| | CAOC5 | *Calycanthus occidentalis* | 75 | 5.2 | 0.2 | 30 | | | X | |
| | FICA | *Ficus carica* | 50 | 3.8 | 0.2 | 20 | | | | X |
| | SALA6 | *Salix lasiolepis* | 25 | 1.4 | 3 | 8 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 25 | 0.2 | 0.2 | 1.2 | | | | |
| | TODI | *Toxicodendron diversilobum* | 25 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | DAPE | *Darmera peltata* | 50 | 0.3 | 0.2 | 2 | | | | |
| | TOAR | *Torilis arvensis* | 38 | 1.0 | 1 | 6 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 38 | 0.3 | 0.2 | 2 | | | | |
| | EPGI | *Epipactis gigantea* | 38 | 0.3 | 0.2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 38 | 0.2 | 0.2 | 1 | | | | X |
| | BRDI3 | *Bromus diandrus* | 25 | 0.8 | 2 | 4 | | | | X |
| | CAREX | *Carex* | 25 | 0.2 | 0.2 | 1 | | | | |
| | LOMU | *Lolium multiflorum* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | PAAC5 | *Panicum acuminatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |

## *Alnus rhombifolia* / *Carex* Association

## White Alder / Sedge Association


### SUMMARY

In the stands sampled, the canopy was typically open to continuous and dominated by *Alnus rhombifolia* at 2-70% combined cover in the tree and/or shrub overstory. Other trees such as *Fraxinus latifolia* and *Salix laevigata* were occasionally present. The shrub layer was open to continuous with *Rubus discolor*, *Salix lasiolepis*, *Toxicodendron diversilobum*, and *Vitis californica* often present. The herbaceous layer was open and often included *Carex nudata*.

In the study area, this association was sampled and observed commonly in the northern Sierra Nevada Foothills and Cascade Range Foothills, and infrequently in the High Cascade Range Subregions (Hickman 1993). Stands often occurred on igneous (volcanic, basalt and gabbro), sometimes on mixed alluvium, and infrequently on sedimentary (including limestone) substrates. White Alder / Sedge stands occurred along riparian corridors and flood plains, usually on bottomlands that were gentle to moderate.


### DISTRIBUTION IN STUDY AREA

This association was sampled in Butte, Calaveras, El Dorado, Nevada, Placer, Shasta, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 57.8 | 17-89 | - |
| Herb | 10 | 2-17 | variable |
| Shrub | 28.6 | 2-91 | <5 |
| Low Tree/Tall Shrub | 3.7 | 0-40 | 5-10 |
| Hardwood | 25.8 | 0-74 | 5-20 |
| Conifer | <1 | 0-2 | 5-20 |
| Relative non-native to native cover | 11.5 | 0-42 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: SW (5), S (4), W (3), N (3), Flat (3), NW (2), NE (2), SE (1)
Macrotopography: bottom (16), bottom to lower slope (2), lower slope (1), lower to middle slope (1), upper slope (1), terrace (2)
Microtopography: concave (11), undulating (8), flat (4)
Parent Material: mixed alluvium (9), volcanic (6), basalt (3), gabbro (2), igneous (1), limestone (1), sedimentary (1)
Soil Texture: sand (18), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1228 ft. | 267-2829 ft. |
| Slope | 2.7º | 1-13º |
| Large rock cover | 31% | 1-78% |
| Small rock cover | 24.1% | 0-70% |
| Bare ground cover | 14% | 0-68% |
| Litter cover | 16.5% | 0-52% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=23)

**Rapid Assessments:** SNNR0016, SNNR0241, SNNR0290, SNNR0292, SNNR0294, SNNR0324, SNNR0461, SNNR0523, SNNR0529, SNNR0563, SNNR0597, SNNR0601, SNNR0602, SNNR0629, SNNR0642, SNNR0837, SNNR1213, SNNR1218, SNNR1310, SNNR1332, SNNR1335 **Relevés:** SNFN0107, SNFN0376

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
The name of the association, including the genus *Carex*, is derived from Potter's (2005) description, which allows for several caespitose sedge species. Samples in our data set contain *Carex nudata* as the principal sedge species. This association has been described for the Sierra Nevada Foothills and lower portions of the Sierra Nevada Mountains. Potter (2005) defined this association from samples he collected through the northern, central, and southern Sierra Nevada Foothills and lower elevations of the northern, central, and southern Sierra Nevada High regions (Hickman 1993). It appears to be one of the most widespread of the several *Alnus rhombifolia* plant associations in the study area.

**STAND TABLE**
***Alnus rhombifolia* / *Carex* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 87 | 30.7 | 0.2 | 70 | X | | X | |
| | FRLA-T | *Fraxinus latifolia* | 35 | 1.0 | 0.2 | 6 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 30 | 3.0 | 0.2 | 25 | | | | |
| | SALA3-T | *Salix laevigata* | 30 | 0.8 | 1 | 4 | | | | |
| | QULO-T | *Quercus lobata* | 22 | 0.6 | 0.2 | 7 | | | | |
| | POFR2-T | *Populus fremontii* | 22 | 0.4 | 0.2 | 7 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 74 | 5.3 | 0.2 | 37 | | | | X |
| | SALA6 | *Salix lasiolepis* | 61 | 6.0 | 1 | 35 | | | | |
| | VICA5 | *Vitis californica* | 52 | 3.1 | 0.2 | 35 | | | | |
| | TODI | *Toxicodendron diversilobum* | 52 | 1.0 | 0.2 | 5 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 39 | 1.1 | 0.2 | 7 | | | | |
| | CAOC5 | *Calycanthus occidentalis* | 22 | 1.3 | 0.2 | 19 | | | | |
| **Herb** | | | | | | | | | | |
| | CANU5 | *Carex nudata* | 70 | 3.8 | 1 | 12 | | | | |
| | ARDO3 | *Artemisia douglasiana* | 39 | 0.5 | 0.2 | 5 | | | | |
| | PAAC5 | *Panicum acuminatum* | 30 | 0.3 | 0.2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 30 | 0.2 | 0.2 | 2 | | | | X |
| | MIGU | *Mimulus guttatus* | 26 | 0.1 | 0.2 | 0.2 | | | | |
| | MURI2 | *Muhlenbergia rigens* | 22 | 0.5 | 0.2 | 5 | | | | |
| | EQAR | *Equisetum arvense* | 22 | 0.2 | 0.2 | 2 | | | | |

### *Alnus rhombifolia* / *Darmera peltata* Association
### White Alder / Indian Rhubarb Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Alnus rhombifolia* at 30-45% cover. Other trees such as *Fraxinus latifolia* and *Quercus lobata* were characteristically present in the overstory and/or understory. The shrub layer was open with *Vitis californica* dominant. The herbaceous layer was open to intermittent and dominated by *Darmera peltata*, and it also included other taxa such as *Carex nudata*, *Lotus corniculatus*, *Melilotus albus*, and *Paspalum* in the two stands sampled.

This association was sampled infrequently in the study area and only within the Cascade Range Foothills Subregion (Hickman 1993). Stands usually occurred on mixed alluvium or sandstone substrates. These White Alder / Indian Rhubarb stands occurred along riparian corridors and flood plains on flat to gentle slopes. Stands may be actively flooded with patchy and regenerating, small alders.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte Counties and the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 62.5 | 55-70 | - |
| Herb | 35 | 30-40 | >0.3 |
| Shrub | 11 | 10-12 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 37.5 | 30-45 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 2.9 | 1-4 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (1), S (1)
Macrotopography: bottom (2)
Microtopography: flat (2)
Parent Material: mixed alluvium (1), sandstone (1)
Soil Texture: loam or sandy loam (1), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 815 ft. | 690-940 ft. |
| Slope | 0.5º | 0-1º |
| Large rock cover | 37.5% | 25-50% |
| Small rock cover | 25% | 25-25% |
| Bare ground cover | 20% | 10-30% |
| Litter cover | 12.5% | 10-15% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0541, SNNR0566

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Mountains and Foothills. It was the most frequently sampled of the *Alnus rhombifolia* Associations by Potter (2005). The few samples collected only in the northernmost positions of our study area underscore the predilection of this association to occur in cooler riparian sites, generally higher in elevation than those of our study area. It has also been observed in the Klamath and North Coast Range Mountains of California, where Cheng (2004) has noted it in several Forest Service Research Natural Areas.

**STAND TABLE**
***Alnus rhombifolia* / *Darmera peltata* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 100 | 37.5 | 30 | 45 | X | | X | |
| | FRLA-T | *Fraxinus latifolia* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | QULO-T | *Quercus lobata* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | SALA3-M | *Salix laevigata* | 50 | 2.5 | 5 | 5 | | | | |
| | PLRA-T | *Platanus racemosa* | 50 | 0.5 | 1 | 1 | | | | |
| | UMCA-T | *Umbellularia californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | VICA5 | *Vitis californica* | 100 | 7.5 | 5 | 10 | | X | X | |
| | BRCA3 | *Brickellia californica* | 50 | 2.5 | 5 | 5 | | | | |
| | CAOC5 | *Calycanthus occidentalis* | 50 | 2.5 | 5 | 5 | | | | |
| | SALA6 | *Salix lasiolepis* | 50 | 2.5 | 5 | 5 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLLI2 | *Clematis ligusticifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RUDI2 | *Rubus discolor* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUUR | *Rubus ursinus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | DAPE | *Darmera peltata* | 100 | 17.5 | 15 | 20 | X | | X | |
| | CANU5 | *Carex nudata* | 100 | 10.5 | 1 | 20 | | | X | |
| | MEAL2 | *Melilotus albus* | 100 | 2.5 | 1 | 4 | | | X | X |
| | LOCO6 | *Lotus corniculatus* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | PASPA2 | *Paspalum* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | MIGU | *Mimulus guttatus* | 50 | 1.0 | 2 | 2 | | | | |
| | MURI2 | *Muhlenbergia rigens* | 50 | 1.0 | 2 | 2 | | | | |
| | EPGI | *Epipactis gigantea* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | EQUIS | *Equisetum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PAAC5 | *Panicum acuminatum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PRVUL2 | *Prunella vulgaris* subsp. *lanceolata* | 50 | 0.1 | 0.2 | 0.2 | | | | |

### *Alnus rhombifolia* / *Salix exigua* Association
### White Alder / Narrow-leaf Willow Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Alnus rhombifolia* at 2-55% cover. Other trees such as *Fraxinus latifolia*, *Populus fremontii*, and *Salix laevigata* were often present in the overstory and/or understory. The shrub layer was open to intermittent with *Salix exigua* dominant and with *Salix lasiolepis* and *Vitis californica* often present. The herbaceous layer was open to intermittent and often included *Artemisia douglasiana*.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills but infrequently in the central Sierra Nevada Foothills, Cascade Range Foothills, and High Cascade Range Subregions (Hickman 1993). Stands usually occurred on mixed alluvium and occasionally on gabbro, granitic, limestone, or ultramafic substrates. These White Alder / Narrow-leaf Willow stands occurred along riparian corridors and flood plains on flat to gentle slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, Calaveras, El Dorado, Nevada, Placer, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 59.3 | 26-90 | - |
| Herb | 10.1 | 1-35 | variable |
| Shrub | 33.7 | 6-62 | <5 |
| Low Tree/Tall Shrub | 10 | 0-60 | 5-15 |
| Hardwood | 27.8 | 3-60 | 5-35 |
| Conifer | 0 | - | 10-20 |
| Relative non-native to native cover | 19.1 | 0-41 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (5), Flat (4), W (2), S (2), SE (1), NW (1)
Macrotopography: bottom (15)
Microtopography: undulating (8), flat (6), concave (1)
Parent Material: mixed alluvium (9), gabbro (3), granitic (1), limestone (1), ultramafic (1)
Soil Texture: sand (8), silt or silt loam (3), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 828 ft. | 382-2100 ft. |
| Slope | 1.1º | 0-2º |
| Large rock cover | 21.9% | 0-60% |
| Small rock cover | 18.1% | 1-53% |
| Bare ground cover | 23.4% | 3-74% |
| Litter cover | 24.4% | 3-89% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** SNNR0227, SNNR0329, SNNR0478, SNNR0591, SNNR0592, SNNR0593, SNNR0621, SNNR0645, SNNR1031, SNNR1056, SNNR1254, SNNR1271, SNNR1356, SNNR1402 **Relevés:** SNFN0017

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Mountains and Foothills by Potter (2005). He considers it a low elevation expression of the *Alnus rhombifolia* Alliance. The average elevation of his samples was 2300 ft. Our samples extend further downslope than his study area. A similar *Alnus rhombifolia* / *Salix exigua* (- *Rosa californica*) Association was defined from the Sacramento-San Joaquin River Delta of the Central Valley (Hickson and Keeler-Wolf 2007), with an average elevation below 100 ft. It differs in species composition and lacks the coarse rocky substrate when compared to this association.

**STAND TABLE**
***Alnus rhombifolia* / *Salix exigua* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 100 | 22.5 | 2 | 55 | X | | X | |
| | FRLA-T | *Fraxinus latifolia* | 47 | 2.1 | 0.2 | 8 | | | | |
| | SALA3-T | *Salix laevigata* | 40 | 3.7 | 3 | 20 | | | | |
| | POFR2-T | *Populus fremontii* | 40 | 2.3 | 0.2 | 20 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 33 | 0.5 | 0.2 | 4 | | | | |
| | FRLA-M | *Fraxinus latifolia* | 33 | 0.3 | 1 | 1 | | | | |
| | POFR2-M | *Populus fremontii* | 27 | 0.4 | 0.2 | 5 | | | | |
| **Shrub** | | | | | | | | | | |
| | SAEX | *Salix exigua* | 100 | 15.6 | 2 | 40 | | X | X | |
| | RUDI2 | *Rubus discolor* | 93 | 14.1 | 2 | 40 | | X | X | X |
| | VICA5 | *Vitis californica* | 73 | 5.0 | 0.2 | 23 | | | | |
| | SALA6 | *Salix lasiolepis* | 67 | 5.1 | 1 | 16 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 40 | 1.3 | 0.2 | 12 | | | | |
| | CYSC4 | *Cytisus scoparius* | 27 | 0.4 | 0.2 | 3 | | | | X |
| | ROCA2 | *Rosa californica* | 27 | 0.3 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 73 | 1.2 | 0.2 | 6 | | | | |
| | EUOC4 | *Euthamia occidentalis* | 33 | 0.1 | 0.2 | 1 | | | | |

***Arbutus menziesii* Woodland/Forest Alliance**

**Pacific Madrone Woodland/Forest Alliance**

As defined in the state, *Arbutus menziesii* is the dominant tree in the canopy with *Lithocarpus densiflorus*, *Quercus chrysolepis*, *Q. wislizeni*, *Q. kelloggii*, and *Umbellularia californica*. The tree canopy is continuous, the shrub layer is sparse to intermittent, and the herbaceous layer is sparse. Stands of *Arbutus menziesii* are found on stream terraces, upland slopes on productive soils, or on steep or shallow, rocky, infertile soils. Pacific Madrone stands are typically somewhat mesic, occurring on northerly facing slopes or on sites recently disturbed by natural or human causes.

In the study area, one stand was classified to the alliance level only (SNNR1359). It lacked *Lithocarpus densiflorus* but had *Quercus kelloggii*, *Pinus ponderosa*, and *Umbellularia californica*. The shrub cover was intermittent with *Heteromeles arbutifolia* and *Toxicodendron diversilobum*.

***Arbutus menziesii* Alliance (no Associations defined)**

**Pacific Madrone Alliance**

**SUMMARY**

In the one stand sampled, the overstory tree canopy was intermittent and dominated by *Arbutus menziesii* at 40% cover. Other trees such as *Acer macrophyllum*, *Pinus ponderosa*, *Quercus chrysolepis*, *Quercus kelloggii*, and *Umbellularia californica* were present. The shrub layer was intermittent with *Toxicodendron diversilobum* and *Heteromeles arbutifolia* co-dominant and with *Lonicera hispidula*, *Philadelphus lewisii*, *Rubus ursinus*, and *Vitis californica* present. The herbaceous layer was open and dominated by *Cynosurus echinatus* and *Torilis arvensis*.

Because the alliance was sampled once in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993), we placed the stand at the alliance level. The stand occurred on a granitic substrate. It occupied the lower to middle portion of a steep slope, where California Bay became dense on the lowest portion of the slope. This stand was riparian influenced and likely had recent disturbance.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Nevada County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 77 | 77-77 | - |
| Herb | 4 | 4-4 | 0-0 |
| Shrub | 47 | 47-47 | 1-2 |
| Low Tree/Tall Shrub | 3 | 3-3 | 5-10 |
| Hardwood | 64 | 64-64 | 10-20 |
| Conifer | 2 | 2-2 | 20-35 |
| Relative non-native to native cover | 1.5 | 2-2 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NW (1)

Macrotopography: lower to middle slope (1)
Microtopography: flat (1)
Parent Material: granitic (1)
Soil Texture: loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 0 ft. | - ft. |
| Slope | 30º | 30-30º |
| Large rock cover | 2% | 2-2% |
| Small rock cover | 5% | 5-5% |
| Bare ground cover | 10% | 10-10% |
| Litter cover | 80% | 80-80% |

**SAMPLES USED TO DESCRIBE ALLIANCE** (n=1)

**Rapid Assessments:** SNNR1359

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This *Arbutus menziesii* Alliance has been described for the Sierra Nevada, Klamath Mountains, and North Coast Range sections of California (Sawyer et al. 2007 MS). However, no formal associations have been defined from the Sierra Nevada Foothills. More stands are likely to occur at slightly higher elevations in the southern Cascades and northern Sierra Nevada.

**STAND TABLE**
***Arbutus menziesii* Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | ARME-T | *Arbutus menziesii* | 100 | 40.0 | 40 | 40 | | X | X | |
| | UMCA-T | *Umbellularia californica* | 100 | 22.0 | 22 | 22 | | | X | |
| | QUKE-T | *Quercus kelloggii* | 100 | 8.0 | 8 | 8 | | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 6.0 | 6 | 6 | | | X | |
| | ACMA3-T | *Acer macrophyllum* | 100 | 3.0 | 3 | 3 | | | X | |
| | PIPO-T | *Pinus ponderosa* | 100 | 2.0 | 2 | 2 | | | X | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 20.0 | 20 | 20 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 16.0 | 16 | 16 | | X | X | |
| | PHLE4 | *Philadelphus lewisii* | 100 | 4.0 | 4 | 4 | | | X | |
| | RUUR | *Rubus ursinus* | 100 | 4.0 | 4 | 4 | | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 100 | 2.0 | 2 | 2 | | | X | |
| | VICA5 | *Vitis californica* | 100 | 1.0 | 1 | 1 | | | X | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 100 | 1.0 | 1 | 1 | | X | X | X |
| | TOAR | *Torilis arvensis* | 100 | 1.0 | 1 | 1 | | X | X | X |
| | BRLA3 | *Bromus laevipes* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | ELGL | *Elymus glaucus* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | IRIS | *Iris* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | METO | *Melica torreyana* | 100 | 0.2 | 0.2 | 0.2 | | | X | |

### *Calocedrus decurrens* Woodland/Forest Alliance
### Incense-cedar Woodland/Forest Alliance

*Calocedrus decurrens* is dominant in the tree layer with *Abies concolor*, *Pinus contorta* subsp. *murrayana*, *P. coulteri*, *P. lambertiana*, *P. jeffreyi*, *P. ponderosa*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, and *Q. kelloggii*. The tree canopy is open to continuous and the shrub and herbaceous layers are variable. Stands occur on raised stream benches and terraces, around wet meadows, and on upper slopes and ridges above 250 m in elevation. Stands grow on a wide variety of parent materials, commonly occurring on unproductive sites as well as well-drained productive ones.

In the study area, stands of this alliance are found along riparian corridors. One association was classified in the study area and is described below. One additional stand (SNFN0260) was classified to the alliance level only. It contained *Quercus* spp., *Salix laevigata*, and *Umbellularia californica* at low cover in the understory.

### *Calocedrus decurrens* - *Alnus rhombifolia* Association
### Incense-cedar - White Alder Association

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Calocedrus decurrens* at 21-30% cover. *Alnus rhombifolia* was often present in the overstory. The shrub layer was open with *Toxicodendron diversilobum* dominant and with *Aristolochia californica*, *Lonicera hispidula* var. *vacillans*, and *Vitis californica* characteristically present. The herbaceous layer was open and included a variety of native and non-native grasses and forbs (see stand table below).

In the study area, this association was sampled twice, once in the Cascade Range Foothills and once in northern Sierra Nevada Foothills Subregions (Hickman 1993). The stands occurred on mixed alluvium or volcanic substrates. The Incense-cedar - White Alder stands occurred along riparian corridors and flood plains with gentle slopes on canyon bottoms or terraces.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte and El Dorado Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 58 | 46-70 | - |
| Herb | 8.5 | 7-10 | variable |
| Shrub | 15 | 15-15 | <1-2 |
| Low Tree/Tall Shrub | 2.5 | 0-5 | 5-10 |
| Hardwood | 12.5 | 11-14 | 10-20 |
| Conifer | 33 | 21-45 | 10-20 |
| Relative non-native to native cover | 18.1 | 5-31 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SE (1), E (1)
Macrotopography: bottom (1), terrace (1)
Microtopography: undulating (2)
Parent Material: mixed alluvium (1), volcanic (1)
Soil Texture: loam or sandy loam (1), sand (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 788 ft. | 725-850 ft. |
| | **Mean** | **Range** |
| Slope | 1º | 1-1º |
| | **Mean** | **Range** |
| Large rock cover | 7.1% | 5-9.2% |
| Small rock cover | 5.1% | 5-5.2% |
| Bare ground cover | 10% | 6-14% |
| Litter cover | 72.5% | 70-75% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0537 **Relevés:** SNFN0002

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Potter (2005). He considers it to be a common riparian association of the mid-elevation, western slopes of the Sierra Nevada with an average elevation of 3925 ft. Stands in our study area represent the low elevation extent of the association. This association is also likely to occur in other mountains of California. Similar stands with co-dominance of *A*. *rhombifolia* and *C*. *decurrens* have been described from the San Jacinto Mountains of western Riverside County, as part of the *Alnus rhombifolia* Alliance and Association (Klein and Evens 2006).

**STAND TABLE**
***Calocedrus decurrens - Alnus rhombifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | CADE27-T | *Calocedrus decurrens* | 100 | 25.5 | 21 | 30 | X | | X | |
| | CADE27-L | *Calocedrus decurrens* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | ALRH2-T | *Alnus rhombifolia* | 50 | 5.0 | 10 | 10 | | | | |
| | PIPO-T | *Pinus ponderosa* | 50 | 5.0 | 10 | 10 | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 50 | 5.0 | 10 | 10 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 50 | 5.0 | 10 | 10 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 50 | 2.0 | 4 | 4 | | | | |
| | QUKE-T | *Quercus kelloggii* | 50 | 0.5 | 1 | 1 | | | | |
| | UMCA-M | *Umbellularia californica* | 50 | 0.5 | 1 | 1 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | FRLA-M | *Fraxinus latifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PIPO-L | *Pinus ponderosa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PIPO-M | *Pinus ponderosa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QULO-T | *Quercus lobata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 4.6 | 1.2 | 8 | | X | X | |
| | VICA5 | *Vitis californica* | 100 | 1.1 | 1 | 1.2 | | | X | |
| | ARCA10 | *Aristolochia californica* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | RUDI2 | *Rubus discolor* | 50 | 6.0 | 12 | 12 | | | | X |
| | RHTR | *Rhus trilobata* | 50 | 1.0 | 2 | 2 | | | | |
| | SALIX | *Salix* | 50 | 0.5 | 1 | 1 | | | | |
| | BAPI | *Baccharis pilularis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CEOCO | *Cercis occidentalis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLLI2 | *Clematis ligusticifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | COSE16 | *Cornus sericea* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SHRBAC | *Shrub spp. - type unknown* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 50 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Calocedrus decurrens - Alnus rhombifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 50 | 3.0 | 6 | 6 | | | | X |
| | NEPA | *Nemophila parviflora* | 50 | 1.5 | 3 | 3 | | | | |
| | CYEC | *Cynosurus echinatus* | 50 | 1.0 | 2 | 2 | | | | X |
| | TORIL | *Torilis* | 50 | 1.0 | 2 | 2 | | | | X |
| | TOAR | *Torilis arvensis* | 50 | 1.0 | 2 | 2 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 50 | 0.5 | 1 | 1 | | | | |
| | HIAL2 | *Hieracium albiflorum* | 50 | 0.5 | 1 | 1 | | | | |
| | BRASS2 | *Brassica* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAAL2 | *Calochortus albus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CARDA | *Cardamine* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEGL2 | *Cerastium glomeratum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CHPO3 | *Chlorogalum pomeridianum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPE | *Claytonia perfoliata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | COHE | *Collinsia heterophylla* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CYPER | *Cyperus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | DAPU3 | *Daucus pusillus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ELGL | *Elymus glaucus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | EPILO | *Epilobium* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | GEDI | *Geranium dissectum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | ISOC3 | *Isopyrum occidentale* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | JUEF | *Juncus effusus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | LAAM | *Lamium amplexicaule* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOPE | *Lolium perenne* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | MADIA | *Madia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MEOF2 | *Melissa officinalis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | MENTH | *Mentha* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | OSCH | *Osmorhiza chilensis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PLLA | *Plantago lanceolata* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | POGL9 | *Potentilla glandulosa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RAOC | *Ranunculus occidentalis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RUMEX | *Rumex* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SOCA5 | *Solidago californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | TRIFO | *Trifolium* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | VISA | *Vicia sativa* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 1.0 | 2 | 2 | | | | |
| | LIVER | *Liverwort* | 50 | 0.1 | 0.2 | 0.2 | | | | |

### *Cupressus macnabiana* Woodland/Forest Alliance
### McNab Cypress Woodland/Forest Alliance

As defined in the state, *Cupressus macnabiana* is dominant in the tree or shrub canopy with *Cupressus sargentii*, *Pinus attenuata*, *P. sabiniana*, *Quercus douglasii*, and *Q. wislizeni*. The tree canopy is open to continuous and the shrub layer is sparse to intermittent. The herbaceous layer is sparse. Stands are on open slopes and ridges. Soils are typically derived from basalt, conglomerate, gabbro, greenstone, or serpentine substrates, and are generally sterile.

The McNab Cypress Alliance is uncommon in the study area, although it is the most abundant and widespread cypress species in the state**.** One association was classified and is described below.

### *Cupressus macnabiana* / *Arctostaphylos viscida* Association (Provisional)
### McNab Cypress / Whiteleaf Manzanita Association (Provisional)

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Cupressus macnabiana* at 30-45% cover. Other trees such as *Pinus ponderosa* and *Quercus kelloggii* were often present. The shrub layer was open to intermittent with *Arctostaphylos viscida* dominant and with *Ceanothus lemmonii*, *Quercus garryana* var. *breweri*, and *Rhamnus ilicifolia* often present. The herbaceous layer was open, with *Carex brainerdii* dominant and with *Chlorogalum pomeridianum* and *Salvia sonomensis* often present.

This association was sampled infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on gabbro substrates. They occupied middle to upper slopes that were gentle to moderate. Two of the three stands followed a drainage and were subject to seasonal flooding.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Yuba County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997). Observations of this association also include upper slopes on serpentine in the Nevada City area in Nevada County (T. Keeler-Wolf pers. obs. 2003). Some stands occur in the north (M262Fa) on volcanic substrate (Griffin and Critchfield 1976), and additional stands also occur on serpentine in the study area (Alexander et al. 2006); however, such sites were not available for access.

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.3 | 49-74 | - |
| Herb | 16 | 7-25 | variable |
| Shrub | 34 | 20-62 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1 | 0-2 | 5-20 |
| Conifer | 27.7 | 3-45 | 5-10 |
| Relative non-native to native cover | 1.4 | 0-3 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: E (2), SW (1)
Macrotopography: middle slope (1), middle to upper slope (1), upper slope (1)
Microtopography: undulating (1), concave (1), convex (1)
Parent Material: gabbro (3)
Soil Texture: loam or sandy loam (2), clay or clay loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 2337 ft. | 2295-2366 ft. |
| Slope | 6º | 4-10º |
| Large rock cover | 7.1% | <1-20% |
| Small rock cover | 29% | 20-37% |
| Bare ground cover | 23.7% | 20-26% |
| Litter cover | 36.3% | 30-44% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0125, SNNR0132 **Relevés:** SNFN0332

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. It is also likely to be present in the Northern California Interior Coast Ranges. Similar stands have been sampled in Napa County, with *Adenostoma fasciculatum* and *Arctostaphylos viscida* in the understory with *Cupressus macnabiana* (CNPS 2006). More stands should be sampled in the Sierra Nevada Foothills to enable a better understanding of the regional variation of this alliance.

**STAND TABLE**

***Cupressus macnabiana* / *Arctostaphylos viscida* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | CUMA | *Cupressus macnabiana* | 100 | 36.7 | 30 | 45 | X | | X | |
| | PIPO-T | *Pinus ponderosa* | 67 | 1.3 | 1 | 3 | | | | |
| | QUKE-T | *Quercus kelloggii* | 67 | 1.0 | 1 | 2 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 33 | 1.7 | 5 | 5 | | | | |
| | PISA2-T | *Pinus sabiniana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 25.0 | 20 | 30 | X | | X | |
| | QUGAB | *Quercus garryana* var. *breweri* | 100 | 3.7 | 0.2 | 6 | | | X | |
| | CELE | *Ceanothus lemmonii* | 67 | 1.0 | 1 | 2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 67 | 1.0 | 1 | 2 | | | | |
| | PIMO5 | *Pickeringia montana* | 33 | 0.3 | 1 | 1 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 33 | 0.3 | 1 | 1 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | FREMO2 | *Fremontodendron* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CABR7 | *Carex brainerdii* | 100 | 10.3 | 4 | 15 | X | | X | |
| | SASO | *Salvia sonomensis* | 100 | 6.7 | 1 | 12 | | | X | |
| | CHPO3 | *Chlorogalum pomeridianum* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 33 | 0.3 | 1 | 1 | | | | X |
| | TRHY3 | *Triteleia hyacinthina* | 33 | 0.3 | 1 | 1 | | | | |
| | VUBR | *Vulpia bromoides* | 33 | 0.3 | 1 | 1 | | | | X |
| | VUMY | *Vulpia myuros* | 33 | 0.3 | 1 | 1 | | | | X |
| | WYBO | *Wyethia bolanderi* | 33 | 0.3 | 1 | 1 | | | | |
| | CAOCO | *Calystegia occidentalis* subsp. *occidentalis* | 33 | 0.1 | 0.4 | 0.4 | | | | |
| | AICA | *Aira caryophyllea* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | COUM | *Comandra umbellata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | FRITI | *Fritillaria* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GIPU2 | *Githopsis pulchella* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LEVI8 | *Lessingia virgata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LILIXX | *Liliaceae* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | MAEX | *Madia exigua* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRBR7 | *Triteleia bridgesii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMI | *Vulpia microstachys* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | WYAN | *Wyethia angustifolia* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | WYRE | *Wyethia reticulata* | 33 | 0.1 | 0.2 | 0.2 | | | | |

### *Fraxinus latifolia* Woodland/Forest Alliance
### Oregon Ash Woodland/Forest Alliance

As defined in the state, *Fraxinus latifolia* is dominant or co-dominant in the tree canopy with *Acer macrophyllum*, *Alnus rhombifolia*, *Calocedrus decurrens*, *Pinus ponderosa*, *Quercus kelloggii*, *Q. wislizeni*, and *Salix laevigata*. The tree canopy is open to continuous and the shrub layer is sparse to intermittent. *Fraxinus latifolia* stands form in riparian corridors, incised canyons, seeps, stream banks, and on stream terraces.

One association of the Oregon Ash Alliance was classified in the study area and is described below. Six stands (SNNR0062, SNNR1255, SNNR0617, SNNR0627, SNNR1215, SNNR0909) showed additional variation and were classified to the alliance level only. Two of these stands shared dominance with *Salix laevigata*, and one stand contained *Salix gooddingii* and *Platanus racemosa*. Another contained variation with *Quercus lobata*. Other stands had non-native invasives such as *Ailanthus altissima* and *Rubus discolor* dominant in the understory.

---

### *Fraxinus latifolia - Alnus rhombifolia* Association
### White Alder - Oregon Ash Association

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Fraxinus latifolia* at <1-25% cover. Other trees such as *Alnus rhombifolia* and *Salix laevigata* were often present. The shrub layer was open to continuous with *Rubus discolor* dominant and with *Vitis californica* often present. The herbaceous layer was open and often included *Artemisia douglasiana*.

In the study area, this association was sampled commonly within the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands often occurred on mixed alluvium, and less frequently occured on volcanic, gravelly alluvium, metamorphic, sedimentary (including limestone), or gabbro substrates. They usually occupied bottom (occasionally lower to middle) slopes that were flat to steep. Stands of White Alder - Oregon Ash occurred along riparian corridors and flood plains.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Calaveras, El Dorado, Nevada, Shasta, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 51.1 | 17-94 | - |
| Herb | 11.5 | 2-26 | variable |
| Shrub | 31.9 | 10-85 | <5 |
| Low Tree/Tall Shrub | 0.9 | 0-13 | 5-10 |
| Hardwood | 28.2 | 0-54 | 5-20 |
| Conifer | <1 | 0-2 | 10-35 |
| Relative non-native to native cover | 21.6 | 0-61 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (3), NW (3), Flat (3), W (2), SE (1), S (1), E (1)
Macrotopography: bottom (11), bottom to lower slope (1), middle slope (1), wash (1)
Microtopography: flat (6), concave (4), undulating (4)
Parent Material: mixed alluvium (6), volcanic (3), gabbro (1), gravelly alluvium (1), limestone (1), metamorphic (1), sedimentary (1)
Soil Texture: sand (10), clay or clay loam (1), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 972 ft. | 329-1643 ft. |
| Slope | 4.3º | 0-40º |
| Large rock cover | 23.6% | 0-60% |
| Small rock cover | 20.5% | 1-72% |
| Bare ground cover | 10.3% | 3-22% |
| Litter cover | 23.1% | 0-92% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0051, SNNR0217, SNNR0293, SNNR0362, SNNR0616, SNNR0819, SNNR0868, SNNR0907, SNNR1046, SNNR1226, SNNR1272, SNNR1322
**Relevés:** SNFN0015, SNFN0163

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Potter (2005). His samples reflect a Sierra Nevada foothill and montane distribution, including east of our study area boundary, with an average elevation of 2454 ft. and a range as high as 4100 ft. Beyond the Sierra Nevada, this association may exist in the Northern California Coast Ranges and needs substantiation elsewhere.

**STAND TABLE**
***Fraxinus latifolia - Alnus rhombifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | FRLA-T | *Fraxinus latifolia* | 100 | 11.0 | 0.2 | 25 | | X | X | |
| | ALRH2-T | *Alnus rhombifolia* | 64 | 12.2 | 1 | 28 | | | | |
| | SALA3-T | *Salix laevigata* | 64 | 8.7 | 1 | 35 | | | | |
| | FRLA-M | *Fraxinus latifolia* | 43 | 1.4 | 0.2 | 6 | | | | |
| | QULO-T | *Quercus lobata* | 43 | 0.8 | 0.2 | 4 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 36 | 1.2 | 0.2 | 5 | | | | |
| | SALA3-M | *Salix laevigata* | 29 | 0.9 | 1 | 5 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 86 | 12.4 | 0.2 | 35 | | X | X | X |
| | VICA5 | *Vitis californica* | 71 | 5.0 | 1 | 25 | | | | |
| | CAOC5 | *Calycanthus occidentalis* | 29 | 2.5 | 1 | 23 | | | | |
| | TODI | *Toxicodendron diversilobum* | 21 | 0.3 | 1 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 71 | 1.7 | 0.2 | 15 | | | | |
| | CANU5 | *Carex nudata* | 36 | 0.9 | 0.2 | 6 | | | | |
| | RUCR | *Rumex crispus* | 21 | 0.4 | 0.2 | 5 | | | | X |
| | HOMA4 | *Hoita macrostachya* | 21 | 0.4 | 0.2 | 3 | | | | |
| | POACXX | Poaceae | 21 | 0.2 | 0.4 | 1.2 | | | | |
| | MEAL2 | *Melilotus albus* | 21 | 0.2 | 0.2 | 2 | | | | X |
| | CYEC | *Cynosurus echinatus* | 21 | 0.2 | 0.2 | 1 | | | | X |
| | LOMU | *Lolium multiflorum* | 21 | 0.2 | 0.2 | 1 | | | | X |
| | TOAR | *Torilis arvensis* | 21 | 0.1 | 0.2 | 1 | | | | X |

### *Juglans hindsii* Woodland/Forest Semi-Natural Stands
### Hind's Walnut Woodland/Forest Semi-Natural Stands

As defined in the state, *Juglans hindsii* is dominant in the tree canopy with *Populus fremontii*, *Quercus lobata*, *Salix exigua*, and *Sambucus mexicana*. The shrub and herb layers may contain riparian or upland species. Stands are found along intermittently flooded or saturated riparian corridors, floodplains, stream and river banks, and terraces. *J. hindsii* is taxonomically and ecologically confused. The species is closely related to *Juglans californica*, and in *The Jepson Manual*, it is considered a variety (*Juglans californica* var. *hindsii*).

The natural range of the Hind's Walnut Alliance is assumed to be restricted, but it has been planted in northern California and commonly used for rootstock for *J. regia*. Native Americans may have planted it in prehistoric times (Thompson 1961). Only one stand (SNNR0846) of Hind's Walnut was sampled in the study area. This stand was not classified to the association level, as it is an introduced or planted feature in the study area.

---

### *Juglans hindsii* Woodland Semi-Natural Stands (no Associations defined)
### Hind's Walnut Woodland Semi-Natural Stands

**SUMMARY**
In the one stand sampled, the overstory tree canopy was open and dominated by *Juglans hindsii* at 17% cover. Other trees such as *Fraxinus latifolia*, *Robinia pseudoacacia*, and *Salix laevigata* were present. *Aristolochia californica*, *Rubus discolor*, and *Vitis californica* were present in the shrub layer. The herbaceous layer was open and included mostly non-native forbs and grasses (see stand table below).

This semi-natural type was sampled once in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). The stand occurred on mixed alluvium substrate, on a bottom with a moderate slope. This stand of Hind's walnut was along a riparian corridor.

**DISTRIBUTION IN STUDY AREA**
This type was sampled in El Dorado County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 27 | 27 | - |
| Herb | 7 | 7 | >0.3 |
| Shrub | 8 | 8 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 20 | 20 | 10-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 35.4 | 35.4 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: S (1)
Macrotopography: bottom (1)
Microtopography: concave (1)

Parent Material: mixed alluvium (1)
Soil Texture: sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 649 ft. | 649 ft. |
| Slope | 7º | 7º |
| Large rock cover | 2% | 2% |
| Small rock cover | 5% | 5% |
| Bare ground cover | 30% | 30% |
| Litter cover | 55% | 55% |

**SAMPLES USED TO DESCRIBE STANDS** (n=1)

**Rapid Assessments:** SNNR0846

**Rank:** Unranked, non-native type

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada and the Central Valley of California (Vaghti 2003, Hickson and Keeler-Wolf 2007). Stands are mostly adventive and of mixed genetic stock (Kirk 2003). They appear to be increasing in distribution along in many riparian settings throughout the California Central Valley (Vaghti and Greco 2007).

**STAND TABLE**
***Juglans hindsii* Woodland/Forest Semi-Natural Stands**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | JUHI-T | *Juglans hindsii* | 100 | 17.0 | 17 | 17 | X | | X | |
| | ROPS | *Robinia pseudoacacia* | 100 | 3.0 | 3 | 3 | | | X | X |
| | FRLA-T | *Fraxinus latifolia* | 100 | 2.0 | 2 | 2 | | | X | |
| | JUHI-M | *Juglans hindsii* | 100 | 2.0 | 2 | 2 | | | X | |
| | SALA3-T | *Salix laevigata* | 100 | 2.0 | 2 | 2 | | | X | |
| | SALA3-M | *Salix laevigata* | 100 | 1.0 | 1 | 1 | | | X | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 100 | 4.0 | 4 | 4 | X | | X | X |
| | ARCA10 | *Aristolochia californica* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | VICA5 | *Vitis californica* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 100 | 3.0 | 3 | 3 | | X | X | X |
| | BRHO2 | *Bromus hordeaceus* | 100 | 1.0 | 1 | 1 | | | X | X |
| | GEDI | *Geranium dissectum* | 100 | 1.0 | 1 | 1 | | | X | X |
| | HOMU | *Hordeum murinum* | 100 | 1.0 | 1 | 1 | | | X | X |
| | ARDO3 | *Artemisia douglasiana* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | CAPY2 | *Carduus pycnocephalus* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | PLBR6 | *Plectritis brachystemon* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | TOAR | *Torilis arvensis* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | VISA | *Vicia sativa* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |

## *Pinus ponderosa* Woodland/Forest Alliance
## Ponderosa Pine Woodland/Forest Alliance

As defined in the state, *Pinus ponderosa* is the dominant or co-dominant in the tree canopy with *Abies concolor*, *Calocedrus decurrens*, *Juniperus occidentalis*, *Lithocarpus densiflorus*, *Pinus contorta* subsp. *murrayana*, *P*. *coulteri*, *P*. *jeffreyi*, *P*. *lambertiana*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Q*. *kelloggii*, and *Q*. *wislizeni*. The canopy and shrub layers are open to continuous. The herbaceous layer is sparse, abundant, or grassy. Stands occupy all upland topography, floodplains, low-gradient deposits along streams, and raised benches.

In the study area, Ponderosa pine stands occur on upland slopes (all aspects) and raised stream terraces with well-drained soils. *P*. *ponderosa* is strongly associated with *Quercus kelloggii* and to a lesser extent, *Q*. *wislizeni* and *Q*. *chrysolepis* (some stands with a co-dominance of oaks are treated in the respective oak alliances). Two associations of the Ponderosa Pine Alliance were classified in the study area and are described below. Please note that many stands in the Sierra Nevada Foothills, with low to high absolute cover (0.2 to 40% cover) of Ponderosa pine, also have high absolute cover (to 55% cover) of Black oak. In the current classification, these stands are members of the Black Oak Alliance (see page 123).

### *Pinus ponderosa* Stream Terrace Association (Provisional)
### Ponderosa Pine Association (Provisional)

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Pinus ponderosa* at 18-40% cover. Other trees such as *Quercus chrysolepis* and *Quercus kelloggii* were characteristically present. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant. The herbaceous layer was open and often included *Cynosurus echinatus*, *Elymus glaucus*, and *Torilis arvensis*.

This association was sampled infrequently in the study area within the High Cascade Range and, northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on volcanic (including basalt), or metamorphic substrates. They occupied gentle, bottom to middle slopes on stream terraces. Stands of this type are more typical of slightly higher elevations above the Foothills belt, as defined in this report (see Potter 2005 and note below). The majority of stands are restricted to the cooler, moister northern portion of the study area.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Nevada, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 52 | 45-65 | - |
| Herb | 15.6 | 3-30 | variable |
| Shrub | 12.6 | 2-40 | <1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 6.2 | 1-10 | 5-20 |
| Conifer | 31.6 | 18-50 | 10-35 |
| Relative non-native to native cover | 20.9 | 1-44 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (1), SW (1), SE (1), S (1), E (1)
Macrotopography: bottom (3), lower slope (2)
Microtopography: undulating (4), flat (1)
Parent Material: volcanic (3), basalt (1), metamorphic (1)
Soil Texture: loam or sandy loam (3), sand (1), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1829 ft. | 897-2300 ft. |
| Slope | 1.8º | 1-4º |
| Large rock cover | 1.8% | <1-4% |
| Small rock cover | 1.4% | <1-3% |
| Bare ground cover | 10.6% | 5-17% |
| Litter cover | 82.4% | 75-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0323, SNNR0333, SNNR0354, SNNR0596, SNNR1194

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada solely from this study region. A similar type, the *Pinus ponderosa - Alnus rhombifolia* Association, has been defined by Potter (2005). It is likely to encompass in part, the refined concept described here. Potter's version is more common at elevations higher than our study area (mean elevation 3664 ft.), but typically occupies stream terraces with *Alnus rhombifolia* and other riparian species. In Potter's plots, 59% contain *A*. *rhombifolia*, 38% contain *Quercus chrysolepis*, and 69% contain *Calocedrus decurrens*. Such variation may exist because of the variable width of the stream terrace, and the positioning of plots for sampling, such that they excluded the immediate riparian zone where *A*. *rhombifolia* may occur.

**STAND TABLE**

***Pinus ponderosa* Stream Terrace Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PIPO-T | *Pinus ponderosa* | 100 | 28.2 | 18 | 40 | X | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 3.8 | 1 | 9 | | | X | |
| | QUKE-T | *Quercus kelloggii* | 80 | 1.1 | 0.2 | 4 | | | X | |
| | CADE27-T | *Calocedrus decurrens* | 40 | 1.2 | 1 | 5 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 40 | 1.0 | 0.2 | 5 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 80 | 3.8 | 1 | 8.2 | | X | X | |
| | ARVI4 | *Arctostaphylos viscida* | 40 | 1.0 | 1 | 4 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 40 | 0.2 | 0.2 | 1 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 100 | 5.6 | 0.2 | 10 | | | X | X |
| | TOAR | *Torilis arvensis* | 80 | 3.0 | 0.2 | 8 | | | X | X |
| | ELGL | *Elymus glaucus* | 60 | 0.5 | 0.2 | 2 | | | | |
| | VISA | *Vicia sativa* | 40 | 0.6 | 0.2 | 3 | | | | X |
| | BRCA5 | *Bromus carinatus* | 40 | 0.6 | 1 | 2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 40 | 0.4 | 0.2 | 2 | | | | |

***Pinus ponderosa* / *Arctostaphylos viscida* Association (Provisional)**
**Ponderosa Pine / Whiteleaf Manzanita Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Pinus ponderosa* at 5-30% cover. *Quercus wislizeni* was characteristically present as a tree and/or shrub. The shrub layer was intermittent with *Arctostaphylos viscida* dominant and with *Heteromeles arbutifolia* and *Toxicodendron diversilobum* often present. The herbaceous layer was open and often included *Aira caryophyllea*, *Galium porrigens*, *Luzula comosa*, and *Polygala cornuta* var. *cornuta*.

This association was sampled infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on metamorphic but also on sedimentary substrates. They occupied middle to upper slopes (and one ridgetop) that were gentle to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador and Placer Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 60.4 | 55-68 | - |
| Herb | 5.6 | 0-16 | <0.3 |
| Shrub | 42.2 | 35-51 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 3.2 | 0-10 | 5-10 |
| Conifer | 21 | 12-34 | 10-35 |
| Relative non-native to native cover | 2.5 | 1-5 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (2), NE (2), NW (1)
Macrotopography: middle slope (2), middle to upper slope (2), ridgetop (1)
Microtopography: convex (3), flat (2)
Parent Material: metamorphic (4), sedimentary (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1758 ft. | 850-2040 ft. |
| Slope | 17.3º | 2-28º |
| Large rock cover | 0.7% | 0-2% |
| Small rock cover | 12.8% | 2-34.2% |
| Bare ground cover | 7% | 1-15% |
| Litter cover | 77% | 50-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0756, SNNR0759, SNNR0763 **Relevés:** SNFN0183, SNFN0296

**Rank:** G3S3

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada solely from data collected for this project. It is likely that this association also occurs beyond the study area in the Klamath Mountains and in the North Coast Ranges of California. Thorne et al. (2007) mapped the apparent shift upward of *Pinus ponderosa* stands over the past 70 years in the central Sierra Nevada. This association is probably the most typical, low elevation extension of the alliance in the Sierra Foothills; although stands of the *Quercus kelloggii* - *Pinus ponderosa* Association and *Quercus kelloggii* - *Pinus ponderosa* / *Arctostaphylos viscida* Association are also common at low elevations, and they may carry relatively higher cover of *P*. *ponderosa*. Average cover and size of *P*. *ponderosa* from our samples in these three associations suggest that stands are small and do not have a closed canopy. Upon reviewing the mapping techniques reported by Thorne et al., these low elevation stands may have gone without previous detection.

**STAND TABLE**

***Pinus ponderosa* / *Arctostaphylos viscida* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PIPO-T | *Pinus ponderosa* | 100 | 12.2 | 5 | 30 | | X | X | |
| | QUWI2-M | *Quercus wislizeni* | 80 | 1.6 | 0.2 | 5 | | | X | |
| | QUKE-L | *Quercus kelloggii* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | PIPO-M | *Pinus ponderosa* | 40 | 6.4 | 10 | 22 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 40 | 1.2 | 0.2 | 6 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 32.2 | 28 | 38 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 11.0 | 1 | 22.2 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 80 | 0.9 | 0.4 | 2 | | | X | |
| **Herb** | | | | | | | | | | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 60 | 0.3 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 60 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPO | *Galium porrigens* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | LUCO6 | *Luzula comosa* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 40 | 0.4 | 0.2 | 2 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | CYEC | *Cynosurus echinatus* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | ELGL | *Elymus glaucus* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAAP2 | *Galium aparine* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | LASU | *Lathyrus sulphureus* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMI | *Lotus micranthus* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 80 | 4.2 | 3 | 12 | X | | X | |

## *Pinus sabiniana* Woodland/Forest Alliance
## Foothill Pine Woodland/Forest Alliance

As defined in the state, *Pinus sabiniana* is dominant in the canopy or emergent over chaparral species. It may also grow with oaks, including *Quercus chrysolepis*, *Q*. *douglasii*, *Q*. *durata*, *Q*. *berberidifolia*, *Q*. *kelloggii*, and *Q*. *wislizeni*. The shrub layer may contain *Adenostoma fasciculatum*, *Heteromeles arbutifolia*, *Arctostaphylos* spp., *Cercocarpus betuloides*, and *Rhamnus* spp. The herb layer is grassy or sparse. Stands typically occur on gentle to steep slopes, sometimes on serpentine soils. Because foothill pine is vulnerable to high intensity fire, stands with foothill pine usually denote areas that have had refuge from fire or areas that have not had recent disturbance (Schwilk and Keeley 2006) - such as in open and rocky serpentine areas that may not carry intense fires as often as on other substrates.

As described below, five associations of the Foothill Pine Alliance were classified in the study area. Four stands (SNNR0654, SNNR0548, SNNR1034, SNFN0576) showed additional variation and were classified to the alliance level only, where *Quercus berberidifolia* or various grass and forb species occurred in the understory.

---

## *Pinus sabiniana* / *Adenostoma fasciculatum* Association
## Foothill Pine / Chamise Association

### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated solely by *Pinus sabiniana* at 7-35% cover. The shrub layer was open to intermittent with *Adenostoma fasciculatum* dominant and with *Arctostaphylos viscida*, *Ceanothus cuneatus*, and *Heteromeles arbutifolia* often present. The herbaceous layer was open to intermittent and often included non-native grasses *Aira caryophyllea*, *Avena barbata*, and *Bromus madritensis*.

In the study area, this association was sampled commonly, within the central Sierra Nevada Foothills, and less commonly, within the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic, but were also found occasionally on ultramafic, limestone, or serpentine substrates. They occupied lower to upper slopes that were moderate to steep, often on north- or west-facing slopes.

Other associations, such as the *Adenostoma fasciculatum* Association of the *A*. *fasciculatum* Alliance, contain similar cover and composition of shrubs, but do not have an open overstory of *Pinus sabiniana*. Differences in fire return interval may play a key role in differentiating these types.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Calaveras, Mariposa, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 64.4 | 53-78 | - |
| Herb | 22.8 | 4-45 | variable |
| Shrub | 42.1 | 18-66 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |

| | | | |
|---|---|---|---|
| Hardwood | 2 | 0-15 | 5-20 |
| Conifer | 16.1 | 0-35 | 5-20 |
| Relative non-native to native cover | 16 | 1-34 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (3), NE (2), W (1), Variable (1), SW (1), S (1), N (1)
Macrotopography: lower slope (2), lower to middle slope (3), lower to upper slope (1), middle slope (1), middle to upper slope (1), upper slope (2)
Microtopography: undulating (5), flat (3), convex (1)
Parent Material: metamorphic (6), ultramafic (2), limestone (1), serpentine (1)
Soil Texture: clay or clay loam (4), loam or sandy loam (2), silt or silt loam (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1564 ft. | 821-3074 ft. |
| Slope | 19º | 8-30º |
| Large rock cover | 6.7% | <1-20% |
| Small rock cover | 20.3% | 4-60% |
| Bare ground cover | 14.3% | 5-25% |
| Litter cover | 55.1% | 20-81% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0036, SNNR0105, SNNR0145, SNNR0359, SNNR0368, SNNR0372, SNNR1090, SNNR1155, SNNR1225 **Relevés:** SNFN0142

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described solely for the Sierra Nevada Foothills area as a result of the data collected for this study. However, similar stands have been observed in the Inner North Coast Ranges (T. Keeler-Wolf, pers. obs. 2007), and similar stands have been sampled on serpentinite substrate in Napa and Colusa Counties (CNPS 2002).

**STAND TABLE**
***Pinus sabiniana* / *Adenostoma fasciculatum* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 100 | 16.8 | 7 | 35 | X | | X | |
| | PISA2-M | *Pinus sabiniana* | 40 | 1.7 | 0.2 | 8 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 27.1 | 3 | 60 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 5.0 | 0.2 | 16 | | | X | |
| | CECU | *Ceanothus cuneatus* | 70 | 3.5 | 0.2 | 15 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 60 | 1.7 | 0.2 | 7 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 40 | 0.4 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRMA3 | *Bromus madritensis* | 50 | 2.2 | 0.2 | 10 | | | | X |
| | AVBA | *Avena barbata* | 50 | 1.3 | 1 | 4 | | | | X |
| | AICA | *Aira caryophyllea* | 50 | 0.9 | 0.2 | 6 | | | | X |

**STAND TABLE continued**
***Pinus sabiniana* / *Adenostoma fasciculatum* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | VUMI | *Vulpia microstachys* | 40 | 1.8 | 0.2 | 15 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 30 | 2.9 | 2 | 18 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 30 | 0.6 | 0.2 | 4 | | | | X |
| | GAPO | *Galium porrigens* | 30 | 0.4 | 0.2 | 4 | | | | |
| | PETR7 | *Pentagramma triangularis* | 30 | 0.3 | 0.2 | 3 | | | | |
| | MECA2 | *Melica californica* | 30 | 0.2 | 0.2 | 2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 40 | 1.1 | 0.2 | 5 | | | | |

***Pinus sabiniana* / *Arctostaphylos viscida* Association (Provisional)**
**Foothill Pine / Whiteleaf Manzanita Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open and dominated solely by *Pinus sabiniana* at 10-23% cover. The shrub layer was open to intermittent with *Arctostaphylos viscida* dominant and with *Adenostoma fasciculatum*, *Ceanothus cuneatus*, *Heteromeles arbutifolia*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included *Aira caryophyllea*, *Bromus madritensis*, *Galium porrigens*, and *Salvia sonomensis*.

This association was sampled commonly in the study area, within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands often occurred on gabbro substrate, and occasionally occurred on metamorphic, serpentine, or other ultramafic substrates. They occupied lower slopes to ridgetops that were gentle to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, Calaveras, El Dorado Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997). It is largely associated with the gabbro outcrops of the Pine Hill area and surrounding foothills, and frequently contains some of the endemic plants from this area.

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 59.6 | 35-78 | - |
| Herb | 21.6 | 3-35 | variable |
| Shrub | 37.3 | 19-65 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.4 | 0-7 | 5-10 |
| Conifer | 17.4 | 10-30 | 5-20 |
| Relative non-native to native cover | 13.1 | 0-27 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (4), Variable (1), SE (1), S (1), E (1)
Macrotopography: lower to middle slope (1), lower to upper slope (1), middle slope (1), middle to upper slope (1), middle slope to ridgetop (1), upper slope (3)
Microtopography: undulating (4), convex (3), flat (1)
Parent Material: gabbro (4), metamorphic (2), serpentine (1), ultramafic (1)
Soil Texture: loam or sandy loam (3), silt or silt loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1564 ft. | 818-2127 ft. |
| Slope | 14.6º | 3-28º |
| Large rock cover | 8.5% | <1-45% |
| Small rock cover | 8.3% | 1-20% |
| Bare ground cover | 15% | 3-57% |
| Litter cover | 65.4% | 27-85% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0150, SNNR0400, SNNR0401, SNNR0501, SNNR0701, SNNR0752, SNNR0784, SNNR0988

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills area as a result of the data collected for this study. It also occurs in the North Coast Ranges with stands sampled in Lake, Napa, and Sonoma Counties on serpentinite substrates (CNPS 2002).

**STAND TABLE**
***Pinus sabiniana* / *Arctostaphylos viscida* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 100 | 15.9 | 10 | 23 | X | | X | |
| | PISA2-M | *Pinus sabiniana* | 63 | 2.2 | 0.2 | 10 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 25 | 0.6 | 1 | 4 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 25 | 0.3 | 0.2 | 2 | | | | |
| | PISA2-L | *Pinus sabiniana* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 18.4 | 3 | 30 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 63 | 3.3 | 2 | 11 | | | | |
| | TODI | *Toxicodendron diversilobum* | 63 | 0.9 | 0.2 | 3 | | | | |
| | ADFA | *Adenostoma fasciculatum* | 50 | 7.3 | 6 | 22 | | | | |
| | CECU | *Ceanothus cuneatus* | 50 | 1.5 | 1 | 6 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 1.1 | 1 | 5 | | | | |
| | CEOCO | *Cercis occidentalis* | 38 | 1.6 | 1 | 10 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 38 | 1.6 | 0.2 | 12 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 38 | 0.8 | 0.2 | 5 | | | | |
| | CERO4 | *Ceanothus roderickii* | 25 | 2.4 | 7 | 12 | | | | |
| | BAPI | *Baccharis pilularis* | 25 | 1.0 | 3 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | BRMA3 | *Bromus madritensis* | 63 | 2.0 | 0.2 | 8 | | | | X |
| | SASO | *Salvia sonomensis* | 50 | 4.6 | 3 | 25 | | | | |
| | AICA | *Aira caryophyllea* | 50 | 0.5 | 0.2 | 2 | | | | X |
| | GAPO | *Galium porrigens* | 50 | 0.2 | 0.2 | 1 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 38 | 3.9 | 4 | 15 | | | | X |
| | MECA2 | *Melica californica* | 38 | 1.8 | 1 | 10 | | | | |
| | VUMY | *Vulpia myuros* | 38 | 0.9 | 2 | 3 | | | | X |
| | LETA | *Leontodon taraxacoides* | 38 | 0.2 | 0.2 | 1 | | | | X |
| | CYEC | *Cynosurus echinatus* | 25 | 0.8 | 1 | 5 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 25 | 0.6 | 2 | 3 | | | | X |
| | CHGR3 | *Chlorogalum grandiflorum* | 25 | 0.3 | 0.2 | 2 | | | | |
| | ELGL | *Elymus glaucus* | 25 | 0.3 | 1 | 1 | | | | |
| | ELEL5 | *Elymus elymoides* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 0.4 | 1 | 2 | | | | |

## *Pinus sabiniana* / *Ceanothus cuneatus* Association

**Foothill Pine / Wedgeleaf Ceanothus Association**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated solely by *Pinus sabiniana* at 7-35% cover. The shrub layer was open to intermittent with *Ceanothus cuneatus* dominant and with *Arctostaphylos manzanita*, *Heteromeles arbutifolia*, and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Cynosurus echinatus*, *Galium porrigens*, *Trifolium hirtum*, and *Trifolium microcephalum*.


This association was sampled throughout the study area within the central Sierra Nevada Foothills, Cascade Range Foothills, High Cascade Range, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on volcanic, metamorphic, mixed metamorphic, or ultramafic substrates. They occupied a variety of slope positions, though usually middle to upper slopes, which were flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in seven counties: Amador, Butte, Calaveras, El Dorado, Shasta, Tehama and Tuolumne - within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 64.6 | 49-85 | - |
| Herb | 30.1 | 12-60 | variable |
| Shrub | 37.8 | 4-65 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 2 | 0-6 | 5-10 |
| Conifer | 18.5 | 7-35 | 5-35 |
| Relative non-native to native cover | 26.2 | 11-69 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: E (3), W (1), Variable (1), SW (1), S (1), NW (1), NE (1), Flat (1)
Macrotopography: bottom to upper slope (1), lower slope (1), middle slope (3), middle to upper slope (1), upper slope (3), ridgetop (1)
Microtopography: undulating (4), flat (4), concave (1)
Parent Material: volcanic (4), metamorphic (3), ultramafic (2), mixed metamorphic (1)
Soil Texture: loam or sandy loam (4), clay or clay loam (3), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1537 ft. | 525-2933 ft. |
| Slope | 12.9º | 0-28º |
| Large rock cover | 2.6% | <1-7% |
| Small rock cover | 10.6% | <1-36% |
| Bare ground cover | 12.9% | 3-28% |
| Litter cover | 69% | 31-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0024, SNNR0045, SNNR0425, SNNR0459, SNNR0786, SNNR1245, SNNR1289, SNNR1415 **Relevés:** SNFN0188, SNFN0316

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described solely for the Sierra Nevada Foothills as a result of this study.

**STAND TABLE**
***Pinus sabiniana* / *Ceanothus cuneatus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 100 | 18.6 | 7 | 35 | X | | X | |
| | QUDO-T | *Quercus douglasii* | 50 | 1.5 | 0.2 | 6 | | | | |
| | PISA2-M | *Pinus sabiniana* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-L | *Pinus sabiniana* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 20.0 | 0.2 | 52 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 70 | 3.0 | 0.2 | 20 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 3.3 | 0.4 | 10 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 50 | 2.4 | 0.2 | 17 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 40 | 2.0 | 0.2 | 16 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 40 | 0.2 | 0.2 | 1 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 30 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | AVBA | *Avena barbata* | 80 | 2.1 | 0.2 | 8 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 60 | 3.0 | 1 | 10 | | | | X |
| | CYEC | *Cynosurus echinatus* | 60 | 1.2 | 0.2 | 7 | | | | X |
| | GAPO | *Galium porrigens* | 60 | 0.6 | 0.2 | 2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 50 | 4.2 | 0.2 | 20 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 50 | 1.3 | 0.2 | 11 | | | | |
| | BRDI3 | *Bromus diandrus* | 50 | 1.2 | 0.2 | 6 | | | | X |
| | BRMA3 | *Bromus madritensis* | 50 | 0.8 | 0.2 | 4 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 40 | 5.7 | 2 | 50 | | | | X |
| | TOAR | *Torilis arvensis* | 40 | 0.7 | 1 | 2 | | | | X |
| | GAPA5 | *Galium parisiense* | 40 | 0.4 | 0.2 | 3 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 40 | 0.3 | 0.2 | 2 | | | | X |
| | AICA | *Aira caryophyllea* | 40 | 0.2 | 0.2 | 1 | | | | X |
| | DAPU3 | *Daucus pusillus* | 40 | 0.2 | 0.2 | 1 | | | | |
| | VUBR | *Vulpia bromoides* | 30 | 1.2 | 0.2 | 8 | | | | X |
| | VUMY | *Vulpia myuros* | 30 | 1.2 | 1 | 9 | | | | X |
| | MECA2 | *Melica californica* | 30 | 1.1 | 0.2 | 6 | | | | |
| | PETR7 | *Pentagramma triangularis* | 30 | 0.7 | 0.2 | 7 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 30 | 0.2 | 0.2 | 1 | | | | |
| | MADIA | *Madia* | 30 | 0.1 | 0.2 | 1 | | | | |

***Pinus sabiniana* / *Ceanothus cuneatus* / *Plantago erecta* Serpentine Association (Provisional)**

**Foothill Pine / Wedgeleaf Ceanothus / Dwarf Plantain Serpentine Association (Provisional)**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open and dominated solely by *Pinus sabiniana* at 7-12% cover. The shrub layer was open with *Ceanothus cuneatus* dominant and with *Heteromeles arbutifolia* often present. The herbaceous layer was open to intermittent and dominated by *Plantago erecta*, with abundant and characteristic taxa such as *Bromus hordeaceus*, *Daucus pusillus*, and *Vulpia microstachys*.

This association was sampled seven times in the study area, only in the central Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on ultramafic, especially serpentine, substrates. They occupied lower to upper slopes that were gentle to steep. Stands were sampled in the vicinities of the Peoria Wildlife Area, the nearby Red Hills, and Lake McClure.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Mariposa and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 58.9 | 25-80 | - |
| Herb | 39.6 | 13-65 | variable |
| Shrub | 17 | 2-25 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | 5-10 |
| Conifer | 9 | 7-12 | 10-35 |
| Relative non-native to native cover | 24.1 | 3-53 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (2), N (2), NW (1), NE (1), E (1)
Macrotopography: entire slope (1), lower slope (1), middle slope (3), middle to upper slope (1), upper slope (1)
Microtopography: undulating (4), convex (2), concave (1)
Parent Material: serpentine (6), ultramafic (1)
Soil Texture: loam or sandy loam (5), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1085 ft. | 934-1232 ft. |
| Slope | 15.9º | 4-28º |
| Large rock cover | 11% | 0-27% |
| Small rock cover | 31.8% | 0.4-60% |
| Bare ground cover | 16.7% | 6-26% |
| Litter cover | 36.7% | 10-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR1101, SNNR1495 **Relevés:** SNFN0086, SNFN0585, SNFN0592, SNFN0600, SNFN0692

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described solely for the central Sierra Nevada Foothills area as a result of the data collected for this and a previous study (Evens et al. 2004). It appears restricted to serpentine areas with a high diversity of native species in the understory.

**STAND TABLE**
***Pinus sabiniana* / *Ceanothus cuneatus* / *Plantago erecta* Serpentine Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 100 | 9.0 | 7 | 12 | X | | X | |
| | PISA2-M | *Pinus sabiniana* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-L | *Pinus sabiniana* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | QUDO-L | *Quercus douglasii* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 13.6 | 0.2 | 35 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 57 | 2.7 | 0.2 | 8 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 43 | 1.0 | 0.2 | 4 | | | | |
| | ERLAG | *Eriophyllum lanatum* var. *grandiflorum* | 43 | 0.6 | 0.2 | 4 | | | | |
| **Herb** | | | | | | | | | | |
| | PLER3 | *Plantago erecta* | 100 | 2.9 | 0.2 | 8 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 86 | 21.5 | 0.2 | 50 | | | X | X |
| | DAPU3 | *Daucus pusillus* | 86 | 4.2 | 0.2 | 16 | | | X | |
| | VUMI | *Vulpia microstachys* | 86 | 4.1 | 0.2 | 25 | | | X | |
| | GAPO | *Galium porrigens* | 71 | 1.9 | 0.2 | 9 | | | | |
| | LACA7 | *Lasthenia californica* | 71 | 1.2 | 0.2 | 4 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 71 | 0.9 | 0.2 | 2 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 71 | 0.8 | 0.2 | 3 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 71 | 0.1 | 0.2 | 0.2 | | | | |
| | AICA | *Aira caryophyllea* | 57 | 3.8 | 0.2 | 25 | | | | X |
| | PETRT | *Pentagramma triangularis* subsp. *triangularis* | 57 | 2.2 | 0.2 | 15 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 57 | 0.9 | 0.2 | 6 | | | | X |
| | MECA2 | *Melica californica* | 57 | 0.5 | 0.2 | 1 | | | | |
| | CAAT25 | *Castilleja attenuata* | 57 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 57 | 0.1 | 0.2 | 0.2 | | | | |
| | LENE3 | *Lessingia nemaclada* | 43 | 1.2 | 0.2 | 8 | | | | |
| | BRDI3 | *Bromus diandrus* | 43 | 0.8 | 0.2 | 5 | | | | X |
| | AVBA | *Avena barbata* | 43 | 0.6 | 1 | 2 | | | | X |
| | ESCA | *Eschscholzia caespitosa* | 43 | 0.5 | 0.2 | 3 | | | | |
| | BRMA3 | *Bromus madritensis* | 43 | 0.3 | 0.2 | 1 | | | | X |
| | CEME2 | *Centaurea melitensis* | 43 | 0.3 | 0.2 | 1 | | | | X |
| | CHLOR3 | *Chlorogalum* | 43 | 0.2 | 0.2 | 1 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 43 | 0.2 | 0.2 | 1 | | | | |

**STAND TABLE continued**
***Pinus sabiniana* / *Ceanothus cuneatus* / *Plantago erecta* Serpentine Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | URLI5 | *Uropappus lindleyi* | 43 | 0.2 | 0.2 | 1 | | | | |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | THCU | *Thysanocarpus curvipes* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | CAOCO | *Calystegia occidentalis* subsp. *occidentalis* | 29 | 1.2 | 0.2 | 8 | | | | |
| | LICI | *Linanthus ciliatus* | 29 | 1.1 | 1 | 7 | | | | |
| | PETR7 | *Pentagramma triangularis* | 29 | 1.0 | 3 | 4 | | | | |
| | LOWR2 | *Lotus wrangelianus* | 29 | 0.5 | 0.2 | 3 | | | | |
| | PSHE | *Pseudobahia heermannii* | 29 | 0.3 | 0.2 | 2 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 29 | 0.2 | 0.2 | 1 | | | | X |
| | LOCO3 | *Lomatium congdonii* | 29 | 0.2 | 0.2 | 1 | | | | |
| | PTDR | *Pterostegia drymarioides* | 29 | 0.2 | 0.2 | 1 | | | | |
| | VUMY | *Vulpia myuros* | 29 | 0.2 | 0.2 | 1 | | | | X |
| | ASTEXX | Asteraceae | 29 | 0.1 | 0.2 | 0.4 | | | | X |
| | AVFA | *Avena fatua* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | DUCYC3 | *Dudleya cymosa* subsp. | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | ERNUP4 | *Eriogonum nudum* var. *pubiflorum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOMAT | *Lomatium* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | MADIA | *Madia* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | MICA | *Micropus californicus* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | PLAGI | *Plagiobothrys* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | PLNO | *Plagiobothrys nothofulvus* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 43 | 2.0 | 1 | 8 | | | | |
| | LICHEN | *Lichen* | 29 | 3.0 | 1 | 20 | | | | |

***Pinus sabiniana* / *Rhamnus tomentella* Association (Provisional)**

**Foothill Pine - Hoary Coffeeberry Association (Provisional)**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Pinus sabiniana* at 4-32% cover. *Quercus wislizeni* was characteristically present as a tree and/or shrub. The shrub layer was open to intermittent with *Rhamnus tomentella* and *Toxicodendron diversilobum* dominant. The herbaceous layer was open to intermittent and often included *Bromus diandrus*, *Cynosurus echinatus*, *Daucus pusillus*, *Eriophyllum lanatum*, *Sanicula bipinnatifida*, *Torilis arvensis*, and *Trifolium hirtum*.

In the study area, this association was sampled six times, most commonly within the northern Sierra Nevada Foothills and once in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates. They occupied bottom to middle slopes or ridgetops on flat to somewhat steep slopes. Stands were sampled primarily at Daugherty Hill and Spenceville Wildlife Areas on north-facing slopes.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Tehama and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 68.5 | 60-78 | - |
| Herb | 34.2 | 21-46 | variable |
| Shrub | 32.5 | 7-58 | <5 |
| Low Tree/Tall Shrub | 1.7 | 0-10 | 5-10 |
| Hardwood | 8.3 | 4-11 | 5-20 |
| Conifer | 17.7 | 5-32 | 5-20 |
| Relative non-native to native cover | 24.9 | 8-35 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NE (3), N (1), Flat (1), E (1)
Macrotopography: bottom (1), middle slope (3), ridgetop (2)
Microtopography: flat (4), convex (1), undulating (1)
Parent Material: metamorphic (5), volcanic (1)
Soil Texture: clay or clay loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1186 ft. | 440-1578 ft. |
| Slope | 12.6º | 0-21º |
| Large rock cover | 11.5% | <1-31.2% |
| Small rock cover | 6.4% | <1-17% |
| Bare ground cover | 11% | 2-25% |
| Litter cover | 67.7% | 48-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0156, SNNR0157, SNNR1613, SNNR1651, SNNR1652 **Relevés:** SNFN0322

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described solely for the Sierra Nevada Foothills as a result of the data collected for this project.

**STAND TABLE**
***Pinus sabiniana* / *Rhamnus tomentella* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 100 | 15.0 | 4 | 32 | | X | X | |
| | PISA2-L | *Pinus sabiniana* | 83 | 4.0 | 0.2 | 21 | | | X | |
| | QUWI2-M | *Quercus wislizeni* | 83 | 1.5 | 0.2 | 5 | | | X | |
| | QUWI2-T | *Quercus wislizeni* | 67 | 3.2 | 1 | 9 | | | | |
| | PISA2-M | *Pinus sabiniana* | 67 | 1.5 | 0.2 | 6 | | | | |
| | QUKE-T | *Quercus kelloggii* | 50 | 2.8 | 2 | 10 | | | | |
| | PIPO-T | *Pinus ponderosa* | 50 | 1.3 | 1 | 5 | | | | |
| | AECA-L | *Aesculus californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUDO-T | *Quercus douglasii* | 33 | 0.5 | 0.2 | 3 | | | | |
| | AECA-M | *Aesculus californica* | 33 | 0.5 | 1 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 15.3 | 4 | 21 | | X | X | |
| | RHTO6 | *Rhamnus tomentella* | 100 | 14.9 | 2 | 37 | | X | X | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 83 | 9.2 | 3 | 20 | | | X | X |
| | BRDI3 | *Bromus diandrus* | 67 | 5.3 | 4 | 14 | | | | X |
| | TOAR | *Torilis arvensis* | 67 | 2.0 | 0.2 | 9 | | | | X |
| | DAPU3 | *Daucus pusillus* | 67 | 0.7 | 0.2 | 2 | | | | |
| | TRHI4 | *Trifolium hirtum* | 50 | 3.7 | 2 | 14 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 50 | 0.9 | 0.2 | 4 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 50 | 0.2 | 0.2 | 1 | | | | |
| | CESO3 | *Centaurea solstitialis* | 33 | 1.0 | 2 | 4 | | | | X |
| | HOMU | *Hordeum murinum* | 33 | 1.0 | 2 | 4 | | | | X |
| | VISA | *Vicia sativa* | 33 | 0.8 | 2 | 3 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 33 | 0.4 | 0.2 | 2 | | | | |
| | AICA | *Aira caryophyllea* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | AVBA | *Avena barbata* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | CLARK | *Clarkia* | 33 | 0.2 | 0.2 | 1 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | AGGR | *Agoseris grandiflora* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CAAL2 | *Calochortus albus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | DIVO | *Dichelostemma volubile* | 33 | 0.1 | 0.2 | 0.2 | | | | |

### *Platanus racemosa* Woodland/Forest Alliance
### California Sycamore Woodland/Forest Alliance

As defined in the state, *Platanus racemosa* is dominant or co-dominant in the tree canopy with *Alnus rhombifolia*, *Populus fremontii*, *Quercus agrifolia*, *Q. lobata*, *Salix exigua*, *S. gooddingii*, *S. laevigata*, *S. lasiolepis*, *S. lutea*, and *Umbellularia californica*. The canopy is open. The shrub layer is sparse to intermittent and the herbaceous layer is sparse to grassy. Stands form in gullies, intermittent streams, springs, seeps, stream and riverbanks, and terraces adjacent to floodplains that are subject to high-intensity flooding. Soils are alluvial, rocky or cobbly with permanent moisture at depth. Stands often occur in the coastal ranges and drainages of southern and central California, inland to the San Joaquin and northern Central Valley.

In the study area, all three samples of the California Sycamore Alliance (SNFN0325, SNNR0270, SNNR0274) were classified to the alliance level only. Two stands had a mixture of trees and shrubs in the overstory and understory, including *Umbellularia californica* and *Aesculus californica* as co-dominants, and the other stand had strong presence of *Platanus racemosa* in the overstory and *Salix lasiolepis* in the understory. *Vitis californica* typically occurred in all layers of the canopy. Sometimes *Sambucus mexicanus*, *Cercis occidentalis*, *Calycanthus occidentalis*, and *Rubus discolor* were present as understory shrubs. The ground layer was grassy.

---

### *Platanus racemosa* Alliance (no Associations defined)
### California Sycamore Alliance

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Platanus racemosa* at 10-16% cover. Other trees such as *Aesculus californica*, *Fraxinus latifolia*, and *Umbellularia californica* were characteristically present. The shrub layer was open with *Vitis californica* dominant and with *Aristolochia californica*, *Cercis occidentalis*, *Sambucus mexicana*, and *Toxicodendron diversilobum* often present. The herbaceous layer was variable and often included *Artemisia douglasiana*, *Bromus hordeaceus*, *Cynosurus echinatus*, and *Torilis arvensis*.

This alliance was sampled infrequently in the study area, only in the Cascade Range Foothills Subregion (Hickman 1993). Stands occurred on volcanic substrates. They occupied bottoms or washes with gentle slopes along riparian corridors. They were sampled along creeks that feed into the Sacramento River, at City of Chico's Bidwell Park and Payne's Creek Recreation Area.

**DISTRIBUTION IN STUDY AREA**

This alliance was sampled within Butte and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 74 | 60-85 | - |
| Herb | 45 | 15-70 | >0.3 |
| Shrub | 22 | 20-25 | 1-5 |
| Low Tree/Tall Shrub | 23.3 | 0-35 | 5-10 |
| Hardwood | 28.7 | 18-40 | 10-20 |
| Conifer | 1.3 | 0-4 | 10-20 |
| Relative non-native to native cover | 12 | 6-19 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (1), SW (1), S (1)
Macrotopography: bottom (2), wash (1)
Microtopography: undulating (3)
Parent Material: volcanic (3)
Soil Texture: sand (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 325 ft. | 308-335 ft. |
| Slope | 1.7º | 1-2º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 3.5% | 2-5% |
| Litter cover | 94% | 92-96% |

**SAMPLES USED TO DESCRIBE ALLIANCE** (n=3)

**Rapid Assessments:** SNNR0270, SNNR0274 **Relevés:** SNFN0325

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
Potter (2005) defined a *Platanus racemosa* / *Toxicodendron diversilobum* Association from lower elevations of the southern Sierra Nevada Foothills area. *Platanus racemosa* stands are sporadic in the central and northern Foothills and appear to be more common and widespread to the south of our study area. The few stands sampled are similar to Potter's (2005) association.

**STAND TABLE**
***Platanus racemosa* Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PLRA-T | *Platanus racemosa* | 100 | 13.7 | 10 | 16 | | X | X | |
| | AECA-T | *Aesculus californica* | 67 | 11.7 | 12 | 23 | | | | |
| | UMCA-T | *Umbellularia californica* | 67 | 6.7 | 5 | 15 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 67 | 5.7 | 7 | 10 | | | | |
| | UMCA-M | *Umbellularia californica* | 33 | 6.7 | 20 | 20 | | | | |
| | AECA-M | *Aesculus californica* | 33 | 3.3 | 10 | 10 | | | | |
| | POFR2-T | *Populus fremontii* | 33 | 3.3 | 10 | 10 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 33 | 1.7 | 5 | 5 | | | | |
| | PISA2-T | *Pinus sabiniana* | 33 | 1.3 | 4 | 4 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 33 | 1.0 | 3 | 3 | | | | |
| | SALA3-T | *Salix laevigata* | 33 | 0.7 | 2 | 2 | | | | |
| | SALA3-M | *Salix laevigata* | 33 | 0.3 | 1 | 1 | | | | |
| | PLRA-L | *Platanus racemosa* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PLRA-M | *Platanus racemosa* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QULO-M | *Quercus lobata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 33 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Platanus racemosa* Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | VICA5 | *Vitis californica* | 100 | 10.3 | 4 | 14 | | X | X | |
| | TODI | *Toxicodendron diversilobum* | 67 | 3.3 | 2 | 8 | | | | |
| | ARCA10 | *Aristolochia californica* | 67 | 2.7 | 4 | 4 | | | | |
| | CEOCO | *Cercis occidentalis* | 67 | 2.0 | 3 | 3 | | | | |
| | SAME5 | *Sambucus mexicana* | 67 | 1.7 | 2 | 3 | | | | |
| | SALA6 | *Salix lasiolepis* | 33 | 4.7 | 14.2 | 14.2 | | | | |
| | RULE | *Rubus leucodermis* | 33 | 4.0 | 12 | 12 | | | | |
| | RUDI2 | *Rubus discolor* | 33 | 1.7 | 5 | 5 | | | | X |
| | CAOC5 | *Calycanthus occidentalis* | 33 | 1.1 | 3.2 | 3.2 | | | | |
| | PHLE4 | *Philadelphus lewisii* | 33 | 0.3 | 1 | 1 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 33 | 0.3 | 1 | 1 | | | | |
| | ROSA5 | *Rosa* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 100 | 2.4 | 0.2 | 4 | | | X | X |
| | BRHO2 | *Bromus hordeaceus* | 67 | 5.1 | 0.2 | 15 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 67 | 3.0 | 4 | 5 | | | | |
| | CYEC | *Cynosurus echinatus* | 67 | 1.7 | 0.2 | 5 | | | | X |
| | CABA4 | *Carex barbarae* | 33 | 8.7 | 26 | 26 | | | | |
| | TYDO | *Typha domingensis* | 33 | 6.7 | 20 | 20 | | | | |
| | ANGLS | *Andropogon glomeratus* var. *scabriglumis* | 33 | 4.0 | 12 | 12 | | | | |
| | BRMA3 | *Bromus madritensis* | 33 | 3.3 | 10 | 10 | | | | X |
| | EUOC4 | *Euthamia occidentalis* | 33 | 2.0 | 6 | 6 | | | | |
| | VIVI | *Vicia villosa* | 33 | 1.0 | 3 | 3 | | | | X |
| | CANU5 | *Carex nudata* | 33 | 0.7 | 2 | 2 | | | | |
| | HEPU2 | *Helenium puberulum* | 33 | 0.7 | 2 | 2 | | | | |
| | ELMO2 | *Eleocharis montevidensis* | 33 | 0.3 | 1 | 1 | | | | |
| | GAAP2 | *Galium aparine* | 33 | 0.3 | 1 | 1 | | | | |
| | LEOR | *Leersia oryzoides* | 33 | 0.3 | 1 | 1 | | | | |
| | AMAR2 | *Ambrosia artemisiifolia* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | ASTEXX | Asteraceae | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRDI3 | *Bromus diandrus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CIVU | *Cirsium vulgare* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | EPCI | *Epilobium ciliatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYAN2 | *Hypericum anagalloides* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HYPE | *Hypericum perforatum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUNE | *Juncus nevadensis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | NAPU4 | *Nassella pulchra* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POTAM | *Potamogeton* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RAMU2 | *Ranunculus muricatus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Platanus racemosa* Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOAS | *Sonchus asper* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | VEPEX2 | *Veronica peregrina* subsp. *xalapensis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 0.7 | 2 | 2 | | | | |

## *Populus fremontii* Woodland/Forest Alliance
## Fremont Cottonwood Woodland/Forest Alliance

As defined in the state, *Populus fremontii* is dominant or co-dominant in the tree canopy with *Acer negundo*, *Fraxinus latifolia*, *Juglans hindsii* and hybrids, *Platanus racemosa*, *Salix exigua*, *S. gooddingii*, *S. laevigata*, *S. lasiolepis*, *S. lucida* subsp. *lasiandra*, and *S. lutea*. The canopy is open to continuous. The shrub layer is open to intermittent and the herbaceous layer is variable. Stands form on floodplains, along low-gradient rivers and perennial or seasonally intermittent streams, near springs, in lower canyons in desert mountains, on alluvial fans, and in valleys with a dependable sub-surface water supply that may vary considerably during the year.

In the study area, two associations of the Fremont Cottonwood Alliance were classified and are described below. Two stands (SNNR0612, SNNR0853) showed additional variation due to the presence of *Salix gooddingii* and were classified to the alliance level only.

### *Populus fremontii - Salix laevigata* Association
### Fremont Cottonwood - Red Willow Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Populus fremontii* at 5-35% cover. *Salix laevigata* was characteristically present in the overstory. The shrub layer was open to continuous with *Rubus discolor* dominant and with *Vitis californica* often present. The herbaceous layer was open to intermittent and often included *Artemisia douglasiana*.

In the study area, this association was sampled commonly within the northern Sierra Nevada Foothills, and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands often occurred on metamorphic or granitic substrates, and occurred with decreasing frequency on mixed alluvium, volcanic, gravelly alluvium, or limestone substrates. They usually occupied flat to gentle, bottom slopes along riparian corridors and stream terraces, often with rocky surfaces.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in ten counties - Amador, Calaveras, El Dorado, Madera, Mariposa, Nevada, Placer, Tehama, Tuolumne, and Yuba Counties - and within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 62.6 | 12-87 | - |
| Herb | 11.9 | 0-44 | variable |
| Shrub | 30.6 | 6-78 | 1-5 |
| Low Tree/Tall Shrub | 9 | 0-37 | 5-15 |
| Hardwood | 29 | 5-59 | 5-35 |
| Conifer | 0.8 | 0-10 | 5-35 |
| Relative non-native to native cover | 28.2 | 0-59 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (5), Variable (4), Flat (4), NW (3), SW (2), N (2), S (1), NE (1), E (1), (0)
Macrotopography: bottom (21), lower slope (4)
Microtopography: concave (9), undulating (8), flat (6), convex (1)
Parent Material: metamorphic (8), granitic (7), mixed alluvium (4), volcanic (4), gravelly alluvium (1), limestone (1)
Soil Texture: sand (9), clay or clay loam (2), loam or sandy loam (1), muck (1), silt or silt loam (1), unknown (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 825 ft. | 187-1591 ft. |
| Slope | 1.3º | 0-3º |
| Large rock cover | 9.6% | 0-60% |
| Small rock cover | 19.3% | 2-85% |
| Bare ground cover | 23.2% | 2-82% |
| Litter cover | 36% | 1-89% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=25)

**Rapid Assessments:** SNNR0021, SNNR0202, SNNR0230, SNNR0239, SNNR0586, SNNR0588, SNNR0603, SNNR0630, SNNR0808, SNNR0878, SNNR0888, SNNR0891, SNNR0892, SNNR0896, SNNR0900, SNNR0908, SNNR1041, SNNR1043, SNNR1053, SNNR1143, SNNR1209, SNNR1253, SNNR1268, SNNR1283
**Relevés:** SNFN0413

**Rank:** G4S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Potter (2005) for the northern, central, and southern Sierra Nevada Foothills, the lower elevations of the southern High Sierra Nevada, and the Tehachapi Mountains. Stands occur on both the east and west sides of the southern Sierra Nevada and range as high as 3400 ft.

**STAND TABLE**
***Populus fremontii - Salix laevigata* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | POFR2-T | *Populus fremontii* | 100 | 15.3 | 5 | 35 | | X | X | |
| | SALA3-T | *Salix laevigata* | 96 | 10.4 | 0.2 | 45 | | | X | |
| | ALRH2-T | *Alnus rhombifolia* | 48 | 3.7 | 0.2 | 25 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 48 | 2.2 | 1 | 10 | | | | |
| | QULO-T | *Quercus lobata* | 44 | 2.8 | 0.2 | 18 | | | | |
| | AIAL | *Ailanthus altissima* | 36 | 1.7 | 0.2 | 20 | | | | X |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 88 | 19.5 | 0.2 | 60 | X | | X | X |
| | VICA5 | *Vitis californica* | 56 | 3.4 | 0.4 | 23 | | | | |
| | SALA6 | *Salix lasiolepis* | 48 | 2.3 | 0.2 | 15 | | | | |
| | SAEX | *Salix exigua* | 44 | 3.1 | 0.2 | 25.2 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 24 | 0.3 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 52 | 0.6 | 0.2 | 3 | | | | |
| | TOAR | *Torilis arvensis* | 24 | 0.5 | 0.2 | 10 | | | | X |
| | EUOC4 | *Euthamia occidentalis* | 24 | 0.1 | 0.2 | 1 | | | | |

### *Populus fremontii* / *Vitis californica* Association

**Fremont Cottonwood / California Wild Grape Association**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Populus fremontii* at 5-35% cover. Other trees such as *Fraxinus latifolia*, *Platanus racemosa*, and *Pinus sabiniana* were often present. The shrub layer was open to intermittent with *Vitis californica* dominant and with *Rhamnus tomentella* characteristically present. The herbaceous layer was variable and often included *Juncus effusus*, *Juncus xiphioides*, *Melilotus*, *Mimulus guttatus*, *Rumex*, *Torilis arvensis*, and *Vicia villosa* subsp. *varia*.

This association was sampled twice in the study area, once in the Cascade Range Foothills and once in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on mixed alluvium or volcanic substrates. They occupied flat bottoms areas. Stands of Fremont Cottonwood / California Wild Grape occurred along riparian corridors and floodplains.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte and Nevada Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 65 | 45-85 | - |
| Herb | 19 | 3-35 | >0.3 |
| Shrub | 35 | 20-50 | 1-5 |
| Low Tree/Tall Shrub | 17.5 | 0-35 | 5-10 |
| Hardwood | 37.5 | 5-70 | 5-20 |
| Conifer | 2 | 0-4 | 5-10 |
| Relative non-native to native cover | 6.7 | 7-7 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (1), Flat (1)
Macrotopography: bottom (2)
Microtopography: undulating (1), flat (1)
Parent Material: mixed alluvium (1), volcanic (1)
Soil Texture: sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 462 ft. | 354-570 ft. |
| Slope | 0º | -º |
| Large rock cover | 70% | 70-70% |
| Small rock cover | 10% | 10-10% |
| Bare ground cover | 10% | 10-10% |
| Litter cover | 8% | 8-8% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0273, SNNR1381

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, based on data collected for this project, and from the Sacramento River (Vaghti 2003) where *Cephalanthus occidentalis* and *Vitis californica* are typical indicator species. It is found on older floodplains. Stands lack cover of *Salix laevigata*, though they may be similar to the association with this tree species.

**STAND TABLE**
***Populus fremontii* / *Vitis californica* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | POFR2-T | *Populus fremontii* | 100 | 20.0 | 5 | 35 | | | X | |
| | POFR2-M | *Populus fremontii* | 100 | 10.0 | 5 | 15 | | X | X | |
| | FRLA-T | *Fraxinus latifolia* | 50 | 10.0 | 20 | 20 | | | | |
| | QULO-T | *Quercus lobata* | 50 | 10.0 | 20 | 20 | | | | |
| | PLRA-T | *Platanus racemosa* | 50 | 6.0 | 12 | 12 | | | | |
| | FRLA-M | *Fraxinus latifolia* | 50 | 5.0 | 10 | 10 | | | | |
| | PLRA-M | *Platanus racemosa* | 50 | 3.0 | 6 | 6 | | | | |
| | PISA2-T | *Pinus sabiniana* | 50 | 2.0 | 4 | 4 | | | | |
| | QULO-M | *Quercus lobata* | 50 | 2.0 | 4 | 4 | | | | |
| | ROPS | *Robinia pseudoacacia* | 50 | 1.0 | 2 | 2 | | | | X |
| **Shrub** | | | | | | | | | | |
| | VICA5 | *Vitis californica* | 100 | 21.0 | 17 | 25 | | X | X | |
| | RHTO6 | *Rhamnus tomentella* | 100 | 4.0 | 1 | 7 | | | X | |
| | RUUR | *Rubus ursinus* | 50 | 6.0 | 12 | 12 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 50 | 5.0 | 10 | 10 | | | | |
| | ARCA10 | *Aristolochia californica* | 50 | 3.0 | 6 | 6 | | | | |
| | CEOCO | *Cercis occidentalis* | 50 | 1.5 | 3 | 3 | | | | |
| | BAPI | *Baccharis pilularis* | 50 | 1.0 | 2 | 2 | | | | |
| | RUDI2 | *Rubus discolor* | 50 | 1.0 | 2 | 2 | | | | X |
| | SALA6 | *Salix lasiolepis* | 50 | 1.0 | 2 | 2 | | | | |
| | SAEX | *Salix exigua* | 50 | 0.5 | 1 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 50 | 4.0 | 8 | 8 | | | | X |
| | VIVIV8 | *Vicia villosa* subsp. *varia* | 50 | 2.0 | 4 | 4 | | | | X |
| | JUEF | *Juncus effusus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | JUXI | *Juncus xiphioides* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MELIL | *Melilotus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | MIGU | *Mimulus guttatus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RUMEX | *Rumex* | 50 | 0.1 | 0.2 | 0.2 | | | | |

## *Pseudotsuga menziesii* Woodland/Forest Alliance

## Douglas-fir Woodland/Forest Alliance

As defined in the state, *Pseudotsuga menziesii* is dominant or co-dominant in the tree canopy with *Abies concolor*, *Acer macrophyllum*, *Calocedrus decurrens*, *Chrysolepis chrysophylla*, *Cornus nuttallii*, *Pinus lambertiana*, *Quercus garryana*, and *Q*. *kelloggii*. The canopy is continuous or intermittent, and it may be two-tiered. Shrubs are infrequent or common. The herbaceous layer is sparse to abundant. Stands occur on raised stream benches and terraces, and on slopes and ridges of all aspects. Soils are deep and well drained.

The Douglas-fir Alliance is uncommon in the study area, occurring on mesic slopes, often with *Quercus kelloggii*, *Q*. *chrysolepis*, *Pinus ponderosa*, or *Umbellularia californica*. Two associations were classified in the study area and are described below.

## *Pseudotsuga menziesii* Association

## Douglas-fir Association

### SUMMARY

In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Pseudotsuga menziesii* at 27-75% cover. Other trees such as *Pinus ponderosa*, *Quercus chrysolepis*, *Quercus kelloggii*, and *Umbellularia californica* were characteristically present. The shrub layer was open with *Toxicodendron diversilobum* dominant and with *Ceanothus integerrimus*, *Ribes roezlii*, and *Symphoricarpos albus* var. *laevigatus* often present. The herbaceous layer was open to intermittent and often included *Galium aparine*, *Iris macrosiphon*, *Melica harfordii*, *Osmorhiza chilensis*, and *Torilis arvensis*.

This association was sampled infrequently in the study area, within the Cascade Range Foothills, High Cascade Range, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) and infrequently on metamorphic substrates. They occupied lower slopes to ridgetops that were somewhat steep. Stands of Douglas-fir occurred in the northern part of the study area, at higher altitudes or on cooler north- or east-facing slopes.

### DISTRIBUTION IN STUDY AREA

This association was sampled in Butte, Nevada and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Shingletown-Paradise (M261Dl), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 75 | 68-85 | - |
| Herb | 17.6 | 0-38 | variable |
| Shrub | 14.3 | 8-20 | <5 |
| Low Tree/Tall Shrub | 1 | 0-4 | 5-10 |
| Hardwood | 5.8 | 5-8 | 10-35 |
| Conifer | 53.8 | 28-75 | 20-35 |
| Relative non-native to native cover | 1.4 | 0-3 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: E (2), NW (1), N (1)
Macrotopography: lower slope (1), lower to middle slope (2), upper slope to ridgetop (1)
Microtopography: flat (3), undulating (1)
Parent Material: volcanic (2), basalt (1), metamorphic (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1978 ft. | 440-3670 ft. |
| Slope | 29.8º | 20-36º |
| Large rock cover | 0.9% | <1-2% |
| Small rock cover | 2.3% | <1-5% |
| Bare ground cover | 5.1% | <1-15% |
| Litter cover | 89% | 75-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0419, SNNR0599, SNNR0720, SNNR1121

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada based upon data collected for this study. Other stands of this association have been identified at Castle Crags State Park in Shasta County (Stuart et al. 1996) and at Mount Tamalpais in Marin County (Evens and Kentner 2006). Several other forest associations, with *Pseudotsuga menziesii* as a dominant or co-dominant, have been described from higher elevations in the northern Sierra Nevada and adjacent southern Cascades by Fites (1993), and were later re-interpreted by Sawyer et al. (2007 MS). This association represents the lowest elevation expression of the alliance within the Sierra Nevada region.

**STAND TABLE**
***Pseudotsuga menziesii* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 100 | 51.8 | 27 | 75 | X | | X | |
| | QUKE-T | *Quercus kelloggii* | 75 | 3.0 | 2 | 5 | | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 75 | 2.3 | 0.2 | 5 | | | X | |
| | PIPO-T | *Pinus ponderosa* | 75 | 2.3 | 1 | 7 | | | X | |
| | UMCA-M | *Umbellularia californica* | 75 | 1.8 | 2 | 3 | | | X | |
| | QUCH2-M | *Quercus chrysolepis* | 75 | 0.4 | 0.2 | 1 | | | X | |
| | PSME-M | *Pseudotsuga menziesii* | 50 | 1.3 | 0.2 | 5 | | | | |
| | UMCA-T | *Umbellularia californica* | 50 | 0.6 | 0.2 | 2 | | | | |
| | AECA-T | *Aesculus californica* | 25 | 0.5 | 2 | 2 | | | | |
| | AECA-M | *Aesculus californica* | 25 | 0.5 | 2 | 2 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 25 | 0.3 | 1 | 1 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PIPO-M | *Pinus ponderosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-L | *Quercus kelloggii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | UMCA-L | *Umbellularia californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 75 | 4.3 | 2 | 13 | | X | X | |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 50 | 1.3 | 2 | 3 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 50 | 0.8 | 0.2 | 3 | | | | |
| | RIRO | *Ribes roezlii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 25 | 1.8 | 7 | 7 | | | | |
| | LOIN4 | *Lonicera interrupta* | 25 | 0.8 | 3 | 3 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 25 | 0.3 | 1 | 1 | | | | |
| | ARCA10 | *Aristolochia californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | RHCA | *Rhamnus californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | RHRU | *Rhamnus rubra* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | MEHA2 | *Melica harfordii* | 75 | 0.2 | 0.2 | 0.2 | | | X | |
| | GAAP2 | *Galium aparine* | 50 | 0.5 | 1 | 1 | | | | |
| | IRMA | *Iris macrosiphon* | 50 | 0.5 | 1 | 1 | | | | |
| | OSCH | *Osmorhiza chilensis* | 50 | 0.5 | 1 | 1 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.5 | 1 | 1 | | | | X |

**STAND TABLE continued**
***Pseudotsuga menziesii* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | MELIC | *Melica* | 25 | 4.5 | 18 | 18 | | | | |
| | FEOC | *Festuca occidentalis* | 25 | 2.5 | 10 | 10 | | | | |
| | ADJO | *Adiantum jordanii* | 25 | 1.5 | 6 | 6 | | | | |
| | ELGL | *Elymus glaucus* | 25 | 1.3 | 5 | 5 | | | | |
| | BROMU | *Bromus* | 25 | 0.8 | 3 | 3 | | | | X |
| | VILOL2 | *Viola lobata* subsp. *lobata* | 25 | 0.5 | 2 | 2 | | | | |
| | CACA39 | *Cardamine californica* | 25 | 0.3 | 1 | 1 | | | | |
| | DRAR3 | *Dryopteris arguta* | 25 | 0.3 | 1 | 1 | | | | |
| | NEHE | *Nemophila heterophylla* | 25 | 0.3 | 1 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 25 | 0.3 | 1 | 1 | | | | |
| | TAUSC | *Tauschia* | 25 | 0.3 | 1 | 1 | | | | |
| | ASHA | *Asarum hartwegii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BROR2 | *Bromus orcuttianus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CYEC | *Cynosurus echinatus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | FRITI | *Fritillaria* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HIAL2 | *Hieracium albiflorum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | IRIS | *Iris* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LILIU | *Lilium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PIEL4 | *Piperia elongata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POGL9 | *Potentilla glandulosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | STREP2 | *Streptanthus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 1.8 | 2 | 5 | | | | |

***Pseudotsuga menziesii* - *Quercus chrysolepis* Association**

**Canyon Live Oak - Douglas-fir Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically intermittent to continuous and co-dominated by *Quercus chrysolepis* at 25-67% cover and *Pseudotsuga menziesii* at 12-45% cover. *Pinus ponderosa* was often present in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Lonicera hispidula* var. *vacillans* often present. The herbaceous layer was open and often included *Sanicula crassicaulis* and *Torilis arvensis*.

This association was sampled infrequently in the study area within the High Cascade Range and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on volcanic, metamorphic, or mixed rock substrates. They occupied bottom to middle slopes, that were gentle to steep (often north-facing), on stream benches or terraces, sometimes in canyon bottoms near streams. They typically occurred in cool settings and higher altitudes within the study area.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in El Dorado, Nevada, Placer, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Shingletown-Paradise (M261Dl), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 76.8 | 60-97 | - |
| Herb | 6.4 | 1-17 | variable |
| Shrub | 18.2 | 1-40 | <5 |
| Low Tree/Tall Shrub | 4.2 | 0-15 | 5-10 |
| Hardwood | 45.4 | 25-77 | 10-20 |
| Conifer | 29.4 | 12-55 | 10-20 |
| Relative non-native to native cover | 0.5 | 0-2 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: E (2), S (1), NE (1), (0)
Macrotopography: bottom (1), lower slope (2), lower to middle slope (1), middle slope (1)
Microtopography: undulating (4), flat (1)
Parent Material: volcanic (2), basalt (1), metamorphic (1), mixed rock (1)
Soil Texture: clay or clay loam (1), sand (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1676 ft. | 740-2721 ft. |
| Slope | 26.8º | 4-40º |
| Large rock cover | 7.4% | 0.6-25% |
| Small rock cover | 19.6% | 0.4-66% |
| Bare ground cover | 7% | 1-12% |
| Litter cover | 60.5% | 3-88% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0422, SNNR0505, SNNR0600 **Relevés:** SNFN0186, SNFN0574

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and Montane zones. Fites (1993) described a *Pseudotsuga menziesii* - (mixed conifer) - *Quercus chrysolepis* / *Polystichum munitum* Association from the northern Sierra Nevada and adjacent southern Cascades (between 3000 and 4400 ft. elevation) that resembles our association in the co-dominance of the two nominate trees. The principal differences lie in the absence of sword-fern (*Polystichum munitum*), and the trees *Pinus lambertiana*, *Abies concolor*, and *Quercus kelloggii* from our samples. Fites' association indicates cooler and perhaps wetter mid elevations. Taylor and Teare (1979) also described a *P. menziesii - Quercus chrysolepis* association from Manzanita Creek RNA in Trinity Co. However, this association differs from ours in the co-dominance of *Arbutus menziesii* and *Acer macrophyllum* (Cheng 2004). NatureServe et al. (2003b) described a *P. menziesii - Q. chrysolepis* association with a co-dominance of the two nominate trees, which is essentially the same as ours, although ranging to higher elevations (up to 5300 ft.). They place it in the *P. menziesii* alliance, and we are adhering to this alliance placement per Sawyer et al. (2007 MS).

**STAND TABLE**
***Pseudotsuga menziesii - Quercus chrysolepis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 39.6 | 25 | 67 | X | | X | |
| | PSME-T | *Pseudotsuga menziesii* | 100 | 25.2 | 12 | 45 | | X | X | |
| | PIPO-T | *Pinus ponderosa* | 60 | 2.8 | 2 | 9 | | | | |
| | PSME-M | *Pseudotsuga menziesii* | 60 | 2.6 | 3 | 5 | | | | |
| | AECA-M | *Aesculus californica* | 60 | 0.4 | 0.2 | 1 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 60 | 0.4 | 0.2 | 1 | | | | |
| | UMCA-T | *Umbellularia californica* | 40 | 0.6 | 1 | 2 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 40 | 0.2 | 0.2 | 1 | | | | |
| | UMCA-M | *Umbellularia californica* | 40 | 0.2 | 0.2 | 1 | | | | |
| | PSME-L | *Pseudotsuga menziesii* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 14.4 | 0.2 | 35 | X | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 60 | 2.9 | 0.2 | 14 | | | | |
| | PHLE4 | *Philadelphus lewisii* | 40 | 1.0 | 0.2 | 5 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 40 | 0.4 | 0.2 | 2 | | | | |
| | RHRU | *Rhamnus rubra* | 40 | 0.1 | 0.2 | 0.4 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 80 | 0.2 | 0.2 | 0.2 | | | X | X |
| | SACR2 | *Sanicula crassicaulis* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | ADJO | *Adiantum jordanii* | 40 | 2.4 | 0.2 | 12 | | | | |
| | METO | *Melica torreyana* | 40 | 1.0 | 1 | 4 | | | | |
| | CAAL2 | *Calochortus albus* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | MEHA2 | *Melica harfordii* | 40 | 0.1 | 0.2 | 0.2 | | | | |

## *Quercus chrysolepis* Woodland/Forest Alliance
## Canyon Live Oak Woodland/Forest Alliance

As defined in the state, *Quercus chrysolepis* is dominant or co-dominant with other hardwoods in the tree canopy, such as *Abies concolor*, *Acer macrophyllum*, *Arbutus menziesii*, *Calocedrus decurrens*, *Lithocarpus densiflorus*, *Pinus coulteri*, *P. lambertiana*, *P. ponderosa*, *P. monophylla*, *Pseudotsuga menziesii*, *P. macrocarpa*, *Quercus garryana*, *Q. kelloggii*, *Q. wislizeni*, and *Umbellularia californica*. The canopy is continuous to intermittent. The shrub layer is intermittent to infrequent and the herbaceous layer is sparse. Stands occur on stream benches and terraces, in canyon bottoms, near streams, and on upland slopes on steep, shallow, rocky, infertile soils.

Nine associations of the Canyon Live Oak Alliance were classified in the study area and are described below. Four stands (SNNR0414, SNNR0303, SNNR1217, SNNR0636) showed additional variation and were classified to the alliance level only. The stands contained *Aesculus californica* in the understory and other shrubs such as *Cercocarpus betuloides* and *Heteromeles arbutifolia*. Several associations with a co-dominance of *Q. chrysolepis* and other trees may have been classified previously as associations of different alliances, such as the *Pinus ponderosa* or *Quercus kelloggii* Alliances (please see key and descriptions for details).

## *Quercus chrysolepis* Association
## Canyon Live Oak Association

### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus chrysolepis* at 13-60% cover. *Aesculus californica* was often present in the overstory. The shrub layer was open to intermittent with *Ceanothus integerrimus*, *Cercocarpus betuloides*, *Heteromeles arbutifolia*, *Lonicera interrupta*, and *Toxicodendron diversilobum* often present. The herbaceous layer was open and often included non-natives *Cynosurus echinatus* and *Torilis arvensis*.

In the study area, this association was sampled four times in the High Cascade Range and four times in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands more commonly occurred on volcanic substrates, and occasionally on, metamorphic, mixed metamorphic, gabbro, or slate substrates. They occupied lower to upper slopes that were moderate to steep, on raised stream benches and terraces, sometimes in canyon bottoms near streams.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, El Dorado, Placer, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 72.1 | 53-90 | - |
| Herb | 6.5 | 1-15 | variable |
| Shrub | 34.4 | 15-55 | <5 |
| Low Tree/Tall Shrub | 1.4 | 0-10 | 5-10 |
| Hardwood | 41.5 | 15-60 | 5-20 |

| | | | |
|---|---|---|---|
| Conifer | 2.1 | 0-10 | 10-35 |
| Relative non-native to native cover | 2.9 | 0-7 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (2), N (2), E (2), S (1), NW (1)
Macrotopography: lower slope (2), middle slope (3), upper slope (3)
Microtopography: undulating (5), flat (2), convex (1)
Parent Material: volcanic (4), gabbro (1), metamorphic (1), mixed metamorphic (1), slate (1)
Soil Texture: silt or silt loam (3), clay or clay loam (2), loam or sandy loam (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 2427 ft. | 1170-3710 ft. |
| Slope | 25.1º | 12-34º |
| Large rock cover | 12.9% | <1-45% |
| Small rock cover | 7.4% | <1-25% |
| Bare ground cover | 12.4% | 2-46% |
| Litter cover | 63.6% | 30-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0127, SNNR0327, SNNR0331, SNNR0420, SNNR0488, SNNR0622, SNNR0748, SNNR0771

**Rank:** G5S5

**GLOBAL DISTRIBUTION**
This association has been described for the Foothills of the Sierra Nevada and southern Cascade ranges from the data collected for this project. Other *Q*. *chrysolepis* associations have been defined from the California Coast Ranges and from western Riverside County (Klein and Evens 2006, Evens and Keeler-Wolf 2006, Evens and Kentner 2006). They are all similar in their strong dominance by *Q*. *chrysolepis*, although minor floristic differences occur. At this point, we do not have complete evidence to substantiate different associations, as most of the more frequent species are found widely in the state. However, shrubs such as *Ceanothus integerrimus*, *Rhus trilobata*, and *Cercis occidentalis* may be more indicative of central and northern regions, such as the Central and North Coast Ranges, Sierra Nevada, and southern Cascades.

**STAND TABLE**
***Quercus chrysolepis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 40.0 | 13 | 60 | X | | X | |
| | QUCH2-M | *Quercus chrysolepis* | 63 | 3.1 | 0.2 | 14 | | | | |
| | AECA-M | *Aesculus californica* | 50 | 1.2 | 0.2 | 8 | | | | |
| | QUKE-T | *Quercus kelloggii* | 38 | 0.4 | 0.2 | 2 | | | | |
| | PIPO-T | *Pinus ponderosa* | 38 | 0.2 | 0.2 | 1 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 1.3 | 0.2 | 10 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 10.8 | 0.2 | 35 | | | X | |
| | CEIN3 | *Ceanothus integerrimus* | 88 | 5.3 | 0.2 | 30 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 1.7 | 0.2 | 9 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 50 | 1.3 | 1 | 5 | | | | |
| | LOIN4 | *Lonicera interrupta* | 50 | 0.7 | 0.2 | 4 | | | | |
| | CEOCO | *Cercis occidentalis* | 38 | 2.2 | 0.2 | 12 | | | | |
| | RHTR | *Rhus trilobata* | 38 | 1.0 | 1 | 5 | | | | |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 25 | 7.5 | 20 | 40 | | | | |
| | QUGAB | *Quercus garryana* var. *breweri* | 25 | 1.5 | 5 | 7 | | | | |
| | PTCR3 | *Ptelea crenulata* | 25 | 0.9 | 1 | 6 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 25 | 0.7 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 25 | 0.5 | 1 | 3 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 25 | 0.2 | 0.2 | 1 | | | | |
| | BEAQD | *Berberis aquifolium* var. *dictyota* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 75 | 0.9 | 0.2 | 2 | | | X | X |
| | CYEC | *Cynosurus echinatus* | 50 | 1.2 | 0.2 | 4 | | | | X |
| | CLRH | *Clarkia rhomboidea* | 38 | 0.3 | 0.2 | 1 | | | | |
| | GAPO | *Galium porrigens* | 38 | 0.3 | 0.2 | 1 | | | | |
| | VUMI | *Vulpia microstachys* | 25 | 1.0 | 0.2 | 8 | | | | |
| | CAAL2 | *Calochortus albus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 6.3 | 5 | 45 | | | | |

### *Quercus chrysolepis* / *Arctostaphylos viscida* Association
### Canyon Live Oak / Whiteleaf Manzanita Association

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus chrysolepis* at 16-65% cover. Other trees often present were *Pinus ponderosa* and *Quercus kelloggii*. The shrub layer was open to continuous, where *Arctostaphylos viscida* was usually dominant and *Heteromeles arbutifolia* and *Toxicodendron diversilobum* were often present. The herbaceous layer was open and included a variety of forbs and grasses (see stand table below).

This association was sampled commonly in the study area, only in the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on metamorphic substrates, but also occurred on gabbro, granitic, mixed rock, slate, and other sedimentary substrates. They most frequently occupied middle and upper slopes, but also occupied lower slopes and ridgetops. Slopes were moderate to steep and typically of cooler, northeast to southeast-facing aspects.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Butte, El Dorado, Placer, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 64.9 | 30-92 | - |
| Herb | 5.5 | 0-18 | variable |
| Shrub | 30.6 | 9-83 | <5 |
| Low Tree/Tall Shrub | 1.9 | 0-23 | 5-10 |
| Hardwood | 48.8 | 20-70 | 5-20 |
| Conifer | 1 | 0-6 | 5-35 |
| Relative non-native to native cover | 2.4 | 0-18 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: E (4), SE (3), NE (3), NW (1), N (1)
Macrotopography: lower slope (2), lower to middle slope (1), middle slope (3), middle to upper slope (2), upper slope (3), upper slope to ridgetop (1)
Microtopography: undulating (8), flat (3), concave (1)
Parent Material: metamorphic (7), gabbro (1), granitic (1), mixed rock (1), sedimentary (1), slate (1)
Soil Texture: clay or clay loam (4), silt or silt loam (4), loam or sandy loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1684 ft. | 850-2359 ft. |
| Slope | 20.5º | 7-40º |
| Large rock cover | 3.6% | <1-25% |
| Small rock cover | 3.8% | <1-12% |
| Bare ground cover | 10.5% | 1-34% |
| Litter cover | 78.9% | 50-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=12)

**Rapid Assessments:** SNNR0131, SNNR0177, SNNR0662, SNNR0747, SNNR0760, SNNR0764, SNNR0766, SNNR1130, SNNR1190, SNNR1297
**Relevés:** SNFN0145, SNFN0568

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and lower elevations of the Sierra Nevada Montane zone (NatureServe et al. 2003b). In Yosemite National Park, stands have been sampled from elevations of up to 6000 ft. Stands may also exist in the Klamath Mountains of California.

**STAND TABLE**
***Quercus chrysolepis* / *Arctostaphylos viscida* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 45.5 | 16 | 65 | X | | X | |
| | PIPO-T | *Pinus ponderosa* | 67 | 1.0 | 0.2 | 6 | | | | |
| | QUKE-T | *Quercus kelloggii* | 58 | 3.4 | 0.2 | 30 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 42 | 0.9 | 0.2 | 5 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 42 | 0.1 | 0.2 | 0.2 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 33 | 0.4 | 0.2 | 2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 33 | 0.3 | 0.2 | 2 | | | | |
| | QUKE-L | *Quercus kelloggii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 12.4 | 1 | 35 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 7.2 | 0.2 | 27 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 83 | 7.1 | 0.2 | 45 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.7 | 1 | 5.2 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 33 | 0.1 | 0.2 | 1 | | | | |
| | CECU | *Ceanothus cuneatus* | 25 | 0.3 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 42 | 0.3 | 0.2 | 3 | | | | X |
| | LUCO6 | *Luzula comosa* | 42 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.5 | 1 | 4 | | | | X |
| | GAAP2 | *Galium aparine* | 25 | 0.1 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.1 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERLA6 | *Eriophyllum lanatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMI | *Lotus micranthus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 42 | 1.9 | 2 | 15 | | | | |

## *Quercus chrysolepis - Pinus ponderosa* Association
## Canyon Live Oak - Ponderosa Pine Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Quercus chrysolepis* at 13-60% cover. *Pinus ponderosa* was characteristically present in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* often present. The herbaceous layer was variable and often included *Hieracium albiflorum*, *Sanicula crassicaulis*, and *Torilis arvensis*.

This association was sampled commonly in the study area in the northern Sierra Nevada Foothills, and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills, Subregions (Hickman 1993). Stands often occurred on metamorphic, and infrequently on volcanic, granitic, or mixed metamorphic substrates. They occupied bottom to upper slopes that were gentle to steep (often north-facing), on stream benches or terraces, and sometimes in canyon bottoms near streams.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, El Dorado, Placer, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 76 | 60-83 | - |
| Herb | 7.6 | 1-20 | variable |
| Shrub | 38.3 | 15-53 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 47.9 | 30-65 | 10-20 |
| Conifer | 15.1 | 7-34 | 10-35 |
| Relative non-native to native cover | 5.7 | 0-29 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (3), Variable (1), SE (1), NW (1), NE (1)
Macrotopography: bottom (1), lower slope (1), lower to middle slope (1), middle slope (3), upper slope (1)
Microtopography: undulating (3), flat (2), concave (2)
Parent Material: metamorphic (4), granitic (1), mixed metamorphic (1), volcanic (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1483 ft. | 1147-1675 ft. |
| Slope | 20.8º | 1-32º |
| Large rock cover | 2.9% | <1-7% |
| Small rock cover | 4.7% | 1-10% |
| Bare ground cover | 12.8% | 6-20% |
| Litter cover | 76.3% | 66-85% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0518, SNNR0667, SNNR0686, SNNR1128, SNNR1140, SNNR1189, SNNR1224

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and the lower elevations of the Sierra Nevada Montane zone, in Yosemite and Sequoia National Parks (NatureServe et al. 2003b, S Haultain, pers. comm. 2004). Stands in Yosemite were sampled up to 6100 ft. elevation.

**STAND TABLE**
***Quercus chrysolepis - Pinus ponderosa* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 45.7 | 30 | 65 | X | | X | |
| | PIPO-T | *Pinus ponderosa* | 100 | 8.0 | 0.2 | 17 | | | X | |
| | CADE27-T | *Calocedrus decurrens* | 57 | 3.7 | 5 | 7 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 43 | 2.7 | 1 | 16 | | | | |
| | QUKE-T | *Quercus kelloggii* | 43 | 0.2 | 0.2 | 1 | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 29 | 2.0 | 2 | 12 | | | | |
| | PISA2-T | *Pinus sabiniana* | 29 | 1.2 | 0.2 | 8 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 29 | 0.3 | 0.2 | 2 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 17.8 | 0.2 | 30 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 86 | 7.1 | 1 | 20 | | | X | |
| | ARCA10 | *Aristolochia californica* | 29 | 0.2 | 0.2 | 1 | | | | |
| | KEBR | *Keckiella breviflora* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 71 | 2.2 | 0.2 | 10 | | | | X |
| | HIAL2 | *Hieracium albiflorum* | 57 | 0.2 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 57 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | VISA | *Vicia sativa* | 29 | 1.0 | 1 | 6 | | | | X |
| | CYEC | *Cynosurus echinatus* | 29 | 0.7 | 1 | 4 | | | | X |
| | BRLA3 | *Bromus laevipes* | 29 | 0.3 | 1 | 1 | | | | |
| | IRHA | *Iris hartwegii* | 29 | 0.3 | 1 | 1 | | | | |
| | ELGL | *Elymus glaucus* | 29 | 0.2 | 0.2 | 1 | | | | |
| | METO | *Melica torreyana* | 29 | 0.2 | 0.2 | 1 | | | | |
| | OSCH | *Osmorhiza chilensis* | 29 | 0.2 | 0.2 | 1 | | | | |
| | CAAL2 | *Calochortus albus* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | IRIS | *Iris* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | LUCO6 | *Luzula comosa* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 43 | 3.1 | 2 | 15 | | | | |

## *Quercus chrysolepis - Quercus kelloggii* Association
## Canyon Live Oak - Black Oak Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Quercus chrysolepis* at 20-66% cover. *Quercus kelloggii* was characteristically present in the overstory. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* often present. The herbaceous layer was open with *Cynosurus echinatus*, *Elymus glaucus*, *Galium porrigens*, *Sanicula crassicaulis*, and *Torilis arvensis* occurring occasionally.

In the study area, this association was sampled commonly within the northern Sierra Nevada Foothills and less frequently the Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands occurred commonly on metamorphic, sometimes on igneous and volcanic, and infrequently on sedimentary substrates. They occupied lower to upper slopes that were moderate to steep, often on stream benches or terraces, sometimes in canyon bottoms near streams. Most stands were sampled north of the Mokulumne River on mesic, northeast to east-facing slopes, or near streams.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Calaveras, El Dorado, Placer, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 74.4 | 55-87 | - |
| Herb | 7.5 | 2-20 | variable |
| Shrub | 32.5 | 9-73 | <5 |
| Low Tree/Tall Shrub | 2.2 | 0-20 | 5-10 |
| Hardwood | 53.4 | 29-71 | 10-20 |
| Conifer | 5.7 | 0-25 | 10-35 |
| Relative non-native to native cover | 1.9 | 0-13 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (5), Variable (2), S (2), NW (2), E (2), W (1)
Macrotopography: lower slope (5), lower to middle slope (1), lower to upper slope (1), middle slope (4), upper slope (1)
Microtopography: flat (4), undulating (4), convex (1), concave (1)
Parent Material: metamorphic (7), igneous (3), volcanic (3), sedimentary (1)
Soil Texture: loam or sandy loam (6), clay or clay loam (1), silt or silt loam (1), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1412 ft. | 331-3428 ft. |
| Slope | 25.8º | 10-35º |
| Large rock cover | 8.5% | 0-60% |
| Small rock cover | 2.8% | 0-10% |
| Bare ground cover | 8.6% | 1-35% |
| Litter cover | 76.3% | 22-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0460, SNNR0479, SNNR0510, SNNR0643, SNNR0647, SNNR0730, SNNR0796, SNNR0820, SNNR1184, SNNR1193, SNNR1287
**Relevés:** SNFN0062, SNFN0181, SNFN0182

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the northern Sierra Nevada Foothills and elsewhere in the Sierra Nevada and Klamath Mountains (Allen et al. 1991). No samples of this association have been collected in either Yosemite or Sequoia and Kings Canyon National Parks, suggesting that this is a relatively lower elevation type associated mainly with the northern Sierra Nevada Foothills and lower montane zones.

**STAND TABLE**
***Quercus chrysolepis* - *Quercus kelloggii* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 39.2 | 20 | 66 | X | | X | |
| | QUKE-T | *Quercus kelloggii* | 100 | 15.7 | 3 | 45 | | | X | |
| | PIPO-T | *Pinus ponderosa* | 64 | 2.5 | 0.2 | 7 | | | | |
| | PISA2-T | *Pinus sabiniana* | 64 | 1.6 | 0.2 | 5 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 50 | 2.0 | 0.2 | 14 | | | | |
| | AECA-M | *Aesculus californica* | 50 | 0.9 | 0.2 | 5 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 29 | 1.3 | 0.2 | 11 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 29 | 0.1 | 0.2 | 1 | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 21 | 0.6 | 0.2 | 8 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 21 | 0.5 | 0.2 | 5 | | | | |
| | QUDO-T | *Quercus douglasii* | 21 | 0.2 | 0.2 | 2 | | | | |
| | UMCA-M | *Umbellularia californica* | 21 | 0.1 | 0.2 | 1 | | | | |
| | QUKE-L | *Quercus kelloggii* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 93 | 12.8 | 0.2 | 45 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 8.2 | 0.2 | 60.2 | | | | |
| | ARCA10 | *Aristolochia californica* | 36 | 0.2 | 0.2 | 2 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 29 | 0.8 | 2 | 4 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 29 | 0.5 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 29 | 0.4 | 0.2 | 4 | | | | |
| | VICA5 | *Vitis californica* | 29 | 0.2 | 0.2 | 1 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 21 | 0.6 | 2 | 5 | | | | |
| | PHLE4 | *Philadelphus lewisii* | 21 | 0.4 | 0.2 | 5 | | | | |
| | RIRO | *Ribes roezlii* | 21 | 0.2 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 43 | 0.3 | 0.2 | 2 | | | | X |
| | GAPO | *Galium porrigens* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | CYEC | *Cynosurus echinatus* | 29 | 0.9 | 0.2 | 9 | | | | X |

**STAND TABLE continued**

***Quercus chrysolepis* - *Quercus kelloggii* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | ELGL | *Elymus glaucus* | 29 | 0.2 | 0.2 | 2 | | | | |
| | CAAL2 | *Calochortus albus* | 21 | 0.1 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 29 | 0.1 | 0.2 | 1 | | | | |
| | METO | *Melica torreyana* | 21 | 0.3 | 0.2 | 2 | | | | |
| | BRLA3 | *Bromus laevipes* | 21 | 0.1 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 21 | 0.1 | 0.2 | 1 | | | | |
| | CYGR | *Cynoglossum grande* | 21 | 0 | 0.2 | 0.2 | | | | |
| | DRAR3 | *Dryopteris arguta* | 21 | 0 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 29 | 4.1 | 1 | 50 | | | | |

## *Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum* Association (Provisional)
## Canyon Live Oak - Black Oak - Big-leaf Maple Association (Provisional)


**SUMMARY**
In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Quercus chrysolepis* at 25-55% cover. Other trees such as *Acer macrophyllum* and *Quercus kelloggii* were characteristically present. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* and *Symphoricarpos albus* var. *laevigatus* often present. The herbaceous layer was open and often included *Bromus laevipes* and *Torilis arvensis*.


In the study area, this association was sampled most commonly in the northern Sierra Nevada Foothills, and once in the Cascade Range Foothills Subregions (Hickman 1993). Stands often occurred on igneous substrates (basalt, gabbro, or granitic), occasionally on metamorphic, and infrequently on limestone substrates. They occupied bottom to upper slopes that were gentle to steep and somewhat cool (north-facing, higher altitudes, northern latitudes). Stands of Canyon Live Oak - Black Oak - Big-leaf Maple often occurred on stream terraces or benches, on spring-fed slopes, and sometimes in canyon bottoms near streams.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, Calaveras, and Nevada Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 81.7 | 70-92 | - |
| Herb | 6 | 3-10 | variable |
| Shrub | 39.7 | 17-65 | <1-5 |
| Low Tree/Tall Shrub | 7.3 | 0-26 | 5-10 |
| Hardwood | 58.7 | 35-75 | 10-35 |
| Conifer | 7.4 | 0-17 | 10-35 |
| Relative non-native to native cover | 5.9 | 0-18 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (2), N (2), Variable (1), SW (1), SE (1)
Macrotopography: bottom (1), lower slope (1), lower to middle slope (3), middle slope (1), upper slope (1)
Microtopography: undulating (3), flat (2), convex (1), concave (1)
Parent Material: basalt (2), metamorphic (2), gabbro (1), granitic (1), limestone (1)
Soil Texture: loam or sandy loam (2), silt or silt loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1307 ft. | 564-2029 ft. |
| Slope | 25.3º | 3-45º |
| Large rock cover | 5.1% | 1-15% |
| Small rock cover | 9.3% | <1-30% |
| Bare ground cover | 9.2% | <1-25% |
| Litter cover | 68.6% | 18-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0533, SNNR0761, SNNR0765, SNNR0774, SNNR1057, SNNR1357, SNNR1379

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on data collected for this project. We predict that this association also occurs in the eastern Klamath Mountains at lower elevations.

**STAND TABLE**
***Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 38.3 | 25 | 55 | | X | X | |
| | QUKE-T | *Quercus kelloggii* | 86 | 19.6 | 2 | 40 | | | X | |
| | ACMA3-T | *Acer macrophyllum* | 86 | 10.7 | 3 | 22 | | | X | |
| | PIPO-T | *Pinus ponderosa* | 71 | 4.9 | 1 | 17 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 43 | 2.2 | 0.2 | 15 | | | | |
| | CADE27-L | *Calocedrus decurrens* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | ARME-T | *Arbutus menziesii* | 29 | 2.1 | 5 | 10 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 29 | 0.6 | 1 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 16.7 | 8 | 40 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 57 | 5.6 | 4 | 22 | | | | |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 57 | 3.0 | 0.2 | 10 | | | | |
| | RUDI2 | *Rubus discolor* | 43 | 5.6 | 5 | 24 | | | | X |
| | CEIN3 | *Ceanothus integerrimus* | 43 | 5.1 | 0.2 | 35 | | | | |
| | VICA5 | *Vitis californica* | 43 | 2.1 | 1 | 8 | | | | |
| | COSE16 | *Cornus sericea* | 43 | 1.2 | 0.2 | 7 | | | | |
| | STOFR | *Styrax officinalis* var. *redivivus* | 29 | 0.6 | 0.2 | 4 | | | | |
| | LOIN4 | *Lonicera interrupta* | 29 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 57 | 0.7 | 1 | 2 | | | | X |
| | BRLA3 | *Bromus laevipes* | 57 | 0.3 | 0.2 | 1 | | | | |
| | DRAR3 | *Dryopteris arguta* | 43 | 0.7 | 1 | 2 | | | | |
| | ADJO | *Adiantum jordanii* | 43 | 0.6 | 0.2 | 2 | | | | |
| | METO | *Melica torreyana* | 43 | 0.6 | 0.2 | 3 | | | | |
| | PETR7 | *Pentagramma triangularis* | 43 | 0.3 | 0.2 | 2 | | | | |
| | ELGL | *Elymus glaucus* | 43 | 0.2 | 0.2 | 1 | | | | |
| | OSCH | *Osmorhiza chilensis* | 43 | 0.2 | 0.2 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 29 | 0.6 | 1 | 3 | | | | X |
| | CLBI | *Clarkia biloba* | 29 | 0.1 | 0.2 | 0.2 | | | | |

### *Quercus chrysolepis - Quercus lobata* / *Vitis californica* Association
### Canyon Live Oak - Valley Oak / California Wild Grape Association


**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus chrysolepis* at 14-65% cover. *Quercus lobata* was characteristically present in the overstory. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant and with *Aristolochia californica* and *Vitis californica* often present. The herbaceous layer was open and often included non-natives *Cynosurus echinatus* and *Torilis arvensis*.

In the study area, this association was sampled commonly in the Cascade Range Foothills and northern Sierra Nevada Foothills, and less frequently in the High Cascade Range Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) substrates, and less frequently on limestone, shale, mixed alluvium, mixed rock, and metamorphic substrates. They occupied mostly bottom to lower slopes (occasionally found on middle to upper slopes), that were gentle to steep. Stands of Canyon Live Oak - Valley Oak / California Wild Grape occurred along riparian corridors or stream terraces.


**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, Calaveras, Nevada, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections.

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.9 | 53-90 | - |
| Herb | 6.7 | 0-25 | variable |
| Shrub | 29 | 6-70 | <5 |
| Low Tree/Tall Shrub | 8.6 | 0-30 | 5-10 |
| Hardwood | 45.9 | 18-70 | 5-20 |
| Conifer | 2.1 | 0-16 | 5-20 |
| Relative non-native to native cover | 10 | 0-47 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SE (3), NW (3), W (2), Variable (2), S (2), N (2), SW (1)
Macrotopography: bottom (4), bottom to lower slope (1), lower slope (5), lower to middle slope (1), middle slope (1), upper slope (2)
Microtopography: undulating (6), concave (5), convex (2)
Parent Material: volcanic (6), basalt (2), gabbro (1), igneous (1), limestone (1), metamorphic (1), mixed alluvium (1), mixed rock (1), shale (1)
Soil Texture: loam or sandy loam (4), clay or clay loam (3), silt or silt loam (3), sand (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1329 ft. | 476-2724 ft. |
| Slope | 9.5º | 2-30º |
| Large rock cover | 7.4% | 1-25% |
| Small rock cover | 8.1% | <1-25% |
| Bare ground cover | 10.3% | 1-30% |
| Litter cover | 69.8% | 42-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** SNNR0175, SNNR0185, SNNR0269, SNNR0446, SNNR0514, SNNR0521, SNNR0522, SNNR0539, SNNR0551, SNNR0570, SNNR0743, SNNR1207, SNNR1216, SNNR1267, SNNR1377

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills solely based on data collected for this project. Similar stands may occur in the Inner North Coast Ranges.

**STAND TABLE**
***Quercus chrysolepis - Quercus lobata* / *Vitis californica* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 35.3 | 14 | 65 | X | | X | |
| | QULO-T | *Quercus lobata* | 73 | 7.6 | 3 | 20 | | | | |
| | PISA2-T | *Pinus sabiniana* | 47 | 0.9 | 0.2 | 10 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 33 | 1.3 | 0.2 | 5 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 27 | 1.1 | 2 | 7 | | | | |
| | AECA-M | *Aesculus californica* | 27 | 0.9 | 1 | 5 | | | | |
| | QUKE-T | *Quercus kelloggii* | 27 | 0.6 | 0.2 | 5 | | | | |
| | QUDO-T | *Quercus douglasii* | 27 | 0.5 | 1 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 93 | 9.8 | 3 | 25 | | X | X | |
| | VICA5 | *Vitis californica* | 60 | 5.8 | 1 | 35 | | | | |
| | ARCA10 | *Aristolochia californica* | 53 | 0.7 | 0.2 | 3 | | | | |
| | RUDI2 | *Rubus discolor* | 40 | 5.9 | 1 | 50 | | | | X |
| | HEAR5 | *Heteromeles arbutifolia* | 40 | 1.1 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 33 | 0.8 | 0.2 | 5 | | | | |
| | CAOC5 | *Calycanthus occidentalis* | 27 | 1.5 | 0.2 | 12 | | | | |
| | RHTR | *Rhus trilobata* | 27 | 0.3 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 80 | 1.4 | 0.2 | 5 | | | X | X |
| | CYEC | *Cynosurus echinatus* | 67 | 1.9 | 0.2 | 10 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 2.7 | 2 | 15 | | | | |

***Quercus chrysolepis* - *Quercus wislizeni* Association**

**Canyon Live Oak - Interior Live Oak Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus chrysolepis* at 7-60% cover. *Quercus wislizeni* was characteristically present as a tree and/or shrub. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* often present. The herbaceous layer was open and often included non-native *Cynosurus echinatus*.

In the study area, this association was sampled commonly within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands often occurred on igneous (especially granitic) substrates, occasionally on sedimentary, and infrequently on mixed alluvium and mixed rock substrates. They more commonly occupied lower slopes, but also occupied middle to upper slopes, that were gentle to steep. They occurred on a variety of aspects in the study area, in dry to mesic settings, with sandy or loamy soils.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Calaveras, El Dorado, Nevada, and Placer Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 67.9 | 35-95 | - |
| Herb | 8.3 | 4-17 | variable |
| Shrub | 20.3 | 7-35 | <5 |
| Low Tree/Tall Shrub | 2.2 | 0-20 | 5-10 |
| Hardwood | 46.6 | 13-90 | 5-20 |
| Conifer | 1.1 | 0-3 | 10-35 |
| Relative non-native to native cover | 8.1 | 0-22 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: W (2), NW (2), N (2), SW (1), SE (1), S (1), NE (1)
Macrotopography: lower slope (5), lower to middle slope (1), lower to upper slope (1), middle slope (3)
Microtopography: undulating (4), flat (3), concave (2), convex (1)
Parent Material: granitic (4), sedimentary (3), igneous (1), mixed alluvium (1), mixed rock (1)
Soil Texture: loam or sandy loam (3), clay or clay loam (1), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1039 ft. | 616-1740 ft. |
| Slope | 23.9º | 5-32º |
| Large rock cover | 15.4% | 0-75% |
| Small rock cover | 5.4% | <1-15% |
| Bare ground cover | 11.1% | 1-53% |
| Litter cover | 64.4% | 18-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0264, SNNR0464, SNNR0490, SNNR0559, SNNR0606, SNNR0639, SNNR1270, SNNR1378, SNNR1389 **Relevés:** SNFN0575

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and the adjacent lower elevation mountains (NatureServe et al. 2003b). It was a called a *Quercus wislizeni - Q. chrysolepis* Association of the *Q. wislizeni* Alliance in the NatureServe report; however, we now have more data from the Foothills to place this association more confidently in the *Q. chrysolepis* Alliance. The association also has been observed in Sequoia and Kings Canyon National Parks at low elevations on the western side of the Sierra Nevada.

**STAND TABLE**
***Quercus chrysolepis - Quercus wislizeni* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 35.9 | 7 | 60 | X | | X | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 11.0 | 3 | 35 | | | X | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 1.0 | 1 | 5 | | | | |
| | AECA-M | *Aesculus californica* | 50 | 0.8 | 0.2 | 3 | | | | |
| | PIPO-T | *Pinus ponderosa* | 40 | 0.6 | 0.2 | 3 | | | | |
| | PISA2-T | *Pinus sabiniana* | 40 | 0.5 | 0.2 | 3 | | | | |
| | ARME-M | *Arbutus menziesii* | 40 | 0.3 | 0.2 | 2 | | | | |
| | AECA-T | *Aesculus californica* | 30 | 1.4 | 0.2 | 12 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 6.6 | 2 | 15.2 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 90 | 5.6 | 0.2 | 15 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 40 | 0.2 | 0.2 | 1 | | | | |
| | RUDI2 | *Rubus discolor* | 30 | 1.9 | 1 | 15 | | | | X |
| | PHLE4 | *Philadelphus lewisii* | 30 | 1.2 | 0.2 | 7 | | | | |
| | KEBR | *Keckiella breviflora* | 30 | 0.5 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 60 | 2.8 | 1 | 10 | | | | X |
| | TOAR | *Torilis arvensis* | 40 | 0.5 | 0.2 | 4 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | CLBI | *Clarkia biloba* | 30 | 0.2 | 0.2 | 2 | | | | |
| | ADJO | *Adiantum jordanii* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 40 | 5.8 | 3 | 20 | | | | |

### *Quercus chrysolepis - Umbellularia californica* Association
### Canyon Live Oak - California Bay Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Quercus chrysolepis* at 30-72% cover. *Umbellularia californica* was characteristically present in the overstory at low cover, and *Q*. *kelloggii* and *Pseudotsuga menziesii* were often present at low cover. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* often present. The herbaceous layer was open to intermittent and often included *Torilis arvensis*.

This association was sampled commonly in the study area within the northern Sierra Nevada Foothills and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic substrates, but also on greenstone and other metamorphic substrates. They occupied lower to upper slopes and benches, that were somewhat steep to steep. Stands were often mesic and north-facing.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte and Placer Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Shingletown-Paradise (M261Dl), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 67.4 | 40-90 | - |
| Herb | 6.8 | 0-35 | variable |
| Shrub | 22.8 | 2-50 | <5 |
| Low Tree/Tall Shrub | 2.1 | 0-12 | 5-10 |
| Hardwood | 55.8 | 33-72 | 10-35 |
| Conifer | 1.2 | 0-5 | 10-35 |
| Relative non-native to native cover | 1 | 0-4 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (4), SW (2), NW (2), Variable (1)
Macrotopography: lower slope (1), lower to middle slope (1), lower to upper slope (1), middle slope (2), middle to upper slope (1), upper slope (2), bench (1)
Microtopography: undulating (5), convex (2), flat (2)
Parent Material: volcanic (6), greenstone (1), igneous (1), metamorphic (1)
Soil Texture: loam or sandy loam (5), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1486 ft. | 477-2222 ft. |
| Slope | 23.4º | 16-35º |
| Large rock cover | 5.8% | 0-40% |
| Small rock cover | 4.2% | <1-10% |
| Bare ground cover | 5.8% | <1-15% |
| Litter cover | 80.7% | 28-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** SNNR0688, SNNR0715, SNNR0717, SNNR0719, SNNR0780, SNNR0793, SNNR1122 **Relevés:** SNFN0095, SNFN0097

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills in this report and by NatureServe et al. (2003b) from the lower elevations of Yosemite National Park. It appears to be well sampled and common in Yosemite, ranging up to 5300 ft elevation. It is also known from Sequoia and Kings Canyon National Parks (S. Haultain, pers. comm. 2004).

**STAND TABLE**
***Quercus chrysolepis - Umbellularia californica* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 49.6 | 30 | 72 | X | | X | |
| | UMCA-M | *Umbellularia californica* | 89 | 5.2 | 0.2 | 20 | | | X | |
| | QUKE-T | *Quercus kelloggii* | 67 | 2.5 | 0.2 | 10 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 56 | 0.9 | 0.2 | 5 | | | | |
| | PSME-M | *Pseudotsuga menziesii* | 56 | 0.6 | 0.2 | 4 | | | | |
| | UMCA-T | *Umbellularia californica* | 44 | 2.5 | 0.2 | 10 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 44 | 0.5 | 0.2 | 3 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 44 | 0.3 | 0.2 | 1 | | | | |
| | PSME-T | *Pseudotsuga menziesii* | 33 | 0.8 | 0.2 | 5 | | | | |
| | AECA-M | *Aesculus californica* | 33 | 0.6 | 0.2 | 5 | | | | |
| | QUKE-L | *Quercus kelloggii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | AECA-T | *Aesculus californica* | 22 | 1.7 | 0.2 | 15 | | | | |
| | CADE27-L | *Calocedrus decurrens* | 22 | 0.1 | 0.2 | 1 | | | | |
| | PIPO-T | *Pinus ponderosa* | 22 | 0.1 | 0.2 | 1 | | | | |
| | QUKE-M | *Quercus kelloggii* | 22 | 0 | 0.2 | 0.2 | | | | |
| | UMCA-L | *Umbellularia californica* | 22 | 0 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 13.3 | 0.2 | 26 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 78 | 1.2 | 0.2 | 7 | | | X | |
| | RHTO6 | *Rhamnus tomentella* | 44 | 0.4 | 0.2 | 2 | | | | |
| | ARCA10 | *Aristolochia californica* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| | COSE16 | *Cornus sericea* | 22 | 0.5 | 0.2 | 4 | | | | |
| | CEOCO | *Cercis occidentalis* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | RIRO | *Ribes roezlii* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 67 | 0.2 | 0.2 | 1 | | | | X |
| | ADJO | *Adiantum jordanii* | 44 | 1.4 | 0.2 | 6 | | | | |
| | DRAR3 | *Dryopteris arguta* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYGR | *Cynoglossum grande* | 33 | 0.4 | 0.2 | 2 | | | | |
| | METO | *Melica torreyana* | 33 | 0.2 | 0.2 | 1 | | | | |
| | MEHA2 | *Melica harfordii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POCA26 | *Polypodium calirhiza* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CYEC | *Cynosurus echinatus* | 22 | 0.6 | 2 | 3 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 22 | 0.1 | 0.2 | 1 | | | | |
| | GEMO | *Geranium molle* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | POMU | *Polystichum munitum* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 67 | 6.6 | 1 | 37 | | | | |

## *Quercus chrysolepis - Umbellularia californica* / *Vitis californica* Riparian Association
## Canyon Live Oak – California Bay / California Wild Grape Riparian Association


**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated or co-dominated by *Quercus chrysolepis* at 10-68% cover. *Umbellularia californica* was characteristically present in the overstory at low to moderate cover, and *Alnus rhombifolia* was often present at low to moderate cover. The shrub layer was open to continuous with *Toxicodendron diversilobum* co-dominant, with *Vitis californica* characteristically present, and with *Calycanthus occidentalis* often present. The herbaceous layer was open to intermittent and often included non-natives *Cynosurus echinatus* and *Torilis arvensis*.


In the study area, this association was sampled commonly in the Cascade Range Foothills and High Cascade Range, and only once in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic substrates (including basalt) but occasionally occurred on mixed alluvium, limestone, and sandstone substrates. They usually occupied bottom and lower slopes, but also occupied middle to upper slopes, that were flat to steep. Stands of Canyon Live Oak - California Bay / California Wild Grape occurred along riparian corridors and flood plains.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Calaveras, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 71.8 | 20-90 | - |
| Herb | 11 | 0-40 | variable |
| Shrub | 30.6 | 5-70 | <5 |
| Low Tree/Tall Shrub | 6.7 | 0-43 | 5-10 |
| Hardwood | 50.3 | 15-72 | 5-20 |
| Conifer | 0.9 | 0-12 | 5-35 |
| Relative non-native to native cover | 10.2 | 0-65 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SE (5), S (5), NW (4), Variable (2), SW (2), N (2), NE (1), Flat (1)
Macrotopography: bottom (4), bottom to lower slope (1), bottom to middle slope (1), lower slope (8), lower to middle slope (3), middle slope (3), middle to upper slope (1), upper slope (1)
Microtopography: undulating (13), concave (5), flat (2), convex (2)
Parent Material: volcanic (17), mixed alluvium (2), basalt (1), limestone (1), sandstone (1)
Soil Texture: loam or sandy loam (7), clay or clay loam (5), silt or silt loam (5), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1573 ft. | 630-2550 ft. |
| Slope | 14.7º | 0-45º |
| Large rock cover | 26.5% | 1-65% |
| Small rock cover | 12.5% | 2-50% |
| Bare ground cover | 12.6% | 2-41% |
| Litter cover | 42.3% | 11-83% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=22)

**Rapid Assessments:** SNNR0180, SNNR0350, SNNR0379, SNNR0380, SNNR0382, SNNR0385, SNNR0416, SNNR0423, SNNR0432, SNNR0540, SNNR0568, SNNR1221, SNNR1239, SNNR1242, SNNR1246, SNNR1248, SNNR1250, SNNR1252, SNNR1308, SNNR1309, SNNR1319, SNNR1353

**Rank:** G3S3

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills solely from the data collected for this project. We classified this type separately from the *Quercus chrysolepis - Umbellularia californica* Association, because it lacked *Vitis californica* and other common riparian associates, including *A. rhombifolia*, *Acer macrophyllum*, and *Calycanthus occidentalis*. Potter's (2005) *Quercus chrysolepis* / *Toxicodendron diversilobum* Association is similar and likely includes (or is equal to) this more finely divided association (see comments under the *Alnus rhombifolia - Quercus chrysolepis* Association). We perceive this association as largely lacking significant cover of *A. rhombifolia*, but it still maintains a riparian character indicated by the high constancy of other riparian woody species .

**STAND TABLE**

***Quercus chrysolepis - Umbellularia californica* / *Vitis californica* Riparian Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 95 | 40.0 | 10 | 68 | X | | X | |
| | UMCA-T | *Umbellularia californica* | 95 | 13.8 | 0.2 | 35 | | | X | |
| | ALRH2-T | *Alnus rhombifolia* | 55 | 3.2 | 0.2 | 21 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 45 | 1.3 | 0.2 | 10 | | | | |
| | UMCA-M | *Umbellularia californica* | 41 | 1.6 | 0.2 | 12 | | | | |
| | AECA-M | *Aesculus californica* | 32 | 0.2 | 0.2 | 2 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 32 | 0.1 | 0.2 | 1 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 27 | 0.8 | 0.2 | 12 | | | | |
| | AECA-T | *Aesculus californica* | 27 | 0.7 | 0.2 | 6 | | | | |
| | UMCA-L | *Umbellularia californica* | 27 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 91 | 12.7 | 1 | 47 | | X | X | |
| | VICA5 | *Vitis californica* | 82 | 5.4 | 0.4 | 16 | | | X | |
| | CAOC5 | *Calycanthus occidentalis* | 55 | 4.2 | 0.2 | 40 | | | | |
| | RUDI2 | *Rubus discolor* | 41 | 5.8 | 0.2 | 68.2 | | | | X |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 36 | 1.2 | 0.2 | 14 | | | | |
| | ARCA10 | *Aristolochia californica* | 36 | 1.0 | 0.2 | 14 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 73 | 1.3 | 0.2 | 6 | | | | X |
| | CYEC | *Cynosurus echinatus* | 64 | 2.1 | 0.2 | 15 | | | | X |
| | ADJO | *Adiantum jordanii* | 27 | 1.2 | 0.2 | 10 | | | | |
| | POCA26 | *Polypodium calirhiza* | 27 | 0.3 | 0.2 | 2 | | | | |
| | WOFI | *Woodwardia fimbriata* | 27 | 0.1 | 0.2 | 1 | | | | |
| | CYGR | *Cynoglossum grande* | 27 | 0.1 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 23 | 0.1 | 0.2 | 1 | | | | |
| | BRLA3 | *Bromus laevipes* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 36 | 9.9 | 0.2 | 60 | | | | |

### *Quercus douglasii* Woodland/Forest Alliance
### Blue Oak Woodland/Forest Alliance

As defined in the state, *Quercus douglasii* is usually dominant or sometimes co-dominant in the tree canopy with *Juniperus californica*, *Pinus sabiniana*, *Quercus agrifolia*, *Q*. *lobata*, and *Q*. *wislizeni*. The canopy is continuous, intermittent, or savanna-like. The shrub layer is sparse to intermittent and *Ceanothus cuneatus* or *Arctostaphylos viscida* may occur. The herbaceous layer is sparse or grassy, and forbs are present seasonally. Stands form on valley bottoms, foothills, and rock outcrops. Stands typically occur on shallow, often rocky, infertile soils with moderate to excessive drainage, in upland valleys and on steep to gentle slopes.

Perhaps the most widespread foothill tree alliance in the study area, stands of the *Quercus douglasii* Alliance form open savannas or intermittent woodlands with generally low shrub cover and grassy understories. Eleven associations were described for the Blue Oak Alliance in the study area. Four stands (SNFN0654, SNNR0376, SNNR0378, SNNR1339) showed additional variation and were classified to the alliance level only; one had high cover of *Toxicodendron diversilobum* with *Aesculus californica*, and three had low cover of *Quercus douglasii*.

### *Quercus douglasii* / Annual Grass - Forb Sub-Alliance
### Blue Oak / Annual Grass - Forb Sub-Alliance

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated solely by *Quercus douglasii* at 1-75% cover. *Toxicodendron diversilobum* was present occasionally in the shrub layer. The herbaceous layer was open to continuous and often included non-natives *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Lolium multiflorum*, *Torilis arvensis*, and *Trifolium hirtum*.

One of the most frequently sampled types, this sub-alliance was common throughout the study area within the central Sierra Nevada Foothills, Cascade Range Foothills, High Cascade Range (uncommon), northern Sierra Nevada Foothills, and Sacramento Valley Subregions (Hickman 1993). Stands often occurred on metamorphic (greenstone, slate, serpentine, or mixed metamorphic), sometimes on igneous (including volcanic, basalt, granitic, and gabbro) and infrequently on sedimentary (sandstone), mixed rock, or clayey alluvium substrates. They occupied all aspects and slope positions, most frequently middle and upper slopes. They infrequently occupied toeslopes, benchs, and plateaus. Slopes varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**
This sub-alliance was sampled within thirteen counties of the study area: Amador, Butte, Calaveras, El Dorado, Madera, Mariposa, Nevada, Placer, Sacramento, Shasta, Tehama, Tuolumne, and Yuba Counties. It occurred in the Camanche Terraces (262Ao), Lower Foothills Meta-morphic Belt (M261Fb), Lower Granitic Foothills (M261Fc), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73 | 34-100 | - |
| Herb | 60.6 | 21-95 | variable |
| Shrub | 2 | 0-30 | <5 |

| | | | |
|---|---|---|---|
| Low Tree/Tall Shrub | 0 | - | 5-10 |
| Hardwood | 26 | 3-75 | 5-20 |
| Conifer | 0.5 | 0-35 | 5-35 |
| Relative non-native to native cover | 64.5 | 0-91 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (41), SW (25), NE (21), SE (16), S (16), NW (14), W (13), E (13), N (11), Flat (7), (0)
Macrotopography: entire slope (3), bottom (10), bottom to lower slope (2), bottom to middle slope (2), lower slope (24), lower to middle slope (11), lower to upper slope (10), middle slope (40), middle to upper slope (4), middle slope to ridgetop (4), upper slope (26), upper slope to ridgetop (7), bench (1), mesa/plateau (1), ridgetop (14), terrace (1), toeslope (1)
Microtopography: undulating (105), flat (24), convex (22), concave (9)
Parent Material: metamorphic (76), volcanic (37), sedimentary (28), slate (12), basalt (6), mixed metamorphic (4), serpentine (4), ultramafic (4), mixed rock (3), clayey alluvium (1), gabbro (1), granitic (1), greenstone (1), igneous (1), sandstone (1)
Soil Texture: loam or sandy loam (47), silt or silt loam (47), clay or clay loam (46), sand (2), unknown (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1038 ft. | 284-2800 ft. |
| Slope | 10.9º | 0-40º |
| Large rock cover | 4.1% | 0-55% |
| Small rock cover | 3.3% | 0-30% |
| Bare ground cover | 17.8% | 1-82% |
| Litter cover | 71.1% | 6-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=180)
**Rapid Assessments:** SNNR0010, SNNR0032, SNNR0039, SNNR0042, SNNR0044, SNNR0053, SNNR0059, SNNR0060, SNNR0073, SNNR0083, SNNR0093, SNNR0097, SNNR0118, SNNR0160, SNNR0161, SNNR0172, SNNR0191, SNNR0197, SNNR0215, SNNR0268, SNNR0319, SNNR0344, SNNR0474, SNNR0482, SNNR0483, SNNR0673, SNNR0736, SNNR0742, SNNR0745, SNNR0767, SNNR0812, SNNR0815, SNNR0816, SNNR0825, SNNR0832, SNNR0856, SNNR0861, SNNR0862, SNNR0866, SNNR0885, SNNR0890, SNNR0901, SNNR0929, SNNR0933, SNNR0942, SNNR0946, SNNR0950, SNNR0953, SNNR0962, SNNR0963, SNNR0968, SNNR0969, SNNR0971, SNNR0990, SNNR0998, SNNR1005, SNNR1010, SNNR1020, SNNR1024, SNNR1037, SNNR1063, SNNR1070, SNNR1074, SNNR1077, SNNR1081, SNNR1082, SNNR1083, SNNR1110, SNNR1113, SNNR1115, SNNR1116, SNNR1147, SNNR1156, SNNR1157, SNNR1179, SNNR1203, SNNR1211, SNNR1228, SNNR1238, SNNR1290, SNNR1294, SNNR1342, SNNR1351, SNNR1403, SNNR1406, SNNR1410, SNNR1416, SNNR1418, SNNR1420, SNNR1421, SNNR1424, SNNR1425, SNNR1434, SNNR1437, SNNR1444, SNNR1445, SNNR1450, SNNR1455, SNNR1458, SNNR1461, SNNR1474, SNNR1478, SNNR1491, SNNR1499, SNNR1605, SNNR1606, SNNR1607, SNNR1609, SNNR1611, SNNR1616, SNNR1618, SNNR1619, SNNR1622, SNNR1623, SNNR1625, SNNR1626, SNNR1629, SNNR1635, SNNR1636, SNNR1637, SNNR1638, SNNR1643, SNNR1644, SNNR1649, SNNR1666, SNNR1667, SNNR1668

**Relevés:** SNFN0016, SNFN0019, SNFN0024, SNFN0027, SNFN0035, SNFN0046, SNFN0050, SNFN0059, SNFN0063, SNFN0136, SNFN0149, SNFN0166, SNFN0209, SNFN0215, SNFN0236, SNFN0255, SNFN0278, SNFN0315, SNFN0399, SNFN0478, SNFN0480, SNFN0484, SNFN0485, SNFN0486, SNFN0488, SNFN0489, SNFN0490, SNFN0493, SNFN0544, SNFN0545, SNFN0554, SNFN0555, SNFN0556, SNFN0557, SNFN0559,

SNFN0560, SNFN0562, SNFN0563, SNFN0580, SNFN0582, SNFN0612, SNFN0613, SNFN0618, SNFN0622, SNFN0625, SNFN0626, SNFN0627, SNFN0628, SNFN0630, SNFN0642, SNFN0646, SNFN0659, SNFN0662

**Rank:** Unranked, multiple associations. We had a preponderence of Rapid Assessment samples conducted from both field seasons for this type. Because samples were collected in different seasons (spring and summer), often without full species lists, we were not able to detect the ecologically significant native annual plants that would represent good differential species (or indicators) defining plant associations through predictable variation in the understory. This classification unit, a sub-alliance, is defined in much the same way that Allen et al. (1989, 1991) identified the Blue Oak / Grass Sub-series. Further sampling at the appropriate time of year (spring to early summer), with full species lists collected in plot-based surveys, would allow us to identify various associations of understory annual herb indicators in the study area.

**GLOBAL DISTRIBUTION**

This sub-alliance has been described for the Sierra Nevada Foothills, Inner North Coast Range, and central Coast Ranges of California (Allen et al. 1989, 1991).

**STAND TABLE**

***Quercus douglasii* / Annual Grass - Forb Sub-Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 25.2 | 1 | 75 | X | | X | |
| | QUDO-L | *Quercus douglasii* | 51 | 0.1 | 0.2 | 2 | | | | |
| | QUDO-M | *Quercus douglasii* | 36 | 0.5 | 0.2 | 15 | | | | |
| | PISA2-T | *Pinus sabiniana* | 30 | 0.3 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 37 | 1.0 | 0.2 | 15 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 87 | 14.0 | 0.2 | 65 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 73 | 5.4 | 0.2 | 70 | | | | X |
| | BRDI3 | *Bromus diandrus* | 72 | 7.3 | 0.2 | 60 | | | | X |
| | TOAR | *Torilis arvensis* | 63 | 1.6 | 0.2 | 20 | | | | X |
| | AVBA | *Avena barbata* | 59 | 5.2 | 0.2 | 48 | | | | X |
| | LOMU | *Lolium multiflorum* | 58 | 5.0 | 0.2 | 55 | | | | X |
| | CYEC | *Cynosurus echinatus* | 52 | 3.7 | 0.2 | 35 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 51 | 1.9 | 0.2 | 40 | | | | X |
| | AVFA | *Avena fatua* | 37 | 3.1 | 0.2 | 57 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 34 | 0.9 | 0.2 | 15 | | | | X |
| | DAPU3 | *Daucus pusillus* | 34 | 0.3 | 0.2 | 6 | | | | |
| | GAPA5 | *Galium parisiense* | 33 | 0.2 | 0.2 | 4 | | | | X |
| | GEMO | *Geranium molle* | 32 | 1.3 | 0.2 | 45 | | | | X |
| | TRDU2 | *Trifolium dubium* | 32 | 0.3 | 0.2 | 6 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 27 | 2.7 | 0.2 | 60 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 26 | 0.2 | 0.2 | 5 | | | | |
| | BRELE | *Brodiaea elegans* subsp. | 26 | 0.1 | 0.2 | 3 | | | | |
| | BRMA3 | *Bromus madritensis* | 22 | 0.7 | 0.2 | 12 | | | | X |
| | AICA | *Aira caryophyllea* | 21 | 0.2 | 0.2 | 6 | | | | X |

### *Quercus douglasii* / Perennial Grass - Forb Sub-Alliance
### Blue Oak / Perennial Grass - Forb Sub-Alliance

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus douglasii* at 10-40% cover. *Toxicodendron diversilobum* occasionally occurred in a sparse shrub layer. The herbaceous layer was open to continuous, often including *Avena barbata*, *Cynosurus echinatus*, *Elymus glaucus*, *Torilis arvensis*, and *Trifolium hirtum*.

This sub-alliance was sampled somewhat commonly in the study area within the Cascade Range Foothills, High Cascade Range, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic, but were sometimes found on igneous (including granitic) substrates. They occupied all aspects and areas of the slope, but most frequently the middle slope. The slopes varied from gentle to steep. Stands typically occur on low fertility or shallow soils.

**DISTRIBUTION IN STUDY AREA**
This sub-alliance was sampled within Butte, Nevada, Tehama Counties and the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.1 | 35-85 | - |
| Herb | 47.5 | 20-85 | variable |
| Shrub | 2.1 | 0-6 | <5 |
| Low Tree/Tall Shrub | 0 | - | 5-10 |
| Hardwood | 25.2 | 10-40 | 5-20 |
| Conifer | 0.7 | 0-3 | 5-20 |
| Relative non-native to native cover | 45.1 | 23-76 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (3), S (3), NW (2), W (1), SW (1), SE (1), N (1), E (1)
Macrotopography: bottom (1), lower slope (2), lower to upper slope (1), middle slope (6), middle to upper slope (1), upper slope (1), ridgetop (1)
Microtopography: undulating (8), convex (3), flat (2)
Parent Material: volcanic (10), igneous (2), granitic (1)
Soil Texture: loam or sandy loam (4), silt or silt loam (4), clay or clay loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1410 ft. | 170-3181 ft. |
| Slope | 14.5º | 2-28º |
| Large rock cover | 3.5% | <1-20% |
| Small rock cover | 5.9% | 1-17% |
| Bare ground cover | 19.8% | 2-70% |
| Litter cover | 66.4% | 2-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=13)

**Rapid Assessments:** SNNR0072, SNNR0261, SNNR0326, SNNR0341, SNNR0383, SNNR0434, SNNR0437, SNNR0519, SNNR0554, SNNR0935, SNNR1385, SNNR1400, SNNR1518

**Rank:** Unranked, multiple associations (see note under rank for the *Quercus douglasii* / Annual Grass - Forb Sub-Alliance).

**GLOBAL DISTRIBUTION**
This sub-alliance has been described for the Sierra Nevada Foothills solely from data collected for this project. This sub-alliance is indicative of blue oak woodlands that have a persistent, but not necessarily dominant, component of native perennial grasses in the understory. *Elymus glaucus*, *Nassella pulchra*, *Melica californica*, and other native perennial grasses frequently have less cover than non-native annual herbs, yet their presence sets them apart from other stands. These stands typically occurred on poor, shallow soils that are less conducive to invasion by non-native annuals and are more likely to support a higher perennial native grass component.

**STAND TABLE**
***Quercus douglasii* / Perennial Grass - Forb Sub-Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 24.8 | 10 | 40 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 31 | 0.5 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 46 | 0.8 | 0.2 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 92 | 11.0 | 2 | 37 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 77 | 7.2 | 1 | 30 | | | X | X |
| | AVBA | *Avena barbata* | 69 | 4.1 | 1 | 15 | | | | X |
| | TOAR | *Torilis arvensis* | 69 | 1.9 | 0.2 | 9 | | | | X |
| | ELGL | *Elymus glaucus* | 62 | 1.2 | 0.2 | 9 | | | | |
| | NAPU4 | *Nassella pulchra* | 46 | 3.1 | 1 | 15 | | | | |
| | BRDI3 | *Bromus diandrus* | 38 | 1.0 | 0.2 | 7 | | | | X |
| | BRMA3 | *Bromus madritensis* | 38 | 0.7 | 0.2 | 5 | | | | X |
| | MECA2 | *Melica californica* | 38 | 0.6 | 0.2 | 5 | | | | |
| | BRELE | *Brodiaea elegans* subsp. | 38 | 0.1 | 0.2 | 1 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 31 | 1.2 | 2 | 8 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 31 | 0.8 | 1 | 7 | | | | X |
| | ELEL5 | *Elymus elymoides* | 31 | 0.6 | 0.2 | 4 | | | | |
| | GAPA5 | *Galium parisiense* | 31 | 0.1 | 0.2 | 1 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 31 | 0.1 | 0.2 | 1 | | | | |
| | LOMU | *Lolium multiflorum* | 23 | 2.4 | 1 | 20 | | | | X |
| | VUMI | *Vulpia microstachys* | 23 | 0.9 | 1 | 8 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 23 | 0.6 | 0.2 | 4 | | | | X |
| | TRDU2 | *Trifolium dubium* | 23 | 0.6 | 0.2 | 6 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 23 | 0.3 | 0.2 | 3 | | | | X |
| | DAPU3 | *Daucus pusillus* | 23 | 0.2 | 0.2 | 2 | | | | |
| | ACMI2 | *Achillea millefolium* | 23 | 0.2 | 0.2 | 1 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 23 | 0.1 | 0.2 | 1 | | | | |
| | GAPO | *Galium porrigens* | 23 | 0.1 | 0.2 | 1 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 23 | 0.1 | 0.2 | 1 | | | | X |

***Quercus douglasii* / *Selaginella hansenii* - *Navarretia pubescens* Association (Provisional)**
**Blue Oak / Hansen's Spikemoss - Downy Pincushionplant Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open and dominated solely by *Quercus douglasii* at 5-16% cover. The shrub layer was open with *Ceanothus cuneatus* often present. *Selaginella hansenii* was characteristically present in the cryptogam layer. The herbaceous layer was variable and often included *Avena barbata*, *Bromus hordeaceus*, *Calycadenia truncata*, *Centaurium muehlenbergii*, *Clarkia purpurea*, *Galium parisiense*, *Navarretia pubescens*, *Petrorhagia dubia*, and *Trifolium hirtum*.

In the study area, this association was sampled commonly but only in the Cascade Range Foothills Subregion (Hickman 1993). Stands occurred on volcanic, including basalt, substrates. They occupied bottom to upper slopes, that were moderate to somewhat steep. Stands were sampled primarily at Dye Creek Preserve and Tehama Wildlife Area, on thin, rocky volcanics.

**DISTRIBUTION IN STUDY AREA**
This association was sampled only within Tehama County, in the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 53.8 | 36-70 | - |
| Herb | 41.8 | 22-60 | variable |
| Shrub | 9.6 | 0-22 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 8.8 | 0-15 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 40.8 | 29-53 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (2), SE (2), S (2), NW (2), Variable (1)
Macrotopography: bottom to lower slope (1), lower slope (1), lower to middle slope (1), middle slope (4), middle to upper slope (1), upper slope (1)
Microtopography: undulating (7), convex (2)
Parent Material: volcanic (8), basalt (1)
Soil Texture: loam or sandy loam (3), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1025 ft. | 720-2202 ft. |
| Slope | 17.7º | 12-25º |
| Large rock cover | 9.3% | 2-20% |
| Small rock cover | 8.1% | 3-20% |
| Bare ground cover | 13.8% | 3-40% |
| Litter cover | 63.9% | 38-80% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** SNNR0027, SNNR0028, SNNR0031, SNNR0076, SNNR0084, SNNR0087, SNNR0198, SNNR0236, SNNR0317

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills (including the adjacent southern Cascade Foothills) solely from data collected for this project. It is likely to occur only on volcanics. The relatively low cover of non-native species is notable and probably the result of the poor, shallow volcanic soils. These stands are among the most open of the blue oak woodlands, with the overstory oaks being smaller and stunted.

**STAND TABLE**
***Quercus douglasii* / *Selaginella hansenii - Navarretia pubescens* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 89 | 8.8 | 5 | 16 | X | | X | |
| | QUDO-M | *Quercus douglasii* | 33 | 1.1 | 1 | 5 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 67 | 4.1 | 1 | 20 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 44 | 1.8 | 0.2 | 7 | | | | |
| | JUCA7 | *Juniperus californica* | 44 | 0.8 | 1 | 3 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 22 | 1.0 | 1 | 8 | | | | |
| | TODI | *Toxicodendron diversilobum* | 22 | 0.2 | 1 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | AVBA | *Avena barbata* | 100 | 7.8 | 2 | 16 | | | X | X |
| | BRHO2 | *Bromus hordeaceus* | 89 | 5.8 | 4 | 10 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 78 | 6.0 | 0.2 | 25 | | | X | X |
| | NAPU2 | *Navarretia pubescens* | 78 | 3.6 | 3 | 7 | | | X | |
| | PEDU2 | *Petrorhagia dubia* | 67 | 1.8 | 0.2 | 10 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 67 | 1.1 | 0.2 | 5 | | | | |
| | GAPA5 | *Galium parisiense* | 67 | 0.6 | 0.2 | 1 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 56 | 1.3 | 0.2 | 7 | | | | |
| | CATR3 | *Calycadenia truncata* | 56 | 0.3 | 0.2 | 1 | | | | |
| | VUMI | *Vulpia microstachys* | 44 | 0.6 | 0.2 | 2 | | | | |
| | BRELE | *Brodiaea elegans* subsp. | 44 | 0.2 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 33 | 1.2 | 2 | 5 | | | | X |
| | CALU9 | *Calochortus luteus* | 33 | 0.9 | 0.2 | 8 | | | | |
| | CESO3 | *Centaurea solstitialis* | 33 | 0.4 | 1 | 2 | | | | X |
| | DAPU3 | *Daucus pusillus* | 22 | 0.9 | 3 | 5 | | | | |
| | AICA | *Aira caryophyllea* | 22 | 0.3 | 1 | 2 | | | | X |
| | TOAR | *Torilis arvensis* | 22 | 0.3 | 1 | 2 | | | | X |
| | PLER3 | *Plantago erecta* | 22 | 0.2 | 0.2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 22 | 0.2 | 1 | 1 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | SEHA2 | *Selaginella hansenii* | 89 | 6.9 | 3 | 25 | X | | X | |

***Quercus douglasii* / *Arctostaphylos manzanita* / Herbaceous Association**

**Blue Oak / Common Manzanita / Herbaceous Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus douglasii* at 11-55% cover. *Pinus sabininiana* was often present in the overstory. The shrub layer was open to intermittent with *Arctostaphylos manzanita* dominant and with *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included non-natives *Cynosurus echinatus*, *Torilis arvensis*, and *Trifolium hirtum*.

In the study area, this association was sampled commonly in the Cascade Range Foothills, and infrequently in the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) substrates, but also occured on metamorphic (including slate) and sedimentary substrates. They occupied all areas of the slope, most frequently the middle and upper slopes. The slopes varied from gentle to steep. This association may occur in rocky areas without recent burn history, where the pine, *P*. *sabiniana*, and particularly the long-lived obligate seeding, *A*. *manzanita*, are able to establish in the overstory and understory, and where *Q*. *douglasii* is able to establish higher average cover.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Calaveras, Mariposa, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63 | 30-80 | - |
| Herb | 39.3 | 15-60 | variable |
| Shrub | 21.7 | 5-40 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 24.4 | 11-60 | 5-20 |
| Conifer | 2.3 | 0-14 | 5-20 |
| Relative non-native to native cover | 30.5 | 6-57 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: N (4), Variable (3), SW (3), SE (1), NW (1)
Macrotopography: lower slope (2), lower to middle slope (1), middle slope (4), middle to upper slope (1), upper slope (3), ridgetop (1)
Microtopography: undulating (6), convex (2), concave (2), flat (2)
Parent Material: volcanic (8), metamorphic (2), basalt (1), slate (1)
Soil Texture: clay or clay loam (6), silt or silt loam (3), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1122 ft. | 448-2300 ft. |
| Slope | 17.9º | 1-30º |
| Large rock cover | 5% | 0-20% |
| Small rock cover | 12.2% | 1-90% |
| Bare ground cover | 16% | 1-37% |
| Litter cover | 63.3% | <1-87% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=12)

**Rapid Assessments:** SNNR0122, SNNR0187, SNNR0718, SNNR0823, SNNR0840, SNNR0884, SNNR1165, SNNR1182, SNNR1188, SNNR1517
**Relevés:** SNFN0158, SNFN0327

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon data collected for this project. The relatively high cover of woody shrubs is distinctive. This association is clearly related to other shrub associations of the Blue Oak Alliance, such as the *Q*. *douglasii* / *Ceanothus cuneatus* and the *Q*. *douglasii* / *Juniperus californica* - *Ceanothus cuneatus* Associations. However, the presence of *A*. *manzanita* and the absence of *C*. *cuneatus* distinguish it from these types.

**STAND TABLE**
***Quercus douglasii* / *Arctostaphylos manzanita* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 23.3 | 11 | 55 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 58 | 2.1 | 0.2 | 14 | | | | |
| | PISA2-M | *Pinus sabiniana* | 42 | 0.4 | 0.2 | 3 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 33 | 1.5 | 0.2 | 8 | | | | |
| | QUDO-L | *Quercus douglasii* | 25 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARMA | *Arctostaphylos manzanita* | 100 | 15.2 | 2 | 35 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 83 | 5.7 | 0.2 | 22 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 42 | 0.2 | 0.2 | 1.2 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 33 | 0.7 | 0.2 | 4 | | | | |
| | JUCA7 | *Juniperus californica* | 25 | 0.5 | 1 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 75 | 5.3 | 1 | 17 | | | X | X |
| | TOAR | *Torilis arvensis* | 67 | 3.4 | 0.2 | 14 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 58 | 5.7 | 0.2 | 26 | | | | X |
| | GAPO | *Galium porrigens* | 42 | 0.2 | 0.2 | 1 | | | | |
| | NAPU4 | *Nassella pulchra* | 42 | 0.2 | 0.2 | 1 | | | | |
| | MECA2 | *Melica californica* | 42 | 0.1 | 0.2 | 0.2 | | | | |
| | AVBA | *Avena barbata* | 33 | 2.1 | 4 | 9 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 33 | 1.4 | 0.2 | 10 | | | | X |
| | AVFA | *Avena fatua* | 33 | 1.1 | 0.2 | 8 | | | | X |
| | BRDI3 | *Bromus diandrus* | 33 | 1.0 | 0.2 | 6 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 33 | 0.1 | 0.2 | 1 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 25 | 2.6 | 0.2 | 24 | | | | X |
| | BRST2 | *Bromus sterilis* | 25 | 1.8 | 2 | 16 | | | | X |
| | GEMO | *Geranium molle* | 25 | 0.9 | 0.2 | 10 | | | | X |
| | LOMU | *Lolium multiflorum* | 25 | 0.8 | 0.2 | 6 | | | | X |
| | VISA | *Vicia sativa* | 25 | 0.8 | 0.2 | 6 | | | | X |
| | AICA | *Aira caryophyllea* | 25 | 0.5 | 0.2 | 3 | | | | X |
| | TRDU2 | *Trifolium dubium* | 25 | 0.3 | 0.2 | 2 | | | | X |
| | GAAP2 | *Galium aparine* | 25 | 0.2 | 0.2 | 2 | | | | |
| | GAPA5 | *Galium parisiense* | 25 | 0.2 | 0.2 | 2 | | | | X |
| | MAGR3 | *Madia gracilis* | 25 | 0.1 | 0.2 | 1 | | | | |
| | VUMI | *Vulpia microstachys* | 25 | 0.1 | 0.2 | 1 | | | | |
| | BRCA5 | *Bromus carinatus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 1.3 | 1 | 6 | | | | |

***Quercus douglasii* / *Ceanothus cuneatus* / Herbaceous Association**

**Blue Oak / Wedgeleaf Ceanothus / Herbaceous Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open and dominated by *Quercus douglasii* at 6-24% cover. *Pinus sabiniana* was characteristically present in the overstory. The shrub layer was open to intermittent with *Ceanothus cuneatus* dominant. The herbaceous layer was open to continuous, with *Bromus hordeaceus* dominant and with *Avena barbata*, *Erodium botrys*, *Hypochaeris glabra*, and *Torilis arvensis* often present.

This association was sampled infrequently throughout the study area within the central Sierra Nevada Foothills, Cascade Range Foothills, High Cascade Range, northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred often on metamorphic (including greenstone and slate) and volcanic substrates, and rarely on sedimentary substrates. They occupied lower slopes to ridgetops, that were gentle to somewhat steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Mariposa, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 59.5 | 46-77 | - |
| Herb | 43.9 | 17-70 | variable |
| Shrub | 20 | 4-40 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 15.5 | 6-24 | 5-20 |
| Conifer | 0.7 | 0-3 | 10-20 |
| Relative non-native to native cover | 49.4 | 25-65 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (2), SW (2), E (2), S (1), N (1)
Macrotopography: lower slope (1), lower to upper slope (1), middle slope (3), middle to upper slope (1), upper slope (1), upper slope to ridgetop (1)
Microtopography: undulating (6), concave (1), convex (1)
Parent Material: volcanic (3), metamorphic (2), greenstone (1), sedimentary (1), slate (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (3), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1511 ft. | 862-2215 ft. |
| Slope | 11.6º | 5-18º |
| Large rock cover | 9.3% | 1-30% |
| Small rock cover | 4% | <1-10% |
| Bare ground cover | 23.3% | 5-40% |
| Litter cover | 59.9% | 20-81.8% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0429, SNNR0801, SNNR0859, SNNR0860, SNNR1086, SNNR1096, SNNR1180, SNNR1288

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and lower montane zone previously by Allen et al. (1989, 1991) and by NatureServe et al. (2003b). Stands range up to 3800 ft elevation in the Yosemite region. They are also is likely to occur at relatively higher elevations on the western side of Sequoia National Park (S. Haultain, pers. comm. 2004).

**STAND TABLE**
***Quercus douglasii* / *Ceanothus cuneatus* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 15.1 | 6 | 24 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 75 | 0.7 | 0.2 | 3 | | | X | |
| | QUDO-M | *Quercus douglasii* | 63 | 2.6 | 0.2 | 20 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 38 | 0.7 | 0.2 | 5 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 15.9 | 4 | 40 | X | | X | |
| | RHIL | *Rhamnus ilicifolia* | 25 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 88 | 14.0 | 2 | 22 | | X | X | X |
| | TOAR | *Torilis arvensis* | 75 | 2.0 | 0.2 | 10 | | | X | X |
| | AVBA | *Avena barbata* | 63 | 2.8 | 0.2 | 10 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 50 | 1.9 | 0.2 | 14 | | | | X |
| | ERBO | *Erodium botrys* | 50 | 1.8 | 0.2 | 6 | | | | X |
| | CYEC | *Cynosurus echinatus* | 38 | 4.3 | 1 | 30 | | | | X |
| | BRDI3 | *Bromus diandrus* | 38 | 2.7 | 0.2 | 18 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 38 | 1.5 | 1 | 10 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 38 | 1.3 | 0.2 | 6 | | | | X |
| | GEMO | *Geranium molle* | 38 | 0.7 | 0.2 | 5 | | | | X |
| | VUBR | *Vulpia bromoides* | 25 | 0.8 | 0.2 | 6 | | | | X |
| | DAPU3 | *Daucus pusillus* | 25 | 0.8 | 2 | 4 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.2 | 0.2 | 1 | | | | |
| | MAGR3 | *Madia gracilis* | 25 | 0.2 | 0.2 | 1 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 25 | 0.2 | 0.2 | 1 | | | | |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | SEHA2 | *Selaginella hansenii* | 25 | 1.4 | 5 | 6 | | | | |

***Quercus douglasii* / *Juniperus californica* - *Ceanothus cuneatus* Association (Provisional)**
**Blue Oak / California Juniper - Wedgeleaf Ceanothus Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to and dominated solely by *Quercus douglasii* at 10-15% cover. Other trees such as *Pinus sabiniana* and *Quercus wislizeni* were often present. The shrub layer was open to intermittent with *Juniperus californica* dominant and with *Ceanothus cuneatus* and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent, with abundant and characteristic taxa such as *Aira caryophyllea*, *Avena barbata*, *Brodiaea elegans* subsp. *elegans*, and *Bromus hordeaceus*.

This association was sampled infrequently in the study area, within the Cascade Range Foothills Subregion and only once in the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on volcanic substrates. They occupied bottoms to middle slopes and ridgetops that were flat to somewhat steep. Two of four stands occurred on terraces above or along a (intermittent) creek.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Shasta, and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 62.3 | 52-73 | - |
| Herb | 39.8 | 17-60 | variable |
| Shrub | 23 | 15-37 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 10.5 | 0-17 | 5-10 |
| Conifer | 1.3 | 0-4 | 10-20 |
| Relative non-native to native cover | 43.7 | 30-73 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (2), N (1), Flat (1)
Macrotopography: bottom (1), lower slope (1), lower to middle slope (1), ridgetop (1)
Microtopography: flat (3), undulating (1)
Parent Material: volcanic (4)
Soil Texture: loam or sandy loam (3), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1061 ft. | 400-1546 ft. |
| Slope | 12.5º | 0-26º |
| Large rock cover | 6.7% | 4.7-10% |
| Small rock cover | 8.1% | 5-10% |
| Bare ground cover | 23.9% | 8-52% |
| Litter cover | 57.8% | 30-70% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0238, SNNR0928, SNNR1305, SNNR1321

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, including the volcanic subsection that is technically part of the southern Cascades. The data comes solely from this project. This association may also exist in the Inner North Coast Range section in western Shasta, Tehama, Glenn, and Colusa Counties. A similar association of *Q*. *douglasii* / *Juniperus californica* has been identified in Monterey County at Pinnacles National Monument, on volcanics with low cover but high constancy of *C*. *cuneatus* (NatureServe 2007b); it is likely that these stands are equivalent. The relative scarcity of *J*. *californica* in the Sierra Nevada Foothills suggests that this association, if validated with more sampling and mapping, is relatively rare.

Other similar associations have been identified in the Central Coast Ranges in San Benito and western Fresno Counties on sedimentary substrates (Evens et al. 2006). However, these stands have higher cover and constancy of other tall chaparral shrubs (either *Cercocarpus betuloides* or *Quercus john-tuckeri*) and/or higher cover of *J*. *californica*.

**STAND TABLE**
***Quercus douglasii* / *Juniperus californica* - *Ceanothus cuneatus* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 75 | 9.8 | 10 | 15 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 50 | 0.8 | 1 | 2 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 50 | 0.5 | 1 | 1 | | | | |
| | QUDO-M | *Quercus douglasii* | 25 | 1.0 | 4 | 4 | | | | |
| | PISA2-M | *Pinus sabiniana* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | JUCA7 | *Juniperus californica* | 100 | 12.8 | 10 | 19 | X | | X | |
| | CECU | *Ceanothus cuneatus* | 100 | 7.8 | 1 | 14 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 75 | 2.5 | 3 | 4 | | | X | |
| | CEBE3 | *Cercocarpus betuloides* | 25 | 1.3 | 5 | 5 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 25 | 0.3 | 1 | 1 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 100 | 7.5 | 5 | 12 | | | X | X |
| | AVBA | *Avena barbata* | 100 | 7.1 | 0.2 | 17 | | | X | X |
| | AICA | *Aira caryophyllea* | 75 | 2.5 | 1 | 8 | | | X | X |
| | BRELE | *Brodiaea elegans* subsp. | 75 | 0.2 | 0.2 | 0.2 | | | X | |
| | CYEC | *Cynosurus echinatus* | 50 | 5.0 | 2 | 18 | | | | X |
| | VUMI | *Vulpia microstachys* | 50 | 0.8 | 1 | 2 | | | | |
| | BRMA3 | *Bromus madritensis* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | HOMA2 | *Hordeum marinum* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | HEFI | *Hemizonia fitchii* | 50 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**

***Quercus douglasii* / *Juniperus californica* - *Ceanothus cuneatus* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | LEVI8 | *Lessingia virgata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 25 | 9.5 | 38 | 38 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 25 | 2.5 | 10 | 10 | | | | X |
| | MAGR3 | *Madia gracilis* | 25 | 1.0 | 4 | 4 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 25 | 0.8 | 3 | 3 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.5 | 2 | 2 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 25 | 0.5 | 2 | 2 | | | | |
| | DAPU3 | *Daucus pusillus* | 25 | 0.5 | 2 | 2 | | | | |
| | MELIC | *Melica* | 25 | 0.5 | 2 | 2 | | | | |
| | AETR | *Aegilops triuncialis* | 25 | 0.3 | 1 | 1 | | | | X |
| | ALAM2 | *Allium amplectens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CAMU3 | *Calycadenia multiglandulosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPO | *Galium porrigens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | PLER3 | *Plantago erecta* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRDE | *Trifolium depauperatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRDU2 | *Trifolium dubium* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | WYAN | *Wyethia angustifolia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | SEHA2 | *Selaginella hansenii* | 50 | 0.3 | 0.2 | 1 | | | | |

## *Quercus douglasii* - *Aesculus californica* / Herbaceous Association

## Blue Oak - California Buckeye / Herbaceous Association


### SUMMARY

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus douglasii* at 6-37% cover. *Aesculus californica* and *Quercus wislizeni* were often present as trees and/or shrubs. The shrub layer was open to intermittent with *Rhamnus ilicifolia* and *Toxicodendron diversilobum* often present. The herbaceous layer was open to continuous and often included non-natives *Avena fatua*, *Bromus diandrus*, *Bromus hordeaceus*, *Cynosurus echinatus*, and *Torilis arvensis*.

In the study area, this association was sampled commonly within the central Sierra Nevada Foothills Subregion and infrequently in the Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands occurred on metamorphic, volcanic (including basalt), sedimentary, and/or ultramafic substrates. They occupied upper slopes most frequently, but also occupied bottom to middle slopes that were flat to steep. Occasionally, stands of Blue Oak - California Buckeye / Herbaceous occurred along riparian corridors and on terraces. Stands usually occurred in mesic settings as compared to other blue oak associations.


### DISTRIBUTION IN STUDY AREA

This association was sampled in Butte, Mariposa, Shasta, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 71.9 | 45-90 | - |
| Herb | 55.7 | 30-85 | variable |
| Shrub | 24.5 | 1-47 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 29.5 | 7-50 | 5-20 |
| Conifer | 1.4 | 0-5 | 10-35 |
| Relative non-native to native cover | 39.7 | 13-68 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: NW (3), N (3), Flat (2), Variable (1), S (1), NE (1)
Macrotopography: bottom to lower slope (1), lower slope (2), lower to upper slope (2), middle slope (2), upper slope (4)
Microtopography: undulating (6), concave (4), flat (1)
Parent Material: metamorphic (3), volcanic (4), sedimentary (2), ultramafic (1), basalt (1)
Soil Texture: clay or clay loam (5), loam or sandy loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1249 ft. | 892-1576 ft. |
| Slope | 15.9º | 0-30º |
| Large rock cover | 20% | 4-55% |
| Small rock cover | 6.5% | 2-10% |
| Bare ground cover | 8% | 2-15% |
| Litter cover | 61.5% | 28-83% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)

**Rapid Assessments:** SNNR0080, SNNR0251, SNNR0735, SNNR1312, SNNR1485, SNNR1486, SNNR1515 **Relevés:** SNFN0162, SNFN0645, SNFN0657, SNFN0658

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills previously by Evens et al. (2004), in a study conducted in Tuolumne County. This current description expands the range across much of the Sierra Nevada Foothills area. Stands have been observed outside the study area as far south as Sequoia National Park (S. Haultain, pers. comm. 2004).

**STAND TABLE**

***Quercus douglasii* - *Aesculus californica* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 21.8 | 6 | 37 | X | | X | |
| | AECA-T | *Aesculus californica* | 73 | 10.2 | 3 | 24 | | | | |
| | AECA-M | *Aesculus californica* | 64 | 5.3 | 0.2 | 30 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 64 | 3.4 | 0.2 | 15 | | | | |
| | PISA2-T | *Pinus sabiniana* | 36 | 0.9 | 1 | 5 | | | | |
| | AECA-L | *Aesculus californica* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | QUDO-L | *Quercus douglasii* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 64 | 9.8 | 0.2 | 45 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 55 | 0.6 | 0.2 | 4 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | CECU | *Ceanothus cuneatus* | 27 | 0.8 | 0.2 | 8 | | | | |
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 64 | 6.5 | 1 | 30 | | | | X |
| | TOAR | *Torilis arvensis* | 64 | 3.5 | 1 | 10 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 55 | 12.6 | 9 | 45 | | | | X |
| | AVFA | *Avena fatua* | 55 | 8.5 | 5 | 25 | | | | X |
| | CYEC | *Cynosurus echinatus* | 55 | 2.7 | 0.2 | 16 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 45 | 2.3 | 0.2 | 10 | | | | X |
| | DIVO | *Dichelostemma volubile* | 45 | 0.1 | 0.2 | 0.2 | | | | |
| | BRMA3 | *Bromus madritensis* | 36 | 1.0 | 0.2 | 8 | | | | X |
| | VIVI | *Vicia villosa* | 36 | 0.9 | 0.2 | 5 | | | | X |
| | MAGR3 | *Madia gracilis* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | TRLA16 | *Triteleia laxa* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | MEPO3 | *Medicago polymorpha* | 27 | 0.4 | 0.2 | 3 | | | | X |
| | GAPA5 | *Galium parisiense* | 27 | 0.1 | 0.2 | 1 | | | | X |
| | MICAC2 | *Micropus californicus* var. *californicus* | 27 | 0.1 | 0.2 | 1 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 27 | 0.1 | 0.2 | 1 | | | | |
| | VUMI | *Vulpia microstachys* | 27 | 0.1 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAAP2 | *Galium aparine* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | SAGR5 | *Sanicula graveolens* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 45 | 3.7 | 0.2 | 22 | | | | |

***Quercus douglasii* - *Pinus sabiniana* / *Arctostaphylos viscida* / Herbaceous Association**
**Blue Oak - Foothill Pine / Whiteleaf Manzanita / Herbaceous Association**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus douglasii* at 11-35% cover. *Pinus sabiniana* was characteristically present in the overstory. The shrub layer was open to intermittent with *Arctostaphylos viscida* dominant and with *Rhamnus ilicifolia* and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included *Avena barbata*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Cynosurus echinatus*, *Pentagramma triangularis*, and *Torilis arvensis*.

In the study area, this association was sampled more commonly in the northern Sierra Nevada Foothills, less commonly in the the central Sierra Nevada Foothills, and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic and volcanic substrates (including granitic) and occasionally on gabbro substrates. They occupied middle to upper slopes and ridgetops. Slopes were gentle to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, El Dorado, Mariposa, Nevada, Shasta, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.4 | 47-85 | - |
| Herb | 37.1 | 18-55 | variable |
| Shrub | 23.1 | 2-55 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 21.7 | 12-37 | 5-20 |
| Conifer | 9.6 | 0-17 | 5-35 |
| Relative non-native to native cover | 33 | 12-43 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (2), N (2), Variable (1), SW (1), NW (1), NE (1), E (1)
Macrotopography: middle slope (3), upper slope (3), upper slope to ridgetop (1), ridgetop (2)
Microtopography: undulating (6), convex (1), flat (1)
Parent Material: metamorphic (4), volcanic (3), gabbro (1), granitic (1)
Soil Texture: clay or clay loam (4), loam or sandy loam (2), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1274 ft. | 677-2619 ft. |
| Slope | 14.1º | 5-30º |
| Large rock cover | 5.1% | <1-15% |
| Small rock cover | 3.2% | 0-17% |
| Bare ground cover | 9% | <1-33% |
| Litter cover | 78.6% | 54-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** SNNR0085, SNNR0112, SNNR0206, SNNR0208, SNNR1382
**Relevés:** SNFN0061, SNFN0382, SNFN0411, SNFN0420

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, including by Allen et al. (1989, 1991) who described it primarily from the Sierra Nevada Foothills. It is unlikely to occur in much of the southern Sierra Foothills region due to the lack of *Pinus sabiniana* from that area.

**STAND TABLE**
***Quercus douglasii - Pinus sabiniana* / *Arctostaphylos viscida* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 21.1 | 11 | 35 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 100 | 9.5 | 0.2 | 17 | | | X | |
| | QUDO-M | *Quercus douglasii* | 44 | 1.0 | 0.2 | 5 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 44 | 0.3 | 0.2 | 1 | | | | |
| | AECA-M | *Aesculus californica* | 33 | 1.1 | 0.2 | 9 | | | | |
| | PISA2-L | *Pinus sabiniana* | 33 | 0.4 | 0.2 | 3 | | | | |
| | PISA2-M | *Pinus sabiniana* | 22 | 0.1 | 0.2 | 1 | | | | |
| | QUDO-L | *Quercus douglasii* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 13.7 | 2 | 40 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 5.9 | 0.2 | 21 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 78 | 2.1 | 0.2 | 11 | | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 44 | 0.3 | 0.2 | 1.2 | | | | |
| | CECU | *Ceanothus cuneatus* | 33 | 2.2 | 0.4 | 15 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 22 | 2.5 | 10 | 12.2 | | | | |
| | LOIN4 | *Lonicera interrupta* | 22 | 0.2 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 89 | 1.3 | 0.2 | 5 | | | X | X |
| | BRDI2 | *Brachypodium distachyon* | 67 | 10.7 | 5 | 27 | | | | X |
| | CYEC | *Cynosurus echinatus* | 67 | 8.7 | 0.2 | 35 | | | | X |
| | AVBA | *Avena barbata* | 67 | 2.8 | 0.2 | 13 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 56 | 2.6 | 0.2 | 12 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 56 | 0.3 | 0.2 | 2 | | | | |
| | BRMA3 | *Bromus madritensis* | 44 | 1.8 | 0.2 | 15 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 44 | 0.3 | 0.2 | 2 | | | | |
| | DIVO | *Dichelostemma volubile* | 44 | 0.2 | 0.2 | 1 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 44 | 0.2 | 0.2 | 1 | | | | |
| | TRHI4 | *Trifolium hirtum* | 44 | 0.2 | 0.2 | 1 | | | | X |
| | GAAP2 | *Galium aparine* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 44 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Quercus douglasii - Pinus sabiniana* / *Arctostaphylos viscida* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | GEMO | *Geranium molle* | 33 | 1.3 | 0.2 | 11 | | | | X |
| | MECA2 | *Melica californica* | 33 | 0.6 | 1 | 2 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ELEL5 | *Elymus elymoides* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LUCO6 | *Luzula comosa* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMU | *Lolium multiflorum* | 22 | 0.9 | 1 | 7 | X | | | |
| | BRDI3 | *Bromus diandrus* | 22 | 0.4 | 1 | 3 | | | | X |
| | RAOC | *Ranunculus occidentalis* | 22 | 0.4 | 0.2 | 3 | | | | |
| | MICA | *Micropus californicus* | 22 | 0.2 | 0.2 | 2 | | | | |
| | BRODI | *Brodiaea* | 22 | 0.1 | 0.2 | 1 | | | | |
| | NAPU2 | *Navarretia pubescens* | 22 | 0.1 | 0.2 | 1 | | | | |
| | VUMY | *Vulpia myuros* | 22 | 0.1 | 0.2 | 1 | | | | X |
| | CAAL2 | *Calochortus albus* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | DOHE | *Dodecatheon hendersonii* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | LIBI | *Linanthus bicolor* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | MADIA | *Madia* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | PIPER2 | *Piperia* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | STME2 | *Stellaria media* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | VISA | *Vicia sativa* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 44 | 0.9 | 0.2 | 5 | | | | |

***Quercus douglasii* - *Pinus sabiniana* / Herbaceous Association**

**Blue Oak - Foothill Pine / Herbaceous Association**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus douglasii* at 6-52% cover. *Pinus sabiniana* was characteristically present in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* often present at low, but variable cover. The herbaceous layer was open to continuous and often included non-natives *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Cynosurus echinatus*, *Torilis arvensis*, and *Trifolium hirtum*.


This association was sampled commonly throughout the study area within the central Sierra Nevada Foothills, Cascade Range Foothills, High Cascade Range, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including slate) substrates, sometimes on igneous (including volcanic and gabbro) or sedimentary substrates, and infrequently on ultramafic (including serpentine) substrates. They most frequently occupied middle slopes to ridgetops, but occasionaly occupied bottom to lower slopes. Stand slopes ranged from flat to steep. Stands usually occurred in mesic settings (more than half the samples occur on north- or east-facing slopes) with well-developed silt or clay loam soils - where *P. sabiniana* and *Q. douglasii* become established with higher average cover, as compared to the drier settings of the *Q. douglasii* / Grass Sub-alliance.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Calaveras, Mariposa, Nevada, Shasta, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 71.9 | 42-96 | - |
| Herb | 49.6 | 12-95 | variable |
| Shrub | 10.2 | 0-61 | <5 |
| Low Tree/Tall Shrub | 0.1 | 0-2 | 5-15 |
| Hardwood | 24.8 | 0-52 | 5-35 |
| Conifer | 7.8 | 0-35 | 5-35 |
| Relative non-native to native cover | 49.5 | 10-81 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NE (9), N (7), Flat (7), E (6), S (4), Variable (3), W (2), SW (2), SE (2), NW (1)
Macrotopography: entire slope (1), bottom (2), bottom to lower slope (1), lower slope (3), lower to middle slope (1), lower to upper slope (1), middle slope (16), middle slope to ridgetop (1), upper slope (3), upper slope to ridgetop (1), ridgetop (13)
Microtopography: undulating (26), flat (9), convex (5), concave (3)
Parent Material: metamorphic (20), volcanic (12), sedimentary (5), slate (2), gabbro (1), igneous (1), serpentine (1), ultramafic (1)
Soil Texture: silt or silt loam (21), clay or clay loam (12), loam or sandy loam (7)

| | Mean | Range |
|---|---|---|
| Elevation | 1201 ft. | 466-2921 ft. |
| Slope | 8.3º | 0-27º |
| Large rock cover | 3.6% | 0-23.6% |

| | | |
|---|---|---|
| Small rock cover | 4.1% | <1-15% |
| Bare ground cover | 15.4% | 1-85% |
| Litter cover | 73% | 10-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=43)

**Rapid Assessments:** SNNR0008, SNNR0141, SNNR0144, SNNR0183, SNNR0184, SNNR0192, SNNR0313, SNNR0528, SNNR0803, SNNR0813, SNNR0824, SNNR0991, SNNR1003, SNNR1084, SNNR1094, SNNR1109, SNNR1167, SNNR1168, SNNR1233, SNNR1235, SNNR1313, SNNR1330, SNNR1428, SNNR1480, SNNR1489, SNNR1615, SNNR1621, SNNR1627, SNNR1628, SNNR1630, SNNR1632, SNNR1641, SNNR1656, SNNR1672, SNNR1678, SNNR1684 **Relevés:** SNFN0056, SNFN0172, SNFN0218, SNFN0244, SNFN0247, SNFN0606, SNFN0656

**Rank:** G5S5

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and the southern Coast Ranges (Allen et al. 1898, 1991). It is also likely to occur in the Inner North Coast and Central Coast Ranges. Since most data collected were Rapid Assessments, additional variation in the understory herb layer could be clarified with full species lists collected in plots.

**STAND TABLE**

***Quercus douglasii* - *Pinus sabiniana* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 24.5 | 6 | 52 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 95 | 7.9 | 0.2 | 35 | | | X | |
| | QUDO-L | *Quercus douglasii* | 53 | 0.1 | 0.2 | 1 | | | | |
| | QUDO-M | *Quercus douglasii* | 47 | 2.0 | 0.2 | 15 | | | | |
| | PISA2-L | *Pinus sabiniana* | 30 | 0.1 | 0.2 | 2 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 23 | 0.4 | 1 | 5 | | | | |
| | PISA2-M | *Pinus sabiniana* | 23 | 0.2 | 0.2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 56 | 4.2 | 0.2 | 60 | | | | |
| | CECU | *Ceanothus cuneatus* | 40 | 1.8 | 0.2 | 20.2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 23 | 0.3 | 0.2 | 3 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 79 | 9.2 | 0.2 | 45 | | | X | X |
| | TOAR | *Torilis arvensis* | 67 | 2.2 | 0.2 | 12 | | | | X |
| | AVBA | *Avena barbata* | 65 | 3.2 | 0.2 | 20 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 63 | 3.3 | 0.2 | 23 | | | | X |
| | BRDI3 | *Bromus diandrus* | 56 | 4.3 | 0.2 | 25 | | | | X |
| | CYEC | *Cynosurus echinatus* | 53 | 6.0 | 0.2 | 36 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 49 | 2.0 | 0.2 | 20 | | | | X |
| | DAPU3 | *Daucus pusillus* | 42 | 0.3 | 0.2 | 4 | | | | |
| | LOMU | *Lolium multiflorum* | 40 | 3.8 | 0.2 | 31 | | | | X |
| | AICA | *Aira caryophyllea* | 35 | 0.4 | 0.2 | 6 | | | | X |
| | AVFA | *Avena fatua* | 33 | 2.1 | 0.2 | 35 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 30 | 0.7 | 0.2 | 12 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 26 | 3.2 | 0.2 | 35 | | | | X |
| | BRMA3 | *Bromus madritensis* | 26 | 1.9 | 0.2 | 40 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 26 | 0.4 | 0.2 | 5 | | | | |
| | BRELE | *Brodiaea elegans* subsp. | 26 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 23 | 0.8 | 0.2 | 9 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 23 | 0.2 | 0.2 | 5 | | | | |
| | DIVO | *Dichelostemma volubile* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| | GEMO | *Geranium molle* | 21 | 1.3 | 0.2 | 18 | | | | X |
| | GAPO | *Galium porrigens* | 21 | 0.1 | 0.2 | 4 | | | | |
| | SABI2 | *Sanicula bipinnata* | 21 | 0.1 | 0.2 | 3 | | | | |
| | CLPU2 | *Clarkia purpurea* | 21 | 0.1 | 0.2 | 1 | | | | |

***Quercus douglasii* - *Quercus lobata* / Herbaceous Association**

**Blue Oak - Valley Oak / Herbaceous Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent, with co-dominants *Quercus douglasii* at 13-23% cover and *Quercus lobata* at 12-15% cover. *Pinus sabiniana* was characteristically present. The shrub layer was open with *Arctostaphylos viscida*, and *Toxicodendron diversilobum* often present. The herbaceous layer was variable with abundant and characteristic taxa such as the non-native grasses *Bromus hordeaceus* and *Lolium multiflorum*.

This association was sampled infrequently in the study area within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on metamorphic and basalt substrates. They occupied lower to upper slopes that were gentle to somewhat steep. Because they were close to wetlands, ponds, or riparian areas, this association may have a higher soil water demand as compared to others of this alliance. Soils were well-developed silt or clay loam.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Calaveras, Nevada, and Shasta Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 77 | 70-82 | - |
| Herb | 52.7 | 28-75 | variable |
| Shrub | 6.3 | 1-16 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 37 | 27-44 | 10-20 |
| Conifer | 2.3 | 1-3 | 10-20 |
| Relative non-native to native cover | 53.6 | 27-70 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: E (2), S (1)
Macrotopography: lower slope (1), middle slope (1), middle to upper slope (1)
Microtopography: undulating (2), concave (1)
Parent Material: metamorphic (2), basalt (1)
Soil Texture: silt or silt loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 688 ft. | 466-874 ft. |
| Slope | 14.7º | 3-23º |
| Large rock cover | 4.5% | 1-8% |
| Small rock cover | 9% | 3-15% |
| Bare ground cover | 46.5% | 20-73% |
| Litter cover | 36.5% | 20-53% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0977, SNNR1162, SNNR1631

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, including by Allen et al. (1989, 1991) from the Central Coast Ranges and the Sierra Nevada Foothills (in Placer and Calaveras Counties). Data from this project expand the range north to Nevada and Shasta Counties. Some stands of *Q*. *douglasii* mixed with *Q*. *lobata* on river terraces near El Portal in the western portion of Yosemite are likely to be classified in this association (NatureServe et al. 2003b). Other occurrences of this association are likely to occur in the Central Valley and in the South Coast Ranges. However, the association is likely to be limited in distribution.

**STAND TABLE**
***Quercus douglasii* - *Quercus lobata* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 16.7 | 13 | 23 | | X | X | |
| | QULO-T | *Quercus lobata* | 100 | 13.3 | 12 | 15 | | X | X | |
| | PISA2-T | *Pinus sabiniana* | 100 | 2.3 | 1 | 3 | | | X | |
| | QUWI2-T | *Quercus wislizeni* | 67 | 6.0 | 6 | 12 | | | | |
| | PISA2-L | *Pinus sabiniana* | 33 | 0.3 | 1 | 1 | | | | |
| | QUDO-M | *Quercus douglasii* | 33 | 0.3 | 1 | 1 | | | | |
| | QUDO-L | *Quercus douglasii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QULO-L | *Quercus lobata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 67 | 2.7 | 0.2 | 8 | | | | |
| | TODI | *Toxicodendron diversilobum* | 67 | 0.7 | 0.2 | 2 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 33 | 1.7 | 5 | 5 | | | | |
| | CECU | *Ceanothus cuneatus* | 33 | 0.3 | 1 | 1 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 33 | 0.3 | 1 | 1 | | | | |
| | FRCA6 | *Fremontodendron californicum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | LOMU | *Lolium multiflorum* | 100 | 18.0 | 3 | 46 | | | X | X |
| | BRHO2 | *Bromus hordeaceus* | 100 | 7.0 | 1 | 13 | | | X | X |
| | BRDI3 | *Bromus diandrus* | 67 | 5.7 | 7 | 10 | | | | X |
| | CYEC | *Cynosurus echinatus* | 67 | 5.3 | 7 | 9 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 67 | 4.0 | 5 | 7 | | | | X |
| | TOAR | *Torilis arvensis* | 67 | 2.7 | 0.2 | 8 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 67 | 2.7 | 3 | 5 | | | | X |
| | AVBA | *Avena barbata* | 67 | 2.0 | 1 | 5 | | | | X |
| | OXLA8 | *Oxalis laxa* | 33 | 3.3 | 10 | 10 | | | | X |
| | ANAR | *Anagallis arvensis* | 33 | 1.7 | 5 | 5 | | | | X |
| | GEMO | *Geranium molle* | 33 | 1.7 | 5 | 5 | | | | X |
| | TRDU2 | *Trifolium dubium* | 33 | 1.3 | 4 | 4 | | | | X |
| | HOMA2 | *Hordeum marinum* | 33 | 0.7 | 2 | 2 | | | | X |
| | JUTE | *Juncus tenuis* | 33 | 0.7 | 2 | 2 | | | | |
| | BRMI2 | *Briza minor* | 33 | 0.3 | 1 | 1 | | | | X |
| | GEDI | *Geranium dissectum* | 33 | 0.3 | 1 | 1 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 33 | 0.3 | 1 | 1 | | | | X |
| | WYAN | *Wyethia angustifolia* | 33 | 0.3 | 1 | 1 | | | | |
| | RAMU2 | *Ranunculus muricatus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | RAOC | *Ranunculus occidentalis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RUSA | *Rumex salicifolius* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TRBR7 | *Triteleia bridgesii* | 33 | 0.1 | 0.2 | 0.2 | | | | |

## *Quercus douglasii* - *Quercus wislizeni* / Herbaceous Association
## Blue Oak - Interior Live Oak / Herbaceous Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus douglasii* at 4-45% cover. *Quercus wislizeni* was characteristically present in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant. The herbaceous layer was open to continuous and often included non-natives *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Trifolium hirtum*.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates (including greenstone, slate, and semi-schist), but were also found on igneous (including volcanic, basalt, and granitic), sedimentary, or mixed alluvium substrates. They usually occupied middle and upper slopes, but also occurred on bottoms, lower slopes, and ridgetops.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Calaveras, El Dorado, Nevada, Shasta, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Tehama Terraces (M261Cb), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 68.6 | 34-84 | - |
| Herb | 43.7 | 0-72 | variable |
| Shrub | 9.8 | 0-46 | <5 |
| Low Tree/Tall Shrub | <1 | 0-6 | 5-10 |
| Hardwood | 29.1 | 5-52 | 5-20 |
| Conifer | 2 | 0-21 | 5-35 |
| Relative non-native to native cover | 46.9 | 0-88 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (9), N (8), S (6), NW (5), W (4), Variable (4), NE (4), SE (3)
Macrotopography: bottom (5), lower slope (6), lower to middle slope (5), middle slope (12), middle to upper slope (2), upper slope (11), ridgetop (2)
Microtopography: undulating (33), flat (3), convex (3), concave (3)
Parent Material: metamorphic (31), volcanic (5), basalt (1), granitic (1), greenstone (1), mixed alluvium (1), semi-schist (1), slate (1), water (1)
Soil Texture: silt or silt loam (30), clay or clay loam (7), loam or sandy loam (4), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 933 ft. | 305-1627 ft. |
| Slope | 10.6º | 0-32º |
| Large rock cover | 2.1% | 0-6% |
| Small rock cover | 3.9% | 1-20% |
| Bare ground cover | 17% | 4-62% |
| Litter cover | 73.7% | 35-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=43)

**Rapid Assessments:** SNNR0003, SNNR0082, SNNR0086, SNNR0155, SNNR0546, SNNR0651, SNNR0657, SNNR0669, SNNR0847, SNNR0926, SNNR0941, SNNR0974, SNNR0980, SNNR1154, SNNR1158, SNNR1164, SNNR1363, SNNR1603, SNNR1617, SNNR1624, SNNR1633, SNNR1640, SNNR1642, SNNR1645, SNNR1647, SNNR1648, SNNR1650, SNNR1654, SNNR1655, SNNR1661, SNNR1663, SNNR1664, SNNR1665, SNNR1669, SNNR1670, SNNR1671, SNNR1673, SNNR1677, SNNR1679, SNNR1680, SNNR1688, SNNR1690, SNNR1691

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills by Allen et al. (1989, 1991) and has been identified as high as 2100 ft. elevation in the Yosemite area (NatureServe et al. 2003b).

**STAND TABLE**
***Quercus douglasii* - *Quercus wislizeni* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 23.3 | 4 | 45 | X | | X | |
| | QUWI2-T | *Quercus wislizeni* | 93 | 5.2 | 1 | 19 | | | X | |
| | PISA2-T | *Pinus sabiniana* | 72 | 2.0 | 0.2 | 21 | | | | |
| | QUDO-L | *Quercus douglasii* | 70 | 0.6 | 0.2 | 21 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 65 | 1.9 | 0.2 | 10 | | | | |
| | QUDO-M | *Quercus douglasii* | 65 | 1.2 | 0.2 | 15 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 60 | 0.2 | 0.2 | 2 | | | | |
| | PISA2-L | *Pinus sabiniana* | 42 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 79 | 4.6 | 0.2 | 40 | X | | X | |
| | CECU | *Ceanothus cuneatus* | 26 | 0.8 | 1 | 10 | | | | |
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 74 | 6.8 | 0.2 | 30 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 74 | 4.9 | 0.2 | 18 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 74 | 4.5 | 0.2 | 20 | | | | X |
| | CYEC | *Cynosurus echinatus* | 72 | 6.5 | 0.2 | 24 | | | | X |
| | AVBA | *Avena barbata* | 65 | 3.9 | 0.2 | 26 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 58 | 1.4 | 0.2 | 8 | | | | X |
| | AVFA | *Avena fatua* | 44 | 1.2 | 0.2 | 14 | | | | X |
| | TOAR | *Torilis arvensis* | 42 | 1.6 | 0.2 | 16 | | | | X |
| | LOMU | *Lolium multiflorum* | 40 | 4.3 | 0.2 | 35 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 40 | 1.4 | 0.2 | 13 | | | | |
| | HOMU | *Hordeum murinum* | 37 | 2.0 | 0.2 | 26 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 30 | 0.3 | 0.2 | 7 | | | | |
| | DAPU3 | *Daucus pusillus* | 26 | 0.1 | 0.2 | 1 | | | | |

### *Quercus kelloggii* Woodland/Forest Alliance
### Black Oak Woodland/Forest Alliance

As defined in the state, *Quercus kelloggii* is dominant in the tree canopy with *Abies concolor*, *Arbutus menziesii*, *Calocedrus decurrens*, *Pinus attenuata*, *P. ponderosa*, *Pseudotsuga macrocarpa*, *P. menziesii*, *Quercus agrifolia*, *Q. chrysolepis*, *Q. garryana*, *Q. lobata*, and *Umbellularia californica*. Stands that have a co-dominance with *Pinus ponderosa* are also placed in this alliance (see discussion under the *Quercus kelloggii - Pinus ponderosa* Association description). The canopy is savanna-like to continuous. The shrub layer is open to intermittent. The herbaceous layer is sparse or grassy. These stands are found on all aspects and topographic settings. Soils are moderately to excessively well-drained.

Foothill stands of the *Quercus kelloggii* Alliance tend to be open to continuous and may contain *Heteromeles arbutifolia*, *Rhamnus tomentella*, and *Toxicodendron diversilobum*. Eight associations were described for the Black oak Alliance in the study area. Eight stands showed additional variation (SNNR0607, SNNR0258, SNNR1300, SNNR0396, SNFN0334, SNNR1059, SNNR1360, SNNR1264) in riparian settings or in upland woodlands mixed with shrubs. These stands were classified to the alliance level only. In the riparian stands, one included co-dominance of *Acer macrophyllum*, another had *A. macrophyllum* and *Symphoricarpos albus* var. *laevigatus*, another had *Alnus rhombifolia* with high cover of *Rubus discolor*, and another had *Rhus trilobata*. In the upland stands, one contained high cover of *Quercus garryana* var. *brewer*, another had *Quercus douglasii* and moss, another had co-dominance of *Pinus sabiniana* with *Quercus kelloggii* and an understory of *Aesculus californica*, another was distinguished by *Heteromeles arbutifolia* and *Philadelphus lewisii*, and another contained significant cover of *Arbutus menziesii*.

---

### *Quercus kelloggii* / *Arctostaphylos viscida* Association (Provisional)
### Black Oak / Whiteleaf Manzanita Association (Provisional)

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus kelloggii* at 1-35% cover. Other trees such as *Pinus sabiniana* and *Quercus wislizeni* were often present. The shrub layer was usually well-developed with intermittent cover, with *Heteromeles arbutifolia* being co-dominant with *Arctostaphylos viscida* and *Toxicodendron diversilobum*. *Cercis occidentalis* was often present at low cover. The herbaceous layer was open and often included *Galium porrigens* and *Wyethia reticulata*.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills and once in the central Sierra Nevada Foothills Subregions (Hickman 1993). Stands often occurred on gabbro substrates, occasionally on metamorphic (including greenstone), and infrequently on granitic substrates. They occupied lower to upper slopes. These slopes were typically northerly facing, mesic, and moderate to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, El Dorado, Mariposa, and Placer Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 55.2 | 35-75 | - |
| Herb | 9.6 | 1-22 | variable |
| Shrub | 40 | 9-60 | <5 |
| Low Tree/Tall Shrub | <1 | 0-2 | 5-10 |
| Hardwood | 25.3 | 1-35 | 5-20 |
| Conifer | 1 | 0-2 | 5-20 |
| Relative non-native to native cover | 1.2 | 0-5 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (5), NE (2), NW (1), E (1)
Macrotopography: lower slope (2), lower to upper slope (1), middle slope (2), middle to upper slope (1), upper slope (3)
Microtopography: flat (5), undulating (3)
Parent Material: gabbro (5), metamorphic (2), granitic (1), greenstone (1)
Soil Texture: clay or clay loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1358 ft. | 504-1969 ft. |
| Slope | 22.1º | 10-34º |
| Large rock cover | 0.8% | 0-3% |
| Small rock cover | 0.8% | <1-3% |
| Bare ground cover | 20.6% | 1-45% |
| Litter cover | 74.5% | 50-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** SNNR0494, SNNR0495, SNNR0499, SNNR0915, SNNR1009, SNNR1123, SNNR1176, SNNR1514, SNNR1597

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project. It is likely to also occur in the eastern Klamath Mountains.

**STAND TABLE**
***Quercus kelloggii* / *Arctostaphylos viscida* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 22.2 | 1 | 35 | X | | X | |
| | QUWI2-T | *Quercus wislizeni* | 67 | 2.6 | 0.2 | 9 | | | | |
| | PISA2-T | *Pinus sabiniana* | 56 | 0.4 | 0.2 | 2 | | | | |
| | PIPO-T | *Pinus ponderosa* | 44 | 0.2 | 0.2 | 1 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 33 | 2.2 | 3 | 13 | | | | |
| | QUKE-M | *Quercus kelloggii* | 22 | 0.7 | 0.2 | 6 | | | | |
| **Shrub** | | | | | | | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 13.1 | 2 | 30 | | X | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 10.1 | 1 | 40 | | | X | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 9.6 | 1 | 17 | | | X | |
| | CEOCO | *Cercis occidentalis* | 56 | 0.6 | 0.2 | 2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 44 | 0.6 | 0.2 | 2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 1.3 | 2 | 7 | | | | |
| | CLLA3 | *Clematis lasiantha* | 22 | 0.4 | 1 | 3 | | | | |
| | CYSC4 | *Cytisus scoparius* | 22 | 0.2 | 0.2 | 2 | | | | X |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | WYRE | *Wyethia reticulata* | 56 | 1.8 | 2 | 5 | | | | |
| | GAPO | *Galium porrigens* | 56 | 0.4 | 0.2 | 3 | | | | |
| | MECA2 | *Melica californica* | 44 | 0.3 | 0.2 | 2 | | | | |
| | TOAR | *Torilis arvensis* | 44 | 0.3 | 0.2 | 1 | | | | X |
| | POACXX | Poaceae | 33 | 1.2 | 0.2 | 10 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 33 | 0.2 | 0.2 | 1 | | | | |
| | GACAS | *Galium californicum* subsp. *sierrae* | 33 | 0.2 | 0.2 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 22 | 0.1 | 0.2 | 1 | | | | X |
| | MOVI2 | *Monardella villosa* | 22 | 0.1 | 0.2 | 1 | | | | |
| | RAOC | *Ranunculus occidentalis* | 22 | 0.1 | 0.2 | 1 | | | | |
| | WYAN | *Wyethia angustifolia* | 22 | 0.1 | 0.2 | 1 | | | | |
| | HYPE | *Hypericum perforatum* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | LUCO6 | *Luzula comosa* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 67 | 4.9 | 0.2 | 35 | | | | |

### *Quercus kelloggii* / *Ceanothus integerrimus* Association
### Black Oak / Deerbrush Association

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus kelloggii* at 20-55% cover. Other trees such as *Pinus ponderosa*, *Pinus sabiniana*, *Quercus douglasii*, and *Quercus wislizeni* were often present. The shrub layer was intermittent to continuous with *Ceanothus integerrimus* dominant and with *Heteromeles arbutifolia*, *Keckiella breviflora*, *Lonicera hispidula* var. *vacillans*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum* often present. The herbaceous layer was variable and included a variety of native and non-native grasses and forbs (see stand table below). This association is likely to be driven by recent fire and is closely related to the two following associations in the *Quercus kelloggii* Alliance (see pages 128-133). These types were all formerly described by Allen et al. (1991), but may, upon closer inspection, be considered a related suite of phases included in a larger, over-arching association of Black oak and poison oak.

This association was sampled infrequently in the study area, occurring in the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on granitic or metamorphic substrates. They occupied lower to upper slopes that were steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Nevada County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 82.5 | 80-85 | - |
| Herb | 18 | 12-24 | >0.3 |
| Shrub | 66 | 45-87 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 41.5 | 20-63 | 5-20 |
| Conifer | 0.6 | 0-1 | 10-35 |
| Relative non-native to native cover | 7.7 | 5-10 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: N (2)
Macrotopography: lower to middle slope (1), upper slope (1)
Microtopography: concave (1), flat (1)
Parent Material: granitic (1), metamorphic (1)
Soil Texture: clay or clay loam (1), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1043 ft. | 891-1194 ft. |
| Slope | 30º | 30-30º |
| Large rock cover | 2.5% | 2-3% |
| Small rock cover | 4% | 3-5% |
| Bare ground cover | 17.5% | 5-30% |
| Litter cover | 73% | 60-86% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR1369, SNNR1370

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Allen et al. (1991). It is also likely to occur in the Klamath Mountains and the North Coast Ranges.

**STAND TABLE**
***Quercus kelloggii* / *Ceanothus integerrimus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 37.5 | 20 | 55 | X | | X | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 5.0 | 2 | 8 | | | X | |
| | ARME-L | *Arbutus menziesii* | 50 | 11.0 | 22 | 22 | | | | |
| | PISA2-T | *Pinus sabiniana* | 50 | 0.5 | 1 | 1 | | | | |
| | QUDO-T | *Quercus douglasii* | 50 | 0.5 | 1 | 1 | | | | |
| | PIPO-T | *Pinus ponderosa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 100 | 31.0 | 25 | 37 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 14.0 | 14 | 14 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 13.5 | 9 | 18 | | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 100 | 1.5 | 1 | 2 | | | X | |
| | KEBR | *Keckiella breviflora* | 50 | 1.0 | 2 | 2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 1.0 | 2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 100 | 6.0 | 2 | 10 | | X | X | X |
| | ELGL | *Elymus glaucus* | 100 | 2.6 | 0.2 | 5 | | | X | |
| | TOAR | *Torilis arvensis* | 50 | 2.0 | 4 | 4 | | | | X |
| | VUMY | *Vulpia myuros* | 50 | 1.5 | 3 | 3 | | | | X |
| | CAOC6 | *Calystegia occidentalis* | 50 | 1.0 | 2 | 2 | | | | |
| | IRIS | *Iris* | 50 | 1.0 | 2 | 2 | | | | |
| | AICA | *Aira caryophyllea* | 50 | 0.5 | 1 | 1 | | | | X |
| | BRCA5 | *Bromus carinatus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | BRLA3 | *Bromus laevipes* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLBI | *Clarkia biloba* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CRAN11 | *Crucianella angustifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERLA6 | *Eriophyllum lanatum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | HYPE | *Hypericum perforatum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LETA | *Leontodon taraxacoides* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | RAOC | *Ranunculus occidentalis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SCCA3 | *Scutellaria californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |

***Quercus kelloggii* / *Toxicodendron diversilobum* - *Styrax officinalis* / *Triteleia laxa* Association**

**Black Oak / Poison-oak - Styrax / Grass Nut Association**

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus kelloggii* at 20-35% cover. Other trees such as *Pinus sabiniana* and *Pinus ponderosa* were infrequently present in the overstory. The shrub layer was open to intermittent with *Styrax officinalis* var. *redivivus* dominant and with *Heteromeles arbutifolia*, *Rhamnus tomentella*, *Symphoricarpos albus* var. *laevigatus*, and *Toxicodendron diversilobum* often present. The herbaceous layer was open and often included *Calochortus*, *Dryopteris arguta*, *Galium porrigens*, *Melica torreyana*, *Potentilla glandulosa*, and *Torilis arvensis*.

This association was sampled infrequently in the study area, in the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on gabbro substrates. They occupied bottom to middle slopes that were gentle to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in El Dorado County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 55.7 | 37-72 | - |
| Herb | 14.3 | 6-22 | variable |
| Shrub | 31.3 | 16-58 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 30.7 | 27-35 | 10-20 |
| Conifer | 1.7 | 0-5 | 5-20 |
| Relative non-native to native cover | 2.5 | 0-6 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NE (1), N (1), E (1)
Macrotopography: bottom (1), lower slope (1), lower to middle slope (1)
Microtopography: flat (2), concave (1)
Parent Material: gabbro (3)
Soil Texture: clay or clay loam (1), sand (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 668 ft. | 560-810 ft. |
| Slope | 14.3º | 5-19º |
| Large rock cover | 6.9% | <1-20% |
| Small rock cover | 1.9% | <1-5% |
| Bare ground cover | 7.3% | 1-20% |
| Litter cover | 80% | 50-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0335, SNNR0340 **Relevés:** SNFN0013

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Allen et al. (1989, 1991). It is also likely to occur in the eastern Klamath Mountains. It is clearly related to the following *Q*. *kelloggii* / *Toxicodendron diversilobum* / Grass association, but ranges into more mesic settings.

**STAND TABLE**
***Quercus kelloggii* / *Toxicodendron diversilobum* - *Styrax officinalis* / *Triteleia laxa* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 27.3 | 20 | 35 | X | | X | |
| | UMCA-T | *Umbellularia californica* | 33 | 3.3 | 10 | 10 | | | | |
| | PIPO-T | *Pinus ponderosa* | 33 | 1.7 | 5 | 5 | | | | |
| | PISA2-M | *Pinus sabiniana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUDO-M | *Quercus douglasii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-L | *Quercus kelloggii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | STOFR | *Styrax officinalis* var. *redivivus* | 100 | 12.7 | 6 | 25.2 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 6.8 | 0.2 | 19.2 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 6.5 | 1 | 15.2 | | | X | |
| | SYALL | *Symphoricarpos albus* var. *laevigatus* | 67 | 2.4 | 0.2 | 7 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 67 | 1.7 | 0.2 | 5 | | | | |
| | RUDI2 | *Rubus discolor* | 33 | 1.0 | 3 | 3 | | | | X |
| | RHOC | *Rhododendron occidentale* | 33 | 0.7 | 2 | 2 | | | | |
| | VICA5 | *Vitis californica* | 33 | 0.4 | 1.2 | 1.2 | | | | |
| | RUUR | *Rubus ursinus* | 33 | 0.3 | 1 | 1 | | | | |
| | CEOCO | *Cercis occidentalis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CLLA3 | *Clematis lasiantha* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RHCA | *Rhamnus californica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ROSA5 | *Rosa* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | METO | *Melica torreyana* | 67 | 4.3 | 1 | 12 | | | | |
| | POGL9 | *Potentilla glandulosa* | 67 | 0.4 | 0.2 | 1 | | | | |
| | ASTEXX | Asteraceae | 67 | 0.1 | 0.2 | 0.2 | | | | X |
| | CALOC | *Calochortus* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | DRAR3 | *Dryopteris arguta* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 67 | 0.1 | 0.2 | 0.2 | | | | X |
| | ASRA | *Aster radulinus* | 33 | 1.7 | 5 | 5 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 33 | 0.7 | 2 | 2 | | | | |
| | WOFI | *Woodwardia fimbriata* | 33 | 0.7 | 2 | 2 | | | | |

**STAND TABLE continued**

***Quercus kelloggii / Toxicodendron diversilobum - Styrax officinalis / Triteleia laxa* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | APCA | *Apocynum cannabinum* | 33 | 0.3 | 1 | 1 | | | | |
| | BRLA3 | *Bromus laevipes* | 33 | 0.3 | 1 | 1 | | | | |
| | ELGLG | *Elymus glaucus* subsp. *glaucus* | 33 | 0.3 | 1 | 1 | | | | |
| | IRIS | *Iris* | 33 | 0.3 | 1 | 1 | | | | |
| | LASU | *Lathyrus sulphureus* | 33 | 0.3 | 1 | 1 | | | | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 33 | 0.3 | 1 | 1 | | | | |
| | ADJO | *Adiantum jordanii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | AQFO | *Aquilegia formosa* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | BROMU | *Bromus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CACAC3 | *Cardamine californica* var. *californica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPA5 | *Claytonia parviflora* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ELGL | *Elymus glaucus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LIHUH | *Lilium humboldtii* subsp. *humboldtii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LIPA | *Lilium pardalinum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LOTUS | *Lotus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RAOC | *Ranunculus occidentalis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SEAR4 | *Senecio aronicoides* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 0.1 | 0.2 | 0.2 | | | | |

### *Quercus kelloggii* / *Toxicodendron diversilobum* / Grass Association
### Black Oak / Poison-oak / Grass Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus kelloggii* at 5-55% cover. *Pinus sabiniana* was often present in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant. The herbaceous layer was open to intermittent and often included *Cynosurus echinatus*, *Elymus glaucus*, and *Torilis arvensis*.

This association was sampled commonly throughout the study area within the Cascade Range Foothills, High Cascade Range, northern Sierra Nevada Foothills, and once in the central Sierra Nevada Foothills Subregions (Hickman 1993). Stands often occurred on igneous substrates (including gabbro, volcanic, or basalt), sometimes on metamorphic (including slate) substrates, and infrequently on sedimentary substrates. They occupied bottom to ridgetop slope positions, that varied from gentle to steep, in draws or on terraces.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, El Dorado, Nevada, Placer, Shasta, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997). This is one of the most commonly encountered types of black oak woodland in the study area, and it ranges into higher elevations of the region. Further study may differentiate specific understory herb species as diagnostic.

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 66.8 | 46-98 | - |
| Herb | 22.2 | 0-60 | variable |
| Shrub | 29.4 | 1-65 | <5 |
| Low Tree/Tall Shrub | 1.5 | 0-20 | 5-10 |
| Hardwood | 37.7 | 5-60 | 5-35 |
| Conifer | 2.5 | 0-10 | 5->35 |
| Relative non-native to native cover | 13.9 | 0-47 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (16), NW (5), NE (5), W (1), SE (1), E (1)
Macrotopography: bottom (1), lower slope (1), lower to middle slope (1), lower to upper slope (1), middle slope (8), middle to upper slope (3), upper slope (9), upper slope to ridgetop (1), draw (1), ridgetop (2), terrace (1)
Microtopography: undulating (12), flat (7), concave (5), convex (5)
Parent Material: volcanic (11), metamorphic (7), basalt (4), igneous (3), gabbro (1), sedimentary (1), slate (1), water (1)
Soil Texture: clay or clay loam (8), loam or sandy loam (6), silt or silt loam (6)

| | Mean | Range |
|---|---|---|
| Elevation | 1571 ft. | 555-3563 ft. |
| Slope | 19.6º | 3-37º |
| Large rock cover | 2.2% | 0-20% |
| Small rock cover | 2.2% | <1-6.2% |
| Bare ground cover | 8% | 1-20% |
| Litter cover | 83.4% | 69-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=29)

**Rapid Assessments:** SNNR0090, SNNR0092, SNNR0095, SNNR0158, SNNR0189, SNNR0252, SNNR0334, SNNR0388, SNNR0447, SNNR0458, SNNR0573, SNNR0676, SNNR0729, SNNR0772, SNNR0829, SNNR0966, SNNR1058, SNNR1061, SNNR1230, SNNR1368, SNNR1614 **Relevés:** SNFN0026, SNFN0049, SNFN0103, SNFN0108, SNFN0144, SNFN0190, SNFN0193, SNFN0331

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Allen et al. (1989, 1991). It also likely occurs in the Klamath and North Coast Range mountains.

**STAND TABLE**
***Quercus kelloggii* / *Toxicodendron diversilobum* / Grass Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 97 | 35.0 | 5 | 55 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 59 | 1.6 | 0.2 | 10 | | | | |
| | AECA-M | *Aesculus californica* | 41 | 2.6 | 0.2 | 30 | | | | |
| | PISA2-M | *Pinus sabiniana* | 41 | 0.3 | 0.2 | 3 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 38 | 0.9 | 0.2 | 7 | | | | |
| | QUKE-L | *Quercus kelloggii* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 34 | 0.3 | 0.2 | 2 | | | | |
| | PIPO-T | *Pinus ponderosa* | 31 | 0.6 | 0.2 | 8 | | | | |
| | QUDO-T | *Quercus douglasii* | 28 | 0.8 | 0.2 | 6 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 17.9 | 0.2 | 55 | X | | X | |
| | RHTO6 | *Rhamnus tomentella* | 38 | 1.3 | 0.2 | 10 | | | | |
| | ARCA10 | *Aristolochia californica* | 28 | 0.4 | 0.2 | 8 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 24 | 3.5 | 1 | 60.2 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 24 | 0.1 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 83 | 3.8 | 0.2 | 15 | | | X | X |
| | CYEC | *Cynosurus echinatus* | 66 | 3.3 | 0.2 | 19 | | | | X |
| | ELGL | *Elymus glaucus* | 59 | 1.0 | 0.2 | 12 | | | | |
| | BRDI3 | *Bromus diandrus* | 48 | 1.8 | 0.2 | 15 | | | | X |
| | GAAP2 | *Galium aparine* | 41 | 0.2 | 0.2 | 1 | | | | |
| | GAPO | *Galium porrigens* | 38 | 0.2 | 0.2 | 2 | | | | |
| | DIVO | *Dichelostemma volubile* | 34 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 31 | 1.0 | 0.2 | 25 | | | | |
| | LUCO6 | *Luzula comosa* | 31 | 0.1 | 0.2 | 1 | | | | |
| | BRLA3 | *Bromus laevipes* | 28 | 0.1 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 28 | 0.1 | 0.2 | 1 | | | | |
| | VISA | *Vicia sativa* | 24 | 1.1 | 1 | 14 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 24 | 0.7 | 0.2 | 14 | X | | LASU | |
| | *Lathyrus sulphureus* | | 24 | 0.2 | 0.2 | 2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 24 | 0.1 | 0.2 | 2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 24 | 0.1 | 0.2 | 1 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 21 | 0.1 | 0.2 | 1 | | | | |
| | RAOC | *Ranunculus occidentalis* | 21 | 0.1 | 0.2 | 1 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 28 | 2.2 | 0.2 | 35 | | | | |

### *Quercus kelloggii - Pinus ponderosa* Association
### Black Oak - Ponderosa Pine Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to continuous and co-dominated by *Pinus ponderosa* at 4-34% cover and *Quercus kelloggii* at 7-47% cover. Other trees such as *Calocedrus decurrens*, *Pinus sabiniana*, and *Quercus chrysolepis* occurred occasionally. The shrub layer was open to intermittent, with *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent with *Achnatherum lemmonii*, *Aira caryophyllea*, *Bromus laevipes*, *Chlorogalum pomeridianum*, *Cynosurus echinatus*, *Elymus glaucus*, *Sanicula bipinnatifida*, and *Torilis arvensis* occurring occasionally.

This association may be perceived as a Ponderosa pine forest or woodland type due to the conspicuous and common presence of co-dominant tree *Pinus ponderosa* (e.g. see *Pinus ponderosa* - *Quercus kelloggii* / *Arctostaphylos viscida* Woodland Association in NatureServe et al. 2003b). However, analysis of plots in this study suggests that this type and the closely related *Quercus kelloggii - Pinus ponderosa* / *Arctostaphylos viscida* Association (see page 136) are more similar to other associations within the *Q. kelloggii* Alliance. The current paucity of mature *P. ponderosa*-dominated stands in the Sierra Nevada Foothills and lower western slope has been recently pointed out by Thorne et al. (2006). It is possible that pre-European *Pinus ponderosa* Alliance stands were much more widespread in the area, but current stands share more similarity with *Q. kelloggii* Alliance stands.

In the study area, this association was sampled occasionally in the northern Sierra Nevada Foothills and High Cascade Range, and only once in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on igneous and volcanic (including basalt) substrates, and infrequently on mixed rock or metamorphic substrates. They occupied lower to upper slopes and ridgetops. Slopes varied from gentle to steep. Stands usually occurred in more mesic settings on north-facing aspects or in wetter, higher elevations of the study area.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, El Dorado, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 51.7 | 40-68 | - |
| Herb | 12.2 | 0-35 | variable |
| Shrub | 14 | 1-43 | <5 |
| Low Tree/Tall Shrub | 1.3 | 0-10 | 5-10 |
| Hardwood | 23.5 | 10-47 | 5-20 |
| Conifer | 20.2 | 8-35 | 5-35 |
| Relative non-native to native cover | 8.4 | 0-32 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (5), SE (2), W (1), Variable (1), N (1)
Macrotopography: lower slope (2), lower to middle slope (1), lower to upper slope (1), middle slope (1), upper slope (3), ridgetop (2)
Microtopography: convex (4), undulating (3), flat (2)
Parent Material: volcanic (5), mixed rock (2), basalt (1), igneous (1), metamorphic (1)
Soil Texture: loam or sandy loam (4), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1724 ft. | 416-3268 ft. |
| Slope | 13.7º | 2-35º |
| Large rock cover | 1.1% | 0-4% |
| Small rock cover | 1.6% | <1-5% |
| Bare ground cover | 5.9% | 1-30% |
| Litter cover | 88.4% | 65-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0069, SNNR0070, SNNR0255, SNNR0328, SNNR0392, SNNR0393, SNNR0512, SNNR0721, SNNR0795, SNNR1192

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada based solely on the data collected for this project.

**STAND TABLE**
***Quercus kelloggii - Pinus ponderosa* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 22.0 | 7 | 47 | | X | X | |
| | PIPO-T | *Pinus ponderosa* | 100 | 19.3 | 4 | 34 | | X | X | |
| | PISA2-T | *Pinus sabiniana* | 40 | 0.8 | 1 | 4 | | | | |
| | PIPO-M | *Pinus ponderosa* | 30 | 1.1 | 1 | 7 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 30 | 0.3 | 0.2 | 2 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 30 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 70 | 5.5 | 0.2 | 31 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 40 | 0.3 | 0.2 | 2 | | | | |
| | CEOCO | *Cercis occidentalis* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 40 | 0.7 | 0.2 | 3 | | | | X |
| | CYEC | *Cynosurus echinatus* | 30 | 2.3 | 1 | 20 | | | | X |
| | ELGL | *Elymus glaucus* | 30 | 0.5 | 0.2 | 3 | | | | |
| | ACLE8 | *Achnatherum lemmonii* | 30 | 0.4 | 0.2 | 2 | | | | |
| | AICA | *Aira caryophyllea* | 30 | 0.1 | 0.2 | 1 | | | | X |
| | CHPO3 | *Chlorogalum pomeridianum* | 30 | 0.1 | 0.2 | 1 | | | | |
| | BRLA3 | *Bromus laevipes* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 30 | 0.1 | 0.2 | 0.2 | | | | |

### *Quercus kelloggii - Pinus ponderosa* / *Arctostaphylos viscida* Association
### Black Oak - Ponderosa Pine / Whiteleaf Manzanita Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was open to continuous and co-dominated by *Pinus ponderosa* at 1-37% cover and *Quercus kelloggii* at 5-55% cover. Other trees such as *Pinus sabiniana*, *Quercus chrysolepis*, and *Quercus wislizeni* were present occasionally. The shrub layer was open to continuous, with *Heteromeles arbutifolia* co-dominant with *Arctostaphylos viscida* and *Toxicodendron diversilobum*. The herbaceous layer was open and often included *Elymus glaucus*, *Galium porrigens*, and *Torilis arvensis*. For justification of the placement of this association in the *Q. kelloggii* Alliance, see discussion in the previous association description.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills, but only once in the High Cascade Range Subregions (Hickman 1993). Stands usually occurred on metamorphic subtrates, but were also found on igneous (including granitic, gabbro, and basalt) substrates. They occupied all slope positions from lower slopes to ridgetops. Slopes varied from gentle to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, El Dorado, Nevada, Placer, Shasta, and Yuba Counties, within the Granitic and Metamorphic Foothills (M261Ef), Lower Foothills Metamorphic Belt (M261Fb), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 68.7 | 49-82 | - |
| Herb | 12.6 | 0-33 | variable |
| Shrub | 36.1 | 5-70 | <5 |
| Low Tree/Tall Shrub | 3.1 | 0-28 | 5-10 |
| Hardwood | 25.5 | 5-55 | 5-20 |
| Conifer | 14.7 | 2-37 | 5->35 |
| Relative non-native to native cover | 5 | 0-27 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (11), NE (6), W (2), Variable (2), E (2), SW (1)
Macrotopography: lower slope (1), lower to upper slope (1), middle slope (12), middle to upper slope (2), upper slope (5), upper slope to ridgetop (1), ridgetop (2)
Microtopography: flat (13), undulating (9), convex (1), concave (1)
Parent Material: metamorphic (10), granitic (5), gabbro (3), mixed metamorphic (2), basalt (1), igneous (1), slate (1), volcanic (1)
Soil Texture: silt or silt loam (8), clay or clay loam (6), loam or sandy loam (6), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1538 ft. | 756-2386 ft. |
| Slope | 20.5º | 2-34º |
| Large rock cover | 1.9% | 0-15% |
| Small rock cover | 1.8% | <1-10% |
| Bare ground cover | 7.1% | 0-28% |
| Litter cover | 85.8% | 54-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=24)

**Rapid Assessments:** SNNR0129, SNNR0163, SNNR0263, SNNR0656, SNNR0665, SNNR0671, SNNR0679, SNNR0769, SNNR0782, SNNR0783, SNNR0822, SNNR1124, SNNR1135, SNNR1136, SNNR1137, SNNR1138, SNNR1139, SNNR1259, SNNR1372, SNNR1376, SNNR1383, SNNR1384, SNNR1399 **Relevés:** SNFN0330

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based on data from NatureServe et al. (2003b) and this project. It may also occur in the eastern Klamath Mountains of California.

**STAND TABLE**

***Quercus kelloggii - Pinus ponderosa* / *Arctostaphylos viscida* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 21.4 | 5 | 55 | | X | X | |
| | PIPO-T | *Pinus ponderosa* | 100 | 14.0 | 1 | 37 | | X | X | |
| | QUWI2-M | *Quercus wislizeni* | 46 | 1.1 | 0.2 | 10 | | | | |
| | PISA2-T | *Pinus sabiniana* | 46 | 0.4 | 0.2 | 4 | | | | |
| | QUKE-L | *Quercus kelloggii* | 42 | 0.2 | 0.2 | 1 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 38 | 1.7 | 2 | 12 | | | | |
| | PIPO-M | *Pinus ponderosa* | 38 | 0.7 | 0.2 | 6 | | | | |
| | PIPO-L | *Pinus ponderosa* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 25 | 3.0 | 2 | 30 | | | | |
| | QUKE-M | *Quercus kelloggii* | 25 | 0.3 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 96 | 7.1 | 0.2 | 23 | | | X | |
| | ARVI4 | *Arctostaphylos viscida* | 92 | 11.8 | 1 | 47 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 92 | 11.6 | 0.2 | 30 | | X | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 29 | 0.3 | 0.2 | 5 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 25 | 3.1 | 0.2 | 40 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 21 | 0.8 | 1 | 12 | | | | |
| **Herb** | | | | | | | | | | |
| | ELGL | *Elymus glaucus* | 75 | 1.4 | 0.2 | 7 | | | X | |
| | GAPO | *Galium porrigens* | 63 | 0.2 | 0.2 | 1 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.8 | 0.2 | 7 | | | | X |
| | CYEC | *Cynosurus echinatus* | 46 | 2.7 | 0.2 | 17 | | | | X |
| | LUCO6 | *Luzula comosa* | 42 | 0.1 | 0.2 | 1 | | | | |
| | BRCA5 | *Bromus carinatus* | 33 | 0.1 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYPE | *Hypericum perforatum* | 29 | 0.2 | 0.2 | 2 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 29 | 0.2 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 29 | 0.1 | 0.2 | 1 | | | | |
| | VUMY | *Vulpia myuros* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | CAAL2 | *Calochortus albus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRLA3 | *Bromus laevipes* | 21 | 0.3 | 0.2 | 3 | | | | |
| | ACMI2 | *Achillea millefolium* | 21 | 0.2 | 0.2 | 3 | | | | |
| | SIMA2 | *Sidalcea malviflora* | 21 | 0.2 | 0.2 | 3 | | | | |
| | DIVO | *Dichelostemma volubile* | 21 | 0.1 | 0.2 | 1 | | | | |
| | IRIS | *Iris* | 21 | 0.1 | 0.2 | 1 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 38 | 1.6 | 0.2 | 12 | | | | |

### *Quercus kelloggii - Pinus ponderosa* / *Ceanothus integerrimus* Association
### Black Oak - Ponderosa Pine / Deerbrush Association


**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and usually dominated by *Quercus kelloggii* at 5-55% cover (average 33%). *Pinus ponderosa* was characteristically present in the overstory at 0.2-40% (8% average). The shrub layer was open to intermittent with *Ceanothus integerrimus* dominant and with *Toxicodendron diversilobum* co-dominant. The herbaceous layer was open to intermittent and often included native herbs *Clarkia rhomboidea*, *Elymus glaucus*, and *Vulpia microstachys*. This association may be related to the more mesic and/or cooler stands in the *Pinus ponderosa - Calocedrus decurrens* Alliance, as suggested by the presence of *Calocedrus* at low cover in some of the samples. *Ceanothus integerrimus* is likely to fluctuate in cover and abundance as a direct result of fire history. Stands that do not burn for long periods are likely to have low cover of *C*. *integerrimus*.


In the study area, this association was sampled commonly within the High Cascade Range, and infrequently in the northern Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands often occurred on volcanic substrates and infrequently on metamorphic and sedimentary substrates. They occupied lower to upper slope positions. The slopes varied from gentle to steep, and they varied in aspect. Stands occurred particularly at higher elevations in the study area, on mesic northerly or easterly slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 69.8 | 59-80 | - |
| Herb | 20.6 | 10-40 | variable |
| Shrub | 30.5 | 1-70 | <5 |
| Low Tree/Tall Shrub | 0.7 | 0-9 | 5-10 |
| Hardwood | 34.8 | 5-58 | 5-20 |
| Conifer | 9.5 | 0-45 | 5-35 |
| Relative non-native to native cover | 6.3 | 0-21 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (4), W (2), SE (2), NW (2), Variable (1), NE (1), E (1)
Macrotopography: lower slope (3), lower to middle slope (1), lower to upper slope (1), middle slope (4), middle to upper slope (1), upper slope (3)
Microtopography: flat (6), undulating (4), concave (2)
Parent Material: volcanic (9), metamorphic (2), sedimentary (2)
Soil Texture: loam or sandy loam (8), clay or clay loam (2), sand (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 2709 ft. | 1061-3842 ft. |
| Slope | 13.6º | 2-30º |
| Large rock cover | 1.3% | 0-5% |
| Small rock cover | 3.1% | <1-8% |
| Bare ground cover | 10.4% | 1-30% |
| Litter cover | 81.5% | 60-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=13)

**Rapid Assessments:** SNNR0347, SNNR0394, SNNR0421, SNNR0449, SNNR0452, SNNR0487, SNNR0492, SNNR0516, SNNR0781, SNNR0787, SNNR1285, SNNR1286
**Relevés:** SNFN0333

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and lower mountains by Allen et al. (1989, 1991).

**STAND TABLE**
***Quercus kelloggii - Pinus ponderosa / Ceanothus integerrimus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 31.9 | 5 | 55 | X | | X | |
| | PIPO-T | *Pinus ponderosa* | 85 | 8.4 | 0.2 | 40 | | | X | |
| | QUKE-L | *Quercus kelloggii* | 38 | 0.5 | 0.2 | 5 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 31 | 0.7 | 0.2 | 4 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 23 | 1.5 | 4 | 10 | | | | |
| | PISA2-T | *Pinus sabiniana* | 23 | 0.2 | 0.2 | 1 | | | | |
| | QUKE-M | *Quercus kelloggii* | 23 | 0.2 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 100 | 16.2 | 2 | 45 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 85 | 12.4 | 3 | 33 | | X | X | |
| | RHTR | *Rhus trilobata* | 46 | 1.3 | 0.2 | 10 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 23 | 2.0 | 0.2 | 24.2 | | | | |
| **Herb** | | | | | | | | | | |
| | ELGL | *Elymus glaucus* | 69 | 1.1 | 0.2 | 6 | | | | |
| | CLRH | *Clarkia rhomboidea* | 62 | 1.2 | 0.2 | 8 | | | | |
| | VUMI | *Vulpia microstachys* | 62 | 0.5 | 0.2 | 4 | | | | |
| | TOAR | *Torilis arvensis* | 54 | 1.0 | 0.2 | 6 | | | | X |
| | CYEC | *Cynosurus echinatus* | 46 | 2.0 | 0.2 | 10 | | | | X |
| | BRTE | *Bromus tectorum* | 38 | 0.3 | 0.2 | 2 | | | | X |
| | BRCA5 | *Bromus carinatus* | 38 | 0.2 | 0.2 | 1 | | | | |
| | CAMU5 | *Carex multicaulis* | 38 | 0.2 | 0.2 | 1 | | | | |
| | GAAP2 | *Galium aparine* | 31 | 0.3 | 0.2 | 2 | | | | |
| | AGGR | *Agoseris grandiflora* | 31 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 31 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 23 | 0.5 | 1 | 5 | | | | |
| | MEAR3 | *Melica aristata* | 23 | 0.2 | 0.2 | 2 | | | | |
| | ACLE8 | *Achnatherum lemmonii* | 23 | 0.2 | 0.2 | 1 | | | | |
| | TONO | *Torilis nodosa* | 23 | 0.1 | 0.2 | 1 | | | | X |

***Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica* Association (Provisional)**

**Black Oak - Douglas-fir - California Bay Association (Provisional)**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Quercus kelloggii* at 18-62% cover. *Pseudotsuga menziesii* was characteristically present while *Umbellularia californica*, *Pinus ponderosa* and *Calocedrus decurrens* were often present in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Rhamnus rubra* often present. The herbaceous layer was open and often included *Melica harfordii*.


This association was sampled infrequently in the study area, exclusively within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on igneous substrates (including volcanic and basalt), and infrequently on ultramafic substrates. They occupied middle slopes to ridgetops, with slopes that were gentle to somewhat steep. Stands were on neutral to mesic slopes, found particularly in Butte County near Paradise.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte County, within the Lower Foothills Metamorphic Belt (M261Fb), Shingletown-Paradise (M261Dl), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 83.2 | 73-89 | - |
| Herb | 2.9 | 0-10 | variable |
| Shrub | 37.5 | 17-55 | <5 |
| Low Tree/Tall Shrub | 11 | 0-30 | 5-15 |
| Hardwood | 41.3 | 18-62 | 10-35 |
| Conifer | 24.3 | 0-46 | 10-35 |
| Relative non-native to native cover | 0.1 | 0-1 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (2), SE (2), S (1), NE (1)
Macrotopography: middle slope (3), middle slope to ridgetop (2), ridgetop (1)
Microtopography: flat (3)
Parent Material: volcanic (3), basalt (1), igneous (1), ultramafic (1)
Soil Texture: loam or sandy loam (2), silt or silt loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 2098 ft. | 1903-2212 ft. |
| Slope | 16º | 2-24º |
| Large rock cover | <1% | -.2% |
| Small rock cover | 0.6% | <1-2% |
| Bare ground cover | 5.3% | 2-15% |
| Litter cover | 90% | 80-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0777, SNNR0778, SNNR0779, SNNR0788, SNNR1118, SNNR1119

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the northern Sierra Nevada Foothills based solely on the data collected for this study. It is likely to occur in the Klamath Mountains and in the North Coast Ranges. This association is related to other stands in the *P. menziesii* Alliance that occur in slightly higher and more mesic settings, such as the *Pseudotsuga menziesii* / *Corylus cornuta* / *Adenocaulon bicolor* Association (Fites 1993).

**STAND TABLE**
***Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 39.7 | 18 | 62 | | X | X | |
| | PSME-T | *Pseudotsuga menziesii* | 83 | 17.5 | 0.2 | 35 | | | X | |
| | UMCA-T | *Umbellularia californica* | 67 | 10.7 | 12 | 19 | | | | |
| | PIPO-T | *Pinus ponderosa* | 67 | 6.2 | 3 | 16 | | | | |
| | PSME-M | *Pseudotsuga menziesii* | 50 | 1.5 | 2 | 5 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 50 | 1.0 | 1 | 3 | | | | |
| | QUCH2-L | *Quercus chrysolepis* | 50 | 0.2 | 0.2 | 1 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 33 | 1.7 | 0.2 | 10 | | | | |
| | UMCA-M | *Umbellularia californica* | 33 | 1.2 | 2 | 5 | | | | |
| | PIPO-M | *Pinus ponderosa* | 33 | 0.8 | 1 | 4 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 33 | 0.7 | 0.2 | 4 | | | | |
| | UMCA-L | *Umbellularia californica* | 33 | 0.5 | 1 | 2 | | | | |
| | ACMA3-M | *Acer macrophyllum* | 33 | 0.2 | 0.2 | 1 | | | | |
| | PSME-L | *Pseudotsuga menziesii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-L | *Quercus kelloggii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 26.5 | 13 | 55 | X | | X | |
| | RHRU | *Rhamnus rubra* | 67 | 1.7 | 0.2 | 5 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 33 | 4.8 | 2 | 27 | | | | |
| | LOIN4 | *Lonicera interrupta* | 33 | 0.8 | 2 | 3 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 33 | 0.5 | 1 | 2 | | | | |
| | RIRO | *Ribes roezlii* | 33 | 0.2 | 0.2 | 1 | | | | |
| | RIBES | *Ribes* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | MEHA2 | *Melica harfordii* | 67 | 0.3 | 0.2 | 1 | | | | |
| | TRLA6 | *Trientalis latifolia* | 33 | 0.7 | 0.2 | 4 | | | | |
| | ASHA | *Asarum hartwegii* | 33 | 0.3 | 1 | 1 | | | | |
| | OSCH | *Osmorhiza chilensis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |

### *Quercus kelloggii - Quercus chrysolepis / Toxicodendron diversilobum* Association
### Black Oak - Canyon Live Oak / Poison-oak Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically intermittent and dominated by *Quercus kelloggii* at 35-40% cover. Other trees such as *Pinus sabiniana* and *Quercus chrysolepis* were characteristically present at lower cover in the overstory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Aristolochia californica*, *Ceanothus integerrimus*, *Heteromeles arbutifolia*, and *Rhamnus tomentella* often present. The herbaceous layer was open and often included *Cynosurus echinatus*, *Elymus glaucus*, and *Torilis arvensis*.

This association was sampled infrequently in the study area, within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on igneous and volcanic (including basalt) substrates. They occupied lower to upper slopes, that were flat to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte and Calaveras Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73 | 67-80 | - |
| Herb | 13 | 8-16 | >0.3 |
| Shrub | 29.3 | 16-42 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 50.7 | 45-57 | 10-20 |
| Conifer | 4.3 | 1-7 | 5-35 |
| Relative non-native to native cover | 6.7 | 4-8 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (2), Flat (1)
Macrotopography: lower to upper slope (1), middle slope (1)
Microtopography: undulating (2), flat (1)
Parent Material: basalt (1), igneous (1), volcanic (1)
Soil Texture: clay or clay loam (1), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 989 ft. | 640-1351 ft. |
| Slope | 10º | 0-20º |
| Large rock cover | 1.5% | 1-2% |
| Small rock cover | 4% | 3-5% |
| Bare ground cover | 14.5% | 14-15% |
| Litter cover | 72.5% | 70-75% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0530, SNNR0536, SNNR0646

**Rank:** G4S4

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills and lower mountains and the Central Coast Range by Allen et al. (1989, 1991), on elevations up to 7200 ft. A similar association (*Q. chrysolepis - Q. kelloggii*) also has been defined by Allen et al. (1989, 1991) and this project, but Allen's type has higher cover of *Q. chrysolepis*.

**STAND TABLE**

***Quercus kelloggii - Quercus chrysolepis / Toxicodendron diversilobum* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 100 | 38.3 | 35 | 40 | X | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 100 | 7.3 | 5 | 12 | | | X | |
| | PISA2-T | *Pinus sabiniana* | 100 | 0.7 | 0.2 | 1 | | | X | |
| | PIPO-T | *Pinus ponderosa* | 67 | 3.3 | 5 | 5 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 33 | 1.7 | 5 | 5 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 33 | 1.3 | 4 | 4 | | | | |
| | CADE27-M | *Calocedrus decurrens* | 33 | 0.3 | 1 | 1 | | | | |
| | CADE27-T | *Calocedrus decurrens* | 33 | 0.3 | 1 | 1 | | | | |
| | PISA2-M | *Pinus sabiniana* | 33 | 0.3 | 1 | 1 | | | | |
| | UMCA-T | *Umbellularia californica* | 33 | 0.3 | 1 | 1 | | | | |
| | UMCA-M | *Umbellularia californica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 8.7 | 6 | 10 | | X | X | |
| | RHTO6 | *Rhamnus tomentella* | 100 | 5.7 | 0.2 | 14 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 67 | 9.0 | 12 | 15 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 67 | 5.0 | 5 | 10 | | | | |
| | ARCA10 | *Aristolochia californica* | 67 | 2.0 | 2 | 4 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.7 | 2 | 2 | | | | |
| | CEOCO | *Cercis occidentalis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RHRU | *Rhamnus rubra* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 100 | 2.7 | 2 | 4 | | | X | X |
| | TOAR | *Torilis arvensis* | 67 | 2.0 | 2 | 4 | | | | X |
| | ELGL | *Elymus glaucus* | 67 | 0.7 | 1 | 1 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 33 | 1.7 | 5 | 5 | | | | X |
| | MEHA2 | *Melica harfordii* | 33 | 1.7 | 5 | 5 | | | | |
| | WOFI | *Woodwardia fimbriata* | 33 | 0.7 | 2 | 2 | | | | |
| | AGRE | *Agoseris retrorsa* | 33 | 0.3 | 1 | 1 | | | | |
| | BRLA3 | *Bromus laevipes* | 33 | 0.3 | 1 | 1 | | | | |
| | IRIS | *Iris* | 33 | 0.3 | 1 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 33 | 0.3 | 1 | 1 | | | | |
| | SCUTE | *Scutellaria* | 33 | 0.3 | 1 | 1 | | | | |
| | ADJO | *Adiantum jordanii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | METO | *Melica torreyana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 33 | 0.1 | 0.2 | 0.2 | | | | |

### *Quercus lobata* Woodland/Forest Alliance
### Valley Oak Woodland/Forest Alliance

As defined in the state, *Quercus lobata* is dominant or co-dominant in the tree canopy with *Acer negundo*, *Alnus rhombifolia*, *Fraxinus latifolia*, *Platanus racemosa*, *Quercus agrifolia*, *Q. douglasii*, *Q. kelloggii*, *Salix gooddingii*, and *S. lasiolepis*. The canopy is open, intermittent, or continuous. Shrubs are common to occasional, including lianas *Aristolochia californica* and *Vitis californica*. The herbaceous layer may be grassy. *Quercus lobata* stands are found in valley bottoms, lower slopes, or summit valleys with seasonally saturated soils that may flood intermittently. Soils are alluvial or residual.

In the Foothills study area, *Quercus lobata* stands form woodlands and (rarely) forests along floodplains and terraces in seasonally saturated soils. *Quercus wislizeni* is the most frequent overstory species found with *Q. lobata*, while *Pinus sabiniana*, *Salix laevigata*, *Platanus racemosa* and other species of *Quercus* are found occasionally. Common understory trees are *Aesculus californica*, *Quercus wislizeni*, and *Salix* spp.

Five associations were described for the Valley Oak Alliance in the study area and are described below. Three stands sampled (SNFN0091, SNFN0070, SNNR0552) showed additional variation, with cover of *Arbutus menziesii* and/or *Aesculus californica* or *Salix lasiolepis*. These were only classified to the alliance level. Potter (2005) in his riparian classification of the Sierra Nevada, did not collect sufficient samples from the *Q. lobata* Alliance to describe any associations. Thus, all of these associations are described for the first time from this region.

---

### *Quercus lobata* / Herbaceous Semi-Riparian Association
### Valley Oak / Herbaceous Semi-Riparian Association

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus lobata* at 6-68% cover. *Pinus sabiniana*, *Quercus douglasii*, and *Quercus wislizeni* were occasionally present in the overstory. The shrub layer was open to intermittent with *Rubus discolor* and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included non-natives *Bromus diandrus*, *Bromus hordeaceus*, *Cynosurus echinatus*, and *Torilis arvensis*.

In the study area, this association was sampled commonly in the Cascade Range Foothills and northern Sierra Nevada Foothills but infrequently in the central Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on igneous substrates including volcanic (basalt), sometimes on metamorphic or mixed metamorphic, and infrequently on clayey or mixed alluvium, or sedimentary substrates. They occupied bottom and lower slopes and occasionally middle to upper slopes and ridgetops. Slopes varied from flat to somewhat steep. Stands are considered semi-riparian as they lacked other typical wetland plants, though many occurred on stream terraces above a riparian corridor.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, Shasta, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 65.6 | 45-87 | - |
| Herb | 40.2 | 20-66 | variable |
| Shrub | 12.1 | 0-45 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 27.8 | 6-68 | 5-20 |
| Conifer | 0.3 | 0-2 | 10-35 |
| Relative non-native to native cover | 50.1 | 12-81 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: W (3), S (3), N (3), Variable (2), SE (2), Flat (2), SW (1)
Macrotopography: bottom (5), bottom to lower slope (1), lower slope (7), middle slope (1), upper slope (1), ridgetop (1)
Microtopography: undulating (10), flat (5), concave (1)
Parent Material: metamorphic (5), volcanic (3), granitic (2), basalt (1), clayey alluvium (1), igneous (1), mixed alluvium (1), mixed metamorphic (1), sedimentary (1)
Soil Texture: silt or silt loam (7), clay or clay loam (4), loam or sandy loam (4)

| | Mean | Range |
|---|---|---|
| Elevation | 841 ft. | 303-1824 ft. |
| Slope | 4.1º | 0-20º |
| Large rock cover | 0.7% | 0-3% |
| Small rock cover | 1.8% | 0-5% |
| Bare ground cover | 12.2% | 2-33% |
| Litter cover | 80.9% | 60-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=16)

**Rapid Assessments:** SNNR0271, SNNR0272, SNNR0480, SNNR0526, SNNR0660, SNNR0731, SNNR0804, SNNR0854, SNNR0970, SNNR0986, SNNR1131, SNNR1144, SNNR1327, SNNR1657, SNNR1659 **Relevés:** SNFN0038

**Rank:** G3S3

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada based solely upon data collected for this project. It is likely to be endemic to this area. The association appears similar to the *Q*. *lobata* / Grass Association defined by Allen et al. (1989, 1991) from the North and Central Coast Ranges (from Mendocino to Los Angeles Counties).

**STAND TABLE**
***Quercus lobata* / Herbaceous Semi-Riparian Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-T | *Quercus lobata* | 100 | 26.4 | 6 | 68 | X | | X | |
| | QULO-L | *Quercus lobata* | 56 | 0.3 | 0.2 | 3 | | | | |
| | QULO-M | *Quercus lobata* | 38 | 0.4 | 0.2 | 2 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 31 | 0.6 | 0.2 | 4 | | | | |
| | QUDO-T | *Quercus douglasii* | 31 | 0.5 | 0.2 | 5 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 0.3 | 0.2 | 2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 25 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 50 | 2.8 | 0.2 | 12 | | | | |
| | RUDI2 | *Rubus discolor* | 50 | 1.4 | 0.2 | 10 | | | | X |
| | RHTO6 | *Rhamnus tomentella* | 38 | 2.6 | 0.2 | 19 | | | | |
| | ARCA10 | *Aristolochia californica* | 31 | 2.1 | 0.2 | 20 | | | | |
| | VICA5 | *Vitis californica* | 31 | 1.1 | 0.2 | 8 | | | | |
| | SAME5 | *Sambucus mexicana* | 25 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 75 | 5.8 | 0.2 | 20 | | | X | X |
| | BRDI3 | *Bromus diandrus* | 69 | 6.3 | 0.2 | 26 | | | | X |
| | TOAR | *Torilis arvensis* | 63 | 3.9 | 1 | 16 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 56 | 4.1 | 0.2 | 22 | | | | X |
| | LOMU | *Lolium multiflorum* | 44 | 2.5 | 0.2 | 25 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 38 | 4.2 | 0.2 | 45 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 38 | 0.8 | 1 | 5 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 31 | 0.9 | 0.2 | 7 | | | | X |
| | VIVI | *Vicia villosa* | 25 | 2.6 | 0.2 | 35 | | | | X |
| | AVBA | *Avena barbata* | 25 | 0.5 | 0.2 | 5 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 25 | 0.5 | 0.2 | 3 | | | | |
| | PLLA | *Plantago lanceolata* | 25 | 0.4 | 0.2 | 5 | | | | X |
| | ELGL | *Elymus glaucus* | 25 | 0.3 | 0.2 | 2 | | | | |
| | HYPE | *Hypericum perforatum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |

***Quercus lobata* / *Rhus trilobata* Association (Provisional)**

**Valley Oak / Skunkbush Association (Provisional)**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus lobata* at 17-62% cover. *Quercus chrysolepis* was occasionally present in the overstory. The shrub layer was open to intermittent with *Rhus trilobata* dominant and with *Rhamnus tomentella* and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included *Avena barbata*, *Cynosurus echinatus*, *Elymus glaucus*, and *Trifolium hirtum*.

In the study area, this association was sampled commonly, but only in the Cascade Range Foothills Subregion (Hickman 1993). Stands usually occurred on volcanic (including basalt) and infrequently on sandstone substrates. They usually occupied lower slopes and stream terraces that were flat to somewhat steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.1 | 65-80 | - |
| Herb | 35.3 | 8-60 | variable |
| Shrub | 31.4 | 7-70 | <5 |
| Low Tree/Tall Shrub | 1.4 | 0-10 | 5-10 |
| Hardwood | 38.1 | 17-65 | 10-35 |
| Conifer | 0.5 | 0-2 | 5-20 |
| Relative non-native to native cover | 28.6 | 6-48 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: W (2), S (2), SW (1), NW (1), Flat (1)
Macrotopography: bottom (1), lower slope (6)
Microtopography: undulating (5), flat (2)
Parent Material: volcanic (4), sandstone (2), basalt (1)
Soil Texture: loam or sandy loam (3), clay or clay loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1162 ft. | 550-1509 ft. |
| Slope | 6.3º | 0-18º |
| Large rock cover | 0.9% | 0-3% |
| Small rock cover | 3% | <1-11% |
| Bare ground cover | 10% | <1-30% |
| Litter cover | 80.4% | 60-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0058, SNNR0242, SNNR0508, SNNR0513, SNNR0524, SNNR0542, SNNR0648

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada based solely upon the data collected for this project. It is likely to be restricted to this region.

**STAND TABLE**
***Quercus lobata* / *Rhus trilobata* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-T | *Quercus lobata* | 100 | 36.7 | 17 | 62 | X | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 43 | 1.0 | 1 | 5 | | | | |
| **Shrub** | | | | | | | | | | |
| | RHTR | *Rhus trilobata* | 100 | 18.9 | 1 | 55 | | X | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 3.9 | 1 | 6 | | | X | |
| | RHTO6 | *Rhamnus tomentella* | 71 | 1.5 | 0.2 | 5 | | | | |
| | VICA5 | *Vitis californica* | 43 | 5.0 | 4 | 16 | | | | |
| | ARCA10 | *Aristolochia californica* | 43 | 1.9 | 0.2 | 12 | | | | |
| | ROCA2 | *Rosa californica* | 29 | 1.0 | 0.2 | 7 | | | | |
| | RIRO | *Ribes roezlii* | 29 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 100 | 10.6 | 1 | 25 | | | X | X |
| | ELGL | *Elymus glaucus* | 86 | 1.0 | 0.2 | 2 | | | X | |
| | AVBA | *Avena barbata* | 57 | 4.6 | 1 | 12 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 57 | 3.5 | 0.2 | 13 | | | | X |
| | TOAR | *Torilis arvensis* | 43 | 4.1 | 3 | 20 | | | | X |
| | BRDI3 | *Bromus diandrus* | 29 | 1.7 | 0.2 | 12 | | | | X |
| | TONO | *Torilis nodosa* | 29 | 1.0 | 2 | 5 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 29 | 0.2 | 0.2 | 1 | | | | |
| | BRELE | *Brodiaea elegans* subsp. | 29 | 0.2 | 0.2 | 1 | | | | |
| | CAOC6 | *Calystegia occidentalis* | 29 | 0.1 | 0.2 | 0.2 | | | | |

## *Quercus lobata* / *Rubus discolor* Association
## Valley Oak / Himalayan Blackberry Association


### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus lobata* at 8-60% cover. *Quercus wislizeni* was characteristically present as a tree and/or shrub. The shrub layer was open to continuous with *Rubus discolor* dominant and with *Toxicodendron diversilobum* and *Vitis californica* often present. The herbaceous layer was open to intermittent with *Elymus glaucus*, *Torilis arvensis*, and *Artemisia douglasiana* occasionally present. The preponderance of the non-native *R*. *discolor* in the understory of this riparian association indicates the ubiquity of "semi-natural" conditions in this Foothills zone. In the Sacramento-San Joaquin River Delta (Hickson and Keeler-Wolf 2007), a close ecological relationship between *Rosa californica* and *Rubus discolor* has been demonstrated. It is likely that *Rosa californica* may have been more common in these foothill settings prior to European colonization.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on igneous (including volcanic, basalt, granitic, or gabbro) and metamorphic substrates (including slate), and infrequently on sedimentary or mixed alluvium substrates. They usually occupied bottoms and lower slopes, but sometimes occupied middle and upper slopes. Stands were usually along riparian corridors and stream terraces, that varied from flat to steep.


### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, Calaveras, El Dorado, Nevada, Placer, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 79.1 | 55-95 | - |
| Herb | 8.5 | 0-35 | variable |
| Shrub | 51.9 | 20-80 | <1-5 |
| Low Tree/Tall Shrub | 9.6 | 0-24 | 5-20 |
| Hardwood | 32.9 | 15-75 | 10-35 |
| Conifer | 0.8 | 0-8 | 5->35 |
| Relative non-native to native cover | 47.1 | 7-66 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: NW (4), SE (3), W (2), Variable (2), SW (2), S (2), Flat (1)
Macrotopography: bottom (6), bottom to lower slope (2), lower slope (4), middle slope (2), upper slope (1)
Microtopography: concave (10), undulating (4), flat (1), convex (1)
Parent Material: granitic (3), metamorphic (3), basalt (2), igneous (2), mixed alluvium (2), gabbro (1), sedimentary (1), slate (1), volcanic (1)
Soil Texture: loam or sandy loam (4), sand (4), silt or silt loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 949 ft. | 233-1565 ft. |
| Slope | 9.8º | 0-34º |

| | | |
|---|---|---|
| Large rock cover | 3.4% | 0-22% |
| Small rock cover | 3.9% | 0-17% |
| Bare ground cover | 17% | 1-60% |
| Litter cover | 72.3% | 32-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=16)

**Rapid Assessments:** SNNR0061, SNNR0287, SNNR0404, SNNR0615, SNNR0618, SNNR0635, SNNR0685, SNNR0810, SNNR0897, SNNR0898, SNNR1052, SNNR1206, SNNR1223, SNNR1269, SNNR1274, SNNR1334

**Rank:** G3S3 (Note: Despite the dominance by non-natives in the understory, the general conservation value rank has been applied considering overall "nativity" in most structural components of this association. This association's natural restriction to riparian foothill settings, suggests that it should be considered a relatively highly ranked community).

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project.

**STAND TABLE**
***Quercus lobata* / *Rubus discolor* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-T | *Quercus lobata* | 100 | 27.9 | 8 | 60 | X | | X | |
| | QUWI2-T | *Quercus wislizeni* | 75 | 2.0 | 0.2 | 6 | | | X | |
| | SALA3-T | *Salix laevigata* | 50 | 2.4 | 1 | 10 | | | | |
| | AECA-T | *Aesculus californica* | 31 | 2.4 | 3 | 12 | | | | |
| | QULO-M | *Quercus lobata* | 31 | 0.9 | 1 | 5 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 31 | 0.5 | 0.2 | 5 | | | | |
| | AECA-M | *Aesculus californica* | 31 | 0.1 | 0.2 | 0.2 | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 25 | 1.1 | 1 | 8 | | | | |
| | POFR2-T | *Populus fremontii* | 25 | 0.8 | 0.2 | 10 | | | | |
| | QUDO-T | *Quercus douglasii* | 25 | 0.3 | 1 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 100 | 43.1 | 7 | 75 | X | | X | X |
| | VICA5 | *Vitis californica* | 56 | 6.9 | 1 | 80 | | | | |
| | TODI | *Toxicodendron diversilobum* | 50 | 1.0 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 25 | 0.3 | 0.2 | 3 | | | | |
| | ARCA10 | *Aristolochia californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | ELGL | *Elymus glaucus* | 44 | 0.7 | 0.2 | 8 | | | | |
| | TOAR | *Torilis arvensis* | 44 | 0.6 | 0.2 | 3 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 31 | 0.2 | 0.2 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 25 | 1.4 | 1 | 15 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 25 | 1.1 | 1 | 10 | | | | X |
| | LOMU | *Lolium multiflorum* | 25 | 0.7 | 0.2 | 10 | | | | X |

### *Quercus lobata* - *Alnus rhombifolia* Association
### Valley Oak - White Alder Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated by *Quercus lobata* at 15-45% cover. *Alnus rhombifolia* was characteristically present and *Salix laevigata* was often present in the overstory, while *Fraxinus latifolia*, *Populus fremontii*, and *Quercus chrysolepis* were occasionally present. The shrub layer was open to continuous with *Rubus discolor* dominant and with *Vitis californica* often present. The herbaceous layer was open to intermittent and often included *Artemisia douglasiana*.

This association was sampled commonly in the study area from the Cascade Range Foothills, High Cascade Range, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on igneous (including granitic or volcanic) substrates, and infrequently on metamorphic or sedimentary substrates. They usually occupied slope bottom positions along riparian corridors and stream terraces, found along many creeks in the study area that were seasonally to perennially flooded. Slopes were flat to gentle. These stands are usually restricted to the immediate vicinity of stream and riverbanks from narrow stream channels. It is unlikely that this association occurs on broad terraces.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Nevada, Placer, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 71.9 | 18-90 | - |
| Herb | 15.2 | 2-50 | variable |
| Shrub | 32.5 | 3-75 | <1-5 |
| Low Tree/Tall Shrub | 12.5 | 0-40 | 5-15 |
| Hardwood | 39 | 15-60 | 10-35 |
| Conifer | 0.6 | 0-7 | 10-35 |
| Relative non-native to native cover | 22.6 | 0-53 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (3), NW (3), W (2), SW (2), S (2), Flat (2), SE (1)
Macrotopography: bottom (11), lower slope along creeks (2), flats along creeks (2)
Microtopography: undulating (5), concave (5), flat (5)
Parent Material: volcanic (8), metamorphic (3), granitic (2), igneous (1), sedimentary (1)
Soil Texture: sand (6), clay or clay loam (3), silt or silt loam (3), loam or sandy loam (1), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1179 ft. | 377-2115 ft. |
| Slope | 1.1º | 0-3º |
| Large rock cover | 10% | <1-45% |
| Small rock cover | 11.5% | 2-60% |
| Bare ground cover | 17% | 2-44% |
| Litter cover | 47.7% | 11-82% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** SNNR0214, SNNR0240, SNNR0244, SNNR0585, SNNR0838, SNNR0893, SNNR0894, SNNR1129, SNNR1145, SNNR1236, SNNR1256, SNNR1275, SNNR1284, SNNR1324, SNNR1325

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon data collected for this project.

**STAND TABLE**
***Quercus lobata* - *Alnus rhombifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-T | *Quercus lobata* | 100 | 28.7 | 15 | 45 | X | | X | |
| | ALRH2-T | *Alnus rhombifolia* | 93 | 12.9 | 0.2 | 40 | | | X | |
| | SALA3-T | *Salix laevigata* | 53 | 1.9 | 0.2 | 11 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 33 | 1.5 | 2 | 10 | | | | |
| | POFR2-T | *Populus fremontii* | 33 | 1.0 | 0.2 | 5 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 33 | 1.0 | 0.2 | 8 | | | | |
| | AECA-M | *Aesculus californica* | 33 | 0.3 | 0.2 | 2 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 27 | 0.8 | 0.2 | 10 | | | | |
| | JUCA-T | *Juglans californica* | 27 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 80 | 15.7 | 2 | 52 | X | | X | X |
| | VICA5 | *Vitis californica* | 80 | 6.6 | 0.2 | 20.2 | | | X | |
| | SALA6 | *Salix lasiolepis* | 47 | 1.5 | 0.2 | 10 | | | | |
| | COSE16 | *Cornus sericea* | 40 | 3.1 | 1 | 26 | | | | |
| | RUUR | *Rubus ursinus* | 33 | 2.4 | 0.2 | 15 | | | | |
| | TODI | *Toxicodendron diversilobum* | 33 | 2.1 | 1 | 20 | | | | |
| | CAOC5 | *Calycanthus occidentalis* | 27 | 2.4 | 4 | 16 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 27 | 1.0 | 0.2 | 12 | | | | |
| | ARCA10 | *Aristolochia californica* | 27 | 0.3 | 0.2 | 3.2 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 60 | 1.7 | 0.2 | 10 | | | | |
| | ELGL | *Elymus glaucus* | 47 | 0.3 | 0.2 | 1 | | | | |
| | JUEF | *Juncus effusus* | 33 | 0.4 | 0.2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 27 | 0.9 | 2 | 6 | | | | X |
| | CYER | *Cyperus eragrostis* | 27 | 0.6 | 0.2 | 5 | | | | |
| | TOAR | *Torilis arvensis* | 27 | 0.4 | 0.2 | 3 | | | | X |

## *Quercus lobata* - *Quercus wislizeni* Association
## Valley Oak - Interior Live Oak Association

### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus lobata* at 6-67% cover. *Quercus wislizeni* was characteristically present as a tree and/or shrub, though other trees were occasionally present, including *Pinus sabiniana* and *Platanus racemosa*. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant. The herbaceous layer was open to intermittent and often included non-natives *Cynosurus echinatus* and *Torilis arvensis*.

This association was sampled commonly in the study area within the Cascade Range Foothills and central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on igneous (including volcanic and granitic) or metamorphic (including phyllite and slate) substrates and occasionally on mixed alluvium or sedimentary substrates. They usually occupied bottoms to lower slopes, along riparian corridors and stream terraces that were intermittently to seasonally flooded. Slopes varied from flat to moderate.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, Calaveras, El Dorado, Mariposa, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Lower Granitic Foothills (M261Fc), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 69.5 | 43-85 | - |
| Herb | 22.1 | 2-40 | variable |
| Shrub | 23.2 | 5-47 | <5 |
| Low Tree/Tall Shrub | 4.3 | 0-40 | 5-15 |
| Hardwood | 36.3 | 20-72 | 10-35 |
| Conifer | 2.8 | 0-20 | 10-35 |
| Relative non-native to native cover | 16.3 | 0-29 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: W (3), Variable (3), SW (3), Flat (3), NW (2), N (2), S (1), E (1)
Macrotopography: bottom (11), bottom to lower slope (3), lower slope (2), terrace (2)
Microtopography: concave (6), undulating (5), convex (4), flat (3)
Parent Material: volcanic (7), metamorphic (4), igneous (2), granitic (1), mixed alluvium (1), phyllite (1), sedimentary (1), slate (1)
Soil Texture: clay or clay loam (4), loam or sandy loam (4), sand (4), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1047 ft. | 339-2157 ft. |
| Slope | 2º | 0-12º |
| Large rock cover | 8.9% | 0-45% |
| Small rock cover | 10.3% | 0-35% |
| Bare ground cover | 18.6% | 2-65% |
| Litter cover | 54.3% | 4.7-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=18)

**Rapid Assessments:** SNNR0022, SNNR0168, SNNR0246, SNNR0256, SNNR0472, SNNR0477, SNNR0732, SNNR0733, SNNR0739, SNNR0843, SNNR0920, SNNR1011, SNNR1045, SNNR1303, SNNR1346, SNNR1347 **Relevés:** SNFN0251, SNFN0326

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project. It is likely to be restricted to this area.

**STAND TABLE**
***Quercus lobata* - *Quercus wislizeni* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-T | *Quercus lobata* | 100 | 22.5 | 6 | 67 | | X | X | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 12.2 | 1 | 30 | | | X | |
| | AECA-M | *Aesculus californica* | 33 | 2.8 | 0.2 | 37 | | | | |
| | PISA2-T | *Pinus sabiniana* | 33 | 2.5 | 0.2 | 20 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 33 | 0.9 | 0.2 | 7 | | | | |
| | PLRA-T | *Platanus racemosa* | 28 | 1.7 | 0.2 | 20 | | | | |
| | QULO-L | *Quercus lobata* | 22 | 0.6 | 0.2 | 11 | | | | |
| | QULO-M | *Quercus lobata* | 22 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 94 | 8.3 | 0.2 | 37 | | X | X | |
| | RUDI2 | *Rubus discolor* | 44 | 1.6 | 0.2 | 12 | | | | X |
| | RHTO6 | *Rhamnus tomentella* | 39 | 1.9 | 1 | 15 | | | | |
| | VICA5 | *Vitis californica* | 33 | 4.0 | 1 | 35 | | | | |
| | CEOCO | *Cercis occidentalis* | 22 | 0.9 | 1 | 8 | | | | |
| | RUUR | *Rubus ursinus* | 22 | 0.3 | 0.2 | 4 | | | | |
| | RHTR | *Rhus trilobata* | 22 | 0.3 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 67 | 4.4 | 0.2 | 20 | | | | X |
| | TOAR | *Torilis arvensis* | 56 | 1.8 | 0.2 | 10 | | | | X |
| | LOMU | *Lolium multiflorum* | 39 | 1.8 | 2 | 10 | | | | X |
| | BRDI3 | *Bromus diandrus* | 39 | 1.2 | 0.2 | 5 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 28 | 0.6 | 0.2 | 6 | | | | X |
| | VISA | *Vicia sativa* | 28 | 0.2 | 0.2 | 2 | | | | X |
| | MIGU | *Mimulus guttatus* | 22 | 0.8 | 3 | 5 | | | | |
| | TRHI4 | *Trifolium hirtum* | 22 | 0.7 | 0.2 | 6 | | | | X |
| | AVBA | *Avena barbata* | 22 | 0.3 | 0.2 | 4 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 22 | 0.1 | 0.2 | 1 | | | | |
| | ELGL | *Elymus glaucus* | 22 | 0.0 | 0.2 | 0.2 | | | | |

## *Quercus wislizeni* Woodland/Forest Alliance
## Interior Live Oak Woodland/Forest Alliance

As defined in the state, *Quercus wislizeni* is dominant or co-dominant in the tree canopy with *Arbutus menziesii*, *Lithocarpus densiflorus*, *Pinus sabiniana*, *Quercus douglasii*, and *Quercus kelloggii*. The canopy is continuous, intermittent, or savanna-like. The shrub layer is open to intermittent and may contain *Heteromeles arbutifolia*, *Arctostaphylos viscida*, and or *A. manzanita*. The herbaceous layer is sparse or grassy. Stands of *Quercus wislizeni* are found on upland slopes, valley bottoms, and terraces. Soils are shallow and moderately to excessively drained. This alliance is greatly indicative of the Sierra Foothills environment, just like the Blue Oak Alliance. Although it is described from other parts of the state, the range of natural variability of the true woodland type (excluding shrub interior live oak associations, considered members of a different alliance) is unsurpassed in the Foothills. Local stands express a range from mesic associations that affiliate with the northwestern California "mixed evergreen forest", to relatively xeric associations that are found primarily in the scrubby California chaparral environment.

In the study area, thirteen associations of the Interior live oak Alliance were classified and are described below. Seven stands showed additional variation and were classified to the alliance level only (SNNR0681, SNNR0734, SNNR1296, SNFN0495, SNNR0113, SNNR0171, SNNR0773). Three of these stands had a well-developed herbaceous understory, including one with *Tuberaria guttata* and moss. One stand contained *Fraxinus dipetala*, another had *Quercus douglasii* and *Q. kelloggii*, and two stands contained *Umbellularia californica* and *Aesculus californica*.

---

## *Quercus wislizeni* / *Arctostaphylos viscida* Association
## Interior Live Oak / Whiteleaf Manzanita Association

### SUMMARY
In the stands sampled, the canopy was typically open to continuous and dominated by *Quercus wislizeni* at 4-71% combined cover in the tree and/or shrub overstory. Other trees such as *Pinus sabiniana* and *Quercus kelloggii* were often present. The shrub layer was open to continuous with *Arctostaphylos viscida* dominant and with *Heteromeles arbutifolia* and *Toxicodendron diversilobum* characteristically present. The herbaceous layer was open and often included *Elymus glaucus*, *Galium porrigens*, and *Torilis arvensis*.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including slate) substrates, occasionally on sedimentary (including shale), and infrequently on igneous (including granitic), and mixed rock substrates. They occupied slope positions from lower slopes to ridgetops (preferring middle and upper slopes). Slopes varied from gentle to steep.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, Butte, Calaveras, El Dorado, Nevada, Placer, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 69.1 | 35-81 | - |
| Herb | 8.1 | 0-23 | variable |
| Shrub | 33.9 | 0-72 | <5 |
| Low Tree/Tall Shrub | 1.3 | 0-20 | 5-10 |
| Hardwood | 36.2 | 0-72 | 5-20 |
| Conifer | 2.7 | 0-9 | 5-35 |
| Relative non-native to native cover | 6.5 | 0-36 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (4), E (4), W (2), SW (2), SE (1), S (1), NW (1), NE (1)
Macrotopography: entire slope (1), lower slope (1), lower to middle slope (1), middle slope (4), middle to upper slope (3), upper slope (3), upper slope to ridgetop (2), ridgetop (1)
Microtopography: convex (7), undulating (7)
Parent Material: metamorphic (8), sedimentary (3), granitic (1), igneous (1), mixed rock (1), shale (1), slate (1)
Soil Texture: clay or clay loam (6), loam or sandy loam (3), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1407 ft. | 670-2859 ft. |
| Slope | 20.6º | 2-30º |
| Large rock cover | 0.7% | 0-3% |
| Small rock cover | 3.4% | 0-17% |
| Bare ground cover | 7.4% | 1-25% |
| Litter cover | 85% | 62-98% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=16)

**Rapid Assessments:** SNNR0300, SNNR0560, SNNR0575, SNNR0576, SNNR0653, **Relevés:** SNFN0004, SNFN0261, SNFN0581

**Rank:** G4S4

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills by Allen et al. (1989, 1991). It is likely to be restricted to this area, but is locally widespread and common.

**STAND TABLE**
***Quercus wislizeni* / *Arctostaphylos viscida* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 88 | 31.5 | 4 | 71 | X | | X | |
| | QUWI2-M | *Quercus wislizeni* | 69 | 6.7 | 0.2 | 42 | | | | |
| | PISA2-T | *Pinus sabiniana* | 69 | 2.1 | 0.2 | 8 | | | | |
| | QUKE-T | *Quercus kelloggii* | 56 | 1.4 | 0.2 | 8 | | | | |
| | PIPO-T | *Pinus ponderosa* | 44 | 0.7 | 0.2 | 4 | | | | |
| | QUDO-T | *Quercus douglasii* | 38 | 0.6 | 0.2 | 4 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-M | *Pinus sabiniana* | 31 | 0.1 | 0.2 | 1 | | | | |
| | AECA-M | *Aesculus californica* | 25 | 0.4 | 0.2 | 4 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 12.2 | 4.2 | 25 | | X | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 8.2 | 0.2 | 30 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 94 | 5.5 | 0.2 | 15 | | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 31 | 0.1 | 0.2 | 0.4 | | | | |
| **Herb** | | | | | | | | | | |
| | GAPO | *Galium porrigens* | 75 | 0.4 | 0.2 | 3 | | | X | |
| | TOAR | *Torilis arvensis* | 56 | 0.5 | 0.2 | 3 | | | | X |
| | ELGL | *Elymus glaucus* | 50 | 0.5 | 0.2 | 3 | | | | |
| | CYEC | *Cynosurus echinatus* | 38 | 1.6 | 0.2 | 14 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 38 | 0.2 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 31 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 25 | 1.1 | 1 | 10 | | | | X |
| | AVBA | *Avena barbata* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 25 | 0.1 | 0.2 | 1 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 3.3 | 0.2 | 20 | | | | |

## *Quercus wislizeni* / *Heteromeles arbutifolia* Association

## Interior Live Oak / Toyon Association

### SUMMARY

In the stands sampled, the canopy was typically open to continuous and dominated by *Quercus wislizeni* at 6-70% combined cover in the tree and/or shrub layers. *Pinus sabiniana* was often present in the tree overstory. The shrub layer was open to continuous with *Heteromeles arbutifolia* dominant and with *Toxicodendron diversilobum* characteristically present. The herbaceous layer was open to continuous with *Galium porrigens* and *Torilis arvensis* often present.

In the study area, this association was sampled commonly within the central and northern Sierra Nevada Foothills, and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including slate and serpentine) or igneous (including granitic, basalt, and gabbro) substrates, and less frequently on sedimentary (including limestone), mixed metamorphic, ultramafic, or conglomerate substrates. They occupied all aspects and slope positions from bottom to upper slopes and draws (preferring middle to upper slopes). Slopes varied from gentle to steep. This was the most common association of Interior Live Oak sampled in the region.

### DISTRIBUTION IN STUDY AREA

This association was sampled in nine counties: Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Tehama, and Tuolumne - within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 70.5 | 45-95 | - |
| Herb | 14.1 | 0-70 | variable |
| Shrub | 39.5 | 2-89 | <5 |
| Low Tree/Tall Shrub | 1 | 0-51 | 5-10 |
| Hardwood | 34.8 | 0-85 | 5-20 |
| Conifer | 1.5 | 0-10 | 5-35 |
| Relative non-native to native cover | 12.3 | 0-44 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: Variable (11), NW (10), W (7), SW (5), S (5), N (5), E (5), SE (4), NE (3)
Macrotopography: entire slope (1), bottom to lower slope (1), lower slope (9), lower to middle slope (7), lower to upper slope (5), middle slope (14), middle to upper slope (4), upper slope (13), draw (1)
Microtopography: undulating (33), flat (11), convex (7), concave (4)
Parent Material: metamorphic (18), volcanic (10), sedimentary (6), slate (5), granitic (3), basalt (2), gabbro (2), igneous (2), ultramafic (2), conglomerate (1), limestone (1), mixed metamorphic (1), serpentine (1), water (1)
Soil Texture: clay or clay loam (20), loam or sandy loam (15), silt or silt loam (11), sand (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1226 ft. | 219-2798 ft. |
| Slope | 20.7º | 1-45º |
| Large rock cover | 3.3% | 0-50% |
| Small rock cover | 4.7% | 0-30% |

| | | |
|---|---|---|
| Bare ground cover | 11.8% | <1-48% |
| Litter cover | 76.4% | 27-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=55)

**Rapid Assessments:** SNNR0099, SNNR0137, SNNR0142, SNNR0148, SNNR0231, SNNR0262, SNNR0275, SNNR0276, SNNR0301, SNNR0305, SNNR0360, SNNR0411, SNNR0412, SNNR0538, SNNR0544, SNNR0555, SNNR0579, SNNR0637, SNNR0672, SNNR0870, SNNR0876, SNNR0937, SNNR0948, SNNR0954, SNNR1001, SNNR1013, SNNR1089, SNNR1091, SNNR1099, SNNR1102, SNNR1117, SNNR1141, SNNR1175, SNNR1177, SNNR1191, SNNR1195, SNNR1198, SNNR1208, SNNR1227, SNNR1257, SNNR1262, SNNR1358, SNNR1392, SNNR1398, SNNR1467, SNNR1468
**Relevés:** SNFN0022, SNFN0044, SNFN0067, SNFN0092, SNFN0146, SNFN0435, SNFN0672, SNFN0681, SNFN0682

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Allen et al. (1989, 1991) and Evens et al. (2004). This is one of the most widespread of the interior live oak associations in the study area. Another association of *Q. wislizeni* with *Heteromeles arbutifolia* has been described from Marin Co. (Evens and Kentner 2006). However, that association is shrubby and considered part of the Interior Live Oak Shrub Alliance.

**STAND TABLE**
***Quercus wislizeni* / *Heteromeles arbutifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 93 | 30.5 | 0.2 | 70 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 67 | 1.5 | 0.2 | 10 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 47 | 5.4 | 0.2 | 58 | | | | |
| | QUDO-T | *Quercus douglasii* | 35 | 0.5 | 0.2 | 5 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 29 | 0.1 | 0.2 | 1 | | | | |
| | AECA-M | *Aesculus californica* | 27 | 1.3 | 0.2 | 28 | | | | |
| | QUKE-T | *Quercus kelloggii* | 27 | 0.9 | 0.2 | 11 | | | | |
| **Shrub** | | | | | | | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 19.9 | 1 | 60.2 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 93 | 11.7 | 0.2 | 50 | | | X | |
| | ARVI4 | *Arctostaphylos viscida* | 40 | 1.0 | 0.2 | 7 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.4 | 0.2 | 5 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 27 | 0.5 | 0.2 | 6 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 27 | 0.5 | 0.2 | 15.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 71 | 1.7 | 0.2 | 10 | | | | X |
| | GAPO | *Galium porrigens* | 56 | 0.2 | 0.2 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 47 | 1.6 | 0.2 | 20 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 38 | 3.5 | 0.2 | 45 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 38 | 0.2 | 0.2 | 3 | | | | |
| | BRDI3 | *Bromus diandrus* | 35 | 0.6 | 0.2 | 7 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 33 | 1.4 | 0.2 | 15 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 31 | 0.1 | 0.2 | 1 | | | | |
| | AVBA | *Avena barbata* | 29 | 0.9 | 0.2 | 15 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 22 | 0.3 | 0.2 | 4 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 31 | 2.8 | 0.2 | 50 | | | | |

### *Quercus wislizeni* / *Toxicodendron diversilobum* Association

### Interior Live Oak / Poison Oak Association

**SUMMARY**

In the stands sampled, the canopy was typically open to continuous and dominated by *Quercus wislizeni* at 10-70% combined cover in the tree overstory and/or understory layers. *Pinus sabiniana* was often present as an overstory tree. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* often present at low cover. The herbaceous layer was open to continuous and often included *Cynosurus echinatus*, *Galium porrigens*, and *Torilis arvensis*.

This association was sampled commonly throughout most of the study area within the central and northern Sierra Nevada Foothills and Cascade Range Foothills Subregions, but only once in the High Cascade Range Subregion (Hickman 1993). Stands often occurred on metamorphic (including mixed metamorphic, greenstone and slate) or on igneous (including volcanic, basalt, gabbro, and granitic) substrates, and less frequently on sedimentary (including sandstone), ultramafic, and mixed rock substrates. They occupied all aspects on lower slopes to ridgetops, preferring middle slope positions. The slopes varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in ten counties: Amador, Butte, Calaveras, El Dorado, Mariposa, Placer, Shasta, Tehama, Tuolumne, and Yuba - within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 70.1 | 32-95 | - |
| Herb | 22.8 | 0-70 | variable |
| Shrub | 24.8 | 0-68 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 46.2 | 0-70 | 5-20 |
| Conifer | 0.9 | 0-4 | 5-35 |
| Relative non-native to native cover | 16.6 | 0-39 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NE (8), W (7), SE (5), N (5), E (5), Variable (4), SW (4), S (1), NW (1), Flat (1), (0)
Macrotopography: lower slope (7), lower to middle slope (1), lower to upper slope (2), middle slope (21), middle to upper slope (4), upper slope (5), ridgetop (3)
Microtopography: undulating (25), flat (9), convex (6), concave (2)
Parent Material: metamorphic (16), sedimentary (7), volcanic (6), basalt (2), gabbro (2), igneous (2), ultramafic (2), granitic (1), greenstone (1), mixed metamorphic (1), mixed rock (1), sandstone (1), slate (1)
Soil Texture: clay or clay loam (12), silt or silt loam (12), loam or sandy loam (10), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1160 ft. | 400-2205 ft. |
| Slope | 17.7º | 0-45º |
| Large rock cover | 6.2% | 0-83% |
| Small rock cover | 3.2% | <1-25.2% |
| Bare ground cover | 12.3% | <1-86% |
| Litter cover | 74.9% | 10-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=43)

**Rapid Assessments:** SNNR0050, SNNR0100, SNNR0159, SNNR0471, SNNR0484, SNNR0527, SNNR0571, SNNR0644, SNNR0661, SNNR0741, SNNR0800, SNNR0905, SNNR0912, SNNR0922, SNNR0982, SNNR0994, SNNR0996, SNNR1018, SNNR1035, SNNR1039, SNNR1170, SNNR1181, SNNR1241, SNNR1293, SNNR1323, SNNR1329, SNNR1338, SNNR1404, SNNR1407, SNNR1426, SNNR1435, SNNR1438
**Relevés:** SNFN0001, SNFN0028, SNFN0060, SNFN0068, SNFN0075, SNFN0106, SNFN0191, SNFN0635, SNFN0665, SNFN0667, SNFN0677

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada by Evens et al. (2004) in Tuolumne County. It appears to be restricted to this region, but it is locally widespread and common.

**STAND TABLE**
***Quercus wislizeni* / *Toxicodendron diversilobum* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 44.3 | 1 | 70 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 63 | 0.8 | 0.2 | 4 | | | | |
| | QUDO-T | *Quercus douglasii* | 42 | 0.7 | 0.2 | 5 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 33 | 3.1 | 0.2 | 45 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-M | *Pinus sabiniana* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 20.7 | 0.2 | 60 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 51 | 0.6 | 0.2 | 6 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 40 | 0.4 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 35 | 0.5 | 0.2 | 5 | | | | |
| | CECU | *Ceanothus cuneatus* | 28 | 1.0 | 0.2 | 20 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 21 | 0.1 | 0.2 | 2 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 21 | 0.1 | 0.2 | 0.4 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 81 | 3.3 | 0.2 | 20 | | | X | X |
| | GAPO | *Galium porrigens* | 63 | 0.3 | 0.2 | 6 | | | | |
| | CYEC | *Cynosurus echinatus* | 56 | 2.4 | 0.2 | 20 | | | | X |
| | BRDI3 | *Bromus diandrus* | 47 | 1.7 | 0.2 | 10 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 42 | 0.2 | 0.2 | 2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 40 | 4.3 | 0.2 | 45 | | | | X |
| | BRMA3 | *Bromus madritensis* | 37 | 0.7 | 0.2 | 7 | | | | X |
| | DAPU3 | *Daucus pusillus* | 37 | 0.3 | 0.2 | 5 | | | | |
| | AVBA | *Avena barbata* | 33 | 0.3 | 0.2 | 5 | | | | X |
| | MECA2 | *Melica californica* | 30 | 0.1 | 0.2 | 1 | | | | |
| | MAGR3 | *Madia gracilis* | 28 | 0.2 | 0.2 | 2 | | | | |
| | GEMO | *Geranium molle* | 26 | 0.7 | 0.2 | 7 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 26 | 0.6 | 0.2 | 10 | | | | X |
| | AICA | *Aira caryophyllea* | 26 | 0.5 | 0.2 | 10 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 26 | 0.1 | 0.2 | 1 | | | | |
| | CAAL2 | *Calochortus albus* | 26 | 0.1 | 0.2 | 1 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 23 | 0.4 | 0.2 | 10 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 21 | 0.3 | 0.2 | 8 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 21 | 0.1 | 0.2 | 1 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 35 | 1.0 | 0.2 | 10 | | | | |

***Quercus wislizeni* Mixed Shrub Association (Provisional)**
**Interior Live Oak Mixed Shrub Association (Provisional)**

**SUMMARY**
In the stands sampled, the canopy was typically open to continuous and dominated by *Quercus wislizeni* at 8-45% cover as a shrub or low tree. *Pinus sabiniana* was often present as a medium to tall tree. The shrub layer was open to continuous with *Arctostaphylos manzanita*, *Ceanothus cuneatus*, *Ceanothus lemmonii*, *Cercis occidentalis*, *Eriodictyon californicum*, *Fremontodendron californicum*, *Rhamnus ilicifolia*, *Rhamnus tomentella*, and *Toxicodendron diversilobum* often present. The herbaceous layer was open and often included *Aira caryophyllea*, *Bromus hordeaceus*, *Sanicula bipinnatifida*, and *Torilis arvensis*. The shrubby nature of this association differentiates it from most others of this alliance within the study area. It is unclear whether the shrubby to understory-tree lifeform of *Q*. *wislizeni* individuals is related to site history (including fire frequency) or whether there is a genetic component involved (e.g., *Quercus wislizeni* var. *frutescens*). The similarity of species composition with the previous *Q*. *wislizeni* / *Toxicodendron diversilobum* Association suggests that at least some of these stands described here are simply early seral (post-fire) expressions of that widespread association (as seen in these stands where *Eriodictyon californicum* is characteristically present).

This association was sampled infrequently in the study area within the Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands always occurred on volcanic substrates. They occupied middle slopes to ridgetops on slopes that were gentle to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in the two northernmost counties: Shasta and Tehama Counties – within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.5 | 45-90 | - |
| Herb | 12 | 1-25 | variable |
| Shrub | 58.5 | 33-91 | 1-5 |
| Low Tree/Tall Shrub | 7.5 | 0-45 | 5-10 |
| Hardwood | 1.2 | 0-5 | 5-20 |
| Conifer | 0.7 | 0-4 | 10-20 |
| Relative non-native to native cover | 11.5 | 1-30 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (3), NE (2), SW (1)
Macrotopography: middle slope (1), upper slope (2), upper slope to ridgetop (2), ridgetop (1)
Microtopography: flat (4), undulating (2)
Parent Material: volcanic (6)
Soil Texture: clay or clay loam (4), loam or sandy loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 2014 ft. | 1357-3265 ft. |
| Slope | 14.3º | 3-24º |
| Large rock cover | 4.1% | <1-22% |
| Small rock cover | 8.2% | 3-15% |
| Bare ground cover | 23.5% | 10-59% |
| Litter cover | 60.2% | 35-80% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0235, SNNR0433, SNNR0441, SNNR0811, SNNR0827, SNNR0833

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, based upon data collected for this project. This association appears similar to the *Quercus wislizeni* / *Eriodictyon californicum* / Grass Association defined by Allen et al. (1989, 1991) for the central Sierra Nevada. When compared to other *Q*. *wislizeni* associations that they defined, their *Q*. *wislizeni* / *E*. *californicum* / Grass Association: 1) had the lowest mean diameter breast height of *Q*. *wislizeni*, 2) commonly had understory live oaks, and 3) had higher average shrub cover.

**STAND TABLE**
***Quercus wislizeni* Mixed Shrub Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-M | *Quercus wislizeni* | 100 | 24.2 | 8 | 45 | X | | X | |
| | PISA2-M | *Pinus sabiniana* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-T | *Pinus sabiniana* | 33 | 0.7 | 0.2 | 4 | | | | |
| | UMCA-M | *Umbellularia californica* | 33 | 0.2 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 4.9 | 0.2 | 23 | | | X | |
| | ERCA6 | *Eriodictyon californicum* | 83 | 2.2 | 0.2 | 8.2 | | | X | |
| | CECU | *Ceanothus cuneatus* | 83 | 1.2 | 0.2 | 3 | | | X | |
| | ARMA | *Arctostaphylos manzanita* | 50 | 5.1 | 0.2 | 30 | | | | |
| | CELE | *Ceanothus lemmonii* | 50 | 4.4 | 6 | 10.2 | | | | |
| | CEOCO | *Cercis occidentalis* | 50 | 1.4 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 50 | 0.4 | 0.2 | 2 | | | | |
| | FRCA6 | *Fremontodendron* | 50 | 0.2 | 0.2 | 1 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 0.2 | 0.2 | 1 | | | | |
| | LECA3 | *Lepechinia calycina* | 33 | 6.7 | 0.2 | 40 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 33 | 2.8 | 1 | 16 | | | | |
| | QUGAB | *Quercus garryana* var. *breweri* | 33 | 1.2 | 1 | 6 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 33 | 0.8 | 1 | 4 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 67 | 3.0 | 2 | 7 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.7 | 0.2 | 4 | | | | X |
| | AICA | *Aira caryophyllea* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | AVBA | *Avena barbata* | 33 | 0.7 | 0.2 | 4 | | | | X |
| | VUMY | *Vulpia myuros* | 33 | 0.3 | 1 | 1 | | | | X |
| | CAMO3 | *Calochortus monophyllus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CAOC6 | *Calystegia occidentalis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 33 | 0.1 | 0.2 | 0.2 | | | | |

***Quercus wislizeni - Salix laevigata / Rhamnus tomentella* Association**

**Interior Live Oak - Red Willow / Hoary Coffeeberry Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus wislizeni* at 5-58% cover. Other trees such as *Salix laevigata* and *Pinus sabiniana* were often present. The shrub layer was open to continuous with *Heteromeles arbutifolia*, *Rhamnus tomentella*, *Rubus discolor*, *Toxicodendron diversilobum*, and *Vitis californica* often present. The herbaceous layer was open to intermittent and often included *Torilis arvensis*.. Although *S. laevigata* is only present in about two-thirds of the samples, it is indicative of the riparian environment, along with other riparian associates of this type.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills and infrequently within the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands sometimes occurred on metamorphic substrates, sometimes on on igneous (including diorite, gabbro, or granitic) substrates, and infrequently on alluvium or shale substrates. They most frequently occupied bottom slope positions, but also occurred on lower to middle slopes along riparian corridors and stream terraces. Stand slopes varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Shasta, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 69.5 | 18-86 | - |
| Herb | 15.8 | 1-50 | variable |
| Shrub | 31.5 | 5-70 | <5 |
| Low Tree/Tall Shrub | 6 | 0-40 | 5-15 |
| Hardwood | 37.8 | 11-67 | 5-20 |
| Conifer | 1.8 | 0-7 | 10-35 |
| Relative non-native to native cover | 15.4 | 0-48 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: S (4), Variable (3), N (3), W (2), SW (2), E (2), NW (1), Flat (1)
Macrotopography: bottom (10), lower slope (3), lower to middle slope (2), middle slope (3)
Microtopography: undulating (10), concave (6), flat (1), convex (1)
Parent Material: metamorphic (8), mixed alluvium (3), shale (2), clayey alluvium (1), diorite (1), gabbro (1), granitic (1), igneous (1)
Soil Texture: sand (5), loam or sandy loam (3), silt or silt loam (3), clay or clay loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 961 ft. | 392-2270 ft. |
| Slope | 7.1º | 0-28º |
| Large rock cover | 6.8% | 0-25% |
| Small rock cover | 11.5% | 0-73% |
| Bare ground cover | 16.2% | 1-59% |
| Litter cover | 59.2% | 8-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=18)

**Rapid Assessments:** SNNR0011, SNNR0052, SNNR0398, SNNR0409, SNNR0475, SNNR0604, SNNR0619, SNNR0625, SNNR0913, SNNR0924, SNNR0936, SNNR1104, SNNR1152, SNNR1196, SNNR1307, SNNR1366, SNNR1395 **Relevés:** SNFN0393

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills solely from the data collected for this project. Potter (2005) does not describe a riparian association of the *Q. wislizeni* Alliance in his description of Sierra Nevada riparian vegetation. This may be related to the focus of that study on higher elevation riparian systems, largely within the lands managed by the US Forest Service.

**STAND TABLE**
***Quercus wislizeni - Salix laevigata / Rhamnus tomentella* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 26.5 | 5 | 58 | X | | X | |
| | SALA3-T | *Salix laevigata* | 50 | 6.2 | 0.2 | 40 | | | | |
| | PISA2-T | *Pinus sabiniana* | 50 | 1.5 | 0.2 | 7 | | | | |
| | QULO-T | *Quercus lobata* | 28 | 2.8 | 4 | 20 | | | | |
| | QUKE-T | *Quercus kelloggii* | 28 | 2.0 | 0.2 | 17 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 28 | 0.5 | 0.2 | 3 | | | | |
| | AECA-T | *Aesculus californica* | 22 | 3.0 | 5 | 25 | | | | |
| | UMCA-T | *Umbellularia californica* | 22 | 1.2 | 0.2 | 16 | | | | |
| | QUDO-T | *Quercus douglasii* | 22 | 0.7 | 2 | 5 | | | | |
| | AECA-M | *Aesculus californica* | 22 | 0.3 | 1 | 3 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 22 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 7.6 | 0.4 | 30 | | | X | |
| | RUDI2 | *Rubus discolor* | 67 | 5.0 | 0.2 | 20 | | | | X |
| | RHTO6 | *Rhamnus tomentella* | 67 | 2.1 | 0.2 | 12 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 61 | 2.2 | 0.2 | 12 | | | | |
| | VICA5 | *Vitis californica* | 50 | 4.1 | 1 | 28 | | | | |
| | FICA | *Ficus carica* | 22 | 0.8 | 0.2 | 10 | | | | X |
| | SALA6 | *Salix lasiolepis* | 22 | 0.8 | 0.2 | 12 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 50 | 1.6 | 0.2 | 15 | | | | X |
| | CYEC | *Cynosurus echinatus* | 44 | 1.9 | 0.2 | 8 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 39 | 0.4 | 0.2 | 5 | | | | X |
| | ARDO3 | *Artemisia douglasiana* | 33 | 0.2 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 28 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 22 | 0.3 | 1 | 2 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 22 | 0.1 | 0.2 | 2 | | | | |
| | MIGU | *Mimulus guttatus* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 56 | 6.6 | 0.2 | 46 | | | | |

## *Quercus wislizeni - Aesculus californica* Association
## Interior Live Oak - California Buckeye Association

### SUMMARY
In the stands sampled, the canopy was typically open to continuous and dominated by *Quercus wislizeni* at 3-70% combined cover in the tree overstory and/or understory layers. Other trees such as *Aesculus californica* were characteristically present. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* often present. The herbaceous layer was open to continuous and often included *Torilis arvensis*.

This association was sampled commonly throughout much of the study area, within the central and northern Sierra Nevada Foothills, and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on igneous substrates (including volcanic, gabbro, or granitic), sometimes on metamorphic (including slate and mixed) substrates, and infrequently on sedimentary (including limestone) or ultramafic substrates. Around half the stands occurred on volcanic substrates, and they commonly occupied bottom to upper slopes. Slopes were, on average, moderately steep, and 60% of the plots were on at least 20 degree slopes.

### DISTRIBUTION IN STUDY AREA
This association was sampled in ten counties: Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Shasta, Tehama, and Tuolumne - within the Lower Foothills Metamorphic Belt (M261Fb), Lower Granitic Foothills (M261Fc), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 69.3 | 25-94 | - |
| Herb | 21.6 | 0-75 | variable |
| Shrub | 40.2 | 4-87 | <5 |
| Low Tree/Tall Shrub | 3.9 | 0-40 | 5-10 |
| Hardwood | 31.2 | 0-75 | 5-35 |
| Conifer | 0.9 | 0-8 | 5-35 |
| Relative non-native to native cover | 13.4 | 0-43 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: N (14), NW (10), Variable (9), NE (7), SW (2), W (1), SE (1), S (1), E (1)
Macrotopography: bottom (5), bottom to lower slope (2), lower slope (12), lower to middle slope (6), lower to upper slope (2), middle slope (4), middle to upper slope (3), upper slope (10), upper slope to ridgetop (1)
Microtopography: undulating (22), convex (8), flat (7), concave (7)
Parent Material: volcanic (19), metamorphic (9), granitic (4), sedimentary (4), slate (3), ultramafic (3), gabbro (1), igneous (1), limestone (1), mixed metamorphic (1)
Soil Texture: loam or sandy loam (14), clay or clay loam (11), sand (7), silt or silt loam (7), unknown (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1063 ft. | 236-2075 ft. |
| Slope | 23.3º | 0-50º |
| Large rock cover | 11.7% | 0-75% |
| Small rock cover | 7.1% | 0-55% |
| Bare ground cover | 12.2% | 0-76% |
| Litter cover | 65.3% | 13-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=46)

**Rapid Assessments:** SNNR0005, SNNR0026, SNNR0037, SNNR0065, SNNR0094, SNNR0098, SNNR0173, SNNR0229, SNNR0234, SNNR0237, SNNR0556, SNNR0557, SNNR0562, SNNR0587, SNNR0608, SNNR0614, SNNR0674, SNNR0740, SNNR0839, SNNR0845, SNNR0851, SNNR0857, SNNR0867, SNNR0875, SNNR0902, SNNR0931, SNNR0932, SNNR0934, SNNR0945, SNNR0955, SNNR1012, SNNR1068, SNNR1079, SNNR1161, SNNR1169, SNNR1201, SNNR1220, SNNR1280, SNNR1408, SNNR1446, SNNR1447, SNNR1459, SNNR1465 **Relevés:** SNFN0257, SNFN0650, SNFN0668

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills by Evens et al. (2004). Similar stands have been observed as far south as the foothills of Sequoia National Park (S. Haultain, pers. comm. 2004).

**STAND TABLE**
***Quercus wislizeni - Aesculus californica* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 87 | 30.2 | 2 | 70 | X | | X | |
| | AECA-M | *Aesculus californica* | 83 | 7.1 | 0.2 | 40 | | | X | |
| | PISA2-T | *Pinus sabiniana* | 46 | 0.8 | 0.2 | 8 | | | | |
| | QUDO-T | *Quercus douglasii* | 46 | 0.4 | 0.2 | 3 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 41 | 4.1 | 0.2 | 45 | | | | |
| | AECA-T | *Aesculus californica* | 37 | 5.0 | 1 | 40 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 96 | 17.3 | 0.2 | 55 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 59 | 4.9 | 0.2 | 30 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.3 | 0.2 | 3 | | | | |
| | CLLA3 | *Clematis lasiantha* | 30 | 0.5 | 0.2 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 63 | 2.0 | 0.2 | 12 | | | | X |
| | CYEC | *Cynosurus echinatus* | 37 | 1.2 | 0.2 | 8 | | | | X |
| | AVBA | *Avena barbata* | 30 | 0.5 | 0.2 | 5 | | | | X |
| | GAPO | *Galium porrigens* | 30 | 0.1 | 0.2 | 1 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 26 | 1.4 | 0.2 | 30 | | | | X |
| | DIVO | *Dichelostemma volubile* | 26 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 24 | 0.2 | 0.2 | 5 | | | | |
| | BRDI3 | *Bromus diandrus* | 22 | 0.9 | 0.2 | 25 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 24 | 3.8 | 2 | 40 | | | | |

***Quercus wislizeni - Pinus ponderosa* Association**

**Interior Live Oak - Ponderosa Pine Association**

**SUMMARY**

In the stands sampled, the canopy was typically open to intermittent and dominated by *Quercus wislizeni* at 5-39% combined cover in the tree overstory and/or understory layers. *Quercus kelloggii* was often present in the overstory. The shrub layer was open with *Toxicodendron diversilobum* dominant and with *Rhamnus tomentella* often present. The herbaceous layer was open to intermittent and often included *Achillea millefolium*, *Bromus diandrus*, *Cynosurus echinatus*, *Elymus glaucus*, and *Torilis arvensis*.

In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on metamorphic substrates and infrequently on gabbro, granitic, or mixed rock substrates. They occupied lower to upper slopes that were moderate to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, El Dorado, Placer, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 55.8 | 37-77 | - |
| Herb | 20 | 1-45 | variable |
| Shrub | 13.4 | 0-33 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 17.2 | 0-38 | 5-20 |
| Conifer | 16.9 | 4-30 | 10->35 |
| Relative non-native to native cover | 22 | 0-55 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: N (5), NW (3), SW (1), NE (1)
Macrotopography: lower slope (4), lower to upper slope (1), middle slope (1), upper slope (4)
Microtopography: undulating (5), flat (4), convex (1)
Parent Material: metamorphic (7), gabbro (1), granitic (1), mixed rock (1)
Soil Texture: clay or clay loam (5), loam or sandy loam (2), silt or silt loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1044 ft. | 513-1514 ft. |
| Slope | 21.3º | 7-32º |
| Large rock cover | 1.4% | 0-10% |
| Small rock cover | 3.6% | 0-20% |
| Bare ground cover | 3.9% | <1-10% |
| Litter cover | 87.8% | 73-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0260, SNNR0403, SNNR0470, SNNR0658, SNNR0670, SNNR0770, SNNR0879, SNNR1174, SNNR1682 **Relevés:** SNFN0104

**Rank:** G3S3

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills based solely from the data collected for this project. These stands appear to be relatively uncommon and are ecologically related to the *Quercus kelloggii - Pinus ponderosa* / *Arctostaphylos viscida* Association of the *Quercus kelloggii* Alliance. The association with *Q*. *kelloggii* is, on average, approximately 500 ft. higher in elevation and clearly shows the gradient of increased importance of *Q*. *kelloggii* in the upper elevations of the Sierra Foothills.

This association represents the lowest elevation stands having a co-dominance of *Pinus ponderosa* in the study area. While concerns have been raised regarding shifts in *Pinus ponderosa* distribution up-slope in the past 70 years or so (Thorne et al. 2006), its presence as a co-dominant with individuals in the regeneration layer in this association at elevations as low as 500 ft. suggests that there are still viable stands of these trees in parts of the Sierra Nevada Foothills below 1000 ft elevation.

**STAND TABLE**

***Quercus wislizeni - Pinus ponderosa* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PIPO-T | *Pinus ponderosa* | 100 | 15.6 | 4 | 26 | | X | X | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 14.1 | 3 | 32 | | X | X | |
| | QUWI2-M | *Quercus wislizeni* | 70 | 2.7 | 0.2 | 12 | | | | |
| | QUKE-T | *Quercus kelloggii* | 70 | 2.0 | 0.2 | 9 | | | | |
| | PIPO-M | *Pinus ponderosa* | 70 | 0.9 | 0.2 | 4 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 50 | 0.2 | 0.2 | 1 | | | | |
| | PISA2-T | *Pinus sabiniana* | 30 | 0.2 | 0.2 | 2 | | | | |
| | QUDO-M | *Quercus douglasii* | 30 | 0.2 | 0.2 | 1 | | | | |
| | PIPO-L | *Pinus ponderosa* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 5.8 | 0.2 | 19 | X | | X | |
| | RHTO6 | *Rhamnus tomentella* | 50 | 1.6 | 0.2 | 8 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 30 | 0.5 | 0.2 | 4.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 90 | 5.4 | 0.2 | 16 | | | X | X |
| | TOAR | *Torilis arvensis* | 80 | 3.1 | 0.2 | 15 | | | X | X |
| | ELGL | *Elymus glaucus* | 70 | 1.9 | 0.2 | 10 | | | | |
| | ACMI2 | *Achillea millefolium* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 50 | 2.0 | 1 | 8 | | | | X |
| | DAPU3 | *Daucus pusillus* | 40 | 0.2 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | AVBA | *Avena barbata* | 30 | 1.1 | 1 | 8 | | | | X |
| | VISA | *Vicia sativa* | 30 | 0.8 | 0.2 | 7 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 30 | 0.6 | 1 | 4 | | | | X |
| | LUCO6 | *Luzula comosa* | 30 | 0.1 | 0.2 | 1 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 40 | 1.7 | 0.2 | 10 | | | | |

## *Quercus wislizeni - Pinus sabiniana* Association
## Interior Live Oak - Foothill Pine Association

### SUMMARY
In the stands sampled, the canopy was open to continuous and dominated by *Quercus wislizeni* at 5-39% combined cover in the tree overstory and/or understory layers. *Pinus sabiniana* was characteristically present in the overstory and sometimes co-dominant. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant. The herbaceous layer was open to intermittent and often included *Torilis arvensis*. The overall understory composition was variable, with natives often present.

In the study area, this association was sampled commonly within the central and northern Sierra Nevada Foothills and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates (including slate), sometimes on igneous substrates (including granitic, gabbro, volcanic, and basalt), and infrequently on sedimentary (including limestone), mixed alluvium, and ultramafic substrates. They occupied bottom to upper slopes (most frequently middle to upper) that varied from flat to very steep.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Lower Granitic Foothills (M261Fc), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 67.7 | 30-90 | - |
| Herb | 26.3 | 0-60 | variable |
| Shrub | 26.8 | 3-72 | <5 |
| Low Tree/Tall Shrub | 0.3 | 0-9 | 5-10 |
| Hardwood | 31.3 | 4-65 | 5-20 |
| Conifer | 9.3 | 1-40 | 5-35 |
| Relative non-native to native cover | 16.8 | 0-46 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: SW (8), S (4), NW (4), N (4), W (3), Variable (3), SE (3), NE (3), E (2), Flat (1)
Macrotopography: bottom (1), lower slope (7), lower to middle slope (6), lower to upper slope (2), middle slope (10), middle to upper slope (2), upper slope (7)
Microtopography: undulating (16), flat (10), convex (7), concave (1)
Parent Material: metamorphic (18), volcanic (5), granitic (3), gabbro (2), sedimentary (2), basalt (1), limestone (1), mixed alluvium (1), slate (1), ultramafic (1)
Soil Texture: loam or sandy loam (9), clay or clay loam (6), silt or silt loam (5), sand (2), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1242 ft. | 450-2390 ft. |
| Slope | 21.8º | 0-50º |
| Large rock cover | 6.7% | 0-35% |
| Small rock cover | 7.8% | <1-50% |
| Bare ground cover | 8.5% | <1-25% |
| Litter cover | 72.9% | 5-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=35)

**Rapid Assessments:** SNNR0040, SNNR0055, SNNR0120, SNNR0162, SNNR0179, SNNR0186, SNNR0468, SNNR0545, SNNR0578, SNNR0610, SNNR0678, SNNR0726, SNNR0737, SNNR0738, SNNR0872, SNNR0917, SNNR0918, SNNR0959, SNNR1000, SNNR1004, SNNR1008, SNNR1014, SNNR1030, SNNR1054, SNNR1107, SNNR1160, SNNR1387, SNNR1390, SNNR1456, SNNR1471
**Relevés** SNFN0005, SNFN0153, SNFN0154, SNFN0155, SNFN0419

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the central Sierra Nevada Foothills (Evens et al. 2004). Its range has been broadened from the data collected for this project to include most of the northern and central Sierra Nevada Foothills.

**STAND TABLE**
***Quercus wislizeni - Pinus sabiniana* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 27.5 | 0.2 | 65 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 100 | 9.2 | 1 | 40 | | | X | |
| | QUWI2-M | *Quercus wislizeni* | 57 | 7.5 | 0.2 | 60 | | | | |
| | QUDO-T | *Quercus douglasii* | 46 | 0.7 | 0.2 | 4 | | | | |
| | PISA2-M | *Pinus sabiniana* | 37 | 0.3 | 0.2 | 3 | | | | |
| | AECA-M | *Aesculus californica* | 31 | 0.6 | 0.2 | 6 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 26 | 0.1 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 89 | 11.3 | 1 | 60 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 49 | 3.7 | 0.2 | 30 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 34 | 1.7 | 0.2 | 31 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 31 | 0.1 | 0.2 | 2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 29 | 0.5 | 0.2 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 51 | 2.4 | 0.2 | 15 | | | | X |
| | CYEC | *Cynosurus echinatus* | 49 | 2.9 | 0.2 | 30 | | | | X |
| | AVBA | *Avena barbata* | 46 | 0.9 | 0.2 | 8 | | | | X |
| | MECA2 | *Melica californica* | 46 | 0.2 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 43 | 0.3 | 0.2 | 3 | | | | |
| | BRDI3 | *Bromus diandrus* | 37 | 4.1 | 0.2 | 25 | | | | X |
| | GAPO | *Galium porrigens* | 31 | 0.2 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 26 | 0.2 | 0.2 | 3 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 23 | 2.2 | 0.2 | 27 | | | | X |
| | GAAP2 | *Galium aparine* | 23 | 0.3 | 0.2 | 5 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 34 | 1.8 | 0.2 | 17 | | | | |

***Quercus wislizeni - Pinus sabiniana* / *Arctostaphylos manzanita* Association**

**Interior Live Oak - Foothill Pine / Common Manzanita Association**

**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus wislizeni* at <1-55% cover. *Pinus sabiniana* was characteristically present in the overstory. The shrub layer was open to continuous with *Arctostaphylos manzanita* dominant and with *Heteromeles arbutifolia* and *Toxicodendron diversilobum* often present. The herbaceous layer was open to intermittent and often included non-natives *Cynosurus echinatus* and *Torilis arvensis*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills, Cascade Range Foothills, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occasionally occurred on metamorphic (including slate) or volcanic substrates, and infrequently on sedimentary or ultramafic substrates. They occupied lower to upper slopes and ridgetops. Slopes varied from moderate to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Butte, El Dorado, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 72.8 | 40-90 | - |
| Herb | 17.7 | 1-45 | variable |
| Shrub | 40.7 | 10-77 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 35.4 | 0-55 | 5-20 |
| Conifer | 4.9 | 0-25 | 5-20 |
| Relative non-native to native cover | 11.2 | 0-28 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: W (3), SW (2), SE (2), NW (2), S (1), N (1)
Macrotopography: entire slope (1), lower slope (1), lower to middle slope (2), middle slope (1), middle to upper slope (1), upper slope (3), ridgetop (2)
Microtopography: flat (4), undulating (3), convex (3), concave (1)
Parent Material: metamorphic (3), volcanic (3), ultramafic (2), sedimentary (2), slate (1)
Soil Texture: loam or sandy loam (5), clay or clay loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1241 ft. | 690-2356 ft. |
| Slope | 20.8º | 10-38º |
| Large rock cover | 5.7% | <1-13% |
| Small rock cover | 3.4% | 0-12% |
| Bare ground cover | 15.4% | 1-40% |
| Litter cover | 71.6% | 40-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)
**Rapid Assessments:** SNNR0222, SNNR0321, SNNR0550, SNNR0871, SNNR0940, SNNR1186, SNNR1187, SNNR1442, SNNR1521 **Relevés:** SNFN0189, SNFN0673

**Rank:** G3S3?

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills by Allen et al. (1989, 1991). It also may occur in the Inner North Coast Range. This association is clearly related to several other associations in the *Q. wislizeni* Alliance. These include the *Quercus wislizeni* / *Heteromeles arbutifolia*, *Quercus wislizeni - Aesculus californica*, *Quercus wislizeni - Pinus sabiniana*, and *Quercus wislizeni* / *Toxicodendron diversilobum* Associations. It remains to be seen if further studies and analyses would suggest subsuming some of these associations.

**STAND TABLE**

***Quercus wislizeni - Pinus sabiniana* / *Arctostaphylos manzanita* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 91 | 4.6 | 0.2 | 25 | | | X | |
| | QUWI2-T | *Quercus wislizeni* | 82 | 35.2 | 18 | 55 | X | | X | |
| | QUWI2-M | *Quercus wislizeni* | 36 | 0.5 | 0.2 | 5 | | | | |
| | QUDO-T | *Quercus douglasii* | 27 | 0.9 | 0.2 | 5 | | | | |
| | PISA2-M | *Pinus sabiniana* | 27 | 0.3 | 0.2 | 2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 27 | 0.1 | 0.2 | 1 | | | | |
| | PISA2-L | *Pinus sabiniana* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARMA | *Arctostaphylos manzanita* | 100 | 19.0 | 0.2 | 62 | | X | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 8.6 | 1 | 17 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 91 | 13.3 | 1 | 30.2 | | | X | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | MIAU | *Mimulus aurantiacus* | 27 | 0.7 | 0.2 | 5 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 27 | 0.3 | 1 | 1 | | | | |
| | KEBR | *Keckiella breviflora* | 27 | 0.1 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 73 | 2.5 | 0.2 | 6 | | | | X |
| | CYEC | *Cynosurus echinatus* | 55 | 2.0 | 0.2 | 9 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 45 | 2.3 | 0.2 | 10 | | | | X |
| | GAPO | *Galium porrigens* | 45 | 0.3 | 0.2 | 2 | | | | |
| | BRMA3 | *Bromus madritensis* | 36 | 1.7 | 0.2 | 15 | | | | X |
| | BRDI3 | *Bromus diandrus* | 36 | 0.9 | 0.2 | 9 | | | | X |
| | AICA | *Aira caryophyllea* | 36 | 0.6 | 0.2 | 3 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 36 | 0.3 | 0.2 | 3 | | | | X |
| | BRLA3 | *Bromus laevipes* | 36 | 0.2 | 0.2 | 1 | | | | |
| | MAGR3 | *Madia gracilis* | 36 | 0.1 | 0.2 | 1 | | | | |
| | MECA2 | *Melica californica* | 36 | 0.1 | 0.2 | 1 | | | | |
| | CAAL2 | *Calochortus albus* | 27 | 0.2 | 0.2 | 1 | | | | |
| | AVBA | *Avena barbata* | 27 | 0.1 | 0.2 | 1 | | | | X |
| | VUMY | *Vulpia myuros* | 27 | 0.1 | 0.2 | 1 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 36 | 2.9 | 1 | 21 | | | | |

## *Quercus wislizeni - Quercus douglasii - Aesculus californica* Association
## Interior Live Oak - Blue Oak - California Buckeye Association


### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to continuous and co-dominated by *Quercus wislizeni* at 8-48% cover with other trees *Quercus douglasii* and *Aesculus californica* characteristically present in overstory and/or understory. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Rhamnus ilicifolia* often present. The herbaceous layer was open to continuous and often included non-natives *Avena barbata*, *Cynosurus echinatus*, *Torilis arvensis*, and *Trifolium hirtum*.


In the study area, this association was sampled somewhat commonly within the Cascade Range Foothills and northern Sierra Nevada Foothills, and infrequently in the central Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic and infrequently on, metamorphic or mixed alluvium substrates. They often occupied bottom to middle slopes that were flat to steep. The majority of the stands were associated within a single cluster cut level of the analysis, which also contained the majority of samples from the *Quercus wislizeni - Quercus douglasii - Pinus sabiniana* association. The ecological relationships between these two associations appear similar except for the complete absence of *Aesculus* in the above mentioned type. Slope position and other floristic attributes of this association suggest that this association is also more mesic and more often found on volcanic substrates than the *Quercus wislizeni - Quercus douglasii - Pinus sabiniana* Association.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte, Calaveras, El Dorado, Shasta, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.5 | 57-93 | - |
| Herb | 36.7 | 16-70 | variable |
| Shrub | 24.1 | 5-61 | <5 |
| Low Tree/Tall Shrub | 5.9 | 0-50 | 5-10 |
| Hardwood | 40.8 | 5-69 | 5-20 |
| Conifer | 0.7 | 0-4 | 10-20 |
| Relative non-native to native cover | 27.2 | 7-48 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: N (5), NW (3), W (2), SW (2), SE (1), S (1), NE (1)
Macrotopography: bottom (2), bottom to lower slope (1), lower slope (4), lower to middle slope (2), lower to upper slope (2), middle slope (2), middle to upper slope (1), draw (1)
Microtopography: undulating (10), flat (2), concave (2), convex (1)
Parent Material: volcanic (11), metamorphic (3), mixed alluvium (1)
Soil Texture: loam or sandy loam (5), clay or clay loam (3), silt or silt loam (3), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 910 ft. | 321-1839 ft. |
| Slope | 17.4º | 0-30º |
| Large rock cover | 7.4% | <1-25% |
| Small rock cover | 8.9% | 1-27% |

| | | |
|---|---|---|
| Bare ground cover | 11.9% | 2-30% |
| Litter cover | 67.9% | 39-82% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** SNNR0013, SNNR0030, SNNR0081, SNNR0123, SNNR0169, SNNR0201, SNNR0257, SNNR0316, SNNR0675, SNNR0938, SNNR0939, SNNR0943, SNNR0967, SNNR1469 **Relevés:** SNFN0245

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the northern Sierra Nevada Foothills based solely upon the data collected for this project. It is likely to be restricted to this part of the state.

**STAND TABLE**
***Quercus wislizeni - Quercus douglasii - Aesculus californica* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 25.7 | 8 | 48 | | X | X | |
| | QUDO-T | *Quercus douglasii* | 100 | 13.7 | 5 | 40 | | | X | |
| | AECA-T | *Aesculus californica* | 60 | 5.4 | 1 | 17 | | | | |
| | AECA-M | *Aesculus californica* | 47 | 11.3 | 5 | 50 | | | | |
| | PISA2-T | *Pinus sabiniana* | 40 | 0.8 | 0.2 | 5 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 27 | 0.4 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 10.1 | 2 | 30 | X | | X | |
| | RHIL | *Rhamnus ilicifolia* | 60 | 1.4 | 0.2 | 7 | | | | |
| | CLLA3 | *Clematis lasiantha* | 40 | 1.1 | 0.2 | 6 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 40 | 1.1 | 0.2 | 8 | | | | |
| | ARCA10 | *Aristolochia californica* | 33 | 0.7 | 1 | 3 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 33 | 0.5 | 0.2 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 80 | 7.9 | 0.2 | 16 | | | X | X |
| | TOAR | *Torilis arvensis* | 80 | 4.7 | 1 | 15 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 67 | 1.4 | 0.2 | 8 | | | | X |
| | AVBA | *Avena barbata* | 53 | 1.1 | 0.2 | 5 | | | | X |
| | LOMU | *Lolium multiflorum* | 33 | 2.5 | 0.2 | 16 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 27 | 2.3 | 2 | 18 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 27 | 0.6 | 0.2 | 5 | | | | X |
| | DIVO | *Dichelostemma volubile* | 27 | 0.1 | 0.2 | 1 | | | | |

***Quercus wislizeni - Quercus douglasii - Pinus sabiniana* Association**

**Interior Live Oak - Blue Oak - Foothill Pine Association**

**SUMMARY**

In the stands sampled, the canopy was typically open to continuous and co-dominated by *Quercus wislizeni* at 7-47% cover and *Quercus douglasii* at 5-33% cover (canopy cover includes the tree overstory and/or understory layers). *Pinus sabiniana* was characteristically present in the overstory at <1-15% cover. The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* and *Rhamnus ilicifolia* often present. The herbaceous layer was variable and often included non-natives *Bromus hordeaceus*, *Cynosurus echinatus*, and *Torilis arvensis*.

This association was sampled commonly in the study area in the central and northern Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands often occurred on metamorphic (including slate) or igneous substrates (including volcanic, basalt, granitic, or gabbro ) and infrequently on sedimentary (including limestone or shale), ultramafic, or mixed rock substrates. They typically occupied lower to upper slopes, which were more often on northerly aspects. Slopes varied from gentle to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in ten counties: Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Shasta, Tehama, Tuolumne, and Yuba - within the Lower Foothills Metamorphic Belt (M261Fb), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 75.7 | 55-96 | - |
| Herb | 31.6 | 6-85 | variable |
| Shrub | 28.9 | 0-66 | <5 |
| Low Tree/Tall Shrub | 0 | 0-1 | 5-10 |
| Hardwood | 36.1 | 19-60 | 5-20 |
| Conifer | 5.8 | 0-15 | 5-35 |
| Relative non-native to native cover | 25.2 | 2-57 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NW (8), Variable (7), N (6), NE (5), W (3), S (3), SW (2), E (1)
Macrotopography: lower slope (6), lower to middle slope (4), lower to upper slope (1), middle slope (9), middle to upper slope (4), middle slope to ridgetop (1), upper slope (8), upper slope to ridgetop (1), ridgetop (1)
Microtopography: undulating (15), flat (10), convex (7), concave (2)
Parent Material: metamorphic (10), granitic (6), volcanic (5), sedimentary (4), ultramafic (2), basalt (1), gabbro (1), igneous (1), limestone (1), mixed rock (1), shale (1), slate (1), water (1)
Soil Texture: loam or sandy loam (15), clay or clay loam (9), silt or silt loam (7)

| | Mean | Range |
|---|---|---|
| Elevation | 1145 ft. | 350-2188 ft. |
| Slope | 17.7º | 2-30º |
| Large rock cover | 7.5% | 0-45% |
| Small rock cover | 4.4% | <1-20% |
| Bare ground cover | 10.2% | <1-27% |
| Litter cover | 74.5% | 30-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=35)
**Rapid Assessments:** SNNR0204, SNNR0309, SNNR0710, SNNR0807, SNNR0830, SNNR0835, SNNR0836, SNNR0873, SNNR0906, SNNR0985, SNNR1007, SNNR1021, SNNR1214, SNNR1222, SNNR1311, SNNR1350, SNNR1361, SNNR1373, SNNR1374, SNNR1375, SNNR1394, SNNR1423, SNNR1431, SNNR1451, SNNR1477, SNNR1674, SNNR1685, SNNR1689 **Relevés:** SNFN0020, SNFN0064, SNFN0105, SNFN0184, SNFN0185, SNFN0567, SNFN0676

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association occurs in the Sierra Nevada and in San Benito County (Allen et al. 1898, 1991, NatureServe et al. 2003b). It occurs as high as 5300 ft elevation in the southern Sierra Nevada.

**STAND TABLE**

***Quercus wislizeni - Quercus douglasii - Pinus sabiniana* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 20.7 | 2 | 45 | | X | X | |
| | QUDO-T | *Quercus douglasii* | 97 | 15.3 | 5 | 33 | | X | X | |
| | PISA2-T | *Pinus sabiniana* | 97 | 5.6 | 0.2 | 15 | | | X | |
| | QUWI2-M | *Quercus wislizeni* | 63 | 3.9 | 0.2 | 19 | | | | |
| | PISA2-M | *Pinus sabiniana* | 34 | 0.5 | 0.2 | 5 | | | | |
| | QUDO-M | *Quercus douglasii* | 29 | 0.6 | 0.2 | 5 | | | | |
| | QUDO-L | *Quercus douglasii* | 29 | 0.1 | 0.2 | 2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-T | *Quercus kelloggii* | 26 | 0.9 | 0.2 | 10 | | | | |
| | PISA2-L | *Pinus sabiniana* | 26 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 97 | 12.8 | 0.2 | 38 | X | | X | |
| | RHIL | *Rhamnus ilicifolia* | 57 | 1.2 | 0.2 | 5 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 54 | 4.8 | 0.2 | 31 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 31 | 3.6 | 0.2 | 42 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 23 | 0.9 | 0.2 | 10 | | | | |
| | CECU | *Ceanothus cuneatus* | 23 | 0.5 | 0.2 | 7 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 83 | 2.8 | 0.2 | 15 | | | X | X |
| | CYEC | *Cynosurus echinatus* | 60 | 3.9 | 0.2 | 14 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 54 | 5.5 | 0.2 | 50 | | | | X |
| | AVBA | *Avena barbata* | 49 | 1.7 | 0.2 | 15 | | | | X |
| | MECA2 | *Melica californica* | 43 | 0.2 | 0.2 | 3 | | | | |
| | GAPO | *Galium porrigens* | 43 | 0.2 | 0.2 | 2 | | | | |
| | TRHI4 | *Trifolium hirtum* | 40 | 1.6 | 0.2 | 21 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 34 | 2.1 | 0.2 | 20 | | | | X |
| | MAGR3 | *Madia gracilis* | 34 | 0.5 | 0.2 | 8 | | | | |
| | BRDI3 | *Bromus diandrus* | 31 | 2.8 | 0.2 | 30 | | | | X |
| | ELGL | *Elymus glaucus* | 29 | 0.7 | 0.2 | 12 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 29 | 0.3 | 0.2 | 3 | | | | |
| | VUMY | *Vulpia myuros* | 26 | 0.5 | 0.2 | 10 | | | | X |
| | DAPU3 | *Daucus pusillus* | 26 | 0.2 | 0.2 | 4 | | | | |
| | BRLA3 | *Bromus laevipes* | 26 | 0.1 | 0.2 | 2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 26 | 0.1 | 0.2 | 1 | | | | |
| | DIVO | *Dichelostemma volubile* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 29 | 3.2 | 0.2 | 47 | | | | |

## *Quercus wislizeni - Quercus douglasii* / Herbaceous Association
## Interior Live Oak - Blue Oak / Herbaceous Association


### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to intermittent and co-dominated by *Quercus wislizeni* at 7-59% cover and *Quercus douglasii* at 3-34% cover (canopy cover includes the tree overstory and/or understory layers). The shrub layer was open to intermittent with *Toxicodendron diversilobum* dominant. The herbaceous layer was open to continuous and often included non-natives *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Torilis arvensis*, and *Trifolium hirtum*.


In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills, less commonly in the central Sierra Nevada Foothills and Cascade Range Foothills, and once in the Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic (including mixed metamorphic, serpentine, and slate) substrates and occasionally on igneous (including volcanic/basalt), sedimentary (including limestone), and mixed alluvium substrates. They occupied all aspects and slope positions from bottoms to ridgetops and terraces. Slopes varied from flat to steep.

The relationship of this association to the more commonly described *Quercus wislizeni - Quercus douglasii - Pinus sabiniana* Association appears close. The principle difference is the lack of significant cover of *Pinus sabiniana* in this association. This difference may have to do with fire or management history, rather than well-defined non-temporal environmental differences in substrate, exposure, or climate.

### DISTRIBUTION IN STUDY AREA
This association was sampled in elevation counties: Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Sacramento, Shasta, Tehama, Tuolumne, and Yuba - within the Camanche Terraces (262Ao), Lower Foothills Metamorphic Belt (M261Fb), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 67.8 | 32-95 | - |
| Herb | 41.7 | 19-90 | variable |
| Shrub | 9.8 | 0-42 | <5 |
| Low Tree/Tall Shrub | 0.1 | 0-5 | 5-10 |
| Hardwood | 35.2 | 9-60 | 5-20 |
| Conifer | 0.9 | 0-6 | 5-35 |
| Relative non-native to native cover | 43.5 | 7-72 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: S (7), SW (6), W (5), NW (4), N (4), Variable (3), SE (3), NE (2), Flat (2), E (2)
Macrotopography: bottom (2), bottom to middle slope (1), lower slope (6), lower to middle slope (2), middle slope (14), middle to upper slope (5), upper slope (1), upper slope to ridgetop (1), ridgetop (5), terrace (1)
Microtopography: undulating (29), convex (4), flat (3), concave (2)
Parent Material: metamorphic (22), volcanic (4), mixed metamorphic (2), sedimentary (2), serpentine (2), slate (2), basalt (1), igneous (1), limestone (1), mixed alluvium (1)
Soil Texture: silt or silt loam (18), clay or clay loam (8), loam or sandy loam (6), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1052 ft. | 208-1900 ft. |
| Slope | 12.1º | 0-40º |
| Large rock cover | 2.1% | 0-15% |
| Small rock cover | 2.4% | 0-10% |
| Bare ground cover | 15.7% | <1-59% |
| Litter cover | 76.4% | 35-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=38)

**Rapid Assessments:** SNNR0002, SNNR0023, SNNR0034, SNNR0041, SNNR0056, SNNR0079, SNNR0343, SNNR0407, SNNR0649, SNNR0650, SNNR0655, SNNR0680, SNNR0975, SNNR1015, SNNR1022, SNNR1051, SNNR1062, SNNR1205, SNNR1291, SNNR1354, SNNR1413, SNNR1414, SNNR1441, SNNR1612, SNNR1634, SNNR1639, SNNR1646, SNNR1653, SNNR1660, SNNR1662, SNNR1675, SNNR1676, SNNR1681, SNNR1683, SNNR1687 **Relevés:** SNFN0006, SNFN0254, SNFN0264

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project.

**STAND TABLE**

***Quercus wislizeni - Quercus douglasii* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 22.7 | 4 | 55 | X | | X | |
| | QUDO-T | *Quercus douglasii* | 97 | 12.4 | 2 | 33 | | X | X | |
| | PISA2-T | *Pinus sabiniana* | 50 | 0.8 | 0.2 | 6 | | | | |
| | QUDO-L | *Quercus douglasii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 47 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 42 | 1.7 | 0.2 | 12 | | | | |
| | QUDO-M | *Quercus douglasii* | 42 | 0.4 | 0.2 | 3 | | | | |
| | PISA2-L | *Pinus sabiniana* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 92 | 5.0 | 0.2 | 45 | X | | X | |
| | CECU | *Ceanothus cuneatus* | 21 | 0.5 | 0.2 | 4 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 82 | 7.0 | 0.2 | 25 | | | X | X |
| | BRDI3 | *Bromus diandrus* | 74 | 6.9 | 0.2 | 30 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 68 | 4.3 | 0.2 | 26 | | | | X |
| | TOAR | *Torilis arvensis* | 66 | 2.1 | 0.2 | 12 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 61 | 4.0 | 0.2 | 26 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 55 | 1.4 | 0.2 | 10 | | | | X |
| | AVBA | *Avena barbata* | 47 | 0.7 | 0.2 | 5 | | | | X |
| | AVFA | *Avena fatua* | 34 | 2.9 | 0.2 | 85 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 29 | 2.7 | 0.2 | 30 | | | | X |
| | HOMU | *Hordeum murinum* | 29 | 1.6 | 0.2 | 15 | | | | X |
| | LOMU | *Lolium multiflorum* | 29 | 1.4 | 0.2 | 32 | | | | X |
| | DAPU3 | *Daucus pusillus* | 29 | 0.1 | 0.2 | 1 | | | | |
| | NAPU2 | *Navarretia pubescens* | 26 | 0.1 | 0.2 | 2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 24 | 0.8 | 0.2 | 8 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 24 | 0.1 | 0.2 | 1 | | | | |
| | ELGL | *Elymus glaucus* | 21 | 0.1 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 21 | 0.1 | 0.2 | 1 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 21 | 0.1 | 0.2 | 1 | | | | |

***Quercus wislizeni - Quercus kelloggii* Association**

**Interior Live Oak - Black Oak Association**


**SUMMARY**

In the stands sampled, the overstory tree canopy was typically open to continuous and dominated by *Quercus wislizeni* at 15-81% combined cover in the tree overstory and/or understory layers. *Quercus kelloggii* was characteristically present at 3-47% cover and sometimes co-dominant with *Q*. *wislizeni*, while *Pinus sabiniana* was often present in the overstory. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant and with *Heteromeles arbutifolia* and *Rhamnus tomentella* often present. The herbaceous layer was open to continuous and often included *Cynosurus echinatus*, *Galium porrigens*, and *Torilis arvensis*.


In the study area, this association was sampled commonly in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates but also occurred on igneous (including gabbro, volcanic, or basalt), mixed rock, and sedimentary substrates. They occupied bottoms to upper slopes, with most samples collected from the middle slope. Slopes varied from gentle to steep, and they usually were mesic and north or east-facing.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in ten counties: Amador, Butte, Calaveras, El Dorado, Nevada, Placer, Shasta, Tehama, Tuolumne, and Yuba; within the Lower Foothills Metamorphic Belt (M261Fb), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 76.9 | 38-95 | - |
| Herb | 16.7 | 1-75 | variable |
| Shrub | 33.9 | 2-70 | <5 |
| Low Tree/Tall Shrub | 2 | 0-25 | 5-10 |
| Hardwood | 49.2 | 15-90 | 5-20 |
| Conifer | 2.5 | 0-14 | 5-35 |
| Relative non-native to native cover | 9 | 0-38 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: N (6), NW (5), NE (4), W (3), Variable (2), E (2), SW (1)
Macrotopography: entire slope (1), bottom (1), lower slope (4), lower to middle slope (1), lower to upper slope (1), middle slope (8), middle to upper slope (3), upper slope (4)
Microtopography: flat (11), undulating (9), convex (2), concave (1)
Parent Material: metamorphic (10), volcanic (4), mixed rock (3), sedimentary (3), gabbro (2), basalt (1)
Soil Texture: loam or sandy loam (7), silt or silt loam (6), clay or clay loam (5)

| | Mean | Range |
|---|---|---|
| Elevation | 1214 ft. | 490-1966 ft. |
| Slope | 23º | 1-35º |
| Large rock cover | 2.7% | 0-12% |
| Small rock cover | 2.5% | <1-7% |
| Bare ground cover | 5.5% | 1-11% |
| Litter cover | 85.9% | 72-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=23)

**Rapid Assessments:** SNNR0318, SNNR0405, SNNR0481, SNNR0496, SNNR0577, SNNR0659, SNNR0708, SNNR0757, SNNR0814, SNNR0973, SNNR1365, SNNR1433, SNNR1658, SNNR1686 **Relevés:** SNFN0058, SNFN0170, SNFN0222, SNFN0253, SNFN0572, SNFN0577, SNFN0579, SNFN0661, SNFN0683

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills by Evens et al. (2004). It is locally common and widespread, though likely restricted to this part of the state.

**STAND TABLE**
***Quercus wislizeni - Quercus kelloggii* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 100 | 27.7 | 5 | 81 | | X | X | |
| | QUKE-T | *Quercus kelloggii* | 100 | 18.9 | 3 | 47 | | | X | |
| | PISA2-T | *Pinus sabiniana* | 65 | 2.8 | 0.2 | 15 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 57 | 5.3 | 0.2 | 52 | | | | |
| | QUDO-T | *Quercus douglasii* | 39 | 1.3 | 0.2 | 7 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 39 | 0.1 | 0.2 | 1 | | | | |
| | PISA2-M | *Pinus sabiniana* | 35 | 0.3 | 0.2 | 3 | | | | |
| | AECA-M | *Aesculus californica* | 30 | 1.2 | 0.2 | 17 | | | | |
| | PISA2-L | *Pinus sabiniana* | 26 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-L | *Quercus kelloggii* | 26 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-M | *Quercus kelloggii* | 22 | 0.1 | 0.2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 20.9 | 0.2 | 70 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 65 | 3.9 | 0.2 | 15 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 52 | 3.1 | 0.2 | 35.4 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 35 | 1.0 | 0.2 | 15 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 35 | 0.1 | 0.2 | 1 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 30 | 1.8 | 0.2 | 15 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 22 | 1.2 | 0.2 | 19 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 65 | 2.5 | 0.2 | 10 | | | | X |
| | TOAR | *Torilis arvensis* | 61 | 1.9 | 0.2 | 15 | | | | X |
| | GAPO | *Galium porrigens* | 57 | 0.1 | 0.2 | 1 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 43 | 0.1 | 0.2 | 1 | | | | |
| | ELGL | *Elymus glaucus* | 35 | 0.5 | 0.2 | 6 | | | | |
| | BRLA3 | *Bromus laevipes* | 30 | 0.1 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 30 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAAP2 | *Galium aparine* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| | TRHI4 | *Trifolium hirtum* | 26 | 0.4 | 0.2 | 3 | | | | X |
| | CAAL2 | *Calochortus albus* | 26 | 0.1 | 0.2 | 1 | | | | |
| | MAGR3 | *Madia gracilis* | 26 | 0.1 | 0.2 | 1 | | | | |
| | MECA2 | *Melica californica* | 26 | 0.1 | 0.2 | 1 | | | | |
| | LUCO6 | *Luzula comosa* | 26 | 0.1 | 0.2 | 0.2 | | | | |
| | BRMA3 | *Bromus madritensis* | 22 | 0.5 | 0.2 | 8 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 39 | 3.5 | 0.2 | 30 | | | | |

## *Salix gooddingii* Woodland/Forest Alliance
## Gooddings (Black) Willow Woodland/Forest Alliance

As defined in the state, *Salix gooddingii* is dominant in the tree canopy with *Alnus rhombifolia*, *Populus fremontii*, *S*. *laevigata*, *S*. *lasiolepis*, *S*. *lucida* subsp. *lasiandra*, *Sambucus nigra* subsp. *canadensis*, and *Washingtonia filifera*. The tree canopy is open to continuous and the shrub layer is open to dense with *Baccharis pilularis*, *B*. *salicifolia*, or *Cornus sericea*. The herbaceous layer is variable.

Stands of *Salix gooddingii* form on terraces along large rivers, canyons, along rocky floodplains of small intermittent streams, and on seeps and springs. Stands from this alliance were not sampled often in the study area. One association was classified and is described below. One stand (SNNR0702) showed additional variation due to a co-dominance with *Salix lucida* subsp. *lasiandra* and *Salix exigua* and was only classified to the alliance level only.

### *Salix gooddingii* Association (Provisional)
### Black Willow Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open and characterized by *Salix gooddingii* at 12-20% cover. The shrub layer was open to intermittent with *Salix exigua* dominant at low cover. The herbaceous layer was open with a variety of native and non-native grasses and forbs (see stand table below).

This association was sampled infrequently in the study area, only within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on igneous (including granitic) substrates. They occupied bottom and lower slopes that were gentle to moderate, along riparian corridors, streambank terraces, and lake margins.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Placer County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 55 | 25-85 | - |
| Herb | 7.6 | 0-15 | variable |
| Shrub | 20 | 5-35 | 2.1-5 |
| Low Tree/Tall Shrub | 12.5 | 0-25 | 5-10 |
| Hardwood | 17.5 | 15-20 | 10-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 33.3 | 15-51 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (1)
Macrotopography: bottom (1), lower slope (1)
Microtopography: undulating (2)

Parent Material: granitic (1), igneous (1)
Soil Texture: sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 619 ft. | 461-777 ft. |
| Slope | 4º | 1-7º |
| Large rock cover | 0% | -% |
| Small rock cover | <1% | <1% |
| Bare ground cover | 23% | 1-45% |
| Litter cover | 75.5% | 55-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0611, SNNR0613

**Rank:** G4S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based upon data collected for this project and by Klein and Evens (2006) in western Riverside County. Although other *S. gooddingii* associations are known from the Central Valley (Hickson and Keeler-Wolf 2007), they do not match well with the local foothill stands.

**STAND TABLE**
***Salix gooddingii* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SAGO-T | *Salix gooddingii* | 100 | 16.0 | 12 | 20 | X | | X | |
| | AIAL | *Ailanthus altissima* | 50 | 1.5 | 3 | 3 | | | | X |
| | MASY3 | *Malus sylvestris* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | QUWI2-M | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | SAEX | *Salix exigua* | 100 | 1.5 | 1 | 2 | | | X | |
| | RUDI2 | *Rubus discolor* | 50 | 17.5 | 35 | 35 | | | | X |
| | SALA6 | *Salix lasiolepis* | 50 | 10.0 | 20 | 20 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 50 | 2.5 | 5 | 5 | | | | |
| | VICA5 | *Vitis californica* | 50 | 1.5 | 3 | 3 | | | | |
| | BAPI | *Baccharis pilularis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | SOHA | *Sorghum halepense* | 50 | 2.5 | 5 | 5 | | | | X |
| | CYDA | *Cynodon dactylon* | 50 | 2.0 | 4 | 4 | | | | X |
| | JUBA | *Juncus balticus* | 50 | 1.5 | 3 | 3 | | | | |
| | TYLA | *Typha latifolia* | 50 | 1.5 | 3 | 3 | | | | |
| | ALPLA | *Alisma plantago-aquatica* var. *americanum* | 50 | 0.5 | 1 | 1 | | | | |
| | CHMA11 | *Chamaesyce maculata* | 50 | 0.5 | 1 | 1 | | | | X |
| | CIVU | *Cirsium vulgare* | 50 | 0.5 | 1 | 1 | | | | X |
| | EPCI | *Epilobium ciliatum* | 50 | 0.5 | 1 | 1 | | | | |
| | JUEF | *Juncus effusus* | 50 | 0.5 | 1 | 1 | | | | |
| | LYSA2 | *Lythrum salicaria* | 50 | 0.5 | 1 | 1 | | | | X |
| | POLYG4 | *Polygonum* | 50 | 0.5 | 1 | 1 | | | | |
| | ASFA | *Asclepias fascicularis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CYER | *Cyperus eragrostis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | HIIN3 | *Hirschfeldia incana* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYPE | *Hypericum perforatum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LASE | *Lactuca serriola* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOPU3 | *Lotus purshianus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MOVE | *Mollugo verticillata* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | PHNO2 | *Phyla nodiflora* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SAMOC2 | *Sagittaria montevidensis* subsp. *calycina* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | HERBAC | unknown | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | VETH | *Verbascum thapsus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | VIVI | *Vicia villosa* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | XAST | *Xanthium strumarium* | 50 | 0.1 | 0.2 | 0.2 | | | | |

### *Salix laevigata* Woodland/Forest Alliance
### Red Willow Woodland/Forest Alliance

As defined in the state, *Salix laevigata* is dominant or co-dominant in the shrub or tree canopy with *Acer negundo*, *Aesculus californica*, *Alnus rhombifolia*, *Calocedrus decurrens*, *Pinus jeffreyi*, *P*. *sabiniana*, *Platanus racemosa*, *Populus fremontii*, *Quercus agrifolia*, *Q*. *chrysolepis*, *Salix gooddingii*, *S*. *lasiolepis*, and *Sambucus nigra* subsp. *canadensis*. The canopy is open to continuous. The shrub layer is sparse to intermittent and the herbaceous layer is variable. Stands of *Salix laevigata* form along creeks, ditches, floodplains, lake edges, and low-gradient depositions along streams.

In the study area, stands are associated with willows such as *Salix lasiolepis* and other common riparian species. *Rubus discolor*, *Vitis californica*, *Rhamnus tomentella*, *Cercis occidentalis* are usually present in the understory. Two associations in the Red Willow Alliance were described. Two stands (SNNR0165, SNNR0445) showed additional variation and were only classified to the alliance level. One of these stands contained *Quercus garryana* var. *breweri*, *Q*. *chrysolepis*, and *Q*. *berberidifolia*, and the other had *Calycanthus occidentalis* and *Cornus glabrata*.

### *Salix laevigata* Association
### Red Willow Association

#### SUMMARY
In the stands sampled, the overstory tree canopy was typically open to intermittent and dominated solely by *Salix laevigata* at 10-65% cover. The shrub layer was open to continuous with *Rubus discolor* dominant and with *Salix lasiolepis* often present. The herbaceous layer was open to intermittent with *Artemisia douglasiana*, *Bromus diandrus*, *Lolium multiflorum*, *Rumex pulcher*, *Paspalum dilatatum*, *Torilis arvensis*, and *Xanthium strumarium* occurring occasionally.

This association was sampled commonly in the study area within the central Sierra Nevada Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands sometimes occurred on metamorphic or mixed alluvium and infrequently on granitic or sedimentary substrates. They usually occupied bottom slope positions but were occasionally found on lower to middle slopes. Slopes were flat to moderate, along seasonally flooded riparian corridors and streambank terraces.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, and Placer Counties, within the Camanche Terraces (262Ao) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.9 | 40-90 | - |
| Herb | 14.4 | 0-40 | variable |
| Shrub | 33.1 | 1-95 | <5 |
| Low Tree/Tall Shrub | 9.7 | 0-80 | 5-10 |
| Hardwood | 23.2 | 2-65 | 5-20 |
| Conifer | 0.5 | 0-4 | 5-20 |
| Relative non-native to native cover | 36.7 | 4-74 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (5), W (2), NW (2), N (2), Flat (2), SE (1), S (1), NE (1)
Macrotopography: bottom (13), lower slope (2), lower to middle slope (1)
Microtopography: concave (8), flat (4), undulating (3), convex (1)
Parent Material: metamorphic (6), mixed alluvium (5), granitic (2), sedimentary (2), igneous (1)
Soil Texture: sand (5), clay or clay loam (2), loam or sandy loam (1), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 852 ft. | 213-2048 ft. |
| Slope | 1.9º | 0-8º |
| Large rock cover | 5.5% | 0-40% |
| Small rock cover | 8% | 0-35% |
| Bare ground cover | 20.7% | <1-70% |
| Litter cover | 47.4% | 0-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=16)

**Rapid Assessments:** SNNR0038, SNNR0063, SNNR0109, SNNR0369, SNNR0605, SNNR0632, SNNR0806, SNNR0899, SNNR0987, SNNR1106, SNNR1210, SNNR1265, SNNR1276, SNNR1278, SNNR1302, SNNR1386

**Rank:** G4S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and lower slopes of the Sierra Nevada. Potter (2005) describes this type up to elevations of 5000 ft. Similar associations may exist elsewhere in cismontane California, including Marin County (Evens and Kentner 2006).

**STAND TABLE**
***Salix laevigata* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-T | *Salix laevigata* | 94 | 23.1 | 10 | 65 | X | | X | |
| | SALA3-M | *Salix laevigata* | 44 | 2.8 | 2 | 10 | | | | |
| | POFR2-T | *Populus fremontii* | 31 | 0.6 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 81 | 21.7 | 1 | 70 | X | | X | X |
| | SALA6 | *Salix lasiolepis* | 50 | 2.3 | 2 | 7 | | | | |
| | VICA5 | *Vitis californica* | 31 | 3.5 | 1 | 45.2 | | | | |
| | SAEX | *Salix exigua* | 25 | 3.3 | 0.2 | 35 | | | | |
| | FICA | *Ficus carica* | 25 | 1.1 | 0.2 | 7 | | | | X |
| | TODI | *Toxicodendron diversilobum* | 25 | 0.5 | 0.2 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 38 | 1.5 | 0.2 | 12 | | | | |
| | BRDI3 | *Bromus diandrus* | 31 | 1.0 | 0.2 | 10 | | | | X |
| | LOMU | *Lolium multiflorum* | 31 | 0.5 | 0.2 | 3 | | | | X |
| | RUPU3 | *Rumex pulcher* | 25 | 0.3 | 0.2 | 2 | | | | X |
| | PADI3 | *Paspalum dilatatum* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | TOAR | *Torilis arvensis* | 25 | 0.1 | 0.2 | 1 | | | | X |
| | XAST | *Xanthium strumarium* | 25 | 0.1 | 0.2 | 1 | | | | |

***Salix laevigata* / *Salix lasiolepis* Association**

**Red Willow / Arroyo Willow Association**

**SUMMARY**

In the stands sampled, the canopy was typically open and dominated by *Salix laevigata* at 10-25% cover (combined cover in the tree overstory and/or understory layers). *Populus fremontii* and *Salix gooddingii* were present occasionally in the overstory. The shrub layer was open to intermittent with *Salix lasiolepis* dominant and with *Rubus discolor* and *Vitis californica* often present. The herbaceous layer was open and often included *Cynosurus echinatus* and *Euthamia occidentalis*.

This association was sampled infrequently in the study area, within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on metamorphic, and infrequently on igneous, and mixed alluvium substrates. They usually occupied bottoms with gentle slopes, along riparian corridors and streambank terraces.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in El Dorado, Nevada, Placer, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 59.7 | 30-85 | - |
| Herb | 17.5 | 3-30 | variable |
| Shrub | 22.8 | 5-45 | 1-5 |
| Low Tree/Tall Shrub | 19.2 | 0-50 | 5-10 |
| Hardwood | 16.3 | 5-25 | 5-20 |
| Conifer | 0 | - | 5-10 |
| Relative non-native to native cover | 27.6 | 14-35 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (3), W (1), N (1), Flat (1)
Macrotopography: bottom (5), lower slope (1)
Microtopography: undulating (3), concave (2), convex (1)
Parent Material: metamorphic (4), igneous (1), mixed alluvium (1)
Soil Texture: clay or clay loam (3), muck (1), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1020 ft. | 374-1652 ft. |
| Slope | 2.5º | 1-5º |
| Large rock cover | 4.1% | <1-8% |
| Small rock cover | 2.5% | 1-4% |
| Bare ground cover | 32% | 2-62% |
| Litter cover | 59.5% | 35-84% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0590, SNNR0698, SNNR0700, SNNR0895, SNNR1282 **Relevés:** SNFN0036

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills using data collected for this project. This same association name has been used in the Suisun Marsh (Keeler-Wolf and Vaghti 2000) and the Santa Monica Mountains of Southern California (Keeler-Wolf and Evens 2006). They share a number of the same, widely-distributed riparian species.

**STAND TABLE**
***Salix laevigata* / *Salix lasiolepis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-T | *Salix laevigata* | 100 | 10.3 | 5 | 15 | X | | X | |
| | SALA3-M | *Salix laevigata* | 50 | 4.5 | 2 | 20 | | | | |
| | SAGO-T | *Salix gooddingii* | 33 | 2.8 | 5 | 12 | | | | |
| | POFR2-T | *Populus fremontii* | 33 | 0.8 | 1 | 4 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | SALA6 | *Salix lasiolepis* | 100 | 18.5 | 11 | 35 | X | | X | |
| | RUDI2 | *Rubus discolor* | 100 | 14.2 | 0.2 | 40 | | | X | X |
| | VICA5 | *Vitis californica* | 50 | 0.4 | 0.2 | 1 | | | | |
| | BAPI | *Baccharis pilularis* | 33 | 0.8 | 2 | 3 | | | | |
| | SAEX | *Salix exigua* | 33 | 0.7 | 2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 50 | 0.2 | 0.2 | 1 | | | | X |
| | EUOC4 | *Euthamia occidentalis* | 50 | 0.2 | 0.2 | 1 | | | | |
| | TYLA | *Typha latifolia* | 33 | 3.5 | 6 | 15 | | | | |
| | PADI3 | *Paspalum dilatatum* | 33 | 1.3 | 1 | 7 | | | | X |
| | HOLA | *Holcus lanatus* | 33 | 0.7 | 1 | 3 | | | | X |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 33 | 0.5 | 0.2 | 3 | | | | |
| | EPCI | *Epilobium ciliatum* | 33 | 0.5 | 1 | 2 | | | | |
| | JUBA | *Juncus balticus* | 33 | 0.5 | 1 | 2 | | | | |
| | STST | *Stachys stricta* | 33 | 0.3 | 1 | 1 | | | | |
| | TYDO | *Typha domingensis* | 33 | 0.3 | 1 | 1 | | | | |
| | GEDI | *Geranium dissectum* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | JUEF | *Juncus effusus* | 33 | 0.2 | 0.2 | 1 | | | | |
| | HYPE | *Hypericum perforatum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |

### *Umbellularia californica* Woodland/Forest Alliance
### California Bay Woodland/Forest Alliance

As defined in the state, *Umbellularia californica* may form dense stands with little understory or may form mixed stands with overstory species such as oaks (*Quercus agrifolia*, *Q*. *chrysolepis*, or *Q*. *wislizeni*), *Lithocarpus densiflorus*, *Arbutus menziesii*, and *Sequoia sempervirens*. Common shrubs associated with *U*. *californica* are *Garrya elliptica*, *Heteromeles arbutifolia*, *Ceanothus* spp., and *Toxicodendron diversilobum*. *Umbellularia californica* may form stands in uplands or along streamsides, on soils that are typically derived from sandstone, schist, or mixed alluvium.

Two associations were described for the California Bay Alliance in the study area. Additional variation occurred in two stream terrace/riparian stands (SNNR0277, SNNR0634) where *Adiantum jordanii*, *Aesculus californica*, and *Styrax officinalis* var. *redivivus* were present in the understory. These stands were classified to the alliance level only.

### *Umbellularia californica* - *Alnus rhombifolia* Association (Provisional)
### California Bay - White Alder Association (Provisional)

#### SUMMARY
In the stands sampled, the overstory tree canopy was typically intermittent to continuous and dominated by *Umbellularia californica* at 28-30% cover. Other trees such as *Alnus rhombifolia* and *Umbellularia californica* were characteristically present. The shrub layer was open with *Toxicodendron diversilobum* dominant and with *Rubus discolor* characteristically present. The herbaceous layer was open with abundant and characteristic taxa such as *Cynosurus echinatus* and *Sanicula crassicaulis*.

This association was sampled infrequently in the study area, once in the Cascade Range Foothills and once in the High Cascade Range Subregions (Hickman 1993). Stands occurred on mixed alluvium or volcanic substrates. They occupied bottoms, lower slopes, and terraced slopes that were moderate to somewhat steep, along riparian corridors.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in Shasta and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.5 | 62-85 | - |
| Herb | 7.5 | 2-13 | <0.3 |
| Shrub | 23.5 | 17-30 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 57.5 | 48-67 | 5-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 5.2 | 3-7 | - |

#### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: S (1), N (1)

Macrotopography: bottom to lower slope (1), terrace (1)
Microtopography: flat (1), undulating (1)
Parent Material: mixed alluvium (1), volcanic (1)
Soil Texture: clay or clay loam (1), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1198 ft. | 555-1841 ft. |
| Slope | 12º | 8-16º |
| Large rock cover | 19.5% | 4-35% |
| Small rock cover | 8% | 5-11% |
| Bare ground cover | 5% | 5-5% |
| Litter cover | 62% | 52-72% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR1249 **Relevés:** SNFN0258

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills in the two northernmost counties. It is likely that the *U*. *californica* - *A*. *rhombifolia* Associations defined from Marin County (Evens and Kentner 2006) and from the Santa Monica Mountains (Keeler-Wolf and Evens 2006) are analogous, thus extending this association's range to the Central Coast Ranges and southern California.

Potter (2005) does not report any version of the *Umbellularia californica* Alliance in his study of Sierra Nevada riparian vegetation. However, this may be due to his focus on U.S. Forest Service lands, which occur principally upslope from the landscape covered in this project. Potter's broadly defined *Quercus chrysolepis* / *Toxicodendron diversilobum* Association contains some stands that have a mix of *U*. *californica*, *A*. *rhombifolia*, *Quercus chrysolepis*, and *Q*. *wislizeni*. These stands resemble this and the following association in the *U*. *californica* alliance; however, in most of Potter's stands, *Q*. *chrysolepis* has significantly higher cover than in this association.

**STAND TABLE**
***Umbellularia californica - Alnus rhombifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | UMCA-T | *Umbellularia californica* | 100 | 29.0 | 28 | 30 | | X | X | |
| | ALRH2-T | *Alnus rhombifolia* | 100 | 8.0 | 1 | 15 | | | X | |
| | UMCA-M | *Umbellularia californica* | 100 | 2.1 | 0.2 | 4 | | | X | |
| | UMCA-L | *Umbellularia californica* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | QUKE-T | *Quercus kelloggii* | 50 | 10.5 | 21 | 21 | | | | |
| | FRLA-T | *Fraxinus latifolia* | 50 | 7.5 | 15 | 15 | | | | |
| | PLRA-T | *Platanus racemosa* | 50 | 1.0 | 2 | 2 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 50 | 0.5 | 1 | 1 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 50 | 0.5 | 1 | 1 | | | | |
| | ACMA3-T | *Acer macrophyllum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | AECA-L | *Aesculus californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUKE-L | *Quercus kelloggii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SNAG | *Standing snag* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 12.0 | 12 | 12 | | X | X | |
| | RUDI2 | *Rubus discolor* | 100 | 3.0 | 1 | 5 | | | X | X |
| | CAOC5 | *Calycanthus occidentalis* | 50 | 6.5 | 13 | 13 | | | | |
| | STOFR | *Styrax officinalis* var. *redivivus* | 50 | 4.0 | 8 | 8 | | | | |
| | VICA5 | *Vitis californica* | 50 | 2.1 | 4.2 | 4.2 | | | | |
| | ARCA10 | *Aristolochia californica* | 50 | 2.0 | 4 | 4 | | | | |
| | RULE | *Rubus leucodermis* | 50 | 0.5 | 1 | 1 | | | | |
| | FICA | *Ficus carica* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PTCR3 | *Ptelea crenulata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SYMO | *Symphoricarpos mollis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | SACR2 | *Sanicula crassicaulis* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | CABA4 | *Carex barbarae* | 50 | 1.0 | 2 | 2 | | | | |
| | TONO | *Torilis nodosa* | 50 | 1.0 | 2 | 2 | | | | X |
| | TRLA6 | *Trientalis latifolia* | 50 | 0.5 | 1 | 1 | | | | |
| | HERBAC | *unknown* | 50 | 0.2 | 0.4 | 0.4 | | | | |

**STAND TABLE continued**
***Umbellularia californica - Alnus rhombifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | ADJO | *Adiantum jordanii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | BRST2 | *Bromus sterilis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAAL2 | *Calochortus albus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CAOL | *Cardamine oligosperma* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CEAR4 | *Cerastium arvense* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPAP | *Claytonia parviflora* subsp. *parviflora* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPE | *Claytonia perfoliata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | DELPH | *Delphinium* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | DIVO | *Dichelostemma volubile* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ELGL | *Elymus glaucus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | FRITI | *Fritillaria* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | METO | *Melica torreyana* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MIGL2 | *Mimulus glaucescens* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | POCOC | *Polygala cornuta* var. *cornuta* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | POCA26 | *Polypodium calirhiza* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PTAQ | *Pteridium aquilinum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SMCA2 | *Smilax californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | STST | *Stachys stricta* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 100 | 2.0 | 1 | 3 | X | | X | |
| | LIVER | *Liverwort* | 50 | 0.1 | 0.2 | 0.2 | | | | |

## *Umbellularia californica* - *Quercus wislizeni* Association
## California Bay - Interior Live Oak Association

**SUMMARY**
In the stands sampled, the overstory tree canopy was typically open to continuous and characterized by *Umbellularia californica* at 10-65% cover (combined cover in the tree overstory and/or understory layers). *Quercus wislizeni* was characteristically present in the tree and/or shrub layers. The shrub layer was open to continuous with *Toxicodendron diversilobum* dominant and with *Ceanothus integerrimus*, *Clematis lasiantha*, and *Heteromeles arbutifolia* often present. The herbaceous layer was open and often included *Torilis arvensis*.

In this study, this association was sampled commonly in the Cascade Range Foothills, and infrequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands always occurred on volcanic (including basalt) substrates. They occupied lower to upper slopes that varied from gentle to steep. Stands occurred in mesic, northwest to east-facing uplands.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Shingletown-Paradise (M261Dl), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 71.6 | 60-85 | - |
| Herb | 5.9 | 1-15 | variable |
| Shrub | 45.4 | 2-80 | <5 |
| Low Tree/Tall Shrub | 5 | 0-40 | 5-10 |
| Hardwood | 29.7 | 0-68 | 5-20 |
| Conifer | <1 | 0-1 | 5-10 |
| Relative non-native to native cover | 2.6 | 0-11 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (3), Variable (2), NE (2), E (2), NW (1)
Macrotopography: lower slope (2), lower to middle slope (1), middle slope (1), upper slope (4)
Microtopography: undulating (4), flat (2), concave (2)
Parent Material: volcanic (9), basalt (1)
Soil Texture: clay or clay loam (2), loam or sandy loam (2), silt or silt loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1156 ft. | 645-1668 ft. |
| Slope | 19.8º | 1-32º |
| Large rock cover | 9% | <1-25% |
| Small rock cover | 12.2% | <1-50% |
| Bare ground cover | 14% | 2-50% |
| Litter cover | 60% | 10-93% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0088, SNNR0431, SNNR0543, SNNR0549, SNNR1067, SNNR1069, SNNR1076, SNNR1337, SNNR1341, SNNR1355

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project. See comments in the previous description of the *Umbellularia californica - Alnus rhombifolia* Association regarding this association's relationship to the Potter (2005) classification. Some of Potter's stand tables appear to have a co-dominance of *U. californica* and *Q. wislizeni*, although, unlike our association, most of his also have high cover of *Q. chrysolepis*. So far, this primarily upland association appears restricted to the Sierra Nevada Foothills.

**STAND TABLE**
***Umbellularia californica - Quercus wislizeni* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | UMCA-M | *Umbellularia californica* | 70 | 18.8 | 3 | 40 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 70 | 8.5 | 0.2 | 40 | | | | |
| | UMCA-T | *Umbellularia californica* | 60 | 18.1 | 1 | 65 | | | | |
| | AECA-M | *Aesculus californica* | 60 | 1.6 | 0.2 | 10 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 9.3 | 3 | 26 | | | | |
| | QUDO-T | *Quercus douglasii* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 14.1 | 3 | 37 | X | | X | |
| | CEIN3 | *Ceanothus integerrimus* | 70 | 3.8 | 0.2 | 25 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 1.6 | 0.2 | 10 | | | | |
| | CLLA3 | *Clematis lasiantha* | 50 | 0.5 | 0.2 | 3 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 40 | 0.6 | 0.2 | 3 | | | | |
| | RHTR | *Rhus trilobata* | 40 | 0.2 | 0.2 | 1 | | | | |
| | ARCA10 | *Aristolochia californica* | 30 | 0.5 | 0.2 | 3.2 | | | | |
| | CECU | *Ceanothus cuneatus* | 30 | 0.3 | 0.2 | 3 | | | | |
| | CEOCO | *Cercis occidentalis* | 30 | 0.1 | 0.2 | 1 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 30 | 0.1 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 60 | 0.6 | 0.2 | 5 | | | | X |
| | ADJO | *Adiantum jordanii* | 30 | 0.3 | 0.2 | 3 | | | | |
| | METO | *Melica torreyana* | 30 | 0.3 | 0.2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 30 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPO | *Galium porrigens* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 30 | 4.1 | 5 | 30 | | | | |

A view across a matrix of the *Adenostoma fasciculatum* - *Arctostaphylos manzanita* Shrubland Association (*A*. *fasciculatum* in flower) on middle and upper slopes. The *Quercus wislizeni* - *Pinus sabiniana* / *Arctostaphylos manzanita* Woodland Association can be seen on adjacent lower slopes. Photo taken in western Tuolumne County.

## *Adenostoma fasciculatum* Shrubland Alliance

## Chamise Shrubland Alliance

As defined in the state, *Adenostoma fasciculatum* is dominant in the shrub canopy, and may occur in pure stands or with *A*. *sparsifolium*, *Arctostaphylos glandulosa*, *A*. *manzanita*, *A*. *viscida*, *Ceanothus* spp., *Eriogonum fasciculatum*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Q*. *wislizeni*, *Salvia apiana*, *S*. *mellifera*, and *Toxicodendron diversilobum*. Emergent trees such as *Pinus sabiniana* and *Quercus wislizeni* may be present and the herb layer is sparse to intermittent. Stands occur across cismontane California in varied topography. Soils are commonly shallow over colluvium and many kinds of bedrock, including serpentine.

As described below, five associations of the Chamise Alliance were classified in the study area. One plot (SNNR0110) showed additional variation, with *Fraxinus dipetala* co-dominating the shrub layer. This plot was classified to the alliance level only.

## *Adenostoma fasciculatum* Association

## Chamise Association

### SUMMARY

In the stands sampled, the shrub canopy was open to continuous and dominated by *Adenostoma fasciculatum* at 20-95% cover. *Heteromeles arbutifolia* was often present in the shrub overstory. *Pinus sabiniana* sometimes occurred as a scattered emergent tree. The herbaceous layer was open and often included non-native grasses *Aira caryophyllea* and *Bromus hordeaceus*.

This association was sampled frequently in the study area within the central Sierra Nevada Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on a variety of substrates - usually on metamorphic (including slate and serpentine) and sedimentary substrates, and rarely on gabbro, ultramafic, and greenstone substrates. They occupied a variety of upland slope positions from lower slopes to ridgetops that were gentle to steep.

### DISTRIBUTION IN STUDY AREA

This association was sampled in Amador, Calaveras, El Dorado, Mariposa, Placer, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 76.2 | 38-95 | - |
| Herb | 9.2 | 0-32 | variable |
| Shrub | 72.4 | 27-95 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.4 | 0-8 | <5-20 |
| Conifer | 0.5 | 0-5 | <5-20 |
| Relative non-native to native cover | 8.1 | 0-33 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (9), SW (4), S (4), NW (4), W (2), SE (2), E (2), NE (1), N (1)
Macrotopography: entire slope (2), lower slope (4), lower to middle slope (3), lower to upper slope (2), middle slope (8), middle to upper slope (2), middle slope to ridgetop (1), upper slope (5), upper slope to ridgetop (1), ridgetop (1)
Microtopography: convex (13), undulating (12), flat (2), concave (1)
Parent Material: metamorphic (12), sedimentary (6), gabbro (2), mixed rock (2), serpentine (2), slate (2), ultramafic (2), greenstone (1)
Soil Texture: loam or sandy loam (8), clay or clay loam (6), silt or silt loam (5), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1177 ft. | 464-2915 ft. |
| Slope | 17.3º | 3-32º |
| Large rock cover | 2.1% | 0-8% |
| Small rock cover | 11.1% | 0.2-60% |
| Bare ground cover | 22.8% | 3-77% |
| Litter cover | 60.5% | 3-87% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=29)

**Rapid Assessments:** SNNR0012, SNNR0015, SNNR0035, SNNR0064, SNNR0067, SNNR0068, SNNR0143, SNNR0154, SNNR0218, SNNR0225, SNNR0869, SNNR0981, SNNR1002, SNNR1087, SNNR1098, SNNR1153, SNNR1166, SNNR1202, SNNR1229, SNNR1432, SNNR1439, SNNR1440, SNNR1462 **Relevés:** SNFN0569, SNFN0570, SNFN0571, SNFN0663, SNFN0671, SNFN0680

**Rank:** G5S5

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills, lower slopes of the Sierra Nevada montane zone (NatureServe et al. 2003b), and for many other parts of Cismontane California from Shasta Co. to San Diego Co. (e.g., Evens and San 2006, Evens et al. 2006, Klein and Evens 2006, Sawyer et al. 2007 MS). This equates to the association defined in Tuolumne Co. as the *Adenostoma fasciculatum*/Annual Grass-Herb-Moss (Evens et al. 2004).

**STAND TABLE**
***Adenostoma fasciculatum* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 34 | 0.3 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 69.2 | 20 | 95 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 55 | 1.5 | 0.2 | 10 | | | | |
| | TODI | *Toxicodendron diversilobum* | 38 | 0.6 | 0.2 | 6 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 28 | 0.3 | 0.2 | 2 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 28 | 0.1 | 0.2 | 2 | | | | |
| | LOSC2 | *Lotus scoparius* | 28 | 0.1 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | AICA | *Aira caryophyllea* | 66 | 0.8 | 0.2 | 5 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 59 | 1.5 | 0.2 | 20 | | | | X |

**STAND TABLE continued**
***Adenostoma fasciculatum* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | GAPO | *Galium porrigens* | 48 | 0.2 | 0.2 | 2 | | | | |
| | VUMY | *Vulpia myuros* | 41 | 1.3 | 0.2 | 10 | | | | X |
| | LOMI | *Lotus micranthus* | 34 | 0.2 | 0.2 | 2 | | | | |
| | DAPU3 | *Daucus pusillus* | 31 | 0.1 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 24 | 0.7 | 0.2 | 12 | | | | X |
| | VUBR | *Vulpia bromoides* | 24 | 0.3 | 0.2 | 8 | | | | X |
| | BRDI3 | *Bromus diandrus* | 24 | 0.2 | 0.2 | 2 | | | | X |
| | CEME2 | *Centaurea melitensis* | 24 | 0.2 | 0.2 | 3 | | | | X |
| | TOAR | *Torilis arvensis* | 24 | 0.1 | 0.2 | 3 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 21 | 0.2 | 0.2 | 3 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 21 | 0.1 | 0.2 | 1 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 28 | 2.8 | 0.2 | 20 | | | | |

***Adenostoma fasciculatum* / Herbaceous Association**

**Chamise / Herbaceous Association**


**SUMMARY**

In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Adenostoma fasciculatum* at 14-75% cover. Other shrubs such as *Eriodictyon californicum*, *Eriophyllum lanatum* var. *grandiflorum*, and *Rhamnus ilicifolia* were often present. *Quercus wislizeni* sometimes occurred as a scattered emergent tree. The herbaceous layer was intermittent to continuous with abundant and characteristic taxa such as *Aira caryophyllea*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Castilleja pruinosa*, *Chlorogalum*, *Daucus pusillus*, *Galium porrigens*, *Silene gallica*, *Torilis arvensis*, and *Trifolium willdenovii*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on volcanic substrates. They occupied upland, ridgetop slopes that were flat to gentle. This association represents open stands of chamise growing on shallow volcanic rock. All stands sampled were found along upper slopes in Table Mountain at Peoria Wildlife Area. The herbaceous openings in this association are not a result of recent fire opening up the shrub canopy, but of inherent edaphic conditions. The herbaceous component is largely native in species composition.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Tuolumne County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 84.5 | 70-95 | - |
| Herb | 68 | 60-72 | variable |
| Shrub | 47.8 | 18-75 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-0.2 | <5 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 42.7 | 16-69 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (1), SW (1), S (1), Flat (1)
Macrotopography: ridgetop (4)
Microtopography: concave (2), flat (1), convex (1)
Parent Material: volcanic (4)
Soil Texture: loam or sandy loam (3), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1737 ft. | 1734-1740 ft. |
| Slope | 0.8º | 0-1º |
| Large rock cover | 12.5% | 5-20% |
| Small rock cover | 7% | 6-8% |
| Bare ground cover | 6.5% | 5-8% |
| Litter cover | 65% | 60-70% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR1463, SNNR1464, SNNR1466 **Relevés:** SNFN0604

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based upon the data collected for this project. This equates to the association defined in Tuolumne Co. as the *Adenostoma fasciculatum* / *Castilleja pruinosa* - Annual Grass - Herb Association (Evens et al. 2004). Other reports define similar types such as the *A. fasciculatum* / Annual Grass - Herb Association in Marin Co. (Evens and Kentner 2006).

**STAND TABLE**
***Adenostoma fasciculatum* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-M | *Quercus wislizeni* | 25 | 0.5 | 2 | 2 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 25 | 0.5 | 2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 48.5 | 14 | 75 | X | | X | |
| | ERCA6 | *Eriodictyon californicum* | 100 | 1.4 | 0.2 | 4 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 0.3 | 0.2 | 1 | | | | |
| | ERLAG | *Eriophyllum lanatum* var. *grandiflorum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 25 | 1.0 | 4 | 4 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 25 | 0.8 | 3 | 3 | | | | |
| | TODI | *Toxicodendron diversilobum* | 25 | 0.5 | 2 | 2 | | | | |
| | MIAU | *Mimulus aurantiacus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PRSU2 | *Prunus subcordata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SYMO | *Symphoricarpos mollis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 100 | 29.0 | 6 | 50 | | | X | X |
| | AVBA | *Avena barbata* | 100 | 20.3 | 0.2 | 65 | | | X | X |
| | TRWI3 | *Trifolium willdenovii* | 100 | 5.0 | 1 | 10 | | | X | |
| | AICA | *Aira caryophyllea* | 100 | 3.8 | 0.2 | 6 | | | X | X |
| | CAPR14 | *Castilleja pruinosa* | 100 | 2.3 | 0.2 | 6 | | | X | |
| | BRDI3 | *Bromus diandrus* | 75 | 8.5 | 1 | 18 | | | X | X |
| | TOAR | *Torilis arvensis* | 75 | 8.0 | 1 | 16 | | | X | X |
| | DAPU3 | *Daucus pusillus* | 75 | 2.8 | 0.2 | 6 | | | X | |
| | SIGA | *Silene gallica* | 75 | 1.6 | 0.2 | 6 | | | X | X |
| | GAPO | *Galium porrigens* | 75 | 0.8 | 0.2 | 2 | | | X | |
| | CHLOR3 | *Chlorogalum* | 75 | 0.2 | 0.2 | 0.2 | | | X | |
| | VUMI | *Vulpia microstachys* | 50 | 6.5 | 1 | 25 | | | | |
| | LUNA3 | *Lupinus nanus* | 50 | 3.1 | 0.2 | 12 | | | | |

**STAND TABLE continued**
***Adenostoma fasciculatum* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRMA3 | *Bromus madritensis* | 50 | 1.8 | 3 | 4 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 50 | 1.6 | 0.2 | 6 | | | | X |
| | ERNUP4 | *Eriogonum nudum* var. *pubiflorum* | 50 | 0.8 | 0.2 | 3 | | | | |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 50 | 0.5 | 1 | 1 | | | | |
| | LACA7 | *Lasthenia californica* | 50 | 0.3 | 0.2 | 1 | | | | |
| | POSE | *Poa secunda* | 50 | 0.3 | 0.2 | 1 | | | | |
| | TRHI4 | *Trifolium hirtum* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 50 | 0.3 | 0.2 | 1 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | PETRT | *Pentagramma triangularis* subsp. *triangularis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PLER3 | *Plantago erecta* | 25 | 1.0 | 4 | 4 | | | | |
| | LUBE | *Lupinus benthamii* | 25 | 0.5 | 2 | 2 | | | | |
| | MADIA | *Madia* | 25 | 0.5 | 2 | 2 | | | | |
| | ASGA | *Astragalus gambelianus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CALU9 | *Calochortus luteus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCI6 | *Erodium cicutarium* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERMO7 | *Erodium moschatum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPA5 | *Galium parisiense* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | GEDI | *Geranium dissectum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOMI | *Lotus micranthus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOWR2 | *Lotus wrangelianus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LUST2 | *Lupinus stiversii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PHCI | *Phacelia cicutaria* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POLYP | *Polypodium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | STME2 | *Stellaria media* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | TONO | *Torilis nodosa* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRLA16 | *Triteleia laxa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | LICHEN | Lichen | 75 | 8.5 | 8 | 16 | | X | X | |
| | MOSS | Moss | 75 | 4.3 | 1 | 8 | | | X | |
| | SEHA2 | *Selaginella hansenii* | 50 | 9.6 | 0.2 | 38 | | | | |

***Adenostoma fasciculatum* - *Arctostaphylos manzanita* Association (Provisional)**
**Chamise - Common Manzanita Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Adenostoma fasciculatum* at 22-63% cover. Other shrubs such as *Arctostaphylos manzanita*, *Ceanothus cuneatus*, and *Heteromeles arbutifolia* were often present. The herbaceous layer was open to intermittent and often included *Aira caryophyllea*, *Bromus hordeaceus*, *Bromus madritensis*, *Calochortus albus*, *Galium porrigens*, *Gastridium ventricosum*, *Torilis arvensis*, and *Vulpia myuros*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on sedimentary substrates, but were also found on metamorphic and ultramafic substrates. These upland stands occupied a variety of slope positions between lower slopes and ridgetops, but most often occupied middle slopes that were gentle to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Calaveras and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 78.3 | 67-90 | - |
| Herb | 12.2 | 1-50 | variable |
| Shrub | 70 | 48-82 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.4 | 0-5 | <5-10 |
| Conifer | 0.4 | 0-1 | 5-10 |
| Relative non-native to native cover | 10.3 | 0-42 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (2), N (2), Variable (1), E (1)
Macrotopography: lower slope (1), middle slope (3), upper slope (1), ridgetop (1)
Microtopography: undulating (2), convex (2), concave (1), flat (1)
Parent Material: sedimentary (3), metamorphic (2), ultramafic (1)
Soil Texture: loam or sandy loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1310 ft. | 1032-1809 ft. |
| Slope | 11.2º | 3-18º |
| Large rock cover | 12.1% | 0.2-34.2% |
| Small rock cover | 8.3% | 3-12% |
| Bare ground cover | 5.3% | 2-10% |
| Litter cover | 70.3% | 55-81% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0006, SNNR0047, SNNR0096 **Relevés:** SNFN0249, SNFN0666, SNFN0679

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills (Evens et al. 2004) based on the data collected for this project. This type extends in range to other parts of the central Sierra Foothills and may also occur in the Inner North Coast Ranges of California.

**STAND TABLE**
***Adenostoma fasciculatum* - *Arctostaphylos manzanita* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-L | *Quercus wislizeni* | 33 | 0.7 | 1 | 3.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 42.5 | 22 | 63 | X | | X | |
| | ARMA | *Arctostaphylos manzanita* | 100 | 18.0 | 2 | 28 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 67 | 9.4 | 2 | 37 | | | | |
| | CECU | *Ceanothus cuneatus* | 50 | 1.7 | 2 | 5 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 33 | 1.0 | 0.2 | 6 | | | | |
| | TODI | *Toxicodendron diversilobum* | 33 | 1.0 | 1 | 5 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.6 | 0.4 | 3 | | | | |
| | MIAU | *Mimulus aurantiacus* | 33 | 0.4 | 0.2 | 2 | | | | |
| | LOSC2 | *Lotus scoparius* | 33 | 0.3 | 1 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 83 | 3.9 | 0.2 | 20 | | | X | X |
| | AICA | *Aira caryophyllea* | 83 | 1.3 | 0.2 | 4 | | | X | X |
| | BRMA3 | *Bromus madritensis* | 67 | 1.7 | 0.2 | 8 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 67 | 0.8 | 0.2 | 4 | | | | X |
| | VUMY | *Vulpia myuros* | 50 | 1.7 | 2 | 5 | | | | X |
| | GAPO | *Galium porrigens* | 50 | 0.2 | 0.2 | 1 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.2 | 0.2 | 1 | | | | X |
| | CAAL2 | *Calochortus albus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | AVBA | *Avena barbata* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | NALE2 | *Nassella lepida* | 33 | 0.2 | 0.2 | 1 | | | | |
| | PETRT | *Pentagramma triangularis* subsp. *triangularis* | 33 | 0.2 | 0.2 | 1 | | | | |
| | BRMI2 | *Briza minor* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEME2 | *Centaurea melitensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CHLOR3 | *Chlorogalum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | MAGR3 | *Madia gracilis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SAGR5 | *Sanicula graveolens* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TRHI4 | *Trifolium hirtum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 1.5 | 0.2 | 9 | | | | |

***Adenostoma fasciculatum* - *Arctostaphylos viscida* Association**

**Chamise - Whiteleaf Manzanita Association**

**SUMMARY**

In the stands sampled, the shrub canopy was intermittent to continuous and dominated by *Adenostoma fasciculatum* at 19-70% cover. *Arctostaphylos viscida* was characteristically present, while *Heteromeles arbutifolia* was often present in the shrub overstory. *Pinus sabiniana* sometimes occurred as a scattered emergent tree. The herbaceous layer was typically open with *Aira caryophyllea*, *Bromus madritensis*, *Galium porrigens*, and *Vulpia myuros* occurring occasionally.

This association was sampled frequently in the study area within the central Sierra Nevada Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates (including slate, mixed metamorphic, and serpentine), but were also found infrequently on sedimentary, ultramafic, gabbro, or mixed rock substrates. They occupied all aspects and slope positions, from lower slopes to ridgetops (most often on middle to upper slopes). Slopes varied from gentle to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Calaveras, El Dorado, Mariposa, Placer, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 72.3 | 48-93 | - |
| Herb | 9.5 | 0-35 | variable |
| Shrub | 66.4 | 37-93 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.3 | 0-3 | <5-20 |
| Conifer | 0.3 | 0-2 | <5-20 |
| Relative non-native to native cover | 7.4 | 0-46 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (11), SW (6), W (4), SE (3), NE (3), E (3), S (2), NW (2)
Macrotopography: entire slope (2), lower slope (4), lower to middle slope (1), lower to upper slope (3), middle slope (8), middle to upper slope (7), middle slope to ridgetop (1), upper slope (6), upper slope to ridgetop (1), ridgetop (1)
Microtopography: undulating (22), convex (7), flat (5)
Parent Material: metamorphic (16), sedimentary (5), slate (4), ultramafic (4), serpentine (2), gabbro (1), mixed metamorphic (1), mixed rock (1)
Soil Texture: loam or sandy loam (6), silt or silt loam (6), clay or clay loam (4), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1391 ft. | 460-2496 ft. |
| Slope | 19º | 2-37º |
| Large rock cover | 2% | 0.2-10% |
| Small rock cover | 11.4% | 0-66.7% |
| Bare ground cover | 20.5% | 2-66% |
| Litter cover | 62.8% | 8-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=34)

**Rapid Assessments:** SNNR0004, SNNR0009, SNNR0103, SNNR0107, SNNR0114, SNNR0138, SNNR0139, SNNR0220, SNNR0224, SNNR0226, SNNR0298, SNNR0310, SNNR0311, SNNR0312, SNNR0366, SNNR0367, SNNR0564, SNNR0565, SNNR0652, SNNR0751, SNNR0797, SNNR1025, SNNR1047, SNNR1048, SNNR1097, SNNR1103, SNNR1150, SNNR1163, SNNR1200 **Relevés:** SNFN0045, SNFN0137, SNFN0139, SNFN0152, SNFN0573

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon data collected for this project. It is likely to occur in the eastern Klamath Mountains and in the adjacent Inner North Coast Ranges.

**STAND TABLE**
***Adenostoma fasciculatum - Arctostaphylos viscida* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 41 | 0.2 | 0.2 | 1 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 24 | 0.6 | 0.2 | 15 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 47.1 | 19 | 70 | X | | X | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 15.4 | 0.2 | 52 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 71 | 1.9 | 0.2 | 14 | | | | |
| | CECU | *Ceanothus cuneatus* | 47 | 0.3 | 0.2 | 3 | | | | |
| | TODI | *Toxicodendron diversilobum* | 35 | 0.4 | 0.2 | 5 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 26 | 0.6 | 0.2 | 10 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 24 | 0.2 | 0.2 | 4 | | | | |
| | LOSC2 | *Lotus scoparius* | 24 | 0.1 | 0.2 | 1.2 | | | | |
| | CLLA3 | *Clematis lasiantha* | 21 | 0.1 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | VUMY | *Vulpia myuros* | 44 | 2.1 | 0.2 | 20 | | | | X |
| | BRMA3 | *Bromus madritensis* | 38 | 0.9 | 0.2 | 7 | | | | X |
| | AICA | *Aira caryophyllea* | 32 | 0.5 | 0.2 | 12 | | | | X |
| | GAPO | *Galium porrigens* | 26 | 0.1 | 0.2 | 1 | | | | |
| | LOMI | *Lotus micranthus* | 24 | 0.1 | 0.2 | 2 | | | | |
| | VUBR | *Vulpia bromoides* | 21 | 0.3 | 0.2 | 8 | | | | X |
| | SACR2 | *Sanicula crassicaulis* | 21 | 0.1 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 21 | 0.1 | 0.2 | 1 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 32 | 1.5 | 0.2 | 15 | | | | |

## *Adenostoma fasciculatum - Eriodictyon californicum - Lotus scoparius* Association
**Chamise - California Yerba Santa - Deer Weed Association**


**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Adenostoma fasciculatum* at 5-60% cover. Other shrubs such as *Eriodictyon californicum*, *Heteromeles arbutifolia*, and *Lotus scoparius* were characteristically present. The herbaceous layer was open to continuous and often included *Centaurea melitensis*, *Daucus pusillus*, *Hypochaeris glabra*, *Lotus micranthus*, and *Vulpia myuros*.


This association was sampled frequently in the study area within the central Sierra Nevada Foothills and infrequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands sometimes occurred on metamorphic, ultramafic, or sedimentary substrates, and rarely on igneous or mixed rock substrates. They occupied a variety of upland slope positions, from lower slopes to ridgetops, but occurred most often on southerly-facing, middle and upper slopes that were gentle to steep.

This association is the typical post-fire expression of the *A*. *fasciculatum* alliance in the Sierra Foothills. Virtually all stands sampled appear to have experienced fire within the last 10 years. As stands mature they are likely to trend toward either *A*. *fasciculatum* or *A*. *fasciculatum* - *Arctostaphylos viscida* associations. In keeping with the philosophy of sampling different seral stages of vegetation in this study, this is considered a temporally-driven association of the widespread chamise chaparral alliance.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Calaveras, El Dorado, Mariposa, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 65.8 | 45-80 | - |
| Herb | 19.3 | 2-70 | variable |
| Shrub | 55.9 | 37-75 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | 0-0.2 | <5 |
| Conifer | 0 | 0-0.2 | 5-20 |
| Relative non-native to native cover | 18.5 | 0-50 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: S (6), Variable (4), SW (4), E (2), W (1), SE (1), NW (1), NE (1)
Macrotopography: entire slope (1), lower slope (1), lower to middle slope (1), lower to upper slope (1), middle slope (6), middle to upper slope (2), upper slope (6), ridgetop (1)
Microtopography: undulating (12), flat (4), convex (3), concave (1)
Parent Material: metamorphic (7), ultramafic (6), sedimentary (5), igneous (1), mixed rock (1)
Soil Texture: clay or clay loam (6), loam or sandy loam (4), silt or silt loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1723 ft. | 540-2737 ft. |
| Slope | 17.5º | 4-30º |
| Large rock cover | 3% | 0-25% |
| Small rock cover | 23% | 0.4-55% |

| | | |
|---|---|---|
| Bare ground cover | 24.8% | 5-69% |
| Litter cover | 45.7% | 10-87% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=20)

**Rapid Assessments:** SNNR0054, SNNR0102, SNNR0106, SNNR0135, SNNR0140, SNNR0302, SNNR0306, SNNR0308, SNNR0314, SNNR0355, SNNR0356, SNNR0357, SNNR0358, SNNR0361, SNNR0364, SNNR0370, SNNR0580 **Relevés:** SNFN0042, SNFN0225, SNFN0227

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon the data collected for this project. Very similar post-fire stands have been identified in the Santa Monica Mountains (Keeler-Wolf and Evens 2006), western Riverside County (Klein and Evens 2006), the southern Sierra Foothills of Sequoia National Park (S. Haultain, pers. comm. 2004), and in the Central Coast Ranges (T. Keeler-Wolf, pers. obs. 2005). This type is also likely to occur in the Inner North Coast Ranges of California.

**STAND TABLE**
***Adenostoma fasciculatum - Eriodictyon californicum - Lotus scoparius* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-M | *Quercus wislizeni* | 25 | 0.2 | 0.2 | 4 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 31.7 | 5 | 60 | X | | X | |
| | ERCA6 | *Eriodictyon californicum* | 95 | 5.6 | 0.2 | 19 | | | X | |
| | LOSC2 | *Lotus scoparius* | 90 | 14.2 | 0.2 | 45 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 80 | 4.4 | 0.2 | 18 | | | X | |
| | ARVI4 | *Arctostaphylos viscida* | 55 | 1.4 | 0.2 | 10 | | | | |
| | CECU | *Ceanothus cuneatus* | 35 | 0.5 | 0.2 | 7 | | | | |
| | ERCO25 | *Eriophyllum confertiflorum* | 30 | 0.7 | 0.2 | 5 | | | | |
| | ERAR27 | *Ericameria arborescens* | 30 | 0.2 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | CEME2 | *Centaurea melitensis* | 70 | 2.5 | 0.2 | 17 | | | | X |
| | DAPU3 | *Daucus pusillus* | 60 | 0.5 | 0.2 | 5 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 55 | 3.9 | 0.2 | 59 | | | | X |
| | VUMY | *Vulpia myuros* | 50 | 4.1 | 1 | 15 | | | | X |
| | LOMI | *Lotus micranthus* | 50 | 0.6 | 0.2 | 4 | | | | |
| | BRMA3 | *Bromus madritensis* | 45 | 1.1 | 0.2 | 5 | | | | X |
| | AICA | *Aira caryophyllea* | 40 | 0.8 | 0.2 | 5 | | | | X |
| | FIGA | *Filago gallica* | 40 | 0.2 | 0.2 | 2 | | | | X |
| | AVBA | *Avena barbata* | 35 | 0.2 | 0.2 | 2 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 35 | 0.2 | 0.2 | 2 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 30 | 1.1 | 0.2 | 8 | | | | X |
| | GAPA5 | *Galium parisiense* | 30 | 0.1 | 0.2 | 1 | | | | X |
| | NALE2 | *Nassella lepida* | 25 | 0.3 | 0.2 | 2 | | | | |
| | VERI | *Velezia rigida* | 25 | 0.1 | 0.2 | 1 | | | | X |

### *Arctostaphylos viscida* Shrubland Alliance
### Whiteleaf manzanita Shrubland Alliance

As defined in the state, *Arctostaphylos viscida* is dominant in the shrub canopy with *Adenostoma fasciculatum*, *Amelanchier alnifolia*, *Arctostaphylos manzanita*, *A. mewukka*, *A. myrtifolia*, *A. patula*, *Ceanothus cordulatus*, *C. cuneatus*, *C. integerrimus*, *C. velutinus*, *Garrya fremontii*, *Heteromeles arbutifolia*, *Holodiscus discolor*, and *Quercus berberidifolia*. Emergent trees such as *Pinus sabiniana*, *P. ponderosa*, or *Pseudotsuga menziesii* may be present. The shrub canopy is continuous or intermittent and the herbaceous layer is sparse. Stands occur on ridges and upper slopes that may be steep. Soils are shallow and are developed from ultramafic, weathered clay, sandstone, or granitic substrates. In many portions of its range, stands of *A. viscida* are transitional to montane forests or woodland types. Other stands persist for over 100 years.

In the Foothills, most of the sampled stands were on gabbro soils. As described below, four associations of the Whiteleaf Manzanita Alliance were classified in the study area. Three plots (SNNR0785, SNNR1244, SNNR0979) showed additional variation, two with *Ceanothus cuneatus* in the shrub layer, and one with an herb layer dominated by *Eriogonum prattenianum*. These were classified to the alliance level only.

### *Arctostaphylos viscida* Association
### Whiteleaf Manzanita Association

**SUMMARY**

In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Arctostaphylos viscida* at 30-75% cover. Other shrubs such as *Heteromeles arbutifolia* and *Quercus wislizeni* were characteristically present. Trees such as *Pinus ponderosa*, *Pinus sabiniana*, and *Quercus chrysolepis* sometimes occurred as scattered emergents. The herbaceous layer was sparse and often included *Aira caryophyllea*, *Polygala cornuta* var. *cornuta*, and *Vulpia myuros*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands often occurred on metamorphic or mixed metamorphic and infrequently occurred on sedimentary substrates. They occupied upland middle to upper slopes and ridgetops, that were gentle to somewhat steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 60 | 31-80 | - |
| Herb | 0.7 | 0-2 | <0.3 |
| Shrub | 59.1 | 30-80 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1 | 0-4 | <5-20 |

| | | | |
|---|---|---|---|
| Conifer | 0.1 | 0-0.2 | 5-20 |
| Relative non-native to native cover | 1.3 | 0-3 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: S (3), Variable (2), SW (2)
Macrotopography: middle slope (2), upper slope (2), upper slope to ridgetop (2), ridgetop (1)
Microtopography: flat (4), convex (3)
Parent Material: metamorphic (3), mixed metamorphic (3), sedimentary (1)
Soil Texture: loam or sandy loam (4), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1925 ft. | 1443-3028 ft. |
| Slope | 10º | 3-24º |
| Large rock cover | 1.1% | 0-3% |
| Small rock cover | 18.7% | 0.2-90% |
| Bare ground cover | 9.3% | 0.2-20% |
| Litter cover | 67.6% | 1-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0297, SNNR0754, SNNR1126, SNNR1133, SNNR1134, SNNR1142, SNNR1298 **Relevés:** none

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills (NatureServe et al. 2003b). In the Yosemite region, stands ascend to 5200 ft elevation. This association was considered a post-fire, early seral type in Yosemite. It is likely to occur elsewhere in the Inner North Coast Range and in the eastern Klamath Mountains.

**STAND TABLE**

***Arctostaphylos viscida* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-M | *Quercus wislizeni* | 86 | 1.1 | 0.2 | 5 | X | | X | |
| | QUCH2-T | *Quercus chrysolepis* | 29 | 0.3 | 1 | 1 | | | | |
| | PIPO-T | *Pinus ponderosa* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-T | *Pinus sabiniana* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 57.4 | 30 | 75 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 1.5 | 0.2 | 5 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | AICA | *Aira caryophyllea* | 71 | 0.4 | 0.2 | 1 | | | | X |
| | VUMY | *Vulpia myuros* | 71 | 0.1 | 0.2 | 0.2 | | | | X |
| | POCOC | *Polygala cornuta* var. *cornuta* | 57 | 0.2 | 0.2 | 1 | | | | |
| | FIGA | *Filago gallica* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYCO3 | *Hypericum concinnum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | LUCO6 | *Luzula comosa* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | MIVI2 | *Mimulus viscidus* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 86 | 1.0 | 0.2 | 2 | X | | X | |

### *Arctostaphylos viscida* / *Salvia sonomensis* Association (Provisional)
### Whiteleaf Manzanita / Creeping Sage Association (Provisional)

**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Arctostaphylos viscida* at 40-65% cover. Other shrubs such as *Ceanothus lemmonii*, *Heteromeles arbutifolia*, *Quercus garryana* var. *breweri*, *Rhamnus ilicifolia*, and *Rhamnus tomentella* were often present. Trees such as *Pinus ponderosa*, *Pinus sabiniana*, *Quercus chrysolepis*, *Quercus kelloggii*, and *Quercus wislizeni* sometimes occurred as scattered emergents. The herbaceous layer was open to intermittent and often included *Carex brainerdii*, *Elymus elymoides*, *Melica californica*, *Salvia sonomensis*, *Triteleia bridgesii*, and *Vulpia myuros*.

This association was sampled infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands consistently occurred on gabbro substrates. They occupied a variety of upland slope positions from lower slopes to ridgetops, on gentle to somewhat steep slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Yuba County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 74.9 | 60-90 | - |
| Herb | 19.7 | 10-40 | <0.3 |
| Shrub | 65.6 | 40-122 | 0-5 |
| Low Tree/Tall Shrub | 5 | 0-30 | 5-10 |
| Hardwood | 3.4 | 0-20 | <5-20 |
| Conifer | 3 | 0-10 | 10-20 |
| Relative non-native to native cover | 6.1 | 1-17 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (2), S (2), Variable (1), SW (1), SE (1)
Macrotopography: lower slope (1), middle slope (3), upper slope to ridgetop (1), ridgetop (2)
Microtopography: undulating (4), flat (3)
Parent Material: gabbro (7)
Soil Texture: clay or clay loam (3), loam or sandy loam (2), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 2239 ft. | 2000-2340 ft. |
| Slope | 7º | 1-20º |
| Large rock cover | 2.1% | 0.2-7% |
| Small rock cover | 10.3% | 2-25% |
| Bare ground cover | 32.2% | 10-48% |
| Litter cover | 48.7% | 20-72% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0126, SNNR0128, SNNR0130, SNNR0133, SNNR0134, SNNR0176 **Relevés:** SNFN0329

**Rank:** G3S3

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills based solely upon the data collected for this project. It is so far understood to be restricted to gabbro soils in the Sierra Nevada Foothills. It is distinguishable from the more typical (*Arctostaphylos viscida* - *Adenostoma fasciculatum*) / *Salvia sonomensis* Association by the lack of *A. fasciculatum* as a significant co-dominant.

**STAND TABLE**

***Arctostaphylos viscida* / *Salvia sonomensis* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-T | *Quercus kelloggii* | 57 | 3.1 | 0.2 | 20 | | | | |
| | PIPO-T | *Pinus ponderosa* | 43 | 1.6 | 1 | 9 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 43 | 1.4 | 2 | 5 | | | | |
| | PISA2-T | *Pinus sabiniana* | 29 | 0.9 | 1 | 5 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 29 | 0.3 | 0.2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 50.4 | 40 | 65 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 1.5 | 0.2 | 4 | | | X | |
| | QUGAB | *Quercus garryana* var. *breweri* | 71 | 2.0 | 1 | 5 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 71 | 1.7 | 1 | 5 | | | | |
| | CELE | *Ceanothus lemmonii* | 71 | 1.6 | 0.2 | 5 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 57 | 1.3 | 0.2 | 6 | | | | |
| | GAFR | *Garrya fremontii* | 43 | 0.3 | 0.2 | 1 | | | | |
| | PIMO5 | *Pickeringia montana* | 29 | 0.7 | 2 | 3 | | | | |
| | BEAQD | *Berberis aquifolium* var. *dictyota* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CABR7 | *Carex brainerdii* | 86 | 4.9 | 3 | 10 | | | X | |
| | SASO | *Salvia sonomensis* | 71 | 15.3 | 5 | 53 | | | | |
| | TRBR7 | *Triteleia bridgesii* | 71 | 1.3 | 0.2 | 7 | | | | |
| | VUMY | *Vulpia myuros* | 57 | 2.3 | 2 | 6 | | | | X |
| | ELEL5 | *Elymus elymoides* | 57 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 57 | 0.1 | 0.2 | 0.2 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 43 | 1.0 | 0.2 | 4 | | | | X |
| | ODHA | *Odontostomum hartwegii* | 43 | 1.0 | 0.2 | 5 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 43 | 0.6 | 1 | 2 | | | | X |
| | CHPO3 | *Chlorogalum pomeridianum* | 43 | 0.3 | 0.2 | 2 | | | | |
| | CHLOR3 | *Chlorogalum* | 29 | 0.7 | 2 | 3 | | | | |
| | TRHY3 | *Triteleia hyacinthina* | 29 | 0.6 | 1 | 3 | | | | |
| | VUMI | *Vulpia microstachys* | 29 | 0.3 | 0.2 | 2 | | | | |
| | BRPU16 | *Brodiaea purdyi* | 29 | 0.2 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | DIMU5 | *Dichelostemma multiflorum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | MAGR3 | *Madia gracilis* | 29 | 0.1 | 0.2 | 0.2 | | | | |

## (*Arctostaphylos viscida - Adenostoma fasciculatum*) / *Salvia sonomensis* Association
## (Whiteleaf Manzanita - Chamise) / Creeping Sage Association


### SUMMARY
In the stands sampled, the canopy was open to continuous with characteristic shrubs *Adenostoma fasciculatum* (<1-60% cover) and *Arctostaphylos viscida* (<1-70% cover). Other shrubs such as *Ceanothus lemmonii*, *Ceanothus roderickii*, *Cercis occidentalis*, and *Rhamnus ilicifolia* were often present. In some stands, *Ceanothus roderickii* was the dominant shrub. *Pinus sabiniana* often occurred as a scattered emergent tree. The herbaceous layer was open to intermittent and dominated by *Salvia sonomensis*.

This association was sampled frequently in the study area within the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on gabbro substrate, but were also found infrequently on metamorphic, igneous, sedimentary, or ultramafic substrates. They occupied all upland slope positions, but more commonly occupied middle and upper slopes that varied from flat to steep.


### DISTRIBUTION IN STUDY AREA
This association was sampled in Calaveras, El Dorado, and Nevada Counties, within the Granitic and Metamorphic Foothills (M261Ef) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997). A large number of samples were collected for a collaborative project relating the importance of this type to habitat for several listed plant species (Gogol-Prokurat pers. comm. 2007). Because many surveys were collected at the same sites, sub-sampling likely occurred across some of the 101 stands.

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 38.2 | 6-87 | - |
| Herb | 16.6 | 2-58 | variable |
| Shrub | 26.5 | 0-85 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1 | 0-35 | <5-10 |
| Conifer | 1.4 | 0-60 | <5-20 |
| Relative non-native to native cover | 4.4 | 0-43 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: S (22), SE (17), SW (15), W (14), NW (10), E (8), NE (5), N (5), Variable (4), Flat (1)
Macrotopography: entire slope (3), bottom (4), lower slope (10), lower to middle slope (4), lower to upper slope (1), middle slope (37), middle to upper slope (2), middle slope to ridgetop (1), upper slope (33), ridgetop (2)
Microtopography: undulating (54), flat (32), convex (11), concave (2)
Parent Material: gabbro (96), metamorphic (2), igneous (1), sedimentary (1), ultramafic (1)
Soil Texture: clay or clay loam (36), loam or sandy loam (31), silt or silt loam (10), sand (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1373 ft. | 519-2427 ft. |
| Slope | 15.9º | 0-37º |
| Large rock cover | 3.9% | 0-33.2% |
| Small rock cover | 27.1% | 0-92% |
| Bare ground cover | 39.9% | 0-89% |
| Litter cover | 25% | 0.2-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=101)

**Rapid Assessments:** SNNR0146, SNNR0147, SNNR0149, SNNR0151, SNNR0152, SNNR0279, SNNR0281, SNNR0283, SNNR0285, SNNR0337, SNNR0338, SNNR0339, SNNR0397, SNNR0399, SNNR0402, SNNR0493, SNNR0498, SNNR0500, SNNR0502, SNNR0504, SNNR0640, SNNR0641, SNNR0911, SNNR1507, SNNR1508, SNNR1523, SNNR1524, SNNR1529, SNNR1530, SNNR1531, SNNR1532, SNNR1533, SNNR1534, SNNR1535, SNNR1536, SNNR1537, SNNR1538, SNNR1539, SNNR1540, SNNR1541, SNNR1542, SNNR1543, SNNR1544, SNNR1545, SNNR1546, SNNR1547, SNNR1548, SNNR1549, SNNR1550, SNNR1551, SNNR1552, SNNR1553, SNNR1554, SNNR1555, SNNR1556, SNNR1557, SNNR1558, SNNR1559, SNNR1560, SNNR1561, SNNR1562, SNNR1563, SNNR1564, SNNR1565, SNNR1567, SNNR1568, SNNR1569, SNNR1570, SNNR1571, SNNR1572, SNNR1573, SNNR1577, SNNR1578, SNNR1579, SNNR1580, SNNR1581, SNNR1582, SNNR1583, SNNR1584, SNNR1585, SNNR1586, SNNR1587, SNNR1588, SNNR1589, SNNR1590, SNNR1591, SNNR1592, SNNR1593, SNNR1596, SNNR1598, SNNR1599, SNNR1600, SNNR1601, SNNR1602 **Relevés:** SNFN0007, SNFN0008, SNFN0009, SNFN0010, SNFN0012, SNFN0014, SNFN0690

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the central and northern Sierra Nevada Foothills based upon the data analyzed in this project. It is likely to be endemic to this area.

**STAND TABLE**
**(*Arctostaphylos viscida - Adenostoma fasciculatum*) / *Salvia sonomensis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 50 | 0.7 | 0.2 | 6 | | | | |
| | PISA2-M | *Pinus sabiniana* | 22 | 0.1 | 0.2 | 1 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 21 | 0.9 | 0.2 | 30 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 96 | 12.2 | 0.2 | 70 | | | X | |
| | ADFA | *Adenostoma fasciculatum* | 95 | 11.2 | 0.2 | 60 | | | X | |
| | CEOCO | *Cercis occidentalis* | 59 | 1.7 | 0.2 | 13 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 59 | 0.9 | 0.2 | 14 | | | | |
| | CERO4 | *Ceanothus roderickii* | 58 | 4.1 | 0.2 | 25.2 | | | | |
| | CELE | *Ceanothus lemmonii* | 57 | 2.0 | 0.2 | 45 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 0.6 | 0.2 | 7 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 39 | 1.0 | 0.2 | 14 | | | | |
| | LECA3 | *Lepechinia calycina* | 38 | 0.5 | 0.2 | 10 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 29 | 0.3 | 0.2 | 4 | | | | |
| | TODI | *Toxicodendron diversilobum* | 25 | 0.4 | 0.2 | 5 | | | | |
| | QUDU4 | *Quercus durata* | 22 | 0.4 | 0.2 | 9 | | | | |
| | BAPI | *Baccharis pilularis* | 21 | 0.3 | 0.2 | 8 | | | | |
| **Herb** | | | | | | | | | | |
| | SASO | *Salvia sonomensis* | 98 | 8.8 | 0.2 | 50 | | X | X | |
| | POACXX | Poaceae | 60 | 2.8 | 0.2 | 35 | | | | |
| | CHGR3 | *Chlorogalum grandiflorum* | 36 | 0.4 | 0.2 | 6 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 34 | 0.2 | 0.2 | 2 | | | | |
| | WYRE | *Wyethia reticulata* | 32 | 1.7 | 0.2 | 37 | | | | |
| | CAST21 | *Calystegia stebbinsii* | 31 | 0.2 | 0.2 | 3 | | | | |
| | SELA4 | *Senecio layneae* | 27 | 0.1 | 0.2 | 2 | | | | |
| | LETAL | *Leontodon taraxacoides* subsp. *Longirostris* | 23 | 0.5 | 0.2 | 15 | | | | X |

## *Arctostaphylos viscida - Quercus wislizeni* Association
## Whiteleaf Manzanita - Interior Live Oak Association

### SUMMARY
In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Arctostaphylos viscida* at 1-64% cover. Other shrubs such as *Adenostoma fasciculatum*, *Ericameria arborescens*, *Eriodictyon californicum*, and *Heteromeles arbutifolia* were often present. *Pinus ponderosa*, *Pinus sabiniana*, *Quercus kelloggii*, and *Quercus wislizeni* sometimes occurred as scattered emergent trees. The herbaceous layer was open and often included *Aira caryophyllea*. A similar type, *Q. wislizeni* / *A. viscida* woodland, was defined by Allen et al. (1991). However, that type was dominated by tree-size *Q. wislizeni*. The stands defined here grouped with chaparral-related stands that did not group with other *Q. wislizeni* types represented in this report.

In the study area, this association was sampled infrequently within the central Sierra Nevada Foothills and Cascade Range Foothills, and often in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on sedimentary substrates, and infrequently on metamorphic and granitic substrates. They usually occupied the middle slope, but were also found on upper slopes and ridgetops. These upland slopes varied from flat to somewhat steep.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador, Calaveras, Mariposa, Nevada, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Tuscan Flows (M261Fa), and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 60 | 30-90 | - |
| Herb | 6.8 | 0-20 | variable |
| Shrub | 54 | 5-85 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 4.8 | 0-20 | <5-20 |
| Conifer | 2.3 | 0-10 | 5-20 |
| Relative non-native to native cover | 2.7 | 0-14 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: Variable (3), NW (3), NE (2), N (2), SW (1), S (1), E (1), (0)
Macrotopography: middle slope (7), upper slope (5), upper slope to ridgetop (1)
Microtopography: undulating (8), flat (4), convex (1)
Parent Material: sedimentary (11), metamorphic (2), granitic (1)
Soil Texture: loam or sandy loam (6), clay or clay loam (2), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 2105 ft. | 1243-2962 ft. |
| Slope | 14.2º | 0-25º |
| Large rock cover | 1% | 0-4% |
| Small rock cover | 9.1% | 0.2-25% |
| Bare ground cover | 32.6% | 3-85% |
| Litter cover | 53.9% | 2-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0296, SNNR0558, SNNR0561, SNNR0581, SNNR0583, SNNR0584, SNNR0746, SNNR1127, SNNR1371, SNNR1509, SNNR1511, SNNR1512, SNNR1513, SNNR1520 **Relevés:** none

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon the data collected for this project. So far, it is known to be restricted to this area of the state.

**STAND TABLE**
***Arctostaphylos viscida* - *Quercus wislizeni* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-M | *Quercus wislizeni* | 71 | 9.6 | 1 | 30 | | | | |
| | QUKE-T | *Quercus kelloggii* | 43 | 0.9 | 0.2 | 5 | | | | |
| | PIPO-T | *Pinus ponderosa* | 43 | 0.8 | 0.2 | 5 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 36 | 2.2 | 0.2 | 20 | | | | |
| | QUKE-M | *Quercus kelloggii* | 36 | 1.6 | 0.2 | 9 | | | | |
| | PISA2-T | *Pinus sabiniana* | 36 | 0.4 | 0.2 | 2 | | | | |
| | PIPO-M | *Pinus ponderosa* | 21 | 0.2 | 0.2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 93 | 27.2 | 1 | 64 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 64 | 5.2 | 0.2 | 27 | | | | |
| | ADFA | *Adenostoma fasciculatum* | 64 | 2.0 | 0.2 | 10 | | | | |
| | ERAR27 | *Ericameria arborescens* | 50 | 1.6 | 1 | 8 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 50 | 0.4 | 0.2 | 2 | | | | |
| | TODI | *Toxicodendron diversilobum* | 29 | 0.8 | 0.2 | 10 | | | | |
| | CETO | *Ceanothus tomentosus* | 21 | 0.5 | 1 | 3 | | | | |
| | BAPI | *Baccharis pilularis* | 21 | 0.5 | 0.2 | 6 | | | | |
| | CECU | *Ceanothus cuneatus* | 21 | 0.2 | 0.2 | 1 | | | | |
| | CHFO | *Chamaebatia foliolosa* | 21 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | AICA | *Aira caryophyllea* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | VUMY | *Vulpia myuros* | 43 | 0.8 | 0.2 | 8 | | | | X |
| | SASO | *Salvia sonomensis* | 36 | 2.1 | 2 | 10 | | | | |
| | HOPA2 | *Horkelia parryi* | 36 | 1.1 | 1 | 5 | | | | |
| | BRMA3 | *Bromus madritensis* | 29 | 0.1 | 0.2 | 1 | | | | X |
| | FIGA | *Filago gallica* | 21 | 0 | 0.2 | 0.2 | | | | X |
| | LOMI | *Lotus micranthus* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 29 | 0.9 | 0.2 | 10 | | | | |

### *Ceanothus cuneatus* Shrubland Alliance
### Wedgeleaf Ceanothus (Buck brush) Shrubland Alliance

As defined in the state, *Ceanothus cuneatus* is dominant in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos manzanita*, *A. patula*, *A. viscida*, *Ceanothus integerrimus*, *Eriodictyon californicum*, *Heteromeles arbutifolia*, *Juniperus californica*, and *Quercus berberidifolia*. Emergent *Calocedrus decurrens*, *Pinus jeffreyi*, *P. ponderosa*, *P. sabiniana*, *Quercus douglasii*, or *Q. wislizeni* trees may be present. The shrub canopy is continuous or intermittent, and the herbaceous layer is sparse to intermittent. Stands occur on ridges and upper slopes. Soils are shallow, rocky, and well drained. In the Foothills, stands occur on a variety of geologic substrates, including serpentinite.

*Ceanothus cuneatus* occurs as a persistent understory shrub across various forests and woodland types in northern California, and it is present as a secondary species in many chaparral types in southern California. Self-perpetuating stands are typically restricted to very rocky and harsh exposures or substrates. Many other stands are established after fire and they are an important part of the chaparral in northern and central California. This alliance is one of the best representations of chaparral types in the Sierra Nevada Foothills.

As described below, four associations of the Wedgeleaf Ceanothus Alliance were classified in the study area. Six plots (SNFN0087, SNNR1487, SNNR1575, SNNR1574, SNNR0881, SNNR1340) showed additional variation and were classified to the alliance level only.

---

### *Ceanothus cuneatus* / Herbaceous Association
### Wedgeleaf Ceanothus / Herbaceous Association

**SUMMARY**

In the stands sampled, the shrub canopy was open to continuous and dominated by *Ceanothus cuneatus* at 11-72% cover. *Toxicodendron diversilobum* was occasionally present in the overstory. Trees such as *Pinus sabiniana*, *Quercus douglasii*, and *Quercus wislizeni* sometimes occurred as scattered emergents. The herbaceous layer was open to intermittent and often included non-native grasses *Aira caryophyllea*, *Avena barbata*, *Bromus hordeaceus*, and *Vulpia myuros*.

In the study area, this association was sampled frequently in the Cascade Range Foothills, less frequently in the central Sierra Nevada Foothill, and fairly infrequently in the High Cascade Range and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt), sometimes on metamorphic (including slate), and infrequently on sedimentary or ultramafic substrates. They occupied a variety of upland slope positions from bottom to ridgetop, appearing most often on upper slopes and ridgetops. Slopes varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Mariposa, Nevada, Shasta, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Northern Eastside Terraces (262Ab), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 60 | 35-85 | - |
| Herb | 32.2 | 7-65 | variable |
| Shrub | 33.8 | 12-75 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.2 | 0-6 | <5-10 |
| Conifer | 0.3 | 0-2 | <5-20 |
| Relative non-native to native cover | 38 | 10-69 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Variable (4), SW (4), SE (4), Flat (4), W (3), S (2), NW (2), NE (1)
Macrotopography: entire slope (2), bottom (2), lower slope (2), middle slope (3), middle to upper slope (1), upper slope (6), upper slope to ridgetop (2), ridgetop (6)
Microtopography: undulating (12), flat (9), convex (2), concave (1)
Parent Material: volcanic (14), metamorphic (3), slate (3), sedimentary (2), basalt (1), ultramafic (1)
Soil Texture: clay or clay loam (8), loam or sandy loam (6), silt or silt loam (5), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1332 ft. | 410-2479 ft. |
| Slope | 11.4º | 0-30º |
| Large rock cover | 7.7% | 0.2-47% |
| Small rock cover | 9.3% | 0.2-40% |
| Bare ground cover | 24.4% | 3-65% |
| Litter cover | 55% | 16-86% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=24)

**Rapid Assessments:** SNNR0164, SNNR0174, SNNR0199, SNNR0254, SNNR0278, SNNR0299, SNNR0320, SNNR0798, SNNR0821, SNNR0850, SNNR0855, SNNR0863, SNNR0864, SNNR0947, SNNR0960, SNNR1017, SNNR1095, SNNR1232, SNNR1240, SNNR1314, SNNR1331 **Relevés:** SNFN0018, SNFN0669, SNFN0670

**Rank:** G4S4

**GLOBAL DISTRIBUTION**

Previously, this association was described for the Sierra Nevada Foothills in the lower elevations of the Yosemite region (NatureServe et al. 2003b). Its range has been extended from data for this project to include most of the northern and central Sierra Nevada Foothills. Analogous stands have also been reported for the southern Sierra Foothills in the Sequoia National Park area (S. Haultain, pers. comm. 2004).

**STAND TABLE**
***Ceanothus cuneatus* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 63 | 1.1 | 0.2 | 3 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 33 | 0.4 | 0.2 | 4 | | | | |
| | PISA2-T | *Pinus sabiniana* | 33 | 0.3 | 0.2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 30.5 | 11 | 72 | X | | X | |
| | TODI | *Toxicodendron diversilobum* | 33 | 1.2 | 0.2 | 20 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 21 | 0.2 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 88 | 10.0 | 1 | 55 | | | X | X |
| | AVBA | *Avena barbata* | 63 | 2.0 | 0.2 | 20 | | | | X |
| | AICA | *Aira caryophyllea* | 63 | 1.2 | 0.2 | 10 | | | | X |
| | VUMY | *Vulpia myuros* | 58 | 1.9 | 0.2 | 11 | | | | X |
| | BRMA3 | *Bromus madritensis* | 46 | 0.8 | 0.2 | 5 | | | | X |
| | VUMI | *Vulpia microstachys* | 46 | 0.8 | 0.2 | 7 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 38 | 2.5 | 3 | 12 | | | | X |
| | CYEC | *Cynosurus echinatus* | 38 | 0.7 | 0.2 | 4 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 33 | 0.7 | 0.2 | 10 | | | | X |
| | ERBO | *Erodium botrys* | 29 | 0.8 | 0.2 | 12 | | | | X |
| | TOAR | *Torilis arvensis* | 29 | 0.2 | 0.2 | 2 | | | | X |
| | CEME2 | *Centaurea melitensis* | 25 | 0.4 | 0.2 | 3 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 25 | 0.1 | 0.2 | 1 | | | | |
| | TRHI4 | *Trifolium hirtum* | 25 | 0.1 | 0.2 | 1 | | | | X |
| | BRDI3 | *Bromus diandrus* | 21 | 0.4 | 0.2 | 5 | | | | X |
| | PEDU2 | *Petrorhagia dubia* | 21 | 0.3 | 0.2 | 4 | | | | X |
| | DAPU3 | *Daucus pusillus* | 21 | 0.2 | 0.2 | 1 | | | | |
| | GAPO | *Galium porrigens* | 21 | 0.1 | 0.2 | 2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 21 | 0.1 | 0.2 | 1 | | | | X |

## *Ceanothus cuneatus* / *Plantago erecta* Association
## Wedgeleaf Ceanothus / Dwarf Plantain Association


### SUMMARY
In the stands sampled, the overstory shrub canopy was open to intermittent and dominated by *Ceanothus cuneatus* at 5-48% cover. Other shrubs such as *Eriodictyon californicum*, *Heteromeles arbutifolia*, and *Rhamnus ilicifolia* were occasionally present. *Pinus sabiniana* sometimes occurred as a scattered emergent tree. The herbaceous layer was open to intermittent, with abundant and characteristic taxa such as *Bromus hordeaceus*, *Galium porrigens*, *Plantago erecta*, and *Vulpia microstachys*. Many of the herbaceous species were natives.


This association was sampled frequently in the study area within the central Sierra Nevada Foothills, and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on serpentine and other ultramafic (gabbro) substrates, but were also found infrequently on metamorphic (including slate) and volcanic substrates. They occupied lower, middle, and upper slopes and were found infrequently on ridgetops. Slopes varied from gentle to steep.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Mariposa, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 40.9 | 15-65 | - |
| Herb | 22.6 | 6-45 | variable |
| Shrub | 23.8 | 7-45 | 0.9-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.3 | 0-3 | <5-20 |
| Conifer | 2.4 | 0-14 | <5-20 |
| Relative non-native to native cover | 18.5 | 0-60 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: Variable (5), SW (5), N (5), SE (4), S (4), E (3), W (1), NE (1)
Macrotopography: lower slope (7), lower to upper slope (3), middle slope (7), middle slope to ridgetop (1), upper slope (8), upper slope to ridgetop (1)
Microtopography: undulating (14), convex (6), flat (6), concave (1)
Parent Material: serpentine (18), ultramafic (3), metamorphic (2), slate (2), volcanic (2), gabbro (1)
Soil Texture: loam or sandy loam (10), clay or clay loam (8), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1470 ft. | 610-2527 ft. |
| Slope | 16.5º | 4-32º |
| Large rock cover | 12.5% | 1-42% |
| Small rock cover | 31.2% | 1-65% |
| Bare ground cover | 29.2% | 10-77% |
| Litter cover | 23.3% | 0.2-85% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=28)

**Rapid Assessments:** SNNR0007, SNNR0101, SNNR0365, SNNR0874, SNNR1028, SNNR1032, SNNR1497, SNNR1506, SNNR1527, SNNR1576 **Relevés:** SNFN0085, SNFN0089, SNFN0113, SNFN0130, SNFN0132, SNFN0135, SNFN0148, SNFN0150, SNFN0175, SNFN0176, SNFN0177, SNFN0298, SNFN0349, SNFN0448, SNFN0591, SNFN0602, SNFN0607, SNFN0691

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills (Evens et al. 2004). Its range has been extended from the data for this project. In the northern and central Sierra Nevada Foothills, it was found on serpentine and other rocky, oligotrophic soils.

**STAND TABLE**
***Ceanothus cuneatus* / *Plantago erecta* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 57 | 1.9 | 0.2 | 14 | | | | |
| | PISA2-M | *Pinus sabiniana* | 29 | 0.3 | 0.2 | 6 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 23.6 | 5 | 48 | X | | X | |
| | ERCA6 | *Eriodictyon californicum* | 36 | 0.3 | 0.2 | 2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 29 | 0.3 | 0.2 | 3 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 25 | 0.6 | 0.2 | 12.2 | | | | |
| **Herb** | | | | | | | | | | |
| | PLER3 | *Plantago erecta* | 89 | 2.4 | 0.2 | 15 | | | X | |
| | VUMI | *Vulpia microstachys* | 82 | 1.9 | 0.2 | 17 | | | X | |
| | GAPO | *Galium porrigens* | 79 | 0.4 | 0.2 | 2 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 75 | 6.2 | 0.2 | 45 | | | X | X |
| | MECA2 | *Melica californica* | 57 | 0.5 | 0.2 | 4 | | | | |
| | PETR7 | *Pentagramma triangularis* | 57 | 0.5 | 0.2 | 2 | | | | |
| | BRMA3 | *Bromus madritensis* | 54 | 1.4 | 0.2 | 10 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 54 | 0.1 | 0.2 | 0.2 | | | | |
| | AVBA | *Avena barbata* | 50 | 0.7 | 0.2 | 8 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 50 | 0.2 | 0.2 | 1 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 46 | 0.9 | 0.2 | 10 | | | | X |
| | LACA7 | *Lasthenia californica* | 46 | 0.8 | 0.2 | 10 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 43 | 0.1 | 0.2 | 1 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 39 | 0.7 | 0.2 | 10 | | | | |
| | AICA | *Aira caryophyllea* | 39 | 0.1 | 0.2 | 1 | | | | X |
| | CALA68 | *Castilleja lacera* | 36 | 0.2 | 0.2 | 4 | | | | |
| | LEVI8 | *Lessingia virgata* | 36 | 0.2 | 0.2 | 2 | | | | |
| | MICA | *Micropus californicus* | 36 | 0.2 | 0.2 | 1 | | | | |
| | VUMY | *Vulpia myuros* | 32 | 0.8 | 0.2 | 7 | | | | X |

**STAND TABLE continued**
***Ceanothus cuneatus* / *Plantago erecta* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | DAPU3 | *Daucus pusillus* | 32 | 0.2 | 0.2 | 1 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 32 | 0.2 | 0.2 | 1 | | | | |
| | CAAT25 | *Castilleja attenuata* | 32 | 0.1 | 0.2 | 1 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 29 | 0.2 | 0.2 | 4 | | | | |
| | AGHE2 | *Agoseris heterophylla* | 29 | 0.1 | 0.2 | 1 | | | | |
| | CAAF | *Castilleja affinis* | 29 | 0.1 | 0.2 | 1 | | | | |
| | ELEL5 | *Elymus elymoides* | 25 | 0.2 | 0.2 | 3 | | | | |
| | URLI5 | *Uropappus lindleyi* | 25 | 0.2 | 0.2 | 3 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.1 | 0.2 | 1 | | | | |
| | CAOCF | *Calystegia occidentalis* subsp. *fulcrata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MICAC2 | *Micropus californicus* var. *californicus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | THCU | *Thysanocarpus curvipes* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 21 | 0.4 | 0.2 | 5 | | | | X |
| | PSHE | *Pseudobahia heermannii* | 21 | 0.2 | 0.2 | 2 | | | | |
| | CEME2 | *Centaurea melitensis* | 21 | 0.1 | 0.2 | 2 | | | | X |
| | LIBI | *Linanthus bicolor* | 21 | 0.1 | 0.2 | 1 | | | | |
| | ERCI6 | *Erodium cicutarium* | 21 | 0 | 0.2 | 0.2 | | | | X |
| | GAAP2 | *Galium aparine* | 21 | 0 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 39 | 2.3 | 0.2 | 25 | | | | |

***Adenostoma fasciculatum* - *Ceanothus cuneatus* Association**
**Chamise - Wedgeleaf Ceanothus Association**

**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Adenostoma fasciculatum* at 12-40% and *Ceanothus cuneatus* at 8-28% cover. Other shrubs such as *Arctostaphylos viscida*, *Eriodictyon californicum*, and *Rhamnus ilicifolia* were often present. Trees such as *Pinus sabiniana* and *Quercus douglasii* sometimes occurred as scattered emergents. The herbaceous layer was open, with abundant and characteristic taxa such as non-natives *Aira caryophyllea*, *Bromus madritensis*, and *Hypochaeris glabra*.

This association was sampled infrequently in the study area, within the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including serpentine), and/or other ultramafic substrates. They occupied a variety of upland slope positions, more often upper slopes that were moderate to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Calaveras, Mariposa, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 61.3 | 52-79 | - |
| Herb | 18.3 | 12-24 | variable |
| Shrub | 46 | 35-68 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.5 | 0-2 | <5 |
| Conifer | 1.5 | 0-2 | <5-20 |
| Relative non-native to native cover | 15.5 | 3-30 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (1), SW (1), SE (1), N (1)
Macrotopography: entire slope (1), middle to upper slope (1), upper slope (2)
Microtopography: flat (2), undulating (1), concave (1)
Parent Material: metamorphic (2), serpentine (1), ultramafic (1)
Soil Texture: loam or sandy loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1479 ft. | 718-2232 ft. |
| Slope | 14.8º | 8-20º |
| Large rock cover | 11.3% | 2-22% |
| Small rock cover | 26% | 15-40% |
| Bare ground cover | 25.3% | 8-38% |
| Litter cover | 35% | 25-45% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0111, SNNR1149 **Relevés:** SNFN0088, SNFN0151

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada, including in the Yosemite region (NatureServe et al. 2003b). Similar association descriptions have been defined from the Central Coast Ranges (Evens et al. 2006) south to San Diego County (Gordon and White 1994); thus, this association may be widespread in cismontane California.

**STAND TABLE**
***Adenostoma fasciculatum* - *Ceanothus cuneatus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 75 | 1.1 | 0.2 | 2 | | X | X | |
| | PISA2-L | *Pinus sabiniana* | 50 | 0.6 | 0.2 | 2 | | | | |
| | QUDO-T | *Quercus douglasii* | 25 | 0.5 | 2 | 2 | | | | |
| | PISA2-M | *Pinus sabiniana* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 23.3 | 12 | 40 | | X | X | |
| | CECU | *Ceanothus cuneatus* | 100 | 18.0 | 8 | 28 | | X | X | |
| | ARVI4 | *Arctostaphylos viscida* | 50 | 3.3 | 1 | 12 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 0.3 | 0.2 | 1 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCO25 | *Eriophyllum confertiflorum* | 25 | 0.8 | 3 | 3 | | | | |
| | CEOCO | *Cercis occidentalis* | 25 | 0.5 | 2 | 2 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 25 | 0.3 | 1.2 | 1.2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 25 | 0.3 | 1 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | BRMA3 | *Bromus madritensis* | 75 | 1.3 | 0.2 | 3 | | | X | X |
| | AICA | *Aira caryophyllea* | 75 | 0.2 | 0.2 | 0.2 | | | X | X |
| | HYGL2 | *Hypochaeris glabra* | 75 | 0.2 | 0.2 | 0.2 | | | X | X |
| | GAVE3 | *Gastridium ventricosum* | 50 | 2.3 | 0.2 | 9 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 50 | 1.8 | 0.2 | 7 | | | | X |
| | MICA | *Micropus californicus* | 50 | 1.3 | 0.2 | 5 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 50 | 0.8 | 1 | 2 | | | | |
| | CALYC | *Calycadenia* | 50 | 0.6 | 0.2 | 2 | | | | |
| | GAPO | *Galium porrigens* | 50 | 0.3 | 0.2 | 1 | | | | |
| | PLER3 | *Plantago erecta* | 50 | 0.3 | 0.2 | 1 | | | | |
| | VUMI | *Vulpia microstachys* | 50 | 0.3 | 0.2 | 1 | | | | |
| | MECA2 | *Melica californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 50 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Adenostoma fasciculatum* - *Ceanothus cuneatus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRST2 | *Bromus sterilis* | 25 | 1.8 | 7 | 7 | | | | X |
| | HOVIV | *Holocarpha virgata* subsp. *virgata* | 25 | 1.5 | 6 | 6 | | | | |
| | VUMY | *Vulpia myuros* | 25 | 1.5 | 6 | 6 | | | | X |
| | CEME2 | *Centaurea melitensis* | 25 | 1.3 | 5 | 5 | | | | X |
| | ALAM2 | *Allium amplectens* | 25 | 0.5 | 2 | 2 | | | | |
| | CHGR3 | *Chlorogalum grandiflorum* | 25 | 0.5 | 2 | 2 | | | | |
| | TRBR7 | *Triteleia bridgesii* | 25 | 0.5 | 2 | 2 | | | | |
| | VUBR | *Vulpia bromoides* | 25 | 0.5 | 2 | 2 | | | | X |
| | AVFA | *Avena fatua* | 25 | 0.3 | 1 | 1 | | | | X |
| | BAMAM | *Balsamorhiza macrolepis* var. *macrolepis* | 25 | 0.3 | 1 | 1 | | | | |
| | CASU3 | *Calochortus superbus* | 25 | 0.3 | 1 | 1 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 25 | 0.3 | 1 | 1 | | | | |
| | GIPUP | *Githopsis pulchella* subsp. *pulchella* | 25 | 0.3 | 1 | 1 | | | | |
| | OXLA8 | *Oxalis laxa* | 25 | 0.3 | 1 | 1 | | | | X |
| | HERBAC | unknown | 25 | 0.2 | 0.6 | 0.6 | | | | |
| | ALPEP2 | *Allium peninsulare* var. *peninsulare* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | AVBA | *Avena barbata* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRMI2 | *Briza minor* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRODI | *Brodiaea* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRTE | *Bromus tectorum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAVE3 | *Calochortus venustus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CAOC6 | *Calystegia occidentalis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CAAF | *Castilleja affinis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CALA68 | *Castilleja lacera* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CLPE | *Claytonia perfoliata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DAPU3 | *Daucus pusillus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DUCYC3 | *Dudleya cymosa* subsp. | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | FICA2 | *Filago californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GIPUS | *Githopsis pulchella* subsp. *serpentinicola* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HEAC8 | *Hesperevax acaulis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HYRA3 | *Hypochaeris radicata* | 25 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Adenostoma fasciculatum* - *Ceanothus cuneatus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | LETA | *Leontodon taraxacoides* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | LEVI8 | *Lessingia virgata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LIBI | *Linanthus bicolor* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOTUS | *Lotus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMI | *Lotus micranthus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOWR2 | *Lotus wrangelianus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MICAC2 | *Micropus californicus* var. *californicus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MICRO6 | *Microseris* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MOVI2 | *Monardella villosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ORUN | *Orobanche uniflora* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PEMU | *Pellaea mucronata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PLAGI | *Plagiobothrys* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PSHE | *Pseudobahia heermannii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI2 | *Sanicula bipinnata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SICAC3 | *Sidalcea calycosa* subsp. *calycosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRIFO | *Trifolium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | URLI5 | *Uropappus lindleyi* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | WYBO | *Wyethia bolanderi* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 7.5 | 30 | 30 | | | | |
| | LICHEN | Lichen | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SEHA2 | *Selaginella hansenii* | 25 | 0.1 | 0.2 | 0.2 | | | | |

***Ceanothus cuneatus - Eriodictyon californicum* - (*Fremontodendron californicum*) Association (Provisional)**

**Wedgeleaf Ceanothus - California Yerba Santa - (Flannelbush) Association (Provisional)**


**SUMMARY**

In the stands sampled, the overstory shrub canopy was typically intermittent and dominated by *Ceanothus cuneatus* at 15-55% cover. Other shrubs such as *Cercis occidentalis*, *Eriodictyon californicum*, *Fremontodendron californicum*, and *Toxicodendron diversilobum* were often present. Trees such as *Pinus sabiniana* and *Quercus kelloggii* sometimes occurred as scattered emergents. The herbaceous layer was open and often included *Aira caryophyllea*, *Bromus hordeaceus*, *Bromus madritensis*, *Galium parisiense*, *Petrorhagia dubia*, *Vulpia microstachys*, and *Vulpia myuros*.

In the study area, this association was sampled infrequently within the Cascade Range Foothills, and more frequently in the High Cascade Range Subregions (Hickman 1993). Stands consistently occurred on volcanic substrates. They occupied a variety of upland slope positions from lower slopes to ridgetops, but most often occupied southerly-facing, middle and upper slopes that were moderate to somewhat steep.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Tehama County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63.4 | 50-75 | - |
| Herb | 16.9 | 6-30 | variable |
| Shrub | 52.7 | 40-65 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.8 | 0-5 | <5-10 |
| Conifer | 0.8 | 0-3 | <5-20 |
| Relative non-native to native cover | 16.3 | 2-28 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: S (3), SE (2), W (1), Variable (1), SW (1), E (1)
Macrotopography: lower to middle slope (1), middle slope (4), upper slope (3), ridgetop (1)
Microtopography: convex (3), concave (2), flat (2), undulating (2)
Parent Material: volcanic (9)
Soil Texture: clay or clay loam (3), loam or sandy loam (3), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 2978 ft. | 2164-3477 ft. |
| Slope | 14.8º | 6-26º |
| Large rock cover | 1.6% | 0-5% |
| Small rock cover | 14.9% | 2-25% |
| Bare ground cover | 31.4% | 6-79% |
| Litter cover | 47.7% | 15-69% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** SNNR0390, SNNR0428, SNNR0438, SNNR0451, SNNR0456, SNNR0462, SNNR0463, SNNR0485 **Relevés:** SNFN0377

**Rank:** G3?S3?

**GLOBAL DISTRIBUTION**

This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project. It is likely restricted to the volcanic flows of the northern Foothills. This is the typical chaparral of warmer and drier slopes on shallow soils across the Foothills study area, even more common than the *Adenostoma fasciculatum* Alliance and other xeric types.

**STAND TABLE**

***Ceanothus cuneatus* - *Eriodictyon californicum* - (*Fremontodendron californicum*) Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-M | *Pinus sabiniana* | 56 | 0.3 | 0.2 | 1 | | | | |
| | QUKE-T | *Quercus kelloggii* | 33 | 0.2 | 0.2 | 1 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 22 | 0.8 | 0.2 | 7 | | | | |
| | PISA2-T | *Pinus sabiniana* | 22 | 0.4 | 0.2 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 32.3 | 15 | 55 | X | | X | |
| | ERCA6 | *Eriodictyon californicum* | 89 | 6.5 | 0.2 | 15 | | | X | |
| | CEOCO | *Cercis occidentalis* | 78 | 0.6 | 0.2 | 3 | | | X | |
| | FRCA6 | *Fremontodendron* | 56 | 7.3 | 0.2 | 40 | | | | |
| | TODI | *Toxicodendron diversilobum* | 56 | 0.9 | 0.2 | 5 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 44 | 0.4 | 0.2 | 2 | | | | |
| | LECA3 | *Lepechinia calycina* | 33 | 1.6 | 1 | 8 | | | | |
| | QUGAB | *Quercus garryana* var. *breweri* | 33 | 1.6 | 1 | 10 | | | | |
| | QUBE5 | *Quercus berberidifolia* | 33 | 0.8 | 0.2 | 7 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 33 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 78 | 3.3 | 0.2 | 12 | | | X | X |
| | PEDU2 | *Petrorhagia dubia* | 78 | 0.6 | 0.2 | 2 | | | X | X |
| | GAPA5 | *Galium parisiense* | 78 | 0.3 | 0.2 | 1 | | | X | X |
| | VUMY | *Vulpia myuros* | 67 | 2.9 | 1 | 8 | | | | X |
| | VUMI | *Vulpia microstachys* | 67 | 1.3 | 0.2 | 5 | | | | |
| | BRMA3 | *Bromus madritensis* | 67 | 0.5 | 0.2 | 1 | | | | X |
| | AICA | *Aira caryophyllea* | 56 | 0.6 | 0.2 | 4 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 44 | 1.7 | 0.2 | 12 | | | | X |
| | AVBA | *Avena barbata* | 44 | 1.3 | 0.2 | 7 | | | | X |
| | CAOC6 | *Calystegia occidentalis* | 33 | 0.6 | 0.2 | 3 | | | | |
| | CEME2 | *Centaurea melitensis* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | MICA | *Micropus californicus* | 33 | 0.2 | 0.2 | 1 | | | | |
| | BRTE | *Bromus tectorum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPO | *Galium porrigens* | 22 | 0.2 | 0.2 | 2 | | | | |
| | DAPU3 | *Daucus pusillus* | 22 | 0.1 | 0.2 | 1 | | | | |
| | POBO3 | *Polygonum bolanderi* | 22 | 0.1 | 0.2 | 1 | | | | |

## *Ceanothus integerrimus* Shrubland Alliance
## Deerbrush Shrubland Alliance

As defined in the state, *Ceanothus integerrimus* dominates the shrub canopy with *Arctostaphylos manzanita*, *A. patula*, *Ceanothus cordulatus*, *C. cuneatus*, *C. velutinus*, *Holodiscus discolor*, *Lepechinia calycina*, *Prunus emarginata*, *Quercus berberidifolia*, and *Symphoricarpos mollis*. Emergent trees may be present including *Q. chrysolepis* and *Q. kelloggii*. The shrub canopy is continuous to intermittent and the herbaceous layer is sparse. Stands occur on ridges and upper slopes. Soils are well-drained. Self-perpetuating stands are very unusual as stands are usually established after fire, logging, or other disturbances.

As described below, two associations of the Deerbrush Alliance were classified in the study area.

## *Ceanothus integerrimus* Association
## Deerbrush Association

**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Ceanothus integerrimus* at 40-60% cover. Other shrubs such as *Eriodictyon californicum*, *Heteromeles arbutifolia*, and *Rhamnus tomentella* were often present. Trees such as *Acer macrophyllum*, *Pinus ponderosa*, *Quercus chrysolepis*, *Quercus kelloggii*, and *Umbellularia californica* sometimes occurred as scattered emergents. The herbaceous layer was open and often included *Elymus glaucus* and *Torilis arvensis*.

This association was sampled infrequently in the study area within the Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands occurred on volcanic and other igneous substrates. They occupied bottom and middle to upper slopes that were somewhat steep.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 67.3 | 59-83 | - |
| Herb | 11 | 8-15 | variable |
| Shrub | 70 | 53-82 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.3 | 0-1 | 10-20 |
| Conifer | 2.7 | 0-8 | 10-20 |
| Relative non-native to native cover | 1.3 | 0-3 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: W (1), SE (1), NW (1)
Macrotopography: bottom (1), middle to upper slope (1)

Microtopography: convex (1), concave (1)
Parent Material: volcanic (2), igneous (1)
Soil Texture: clay or clay loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 2314 ft. | 1458-3975 ft. |
| Slope | 17º | 16-18º |
| Large rock cover | 1.4% | 0-4% |
| Small rock cover | 8% | 4-15% |
| Bare ground cover | 37.3% | 20-47% |
| Litter cover | 50% | 30-74% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0348, SNNR0535, SNNR0714 **Relevés:** none

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada and adjacent foothills by NatureServe et al. (2003b). Similar stands have been observed as far south as the semi-desert mountains of San Diego County (Keeler-Wolf et al. 1998).

**STAND TABLE**

***Ceanothus integerrimus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUKE-L | *Quercus kelloggii* | 67 | 0.4 | 0.2 | 1 | | | | |
| | PIPO-T | *Pinus ponderosa* | 33 | 2.7 | 8 | 8 | | | | |
| | QUKE-M | *Quercus kelloggii* | 33 | 2.0 | 6 | 6 | | | | |
| | PIPO-M | *Pinus ponderosa* | 33 | 1.0 | 3 | 3 | | | | |
| | UMCA-M | *Umbellularia californica* | 33 | 0.7 | 2 | 2 | | | | |
| | ACMA3-L | *Acer macrophyllum* | 33 | 0.3 | 1 | 1 | | | | |
| | QUCH2-T | *Quercus chrysolepis* | 33 | 0.3 | 1 | 1 | | | | |
| | SNAG | *Standing snag* | 33 | 0.3 | 1 | 1 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 100 | 47.3 | 40 | 60 | X | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 67 | 11.7 | 5 | 30 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 67 | 2.7 | 4 | 4 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 33 | 3.3 | 10 | 10 | | | | |
| | TODI | *Toxicodendron diversilobum* | 33 | 3.3 | 10 | 10 | | | | |
| | VICA5 | *Vitis californica* | 33 | 3.3 | 10 | 10 | | | | |
| | CECU | *Ceanothus cuneatus* | 33 | 2.7 | 8 | 8 | | | | |
| | RUUR | *Rubus ursinus* | 33 | 1.7 | 5 | 5 | | | | |
| | CEPR | *Ceanothus prostratus* | 33 | 1.0 | 3 | 3 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 33 | 0.7 | 2 | 2 | | | | |
| | BAPI | *Baccharis pilularis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | OECE | *Oemleria cerasiformis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RIRO | *Ribes roezlii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | ELGL | *Elymus glaucus* | 67 | 0.4 | 0.2 | 1 | | | | |
| | TOAR | *Torilis arvensis* | 67 | 0.4 | 0.2 | 1 | | | | X |
| | CAOCO | *Calystegia occidentalis* subsp. *occidentalis* | 33 | 2.3 | 7 | 7 | | | | |
| | POACXX | Poaceae | 33 | 2.3 | 7 | 7 | | | | |
| | CYEC | *Cynosurus echinatus* | 33 | 0.7 | 2 | 2 | | | | X |
| | MAGR3 | *Madia gracilis* | 33 | 0.7 | 2 | 2 | | | | |
| | DRAR3 | *Dryopteris arguta* | 33 | 0.3 | 1 | 1 | | | | |
| | METO | *Melica torreyana* | 33 | 0.3 | 1 | 1 | | | | |
| | VIAMA3 | *Vicia americana* subsp. *americana* | 33 | 0.3 | 1 | 1 | | | | |
| | VISA | *Vicia sativa* | 33 | 0.3 | 1 | 1 | | | | |
| | BRCA5 | *Bromus carinatus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CIVU | *Cirsium vulgare* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | DIMU5 | *Dichelostemma multiflorum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | MITO | *Mimulus torreyi* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PHPU2 | *Phacelia purpusii* | 33 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Ceanothus integerrimus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | POLEXX | Polemoniaceae | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SACR2 | *Sanicula crassicaulis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMI | *Vulpia microstachys* | 33 | 0.1 | 0.2 | 0.2 | | | | |

## *Ceanothus integerrimus* - *Quercus garryana* var. *breweri* Association (Provisional)

**Deerbrush - Brewer Oak Association (Provisional)**


### SUMMARY

In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Ceanothus integerrimus* at 10-54% cover. *Quercus garryana* var. *breweri* was characteristically present, while *Ceanothus cuneatus*, *Cercis occidentalis*, *Cercocarpus betuloides*, *Eriodictyon californicum*, *Fraxinus dipetala*, *Lepechinia calycina*, and *Ptelea crenulata* were often present in the shrub layer. *Pinus sabiniana* sometimes occurred as a scattered emergent tree. The herbaceous layer was open and often included *Clarkia rhomboidea*, *Galium parisiense*, and *Vulpia myuros*.

In the study area, this association was sampled somewhat frequently, but only within the High Cascade Range Subregion (Hickman 1993). Stands consistently occurred on volcanic substrates. They occupied a variety of upland slope positions, from lower to ridgetop, on slopes that were gentle to steep. The winter-deciduous nature of the two dominant and characteristic taxa suggest higher cold tolerance and greater moisture requirement than most chaparral types in the area.


### DISTRIBUTION IN STUDY AREA

This association was sampled in Tehama County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 70.2 | 50-78 | - |
| Herb | 4.2 | 0-12 | variable |
| Shrub | 71.9 | 50-83 | 0.9-5 |
| Low Tree/Tall Shrub | 0.7 | 0-5 | 5-10 |
| Hardwood | 0.5 | 0-4 | <5-20 |
| Conifer | 0.1 | 0-0.2 | <5-20 |
| Relative non-native to native cover | 4 | 0-14 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: NW (4), W (3), NE (1), E (1)
Macrotopography: lower to middle slope (1), lower to upper slope (2), middle slope (2), middle to upper slope (1), upper slope (1), upper slope to ridgetop (1), ridgetop (1)
Microtopography: convex (5), flat (2), undulating (2)
Parent Material: volcanic (9)
Soil Texture: loam or sandy loam (3), clay or clay loam (2), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 3421 ft. | 2942-3860 ft. |
| Slope | 19.8º | 3-32º |
| Large rock cover | 1.3% | 0.2-5% |
| Small rock cover | 10.1% | 5-28% |
| Bare ground cover | 12.9% | 7-33% |
| Litter cover | 70.8% | 55-81% |

### SAMPLES USED TO DESCRIBE ASSOCIATION (n=9)

**Rapid Assessments:** SNNR0330, SNNR0373, SNNR0418, SNNR0442, SNNR0444, SNNR0453, SNNR0454, SNNR0486, SNNR0489 **Relevés:** none

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project. It is likely to occur in the adjacent montane Sierra Nevada at elevations up to at least 5000 ft.

**STAND TABLE**
***Ceanothus integerrimus* - *Quercus garryana* var. *breweri* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-M | *Pinus sabiniana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 22 | 0.7 | 1 | 5 | | | | |
| | PISA2-T | *Pinus sabiniana* | 22 | 0 | 0.2 | 0.2 | | | | |
| | QUKE-T | *Quercus kelloggii* | 22 | 0 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 100 | 33.6 | 10 | 54 | | X | X | |
| | QUGAB | *Quercus garryana* var. *breweri* | 89 | 7.3 | 1 | 18 | | | X | |
| | LECA3 | *Lepechinia calycina* | 78 | 6.6 | 1 | 25 | | | X | |
| | CEOCO | *Cercis occidentalis* | 78 | 3.2 | 2 | 8 | | | X | |
| | FRDI2 | *Fraxinus dipetala* | 67 | 3.4 | 0.2 | 9 | | | | |
| | CECU | *Ceanothus cuneatus* | 67 | 2.2 | 0.4 | 14 | | | | |
| | PTCR3 | *Ptelea crenulata* | 67 | 1.0 | 0.2 | 4 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 67 | 0.7 | 0.2 | 3 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 56 | 0.6 | 0.2 | 2 | | | | |
| | ARPA6 | *Arctostaphylos patula* | 33 | 3.0 | 0.2 | 23 | | | | |
| | QUBE5 | *Quercus berberidifolia* | 33 | 0.6 | 1 | 3 | | | | |
| | CLLA3 | *Clematis lasiantha* | 33 | 0.3 | 1 | 1 | | | | |
| | TODI | *Toxicodendron diversilobum* | 33 | 0.3 | 0.4 | 1.2 | | | | |
| | KEBR | *Keckiella breviflora* | 33 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | VUMY | *Vulpia myuros* | 67 | 2.3 | 0.2 | 10 | | | | X |
| | CLRH | *Clarkia rhomboidea* | 56 | 0.4 | 0.2 | 1 | | | | |
| | GAPA5 | *Galium parisiense* | 56 | 0.3 | 0.2 | 1 | | | | X |
| | BRTE | *Bromus tectorum* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | TONO | *Torilis nodosa* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | AICA | *Aira caryophyllea* | 22 | 0 | 0.2 | 0.2 | | | | X |

## *Cephalanthus occidentalis* Shrubland Alliance
## Button-willow Shrubland Alliance

As defined in the state, *Cephalanthus occidentalis* is the dominant in the shrub canopy. *Salix laevigata*, *Rubus discolor*, and *Vitis californica* are often present in the shrub layer. Emergent trees may include *Fraxinus latifolia*. The shrub layer is sparse to continuous, and the herb layer is sparse to open. Stands occur on the banks of rivers and streams, and in the Foothills, soils are generally coarse sand.

As described below, one association of the Button-willow Alliance was classified in the study area.

## *Cephalanthus occidentalis* Association
## Button-willow Association

### SUMMARY
In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Cephalanthus occidentalis* var. *californicus* at 1-53% cover. Other shrubs such as *Rubus discolor* and *Vitis californica* were often present. Trees such as *Fraxinus latifolia*, *Pinus sabiniana*, and *Salix laevigata* sometimes occurred as scattered emergents. The herbaceous layer was open and often included *Artemisia douglasiana*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills and Cascade Range Foothills, and occasionally in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on mixed or sandy alluvium, metamorphic, basalt, or mixed rock substrates. They usually occupied bottom slopes that were flat to moderate along riparian corridors with seasonal inundation.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, and Shasta Counties within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 29.4 | 8-59 | - |
| Herb | 8.8 | 3-26 | variable |
| Shrub | 27.8 | 2-83 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 3.4 | 0-19 | <5-20 |
| Conifer | 0.6 | 0-3 | 10-35 |
| Relative non-native to native cover | 18 | 6-34 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: Flat (3), N (2), W (1), SW (1), S (1)

Macrotopography: bottom (7), lower slope (1)
Microtopography: flat (4), concave (2), undulating (2)
Parent Material: mixed alluvium (3), metamorphic (2), basalt (1), mixed rock (1), sandy alluvium (1)
Soil Texture: sand (7)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1120 ft. | 638-1814 ft. |
| Slope | 1.6º | 0-6º |
| Large rock cover | 40% | 5-75% |
| Small rock cover | 21.1% | 6-63% |
| Bare ground cover | 14.5% | 1-40% |
| Litter cover | 10.3% | 2-40% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0595, SNNR0633, SNNR0723, SNNR0904, SNNR0964, SNNR0995, SNNR1006, SNNR1266 **Relevés:** none

**Rank:** G4S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. The *C*. *occidentalis* alliance has also been described for the Great Valley (Hickson and Keeler-Wolf 2007, Holland 1986), but not in sufficient detail to describe different associations. Stands from the lower elevation valley floor are likely to be different than this foothill type. So far as is understood, this association is endemic to the Sierra Nevada Foothills.

**STAND TABLE**
***Cephalanthus occidentalis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-M | *Salix laevigata* | 50 | 2.4 | 0.2 | 16 | | | | |
| | SALA3-T | *Salix laevigata* | 50 | 2.4 | 4 | 5 | | | | |
| | FRLA-M | *Fraxinus latifolia* | 38 | 0.8 | 0.2 | 4 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 0.5 | 1 | 3 | | | | |
| **Shrub** | | | | | | | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 100 | 15.3 | 1 | 53 | X | | X | |
| | RUDI2 | *Rubus discolor* | 63 | 4.0 | 0.2 | 20 | | | | X |
| | VICA5 | *Vitis californica* | 50 | 1.8 | 0.2 | 10 | | | | |
| | SAEX | *Salix exigua* | 38 | 1.5 | 4 | 4 | | | | |
| | SALA6 | *Salix lasiolepis* | 38 | 1.3 | 1 | 6 | | | | |
| | CEOCO | *Cercis occidentalis* | 25 | 0.2 | 0.2 | 1 | | | | |
| | BRCA3 | *Brickellia californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TODI | *Toxicodendron diversilobum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 50 | 0.2 | 0.2 | 1 | | | | |
| | CYDA | *Cynodon dactylon* | 38 | 2.4 | 2 | 12 | | | | X |
| | MEAL2 | *Melilotus albus* | 38 | 0.3 | 0.2 | 1 | | | | X |
| | MIGU | *Mimulus guttatus* | 38 | 0.2 | 0.2 | 1 | | | | |
| | ELMA5 | *Eleocharis macrostachya* | 25 | 0.8 | 0.2 | 6 | | | | |
| | CYER | *Cyperus eragrostis* | 25 | 0.5 | 1 | 3 | | | | |
| | HOFI | *Holozonia filipes* | 25 | 0.4 | 1 | 2 | | | | |
| | MURI2 | *Muhlenbergia rigens* | 25 | 0.4 | 1 | 2 | | | | |
| | STST | *Stachys stricta* | 25 | 0.4 | 1 | 2 | | | | |
| | DAGL2 | *Datisca glomerata* | 25 | 0.3 | 0.2 | 2 | | | | |
| | JUEF | *Juncus effusus* | 25 | 0.3 | 1 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | GRHID2 | *Grindelia hirsutula* var. *davyi* | 25 | 0.2 | 0.2 | 1 | | | | |
| | HOMA4 | *Hoita macrostachya* | 25 | 0.2 | 0.2 | 1 | | | | |
| | CESO3 | *Centaurea solstitialis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ELGL | *Elymus glaucus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | EPCI | *Epilobium ciliatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | EUOC4 | *Euthamia occidentalis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HYPE | *Hypericum perforatum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | PAAC5 | *Panicum acuminatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | POLYG4 | *Polygonum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |

### *Cercocarpus betuloides* Shrubland Alliance
### Birchleaf Mountain-mahogany Shrubland Alliance

As defined in the state, *Cercocarpus betuloides* (=*C. montanus*) is dominant or co-dominant in the shrub or small tree canopy layer with the chaparral shrubs *Adenostoma fasciculatum*, *Arctostaphylos glandulosa*, *A. glauca*, *Artemisia californica*, *Ceanothus crassifolius*, *C. cuneatus*, *C. spinosus*, *Eriogonum fasciculatum*, *Fremontodendron californicum*, *Garrya flavescens*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Malosma laurina*, *Prunus ilicifolia*, *Quercus berberidifolia*, *Q. john-tuckeri*, *Rhamnus ilicifolia*, and *Salvia mellifera*. Emergent *Juglans californica*, *Juniperus californica*, *Pinus sabiniana*, *Platanus racemosa*, *Quercus agrifolia*, *Q. douglasii* or *Umbellularia californica* trees may be present. The shrub canopy is often two-tiered, and shrubs are patchy. Stands occur on ridges, upper slopes, and fractured rock outcrops on limestone, marble, volcanic, and rarely-flooded rocky alluvium.

In the study area, stands typically occupy rockier sites than denser *Ceanothus* or *Quercus*-dominated chaparral stands. Two associations of the Birchleaf Mountain-mahogany Alliance were classified and are described below.

### *Cercocarpus betuloides* Association
### Birchleaf Mountain-mahogany Association

**SUMMARY**
In the stands sampled, the overstory shrub canopy was open and dominated by *Cercocarpus betuloides* at 5-20% cover. Other shrubs such as *Brickellia californica*, *Ceanothus cuneatus*, *Cercis occidentalis*, *Lonicera hispidula* var. *vacillans*, and *Toxicodendron diversilobum* were often present. Trees such as *Aesculus californica*, *Pinus ponderosa*, *Pinus sabiniana*, and *Quercus wislizeni* sometimes occurred as scattered emergents. The herbaceous layer was open and included a variety of native and non-native grasses and forbs (see stand table below).

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills, Cascade Range Foothills, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on mixed alluvium, greenstone, or other metamorphic substrates. They occupied gently sloping bottoms, lower slopes, or draws, often along riparian corridors.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Mariposa, Placer, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 29.5 | 14-45 | - |
| Herb | 9.5 | 4-22 | variable |
| Shrub | 16.8 | 10-23 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.3 | 0-5 | <5-10 |
| Conifer | 1.5 | 0-5 | 5-20 |
| Relative non-native to native cover | 16.1 | 9-21 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (2), W (1), E (1)
Macrotopography: bottom (2), lower slope (1), draw (1)
Microtopography: undulating (3), concave (1)
Parent Material: mixed alluvium (2), greenstone (1), metamorphic (1)
Soil Texture: sand (2), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1349 ft. | 968-2170 ft. |
| Slope | 2.8º | 2-4º |
| Large rock cover | 45.5% | 10-88% |
| Small rock cover | 35% | 10-55% |
| Bare ground cover | 11.8% | 1-39% |
| Litter cover | 3.3% | 0.2-10% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0623, SNNR0728, SNNR0802 **Relevés:** SNFN0344

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills and adjacent lower Sierra Nevada montane zone (NatureServe et al. 2003b) as the *C. montanus* var. *glaber* association. It is likely to occur at least as far south as Sequoia National Park (S. Haultain, pers. comm. 2004).

**STAND TABLE**
***Cercocarpus betuloides* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-M | *Quercus wislizeni* | 25 | 1.3 | 5 | 5 | | | | |
| | PIPO-T | *Pinus ponderosa* | 25 | 1.0 | 4 | 4 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 0.3 | 1 | 1 | | | | |
| | AECA-M | *Aesculus californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-T | *Quercus wislizeni* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 100 | 11.8 | 5 | 20 | X | | X | |
| | BRCA3 | *Brickellia californica* | 75 | 2.3 | 1 | 6 | | | X | |
| | CEOCO | *Cercis occidentalis* | 75 | 1.1 | 0.2 | 2 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 75 | 0.8 | 0.2 | 2 | | | X | |
| | CECU | *Ceanothus cuneatus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 25 | 0.5 | 2 | 2 | | | | |
| | RUDI2 | *Rubus discolor* | 25 | 0.5 | 2 | 2 | | | | X |
| | JUCA7 | *Juniperus californica* | 25 | 0.3 | 1 | 1 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CELE | *Ceanothus lemmonii* | 25 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Cercocarpus betuloides* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | CLLA3 | *Clematis lasiantha* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERPR8 | *Eriogonum prattenianum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LUAL4 | *Lupinus albifrons* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | TRHI4 | *Trifolium hirtum* | 50 | 1.1 | 0.2 | 4 | | | | X |
| | LOMU | *Lolium multiflorum* | 50 | 0.8 | 0.2 | 3 | | | | X |
| | LOPU3 | *Lotus purshianus* | 50 | 0.8 | 0.2 | 3 | | | | |
| | MURI2 | *Muhlenbergia rigens* | 50 | 0.8 | 0.2 | 3 | | | | |
| | GRHID2 | *Grindelia hirsutula* var. *davyi* | 50 | 0.6 | 0.2 | 2 | | | | |
| | VUMY | *Vulpia myuros* | 50 | 0.6 | 0.2 | 2 | | | | X |
| | ACLE8 | *Achnatherum lemmonii* | 50 | 0.3 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | CLPA5 | *Claytonia parviflora* | 50 | 0.3 | 0.2 | 1 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 50 | 0.3 | 0.2 | 1 | | | | |
| | AVBA | *Avena barbata* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | ELEL5 | *Elymus elymoides* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MADIA | *Madia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MOVI2 | *Monardella villosa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SCUTE | *Scutellaria* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 25 | 0.8 | 3 | 3 | | | | X |
| | ELGL | *Elymus glaucus* | 25 | 0.5 | 2 | 2 | | | | |
| | HEFI | *Hemizonia fitchii* | 25 | 0.5 | 2 | 2 | | | | |
| | MAGR3 | *Madia gracilis* | 25 | 0.5 | 2 | 2 | | | | |
| | ERUM | *Eriogonum umbellatum* | 25 | 0.3 | 1 | 1 | | | | |
| | SHAR2 | *Sherardia arvensis* | 25 | 0.3 | 1 | 1 | | | | X |
| | AICA | *Aira caryophyllea* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ALAM2 | *Allium amplectens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ALSAS | *Allium sanbornii* var. *sanbornii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ANCA14 | *Anthriscus caucalis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ASCLE | *Asclepias* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ASER | *Asclepias eriocarpa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRCA4 | *Brodiaea californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAAL2 | *Calochortus albus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CAOL | *Cardamine oligosperma* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | COPA3 | *Collinsia parviflora* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CRAN11 | *Crucianella angustifolia* | 25 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Cercocarpus betuloides* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | CRCR4 | *Cryptantha crinita* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CYEC | *Cynosurus echinatus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | DELPH | *Delphinium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | EPBR3 | *Epilobium brachycarpum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | EPCA3 | *Epilobium canum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | EPCAL | *Epilobium canum* subsp. *latifolium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERSE3 | *Eremocarpus setigerus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERFOH | *Erigeron foliosus* var. *hartwegii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERBO | *Erodium botrys* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ESCA | *Eschscholzia caespitosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAAP2 | *Galium aparine* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPO | *Galium porrigens* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GEMO | *Geranium molle* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | GRCA | *Grindelia camporum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HOMU | *Hordeum murinum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOMAT | *Lomatium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMA4 | *Lomatium marginatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOUT | *Lomatium utriculatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMI | *Lotus micranthus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MEPO3 | *Medicago polymorpha* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | MICA | *Micropus californicus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MIGU | *Mimulus guttatus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | NAPU4 | *Nassella pulchra* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | NATA3 | *Navarretia tagetina* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | NEHE | *Nemophila heterophylla* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ODHA | *Odontostomum hartwegii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | PLNO | *Plagiobothrys nothofulvus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PLER3 | *Plantago erecta* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PLLA | *Plantago lanceolata* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | POAN | *Poa annua* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | POSE | *Poa secunda* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PTDR | *Pterostegia drymarioides* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | RAMU2 | *Ranunculus muricatus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | SADEO | *Sagina decumbens* subsp. *occidentalis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SEVU | *Senecio vulgaris* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOCA5 | *Solidago californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Cercocarpus betuloides* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | SOHA | *Sorghum halepense* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | STME2 | *Stellaria media* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | THCU | *Thysanocarpus curvipes* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRDU2 | *Trifolium dubium* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRLA16 | *Triteleia laxa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMI | *Vulpia microstachys* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SEHA2 | *Selaginella hansenii* | 25 | 0.1 | 0.2 | 0.2 | | | | |

***Cercocarpus betuloides* - *Ceanothus cuneatus* Association (Provisional)**
**Birchleaf Mountain-mahogany - Wedgeleaf Ceanothus Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory shrub canopy was open to intermittent and dominated by *Ceanothus cuneatus* at 2-16% cover and *Cercocarpus betuloides* at 3-18% cover. Other shrubs such as *Lonicera interrupta* and *Toxicodendron diversilobum* were often present. Trees or shrubs such as *Aesculus californica*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus wislizeni* sometimes occurred as scattered emergents. The herbaceous layer was open to intermittent and often included *Avena barbata*, *Bromus hordeaceus*, *Bromus madritensis*, *Galium porrigens*, *Torilis arvensis*, and *Vulpia microstachys*.

In the study area, this association was sampled occasionally in the Cascade Range Foothills and High Cascade Range, extending infrequently into the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands consistently occurred on volcanic (including basalt) substrates. They occupied a variety of upland slope positions from bottom to upper slopes (most often middle slopes), that were flat to very steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Nevada and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 60.9 | 49-75 | - |
| Herb | 33.9 | 8-60 | variable |
| Shrub | 30.5 | 21-42 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1 | 0-6 | <5-10 |
| Conifer | 0.5 | 0-3 | <5-20 |
| Relative non-native to native cover | 29.9 | 7-58 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (3), SE (1), S (1), NW (1), NE (1), Flat (1)
Macrotopography: bottom (1), lower slope (2), middle slope (3), middle to upper slope (1), upper slope (1)
Microtopography: undulating (5), convex (2), flat (1)
Parent Material: volcanic (7), basalt (1)
Soil Texture: loam or sandy loam (3), clay or clay loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1748 ft. | 500-3228 ft. |
| Slope | 22.9º | 0-48º |
| Large rock cover | 11.2% | 0.2-40% |
| Small rock cover | 9.6% | 5-20% |
| Bare ground cover | 17.4% | 5-40% |
| Litter cover | 57.4% | 30-79% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0190, SNNR0211, SNNR0332, SNNR0349, SNNR0598, SNNR0858, SNNR1348 **Relevés:** SNFN0164

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon the data from this project. A similar association has been defined for the central Coast Ranges in W. Fresno Co. (Evens and Keeler-Wolf 2006).

**STAND TABLE**

***Cercocarpus betuloides* - *Ceanothus cuneatus* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | AECA-M | *Aesculus californica* | 63 | 1.0 | 0.2 | 3 | | | | |
| | QUDO-T | *Quercus douglasii* | 38 | 0.4 | 1 | 1 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 25 | 0.4 | 0.2 | 3 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 25 | 0.2 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 10.9 | 2 | 16 | | X | X | |
| | CEBE3 | *Cercocarpus betuloides* | 100 | 10.8 | 3 | 18 | | X | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 1.8 | 0.2 | 4 | | | X | |
| | LOIN4 | *Lonicera interrupta* | 50 | 0.3 | 0.2 | 1 | | | | |
| | CLLA3 | *Clematis lasiantha* | 38 | 0.7 | 0.2 | 5 | | | | |
| | CEOCO | *Cercis occidentalis* | 38 | 0.4 | 0.2 | 2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 38 | 0.3 | 0.2 | 2 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 25 | 1.4 | 1 | 10 | | | | |
| | PHLE4 | *Philadelphus lewisii* | 25 | 0.7 | 0.2 | 5 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 75 | 5.9 | 2 | 20 | | | X | X |
| | TOAR | *Torilis arvensis* | 75 | 2.3 | 0.2 | 8 | | | X | X |
| | AVBA | *Avena barbata* | 63 | 2.0 | 0.2 | 8 | | | | X |
| | BRMA3 | *Bromus madritensis* | 50 | 1.4 | 0.2 | 10 | | | | X |
| | VUMI | *Vulpia microstachys* | 50 | 0.4 | 0.2 | 2 | | | | |
| | GAPO | *Galium porrigens* | 50 | 0.2 | 0.2 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 38 | 1.5 | 0.2 | 9 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 38 | 1.0 | 0.2 | 7 | | | | X |
| | AICA | *Aira caryophyllea* | 38 | 0.8 | 1 | 3 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 38 | 0.7 | 0.2 | 4 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 38 | 0.3 | 0.2 | 2 | | | | |
| | CESO3 | *Centaurea solstitialis* | 38 | 0.2 | 0.2 | 1 | | | | X |
| | GAPA5 | *Galium parisiense* | 25 | 0.4 | 1 | 2 | | | | X |
| | MICA | *Micropus californicus* | 25 | 0.4 | 1 | 2 | | | | |
| | VUMY | *Vulpia myuros* | 25 | 0.4 | 1 | 2 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 25 | 0.3 | 0.2 | 2 | | | | X |
| | MAGR3 | *Madia gracilis* | 25 | 0.3 | 0.2 | 2 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | PETR7 | *Pentagramma triangularis* | 25 | 0.2 | 0.2 | 1 | | | | |
| | GEMO | *Geranium molle* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | MECA2 | *Melica californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRLA16 | *Triteleia laxa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 4.3 | 4 | 30 | | | | |

***Cornus sericea* Shrubland Alliance**

**Red-osier Dogwood Shrubland Alliance**

As defined in the state, *Cornus sericea* is the dominant shrub with *Salix exigua*, *Salix lasiolepis*, *Cercis occidentalis* or *Toxicodendron diversilobum*. The shrub layer is intermittent to continuous, and the herb layer is sparse to open. In California, stands are known from the Sacramento-San Joaquin Delta and from the Sierra, but few stands have been sampled.

One stand in this alliance was sampled in the Foothills (SNNR0181), and it occurred in an environmental setting different from associations described from the Delta. It had an intermittent shrub cover, which was dominated strongly by *Cornus sericea* and included *Cercis occidentalis*, *Toxicodendron diversilobum*, and *Rhus trilobata*.

***Cornus sericea* Alliance (no Associations defined)**

**Red-osier Dogwood Alliance**

**SUMMARY**

In the stand sampled, the overstory shrub canopy was intermittent and dominated by *Cornus sericea* at 50% cover. Other shrubs such as *Cercis occidentalis*, *Rhamnus ilicifolia*, *Rhamnus tomentella*, *Rhus trilobata*, *Sambucus mexicana*, *Toxicodendron diversilobum*, and *Vitis californica* were present. Trees such as *Aesculus californica* and *Pinus sabiniana* sometimes occurred as scattered emergents. The herbaceous layer was variable and dominated by *Madia elegans* and *Torilis arvensis*, and it included a variety of other taxa such as *Bromus* spp., *Galium aparine*, *G. parisiense*, and *Taeniatherum caput-medusae*.

This alliance was sampled once in the study area in the Tehama Wildlife Area within the Cascade Range Foothills Subregion (Hickman 1993). Although *Cornus sericea* is usually a riparian, understory species in the Sierra Nevada, this stand occurred in an unusual setting – in a small disturbed upland area on volcanic substrate near more mesic vegetation.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Tehama County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 82 | 82-82 | - |
| Herb | 15 | 15-15 | <0.3 |
| Shrub | 70 | 70-70 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0.2 | 0-0.2 | 10-20 |
| Relative non-native to native cover | 11 | 11-11 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: N (1)

Macrotopography: middle slope (1)
Microtopography: undulating (1)
Parent Material: volcanic (1)
Soil Texture: loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1391 ft. | 1391-1391 ft. |
| Slope | 3º | 3-3º |
| Large rock cover | 5% | 5-5% |
| Small rock cover | 3% | 3-3% |
| Bare ground cover | 8% | 8-8% |
| Litter cover | 79% | 79-79% |

**SAMPLES USED TO DESCRIBE ALLIANCE** (n=1)

**Rapid Assessments:** SNNR0181 **Relevés:** none

**Rank:** G4S3

**GLOBAL DISTRIBUTION**
This alliance has been described for the Sierra Nevada and many other parts of western North America (NatureServe 2007a). Insufficient sampling precludes further description of stands in the Sierra Foothills. Other associations have been defined from the Sacramento-San Joaquin River Delta (Hickson and Keeler-Wolf 2007) and from the higher elevations of the Sierra Nevada (Potter 2005).

**STAND TABLE**
***Cornus sericea* Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | AECA-M | *Aesculus californica* | 100 | 1.0 | 1 | 1 | X | | X | |
| | PISA2-T | *Pinus sabiniana* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| **Shrub** | | | | | | | | | | |
| | COSE16 | *Cornus sericea* | 100 | 50.0 | 50 | 50 | X | | X | |
| | CEOCO | *Cercis occidentalis* | 100 | 10.0 | 10 | 10 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 10.0 | 10 | 10 | | | X | |
| | RHTR | *Rhus trilobata* | 100 | 2.0 | 2 | 2 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 100 | 1.0 | 1 | 1 | | | X | |
| | RHTO6 | *Rhamnus tomentella* | 100 | 1.0 | 1 | 1 | | | X | |
| | VICA5 | *Vitis californica* | 100 | 1.0 | 1 | 1 | | | X | |
| | SAME5 | *Sambucus mexicana* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| **Herb** | | | | | | | | | | |
| | MAEL | *Madia elegans* | 100 | 5.0 | 5 | 5 | | X | X | |
| | TOAR | *Torilis arvensis* | 100 | 5.0 | 5 | 5 | | X | X | X |
| | BRDI3 | *Bromus diandrus* | 100 | 1.0 | 1 | 1 | | | X | X |
| | BRMA3 | *Bromus madritensis* | 100 | 1.0 | 1 | 1 | | | X | X |
| | BRTE | *Bromus tectorum* | 100 | 1.0 | 1 | 1 | | | X | X |
| | GAAP2 | *Galium aparine* | 100 | 1.0 | 1 | 1 | | | X | |
| | GAPA5 | *Galium parisiense* | 100 | 1.0 | 1 | 1 | | | X | X |
| | TACA8 | *Taeniatherum caput-medusae* | 100 | 1.0 | 1 | 1 | | | X | X |
| | ELGL | *Elymus glaucus* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | VUMY | *Vulpia myuros* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |

## *Eriodictyon californicum* Shrubland Alliance
## Yerba Santa Shrubland Alliance

As defined in the state, *Eriodictyon californicum* is the dominant shrub, with *Ceanothus cuneatus* frequently present, and *Adenostoma fasciculatum* and *Toxicodendron diversilobum* less frequent in the shrub layer. The shrub canopy is open to intermittent. Topography and geologic substrates are variable (including serpentinite substrate in the Foothills). Stands generally occur in relatively recently-burned areas, although they may occur in other disturbed areas.

As described below, one association of the Yerba Santa Alliance was classified in the study area. This type is typically associated with recent disturbance, including recent burns, and stands may transition to Wedgeleaf Ceanothus or Blue Oak Alliances with lack of disturbance.

---

## *Eriodictyon californicum* / Herbaceous Association
## California Yerba Santa / Herbaceous Association

**SUMMARY**
In the stands sampled, the shrub canopy was open to intermittent and dominated by *Eriodictyon californicum* at 6-45% cover. *Ceanothus cuneatus* often intermixed in the shrub overstory. *Pinus sabiniana* sometimes occurred as a scattered emergent tree. The herbaceous layer was open to continuous and often included *Avena barbata*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea melitensis*, *Daucus pusillus*, *Galium parisiense*, *Hypochaeris glabra*, and *Vulpia myuros*.

In the study area, this association was sampled often within the central Sierra Nevada Foothills and infrequently in the Cascade Range Foothills, High Cascade Range, and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including serpentine) substrates, and infrequently on volcanic or ultramafic substrates. They usually occupied upland middle slopes to ridgetops that were moderate to steep. Stands may be in recently disturbed settings, including recently burned or cleared areas, and they may transition to the *Ceanothus cuneatus* Alliance 10 or more years after disturbance.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Calaveras, Mariposa, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 60.2 | 20-96 | - |
| Herb | 41.9 | 5-90 | variable |
| Shrub | 28.5 | 7-50 | 0-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.4 | 0-5 | <5 |
| Conifer | 0.2 | 0-1 | <5 |
| Relative non-native to native cover | 45.8 | 9-93 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (6), S (4), Variable (2), W (1), SE (1)
Macrotopography: lower to middle slope (1), middle slope (6), middle slope to ridgetop (1), upper slope (3), ridgetop (3)
Microtopography: convex (7), undulating (4), flat (2), concave (1)
Parent Material: metamorphic (7), volcanic (4), serpentine (2), ultramafic (1)
Soil Texture: loam or sandy loam (5), clay or clay loam (3), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1734 ft. | 784-2618 ft. |
| Slope | 16.9º | 6-29º |
| Large rock cover | 6.4% | 0.2-20% |
| Small rock cover | 14.5% | 0.2-65% |
| Bare ground cover | 26.5% | 2-49% |
| Litter cover | 48.9% | 1-76% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0136, SNNR0245, SNNR0415, SNNR0424, SNNR0466, SNNR0755, SNNR1036, SNNR1092, SNNR1148, SNNR1417 **Relevés:** SNFN0111, SNFN0226, SNFN0652, SNFN0653

**Rank:** G4S4?

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon data collected for this project. It is likely to occur in the Inner North Coast Ranges as well.

**STAND TABLE**

***Eriodictyon californicum* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-M | *Pinus sabiniana* | 36 | 0.2 | 0.2 | 1 | | | | |
| | QUDO-M | *Quercus douglasii* | 21 | 0.6 | 0.2 | 8 | | | | |
| **Shrub** | | | | | | | | | | |
| | ERCA6 | *Eriodictyon californicum* | 100 | 24.6 | 6 | 45 | X | | X | |
| | CECU | *Ceanothus cuneatus* | 64 | 1.2 | 0.2 | 12 | | | | |
| | ADFA | *Adenostoma fasciculatum* | 29 | 1.2 | 0.2 | 8 | | | | |
| | TODI | *Toxicodendron diversilobum* | 29 | 0.3 | 0.2 | 2 | | | | |
| | LOSC2 | *Lotus scoparius* | 21 | 0.1 | 0.2 | 1 | | | | |
| | MIAU | *Mimulus aurantiacus* | 21 | 0 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | GAPA5 | *Galium parisiense* | 71 | 1.7 | 0.2 | 10 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 64 | 6.5 | 1 | 30 | | | | X |
| | AVBA | *Avena barbata* | 64 | 1.8 | 0.2 | 10 | | | | X |
| | VUMY | *Vulpia myuros* | 57 | 4.3 | 0.2 | 25 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 57 | 1.8 | 0.2 | 10 | | | | X |
| | CEME2 | *Centaurea melitensis* | 50 | 1.4 | 0.2 | 8 | | | | X |
| | DAPU3 | *Daucus pusillus* | 50 | 0.6 | 0.2 | 3 | | | | |
| | BRMA3 | *Bromus madritensis* | 50 | 0.2 | 0.2 | 1 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 43 | 2.6 | 0.2 | 30 | | | | X |
| | AICA | *Aira caryophyllea* | 43 | 1.0 | 0.2 | 7 | | | | X |
| | BRDI2 | *Brachypodium distachyon* | 36 | 9.9 | 0.2 | 65 | | | | X |
| | FIGA | *Filago gallica* | 36 | 0.9 | 0.2 | 8 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 36 | 0.1 | 0.2 | 1 | | | | X |
| | PEDU2 | *Petrorhagia dubia* | 29 | 0.5 | 0.2 | 5 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 29 | 0.2 | 0.2 | 2 | | | | X |
| | LOWR2 | *Lotus wrangelianus* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | ERBO | *Erodium botrys* | 21 | 1.3 | 0.2 | 17 | | | | X |
| | MAGR3 | *Madia gracilis* | 21 | 0.5 | 0.2 | 7 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 21 | 0.4 | 0.2 | 5 | | | | |
| | BRDI3 | *Bromus diandrus* | 21 | 0.3 | 0.2 | 3 | | | | X |
| | CAOCO | *Calystegia occidentalis* subsp. *occidentalis* | 21 | 0 | 0.2 | 0.2 | | | | |
| | CAAT25 | *Castilleja attenuata* | 21 | 0 | 0.2 | 0.2 | | | | |
| | SIGA | *Silene gallica* | 21 | 0 | 0.2 | 0.2 | | | | X |
| | SOOL | *Sonchus oleraceus* | 21 | 0 | 0.2 | 0.2 | | | | X |

### *Heteromeles arbutifolia* Shrubland Alliance

### Toyon Shrubland Alliance

As defined in the state, *Heteromeles arbutifolia* is dominant or co-dominant in the shrub canopy with *Artemisia californica*, *Ceanothus crassifolius*, *Ceanothus spinosus*, *Cercocarpus montanus*, *Diplacus aurantiacus*, *Eriogonum fasciculatum*, *Fraxinus dipetala*, *Keckiella antirrhinoides*, *Lonicera subspicata*, *Malosma laurina*, *Prunus ilicifolia*, *Quercus berberidifolia*, *Rhamnus ilicifolia*, *Rhus ovata*, *Salvia mellifera*, and *Sambucus nigra* subsp. *canadensis*. Emergent *Cupressus forbesii*, *Juglans californica*, and *Quercus agrifolia* trees may be present. The shrub canopy is often two-tiered and is open to continuous. The herbaceous layer is open to intermittent. Stands generally occur on steep, north-facing slopes. Soils are loams. The alliance is generally represented by a heterogeneous mixture of chaparral dominants. The difference between this alliance and other chaparral types appears to be mostly related to site history, largely time since last fire, fire frequency, and proximity to other alliances.

As described below, one association of the Toyon Alliance was classified. This association was found on serpentine and was similar to Wedgeleaf Ceanothus stands in the study area. One stand (SNNR0395) in the Foothills did not occur on serpentine soil and was classified to the alliance level only.

---

### *Heteromeles arbutifolia Serpentine* Association (Provisional)

### Toyon Serpentine Association (Provisional)


**SUMMARY**

In the stands sampled, the overstory shrub canopy was open to intermittent and dominated by *Heteromeles arbutifolia* at 19-35% cover. Other shrubs such as *Ceanothus cuneatus*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum* were often present. *Pinus sabiniana* often occurred as a scattered emergent tree. The herbaceous layer was open, with abundant and characteristic taxa such as *Bromus hordeaceus*, *Bromus madritensis*, *Dichelostemma capitatum* subsp. *capitatum*, *Eriophyllum lanatum*, *Galium porrigens*, *Lasthenia californica*, *Linanthus bicolor*, *Melica californica*, *Micropus californicus*, *Pentagramma triangularis*, *Uropappus lindleyi*, and *Vulpia microstachys*.


This association was sampled somewhat infrequently in the study area within the central Sierra Nevada Foothills Subregion (Hickman 1993). Stands consistently occurred on serpentine substrates. They occupied upland sites on lower to upper slopes that were moderate to steep and usually north-facing.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Mariposa and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 50.8 | 45-55 | - |
| Herb | 18.6 | 8-28 | <0.3 |
| Shrub | 37.2 | 24-47 | 1-5 |

| | | | |
|---|---|---|---|
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.2 | 0-1 | 5-10 |
| Conifer | 1.6 | 0-6 | <5-10 |
| Relative non-native to native cover | 12 | 2-39 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NE (2), N (2), W (1)
Macrotopography: lower slope (1), lower to middle slope (1), middle slope (1), upper slope (2)
Microtopography: convex (2), flat (2), undulating (1)
Parent Material: serpentine (5)
Soil Texture: loam or sandy loam (3), clay or clay loam (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1153 ft. | 860-1458 ft. |
| Slope | 25.2º | 12-35º |
| Large rock cover | 12.8% | 0-35% |
| Small rock cover | 26.5% | 0.4-45% |
| Bare ground cover | 13% | 6-30% |
| Litter cover | 44.2% | 10-78% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR1100 **Relevés:** SNFN0112, SNFN0133, SNFN0180, SNFN0348

**Rank:** G3S3?

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada based solely upon the data collected for this project. It is likely to also occur in the Inner North Coast Ranges. Stands are likely to be small and localized on serpentine outcrops.

**STAND TABLE**
***Heteromeles arbutifolia Serpentine* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-M | *Pinus sabiniana* | 80 | 0.3 | 0.2 | 1 | | X | X | |
| | PISA2-T | *Pinus sabiniana* | 40 | 1.4 | 1 | 6 | | | | |
| **Shrub** | | | | | | | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 27.8 | 19 | 35 | X | | X | |
| | CECU | *Ceanothus cuneatus* | 100 | 7.0 | 1 | 23 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 80 | 0.7 | 0.2 | 1.2 | | | X | |
| | RHIL | *Rhamnus ilicifolia* | 60 | 0.6 | 0.2 | 2 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 40 | 1.2 | 0.2 | 6 | | | | |
| **Herb** | | | | | | | | | | |
| | PETR7 | *Pentagramma triangularis* | 100 | 0.7 | 0.2 | 2 | | | X | |
| | ERLA6 | *Eriophyllum lanatum* | 100 | 0.4 | 0.2 | 1 | | | X | |
| | GAPO | *Galium porrigens* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 80 | 4.2 | 1 | 10 | | | X | X |
| | VUMI | *Vulpia microstachys* | 80 | 2.8 | 0.2 | 6 | | | X | |
| | MECA2 | *Melica californica* | 80 | 1.6 | 0.2 | 4 | | | X | |
| | LACA7 | *Lasthenia californica* | 80 | 1.6 | 1 | 4 | | | X | |
| | LIBI | *Linanthus bicolor* | 80 | 0.9 | 0.2 | 4 | | | X | |
| | URLI5 | *Uropappus lindleyi* | 80 | 0.7 | 0.2 | 3 | | | X | |
| | MICA | *Micropus californicus* | 80 | 0.5 | 0.2 | 1 | | | X | |
| | BRMA3 | *Bromus madritensis* | 80 | 0.3 | 0.2 | 1 | | | X | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 80 | 0.2 | 0.2 | 0.2 | | | X | |
| | MECA | *Meconella californica* | 60 | 0.5 | 0.2 | 2 | | | | |
| | CAOCF | *Calystegia occidentalis* subsp. *fulcrata* | 60 | 0.3 | 0.2 | 1 | | | | |
| | AGHE2 | *Agoseris heterophylla* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | DAPU3 | *Daucus pusillus* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | PLCI | *Plectritis ciliosa* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | MAEX | *Madia exigua* | 40 | 1.4 | 2 | 5 | | | | |
| | LEVI8 | *Lessingia virgata* | 40 | 0.6 | 0.2 | 3 | | | | |
| | CLARK | *Clarkia* | 40 | 0.6 | 1 | 2 | | | | |
| | AVBA | *Avena barbata* | 40 | 0.4 | 0.2 | 2 | | | | X |
| | LOUT | *Lomatium utriculatum* | 40 | 0.4 | 0.2 | 2 | | | | |
| | PLER3 | *Plantago erecta* | 40 | 0.4 | 0.2 | 2 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 40 | 0.2 | 0.2 | 1 | | | | |
| | PSHE | *Pseudobahia heermannii* | 40 | 0.2 | 0.2 | 1 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 40 | 0.2 | 0.2 | 1 | | | | |
| | VUMY | *Vulpia myuros* | 40 | 0.2 | 0.2 | 1 | | | | X |
| | AICA | *Aira caryophyllea* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | APOC | *Aphanes occidentalis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | ASTEXX | Asteraceae | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAAL2 | *Calochortus albus* | 40 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Heteromeles arbutifolia Serpentine* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | DUCYC3 | *Dudleya cymosa* subsp. | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | ELEL5 | *Elymus elymoides* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | EPMI | *Epilobium minutum* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | GIPUS | *Githopsis pulchella* subsp. *serpentinicola* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | HEAC8 | *Hesperevax acaulis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | THCU | *Thysanocarpus curvipes* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | TRLA16 | *Triteleia laxa* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 80 | 4.0 | 1 | 10 | X | | X | |

## *Juniperus californica* Shrubland Alliance
## California juniper Shrubland Alliance

As defined in the state, *Juniperus californica* is the dominant shrub, often with low cover of *Ceanothus cuneatus*. *Quercus douglasii* is often an emergent tree at low cover. The shrub canopy is open, with an intermittent herbaceous understory. Topography and aspect are variable.

Most stands in the Foothills are on volcanic mudflow substrates. One association of the California Juniper Alliance was classified for the study area and is described below.

### *Juniperus californica* / Herbaceous Association
### California Juniper / Herbaceous Association

**SUMMARY**
In the stands sampled, the shrub canopy was open to intermittent and dominated by *Juniperus californica* at 5-35% cover. *Ceanothus cuneatus* was often present in the shrub overstory. *Quercus douglasii* often occurred as a scattered emergent tree. The herbaceous layer was open to continuous and often included *Aira caryophyllea*, *Avena barbata*, *Bromus hordeaceus*, *Geranium molle*, *Hypochaeris glabra*, *Micropus californicus*, *Plagiobothrys nothofulvus*, *Torilis arvensis*, *Trifolium hirtum*, and *Vulpia microstachys*.

In the study area, this association was sampled infrequently within the central Sierra Nevada Foothills and somewhat frequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic, and rarely occurred on metamorphic substrates. They occupied bottom to upper slopes and draws on slopes that were flat to somewhat steep, sometimes along, or adjacent to, seasonal creeks and draws.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Mariposa and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 54 | 22-77 | - |
| Herb | 42.3 | 12-65 | <0.3 |
| Shrub | 17.2 | 0-35 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 2.1 | 0-8 | <5-20 |
| Conifer | 5.1 | 0-27 | <5-10 |
| Relative non-native to native cover | 35.6 | 2-80 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (3), Variable (1), S (1), NE (1), N (1)
Macrotopography: bottom (1), bottom to lower slope (1), lower to middle slope (1), upper slope (2), draw (2)

Microtopography: undulating (4), concave (3)
Parent Material: volcanic (6), metamorphic (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1090 ft. | 334-2692 ft. |
| Slope | 7.5º | 0-24º |
| Large rock cover | 25% | 5-48% |
| Small rock cover | 12.1% | 5-20% |
| Bare ground cover | 9.7% | 3-18% |
| Litter cover | 42.5% | 2-77% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0025, SNNR0852, SNNR0883, SNNR1073 **Relevés:** SNFN0228, SNFN0259, SNFN0320

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. Similar stands have been described for the central Coast Ranges in Fresno Co., but with different associated species (Evens and Keeler-Wolf 2006). Outside of the Sierra Foothills, this association is only likely to occur in spotty portions of the Inner North Coast Ranges.

**STAND TABLE**
***Juniperus californica* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 57 | 1.9 | 1 | 8 | | | | |
| **Shrub** | | | | | | | | | | |
| | JUCA7 | *Juniperus californica* | 100 | 19.9 | 5 | 35 | X | | X | |
| | CECU | *Ceanothus cuneatus* | 57 | 1.5 | 0.2 | 5 | | | | |
| | LOHIV | *Lonicera hispidula* var. *vacillans* | 29 | 0.1 | 0.2 | 0.4 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 86 | 5.0 | 0.2 | 10 | | | X | X |
| | MICA | *Micropus californicus* | 71 | 0.9 | 0.2 | 4 | | | | |
| | GEMO | *Geranium molle* | 57 | 2.5 | 0.2 | 17 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 57 | 2.3 | 0.2 | 7 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 57 | 1.9 | 0.2 | 8 | | | | X |
| | AVBA | *Avena barbata* | 57 | 1.6 | 0.2 | 4 | | | | X |
| | TOAR | *Torilis arvensis* | 57 | 0.8 | 0.2 | 4 | | | | X |
| | VUMI | *Vulpia microstachys* | 57 | 0.6 | 0.2 | 2 | | | | |
| | AICA | *Aira caryophyllea* | 57 | 0.3 | 0.2 | 1 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 43 | 3.9 | 3 | 20 | | | | X |
| | ERBO | *Erodium botrys* | 43 | 2.5 | 0.2 | 15 | | | | X |

**STAND TABLE continued**

***Juniperus californica* / Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | CYEC | *Cynosurus echinatus* | 43 | 2.0 | 1 | 12 | | | | X |
| | LOMU | *Lolium multiflorum* | 43 | 1.3 | 0.2 | 6 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 43 | 1.0 | 2 | 3 | | | | X |
| | BRMA3 | *Bromus madritensis* | 43 | 0.7 | 1 | 2 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 43 | 0.6 | 0.2 | 3 | | | | |
| | TRDU2 | *Trifolium dubium* | 43 | 0.5 | 0.2 | 2 | | | | X |
| | MAGR3 | *Madia gracilis* | 43 | 0.3 | 0.2 | 2 | | | | |
| | PLER3 | *Plantago erecta* | 43 | 0.3 | 0.2 | 1 | | | | |
| | ALAM2 | *Allium amplectens* | 43 | 0.2 | 0.2 | 1 | | | | |
| | CLPU2 | *Clarkia purpurea* | 43 | 0.2 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 43 | 0.2 | 0.2 | 1 | | | | |
| | CEME2 | *Centaurea melitensis* | 43 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 43 | 0.1 | 0.2 | 0.2 | | | | X |
| | PLNO | *Plagiobothrys nothofulvus* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 29 | 0.6 | 1 | 3 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 29 | 0.5 | 0.2 | 3 | | | | |
| | DAPU3 | *Daucus pusillus* | 29 | 0.5 | 0.2 | 3 | | | | |
| | MADIA | *Madia* | 29 | 0.3 | 0.2 | 2 | | | | |
| | BRELE | *Brodiaea elegans* subsp. | 29 | 0.2 | 0.2 | 1 | | | | |
| | CASU3 | *Calochortus superbus* | 29 | 0.2 | 0.2 | 1 | | | | |
| | JUBU | *Juncus bufonius* | 29 | 0.2 | 0.2 | 1 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 29 | 0.2 | 0.2 | 1 | | | | X |
| | SIGA | *Silene gallica* | 29 | 0.2 | 0.2 | 1 | | | | X |
| | DEVAV | *Delphinium variegatum* subsp. *variegatum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | GRHID2 | *Grindelia hirsutula* var. *davyi* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | LUNA3 | *Lupinus nanus* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | MEPO3 | *Medicago polymorpha* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | NATA3 | *Navarretia tagetina* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | TRBR7 | *Triteleia bridgesii* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | SEHA2 | *Selaginella hansenii* | 71 | 2.6 | 0.2 | 12 | | | | |
| | MOSS | Moss | 43 | 1.1 | 1 | 5 | | | | |

### *Quercus berberidifolia* Shrubland Alliance
### Scrub oak Shrubland Alliance

As defined in the state, *Quercus berberidifolia* is dominant in the shrub canopy with *Adenostoma fasciculatum*, *A. sparsifolium*, *Arctostaphylos glandulosa*, *Ceanothus cuneatus*, *C. thyrsiflorus*, *Frangula californica*, *Heteromeles arbutifolia*, *Pickeringia montana*, *Prunus ilicifolia*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum*. The shrub canopy is continuous. Emergent *Aesculus californica*, *Quercus wislizeni*, and *Pinus sabiniana* may be present. The herbaceous layer is sparse to open. Stands primarily occur on north-facing, steep slopes. Soils are deep to shallow and are well to extensively-drained. Stands of scrub oak typically occur on mesic, north-facing slopes from southern to northern cismontane California. It is the most common scrub oak alliance on non-serpentinite substrates. In the Foothills, it is found primarily on volcanic mudflow substrate. Careful oak identification is necessary to correctly assign stands to this alliance.

As described below, two associations of the Scrub Oak Alliance were classified in the study area. Two stands (SNNR0322, SNNR0507) showed additional variation, with a co-dominance of *Quercus wislizeni*, and were only classified to the alliance level only.

---

### *Quercus berberidifolia - Ceanothus cuneatus* Association
### Scrub Oak - Wedgeleaf Ceanothus Association

**SUMMARY**

In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Quercus berberidifolia* at 7-35% cover. Other shrubs such as *Ceanothus cuneatus*, *Cercocarpus betuloides*, *Lonicera interrupta*, and *Toxicodendron diversilobum* were often present. *Pinus sabiniana* often occurred as a scattered emergent tree. The herbaceous layer was open and often included *Galium porrigens* and *Vulpia microstachys*.

In the study area, this association was sampled infrequently within the central and northern Sierra Nevada Foothills, and occasionally in the Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) substrates, but occurred once on serpentine substrate. They occupied a variety of upland slope positions, from lower slopes to ridgetops (most often on middle and upper slopes). Slopes varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997). Stands appear to be more common in the northern part of the study area on volcanics. The stands in Tuolumne Co. are scattered. It is notable that: 1) no stands were described in the western foothills portion of the Yosemite region by Keeler-Wolf et al. (2003) and 2) no *Q. berberidifolia* stands were identified in the vegetation inventory of Sequoia National Park (S. Haultain, pers. comm. 2004).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 66.9 | 40-88 | - |

| | | | |
|---|---|---|---|
| Herb | 12.5 | 2-28 | variable |
| Shrub | 57.4 | 32-85 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 3.4 | 0-35 | <5-10 |
| Conifer | 1.9 | 0-12 | 5-20 |
| Relative non-native to native cover | 9.4 | 0-28 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (3), SW (2), NW (2), NE (2), Flat (2), Variable (1), S (1)
Macrotopography: lower slope (1), middle slope (3), middle to upper slope (1), upper slope (5), upper slope to ridgetop (2), ridgetop (1)
Microtopography: flat (6), undulating (4), convex (2), concave (1)
Parent Material: volcanic (11), basalt (1), serpentine (1)
Soil Texture: loam or sandy loam (6), clay or clay loam (4), silt or silt loam (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 2348 ft. | 1402-3353 ft. |
| Slope | 14.9º | 0-29º |
| Large rock cover | 2.5% | 0-10% |
| Small rock cover | 11.5% | 0.2-50% |
| Bare ground cover | 25.4% | 2-47% |
| Litter cover | 56% | 35-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=13)

**Rapid Assessments:** SNNR0203, SNNR0363, SNNR0386, SNNR0389, SNNR0435, SNNR0436, SNNR0440, SNNR0517, SNNR0547, SNNR0716, SNNR0775, SNNR0790
**Relevés:** SNFN0375

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association is now known from the Sierra Nevada Foothills based on data collected for this project. Formerly it was known from the southern California mountains (Gordon and White 1994, Klein and Evens 2006, and Keeler-Wolf and Evens 2006).

**STAND TABLE**
***Quercus berberidifolia - Ceanothus cuneatus* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-T | *Pinus sabiniana* | 54 | 1.9 | 0.2 | 12 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 23 | 0.2 | 0.2 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | QUBE5 | *Quercus berberidifolia* | 100 | 29.9 | 11 | 55 | | X | X | |
| | CECU | *Ceanothus cuneatus* | 100 | 11.2 | 0.2 | 28 | | | X | |
| | CEBE3 | *Cercocarpus betuloides* | 69 | 3.2 | 0.2 | 17 | | | | |
| | TODI | *Toxicodendron diversilobum* | 69 | 3.2 | 1 | 15 | | | | |
| | LOIN4 | *Lonicera interrupta* | 69 | 1.1 | 0.2 | 5 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 46 | 3.5 | 0.2 | 30 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 46 | 1.1 | 0.2 | 5 | | | | |
| | CEOCO | *Cercis occidentalis* | 38 | 0.6 | 0.2 | 3 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 31 | 2.9 | 0.2 | 25 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 31 | 2.8 | 1 | 16 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 31 | 1.3 | 0.2 | 10 | | | | |
| | CLLA3 | *Clematis lasiantha* | 31 | 0.6 | 0.2 | 5 | | | | |
| | LECA3 | *Lepechinia calycina* | 31 | 0.4 | 0.2 | 3 | | | | |
| | CEIN3 | *Ceanothus integerrimus* | 23 | 1.2 | 4 | 7 | | | | |
| | FRDI2 | *Fraxinus dipetala* | 23 | 0.3 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | VUMI | *Vulpia microstachys* | 62 | 2.2 | 0.2 | 10 | | | | |
| | GAPO | *Galium porrigens* | 62 | 0.6 | 0.2 | 2.2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 46 | 1.5 | 1 | 6 | | | | X |
| | VUMY | *Vulpia myuros* | 46 | 1.2 | 1 | 6 | | | | X |
| | TOAR | *Torilis arvensis* | 38 | 0.3 | 0.2 | 3 | | | | X |
| | AVBA | *Avena barbata* | 31 | 0.6 | 0.2 | 4 | | | | X |
| | PEDU2 | *Petrorhagia dubia* | 31 | 0.3 | 0.2 | 2 | | | | X |
| | CYEC | *Cynosurus echinatus* | 31 | 0.2 | 0.2 | 1 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 31 | 0.1 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 31 | 0.1 | 0.2 | 0.2 | | | | |
| | BRMA3 | *Bromus madritensis* | 23 | 0.6 | 0.2 | 6 | | | | X |
| | AICA | *Aira caryophyllea* | 23 | 0.4 | 1 | 3 | | | | X |
| | GAPA5 | *Galium parisiense* | 23 | 0.3 | 0.2 | 2 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 23 | 0.2 | 0.2 | 1 | | | | X |
| | DIVO | *Dichelostemma volubile* | 23 | 0 | 0.2 | 0.2 | | | | |

### *Quercus berberidifolia - Fraxinus dipetala - Heteromeles arbutifolia* Association
### Scrub Oak - Foothill Ash - Toyon Association

**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Quercus berberidifolia* at 18-45% cover. Other shrubs such as *Arctostaphylos manzanita*, *Cercocarpus betuloides*, *Eriophyllum confertiflorum*, *Fraxinus dipetala*, *Heteromeles arbutifolia*, *Juniperus californica*, *Keckiella breviflora*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum* were often present. Trees such as *Aesculus californica* and *Quercus wislizeni* often occurred as scattered emergents. The herbaceous layer was open and included a variety of native and non-native grasses and forbs (see stand table below).

This association was sampled twice in the study area, once in the central Sierra Nevada Foothills and once in the Cascade Range Foothills Subregions (Hickman 1993). Stands occurred on ultramafic or volcanic substrates. They occupied lower slopes of upland sites that were moderate to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 70 | 60-80 | - |
| Herb | 16 | 7-25 | <0.3 |
| Shrub | 56.5 | 37-76 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 18.8 | 1-36 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (1), N (1)
Macrotopography: lower slope (2)
Microtopography: undulating (2)
Parent Material: ultramafic (1), volcanic (1)
Soil Texture: clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1148 ft. | 738-1557 ft. |
| Slope | 14.5º | 7-22º |
| Large rock cover | 2.5% | 1-4% |
| Small rock cover | 10.5% | 1-20% |
| Bare ground cover | 14% | 10-18% |
| Litter cover | 70.5% | 66-75% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0307, SNNR1066 **Relevés:** none

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described from Western Riverside Co. (Klein and Evens 2006). Its range has been extended to the Sierra Nevada Foothills based on data collected for this project. It is also likely to occur in the Inner North Coast Ranges and in the Central Coast Ranges.

**STAND TABLE**

***Quercus berberidifolia - Fraxinus dipetala - Heteromeles arbutifolia* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | AECA-M | *Aesculus californica* | 100 | 0.2 | 0.2 | 0.2 | X | | X | |
| | QUWI2-M | *Quercus wislizeni* | 50 | 0.5 | 1 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | QUBE5 | *Quercus berberidifolia* | 100 | 31.5 | 18 | 45 | | X | X | |
| | TODI | *Toxicodendron diversilobum* | 100 | 12.0 | 8 | 16 | | | X | |
| | FRDI2 | *Fraxinus dipetala* | 100 | 11.0 | 2 | 20 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 100 | 6.5 | 1 | 12 | | | X | |
| | CLLI2 | *Clematis ligusticifolia* | 50 | 1.0 | 2 | 2 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 50 | 0.5 | 1 | 1 | | | | |
| | CEBE3 | *Cercocarpus betuloides* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLLA3 | *Clematis lasiantha* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCO25 | *Eriophyllum confertiflorum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | JUCA7 | *Juniperus californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | KEBR | *Keckiella breviflora* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | BRMA3 | *Bromus madritensis* | 100 | 6.5 | 1 | 12 | | X | X | X |
| | VUMY | *Vulpia myuros* | 50 | 6.0 | 12 | 12 | | | | X |
| | METO | *Melica torreyana* | 50 | 1.0 | 2 | 2 | | | | |
| | VUMI | *Vulpia microstachys* | 50 | 1.0 | 2 | 2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 50 | 0.5 | 1 | 1 | | | | X |
| | BRLA3 | *Bromus laevipes* | 50 | 0.5 | 1 | 1 | | | | |
| | AVBA | *Avena barbata* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CALYS | *Calystegia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLBI | *Clarkia biloba* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | DAPU3 | *Daucus pusillus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | DIVO | *Dichelostemma volubile* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ERLA6 | *Eriophyllum lanatum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | LICI | *Linanthus ciliatus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MAGR3 | *Madia gracilis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MECA2 | *Melica californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 2.0 | 4 | 4 | | | | |

## *Quercus durata* Shrubland Alliance
## Leather Oak Shrubland Alliance

As defined in the state, *Quercus durata* is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa*, *A. glauca*, *A. pungens*, *A. viscida*, *Eriodictyon californicum*, *Fremontodendron californicum*, *Garrya congdonii*, *Heteromeles arbutifolia*, *Rhamnus ilicifolia*, *R. tomentella*, *Quercus berberidifolia*, and *Q. wislizeni*. Emergent *Pinus ponderosa*, *P. sabiniana*, or *Umbellularia californica* trees may be present. The shrub canopy is intermittent to continuous and the herbaceous layer is sparse to intermittent. Stands occur on varied topography. Soils are shallow and rocky. Stands of this alliance have a high fidelity to serpentinite or other ultramafic substrates (Kruckeberg 1951, Alexander et al. 2006).

In the Foothills, stands are found on gabbro soils. *Q. durata* is typically dominant or co-dominant in mesic sites, including north-facing slopes. Two associations of the Leather Oak Alliance were classified for the study area and are described below.

---

## *Quercus durata* Association (Provisional)
## Leather Oak Association (Provisional)

### SUMMARY
In the stands sampled, the overstory shrub canopy was open and dominated by *Quercus durata* at 8-12% cover. Other shrubs such as *Arctostaphylos viscida*, *Ceanothus cuneatus*, *Rhamnus ilicifolia*, and *Rhamnus tomentella* were often present. Trees such as *Pinus ponderosa*, *Pinus sabiniana*, and *Umbellularia californica* often occurred as scattered emergents. The herbaceous layer was open with abundant and characteristic taxa such as *Elymus multisetus*, *Eriophyllum lanatum*, *Melica californica*, other identified grasses, and *Scutellaria californica*.

This association was sampled twice in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on serpentine substrates. They occupied upland middle to upper slopes that were somewhat steep.

### DISTRIBUTION IN STUDY AREA
This association was sampled in El Dorado County, within the Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsection (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 19.5 | 11-28 | - |
| Herb | 7 | 4-10 | >0.3 |
| Shrub | 11 | 0-22 | 1-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0.5 | 0-1 | 5-10 |
| Relative non-native to native cover | 0 | - | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: W (1), SE (1)
Macrotopography: middle slope (1), upper slope (1)
Microtopography: undulating (2)

Parent Material: serpentine (2)
Soil Texture: silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 2265 ft. | 2250-2280 ft. |
| Slope | 18º | 18-18º |
| Large rock cover | 4.5% | 0-9% |
| Small rock cover | 73% | 61-85% |
| Bare ground cover | 8% | 6-10% |
| Litter cover | 12.5% | 4-21% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR1594, SNNR1595 **Relevés:** none

**Rank:** G3S3?

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon data collected for this project. Another association defined by relatively strong dominance of *Q*. *durata* in the shrub layer and *Pinus sabiniana* as a regular overstory emergent has been defined in the central Coast Ranges of San Benito Co. (Evens et al. 2006). This association is likely similar to the association described here.

**STAND TABLE**
***Quercus durata* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | UMCA-M | *Umbellularia californica* | 100 | 2.5 | 1 | 4 | | X | X | |
| | PISA2-T | *Pinus sabiniana* | 100 | 2.0 | 2 | 2 | | X | X | |
| | PIPO-M | *Pinus ponderosa* | 50 | 0.5 | 1 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | QUDU4 | *Quercus durata* | 100 | 10.0 | 8 | 12 | X | | X | |
| | RHIL | *Rhamnus ilicifolia* | 100 | 2.1 | 0.2 | 4 | | | X | |
| | RHTO6 | *Rhamnus tomentella* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | CECU | *Ceanothus cuneatus* | 50 | 1.5 | 3 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | POACXX | Poaceae | 100 | 2.1 | 0.2 | 4 | | | X | |
| | ELMU3 | *Elymus multisetus* | 100 | 1.5 | 1 | 2 | | | X | |
| | ERLA6 | *Eriophyllum lanatum* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | MECA2 | *Melica californica* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | SCCA3 | *Scutellaria californica* | 100 | 0.6 | 0.2 | 1 | | | X | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 50 | 0.5 | 1 | 1 | | | | |
| | GAPO | *Galium porrigens* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MOVI2 | *Monardella villosa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SELA4 | *Senecio layneae* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SICA4 | *Silene californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |

***Quercus durata - Adenostoma fasciculatum* / *Salvia sonomensis* Association (Provisional)**
**Leather Oak - Chamise / Creeping Sage Association (Provisional)**

**SUMMARY**
In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Quercus durata* at 11-35% cover and *Adenostoma fasciculatum* at 3-37% cover. Other shrubs such as *Arctostaphylos viscida*, *Ceanothus lemmonii*, *Heteromeles arbutifolia*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum* were often present. Trees such as *Pinus sabiniana* and *Quercus wislizeni* often occurred as scattered emergents. The herbaceous layer was open and dominated by *Salvia sonomensis*.

This association was sampled somewhat frequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands consistently occurred on gabbro substrates. They occupied a variety of upland slope positions, most often on lower and middle slopes that were flat to moderate.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in El Dorado County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 57.6 | 25-83 | - |
| Herb | 12.9 | 3-28 | <0.3 |
| Shrub | 48.6 | 10-70 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.6 | 0-4 | <5-10 |
| Conifer | 1.3 | 0-5 | <5-20 |
| Relative non-native to native cover | 1.6 | 0-6 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (2), E (2), N (1), Flat (1), (0)
Macrotopography: entire slope (1), lower slope (3), lower to middle slope (1), middle slope (2)
Microtopography: undulating (4), flat (3)
Parent Material: gabbro (7)
Soil Texture: clay or clay loam (2), loam or sandy loam (2), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 846 ft. | 487-1120 ft. |
| Slope | 8.7º | 0-13º |
| Large rock cover | 1.1% | 0-5% |
| Small rock cover | 8.1% | 0.2-30% |
| Bare ground cover | 44% | 2-88% |
| Litter cover | 42.5% | 3-95% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** SNNR0280, SNNR0336, SNNR0503, SNNR0914, SNNR1522, SNNR1566 **Relevés:** SNFN0011

**Rank:** G3S3

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon the data collected for this project. It is likely to be an endemic association of gabbro and serpentine substrates in the central and northern Sierra Nevada Foothills.

**STAND TABLE**
***Quercus durata - Adenostoma fasciculatum* / *Salvia sonomensis* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 71 | 1.9 | 0.2 | 5 | | | | |
| | PISA2-T | *Pinus sabiniana* | 57 | 1.1 | 0.2 | 5 | | | | |
| **Shrub** | | | | | | | | | | |
| | ADFA | *Adenostoma fasciculatum* | 100 | 20.4 | 3 | 37 | | X | X | |
| | QUDU4 | *Quercus durata* | 100 | 20.3 | 11 | 35 | | X | X | |
| | ARVI4 | *Arctostaphylos viscida* | 100 | 10.6 | 0.2 | 35 | | | X | |
| | CELE | *Ceanothus lemmonii* | 71 | 2.3 | 0.2 | 12 | | | | |
| | TODI | *Toxicodendron diversilobum* | 71 | 2.1 | 0.2 | 7 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 71 | 0.9 | 0.2 | 2 | | | | |
| | HEAR5 | *Heteromeles arbutifolia* | 57 | 0.6 | 0.2 | 2 | | | | |
| | CERO4 | *Ceanothus roderickii* | 43 | 1.4 | 1 | 5 | | | | |
| | CEOCO | *Cercis occidentalis* | 43 | 0.6 | 0.2 | 2 | | | | |
| | BAPI | *Baccharis pilularis* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | SASO | *Salvia sonomensis* | 100 | 9.9 | 0.2 | 25 | X | | X | |
| | POCOC | *Polygala cornuta* var. *cornuta* | 43 | 0.6 | 0.2 | 3 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 43 | 0.5 | 0.2 | 2 | | | | |
| | WYRE | *Wyethia reticulata* | 29 | 0.9 | 2 | 4 | | | | |
| | VUMY | *Vulpia myuros* | 29 | 0.3 | 0.2 | 2 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 29 | 0.3 | 1 | 1 | | | | X |
| | AICA | *Aira caryophyllea* | 29 | 0.2 | 0.2 | 1 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 29 | 0.1 | 0.2 | 0.2 | | | | |

### *Quercus garryana* var. *breweri* Shrubland Alliance (Provisional)
### Oregon White Oak Shrubland Alliance (Provisional)

As defined in the state, *Quercus garryana* var. *breweri* is dominant in the shrub canopy with *Amelanchier utahensis*, *Arctostaphylos manzanita*, *Ceanothus cuneatus*, *C*. *integerrimus*, *Cercis occidentalis*, *Cercocarpus montanus*, *Clematis lasiantha*, *Fraxinus dipetala*, *Prunus emarginata*, *P*. *subcordata*, *Quercus berberidifolia*, *Q*. *vacciniifolia*, *Rhamnus ilicifolia* and *Toxicodendron diversilobum*. Emergent trees such as *Quercus kelloggii*, *Q*. *chrysolepis*, *Q*. *wislizeni*, or *Pinus sabiniana* may be present. The shrub canopy is intermittent to continuous and the herbaceous layer is usually open and grassy. Stands occur on ridges and upper slopes that may be steep or rocky.

As described below, one association of the Scrub Oak Alliance was classified in the study area. One stand (SNNR0511) showed additional variation with a co-dominance of *Ceanothus cuneatus* and was classified to the alliance level only.

### *Quercus garryana* var. *breweri* Association (Provisional)
### Brewer Oak Association (Provisional)

**SUMMARY**
In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Quercus garryana* var. *breweri* at 22-60% cover. Other shrubs such as *Ceanothus cuneatus*, *Ceanothus integerrimus*, *Cercis occidentalis*, *Cercocarpus betuloides*, *Rhus trilobata*, and *Toxicodendron diversilobum* were often present. *Pinus sabiniana* sometimes occurred as a scattered emergent tree. The herbaceous layer was open and often included non-natives *Bromus hordeaceus* and *Torilis arvensis*.

This association was sampled infrequently in the study area within the Cascade Range Foothills and High Cascade Range Subregions (Hickman 1993). Stands consistently occurred on volcanic substrates. They usually occupied somewhat steep, upland, middle slopes, but were occasionally found on upper slopes and/or ridgetops.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Tehama County within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 66.8 | 53-80 | - |
| Herb | 8.6 | 0-17 | variable |
| Shrub | 64.2 | 44-75 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.8 | 0-2 | 5-10 |
| Conifer | 5.4 | 0-17 | 5-20 |
| Relative non-native to native cover | 8.9 | 0-20 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (2), NW (1), NE (1), E (1)
Macrotopography: middle slope (3), upper slope (1), upper slope to ridgetop (1)
Microtopography: flat (4), concave (1)
Parent Material: volcanic (5)
Soil Texture: clay or clay loam (2), loam or sandy loam (2), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 2872 ft. | 2432-3689 ft. |
| Slope | 18º | 15-20º |
| Large rock cover | 2.8% | 1-5% |
| Small rock cover | 9% | 3-15% |
| Bare ground cover | 17.2% | 2-44% |
| Litter cover | 65.4% | 44-80% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0188, SNNR0375, SNNR0417, SNNR0455, SNNR0520
**Relevés:** none

**Rank:** G4S4?

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. Although stands have been observed in the Yosemite region (NatureServe et al. 2003b) and in the Sequoia National Park area (S. Haultain pers. comm. 2004), they have not been well described. It appears that the most extensive stands of this association occur in the northern Sierra Nevada Foothills. The samples collected in this study suggest a common mixture with *Cercocarpus betuloides*, which has also been noted in Sequoia National Park (S. Haultain, pers. comm. 2004). Similar stands may occur in the central and inner North Coast Ranges, from Mendocino to Humboldt Counties.

**STAND TABLE**
***Quercus garryana* var. *breweri* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | PISA2-M | *Pinus sabiniana* | 60 | 1.8 | 0.2 | 8 | | | | |
| | PISA2-T | *Pinus sabiniana* | 40 | 3.6 | 1 | 17 | | | | |
| **Shrub** | | | | | | | | | | |
| | QUGAB | *Quercus garryana* var. *breweri* | 100 | 41.4 | 22 | 60 | X | | X | |
| | CEBE3 | *Cercocarpus betuloides* | 80 | 8.4 | 1 | 20 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 80 | 2.4 | 0.2 | 10 | | | X | |
| | CEIN3 | *Ceanothus integerrimus* | 60 | 4.6 | 3 | 16 | | | | |
| | CEOCO | *Cercis occidentalis* | 60 | 2.6 | 1 | 8 | | | | |
| | CECU | *Ceanothus cuneatus* | 60 | 2.0 | 2 | 5 | | | | |
| | RHTR | *Rhus trilobata* | 60 | 0.5 | 0.2 | 2 | | | | |
| | LECA3 | *Lepechinia calycina* | 40 | 1.2 | 0.2 | 6 | | | | |
| | QUBE5 | *Quercus berberidifolia* | 40 | 1.2 | 1 | 5 | | | | |
| | CLLA3 | *Clematis lasiantha* | 40 | 1.0 | 0.2 | 5 | | | | |
| | LOIN4 | *Lonicera interrupta* | 40 | 0.6 | 0.2 | 3 | | | | |
| **Herb** | | | | | | | | | | |
| | TOAR | *Torilis arvensis* | 60 | 1.2 | 0.2 | 4 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 60 | 0.8 | 1 | 2 | | | | X |
| | VUMY | *Vulpia myuros* | 40 | 2.4 | 2 | 10 | | | | X |
| | CYEC | *Cynosurus echinatus* | 40 | 0.8 | 0.2 | 4 | | | | X |
| | BRDI3 | *Bromus diandrus* | 40 | 0.6 | 1 | 2 | | | | X |
| | SABI3 | *Sanicula bipinnatifida* | 40 | 0.4 | 0.2 | 2 | | | | |
| | CLCO | *Clarkia concinna* | 40 | 0.2 | 0.2 | 1 | | | | |
| | VUMI | *Vulpia microstachys* | 40 | 0.2 | 0.2 | 1 | | | | |

### *Frangula californica* (=*Rhamnus tomentella*) Shrubland Alliance
### California Coffeeberry Shrubland Alliance

As defined in the state, *Frangula californica* is dominant or co-dominant in the shrub canopy with *Baccharis pilularis*, *Calycanthus occidentalis*, *Ericameria pinifolia*, *Eriogonum wrightii*, *Garrya veatchii*, *Hoita macrostachya*, *Prunus virginiana*, *Ribes roezlii*, *Salix breweri*, *Sambucus nigra* var. *canadensis*, and *Toxicodendron diversilobum*. Emergent *Quercus agrifolia*, *Q. chrysolepis*, and other trees may be present. The tree layer is sparse. The shrub layer can be two-tiered with an open to continuous canopy. The herbaceous layer is sparse with a high amount of exposed soil and rock. Stands occur along drainages at the bottom of concave and undulating slopes that are moderate to somewhat steep and derived from sedimentary or serpentinite substrates. Soils retain moisture much of the year. The names *Rhamnus californica* and *Rhamnus tomentella* have been used in most manuals, but both warrant a generic status with a subspecies designation (Bolmgren and Oxelman 2004).

Stands of *F. californica* have been defined along the coast of central and northern California (NatureServe et al. 2003a). These stands are mesic coastal scrub types, much different than those of *F. tomentella* described herein. Another type, the *F. tomentella* subsp. *crassifolia* Association, has been provisionally identified and sampled in moist serpentine areas in the inner North Coast Ranges from Napa, Lake, and Colusa Counties (CNPS 2002). In the Foothills, stands occur on south-facing slopes, often on serpentine soils. One association of the California Coffeeberry Alliance was classified for the study area and is described below.

### *Rhamnus tomentella* - *Hoita macrostachya* Association (Provisional)
### Hoary Coffeeberry - Large Leather-root Association (Provisional)

**SUMMARY**
In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Rhamnus tomentella* at 12-45% cover. Other shrubs such as *Heteromeles arbutifolia*, *Sambucus mexicana*, and *Toxicodendron diversilobum* were often present. Trees such as *Pinus sabiniana*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus wislizeni*, and *Umbellularia californica* sometimes occurred as scattered emergents. The herbaceous layer was open to intermittent, with abundant and characteristic taxa such as *Hoita macrostachya*, *Lactuca serriola*, and *Mimulus guttatus*.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills and High Cascade Range Subregions (Hickman 1993). Stands usually occurred on serpentine, with the exception of one stand found on conglomerate substrate. They occupied bottom to middle slopes that were gentle to somewhat steep. Sometimes stands occurred along riparian corridors or stream terraces.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Tehama and Tuolumne Counties within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 67.5 | 45-80 | - |
| Herb | 26.5 | 16-35 | >0.3 |
| Shrub | 53.8 | 15-80 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 3.5 | 0-9 | 10-20 |
| Conifer | 0.6 | 0-2 | 10-20 |
| Relative non-native to native cover | 30.8 | 2-50 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (2), S (1), E (1)
Macrotopography: bottom (2), lower slope (1), middle slope (1)
Microtopography: concave (3), undulating (1)
Parent Material: serpentine (3), conglomerate (1)
Soil Texture: loam or sandy loam (2), clay or clay loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1266 ft. | 1000-1976 ft. |
| Slope | 9.8º | 4-20º |
| Large rock cover | 13.3% | 1-30% |
| Small rock cover | 14.3% | 5-28% |
| Bare ground cover | 22.7% | 7-46% |
| Litter cover | 40.7% | 1-81% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0342, SNNR1492, SNNR1493, SNNR1525 **Relevés:** none

**Rank:** G3S3

**GLOBAL DISTRIBUTION**

This association has been described sporadically in the Sierra Nevada Foothills, including the Peoria Wildlife Area (Evens et al. 2004). This association probably also occurs in small, localized, stands in riparian settings within the inner North Coast Ranges. Similar stands, lacking *Hoita macrostachya*, occur in serpentine seeps in the central Coast Ranges of Santa Clara County (Evens and San 2004).

**STAND TABLE**

***Rhamnus tomentella - Hoita macrostachya* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 25 | 1.3 | 5 | 5 | | | | |
| | QUDO-T | *Quercus douglasii* | 25 | 1.0 | 4 | 4 | | | | |
| | UMCA-M | *Umbellularia californica* | 25 | 0.8 | 3 | 3 | | | | |
| | QUCH2-M | *Quercus chrysolepis* | 25 | 0.3 | 1 | 1 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RHTO6 | *Rhamnus tomentella* | 100 | 30.5 | 12 | 45 | X | | X | |
| | HOMA4 | *Hoita macrostachya* | 75 | 5.8 | 1 | 16 | | | X | |
| | TODI | *Toxicodendron diversilobum* | 75 | 6.0 | 8 | 8 | | | X | |
| | HEAR5 | *Heteromeles arbutifolia* | 50 | 2.0 | 2 | 6 | | | | |
| | SAME5 | *Sambucus mexicana* | 50 | 1.0 | 1 | 3 | | | | |
| | RUDI2 | *Rubus discolor* | 25 | 6.3 | 25 | 25 | | | | X |
| | CAOC5 | *Calycanthus occidentalis* | 25 | 1.5 | 6 | 6 | | | | |
| | RUUR | *Rubus ursinus* | 25 | 1.3 | 5 | 5 | | | | |
| | SALA6 | *Salix lasiolepis* | 25 | 1.3 | 5 | 5 | | | | |
| | CECU | *Ceanothus cuneatus* | 25 | 0.5 | 2 | 2 | | | | |
| | VICA5 | *Vitis californica* | 25 | 0.5 | 2 | 2 | | | | |
| | BEAQD | *Berberis aquifolium* var. *dictyota* | 25 | 0.3 | 1 | 1 | | | | |
| | ERCA6 | *Eriodictyon californicum* | 25 | 0.3 | 1 | 1 | | | | |
| | PRSU2 | *Prunus subcordata* | 25 | 0.3 | 1 | 1 | | | | |
| | ARMA | *Arctostaphylos manzanita* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | RHIL | *Rhamnus ilicifolia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | MIGU | *Mimulus guttatus* | 75 | 1.3 | 0.2 | 3 | | | X | |
| | LASE | *Lactuca serriola* | 75 | 0.6 | 0.2 | 1 | | | X | X |
| | BRHO2 | *Bromus hordeaceus* | 50 | 21.5 | 16 | 70 | | | | X |
| | AVBA | *Avena barbata* | 50 | 4.3 | 1 | 16 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 50 | 3.0 | 6 | 6 | | | | X |
| | RORIP | *Rorippa* | 50 | 1.5 | 1 | 5 | | | | |
| | CEME2 | *Centaurea melitensis* | 50 | 1.3 | 0.2 | 5 | | | | X |
| | POMO5 | *Polypogon monspeliensis* | 50 | 1.3 | 1 | 4 | | | | X |
| | STST | *Stachys stricta* | 50 | 1.0 | 1 | 3 | | | | |
| | ASFA | *Asclepias fascicularis* | 50 | 0.5 | 1 | 1 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 50 | 0.5 | 1 | 1 | | | | X |

**STAND TABLE continued**

***Rhamnus tomentella* - *Hoita macrostachya* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | HOBRB2 | *Hordeum brachyantherum* subsp. *brachyantherum* | 25 | 4.0 | 16 | 16 | | | | |
| | CAREX | *Carex* | 25 | 2.0 | 8 | 8 | | | | |
| | LOMU | *Lolium multiflorum* | 25 | 2.0 | 8 | 8 | | | | X |
| | MIFL2 | *Mimulus floribundus* | 25 | 2.0 | 8 | 8 | | | | |
| | CEVE3 | *Centaurium venustum* | 25 | 1.0 | 4 | 4 | | | | |
| | CESO3 | *Centaurea solstitialis* | 25 | 0.8 | 3 | 3 | | | | X |
| | MICA3 | *Mimulus cardinalis* | 25 | 0.8 | 3 | 3 | | | | |
| | BRMI2 | *Briza minor* | 25 | 0.5 | 2 | 2 | | | | X |
| | BRDI3 | *Bromus diandrus* | 25 | 0.5 | 2 | 2 | | | | X |
| | LOTUS | *Lotus* | 25 | 0.5 | 2 | 2 | | | | |
| | LOPU3 | *Lotus purshianus* | 25 | 0.5 | 2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 25 | 0.3 | 1 | 1 | | | | X |
| | CYER | *Cyperus eragrostis* | 25 | 0.3 | 1 | 1 | | | | |
| | ELGL | *Elymus glaucus* | 25 | 0.3 | 1 | 1 | | | | |
| | GAAP2 | *Galium aparine* | 25 | 0.3 | 1 | 1 | | | | |
| | HEPU2 | *Helenium puberulum* | 25 | 0.3 | 1 | 1 | | | | |
| | HEFI | *Hemizonia fitchii* | 25 | 0.3 | 1 | 1 | | | | |
| | LENE3 | *Lessingia nemaclada* | 25 | 0.3 | 1 | 1 | | | | |
| | PADI6 | *Paspalum distichum* | 25 | 0.3 | 1 | 1 | | | | |
| | RUCR | *Rumex crispus* | 25 | 0.3 | 1 | 1 | | | | X |
| | TOAR | *Torilis arvensis* | 25 | 0.3 | 1 | 1 | | | | X |
| | AGVI11 | *Agrostis viridis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRMA3 | *Bromus madritensis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CANU5 | *Carex nudata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DAPU3 | *Daucus pusillus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | JUBU | *Juncus bufonius* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LYCA4 | *Lythrum californicum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MADIA | *Madia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MIMO3 | *Mimulus moschatus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | NAPU4 | *Nassella pulchra* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMI | *Vulpia microstachys* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 0.8 | 3 | 3 | | | | |

## *Rubus discolor* Shrubland Semi-Natural Stands

## Himalaya blackberry Shrubland Semi-Natural Stands

As defined in the state, the non-native, invasive *Rubus discolor* is dominant in the shrub layer with *Clematis ligusticifolia*, *Philadelphus lewisii*, *Rosa californica*, *Rubus ursinus*, *Toxicodendron diversilobum* and *Vitis californica*. Emergent trees of *Quercus wislizeni*, *Q. lobata*, *Populus fremontii*, or *Salix* spp. may be present. The canopy is intermittent to continuous and the herbaceous layer is open to intermittent. Stands occur in wastelands, pastures, forest plantations, and along roadsides, streams, river flats, fence lines, and right-of-way corridors. *R. discolor* and the native *R. ursinus* and have similar ecologies, and both species are found to intermix in some sites.

As described below, one association of the Himalaya Blackberry Alliance was classified in the study area. Studies in the Sacramento-San Joaquin River Delta (Hickson and Keeler-Wolf 2007) suggest *R. discolor* is the close ecological equivalent of native briars and brambles such as *Rosa californica* and *Rubus ursinus*. Thus, these stands may have once been occupied by *Rosa californica* or native *Rubus* sp. in much of California.

---

## *Rubus discolor* Association

## Himalayan Blackberry Association

### SUMMARY

In the stands sampled, the overstory shrub canopy was intermittent to continuous and dominated by *Rubus discolor* at 23-85% cover. *Vitis californica* was often present as a viney shrub. Trees such as *Alnus rhombifolia*, *Pinus ponderosa*, *Pinus sabiniana*, *Quercus lobata*, *Quercus wislizeni*, and *Salix laevigata* sometimes occurred as scattered emergents. The herbaceous layer was open and often included *Artemisia douglasiana*, *Holcus lanatus*, and *Hypericum perforatum*.

In the study area, this association was sampled occasionally in the northern Sierra Nevada Foothills and once each in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates, but were found once each on mixed sedimentary or volcanic substrates. They usually occupied gently sloping bottom to lower slopes, and rarely occupied a middle slope or upper slope. Stands were invasive and almost always associated with water. They formed dense stands along riparian corridors, stream terraces, and lake edges.

### DISTRIBUTION IN STUDY AREA

This association was sampled in Amador, El Dorado, Mariposa, Placer, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 77 | 57-87 | - |
| Herb | 7 | 0-16 | variable |
| Shrub | 73 | 50-88 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |

| | | | |
|---|---|---|---|
| Hardwood | 5.9 | 0-35 | <5-20 |
| Conifer | 0.1 | - | <5-35 |
| Relative non-native to native cover | 76.2 | 47-95 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: S (3), W (2), Variable (1), SE (1), N (1)
Macrotopography: bottom (3), bottom to lower slope (3), middle slope (1), upper slope (1)
Microtopography: concave (3), flat (3), undulating (1)
Parent Material: metamorphic (6), mixed sedimentary (1), volcanic (1)
Soil Texture: silt or silt loam (3), loam or sandy loam (2), sand (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1157 ft. | 539-2205 ft. |
| Slope | 2.4º | 1-5º |
| Large rock cover | 1.6% | 0-9.1% |
| Small rock cover | 2.6% | 0-15.5% |
| Bare ground cover | 26.3% | 10-50% |
| Litter cover | 61.3% | 33-84% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0291, SNNR0467, SNNR0683, SNNR1040, SNNR1132, SNNR1258, SNNR1263, SNNR1344 **Relevés:** none

**Rank:** Unranked, non-native type

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. Similar stands have been described at the alliance level in the Sacramento-San Joaquin River Delta (Hickson and Keeler-Wolf 2007) and in the Suisun Marsh of Solano Co. (Keeler-Wolf and Vaghti 2000).

**STAND TABLE**
***Rubus discolor* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 38 | 3.9 | 0.2 | 30 | | | | |
| | QUWI2-M | *Quercus wislizeni* | 38 | 0.8 | 0.2 | 6 | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 38 | 0.8 | 0.2 | 5 | | | | |
| | SALA3-M | *Salix laevigata* | 25 | 0.5 | 0.2 | 4 | | | | |
| | SALA3-T | *Salix laevigata* | 25 | 0.5 | 2 | 2 | | | | |
| | PIPO-T | *Pinus ponderosa* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PISA2-T | *Pinus sabiniana* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | QULO-T | *Quercus lobata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 100 | 63.8 | 23 | 85 | X | | X | X |
| | VICA5 | *Vitis californica* | 50 | 4.5 | 2 | 20 | | | | |
| | BAPI | *Baccharis pilularis* | 38 | 4.0 | 1 | 30 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 38 | 0.2 | 0.2 | 1 | | | | |
| | SALA6 | *Salix lasiolepis* | 25 | 1.0 | 2 | 6 | | | | |
| | RUUR | *Rubus ursinus* | 25 | 0.2 | 0.2 | 1 | | | | |
| | ARVI4 | *Arctostaphylos viscida* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | HYPE | *Hypericum perforatum* | 75 | 0.7 | 0.2 | 4 | | | X | X |
| | ARDO3 | *Artemisia douglasiana* | 50 | 0.4 | 0.2 | 2 | | | | |
| | HOLA | *Holcus lanatus* | 50 | 0.3 | 0.2 | 2 | | | | X |
| | TOAR | *Torilis arvensis* | 38 | 0.7 | 0.2 | 4 | | | | X |
| | CLPE | *Claytonia perfoliata* | 25 | 1.3 | 0.2 | 10 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.9 | 0.2 | 7 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 25 | 0.2 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ANAR | *Anagallis arvensis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CLUN | *Clarkia unguiculata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMU | *Lolium multiflorum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | MESP3 | *Mentha spicata* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | VEBL | *Verbascum blattaria* | 25 | 0.1 | 0.2 | 0.2 | | | | X |

## *Salix exigua* Shrubland Alliance
## Narrow-leaf Willow Shrubland Alliance

As defined in the state, *Salix exigua* is dominant or co-dominant in the shrub canopy, often with *Salix lasiolepis*, *Rosa californica*, *Rubus discolor*, *R. ursinus*, and *Cephalanthus occidentalis*. Emergent trees may be present, including *Acer negundo*, *Alnus rhombifolia*, *Juglans hindsii*, *Populus fremontii*, *Salix gooddingii*, *Salix laevigata*, and *S. lucida*. Stands occur in temporarily flooded floodplains, depositions along rivers and streams, springs, and reservoir edges.

In the study area, stands often occur with *Salix lasiolepis* and *Rubus discolor*. Two associations were classified and are described below for the Narrow-leaf Willow Alliance. One stand (SNNR0692) showed additional variation, due to high cover of *Salix lasiolepis*, and was only classified to the alliance level only.

## *Salix exigua* Association
## Narrow-leaf Willow Association

### SUMMARY
In the stands sampled, the overstory shrub canopy was open to continuous and dominated by *Salix exigua* at 18-84% cover. *Rubus discolor* was often present in the shrub layer. Trees such as *Ailanthus altissima*, *Fraxinus latifolia*, and *Salix laevigata* sometimes occurred as scattered emergents. The herbaceous layer was open and often included *Artemisia douglasiana*.

In the study area, this association was sampled frequently in the northern Sierra Nevada Foothills and once each in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on mixed, sandy, or silty alluvium substrates and infreqently on gabbro, granitic, greenstone, sedimentary, slate, or volcanic substrates. They usually occupied slope bottoms, occasionally extending to lower slopes that were flat to somewhat steep. Stands occurred along riparian corridors and stream terraces.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Calaveras, El Dorado, Madera, Nevada, Placer, Tehama, and Yuba Counties within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 64 | 25-90 | - |
| Herb | 11 | 0-30 | variable |
| Shrub | 51.8 | 22-105 | 0-5 |
| Low Tree/Tall Shrub | 4 | 0-44 | 5-10 |
| Hardwood | 11.5 | 0-65 | 5-20 |
| Conifer | 0 | - | 10-20 |
| Relative non-native to native cover | 26.6 | 0-61 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: Flat (4), W (3), NW (2), SW (1), SE (1), S (1), N (1), (0)
Macrotopography: bottom (11), bottom to lower slope (1), lower slope (2)
Microtopography: flat (9), undulating (3), concave (2)
Parent Material: mixed alluvium (6), gabbro (1), granitic (1), greenstone (1), sandy alluvium (1), sedimentary (1), silty alluvium (1), slate (1), volcanic (1)
Soil Texture: sand (10)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 677 ft. | 279-1681 ft. |
| Slope | 2.8º | 0-24º |
| Large rock cover | 3.9% | 0-25% |
| Small rock cover | 20.4% | 0-85% |
| Bare ground cover | 26.9% | 5-80% |
| Litter cover | 29.4% | 1-88% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0074, SNNR0232, SNNR0288, SNNR0631, SNNR0805, SNNR0841, SNNR0887, SNNR0903, SNNR0919, SNNR0984, SNNR1055, SNNR1151, SNNR1362, SNNR1388 **Relevés:** none

**Rank:** G5S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills. Potter (2005) describes a *Salix exigua*/*Artemisia douglasiana* Association, which commonly occurs below 3000 ft, but up to 4,680 ft. along the western slope of the Sierra. This association is very similar to his association, but his includes both *Brickellia californica* and *A*. *douglasiana*, while we identify two associations that have *A*. *douglasiana* and *B*. *californica* as separate indicators. Hickson and Keeler-Wolf (2007) describe a *Salix exigua* – (*Salix lasiolepis*) - *Rubus discolor* Association from the Sacramento-San Joaquin River Delta. About 20% of their stands contain *Artemisia douglasiana*. Similar stands have also been described for southern California in the Santa Monica Mountains (Keeler-Wolf and Evens 2006) and in Western Riverside County (Klein and Evens 2006).

**STAND TABLE**
***Salix exigua* Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-T | *Salix laevigata* | 36 | 1.3 | 1 | 7 | | | | |
| | AIAL | *Ailanthus altissima* | 29 | 0.7 | 0.2 | 6 | | | | X |
| | FRLA-T | *Fraxinus latifolia* | 29 | 0.3 | 0.2 | 2 | | | | |
| | ALRH2-T | *Alnus rhombifolia* | 21 | 1.2 | 0.2 | 15 | | | | |
| | SALA3-M | *Salix laevigata* | 21 | 0.6 | 2 | 4 | | | | |
| | POFR2-T | *Populus fremontii* | 21 | 0.2 | 1 | 1 | | | | |
| **Shrub** | | | | | | | | | | |
| | SAEX | *Salix exigua* | 100 | 44.6 | 18 | 84 | X | | X | |
| | RUDI2 | *Rubus discolor* | 64 | 14.8 | 1 | 40 | | | | X |
| | VICA5 | *Vitis californica* | 43 | 2.6 | 0.2 | 16 | | | | |
| **Herb** | | | | | | | | | | |
| | ARDO3 | *Artemisia douglasiana* | 50 | 1.8 | 0.2 | 10 | | | | |
| | LOMU | *Lolium multiflorum* | 43 | 1.1 | 0.2 | 5 | | | | X |
| | RUCR | *Rumex crispus* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRDI3 | *Bromus diandrus* | 21 | 0.4 | 0.2 | 3 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 21 | 0.4 | 1 | 2 | | | | X |
| | XAST | *Xanthium strumarium* | 21 | 0.3 | 0.2 | 4 | | | | |
| | CYER | *Cyperus eragrostis* | 21 | 0.2 | 0.2 | 2 | | | | |
| | LYHY2 | *Lythrum hyssopifolia* | 21 | 0.2 | 0.2 | 1 | | | | X |
| | BRNI | *Brassica nigra* | 21 | 0.1 | 0.2 | 1 | | | | X |
| | HOLA | *Holcus lanatus* | 21 | 0.1 | 0.2 | 1 | | | | X |
| | POMO5 | *Polypogon monspeliensis* | 21 | 0 | 0.2 | 0.2 | | | | X |

***Salix exigua* - *Brickellia californica* Association (Provisional)**

**Narrow-leaf Willow - California Brickellbush Association (Provisional)**

**SUMMARY**

In the stands sampled, the overstory shrub canopy was open and dominated by *Salix exigua* at 2-15% cover. Other shrubs such as *Brickellia californica*, *Cephalanthus occidentalis* var. *californicus*, and *Vitis californica* were characteristically present. Trees such as *Fraxinus latifolia* and *Populus fremontii* sometimes occurred as scattered emergents. The herbaceous layer was open and often included *Carex barbarae*.

This association was sampled somewhat infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on metamorphic (including greenstone) or mixed alluvium substrates. They usually occupied slope bottoms that were flat to gentle, along stream corridors that were subject to seasonal inundation or submersion.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in El Dorado and Placer Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 14.6 | 8-26 | - |
| Herb | 1.9 | 0-8 | variable |
| Shrub | 8.8 | 5-13 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 3.8 | 0-19 | <5 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 6.3 | 0-12 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (3), SW (1), NW (1)
Macrotopography: bottom (4), bottom to lower slope (1)
Microtopography: undulating (2), flat (1), concave (1), convex (1)
Parent Material: metamorphic (2), mixed alluvium (2), greenstone (1)
Soil Texture: sand (5)

| | Mean | Range |
|---|---|---|
| Elevation | 615 ft. | 422-1015 ft. |
| Slope | 0.8º | 0-3º |
| Large rock cover | 35.2% | 0.2-87% |
| Small rock cover | 29.8% | 0.2-85% |
| Bare ground cover | 31.4% | 1-99% |
| Litter cover | 0.9% | 0.2-2% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0282, SNNR0687, SNNR0689, SNNR0727, SNNR0916
**Relevés:** none

**Rank:** G3S3?

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely on the data collected for this project. It is closely related to Potter's (2005) *S*. *exigua* / *A*. *douglasiana* association and may, with further data collection and analysis, be considered a phase of that broadly defined association. Both species are widespread in California and this association may occur in the North Coast Ranges, the Central and South Coast Ranges, and the Transverse Ranges as well.

**STAND TABLE**
***Salix exigua* - *Brickellia californica* Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | FRLA-M | *Fraxinus latifolia* | 60 | 1.0 | 1 | 3 | | | | |
| | POFR2-M | *Populus fremontii* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | SAEX | *Salix exigua* | 100 | 6.8 | 2 | 15 | X | | X | |
| | BRCA3 | *Brickellia californica* | 100 | 2.7 | 0.2 | 7 | | | X | |
| | VICA5 | *Vitis californica* | 80 | 1.0 | 0.2 | 3 | | | X | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 80 | 0.7 | 0.2 | 2 | | | X | |
| | RUDI2 | *Rubus discolor* | 60 | 0.3 | 0.2 | 1 | | | | X |
| | SALA6 | *Salix lasiolepis* | 40 | 0.4 | 0.2 | 2 | | | | |
| | CEOCO | *Cercis occidentalis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | CABA4 | *Carex barbarae* | 60 | 1.1 | 0.2 | 5 | | | | |
| | CHJU | *Chondrilla juncea* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERFOH | *Erigeron foliosus* var. *hartwegii* | 40 | 0.1 | 0.2 | 0.2 | | | | |

## *Salix lasiolepis* Shrubland Alliance
## Arroyo Willow Shrubland Alliance

As defined in the state, *Salix lasiolepis* dominates the shrub or low tree canopy alone or with *Baccharis pilularis*, *B. salicifolia*, *Rosa californica*, *Rubus ursinus*, *R. discolor*, *Cephalanthus occidentalis*, *Cornus sericea*, *Populus balsamifera*, *P. fremontii*, *Salix* spp., and *Sambucus nigra* subsp. *canadensis*. Stands occur in riparian areas, typically along creeks and rivers. Plants generally resprout as tall shrubs from recurring flood activity.

As described below, one association of the Arroyo Willow Alliance was classified in the study area. One stand (SNNR0705) showed additional variation with high cover of *Typha latifolia* and scattered arroyo willow. This stand was only classified to the alliance level only.

### *Salix lasiolepis* / *Rubus* spp. Association
### Arroyo Willow / Blackberry Association

**SUMMARY**
In the stands sampled, the overstory shrub canopy was open to intermittent and dominated by *Salix lasiolepis* at 40-45% cover. Other shrubs such as *Baccharis pilularis*, *Rosa californica*, and *Rubus discolor* were often present. *Quercus wislizeni* often occurred as a scattered emergent tree. The herbaceous layer was open to intermittent and often included *Juncus effusus* and *Panicum acuminatum*.

This association was sampled infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on metamorphic or sedimentary substrates. They occupied upper slopes that were flat to gentle along riparian corridors, stream terraces, or lake edges.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Placer County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 75.7 | 67-85 | - |
| Herb | 19.7 | 4-45 | variable |
| Shrub | 34.7 | 6-63 | 1-5 |
| Low Tree/Tall Shrub | 15 | 0-45 | 5-10 |
| Hardwood | 23 | 6-40 | <5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 37.3 | 28-43 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (1), Flat (1)
Macrotopography: upper slope (1)
Microtopography: undulating (2), concave (1)

Parent Material: metamorphic (2), sedimentary (1)
Soil Texture: muck (1), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 973 ft. | 630-1415 ft. |
| Slope | 1.3º | 0-3º |
| Large rock cover | 0.1% | 0-0.2% |
| Small rock cover | 0.1% | 0-0.2% |
| Bare ground cover | 15% | 10-20% |
| Litter cover | 65% | 42-88% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0704, SNNR0620 **Relevés:** SNFN0143

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon the data collected for this project. Potter (2005) defines a *S*. *lasiolepis* / *Artemisia douglasiana* Association from the Sierra Nevada between 2500 and 7100 ft. elevation. This current association can also be compared to the *S*. *lasiolepis* Great Valley Association defined for the Sacramento-San Joaquin River Delta project (Hickson and Keeler-Wolf 2007). Apparently, *S*. *lasiolepis* Alliance stands are relatively rare in the Sierra Nevada Foothills compared to other adjacent areas.

**STAND TABLE**
***Salix lasiolepis* / *Rubus* spp. Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUWI2-T | *Quercus wislizeni* | 67 | 0.7 | 1 | 1 | | | | |
| | ALRH2-M | *Alnus rhombifolia* | 33 | 1.7 | 5 | 5 | | | | |
| | POFR2-M | *Populus fremontii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SALA3-T | *Salix laevigata* | 33 | 1.7 | 5 | 5 | | | | |
| | QULO-T | *Quercus lobata* | 33 | 0.7 | 2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | SALA6 | *Salix lasiolepis* | 100 | 41.7 | 40 | 45 | X | | X | |
| | RUDI2 | *Rubus discolor* | 100 | 20.3 | 6 | 35 | | | X | X |
| | BAPI | *Baccharis pilularis* | 67 | 1.1 | 0.2 | 3 | | | | |
| | ROCA2 | *Rosa californica* | 67 | 0.4 | 0.2 | 1 | | | | |
| | CYSC4 | *Cytisus scoparius* | 33 | 0.3 | 1 | 1 | | | | X |
| | VICA5 | *Vitis californica* | 33 | 0.1 | 0.4 | 0.4 | | | | |
| | PTCR3 | *Ptelea crenulata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SAEX | *Salix exigua* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | JUEF | *Juncus effusus* | 67 | 1.0 | 1 | 2 | | | | |
| | PAAC5 | *Panicum acuminatum* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | ELPA | *Eleocharis pachycarpa* | 33 | 10.0 | 30 | 30 | | | | X |
| | TYLA | *Typha latifolia* | 33 | 1.7 | 5 | 5 | | | | |
| | CANU5 | *Carex nudata* | 33 | 0.7 | 2 | 2 | | | | |
| | HYPE | *Hypericum perforatum* | 33 | 0.7 | 2 | 2 | | | | X |
| | MEAR4 | *Mentha arvensis* | 33 | 0.7 | 2 | 2 | | | | |
| | PADI3 | *Paspalum dilatatum* | 33 | 0.7 | 2 | 2 | | | | X |
| | POPU5 | *Polygonum punctatum* | 33 | 0.7 | 2 | 2 | | | | |
| | WOFI | *Woodwardia fimbriata* | 33 | 0.3 | 1 | 1 | | | | |
| | ANVI2 | *Andropogon virginicus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | APIAXX | Apiaceae | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ARDO3 | *Artemisia douglasiana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CAREX | *Carex* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | DAGL2 | *Datisca glomerata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | EPILO | *Epilobium* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | EQLA | *Equisetum laevigatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | EUOC4 | *Euthamia occidentalis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HYCO3 | *Hypericum concinnum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PLANT | *Plantago* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SEEU | *Senecio eurycephalus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TOAR | *Torilis arvensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TYPHA | *Typha* | 33 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**

***Salix lasiolepis* / *Rubus* spp. Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | VIMA | *Vinca major* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOHA | *Sorghum halepense* | 33 | 0.7 | 2 | 2 | | | | X |
| | CHPO3 | *Chlorogalum pomeridianum* | 33 | 0.3 | 1 | 1 | | | | |
| | EPCI | *Epilobium ciliatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HIIN3 | *Hirschfeldia incana* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOPU3 | *Lotus purshianus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SESP5 | *Setaria sphacelata* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | VETH | *Verbascum thapsus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |

### *Tamarix* sp. Shrubland Semi-Natural Stands
### Tamarisk Shrubland Semi-Natural Stands

As defined in the state, the invasive, non-native *Tamarix* is dominant in the shrub layer, often forming pure stands along rivers, creeks, and reservoir banks.

One stand of the Tamarisk Alliance was sampled in the study area and was dominated by *Tamarix parviflora*. Other than emergent, low cover of *Quercus lobata*, this stand supported non-native species - including low cover of *Catalpa bignonioides* and *Rubus discolor* in a continuous shrub layer and sparse cover of *Bromus diandrus* and *Geranium dissectum* in the herbaceous layer.

---

### *Tamarix* spp. Shrubland Semi-Natural Stands (no Associations defined)
### Shrub Tamarisk Shrubland Semi-Natural Stands

**SUMMARY**

In the one stand sampled, the overstory shrub canopy was dominated by *Tamarix parviflora* at 75% cover. *Rubus discolor* was also present in the shrub layer. Trees such as *Catalpa bignonioides* and *Quercus lobata* occurred as scattered emergents. The herbaceous layer was open, with *Bromus diandrus* and *Geranium dissectum* present.

This semi-natural type was sampled infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). The stand occurred on metamorphic substrates. It occupied a gentle lower slope above a river.

**DISTRIBUTION IN STUDY AREA**

This type was sampled in Placer County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 85 | 85-85 | - |
| Herb | 3 | 3-3 | <0.3 |
| Shrub | 90 | 90-90 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 5 | 5-5 | 10-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 96.8 | 97-97 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NE (1)
Macrotopography: lower slope (1)
Microtopography: undulating (1)
Parent Material: metamorphic (1)
Soil Texture: clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1285 ft. | 1285-1285 ft. |
| Slope | 0º | -º |
| Large rock cover | 0% | -% |
| Small rock cover | 5% | 5-5% |
| Bare ground cover | 5% | 5-5% |
| Litter cover | 87% | 87-87% |

**SAMPLES USED TO DESCRIBE ALLIANCE** (n=1)

**Rapid Assessments:** SNNR0722 **Relevés:** none

**Rank:** Unranked, non-native type

**GLOBAL DISTRIBUTION**
This semi-natural stands type has been described for the Sierra Nevada and a number of other moderate to low elevation areas in central and southern California (including the deserts). Currently, it is not as much of an invasive problem in the Sierra Nevada Foothills as in many other parts of the state.

**STAND TABLE**
***Tamarix* spp. Shrubland Semi-Natural Stands**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-T | *Quercus lobata* | 100 | 3.0 | 3 | 3 | X | | X | |
| | CABI8 | *Catalpa bignonioides* | 100 | 2.0 | 2 | 2 | | X | X | X |
| **Shrub** | | | | | | | | | | |
| | TAPA4 | *Tamarix parviflora* | 100 | 75.0 | 75 | 75 | X | | X | X |
| | RUDI2 | *Rubus discolor* | 100 | 10.0 | 10 | 10 | | | X | X |
| **Herb** | | | | | | | | | | |
| | BRDI3 | *Bromus diandrus* | 100 | 2.0 | 2 | 2 | X | | X | X |
| | GEDI | *Geranium dissectum* | 100 | 1.0 | 1 | 1 | | X | X | X |

### *Toxicodendron diversilobum* Shrubland Alliance

### Poison oak Shrubland Alliance

As defined in the state, *Toxicodendron diversilobum* is dominant or co-dominant in the shrub canopy, where stands have been sampled from southern to northern California. Other shrubs may include *Artemisia californica*, *Diplacus* (=*Mimulus*) *aurantiacus*, *Heteromeles arbutifolia*, *Keckiella cordifolia*, *Malosma laurina*, *Salvia leucophylla*, *S*. *mellifera*, and *Sambucus nigra* subsp. *canadensis*. Emergent *Juglans californica*, *Quercus agrifolia*, or *Q*. *douglasii* trees may be present. Herbs may include *Bromus hordeaceus*, *B*. *diandrus*, and *Leymus condensatus*. The shrub canopy is intermittent to continuous and two-tiered. The herbaceous layer is variable. While sampling this alliance must be done with caution, it has been sampled in a variety of settings in California, from the immediate coastline to the Foothills. Some coastal stands are nearly pure, persistent, and have relatively low diversity. However, some stands are likely to be a consequence of past and frequent fire disturbance, and may have a high diversity of native herbs and emergent trees.

As described below, one association of the Poison Oak Alliance was classified in the study area. While there was variability in the herbaceous understory, stands were classified broadly into one association, even though past sampling (Evens et al. 2004) denoted a couple of associations in the foothills of Tuolumne Co.

---

### *Toxicodendron diversilobum* / Herbaceous Association

### Poison-Oak / Herbaceous Association

**SUMMARY**
In the stands sampled, the overstory shrub canopy was open to continuous and dominated solely by *Toxicodendron diversilobum* at 7-76% cover. *Rhamnus ilicifolia* was occasionally present with sparse cover. The herbaceous layer was open to continuous and often included *Bromus diandrus*, *Bromus madritensis*, *Daucus pusillus*, *Dichelostemma volubile*, and *Torilis arvensis*.

In the study area, this association was sampled frequently in the central Sierra Nevada Foothills, occasionally in the northern Sierra Nevada Foothills, and infrequently in the Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including mixed metamorphic serpentine and slate), sometimes on sedimentary, and rarely on ultramafic, volcanic, or mixed rock substrates. They occupied a variety of slope positions from lower to upper slopes and ridgetops (most frequently on middle to upper slopes) that were moderate to abrupt. Stands commonly appeared to be the result of removing overstory oak trees and often persisted in more rocky areas of northerly facing slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Butte, El Dorado, Mariposa, Placer, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 72.2 | 15-95 | - |

| | | | |
|---|---|---|---|
| Herb | 46.1 | 4-80 | variable |
| Shrub | 37.3 | 8-76 | <5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.8 | 0-5 | <5-10 |
| Conifer | 0.1 | 0-1 | <5-20 |
| Relative non-native to native cover | 51.2 | 5-87 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NE (7), N (6), W (5), Variable (3), SE (3), NW (3), E (2), SW (1), S (1)
Macrotopography: entire slope (4), lower slope (2), lower to middle slope (2), lower to upper slope (1), middle slope (10), upper slope (10), ridgetop (2)
Microtopography: convex (14), undulating (9), flat (8)
Parent Material: metamorphic (13), sedimentary (7), slate (3), ultramafic (3), volcanic (2), mixed metamorphic (1), mixed rock (1), serpentine (1)
Soil Texture: loam or sandy loam (10), silt or silt loam (9), clay or clay loam (5), sand (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1153 ft. | 500-2240 ft. |
| Slope | 22.7º | 9-75º |
| Large rock cover | 13.8% | 0-75% |
| Small rock cover | 2.8% | <1-13% |
| Bare ground cover | 19.7% | <1-45% |
| Litter cover | 60.1% | 8-92% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=31)

**Rapid Assessments:** SNNR0020, SNNR0259, SNNR0410, SNNR0664, SNNR0768, SNNR0865, SNNR0956, SNNR1019, SNNR1023, SNNR1050, SNNR1085, SNNR1108, SNNR1204, SNNR1405, SNNR1419, SNNR1429, SNNR1436, SNNR1448, SNNR1452, SNNR1453, SNNR1460, SNNR1482 **Relevés:** SNFN0192, SNFN0610, SNFN0617, SNFN0638, SNFN0647, SNFN0651, SNFN0660, SNFN0674, SNFN0675

**Rank:** G4S4

**GLOBAL DISTRIBUTION**
This association has been described for the Sierra Nevada Foothills based solely upon the data collected for this project. Other stands of this alliance have been defined from the outer coast ranges in Marin and San Mateo Counties (NatureServe et al. 2003a), the Santa Monica Mountains (Keeler-Wolf and Evens 2006), and elsewhere in the state (Sawyer et al. 2007 MS).

**STAND TABLE**

***Toxicodendron diversilobum* / Herbaceous**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 100 | 35.3 | 7 | 76 | X | | X | |
| | RHIL | *Rhamnus ilicifolia* | 29 | 0.1 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 94 | 22.4 | 0.2 | 60 | | X | X | X |
| | BRDI3 | *Bromus diandrus* | 68 | 2.6 | 0.2 | 13 | | | | X |
| | TOAR | *Torilis arvensis* | 65 | 2.0 | 0.2 | 12 | | | | X |
| | DAPU3 | *Daucus pusillus* | 65 | 1.2 | 0.2 | 6 | | | | |
| | BRMA3 | *Bromus madritensis* | 58 | 2.4 | 0.2 | 15 | | | | X |
| | DIVO | *Dichelostemma volubile* | 52 | 0.1 | 0.2 | 1 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 48 | 1.7 | 0.2 | 13 | | | | X |
| | VIVI | *Vicia villosa* | 45 | 7.0 | 0.2 | 60 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 45 | 0.1 | 0.2 | 1 | | | | |
| | CEME2 | *Centaurea melitensis* | 39 | 1.7 | 0.2 | 20 | | | | X |
| | MAGR3 | *Madia gracilis* | 39 | 1.3 | 0.2 | 12 | | | | |
| | AICA | *Aira caryophyllea* | 39 | 0.3 | 0.2 | 5 | | | | X |
| | BRMI2 | *Briza minor* | 39 | 0.1 | 0.2 | 1 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 35 | 1.3 | 0.2 | 20 | | | | X |
| | MICAC2 | *Micropus californicus* var. *californicus* | 35 | 1.1 | 0.2 | 15 | | | | |
| | AVBA | *Avena barbata* | 35 | 0.7 | 0.2 | 18 | | | | X |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 35 | 0.3 | 0.2 | 6 | | | | |
| | AVFA | *Avena fatua* | 32 | 3.7 | 0.2 | 35 | | | | X |
| | GEDI | *Geranium dissectum* | 32 | 0.4 | 0.2 | 5 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 32 | 0.2 | 0.2 | 3 | | | | |
| | VUMY | *Vulpia myuros* | 29 | 0.3 | 0.2 | 5 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRLA16 | *Triteleia laxa* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 26 | 0.1 | 0.2 | 1 | | | | X |
| | GAPO | *Galium porrigens* | 26 | 0.1 | 0.2 | 0.2 | | | | |

Stands of the *Layia fremontii - Lasthenia californica - Achyrachaena mollis* Herbaceous Association (in flower) interspersed with the *Vulpia microstachys - Plantago erecta* - (*Calycadenia truncata - Calycadenia multiglandulosa*) Herbaceous Association (green, non-flowery) on Tuscan soils northeast of Chico, Butte County, California.

### *Avena* (*barbata*, *fatua*) Herbaceous Semi-Natural Stands
### Oat (Slender, Wild) Herbaceous Semi-Natural Stands

As defined in the state, *Avena barbata* and/or *Avena fatua* strongly dominate(s) (> 90% relative cover) in the herbaceous layer with intermittent to continuous cover. Other non-native or native species may be present, but with low overall cover. General references for an *Avena barbata*/*A*. *fatua* Herbaceous Alliance include studies from the Point Reyes National Seashore area in Marin County (NatureServe et al. 2003a), Coyote Ridge in Santa Clara County (Evens and San 2004), and the Santa Monica Mountains in southern California (Keeler-Wolf and Evens 2006), where *Avena* is an indicator and strong dominant. Previous to these studies, the "California Annual Grassland" Series (Sawyer and Keeler-Wolf 1995) was used as a generic term to include this and other upland herbaceous alliances; however, state ecologists are beginning to define this type because of its distribution and clear establishment over the past 100 years. It potentially occurs across cismontane California on sedimentary and igneous parent materials at elevations below 5000 ft., especially where agriculture, hay, and cattle grazing have been introduced (Evens and San 2004).

In the study area, stands usually contain *Bromus hordeaceus* and other non-native grasses such as *Vulpia* spp. at low cover. Native and non-native forbs in the genera of *Clarkia*, *Trifolium*, *Dichelostemma*, *Galium*, and *Plagiobothrys* may occur in these stands as well. One association was classified for the Oat (Slender, Wild) Alliance and is described below. This semi-natural type is closely related to the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Semi-Natural Stands type. Further research and analysis may show them to be better described as a single alliance characterized by a combination of both *Avena* and *B*. *hordeaceus*. The distinguishing features of both are that they contain little cover of any diagnostic native herbaceous annual species and are thus distinguished by the overwhelming presence of these non-native taxa.

---

### *Avena barbata* - *Bromus hordeaceus* Herbaceous Association (Provisional)
### Slender Oat - Soft Chess Herbaceous Association (Provisional)

#### SUMMARY
In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Avena barbata* at 25-65% cover. *Bromus hordeaceus* (6-10% cover) and *Galium parisiense* (<1-3% cover) were consistently present, while *Bromus madritensis*, *Clarkia purpurea*, *Eremocarpus setigerus*, *Filago gallica*, *Galium murale*, *Lactuca serriola*, *Lupinus nanus*, *Plagiobothrys fulvus*, and *Trifolium microcephalum* were often present.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands occurred on either basalt or metamorphic substrates. They occupied upland slope positions from bottom to upper slope, that were flat to somewhat steep.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte, Calaveras, and Madera Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 54.3 | 35-82 | - |
| Herb | 54.3 | 35-82 | >0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 88.7 | 67-99 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (1), Variable (1), S (1), Flat (1)
Macrotopography: bottom (2), bottom to upper slope (1), middle slope (1)
Microtopography: undulating (2), flat (1), convex (1)
Parent Material: basalt (2), metamorphic (2)
Soil Texture: loam or sandy loam (2), clay or clay loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 601 ft. | 267-1309 ft. |
| Slope | 6.3º | 0-18º |
| Large rock cover | 0.3% | 0-1% |
| Small rock cover | 1.8% | 0.2-3% |
| Bare ground cover | 15% | 5-33% |
| Litter cover | 78.3% | 62-89% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=4)

**Rapid Assessments:** SNNR0046, SNNR0889 **Relevés:** SNFN0195, SNFN0197

**Rank:** Unranked, non-native type

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on the upland grassland data from this study and from uplands associated with vernal pools in southern California (Kopecko and Lathrop 1975). Similar stands have been described from the Santa Monica Mountains (Keeler-Wolf and Evens 2006).

**STAND TABLE**

***Avena barbata* - *Bromus hordeaceus* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **AVBA** | ***Avena barbata*** | **100** | **40.8** | **25** | **65** | **X** | | **X** | **X** |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **7.8** | **6** | **10** | | | **X** | **X** |
| | GAPA5 | *Galium parisiense* | 100 | 1.1 | 0.2 | 3 | | | X | X |
| | ERSE3 | *Eremocarpus setigerus* | 75 | 0.4 | 0.2 | 1 | | | | |
| | LASE | *Lactuca serriola* | 75 | 0.2 | 0.2 | 0.2 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 50 | 0.8 | 1 | 2 | | | | |
| | FIGA | *Filago gallica* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | GAMU4 | *Galium murale* | 50 | 0.3 | 0.2 | 1 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 50 | 0.3 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LUNA3 | *Lupinus nanus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PLFU | *Plagiobothrys fulvus* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 25 | 2.0 | 8 | 8 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 25 | 1.3 | 5 | 5 | | | | X |
| | CLGR | *Clarkia gracilis* | 25 | 1.3 | 5 | 5 | | | | |
| | TRHI4 | *Trifolium hirtum* | 25 | 0.8 | 3 | 3 | | | | X |
| | AICA | *Aira caryophyllea* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | AMME | *Amsinckia menziesii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRODI | *Brodiaea* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRMI3 | *Brodiaea minor* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CALU9 | *Calochortus luteus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CAAT25 | *Castilleja attenuata* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CESO3 | *Centaurea solstitialis* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CHAN2 | *Chlorogalum angustifolium* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DOCLP | *Dodecatheon clevelandii* subsp. *patulum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | EPTO4 | *Epilobium torreyi* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERBO | *Erodium botrys* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | ESLO | *Eschscholzia lobbii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HYRA3 | *Hypochaeris radicata* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | MICAC2 | *Micropus californicus* var. *californicus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SCCA2 | *Scrophularia californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | SIMA3 | *Silybum marianum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | VICIA | *Vicia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | VIVI | *Vicia villosa* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | VUBR | *Vulpia bromoides* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 2.5 | 10 | 10 | | | | |

## *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands
## Brome (Ripgut, Soft Chess, Foxtail) Herbaceous Semi-Natural Stands

As defined in the state, *Bromus hordeaceus* and/or *B. diandrus* is/are usually strongly dominant in this generic upland grassland semi-natural type; however, some stands may contain other non-native and native species that may sometimes co-dominate. Non-native species typically predominate (at > 90% of relative cover) when natives are present. Annual bromes are now considered "resident annuals" and permanent members of the broader category of "California Annual Grassland." This type tends to be depauperate of species with low native herb cover. The associations in this type are coarser-level than others in this report. This underscores the shifting composition of relatively non-diagnostic alien and native species in associations of this semi-natural stands type. Further analysis with full species lists from field surveys, over a period of several seasons and years in permanent plots, are needed to understand the relationships between the component vegetation associations of this type and other similar associations in the *Avena* (*barbata*, *fatua*) Semi-Natural Stands type.

In the study area, stands often contain other non-native forbs and grasses such as *Trifolium hirtum*, *T. dubium*, *Erodium botrys*, *Bromus diandrus*, and *Hypochaeris glabra*. Occasionally, native herbs occur, including *Brodiaea elegans* subsp. *elegans*, *Castilleja attenuata*, *Plagiobothrys fulvus*, *Lotus micranthus*, *Lupinus nanus*, *L. bicolor*, and *Trifolium microcephalum*. One sub-alliance and four associations have been described below for this alliance.

### *Brachypodium distachyon - Bromus diandrus* / (*Quercus douglasii*) Sub-Alliance
### Purple False Brome - Ripgut Brome / (Blue Oak) Sub-Alliance

**SUMMARY**
In the stands sampled, the herbaceous canopy was intermittent to continuous and characterized by *Bromus hordeaceus* with *Brachypodium distachyon* (<1-65% cover) and/or *Bromus diandrus* (<1-60% cover). *B. distachyon* and/or *B. diandrus* occurred in > 97% of samples, where one or both species was/were dominant or co-dominant. *Avena barbata*, *Carduus pycnocephalus*, *Trifolium hirtum*, and *Vicia villosa* were often present in the herbaceous layer. *Quercus douglasii* often occurred as a scattered emergent tree, and *Toxicodendron diversilobum* sometimes occurred as an emergent shrub. Some stands were recovering from recent fire disturbance and had snags and burned oak trees that recover more slowly from fire than the non-native grass species.

This group of related associations was sampled frequently in the study area within the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic (including greenstone) substrates, but were also found occasionally on granitic, volcanic, sedimentary (including limestone), serpentine and other ultramafic substrates. They occupied a variety of upland slope positions from bottom to ridgetop (most commonly middle and upper slopes) that varied from gentle to steep.

**DISTRIBUTION IN STUDY AREA**
This group of related associations was sampled within Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, Tuolumne and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsection(s) (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 69.3 | 35-95 | - |
| Herb | 68.7 | 35-95 | variable |
| Shrub | 1.5 | 0-16 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.2 | 0-6 | 5-20 |
| Conifer | 0 | 0-1 | 5-20 |
| Relative non-native to native cover | 92.2 | 68-100 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (12), W (6), Variable (6), S (6), SE (5), NW (2), E (1)
Macrotopography: entire slope (2), bottom (1), lower slope (4), lower to middle slope (3), lower to upper slope (1), middle slope (10), middle to upper slope (2), upper slope (11), ridgetop (4)
Microtopography: undulating (22), flat (9), convex (7)
Parent Material: metamorphic (27), granitic (2), serpentine (2), ultramafic (2), volcanic (2), greenstone (1), limestone (1), sedimentary (1)
Soil Texture: silt or silt loam (15), clay or clay loam (10), loam or sandy loam (10)

| | Mean | Range |
|---|---|---|
| Elevation | 1142 ft. | 316-2029 ft. |
| Slope | 14.6º | 1-37º |
| Large rock cover | 3.3% | 0-20% |
| Small rock cover | 4.1% | 0-20% |
| Bare ground cover | 14.8% | 1-36% |
| Litter cover | 74.6% | 45-97% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=38)

**Rapid Assessments:** SNNR0066, SNNR0233, SNNR0663, SNNR0677, SNNR0927, SNNR0961, SNNR0983, SNNR0997, SNNR1060, SNNR1065, SNNR1183, SNNR1219, SNNR1292, SNNR1295, SNNR1299, SNNR1393, SNNR1396, SNNR1409, SNNR1412, SNNR1449, SNNR1457, SNNR1475, SNNR1479, SNNR1604, SNNR1608, SNNR1610, SNNR1620 **Relevés:** SNFN0025, SNFN0387, SNFN0611, SNFN0614, SNFN0615, SNFN0619, SNFN0620, SNFN0621, SNFN0623, SNFN0633, SNFN0644

**Rank:** Unranked, non-native type. Likely with multiple associations

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based on data collected and analyzed for this project and for a previous project in Peoria Wildlife Area, Tuolumne County (Evens et al. 2004). The study in Peoria Wildlife Area recognized a *Brachypodium distachyon* Herbaceous Alliance and a *Brachypodium distachyon - Centaurea* spp. Herbaceous Association. A similar association, *Brachypodium distachyon* Herbaceous Association, was defined in Point Reyes National Seashore (NatureServe et al. 2003a).

**STAND TABLE**

***Brachypodium distachyon - Bromus diandrus* / (*Quercus douglasii*) *Sub*-Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | **QUDO-T** | ***Quercus douglasii*** | **53** | **1.0** | **0.2** | **6** | | | | |
| **Shrub** | | | | | | | | | | |
| | TODI | *Toxicodendron diversilobum* | 26 | 0.7 | 0.2 | 12 | | | | |
| **Herb** | | | | | | | | | | |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **18.4** | **0.2** | **68** | | | **X** | **X** |
| | TRHI4 | *Trifolium hirtum* | 74 | 3.2 | 0.2 | 30 | | | | X |
| | **BRDI3** | ***Bromus diandrus*** | **71** | **10.4** | **0.2** | **60** | | | | **X** |
| | AVBA | *Avena barbata* | 61 | 4.4 | 0.2 | 25 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 61 | 2.9 | 0.2 | 20 | | | | X |
| | VIVI | *Vicia villosa* | 50 | 10.6 | 0.2 | 75 | | | | X |
| | **BRDI2** | ***Brachypodium distachyon*** | **47** | **12.9** | **0.2** | **65** | | | | **X** |
| | LOMU | *Lolium multiflorum* | 45 | 4.6 | 0.2 | 45 | | | | X |
| | AVFA | *Avena fatua* | 45 | 3.9 | 0.2 | 25 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 42 | 0.1 | 0.2 | 1 | | | | |
| | CEME2 | *Centaurea melitensis* | 39 | 2.4 | 0.2 | 20 | | | | X |
| | TOAR | *Torilis arvensis* | 39 | 0.7 | 0.2 | 10 | | | | X |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 39 | 0.2 | 0.2 | 4 | | | | |
| | ERBO | *Erodium botrys* | 37 | 0.7 | 0.2 | 15 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 37 | 0.7 | 0.2 | 10 | | | | X |
| | GAPA5 | *Galium parisiense* | 37 | 0.3 | 0.2 | 5 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 29 | 0.3 | 0.2 | 5 | | | | |
| | DAPU3 | *Daucus pusillus* | 29 | 0.2 | 0.2 | 4 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 26 | 3.3 | 0.2 | 40 | | | | X |
| | BRMA3 | *Bromus madritensis* | 26 | 0.5 | 0.2 | 5 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 21 | 0.3 | 0.2 | 10 | | | | |
| | MAGR3 | *Madia gracilis* | 21 | 0.2 | 0.2 | 3 | | | | |

***Bromus hordeaceus* - *Erodium botrys* - *Plagiobothrys fulvus* Herbaceous Association**
**Soft Chess - Filaree - Fulvous Popcornflower Herbaceous Association**

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous and characterized by *Bromus hordeaceus* (<1-40% cover), *Erodium botrys* (<1-30% cover), *Hypochaeris glabra* (<1-17% cover), *Plagiobothrys fulvus* (<1-5% cover), and *Trifolium hirtum* (<1-25% cover). Other taxa that were often present included non-natives *Aira caryophyllea*, *Eschscholzia lobbii*, and *Taeniatherum caput-medusae*.

This association was sampled infrequently in the study area within the central and northern Sierra Nevada Foothills, and occasionally in the Cascade Range Foothills Subregions (Hickman 1993). Stands often occurred on igneous substrates (including basalt and other volcanic), occasionally on metamorphic substrates, and infrequently on sedimentary substrates. They occupied a variety of upland slope positions from bottom to ridgetop, on slopes that were flat to moderate.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, El Dorado, Mariposa, Placer, Shasta, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Northern Eastside Terraces (262Ab), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 54.4 | 27-73 | - |
| Herb | 54.4 | 27-73 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | 0-0.2 | 5-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 87.1 | 35-99 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (4), Variable (2), W (1), SW (1), NW (1), NE (1), E (1)
Macrotopography: bottom (2), lower slope (2), lower to middle slope (1), lower to upper slope (1), middle slope (2), upper slope (1), mesa/plateau (1), ridgetop (1)
Microtopography: flat (5), undulating (4), concave (1), convex (1)
Parent Material: volcanic (4), metamorphic (3), basalt (2), igneous (1), sedimentary (1)
Soil Texture: clay or clay loam (5), loam or sandy loam (3), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 815 ft. | 282-1547 ft. |
| Slope | 2.8º | 0-14º |
| Large rock cover | 1.5% | 0-14.2% |
| Small rock cover | 5% | 0.2-20.2% |
| Bare ground cover | 29.4% | 0.2-57% |
| Litter cover | 61.7% | 28-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)

**Rapid Assessments:** SNNR0001, SNNR0818, SNNR0972, SNNR1093, SNNR1114 **Relevés:** SNFN0057, SNFN0079, SNFN0110, SNFN0339, SNFN0352, SNFN0429

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based on the data collected for this project. Similar stands have been described for other areas of the state with *B. hordeaceus* and *Erodium botrys* (Schlising and Sanders 1982, Jimerson et al. 2000, Keeler-Wolf and Evens 2006).

**STAND TABLE**

***Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **17.4** | **0.2** | **40** | | | **X** | **X** |
| | **ERBO** | ***Erodium botrys*** | **91** | **10.1** | **0.2** | **30** | | | **X** | **X** |
| | HYGL2 | *Hypochaeris glabra* | 91 | 4.8 | 0.2 | 17 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 82 | 4.3 | 0.2 | 25 | | | X | X |
| | **PLFU** | ***Plagiobothrys fulvus*** | **82** | **0.9** | **0.2** | **5** | | | **X** | |
| | TACA8 | *Taeniatherum caput-medusae* | 73 | 6.7 | 0.2 | 30 | | | | X |
| | AICA | *Aira caryophyllea* | 64 | 0.7 | 0.2 | 4 | | | | X |
| | ESLO | *Eschscholzia lobbii* | 55 | 1.0 | 0.2 | 10 | | | | |
| | AVBA | *Avena barbata* | 45 | 1.1 | 0.2 | 7 | | | | X |
| | TRDU2 | *Trifolium dubium* | 45 | 1.0 | 1 | 4 | | | | X |
| | LUBI | *Lupinus bicolor* | 45 | 0.1 | 0.2 | 0.2 | | | | |
| | BRDI3 | *Bromus diandrus* | 36 | 0.5 | 0.2 | 3 | | | | X |
| | LOMU | *Lolium multiflorum* | 36 | 0.4 | 0.2 | 4 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 36 | 0.2 | 0.2 | 2 | | | | |
| | BRMI2 | *Briza minor* | 36 | 0.1 | 0.2 | 1 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 36 | 0.1 | 0.2 | 1 | | | | |
| | SHAR2 | *Sherardia arvensis* | 36 | 0.1 | 0.2 | 1 | | | | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | HERBAC | unknown | 27 | 0.3 | 0.2 | 3.4 | | | | |
| | HOMA2 | *Hordeum marinum* | 27 | 0.2 | 0.2 | 2 | | | | X |
| | VUBR | *Vulpia bromoides* | 27 | 0.2 | 0.2 | 2 | | | | X |
| | PLER3 | *Plantago erecta* | 27 | 0.1 | 0.2 | 1 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | LOCA5 | *Lomatium caruifolium* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | PLNO | *Plagiobothrys nothofulvus* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | TRDE | *Trifolium depauperatum* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 27 | 2.3 | 0.2 | 15 | | | | |

***Bromus hordeaceus* - *Leontodon taraxacoides* Herbaceous Association**

**Soft Chess - Lesser Hawkbit Herbaceous Association**

**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous, with the consistent presence of *Bromus hordeaceus* at <1-45% cover and *Leontodon taraxacoides* at 1-28% cover. Other taxa that were characteristically present included non-natives *Aira caryophyllea*, *Briza minor*, *Erodium botrys*, *Hypochaeris glabra*, *Trifolium dubium*, and *Trifolium hirtum*.

In the study area, this association was sampled somewhat frequently in the northern Sierra Nevada Foothills and frequently in the Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates and sometimes on sedimentary substrates. They occupied a variety of upland slope positions, from bottom to upper slopes, that were flat to steep surfaces.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Calaveras, and Sacramento Counties, within the Camanche Terraces (262Ao) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63 | 25-90 | - |
| Herb | 63 | 25-90 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-1 | 5-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 83.2 | 52-100 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: W (5), S (4), SW (3), E (3), Variable (2), N (2), SE (1), Flat (1)
Macrotopography: bottom (1), bottom to lower slope (1), middle slope (1), upper slope (1)
Microtopography: concave (2), flat (2)
Parent Material: metamorphic (14), sedimentary (9)
Soil Texture: silt or silt loam (4)

| | Mean | Range |
|---|---|---|
| Elevation | 631 ft. | 365-751 ft. |
| Slope | 6.3º | 0-30º |
| Large rock cover | 0.3% | 0.2-0.4% |
| Small rock cover | 3.5% | 2-5% |
| Bare ground cover | 38% | 8-68% |
| Litter cover | 56.5% | 25-88% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=23)

**Rapid Assessments:** SNNR1049, SNNR1159 **Relevés:** SNFN0206, SNFN0412, SNFN0466, SNFN0477, SNFN0479, SNFN0483, SNFN0487, SNFN0491, SNFN0492, SNFN0494, SNFN0496, SNFN0497, SNFN0498, SNFN0499, SNFN0500, SNFN0501, SNFN0502, SNFN0504, SNFN0511, SNFN0514, SNFN0530

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills and appears largely restricted to the central Sierra Nevada Foothills. It is particularly well-represented due to the sampling efforts at Deer Creek Hills, Sacramento County.

**STAND TABLE**
***Bromus hordeaceus - Leontodon taraxacoides* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **15.0** | **0.2** | **45** | | | **X** | **X** |
| | **LETA** | ***Leontodon taraxacoides*** | **100** | **13.7** | **1** | **28** | | | **X** | **X** |
| | AICA | *Aira caryophyllea* | 96 | 0.5 | 0.2 | 5 | | | X | X |
| | ERBO | *Erodium botrys* | 91 | 2.7 | 0.2 | 9 | | | X | X |
| | TRDU2 | *Trifolium dubium* | 87 | 4.0 | 0.2 | 20 | | | X | X |
| | HYGL2 | *Hypochaeris glabra* | 87 | 3.0 | 0.2 | 20 | | | X | X |
| | BRMI2 | *Briza minor* | 87 | 0.3 | 0.2 | 1 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 83 | 5.1 | 0.2 | 35 | | | X | X |
| | TRMI4 | *Trifolium microcephalum* | 74 | 0.4 | 0.2 | 2 | | | | |
| | VUBR | *Vulpia bromoides* | 70 | 2.6 | 0.2 | 20 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 65 | 0.5 | 0.2 | 5 | | | | |
| | AVFA | *Avena fatua* | 61 | 1.6 | 0.2 | 10 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 57 | 0.8 | 0.2 | 10 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 52 | 3.8 | 0.2 | 20 | | | | X |
| | LOMU | *Lolium multiflorum* | 52 | 2.0 | 0.2 | 20 | | | | X |
| | JUBU | *Juncus bufonius* | 52 | 1.0 | 0.2 | 5 | | | | |
| | SIGA | *Silene gallica* | 52 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 48 | 0.7 | 0.2 | 12 | | | | |
| | FIGA | *Filago gallica* | 48 | 0.1 | 0.2 | 1 | | | | X |
| | GAPA5 | *Galium parisiense* | 48 | 0.1 | 0.2 | 0.2 | | | | X |
| | LYHY2 | *Lythrum hyssopifolia* | 43 | 0.7 | 0.2 | 10 | | | | X |
| | HOVIV | *Holocarpha virgata* subsp. *virgata* | 39 | 2.2 | 0.2 | 23 | | | | |
| | LOMI | *Lotus micranthus* | 39 | 0.1 | 0.2 | 1 | | | | |
| | TRVA | *Trifolium variegatum* | 39 | 0.1 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 35 | 0.3 | 0.2 | 4 | | | | X |
| | LOPU3 | *Lotus purshianus* | 35 | 0.2 | 0.2 | 3 | | | | |
| | HEFI | *Hemizonia fitchii* | 35 | 0.1 | 0.2 | 1 | | | | |
| | CEMU2 | *Centaurium muehlenbergii* | 35 | 0.1 | 0.2 | 1 | | | | |
| | DAPU3 | *Daucus pusillus* | 35 | 0.1 | 0.2 | 1 | | | | |
| | CYEC | *Cynosurus echinatus* | 30 | 1.8 | 0.2 | 40 | | | | X |
| | NATA3 | *Navarretia tagetina* | 30 | 1.0 | 0.2 | 15 | | | | |
| | TRLA4 | *Trichostema lanceolatum* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| | TRHY3 | *Triteleia hyacinthina* | 30 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**
***Bromus hordeaceus* - *Leontodon taraxacoides* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRDI2 | *Brachypodium distachyon* | 26 | 3.5 | 1 | 25 | | | | X |
| | BRDI3 | *Bromus diandrus* | 26 | 0.7 | 0.2 | 12 | | | | X |
| | MEPO3 | *Medicago polymorpha* | 26 | 0.3 | 0.2 | 3 | | | | X |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 26 | 0.2 | 0.2 | 2 | | | | |
| | CALU9 | *Calochortus luteus* | 26 | 0.1 | 0.2 | 1 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 26 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRST2 | *Bromus sterilis* | 22 | 0.4 | 0.2 | 8 | | | | X |
| | HOMAG | *Hordeum marinum* subsp. *gussonianum* | 22 | 0.4 | 0.2 | 4 | | | | X |
| | VUMI | *Vulpia microstachys* | 22 | 0.1 | 0.2 | 2 | | | | |
| | TRCI | *Trifolium ciliolatum* | 22 | 0.1 | 0.2 | 1 | | | | |
| | ANAR | *Anagallis arvensis* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | LIBI | *Linanthus bicolor* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 52 | 1.0 | 0.2 | 12 | | | | |

***Bromus hordeaceus* - *Lupinus nanus* - *Trifolium* spp. Herbaceous Association (Provisional)**

**Soft Chess - Sky Lupine - Clover Herbaceous Association (Provisional)**


**SUMMARY**

In the stands sampled, the herbaceous canopy was intermittent to continuous and characterized by *Trifolium hirtum* at <1-55% cover and *Hypochaeris glabra* at <1-30% cover. Other dominant plants included *Lupinus* species: *Lupinus nanus* and *Lupinus bicolor* at up to 76% and 21% cover, respectively. Other species of *Trifolium* often present include *Trifolium dubium* and *Trifolium microcephalum*. Other taxa that were often present included *Aira caryophyllea*, *Bromus hordeaceus*, *Castilleja attenuata*, *Erodium botrys*, *Lotus micranthus*, *Lupinus nanus*, and *Triphysaria eriantha* subsp. *eriantha*.

This association was sampled infrequently in the study area within the central and northern Sierra Nevada Foothills and Sacramento Valley Subregions (Hickman 1993). Stands sometimes occurred on metamorphic (including slate and serpentine) and volcanic (including rhyolite) substrates and infrequently on granitic or sedimentary substrates. They occupied a variety of upland slope positions from bottoms to upper slopes and ridgetops. Slopes were flat to somewhat steep.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in El Dorado, Mariposa, Sacramento, and Tuolumne Counties, within the Camanche Terraces (262Ao) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 76.2 | 60-99 | - |
| Herb | 75.8 | 60-99 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-1 | 5-10 |
| Conifer | 0.4 | 0-4 | 10-20 |
| Relative non-native to native cover | 67.6 | 42-95 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (3), W (1), Variable (1), SW (1), SE (1), NW (1), E (1)
Macrotopography: bottom (1), lower slope (4), upper slope (1), ridgetop (2)
Microtopography: flat (5), convex (2), concave (1)
Parent Material: slate (2), volcanic (2), granitic (1), metamorphic (1), rhyolite (1), sedimentary (1), serpentine (1)
Soil Texture: silt or silt loam (3), loam or sandy loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 880 ft. | 382-1810 ft. |
| Slope | 8.3º | 0-25º |
| Large rock cover | 8.4% | 0-40% |
| Small rock cover | 17.1% | <1-45% |
| Bare ground cover | 31.4% | 1-74% |
| Litter cover | 40.2% | 3-92% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** SNNR1080 **Relevés:** SNFN0023, SNFN0043, SNFN0093, SNFN0232, SNFN0475, SNFN0588, SNFN0594, SNFN0598

**Rank:** G4 S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on the data collected for this project and for Peoria Wildlife Area in Tuolumne County (Evens et al. 2004). It is likely to occur commonly throughout cismontane California.

The combination of several species of native and non-native *Trifolium* species and the native *L. nanus* suggests that this association may belong to a different alliance, defined by native species. Further sampling and comparative analysis is necessary to determine if placement in the *B. hordeaceus* alliance is correct.

**STAND TABLE**
***Bromus hordeaceus* - *Lupinus nanus* - *Trifolium* spp. Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **TRHI4** | ***Trifolium hirtum*** | **89** | **12.8** | **0.2** | **55** | | | **X** | **X** |
| | HYGL2 | *Hypochaeris glabra* | 89 | 12.0 | 0.2 | 30 | | | X | X |
| | **BRHO2** | ***Bromus hordeaceus*** | **78** | **18.7** | **1** | **55** | | | | **X** |
| | **TRDU2** | ***Trifolium dubium*** | **78** | **8.6** | **0.2** | **30** | | | | **X** |
| | ERBO | *Erodium botrys* | 78 | 5.9 | 1 | 20 | | | | X |
| | LOMI | *Lotus micranthus* | 78 | 2.2 | 0.2 | 9 | | | | |
| | CAAT25 | *Castilleja attenuata* | 78 | 0.2 | 0.2 | 1 | | | | |
| | **LUNA3** | ***Lupinus nanus*** | **67** | **15.0** | **2** | **76** | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 67 | 3.1 | 0.2 | 27 | | | | |
| | AICA | *Aira caryophyllea* | 67 | 1.0 | 0.2 | 6 | | | | X |
| | **TRMI4** | ***Trifolium microcephalum*** | **56** | **2.5** | **0.2** | **20** | | | | |
| | **LUBI** | ***Lupinus bicolor*** | **44** | **5.2** | **0.2** | **21** | | | | |
| | VUMY | *Vulpia myuros* | 44 | 0.3 | 0.2 | 1 | | | | X |
| | VUBR | *Vulpia bromoides* | 33 | 3.9 | 1 | 27 | | | | X |
| | BRDI3 | *Bromus diandrus* | 33 | 2.3 | 0.2 | 20 | | | | X |
| | **TRWI3** | ***Trifolium willdenovii*** | **33** | **1.2** | **0.2** | **10** | | | | |
| | VIVI | *Vicia villosa* | 33 | 0.8 | 0.2 | 5 | | | | X |
| | LOPU3 | *Lotus purshianus* | 33 | 0.4 | 0.2 | 2 | | | | |
| | CYDA | *Cynodon dactylon* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | FIGA | *Filago gallica* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | AVBA | *Avena barbata* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRMI2 | *Briza minor* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | VUMI | *Vulpia microstachys* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMU | *Lolium multiflorum* | 22 | 2.0 | 0.2 | 18 | | | | X |
| | GAPA5 | *Galium parisiense* | 22 | 0.4 | 2 | 2 | | | | X |
| | LETA | *Leontodon taraxacoides* | 22 | 0.4 | 2 | 2 | | | | X |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 22 | 0.2 | 1 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | LACA7 | *Lasthenia californica* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | PAPU10 | *Parvisedum pumilum* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | PLFU | *Plagiobothrys fulvus* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | TRVA | *Trifolium variegatum* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | TRHY3 | *Triteleia hyacinthina* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 0.8 | 0.2 | 7 | | | | |

***Trifolium hirtum* - *Bromus hordeaceus* Herbaceous Association (Provisional)**

**Rose Clover - Soft Chess Herbaceous Association (Provisional)**

**SUMMARY**

In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Trifolium hirtum* at <1-55%. *Bromus hordeaceus* (1-70% cover) was characteristically present and usually co-dominant with at least 30% relative cover, while *Amsinckia menziesii* var. *intermedia*, *Avena fatua*, *Bromus diandrus*, *Centaurea solstitialis*, *Erodium botrys*, *Lolium multiflorum*, and *Vulpia myuros* were often present with low cover in the herbaceous layer.

In the study area, this association was sampled infrequently within the central Sierra Nevada Foothills and occasionally in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on metamorphic, sedimentary, ultramafic, mixed rock, or volcanic substrates. They occupied a variety of upland slope positions from lower to upper slopes and ridgetops, on gentle to somewhat steep surfaces.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Calaveras, El Dorado, Placer, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Upper Foothills Metamorphic Belt (M261Eg) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 64.6 | 29-85 | - |
| Herb | 64.6 | 29-85 | variable |
| Shrub | 0.1 | 0-0.2 | 1-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-0.2 | <5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 96.8 | 94-99 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SE (4), W (1), SW (1), S (1), NW (1)
Macrotopography: lower slope (3), middle slope (3), upper slope (1), ridgetop (1)
Microtopography: flat (4), undulating (2), concave (1), convex (1)
Parent Material: metamorphic (2), mixed rock (2), sedimentary (1), serpentine (1), ultramafic (1), volcanic (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1040 ft. | 460-1630 ft. |
| Slope | 10º | 2-23º |
| Large rock cover | 0.2% | 0-0.2% |
| Small rock cover | 2.9% | 0.2-10% |
| Bare ground cover | 7% | 1-15% |
| Litter cover | 86.8% | 68-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0049, SNNR0223, SNNR0406 **Relevés:** SNFN0065, SNFN0147, SNFN0578, SNFN0605, SNFN0632

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on the data collected for this project. Its appears to be closely related to the *Bromus hordeaceus - Lupinus nanus - Trifolium* spp. Herbaceous Association, *Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus* Herbaceous Association, and the *Avena* (*barbata*, *fatua*) Semi-Natural Stands type. Further, detailed analysis of field samples with full species lists in these annual grasslands will be necessary to understand their proper placement.

**STAND TABLE**
***Trifolium hirtum - Bromus hordeaceus* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **TRHI4** | ***Trifolium hirtum*** | **100** | **35.4** | **15** | **58** | | **X** | **X** | **X** |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **16.8** | **1** | **35** | | | **X** | **X** |
| | CESO3 | *Centaurea solstitialis* | 75 | 7.5 | 1 | 34 | | | | X |
| | BRDI3 | *Bromus diandrus* | 75 | 3.6 | 1 | 10 | | | | X |
| | ERBO | *Erodium botrys* | 63 | 1.1 | 0.2 | 5 | | | | X |
| | AVFA | *Avena fatua* | 50 | 4.1 | 0.2 | 30 | | | | X |
| | LOMU | *Lolium multiflorum* | 50 | 1.3 | 0.2 | 10 | | | | X |
| | VUMY | *Vulpia myuros* | 50 | 0.4 | 0.2 | 2 | | | | X |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 38 | 0.4 | 0.2 | 3 | | | | X |
| | LUNA3 | *Lupinus nanus* | 38 | 0.3 | 0.2 | 2 | | | | |
| | VISA | *Vicia sativa* | 38 | 0.3 | 0.2 | 2 | | | | X |
| | PLNO | *Plagiobothrys nothofulvus* | 38 | 0.2 | 0.2 | 1 | | | | |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCI6 | *Erodium cicutarium* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPA5 | *Galium parisiense* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRDU2 | *Trifolium dubium* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | VISAN2 | *Vicia sativa* subsp. *nigra* | 25 | 5.0 | 0.2 | 40 | | | | X |
| | BRMA3 | *Bromus madritensis* | 25 | 0.4 | 0.2 | 3 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | AICA | *Aira caryophyllea* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | AVBA | *Avena barbata* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | CLARK | *Clarkia* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPU2 | *Clarkia purpurea* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GEDI | *Geranium dissectum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYPE | *Hypericum perforatum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | MAGR3 | *Madia gracilis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | THCU | *Thysanocarpus curvipes* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRLA16 | *Triteleia laxa* | 25 | 0.1 | 0.2 | 0.2 | | | | |

### *Bromus hordeaceus* - (*Holocarpha virgata*) Herbaceous Alliance
### Soft Chess - (Yellowflower Tarweed) Herbaceous Alliance

As defined for the first time in the state, *Bromus hordeaceus* and *Holocarpha virgata* typically co-dominate with a variety of other herbs in an intermittent to continuous herbaceous layer. *B. hordeaceus* may be higher in cover, and native forbs may have 10-15% relative cover. An infrequent and sparse shrub layer includes *Toxicodendron diversilobum*. Occasionally, emergent trees (and snags) such as *Quercus douglasii* are found in low cover in the understory or overstory. In this alliance, the herbaceous layer is usually diverse and dominated by grass and forb species. The parentheses in the name of this alliance highlights the importance of *H. virgata* as an indicator, which may have sub-dominance to dominance with *B. hordeaceus* and other non-native taxa. Associated native species may include *Castilleja attenuata*, *Centaurium venustum*, *Clarkia purpurea*, *Daucus pusillus*, *Navarretia intertexta*, *N. pubescens*, *Trifolium microcephalum*, and *Triteleia hyacinthina*. Stands of this type occur in upland grasslands in the Central Valley (per Solomeschch in Keeler-Wolf et al. 2007) and in the Sierra Nevada Foothills.

In the study area, stands often contain abundant non-native species, such as *Trifolium hirtum*, *Taeniatherum caput-medusae*, *Lolium multiflorum*, and *Vicia villosa*. Stands also contain occasional native species such as *Navarretia pubescens*, *Clarkia* spp., *Castilleja attenuata*, *Trifolium microcephalum*, and *Vulpia microstachys*. As described below, one association was classified for the Soft Chess - (Yellowflower Tarweed) Herbaceous Alliance.

---

#### *Holocarpha virgata* - *Bromus hordeaceus* - *Taeniatherum caput-medusae* Herbaceous Association
#### Yellowflower Tarweed - Soft Chess - Medusahead Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Bromus hordeaceus* at 1-70% cover. Other taxa that were characteristic included *Holocarpha virgata* subsp. *virgata* (<1-33% cover), *Hypochaeris glabra* (<1-20% cover), *Taeniatherum caput-medusae* (<1-50% cover), and *Trifolium hirtum* (<1-25% cover).

In the study area, this association was sampled frequently within the central Sierra Nevada Foothills and infrequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates, but were found infrequently on ultramafic (including serpentine and gabbro), mixed rock, or slate substrates. They occupied a variety of upland slope positions, from lower to upper slopes and ridgetops, that were flat to somewhat steep.

*H. virgata* is a summer-flowering native annual that is widespread throughout cismontane northern and central California. It was likely to have been an important component of pre-European grasslands. Its proper placement in the vegetation hierarchy will not be determined until more plot data with full species lists are analyzed within and beyond the Sierra Nevada Foothills.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Calaveras, Mariposa, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 66 | 37-93 | - |
| Herb | 65.9 | 36-93 | variable |
| Shrub | 0.1 | 0-1 | 1-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-1 | <5-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 73.1 | 26-98 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (11), S (3), N (3), E (3), Variable (2), Flat (2), NE (1)
Macrotopography: entire slope (1), bottom (3), lower slope (8), lower to upper slope (1), middle slope (8), upper slope (1), bench (2), ridgetop (1)
Microtopography: flat (10), undulating (7), convex (5), concave (3)
Parent Material: metamorphic (15), ultramafic (5), mixed rock (2), gabbro (1), serpentine (1), slate (1)
Soil Texture: loam or sandy loam (13), clay or clay loam (8), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1345 ft. | 735-2277 ft. |
| Slope | 5.1º | 0-19º |
| Large rock cover | 2.9% | 0-8% |
| Small rock cover | 7.5% | 0.2-35% |
| Bare ground cover | 25.1% | 7-35% |
| Litter cover | 58.6% | 47-70% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=25)

**Rapid Assessments:** SNNR0104, SNNR0799, SNNR1016, SNNR1026, SNNR1427, SNNR1473, SNNR1476, SNNR1481, SNNR1483, SNNR1498, SNNR1500 **Relevés:** SNFN0217, SNFN0219, SNFN0250, SNFN0252, SNFN0608, SNFN0609, SNFN0616, SNFN0624, SNFN0629, SNFN0631, SNFN0634, SNFN0639, SNFN0641, SNFN0655

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon data collected for this project and the Peoria Wildlife Area project in Tuolumne County (Evens et al. 2004). Similar associations are described for the Central Valley, including the *Holocarpha virgata* Association (per Solomeshch in Keeler-Wolf et al. 2007), and for the inner North Coast Ranges, including the *Bromus hordeaceus - Taeniatherum caput - medusae - Erodium botrys* and *Cynosurus cristatus - Bromus hordeaceus - Taeniatherum caput - medusae* Associations (Jimerson et al. 2000).

**STAND TABLE**
***Holocarpha virgata - Bromus hordeaceus - Taeniatherum caput-medusae* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **30.3** | **1** | **70** | | **X** | **X** | **X** |
| | **HOVIV** | ***Holocarpha virgata* ssp.*virgata*** | **96** | **13.1** | **0.2** | **33** | | | **X** | |
| | TRHI4 | *Trifolium hirtum* | 92 | 3.0 | 0.2 | 25 | | | X | X |
| | **TACA8** | ***Taeniatherum caput-medusae*** | **80** | **10.3** | **0.2** | **50** | | | **X** | **X** |
| | HYGL2 | *Hypochaeris glabra* | 80 | 4.8 | 0.2 | 20 | | | X | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 68 | 0.3 | 0.2 | 2 | | | | |
| | LOMU | *Lolium multiflorum* | 56 | 3.2 | 0.2 | 25 | | | | X |
| | VIVI | *Vicia villosa* | 56 | 1.1 | 0.2 | 7 | | | | X |
| | BRMI2 | *Briza minor* | 56 | 0.4 | 0.2 | 3 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 56 | 0.1 | 0.2 | 0.2 | | | | |
| | AVBA | *Avena barbata* | 52 | 3.0 | 0.2 | 30 | | | | X |
| | VISAN2 | *Vicia sativa* subsp. *nigra* | 52 | 0.7 | 0.2 | 5 | | | | X |
| | GAPA5 | *Galium parisiense* | 52 | 0.2 | 0.2 | 2 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 48 | 0.2 | 0.2 | 1 | | | | |
| | BRDI3 | *Bromus diandrus* | 44 | 1.2 | 0.2 | 8 | | | | X |
| | TRDU2 | *Trifolium dubium* | 40 | 0.6 | 0.2 | 8 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 40 | 0.1 | 0.2 | 1 | | | | |
| | AGHE2 | *Agoseris heterophylla* | 36 | 0.8 | 0.2 | 8 | | | | |
| | BRMA3 | *Bromus madritensis* | 36 | 0.5 | 0.2 | 8 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 36 | 0.4 | 0.2 | 5 | | | | |
| | CAPY2 | *Carduus pycnocephalus* | 36 | 0.4 | 0.2 | 4 | | | | X |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 32 | 0.5 | 0.2 | 8 | | | | |
| | GEDI | *Geranium dissectum* | 32 | 0.4 | 0.2 | 4 | | | | X |
| | ERBO | *Erodium botrys* | 32 | 0.2 | 0.2 | 2 | | | | X |
| | CEME2 | *Centaurea melitensis* | 32 | 0.1 | 0.2 | 1 | | | | X |
| | TOAR | *Torilis arvensis* | 32 | 0.1 | 0.2 | 1 | | | | X |
| | HOMAG | *Hordeum marinum* subsp. *gussonianum* | 28 | 1.3 | 0.2 | 15 | | | | X |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 28 | 0.2 | 0.2 | 3 | | | | |
| | AICA | *Aira caryophyllea* | 28 | 0.2 | 0.2 | 2 | | | | X |
| | JUBU | *Juncus bufonius* | 28 | 0.2 | 0.2 | 2 | | | | |
| | PLER3 | *Plantago erecta* | 24 | 0.6 | 0.2 | 11 | | | | |
| | DAPU3 | *Daucus pusillus* | 24 | 0.1 | 0.2 | 2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 24 | 0.4 | 0.2 | 6 | | | | |

### *Bromus hordeaceus* - (*Plagiobothrys nothofulvus*) Herbaceous Alliance
### Soft Chess - (Rusty Popcornflower) Herbaceous Alliance

As described for the first time in the state, *Bromus hordeaceus* and *Plagiobothrys nothofulvus* define an intermittent to continuous herbaceous layer, where *P. nothofulvus* is characteristically present as a sub-dominant to co-dominant with *B. hordeaceus*. The shrub layer, when present, is sparse. Hardwood trees, including *Quercus douglasii*, occur infrequently in an emergent layer. Stands appear as a regular feature in the lower elevations of the Sierra Nevada Foothills, with white popcorn flower carpeting hillsides in early spring. *P. nothofulvus* and other "popcorn flowers" were an important food source for Native Americans (Anderson 2005) and are likely to have been common dominants in foothill and valley grassland stands prior to the introduction of non-natives. The parentheses in the name of this alliance highlights the importance of *P. nothofulvus* as a native indicator species, where it may have sub-dominance to dominance with *B. hordeaceus* and other non-native taxa.

As described below, one association was classified in the study area. The herbaceous layer is diverse and dominated by grass and forb species such as *B. hordeaceus*, *P. nothofulvus*, *Daucus pusillus*, *Erodium botrys*, *Trifolium hirtum* and *B. diandrus*. Stands often contain natives such as *Trifolium microcephalum*, *Amsinckia menziesii* var. *intermedia*, *Castilleja attenuata*, and occasionally contain annual species of *Lupinus* and *Clarkia*. Five surveys (SNFN0099, SNFN0389, SNFN0350, SNFN0030, SNNR0848) showed additional variation, where *Erodium botrys*, *E. cicutarium*, *Hypochaeris glabra*, and/or *Vulpia* spp. had high cover, along with *B. hordeaceus* and *P. nothofulvus*. These surveys were classified to the alliance only.

---

### *Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus* Herbaceous Association
### Rusty Popcornflower - Wild Carrot - Soft Chess Herbaceous Association

**SUMMARY**

In the stands sampled, the herbaceous canopy was intermittent to continuous and characterized by *Bromus hordeaceus* (<1-70% cover), *Daucus pusillus* (<1-17% cover), *Plagiobothrys nothofulvus* (<1-23% cover), and *Trifolium hirtum* (<1-35% cover). Other taxa that were often present included *Aira caryophyllea*, *Amsinckia menziesii* var. *intermedia*, *Bromus diandrus*, *Castilleja attenuata*, *Cerastium glomeratum*, *Erodium botrys*, *Filago gallica*, *Hypochaeris glabra*, and *Trifolium microcephalum*.

In the study area, this association was sampled frequently within the northern Sierra Nevada Foothills, occasionally in the central Sierra Nevada Foothills, and infrequently in the Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic (including slate or serpentine) substrates, and occasionally on sedimentary, ultramafic, and mixed alluvium substrates. They occupied a variety of upland slope positions, from lower slopes to upper slopes and ridgetops, on slopes or terraces that were flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in El Dorado, Mariposa, Sacramento, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Total vegetation cover | 69.5 | 43-91 | - |
| Herb | 69 | 43-90 | variable |
| Shrub | 0.3 | 0-5 | 0.9-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.4 | 0-8 | <5 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 61.4 | 21-86 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (5), SW (3), W (2), SE (2), S (2), NW (2), NE (2), E (2), Variable (1), Flat (1)
Macrotopography: lower slope (6), middle slope (5), upper slope (3), ridgetop (2), terrace (1)
Microtopography: flat (7), undulating (5), convex (4), concave (1)
Parent Material: metamorphic (11), sedimentary (4), slate (3), ultramafic (2), mixed alluvium (1), serpentine (1)
Soil Texture: loam or sandy loam (9), clay or clay loam (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 713 ft. | 253-1225 ft. |
| Slope | 13.7º | 0-40º |
| Large rock cover | 0.4% | 0-2% |
| Small rock cover | 2.8% | 0.2-8.2% |
| Bare ground cover | 25.8% | 2-74% |
| Litter cover | 67% | 23-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=22)

**Rapid Assessments:** SNNR1111, SNNR1430, SNNR1443, SNNR1484, SNNR1501
**Relevés:** SNFN0003, SNFN0047, SNFN0048, SNFN0074, SNFN0094, SNFN0194, SNFN0211, SNFN0279, SNFN0283, SNFN0288, SNFN0452, SNFN0457, SNFN0507, SNFN0513, SNFN0521, SNFN0636, SNFN0637

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on the data collected for this project and for the Peoria Wildlife Area project in Tuolumne County (Evens et al. 2004). It is likely to occur as a widespread association throughout much of cismontane California. A similar association, *Bromus diandrus* - *Bromus hordeaceus* - *Trifolium* spp. - *Daucus* spp., was defined in a Yosemite National Park study (NatureServe et al. 2003b).

**STAND TABLE**
***Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus* Herbaceous Association**

| **Lifeform** | **Code** | **Species Name** | **Con** | **Avg** | **Min** | **Max** | **D** | **cD** | **C** | **N** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **BRHO2** | ***Bromus hordeaceus*** | **100** | **21.5** | **0.2** | **70** | | | **X** | **X** |
| | **PLNO** | ***Plagiobothrys nothofulvus*** | **91** | **5.8** | **0.2** | **23** | | | **X** | |
| | **DAPU3** | ***Daucus pusillus*** | **91** | **2.5** | **0.2** | **17** | | | **X** | |
| | TRHI4 | *Trifolium hirtum* | 82 | 11.3 | 0.2 | 35 | | | X | X |
| | ERBO | *Erodium botrys* | 73 | 3.2 | 0.2 | 35 | | | | X |
| | BRDI3 | *Bromus diandrus* | 73 | 3.1 | 0.2 | 15 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 64 | 5.2 | 0.2 | 35 | | | | |

**STAND TABLE continued**
***Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | HYGL2 | *Hypochaeris glabra* | 64 | 2.8 | 0.2 | 20 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 64 | 0.6 | 0.2 | 4 | | | | |
| | AMMEI2 | *Amsinckia menziesii* var. *intermedia* | 59 | 0.7 | 0.2 | 6 | | | | |
| | AICA | *Aira caryophyllea* | 55 | 0.6 | 0.2 | 4 | | | | X |
| | FIGA | *Filago gallica* | 55 | 0.1 | 0.2 | 1 | | | | X |
| | CEGL2 | *Cerastium glomeratum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | VUBR | *Vulpia bromoides* | 45 | 4.4 | 0.2 | 25 | | | | X |
| | TRDU2 | *Trifolium dubium* | 45 | 0.5 | 0.2 | 8 | | | | X |
| | GEMO | *Geranium molle* | 41 | 2.0 | 0.2 | 22 | | | | X |
| | LOMI | *Lotus micranthus* | 41 | 1.4 | 0.2 | 17 | | | | |
| | TRCI | *Trifolium ciliolatum* | 41 | 1.1 | 0.2 | 22 | | | | |
| | AVFA | *Avena fatua* | 41 | 0.7 | 0.2 | 5 | | | | X |
| | LUBI | *Lupinus bicolor* | 41 | 0.5 | 0.2 | 3 | | | | |
| | GAPA5 | *Galium parisiense* | 41 | 0.1 | 0.2 | 1 | | | | X |
| | LETA | *Leontodon taraxacoides* | 36 | 0.8 | 0.2 | 8 | | | | X |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 32 | 1.8 | 0.2 | 16 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 32 | 0.3 | 0.2 | 4 | | | | |
| | LIBI | *Linanthus bicolor* | 27 | 0.7 | 0.2 | 8 | | | | |
| | AVBA | *Avena barbata* | 27 | 0.1 | 0.2 | 2 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 27 | 0.1 | 0.2 | 2 | | | | X |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 27 | 0.1 | 0.2 | 1 | | | | |
| | CRTI | *Crassula tillaea* | 27 | 0.1 | 0.2 | 1 | | | | X |
| | JUBU | *Juncus bufonius* | 27 | 0.1 | 0.2 | 1 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 27 | 0.1 | 0.2 | 1 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | ESLO | *Eschscholzia lobbii* | 23 | 1.9 | 2 | 22 | | | | |
| | LUNA3 | *Lupinus nanus* | 23 | 1.1 | 0.2 | 12 | | | | |
| | VIVI | *Vicia villosa* | 23 | 0.6 | 0.2 | 5 | | | | X |
| | TOAR | *Torilis arvensis* | 23 | 0.4 | 0.2 | 5 | | | | X |
| | PLFU | *Plagiobothrys fulvus* | 23 | 0.4 | 0.2 | 5 | | | | |
| | TRLA16 | *Triteleia laxa* | 23 | 0.4 | 0.2 | 7 | | | | |
| | MICA | *Micropus californicus* | 23 | 0.1 | 0.2 | 2 | | | | |
| | TRVA | *Trifolium variegatum* | 23 | 0.1 | 0.2 | 2 | | | | |
| | BRMI2 | *Briza minor* | 23 | 0.1 | 0.2 | 1 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 55 | 4.0 | 0.2 | 35 | | | | |

### *Carex barbarae* Herbaceous Alliance
### Santa Barbara Sedge Herbaceous Alliance

As defined in the state, C*arex barbarae* dominates the herbaceous layer with dense cover in wetland settings, particularly streambanks. The shrub and tree layers are absent or open, including species such as *Fraxinus latifolia*, *Populus fremontii*, and *Quercus lobata*. *Carex barbarae* may have been cultivated and amplified in stands by historic Native American influences. Stands of this alliance have been described in Marin County on Mount Tamalpais in the Marin Municipal Water District (Evens and Kentner 2006) and the Sacramento-San Joaquin River Delta (Hickson and Keeler-Wolf 2007). Stands may contain other wetland herbs such as *Asclepias fascicularis*.

In the Foothills, this alliance was rarely sampled and one association was described below. Stands contain a variety of trees and shrubs with low cover, sometimes including *Fraxinus latifolia*, *Populus fremontii*, *Rubus discolor* or *Cephalanthus occidentalis* var. *californicus*. Herbs occasionally include wetland and upland species such as *Cynodon dactylon*, *Euthamia occidentalis* and *Perideridia kelloggii*. *C*. *barbarae* is an important basketry plant for Native Americans throughout cismontane California (Anderson 2005). Stands of *C*. *barbarae* were likely encouraged through “tending” in many areas of the Foothills. Remaining stands are important indicators of pre-European conditions.

---

### *Carex barbarae* Herbaceous Association (Provisional)
### Santa Barbara Sedge Herbaceous Association (Provisional)

**SUMMARY**
In the stands sampled, the herbaceous canopy was open and dominated by *Carex barbarae* at 19-25% cover. Other taxa that were often present included *Centaurea solstitialis*, *Cynodon dactylon*, *Epilobium ciliatum*, *Euthamia occidentalis*, *Hirschfeldia incana*, *Holozonia filipes*, *Melilotus albus*, *Perideridia kelloggii*, *Polypogon monspeliensis*, *Solidago*, and *Vicia sativa*. Trees such as *Fraxinus latifolia* and *Populus fremontii* often occurred as scattered emergents, and shrubs such as *Cephalanthus occidentalis* var. *californicus*, *Rhamnus tomentella*, *Rubus discolor*, *Rubus ursinus*, *Salix lasiolepis*, and *Vitis californica* often occurred as emergents.

This association was sampled twice in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on metamorphic or mixed alluvium substrates. They occupied wetland habitats or riparian corridors on gentle bottom slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in El Dorado and Placer Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 28 | 27-29 | - |
| Herb | 23.5 | 22-25 | >0.3 |
| Shrub | 5 | 2-8 | 0.9-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 4.2 | 2-6 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SE (1), E (1)
Macrotopography: bottom (2)
Microtopography: flat (2)
Parent Material: metamorphic (1), mixed alluvium (1)
Soil Texture: loam or sandy loam (1), muck (1)

| | Mean | Range |
|---|---|---|
| Elevation | 695 ft. | 367-1022 ft. |
| Slope | 2º | 1-3º |
| Large rock cover | 10.1% | 0.2-20% |
| Small rock cover | 3.5% | 2-5% |
| Bare ground cover | 20% | 12-28% |
| Litter cover | 40.1% | 0.2-80% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0228, SNNR0724 **Relevés:** none

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills. Similar stands have been identified in the Sacramento-San Joaquin River Delta (Hickson and Keeler-Wolf 2007) as well as in the central and north Coast Ranges (T. Keeler-Wolf and J. Evens, pers. obs. 2006). Turf with this species also forms in the understory of *Quercus lobata* woodland stands throughout the same areas.

**STAND TABLE**

***Carex barbarae* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | FRLA-M | *Fraxinus latifolia* | 50 | 1.0 | 2 | 2 | | | | |
| | POFR2-M | *Populus fremontii* | 50 | 1.0 | 2 | 2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 100 | 0.6 | 0.2 | 1 | | | X | X |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 50 | 1.5 | 3 | 3 | | | | |
| | RUUR | *Rubus ursinus* | 50 | 0.5 | 1 | 1 | | | | |
| | SALA6 | *Salix lasiolepis* | 50 | 0.5 | 1 | 1 | | | | |
| | RHTO6 | *Rhamnus tomentella* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | VICA5 | *Vitis californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **CABA4** | ***Carex barbarae*** | **100** | **22.0** | **19** | **25** | **X** | | **X** | |
| | EUOC4 | *Euthamia occidentalis* | 50 | 1.0 | 2 | 2 | | | | |
| | HOFI | *Holozonia filipes* | 50 | 0.5 | 1 | 1 | | | | |
| | CESO3 | *Centaurea solstitialis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CYDA | *Cynodon dactylon* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | EPCI | *Epilobium ciliatum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | HIIN3 | *Hirschfeldia incana* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | MEAL2 | *Melilotus albus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | PEKE | *Perideridia kelloggii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | POMO5 | *Polypogon monspeliensis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOLID | *Solidago* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | VISA | *Vicia sativa* | 50 | 0.1 | 0.2 | 0.2 | | | | X |

## *Carex nudata* Herbaceous Alliance
## Naked Sedge Herbaceous Alliance

As defined in the state, *Carex nudata* is either dominant or co-dominant in the herbaceous layer with other graminoid or herb species such as *Typha domingensis*, *Paspalum dilatatum*, and *Stachys stricta*, *Mentha* spp., or *Artemisia douglasiana*. An open overstory shrub and tree layer may include *Fraxinus latifolia*, *Alnus rhombifolia*, *Salix laevigata*, and *Rubus discolor*. The herbaceous layer is often continuous and the shrub layer is open. Stands are described in the northern, central, and southern Sierra Nevada Foothills along small secondary streams in narrow v-shaped canyons of wider, trough-shaped valleys. Stands occur as tussocks on stream bank, bar, or mid-channel boulders (Potter 2005).

In the Foothills, stands of this alliance were sampled rarely, although the species, *Carex nudata*, occurred often in other riparian vegetation types. As described above, stands occur with trees and shrubs such as *Salix laevigata* and *Rhamnus tomentella* and herbs such as *Stachys stricta*, *Carex praegracilis*, and *Mimulus guttatus*. As described below, one association was described from the study area.

## *Carex nudata* Herbaceous Association
## Naked Sedge Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Carex nudata* at 35-60% cover. Other taxa that were often present included *Carex praegracilis*, *Carex serratodens*, *Helianthus bolanderi*, *Mimulus floribundus*, *Mimulus guttatus*, *Rumex crispus*, and *Stachys stricta*. Trees such as *Quercus douglasii* and *Salix laevigata* sometimes occurred as scattered emergents, and shrubs such as *Rhamnus tomentella*, *Rubus discolor*, and *Salix lasiolepis* sometimes occurred as emergents.

This association was sampled infrequently in the study area within the central Sierra Nevada Foothills Subregion (Hickman 1993). Stands consistently occurred on serpentine substrates. They occupied riparian sites in a draw, the edge of a basin/wetland, and a terrace. Slopes were flat to gentle.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Tuolumne County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 76.7 | 67-90 | - |
| Herb | 72.3 | 57-85 | >0.3 |
| Shrub | 8 | 1-16 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1.7 | 0-5 | 0-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 8.5 | 0-16 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SE (2), Flat (1)
Macrotopography: draw (1), edge of basin/wetland (1), terrace (1)
Microtopography: undulating (2), concave (1)
Parent Material: serpentine (3)
Soil Texture: loam or sandy loam (1), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 952 ft. | 765-1058 ft. |
| Slope | 1º | 0-2º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 0% | -% |
| Litter cover | 0% | -% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** none **Relevés:** SNFN0134, SNFN0179, SNFN0687

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described in the Sierra Nevada Foothills, including the Peoria Wildlife Area and Red Hills, Tuolumne County, and adjacent mid-elevations of the Sierra Nevada (Potter 2005). Similar stands also occur throughout the central and northern California Coast Ranges and in the eastern Klamath Province (T. Keeler-Wolf, pers. obs. 2006).

**STAND TABLE**
***Carex nudata* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-M | *Salix laevigata* | 33 | 0.3 | 1 | 1 | | | | |
| | QUDO-M | *Quercus douglasii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RHTO6 | *Rhamnus tomentella* | 67 | 0.7 | 1 | 1 | | | | |
| | SALA6 | *Salix lasiolepis* | 33 | 5.7 | 17 | 17 | | | | |
| | RUDI2 | *Rubus discolor* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| **Herb** | | | | | | | | | | |
| | **CANU5** | ***Carex nudata*** | **100** | **45.0** | **35** | **60** | | **X** | **X** | |
| | STST | *Stachys stricta* | 67 | 17.7 | 18 | 35 | | | | |
| | CAPR5 | *Carex praegracilis* | 67 | 6.7 | 3 | 17 | | | | |
| | CASE2 | *Carex serratodens* | 67 | 5.7 | 5 | 12 | | | | |
| | HEBO3 | *Helianthus bolanderi* | 67 | 1.0 | 1 | 2 | | | | |
| | MIGU | *Mimulus guttatus* | 67 | 0.7 | 0.2 | 2 | | | | |
| | MIFL2 | *Mimulus floribundus* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 67 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Carex nudata* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | HOMA4 | *Hoita macrostachya* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | COMA2 | *Conium maculatum* | 33 | 3.3 | 10 | 10 | | | | X |
| | PADI3 | *Paspalum dilatatum* | 33 | 2.3 | 7 | 7 | | | | X |
| | SECL2 | *Senecio clevelandii* | 33 | 2.0 | 6 | 6 | | | | |
| | TYDO | *Typha domingensis* | 33 | 2.0 | 6 | 6 | | | | |
| | LOMU | *Lolium multiflorum* | 33 | 1.3 | 4 | 4 | | | | X |
| | VECA9 | *Verbena californica* | 33 | 1.3 | 4 | 4 | | | | |
| | SENEC | *Senecio* | 33 | 1.0 | 3 | 3 | | | | |
| | ASFA | *Asclepias fascicularis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | BRMA3 | *Bromus madritensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CORDY | *Cordylanthus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CYPER | *Cyperus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CYER | *Cyperus eragrostis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | EPILO | *Epilobium* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | EPDE4 | *Epilobium densiflorum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ERIOG | *Eriogonum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HOLA | *Holcus lanatus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOCAD | *Horkelia californica* subsp. *dissita* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | IRIS | *Iris* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | JUEF | *Juncus effusus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LASE | *Lactuca serriola* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOPU3 | *Lotus purshianus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POMO5 | *Polypogon monspeliensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUCO2 | *Rumex conglomeratus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOAS | *Sonchus asper* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRRU | *Trichostema rubisepalum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | URDI | *Urtica dioica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | XAST | *Xanthium strumarium* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 33 | 0.3 | 1 | 1 | | | | |

## *Carex serratodens* Herbaceous Alliance
## Twotooth Sedge Herbaceous Alliance

As defined in the state, *Carex serratodens* is dominant or co-dominant in the herbaceous layer with other wetland graminoids such as *Hordeum brachyantherum*, *Juncus occidentalis*, or *J. bufonius*. Other wetland and upland species also occur in the stands, which are characterized by a dense herbaceous layer. The shrub and tree layers are open or absent, with *Baccharis pilularis* being the most common shrub. Stands of the Twotooth Sedge Alliance have been described on serpentine wetland sites in Peoria Wildlife Area, Tuolumne County (Evens et al. 2004), and on Mount Tamalpais in the Marin Municipal Water District, Marin County (Evens and Kentner 2006).

This alliance was sampled once in the study area and one association is described below.

---

## *Carex serratodens* Herbaceous Association (Provisional)
## Twotooth Sedge Alliance (Provisional)

### SUMMARY
In the one stand sampled, the herbaceous canopy was continuous and dominated by *Carex serratodens* at 60% cover. Other taxa that were present included *Allium*, *Deschampsia danthonioides*, *Hordeum brachyantherum*, *Juncus bufonius*, *Lotus purshianus*, *Mimulus guttatus*, and *Sisyrinchium bellum*.

This association was sampled once in the study area within the central Sierra Nevada Foothills Subregion (Hickman 1993). The stand occurred on serpentine substrate. It occupied the edge of a basin/wetland on a gentle slope.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Tuolumne County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 80 | 80-80 | - |
| Herb | 80 | 80-80 | >0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 0 | - | - |

### LOCAL ENVIRONMENTAL DESCRIPTION
Aspect: N (1)
Macrotopography: edge of basin/wetland (1)
Microtopography: concave (1)
Parent Material: serpentine (1)
Soil Texture: no data

| | Mean | Range |
|---|---|---|
| Elevation | 1128 ft. | 1128-1128 ft. |
| Slope | 1º | 1-1º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 0% | -% |
| Litter cover | 0% | -% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=1)

**Rapid Assessments:** none **Relevés:** SNFN0593

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills from data collected at Peoria Wildlife Area in Tuolumne County (Evens et al. 2004). Similar associations have been described in serpentine seeps in the central California Coast Ranges of Santa Clara and San Benito Counties (Evens and San 2004, Evens et al. 2006). According to Alexander et al. (2006) the *C. serratodens* Herbaceous Alliance and Association is endemic to serpentine seeps and streamsides in the California Floristic Province.

**STAND TABLE**
***Carex serratodens* Alliance**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **CASE2** | ***Carex serratodens*** | **100** | **60.0** | **60** | **60** | **X** | | **X** | |
| | HOBR2 | *Hordeum brachyantherum* | 100 | 7.0 | 7 | 7 | | | X | |
| | JUBU | *Juncus bufonius* | 100 | 5.0 | 5 | 5 | | | X | |
| | HERBAC | unknown | 100 | 5.0 | 5 | 5 | | | X | |
| | MIGU | *Mimulus guttatus* | 100 | 2.0 | 2 | 2 | | | X | |
| | ALLIU | *Allium* | 100 | 1.0 | 1 | 1 | | | X | |
| | SIBE | *Sisyrinchium bellum* | 100 | 1.0 | 1 | 1 | | | X | |
| | DEDA | *Deschampsia danthonioides* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | LOPU3 | *Lotus purshianus* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 100 | 0.2 | 0.2 | 0.2 | X | | X | |

### *Centaurea* (*melitensis*, *solstitialis*) Herbaceous Semi-Natural Stands
### Star Thistle (Maltese, Yellow) Herbaceous Semi-Natural Stands

Described for the first time in the state, *Centaurea melitensis* and/or *C*. *solstitialis* are/is dominant or co-dominant in the herbaceous layer. Stands have an intermittent to continuous canopy that is depauperate of species. Trees do not occur and shrubs rarely occur as emergents in this semi-natural type. Stands of *Centaurea solstitialis* are invasive and occur on all aspects, in disturbed, often overgrazed grasslands, with other disturbance-related grasses and forbs.

Although very common in California currently, the type has not been described before this study. It is clearly related to other annual herbaceous semi-natural types described in this report, including the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) and *Avena* (*barbata*, *fatua*) Semi-Natural Stands types. Resolute placement of these upland herbaceous stands await more detailed analysis. One association was described for the Star Thistle Semi-Natural Stands, and the type was not well-sampled in proportion to its relatively common presence in the study area. Stands contained *Centaurea solstitialis* and other non-native forbs and grasses such as *Bromus diandrus* or *B*. *hordeaceus*, *Taeniatherum caput-medusae*, and *Trifolium hirtum*. Natives such as *Amsinckia menziesii*, *Elymus glaucus*, or *Brodiaea elegans* subsp. *elegans* were occasionally present. Similar stands dominated by *C*. *melitensis* have been described for southern coastal California (Keeler-Wolf and Evens 2006).

---

### *Centaurea solstitialis* Herbaceous Association (Provisional)
### Yellow Star Thistle Herbaceous Association (Provisional)

#### SUMMARY
In the stands sampled, the herbaceous canopy was open to continuous and dominated by the non-native forb *Centaurea solstitialis* at 8-75% cover. *Bromus diandrus*, *Bromus hordeaceus*, *Taeniatherum caput-medusae*, *Torilis arvensis*, *Trifolium hirtum*, and *Vulpia myuros* were often present in the herbaceous layer.

In this study, this association was sampled infrequently within the Cascade Range Foothills and High Cascade Ranges and somewhat infrequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). However, we suspect that the association is far more prevalent than the sampling suggests. Stands usually occurred on igneous substrates (including granitic, volcanic, and basalt) and infrequently on metamorphic or mixed alluvium substrates. This invasive non-native star thistle occupied lower slopes to upper slopes that were gentle to steep.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte, Calaveras, Nevada, Placer, Shasta, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 62.1 | 17-90 | - |
| Herb | 61.9 | 15-90 | >0.3 |
| Shrub | 0.1 | 0-1 | <1 |
| Low Tree/Tall Shrub | 0 | - | - |

| | | | |
|---|---|---|---|
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 96.9 | 91-100 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Variable (3), W (1), SW (1), S (1), NW (1), NE (1)
Macrotopography: lower slope (3), lower to upper slope (1), middle slope (3), middle to upper slope (1)
Microtopography: undulating (4), flat (3), convex (1)
Parent Material: granitic (2), metamorphic (2), volcanic (2), basalt (1), mixed alluvium (1)
Soil Texture: clay or clay loam (2), silt or silt loam (2), loam or sandy loam (1), sand (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1053 ft. | 567-1915 ft. |
| Slope | 8º | 1-30º |
| Large rock cover | 1% | 0-5% |
| Small rock cover | 10.1% | 0-65% |
| Bare ground cover | 14.3% | 2-37% |
| Litter cover | 70.4% | 5-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0089, SNNR0408, SNNR0525, SNNR0532, SNNR0910, SNNR1231, SNNR1261, SNNR1380 **Relevés:** none

**Rank:** Unranked, non-native type

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills from data collected for this project. Stands similar to this association have been classified and mapped, where *C*. *solstitialis* is dominant in narrow upland belts as on levee tops in Suisun Marsh (Keeler-Wolf and Vaghti 2000). Also, NatureServe et al. (2003b) defined a provisional *Centaurea solstitialis* Alliance in lower elevation foothills (< 1000 m) in or near Yosemite and near El Portal. This association is likely to occur throughout much of cismontane northern and central California.

**STAND TABLE**

***Centaurea solstitialis* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **CESO3** | ***Centaurea solstitialis*** | **100** | **33.1** | **8** | **75** | **X** | | **X** | **X** |
| | BRDI3 | *Bromus diandrus* | 88 | 3.0 | 0.2 | 15 | | | X | X |
| | BRHO2 | *Bromus hordeaceus* | 75 | 7.5 | 1 | 35 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 63 | 4.1 | 0.2 | 28 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 63 | 3.9 | 1 | 20 | | | | X |
| | VUMY | *Vulpia myuros* | 50 | 2.0 | 0.2 | 10 | | | | X |
| | TOAR | *Torilis arvensis* | 50 | 0.8 | 1 | 3 | | | | X |
| | LOMU | *Lolium multiflorum* | 38 | 3.9 | 0.2 | 30 | | | | X |
| | AVBA | *Avena barbata* | 38 | 0.4 | 0.2 | 3 | | | | X |
| | AMME | *Amsinckia menziesii* | 38 | 0.3 | 0.2 | 2 | | | | |
| | CYEC | *Cynosurus echinatus* | 38 | 0.3 | 0.2 | 2 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | ELGL | *Elymus glaucus* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRMA3 | *Bromus madritensis* | 25 | 0.4 | 0.2 | 3 | | | | X |
| | MAGR3 | *Madia gracilis* | 25 | 0.2 | 0.2 | 1 | | | | |
| | PLLA | *Plantago lanceolata* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CHPO3 | *Chlorogalum pomeridianum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPU2 | *Clarkia purpurea* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | HYPE | *Hypericum perforatum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | LUNA3 | *Lupinus nanus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | SIMA3 | *Silybum marianum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |

### *Eleocharis acicularis* Herbaceous Alliance (Provisional)
### Needle Spikerush Herbaceous Alliance (Provisional)

Described for the first time in the state, *Eleocharis acicularis* is dominant with other wetland herbaceous species. Herbs that may attain co-dominance include *Eryngium* spp., *Rorippa nasturtium-aquaticum*, *Mimulus guttatus*, *Lolium multiflorum*, or *Veronica anagallis-aquatica*. The stands sampled appear in shallow vernal pools and spring-developed pools on volcanic substrates, along rocky and clayey streambanks with running water in the Cascade Range Foothills.

In the study area, one association was described below. Smith (1998) described similar stands found on rocky volcanic streambanks and clayey floodplains in the Cascade Ranges of northwestern California, where *E*. *acicularis* var. *acicularis* occurs in high constancy and cover within a *Plagiobothrys mollis* community type along with *Eryngium mathiasiae*. Smith (1998) also proposed a *Navarretia* community type with high cover of *E*. *acicularis* var. *bella* and *Eryngium alismifolium*, in silty stream bars and drying vernal pools. Other stands observed in the Cascade foothills often contain *E*. *acicularis* with *Isoetes nuttallii*, *Centaurium venustum*, *Epilobium pallidum*, *Eryngium articulatum*, and *M*. *guttatus* (C. Witham, pers. obs. 2003). More data and analysis are needed to fully describe the alliance and associations.

---

### *Eleocharis acicularis - Eryngium castrense* Herbaceous Association (Provisional)
### Needle Spikerush - Coyote-thistle Herbaceous Association (Provisional)

**SUMMARY**
In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Eleocharis acicularis* at 12-35% cover. Other taxa that were characteristically present included *Epilobium pallidum*, *Eryngium castrense*, *Lolium multiflorum*, *Mimulus guttatus*, *Paspalum dilatatum*, *Polypogon monspeliensis*, *Rorippa nasturtium-aquaticum*, and *Trifolium variegatum*.

This association was sampled infrequently in the study area within the Cascade Range Foothills Subregion (Hickman 1993). Stands occurred in a localized area on wet volcanic substrates. They occupied wetland seeps on mesas/plateaus and adjacent streambanks.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Shasta County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 51.7 | 39-65 | - |
| Herb | 51.7 | 39-65 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 32.8 | 15-64 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (2), W (1)
Macrotopography: ridgetop (3)

Microtopography: flat (2), convex (1)
Parent Material: volcanic (3)
Soil Texture: muck (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1256 ft. | 1252-1260 ft. |
| Slope | 0º | -º |
| Large rock cover | 9.4% | 0.2-25% |
| Small rock cover | 5.8% | 3-10% |
| Bare ground cover | 56.3% | 46-64% |
| Litter cover | 3.6% | 0.9-5% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR1315, SNNR1316, SNNR1318 **Relevés:** none

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the northern Sierra Nevada Foothills and Cascade Ranges.

**STAND TABLE**
***Eleocharis acicularis - Eryngium castrense* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **ELAC** | ***Eleocharis acicularis*** | **100** | **19.7** | **12** | **35** | | **X** | **X** | |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 100 | 10.1 | 0.2 | 30 | | | X | |
| | MIGU | *Mimulus guttatus* | 100 | 5.7 | 0.2 | 16 | | | X | |
| | LOMU | *Lolium multiflorum* | 100 | 5.4 | 0.2 | 10 | | | X | X |
| | **ERCA33** | ***Eryngium castrense*** | **100** | **2.7** | **1** | **5** | | | **X** | |
| | PADI3 | *Paspalum dilatatum* | 100 | 1.1 | 0.2 | 3 | | | X | X |
| | EPPA7 | *Epilobium pallidum* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | POMO5 | *Polypogon monspeliensis* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | TRVA | *Trifolium variegatum* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | BRMI2 | *Briza minor* | 67 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOMA2 | *Hordeum marinum* | 67 | 0.1 | 0.2 | 0.2 | | | | X |
| | VEAN2 | *Veronica anagallis-aquatica* | 33 | 8.7 | 26 | 26 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEVE3 | *Centaurium venustum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HEFI | *Hemizonia fitchii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | JUNCU | *Juncus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LETA | *Leontodon taraxacoides* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | MICA | *Micropus californicus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RAAQ | *Ranunculus aquatilis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRLA4 | *Trichostema lanceolatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TRFU | *Trifolium fucatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 67 | 0.4 | 0.2 | 1 | | | | |

### *Eleocharis macrostachya* Herbaceous Alliance

### Pale Spikerush Herbaceous Alliance

As defined in the state, stands of this alliance have an intermittent to continuous herbaceous layer dominated by *Eleocharis macrostachya*. Stands may contain high cover of other species, including *Cynodon dactylon*. Stands are usually associated with standing water in depressions, ponds, and shallow lakes - in meadow systems that are seasonally or permanently flooded or saturated (Potter 2005), including deeper vernal pools where water ponds for much of the spring season. Stands may contain high cover of other species including *Cynodon dactylon*., *Carex*, *Juncus*, *Eryngium*, *Orcuttia*, or *Perideridia*.

In the study area, stands of the Pale Spikerush Alliance sometimes contain *Lolium multiflorum*, *Ranunculus muricatus*, *Glyceria* spp., *Pleuropogon californicus*, or *Marsilea vestita* subsp. *vestita*. Three associations were classified and are described below. Four stands (SNNR0999, SNNR0828, SNNR0284, SNNR0115) showed additional variation because of high cover of other herbs such as *Holozonia filipes*, *Damasonium californicum*, or *Xanthium strumarium*. One stand contained the rare grass, *Orcuttia tenuis*. These four stands were classified to the alliance level only.

---

### *Eleocharis macrostachya* Herbaceous Association

### Pale Spikerush Herbaceous Association

#### SUMMARY

In the stands sampled, the herbaceous canopy was open to continuous and dominated by *Eleocharis macrostachya* at 3-67% cover. *Lolium multiflorum* was often present, while *Aira carophyllea*, *Centaurea solstitialis*, *Juncus effusus*, *Lythrum hyssopifolia*, and *Rumex crispus* were occasionally present in the herbaceous layer.

This association was sampled consistently throughout the study area, but infrequently within each of the following Subregions: central and northern Sierra Nevada Foothills, Cascade Range Foothills, and High Cascade Range (Hickman 1993). Stands usually occurred on volcanic (including basalt), metamorphic (including slate), mixed alluvium, or sandstone substrates. They occupied wetland habitats in bottoms or on lower and middle slopes, sometimes at the edges of basins/wetlands. Slopes were flat to moderate. In general, stands can be found in natural or created ponds, pools, and shallow lake areas.

#### DISTRIBUTION IN STUDY AREA

This association was sampled in Butte, Calaveras, El Dorado, Mariposa, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 49.5 | 20-79 | - |
| Herb | 50.2 | 20-79 | variable |
| Shrub | 0.8 | 0-5 | 1-2 |
| Low Tree/Tall Shrub | 0 | 0-0.2 | 5-10 |
| Hardwood | 0.2 | 0-2 | 5-20 |
| Conifer | 0.2 | 0-2 | 10-20 |
| Relative non-native to native cover | 19.6 | 0-60 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (6), S (3), W (2), SW (1), SE (1)
Macrotopography: bottom (4), lower slope (2), middle slope (6), edge of basin/wetland (1)
Microtopography: concave (5), flat (5), undulating (3)
Parent Material: volcanic (5), metamorphic (3), basalt (2), mixed alluvium (1), sandstone (1), slate (1)
Soil Texture: clay or clay loam (5), muck (3), sand (2), loam or sandy loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1457 ft. | 377-2205 ft. |
| Slope | 1.8º | 0-8º |
| Large rock cover | 3.6% | 0-20% |
| Small rock cover | 5.3% | 0-20% |
| Bare ground cover | 37.2% | 7-98% |
| Litter cover | 35.2% | 0.2-78% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=13)

**Rapid Assessments:** SNNR0351, SNNR0352, SNNR0381, SNNR0531, SNNR0569, SNNR0703, SNNR0844, SNNR0993 **Relevés:** SNFN0221, SNFN0223, SNFN0224, SNFN0321, SNFN0664

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the foothills and montane zones of the Sierra Nevada (Potter 2005) and in southern California (Klein and Evens 2006). Similar stands with strongly dominant *E. macrostachya* occur elsewhere in cismontane California, including Humboldt Bay National Wildlife Refuge (Pickart 2006).

**STAND TABLE**
***Eleocharis macrostachya* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **ELMA5** | ***Eleocharis macrostachya*** | **100** | **29.8** | **3** | **67** | **X** | | **X** | |
| | LOMU | *Lolium multiflorum* | 62 | 4.3 | 0.2 | 25 | | | | X |
| | LYHY2 | *Lythrum hyssopifolia* | 46 | 1.3 | 0.2 | 8 | | | | X |
| | JUEF | *Juncus effusus* | 38 | 1.6 | 0.4 | 10 | | | | |
| | RUCR | *Rumex crispus* | 31 | 1.6 | 0.2 | 15 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 31 | 0.3 | 0.2 | 2 | | | | X |
| | AICA | *Aira caryophyllea* | 31 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRVA | *Trifolium variegatum* | 23 | 1.2 | 0.2 | 15 | | | | |
| | CYDA | *Cynodon dactylon* | 23 | 0.6 | 0.2 | 7 | | | | X |
| | BRMI2 | *Briza minor* | 23 | 0.2 | 0.2 | 2 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 23 | 0.1 | 0.2 | 1 | | | | |
| | HERBAC | unknown | 23 | 0.1 | 0.2 | 1 | | | | |
| | GEDI | *Geranium dissectum* | 23 | 0.0 | 0.2 | 0.2 | | | | X |
| | PLST | *Plagiobothrys stipitatus* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| | POMO5 | *Polypogon monspeliensis* | 23 | 0.0 | 0.2 | 0.2 | | | | X |

***Eleocharis macrostachya* - (*Pleuropogon californicus*) Herbaceous Association (Provisional)**

**Pale Spikerush - (Semaphore Grass) Herbaceous Association (Provisional)**


**SUMMARY**

In the stands sampled, the herbaceous canopy was typically continuous, and characterized by *Briza minor* (<1% cover), *Eleocharis macrostachya* (<1-22% cover), *Lolium multiflorum* (<1-17% cover), and *Ranunculus muricatus* (<1-40% cover). Other taxa that were often present included *Hemizonia fitchii*, *Hordeum marinum*, *Juncus bufonius*, *Mimulus guttatus*, *Pleuropogon californicus*, *Poa annua*, *Rorippa nasturtium-aquaticum*, *Trifolium variegatum*, *Veronica*, and *Vulpia bromoides*. Because of difficulty in identifying *Pleuropogon californicus* versus *Glyceria*, a provisional association name with *Pleuropogon californicus* is used in this report.

In the study area, this association was sampled infrequently within the central Sierra Nevada Foothills and Sacramento Valley and somewhat infrequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands consistently occurred on metamorphic substrates. They occupied wetland habitats in bottoms and on lower to middle slopes, in draws, or edges of basins/wetlands. Slopes were gentle to moderate.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Calaveras, Mariposa, and Sacramento Counties, within the Camanche Terraces (262Ao) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 75.5 | 64-83 | - |
| Herb | 75.5 | 64-83 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 47.2 | 17-87 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NE (3), SW (1), S (1), NW (1)
Macrotopography: bottom (1), middle slope (1), draw (2), edge of basin/wetland (2)
Microtopography: concave (3), flat (2), undulating (1)
Parent Material: metamorphic (6)
Soil Texture: silt or silt loam (4), muck (1)

| | Mean | Range |
|---|---|---|
| Elevation | 466 ft. | 200-850 ft. |
| Slope | 2.3º | 1-6º |
| Large rock cover | 1.7% | 0-5% |
| Small rock cover | 3.1% | 0.2-7% |
| Bare ground cover | 56.7% | 35-79% |
| Litter cover | 34.7% | 14-50% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** none **Relevés:** SNFN0263, SNFN0388, SNFN0394, SNFN0422, SNFN0423, SNFN0424

**Rank:** G4S3?

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on the data collected for this project. This provisional association is similar to other *E*. *macrostachya* associations. Since fewer than ten samples represent this association, further sampling and analysis are necessary for substantiation of this type.

**STAND TABLE**
***Eleocharis macrostachya* - (*Pleuropogon californicus*) Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **ELMA5** | ***Eleocharis macrostachya*** | **83** | **9.0** | **0.2** | **22** | | | **X** | |
| | RAMU2 | *Ranunculus muricatus* | 83 | 6.9 | 0.2 | 40 | | | X | X |
| | LOMU | *Lolium multiflorum* | 83 | 6.4 | 0.2 | 17 | | | X | X |
| | BRMI2 | *Briza minor* | 83 | 0.2 | 0.2 | 0.2 | | | X | X |
| | HOMA2 | *Hordeum marinum* | 67 | 8.1 | 0.2 | 25 | | | | X |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 67 | 7.7 | 0.2 | 45 | | | | |
| | JUBU | *Juncus bufonius* | 67 | 0.4 | 0.2 | 1 | | | | |
| | **PLCA6** | ***Pleuropogon californicus*** | **50** | **4.4** | **0.2** | **22** | | | | |
| | VERON | *Veronica* | 50 | 1.5 | 0.2 | 8 | | | | X |
| | MIGU | *Mimulus guttatus* | 50 | 1.3 | 1 | 6 | | | | |
| | TRVA | *Trifolium variegatum* | 50 | 1.3 | 1 | 6 | | | | |
| | HEFI | *Hemizonia fitchii* | 50 | 0.7 | 0.2 | 4 | | | | |
| | POAN | *Poa annua* | 50 | 0.7 | 0.2 | 4 | | | | X |
| | VUBR | *Vulpia bromoides* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOPU3 | *Lotus purshianus* | 33 | 2.5 | 0.2 | 15 | | | | |
| | RUPU3 | *Rumex pulcher* | 33 | 0.5 | 1 | 2 | | | | X |
| | JUTE | *Juncus tenuis* | 33 | 0.4 | 0.2 | 2 | | | | |
| | RUSA | *Rumex salicifolius* | 33 | 0.4 | 0.2 | 2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEGL2 | *Cerastium glomeratum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CYDA | *Cynodon dactylon* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | GEDI | *Geranium dissectum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | MOFO | *Montia fontana* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HERBAC | unknown | 33 | 0.1 | 0.2 | 0.2 | | | | |

***Eleocharis macrostachya* - *Marsilea vestita* Herbaceous Association (Provisional)**
**Pale Spikerush - Hairy Waterclover Herbaceous Association (Provisional)**

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and dominated by *Eleocharis macrostachya* at 3-40% cover. Aquatic taxon *Marsilea vestita* subsp. *vestita* was consistently present with <1-16% cover. A variety of facultative and obligate wetland taxa were sometimes present (see stand table below).

This association was sampled infrequently in the study area within the Cascade Range Foothills Subregion (Hickman 1993). Stands usually occurred on volcanic (including basalt), or sandy alluvium substrates. They occupied flat, wetland habitats, on bottom slopes or in washes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Shasta, and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 27.2 | 14-45 | - |
| Herb | 27.2 | 14-45 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.2 | 0-1 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 3.8 | 0-11 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (5)
Macrotopography: bottom (4), wash (1)
Microtopography: flat (3), concave (2)
Parent Material: volcanic (3), basalt (1), sandy alluvium (1)
Soil Texture: sand (3), loam or sandy loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1449 ft. | 661-2800 ft. |
| Slope | 0º | -º |
| Large rock cover | 29.5% | 29-30% |
| Small rock cover | 62.5% | 60-65% |
| Bare ground cover | 3% | 3-3% |
| Litter cover | 2.5% | 1-4% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0194, SNNR0213 **Relevés:** SNFN0306, SNFN0364, SNFN0384

**Rank:** G4S3?

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills, based on the data collected for this project. Stands of this provisional association may be related to other stands of the *E*. *macrostachya* Herbaceous Alliance and may vary in their representation of *M*. *vestita*, depending upon whether sampling occurred during early or late phenology.

**STAND TABLE**

***Eleocharis macrostachya* - *Marsilea vestita* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **ELMA5** | ***Eleocharis macrostachya*** | **100** | **16.0** | **3** | **40** | | **X** | **X** | |
| | **MAVEV** | ***Marsilea vestita* subsp. *vestita*** | **100** | **5.8** | **0.2** | **16** | | | **X** | |
| | ELAC | *Eleocharis acicularis* | 60 | 0.3 | 0.2 | 1 | | | | |
| | HERBAC | unknown | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCA33 | *Eryngium castrense* | 40 | 3.4 | 6 | 11 | | | | |
| | POACXX | Poaceae | 40 | 0.4 | 0.2 | 2 | | | | |
| | CYDA | *Cynodon dactylon* | 40 | 0.2 | 0.2 | 1 | | | | X |
| | MIGU | *Mimulus guttatus* | 40 | 0.2 | 0.2 | 1 | | | | |
| | ODHA | *Odontostomum hartwegii* | 40 | 0.2 | 0.2 | 1 | | | | |
| | LOMU | *Lolium multiflorum* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | PLGL2 | *Plagiobothrys glyptocarpus* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | POAN | *Poa annua* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | PODI | *Potamogeton diversifolius* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | RAAQ | *Ranunculus aquatilis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | RAMU2 | *Ranunculus muricatus* | 40 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUCR | *Rumex crispus* | 40 | 0.1 | 0.2 | 0.2 | | | | X |

## *Juncus* (*balticus*, *mexicanus*) Herbaceous Alliance
## Rush (Baltic, Mexican) Herbaceous Alliance

As defined in the state, *Juncus balticus* and/or *J. mexicanus* dominate(s) or co-dominate(s) with a variety of other wetland species. In some cases, *Carex praegracilis* may dominate, but *J. balticus* and/or *J. mexicanus* are/is present in an intermittent to continuous herbaceous layer. A diverse variety of other wetland native and non-native species occupy the herb overstory at low cover. Trees, such as *Pinus sabiniana*, and shrubs, such as *Juniperus californica* and *Rhamnus tomentella*, may occur in the overstory at trace cover. Both *J. balticus* and the less widespread *J. mexicanus* are ecologically similar and have overlapping morphological traits. They are thus combined into a single alliance (per Sawyer et al. 2007 MS). Both species have been observed in stands in the Foothills.

In the Foothills, stands contain other wetland species such as *Carex praegracilis*, *Epilobium* spp., *Juncus* spp., *Rumex crispus*, and *R. pulcher*. Two associations were classified for this alliance and are described below.

### *Juncus balticus* Herbaceous Association
### Baltic Rush Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and dominated by *Juncus balticus* at 3-52% cover. Other taxa that were occasionally present included *Epilobium*, *Geranium dissectum*, *Mimulus guttatus*, and *Rumex crispus.*

In the study area, this association was sampled infrequently within the central Sierra Nevada Foothills and Cascade Range Foothills, and somewhat frequently in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occasionally occurred on metamorphic (including gabbro) substrates, and infrequently on granitic, ultramafic, basalt, or mixed alluvium substrates. They occupied a variety of wetland settings, from bottoms to middle slopes, or on the edges of basins/wetlands. Slopes were flat to moderate.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Calaveras, El Dorado, Nevada, Placer, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 52.4 | 20-95 | - |
| Herb | 51.2 | 16-95 | variable |
| Shrub | 1 | 0-4 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.3 | 0-3 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 29.7 | 0-63 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (2), SW (2), SE (2), Variable (1), S (1), NE (1), Flat (1)
Macrotopography: bottom (3), lower slope (2), middle slope (3), edge of basin/wetland (2)
Microtopography: undulating (5), flat (3), concave (1), convex (1)
Parent Material: metamorphic (3), granitic (2), ultramafic (2), basalt (1), gabbro (1), mixed alluvium (1)
Soil Texture: clay or clay loam (5), loam or sandy loam (1), muck (1), sand (1), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 881 ft. | 454-1452 ft. |
| Slope | 3.7º | 0-8º |
| Large rock cover | 1.4% | 0-5% |
| Small rock cover | 1.5% | 0-6% |
| Bare ground cover | 32.6% | 5-66% |
| Litter cover | 53.4% | 25-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=10)

**Rapid Assessments:** SNNR0266, SNNR0609, SNNR0707, SNNR1397 **Relevés:** SNFN0039, SNFN0055, SNFN0220, SNFN0291, SNFN0356, SNFN0689

**Rank:** G5S

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills, Yosemite National Park (Keeler-Wolf et al 2003b), the eastern Sierra Nevada and Carson Range (Manning and Padgett 1995), the Great Valley area in Suisun Marsh (Keeler-Wolf and Vaghti 200), and southern California (Evens and San 2006). It is likely widespread in cismontane and transmontane California, including the central Mojave Desert (Thomas et al. 2004).

**STAND TABLE**
***Juncus balticus* Herbaceous Association**

| **Lifeform** | **Code** | **Species Name** | **Con** | **Avg** | **Min** | **Max** | **D** | **cD** | **C** | **N** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **JUBA** | ***Juncus balticus*** | **90** | **21.5** | **3** | **52** | | **X** | **X** | |
| | GEDI | *Geranium dissectum* | 40 | 0.6 | 0.2 | 5 | | | | X |
| | MIGU | *Mimulus guttatus* | 30 | 0.3 | 0.2 | 3 | | | | |
| | RUCR | *Rumex crispus* | 30 | 0.2 | 0.2 | 2 | | | | X |
| | EPILO | *Epilobium* | 30 | 0.2 | 0.2 | 1 | | | | |

***Juncus balticus* - *Carex praegracilis* Herbaceous Association (Provisional)**
**Baltic Rush - Clustered Field Sedge Herbaceous Association (Provisional)**

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and dominated by *Carex praegracilis* at 5-44% cover. Other taxa that were often present included *Juncus* spp., *Juncus balticus*, and *Rumex pulcher*. *Salix laevigata* sometimes occurred as a scattered emergent tree.

This association was sampled infrequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on metamorphic or sandy alluvium substrates. They occupied gentle, sloping wetland sites in bottoms and on lower to middle slopes.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in El Dorado and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 27 | 15-44 | - |
| Herb | 27 | 15-44 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-0.2 | <5 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 5.1 | 4-6 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (3)
Macrotopography: bottom (1), lower slope (1), middle slope (1)
Microtopography: undulating (2), concave (1)
Parent Material: metamorphic (2), sandy alluvium (1)
Soil Texture: clay or clay loam (2), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 486 ft. | 330-749 ft. |
| Slope | 3º | 2-4º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 7% | 7-7% |
| Litter cover | 91% | 91-91% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0925 **Relevés:** SNFN0040, SNFN0041

**Rank:** G4S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based currently on the data collected for this project. It likely occurs elsewhere in cismontane California, especially the Central Valley, and may occur in transmontane California east of the Sierra Nevada. Holstein (2001) specifically notes that stands where *Carex praegracilis* is dominant occur in the Central Valley. More sampling and analysis is needed to determine if *C*. *praegracilis* is important and diagnostic enough for a separate alliance, or if it should be retained within the *J*. *balticus* Alliance.

**STAND TABLE**
***Juncus balticus* - *Carex praegracilis* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-M | *Salix laevigata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SALA3-L | *Salix laevigata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **CAPR5** | ***Carex praegracilis*** | **100** | **20.7** | **5** | **44** | **X** | | **X** | |
| | **JUBA** | ***Juncus balticus*** | **67** | **4.7** | **7** | **7** | | | | |
| | **JUNCU** | ***Juncus*** | **67** | **0.4** | **0.2** | **1** | | | | |
| | RUPU3 | *Rumex pulcher* | 67 | 0.4 | 0.2 | 1 | | | | X |
| | HERBAC | unknown | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | CADE8 | *Carex densa* | 33 | 1.0 | 3 | 3 | | | | |
| | EPILO | *Epilobium* | 33 | 1.0 | 3 | 3 | | | | |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 33 | 0.7 | 2 | 2 | | | | |
| | STACH | *Stachys* | 33 | 0.7 | 2 | 2 | | | | |
| | CIVU | *Cirsium vulgare* | 33 | 0.3 | 1 | 1 | | | | X |
| | JUTE | *Juncus tenuis* | 33 | 0.3 | 1 | 1 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 33 | 0.3 | 1 | 1 | | | | X |
| | ANVI2 | *Andropogon virginicus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CYPER | *Cyperus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CYER | *Cyperus eragrostis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ELMA5 | *Eleocharis macrostachya* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ERSE3 | *Eremocarpus setigerus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GEMO | *Geranium molle* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYPE | *Hypericum perforatum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUME4 | *Juncus mexicanus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | KIEL | *Kickxia elatine* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | LYHY2 | *Lythrum hyssopifolia* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | MYOSO | *Myosotis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUSA | *Rumex salicifolius* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TYPHA | *Typha* | 33 | 0.1 | 0.2 | 0.2 | | | | |

## *Juncus* (*oxymeris*, *xiphioides*) Herbaceous Alliance
## Rush (Pointed, Irisleaf) Herbaceous Alliance

Evens and San (2004) and Alexander et al. (2006) define a *J. xiphioides* alliance as typical of serpentine seeps in the Central Coast and the California Floristic Province. We are redefining the *Juncus xiphioides* Alliance in the state, whereby either *J. oxymeris* or *J. xiphioides* dominates in the herbaceous layer. This alliance is found in seeps and on riparian margins, which often have ultramafic soils. Other native and non-native species may be present, but with lower numbers and abundance than *J. oxymeris* or *J. xiphioides*. Such species include *Carex* spp., *Juncus balticus*, *Lolium multiflorum*, and *Lythrum* spp. This alliance has been found in natural, wetland habitats such as streams of serpentine alluvial substrates from the Central Coast and North Coast Ranges of California (CNPS 2006, J. Evens, pers. obs. 2003, Evens and San 2004). The alliance also is likely to occur in small patches in other parts of California, Nevada, Arizona, New Mexico, Idaho, Oregon, and Washington.

In the study area, *Juncus oxymeris* was sampled more commonly than *Juncus xiphioides*. Stands contained herbs and grasses such as *Lotus purshianus*, *Lolium multiflorum*, *Eleocharis acicularis* or *E. macrostachya*. There are two associations described for the Rush (Pointed, Irisleaf) Alliance - one for each of the two *Juncus* species.

### *Juncus oxymeris* Herbaceous Association (Provisional)
### Pointed Rush Herbaceous Association (Provisional)

#### SUMMARY
In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Juncus oxymeris* at 9-50% cover. Other taxa that were often present included *Briza minor*, *Lolium multiflorum*, *Lotus purshianus*, *Mimulus guttatus*, *Rumex crispus*, and *Triteleia hyacinthina*.

This association was sampled infrequently in the study area within the central and northern Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands occurred on metamorphic, ultramafic, or volcanic substrates. They occupied wetland sites on bottom to middle slopes that were flat to gentle.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in El Dorado, Mariposa, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 64.8 | 39-95 | - |
| Herb | 64.4 | 37-95 | variable |
| Shrub | 0.4 | 0-2 | 1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 30.3 | 10-52 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (4), SE (1)
Macrotopography: bottom (3), bottom to lower slope (1), middle slope (1)
Microtopography: flat (3), concave (2)
Parent Material: metamorphic (2), ultramafic (2), volcanic (1)
Soil Texture: loam or sandy loam (1), sand (1), silt or silt loam (1), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1273 ft. | 869-2061 ft. |
| Slope | 0.4º | 0-1º |
| Large rock cover | 20% | 0-60% |
| Small rock cover | 6.7% | 0-20% |
| Bare ground cover | 26.7% | 5-40% |
| Litter cover | 40.7% | 10-62% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** SNNR0108, SNNR0212, SNNR0690, SNNR1411, SNNR1490
**Relevés:** none

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on data collected for this project. It appears that wetland stands on ultramafics contain falcate-leaved rushes, such as *J. oxymeris* or *J. xiphioides*. However, we need more data and analysis to determine if stands where either species is dominant are significantly different from each other and from the non-serpentine stands with other wetland species.

**STAND TABLE**
***Juncus oxymeris* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **JUOX** | ***Juncus oxymeris*** | **100** | **26.8** | **9** | **50** | | **X** | **X** | |
| | LOPU3 | *Lotus purshianus* | 80 | 2.5 | 0.2 | 10 | | | X | |
| | LOMU | *Lolium multiflorum* | 60 | 2.1 | 0.2 | 10 | | | | X |
| | MIGU | *Mimulus guttatus* | 60 | 1.1 | 0.2 | 5 | | | | |
| | RUCR | *Rumex crispus* | 60 | 0.9 | 0.2 | 4 | | | | X |
| | BRMI2 | *Briza minor* | 60 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRHY3 | *Triteleia hyacinthina* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | POMO5 | *Polypogon monspeliensis* | 40 | 6.4 | 10 | 22 | | | | X |
| | HOBR2 | *Hordeum brachyantherum* | 40 | 3.0 | 0.2 | 15 | | | | |
| | SIBE | *Sisyrinchium bellum* | 40 | 1.4 | 0.2 | 7 | | | | |
| | ELMA5 | *Eleocharis macrostachya* | 40 | 0.6 | 0.2 | 3 | | | | |
| | HECA | *Helianthella californica* | 40 | 0.6 | 1 | 2 | | | | |
| | CYDA | *Cynodon dactylon* | 40 | 0.4 | 0.2 | 2 | | | | X |
| | HEFI | *Hemizonia fitchii* | 40 | 0.2 | 0.2 | 1 | | | | |
| | PHAQ | *Phalaris aquatica* | 40 | 0.2 | 0.2 | 1 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 40 | 0.2 | 0.2 | 1 | | | | |
| | POA | *Poa* | 40 | 0.1 | 0.2 | 0.2 | | | | |

***Juncus xiphioides* Herbaceous Association (Provisional)**

**Irisleaf Rush Herbaceous Association (Provisional)**

**SUMMARY**

In the one stand sampled, the herbaceous canopy was intermittent and dominated by *Juncus xiphioides* at 28% cover. A variety of facultative and obligate wetland taxa were present with sparse cover (see stand table below). *Quercus douglasii* occurred as a scattered emergent tree.

This association was sampled once in the study area within the Cascade Range Foothills Subregion (Hickman 1993). Stands occurred on volcanic substrates. They occupied wetland habitats on bottom slopes that were gentle.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Shasta County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 40 | 40-40 | - |
| Herb | 40 | 40-40 | >0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1 | 1-1 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 5 | 5-5 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NW (1)
Macrotopography: bottom (1)
Microtopography: concave (1)
Parent Material: volcanic (1)
Soil Texture: loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1370 ft. | 1370-1370 ft. |
| Slope | 3º | 3-3º |
| Large rock cover | 10.9% | 10.9-10.9% |
| Small rock cover | 25.5% | 25.5-25.5% |
| Bare ground cover | 31.8% | 31.8-31.8% |
| Litter cover | 1.8% | 1.8-1.8% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=1)

**Rapid Assessments:** SNNR0834 **Relevés:** none

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described on volcanics in the Sierra Nevada Foothills based on data from this project; it has also been described on serpentine in the Central Coast, specifically on serpentine seeps in Santa Clara County (Evens and San 2004). This sample in the Foothills appears similar to surveys in the *Eleocharis acicularis - Eryngium castrense* Association - both types are found on volcanic wetlands and have similar species composition. More sampling and analysis is needed to determine if this plot should be merged into the volcanic wetland association with *Eleocharis acicularis*, instead of the *J. xiphioides* association.

**STAND TABLE**
***Juncus xiphioides* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QUDO-T | *Quercus douglasii* | 100 | 1.0 | 1 | 1 | X | | X | |
| **Herb** | | | | | | | | | | |
| | **JUXI** | ***Juncus xiphioides*** | **100** | **28.0** | **28** | **28** | **X** | | **X** | |
| | ELAC | *Eleocharis acicularis* | 100 | 4.0 | 4 | 4 | | | X | |
| | ERCA33 | *Eryngium castrense* | 100 | 2.0 | 2 | 2 | | | X | |
| | HOMA2 | *Hordeum marinum* | 100 | 2.0 | 2 | 2 | | | X | X |
| | JUTE | *Juncus tenuis* | 100 | 1.0 | 1 | 1 | | | X | |
| | LOOB2 | *Lotus oblongifolius* | 100 | 1.0 | 1 | 1 | | | X | |
| | ASFA | *Asclepias fascicularis* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | CAHE3 | *Callitriche heterophylla* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | ELMA5 | *Eleocharis macrostachya* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | HERA3 | *Heterocodon rariflorum* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | ISHO | *Isoetes howellii* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | LOMAT | *Lomatium* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | MIGU | *Mimulus guttatus* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | NATA3 | *Navarretia tagetina* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | ODHA | *Odontostomum hartwegii* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | PAVI3 | *Parentucellia viscosa* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | TRVA | *Trifolium variegatum* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | HERBAC | unknown | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 100 | 3.0 | 3 | 3 | X | | X | |

## *Juncus effusus* Herbaceous Alliance
## Common Rush Herbaceous Alliance

As defined in the state, *Juncus effusus* is dominant or co-dominant with other graminoids such as *Carex praegracilis*, *C. subfusca*, and *J. xiphioides* in an intermittent to dense herbaceous layer. The shrub and tree layers are absent or sparse. This alliance grows on silty or clayey loam soils, in flats and depressions with high water tables, or on gentle slopes of all aspects that have saturated or at least moist soils throughout most of the growing season. *Juncus effusus* stands are often able to persist in degraded sites such as heavily grazed pastures where some species associates are largely non-native. The *Juncus effusus* Alliance has been described previously as abundant in low elevation wetland sites in western Oregon (Christy 2004), as sporadic in the San Dieguito River Park Region, San Diego County (Evens and San 2006) with *Juncus effusus* var. *pacificus*, and in coastal sites in Marin County including the Point Reyes National Seashore area and Mount Tamalpais (NatureServe et al. 2003a, Evens and Kentner 2006) with *J. effusus* var. *brunneus*.

In the Foothills, this alliance was sampled twice and one association was described. Stands contained other riparian/wetlands herbs and occasional trees and shrubs such as *Rubus discolor*, *Holcus lanatus*, *Epilobium ciliatum*, and *Quercus lobata*.

---

## *Juncus effusus* Herbaceous Association
## Common Rush Herbaceous Association

### SUMMARY
In the stands sampled, the herbaceous canopy was continuous and dominated by *Juncus effusus* at 65-89% cover. Other taxa that were characteristically present included *Cirsium vulgare* *Epilobium ciliatum*, and *Holcus lanatus*. *Quercus lobata* often occurred as a scattered emergent tree, and *Rhamnus tomentella*, *Rosa californica*, and *Rubus discolor* often occurred as emergent shrubs.

This association was sampled twice in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands occurred on metamorphic substrates with silty or clayey loam soils. They occupied wetland habitats on lower and middle slopes. Stands typically have water throughout the growing season from natural drainage and/or freshwater seeps.

### DISTRIBUTION IN STUDY AREA
This association was sampled in Amador and Nevada Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 87.5 | 85-90 | - |
| Herb | 86.5 | 83-90 | >0.3 |
| Shrub | 3.5 | 2-5 | 1-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-0.2 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 11.3 | 8-15 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (1), SE (1)
Macrotopography: lower slope (1), middle slope (1)
Microtopography: concave (2)
Parent Material: metamorphic (2)
Soil Texture: clay or clay loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1154 ft. | 1008-1300 ft. |
| Slope | 2.5º | 2-3º |
| Large rock cover | 0.1% | 0-0.2% |
| Small rock cover | 0.1% | 0-0.2% |
| Bare ground cover | 40% | 40-40% |
| Litter cover | 47.5% | 45-50% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0624, SNNR1064 **Relevés:** none

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described in inland wetlands in California, including the Sierra Nevada Foothills and the San Dieguito River Park in San Diego County (Evens and San 2006). It has also been described in coastal to inland wetlands of western Oregon (Christy 2004).

**STAND TABLE**
***Juncus effusus* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | QULO-M | *Quercus lobata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QULO-T | *Quercus lobata* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 100 | 3.0 | 1 | 5 | X | | X | X |
| | RHTO6 | *Rhamnus tomentella* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ROCA2 | *Rosa californica* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **JUEF** | ***Juncus effusus*** | **100** | **77.0** | **65** | **89** | **X** | | **X** | |
| | HOLA | *Holcus lanatus* | 100 | 2.0 | 1 | 3 | | | X | X |
| | EPCI | *Epilobium ciliatum* | 100 | 1.1 | 0.2 | 2 | | | X | |
| | CIVU | *Cirsium vulgare* | 100 | 0.6 | 0.2 | 1 | | | X | X |
| | TYLA | *Typha latifolia* | 50 | 3.5 | 7 | 7 | | | | |
| | POPE3 | *Polygonum persicaria* | 50 | 2.0 | 4 | 4 | | | | X |
| | MEPU | *Mentha pulegium* | 50 | 1.5 | 3 | 3 | | | | X |
| | RORA | *Rotala ramosior* | 50 | 1.5 | 3 | 3 | | | | |
| | MIGU | *Mimulus guttatus* | 50 | 0.5 | 1 | 1 | | | | |
| | POMO5 | *Polypogon monspeliensis* | 50 | 0.5 | 1 | 1 | | | | X |
| | STACH | *Stachys* | 50 | 0.5 | 1 | 1 | | | | |
| | AVBA | *Avena barbata* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | COAR4 | *Convolvulus arvensis* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | GEDI | *Geranium dissectum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOMA2 | *Hordeum marinum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | HYPE | *Hypericum perforatum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUOX | *Juncus oxymeris* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | MEAR4 | *Mentha arvensis* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | PADI6 | *Paspalum distichum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RONA2 | *Rorippa nasturtium-aquaticum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUPU3 | *Rumex pulcher* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOAS | *Sonchus asper* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRPO | *Tragopogon porrifolius* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | VEBL | *Verbascum blattaria* | 50 | 0.1 | 0.2 | 0.2 | | | | X |

### *Lasthenia fremontii - Downingia* (*bicornuta*) Herbaceous Alliance
### Fremont's Goldfields - Calicoflower Herbaceous Alliance

As defined for the state, *Lasthenia fremontii*, *Downingia* spp., *Navarretia leucocephala*, and/or *Eryngium* (*castrense* or *vaseyi*) are present and characteristic species. Stands are characterized by an open to continuous herbaceous canopy. They occur in ephemeral wetlands with very gradual or no significant slope, in swales and vernal pools of the Northern Hardpan, Northern Mudflow, and Northern Basalt Flow Vernal Pool types (Holland 1986). These wetlands have standing water during the winter and early spring, which may fill and empty multiple times during a normal rainy season.

In the study area, the calicoflowers in this alliance were primarily *Downingia ornatissima*, *D. cuspidata*, and *D. bicornuta*. Stands contained other vernal pool species such as *Deschampsia danthonioides*, *Eryngium castrense*, and *Plagiobothrys stipitatus* var. *micranthus*. Five associations are described for the Fremont's Goldfields - Calicoflower Alliance. Three samples (SNFN0307, SNFN0367, SNFN0362) showed additional variation and were classified to the alliance level only because of high cover of other forbs such as *Navarretia leucocephala*, *Alopecurus saccatus*, and *Gratiola ebracteata*, but little or no cover of *Lasthenia fremontii* or *Downingia* species.

---

### *Downingia* (*cuspidata*, *bicornuta*) Herbaceous Association
### Calicoflower (Toothed, Doublehorn) Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was intermittent to continuous, with the consistent presence of *Downingia bicornuta* and/or *Downingia cuspidata* at <1-16% cover. *Deschampsia danthonioides*, *Eryngium castrense*, and *Psilocarphus brevissimus* were characteristically present, while *Eleocharis macrostachya*, *Lasthenia californica*, and *Navarretia leucocephala* subsp. *leucocephala* were often present.

This association was sampled infrequently in the study area within the Cascade Range Foothills Subregion (Hickman 1993). Stands consistently occurred on volcanic substrates. They usually occupied flats, edges of basins/wetlands, or bottoms - usually in northern hardpan vernal pools or infrequently in vernally wet habitats.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Tehama County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 54 | 35-72 | - |
| Herb | 54 | 35-72 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 15.8 | 0-73 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (5)
Macrotopography: bottom (1), edge of basin/wetland (4)
Microtopography: flat (3), undulating (2)
Parent Material: volcanic (5)
Soil Texture: clay or clay loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 670 ft. | 361-881 ft. |
| Slope | 0º | -º |
| Large rock cover | 0% | -% |
| Small rock cover | 6% | 6-6% |
| Bare ground cover | 14% | 14-14% |
| Litter cover | 70% | 70-70% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** none **Relevés:** SNFN0237, SNFN0239, SNFN0240, SNFN0323, SNFN0324

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills and adjacent Great Valley (Barbour et al. 2007). According to Barbour et al. (2007), the *Downingia cuspidata*/*bicornuta* herbaceous Association is relatively common in volcanic pools on high terrace, or mud flow landforms, with Red Bluff, Tuscan, or Holocene geomorphic surfaces, and on Toomes, Tuscan, or Anita soil series. Vernal pools are usually large (ca. 2500 $m^2$). This type is found in the Northeastern Sacramento Valley region, and it fits within the "Northern Mudflow" category of Sawyer and Keeler-Wolf (1995).

**STAND TABLE**
***Downingia* (*cuspidata*, *bicornuta*) Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | PSBR | *Psilocarphus brevissimus* | 80 | 6.8 | 0.2 | 24 | | | X | |
| | DEDA | *Deschampsia danthonioides* | 80 | 5.7 | 0.2 | 27 | | | X | |
| | **DOCU** | ***Downingia cuspidata*** | **80** | **3.7** | **0.2** | **16** | | | **X** | |
| | ERCA33 | *Eryngium castrense* | 80 | 1.5 | 0.2 | 5 | | | X | |
| | NALEL | *Navarretia leucocephala* subsp. *leucocephala* | 60 | 12.2 | 6 | 45 | | | | |
| | LACA7 | *Lasthenia californica* | 60 | 3.0 | 1 | 10 | | | | |
| | ELMA5 | *Eleocharis macrostachya* | 60 | 1.4 | 0.2 | 6 | | | | |
| | LOMU | *Lolium multiflorum* | 40 | 5.4 | 4 | 23 | | | | X |
| | **DOBIP** | ***Downingia bicornuta* var. *picta*** | **40** | **3.2** | **0.2** | **16** | | | | |
| | PLSTS | *Plagiobothrys stipitatus* var. *stipitatus* | 40 | 3.2 | 2 | 14 | | | | |
| | ALSA3 | *Alopecurus saccatus* | 40 | 1.2 | 3 | 3 | | | | |
| | PLST | *Plagiobothrys stipitatus* | 40 | 0.8 | 0.2 | 4 | | | | |
| | LAFR4 | *Lasthenia fremontii* | 40 | 0.1 | 0.2 | 0.2 | | | | |

***Downingia bicornuta - Lasthenia fremontii* Herbaceous Association**

**Doublehorn Calicoflower - Fremont's Goldfields Herbaceous Association**

**SUMMARY**

In the one stand sampled, the herbaceous canopy was intermittent, with *Downingia bicornuta* (9% cover), *Eleocharis acicularis* (10% cover), *Lasthenia fremontii* (30% cover), and *Ranunculus bonariensis* (38% cover) having the highest cover values. A variety of facultative and obligate wetland species were present (see stand table below).

This association was sampled once in the study area within the Sacramento Valley Subregion (Hickman 1993). The stand occurred on clayey alluvium substrate. It occupied a gently sloping bottom in a northern hardpan vernal pool.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Sacramento County, within the Camanche Terraces (262Ao) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 65 | 65-65 | - |
| Herb | 65 | 65-65 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 0.7 | 1-1 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SE (1)
Macrotopography: bottom (1)
Microtopography: flat (1)
Parent Material: clayey alluvium (1)
Soil Texture: clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 174 ft. | 174-174 ft. |
| Slope | 1º | 1-1º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 59% | 59-59% |
| Litter cover | 40% | 40-40% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=1)

**Rapid Assessments:** none **Relevés:** SNFN0710

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills and adjacent Great Valley (Barbour et al. 2007). According to Barbour et al. (2007), the *Downingia bicornuta - Lasthenia fremontii* Herbaceous Association occurs in hardpan pools on low terrace, high terrace, and (occasionally) on volcanic landforms, with Riverbank, Modesto, Turlock, Laguna, Valley Springs, Mehrten, and China Hat geomorphic surfaces, and on a wide variety of soils series. Vernal pools are small (ca. 700 $m^2$). This common association occurs in the Southeastern Sacramento Valley and Southern Sierra Foothills vernal pool regions, and it fits within the "Northern Hardpan" category of Sawyer and Keeler-Wolf (1995).

**STAND TABLE**

***Downingia bicornuta - Lasthenia fremontii* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | RABO | *Ranunculus bonariensis* | 100 | 38.0 | 38 | 38 | | X | X | |
| | **LAFR4** | ***Lasthenia fremontii*** | **100** | **30.0** | **30** | **30** | | | **X** | |
| | ELAC | *Eleocharis acicularis* | 100 | 10.0 | 10 | 10 | | | X | |
| | **DOBI** | ***Downingia bicornuta*** | **100** | **9.0** | **9** | **9** | | | **X** | |
| | ERVA5 | *Eryngium vaseyi* | 100 | 6.0 | 6 | 6 | | | X | |
| | DEDA | *Deschampsia danthonioides* | 100 | 5.0 | 5 | 5 | | | X | |
| | PIAM | *Pilularia americana* | 100 | 5.0 | 5 | 5 | | | X | |
| | PLSTM | *Plagiobothrys stipitatus* var. *micranthus* | 100 | 5.0 | 5 | 5 | | | X | |
| | NALE | *Navarretia leucocephala* | 100 | 2.0 | 2 | 2 | | | X | |
| | CAMA3 | *Callitriche marginata* | 100 | 1.0 | 1 | 1 | | | X | |
| | CACA79 | *Castilleja campestris* | 100 | 1.0 | 1 | 1 | | | X | |
| | ALSA3 | *Alopecurus saccatus* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | CRAQ | *Crassula aquatica* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | ELMA5 | *Eleocharis macrostachya* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | GREB | *Gratiola ebracteata* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | HYGL2 | *Hypochaeris glabra* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | JUBU | *Juncus bufonius* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | LETA | *Leontodon taraxacoides* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | LYHY2 | *Lythrum hyssopifolia* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |
| | POAN | *Poa annua* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |

***Downingia ornatissima* - *Lasthenia fremontii* Herbaceous Association**
**Folded Calicoflower - Fremont's Goldfields Herbaceous Association**

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and characterized by *Alopecurus saccatus* (1-6% cover), *Deschampsia danthonioides* (<1-21% cover), *Downingia ornatissima* (<1-19% cover), and *Plagiobothrys stipitatus* var. *micranthus* (<1-9% cover). Other taxa that were often present included *Blennosperma nanum* var. *nanum*, *Eryngium castrense*, *Lasthenia fremontii*, *Lolium multiflorum*, and *Navarretia leucocephala* subsp. *leucocephala*.

In the study area, this association was sampled somewhat infrequently within the Cascade Range Foothills, and infrequently in the Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic or volcanic substrates. They often occupied flat bottoms or mesa/plateaus, and infrequently occupied flat edges of a basin/wetland, usually in Northern Hardpan Vernal Pools and occasionally in Northern Basalt Flow Vernal Pools.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte and Shasta Counties, within the North Valley Alluvium (262Aa) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 35 | 17-65 | - |
| Herb | 34.9 | 17-64 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 5 | 0-14 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (8), N (1)
Macrotopography: bottom (4), edge of basin/wetland (1), mesa/plateau (4)
Microtopography: concave (4), flat (4), undulating (1)
Parent Material: metamorphic (5), volcanic (4)
Soil Texture: clay or clay loam (5), silt or silt loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 504 ft. | 206-880 ft. |
| Slope | 0º | -º |
| Large rock cover | 4% | 0-13% |
| Small rock cover | 4.7% | 0.4-11% |
| Bare ground cover | 83.6% | 71-93% |
| Litter cover | 5.8% | 2-16% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** none **Relevés:** SNFN0117, SNFN0118, SNFN0120, SNFN0126, SNFN0129, SNFN0365, SNFN0368, SNFN0373, SNFN0374

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills. According to Barbour et al. (2007), the *Downingia ornatissima - Lasthenia fremontii* Association is common in hardpan vernal pools on high terrace and low terrace landforms in the northern Foothills on Tuscan and related soils. It occurs in the Northeastern Sacramento Valley and foothills, and it fits into the "Northern Hardpan" category of Sawyer and Keeler-Wolf (1995). It is possibly endemic to this region.

**STAND TABLE**

***Downingia ornatissima - Lasthenia fremontii* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | DEDA | *Deschampsia danthonioides* | 100 | 4.4 | 0.2 | 21 | | | X | |
| | PLSTM | *Plagiobothrys stipitatus* var. *micranthus* | 100 | 2.4 | 0.2 | 9 | | | X | |
| | ALSA3 | *Alopecurus saccatus* | 100 | 2.2 | 1 | 6 | | | X | |
| | **DOOR** | ***Downingia ornatissima*** | **89** | **4.7** | **0.2** | **19** | | | **X** | |
| | ERCA33 | *Eryngium castrense* | 67 | 3.4 | 0.2 | 10 | | | | |
| | LOMU | *Lolium multiflorum* | 67 | 0.5 | 0.2 | 3 | | | | X |
| | NALEL | *Navarretia leucocephala* subsp. *leucocephala* | 56 | 13.8 | 1 | 60 | | | | |
| | **LAFR4** | ***Lasthenia fremontii*** | **56** | **4.0** | **1** | **16** | | | | |
| | BLNAN | *Blennosperma nanum* var. *nanum* | 56 | 0.2 | 0.2 | 1 | | | | |
| | HOMA2 | *Hordeum marinum* | 44 | 0.7 | 0.2 | 3 | | | | X |
| | GREB | *Gratiola ebracteata* | 44 | 0.5 | 0.2 | 2 | | | | |
| | PSBR | *Psilocarphus brevissimus* | 44 | 0.2 | 0.2 | 1 | | | | |
| | POZI | *Pogogyne ziziphoroides* | 33 | 0.5 | 0.2 | 3 | | | | |
| | ERYNG | *Eryngium* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HEFI | *Hemizonia fitchii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LACA7 | *Lasthenia californica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POAN | *Poa annua* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | MYMI2 | *Myosurus minimus* | 22 | 0.8 | 0.2 | 7 | | | | |
| | BRODI | *Brodiaea* | 22 | 0.6 | 1 | 4 | | | | |
| | TRDE | *Trifolium depauperatum* | 22 | 0.4 | 0.2 | 3 | | | | |
| | ISHO | *Isoetes howellii* | 22 | 0.2 | 0.2 | 2 | | | | |
| | JUBU | *Juncus bufonius* | 22 | 0.2 | 0.2 | 2 | | | | |
| | ACMO2 | *Achyrachaena mollis* | 22 | 0.1 | 0.2 | 1 | | | | |
| | NALE | *Navarretia leucocephala* | 22 | 0.1 | 0.2 | 1 | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | CYDA | *Cynodon dactylon* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | LEPID | *Lepidium* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | LYHY2 | *Lythrum hyssopifolia* | 22 | 0.0 | 0.2 | 0.2 | | | | X |
| | MIAC | *Microseris acuminata* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | PLER3 | *Plantago erecta* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 22 | 0.0 | 0.2 | 0.2 | | | | |

## *Eryngium* (*vaseyi*, *castrense*) Herbaceous Association

## Coyote-thistle Herbaceous Association


### SUMMARY

In the stands sampled, the herbaceous canopy was open to intermittent and characterized by *Eryngium castrense* at 1-36% cover. Other taxa that were often present included *Deschampsia danthonioides* and *Plagiobothrys stipitatus* var. *micranthus*. In the local northern Foothills, stands appear to be dominated by *E*. *castrense* without *E*. *vaseyi*. According to Barbour et al. (2007), this association does not have many diagnostic species within the *Downingia bicornuta - Lasthenia fremontii* Herbaceous Alliance, other than the *Eryngium* species, *Plagiobothrys stipitatus* var. *micranthus*, and *Psilocarphus brevissimus*. However, diagnostic species of class and order are present, which places this type within the order *Downingia-Lasthenia*.

In the study area, this association was sampled somewhat frequently in the Cascade Range Foothills and infrequently in the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic, and infrequently on metamorphic or granitic substrates. They were found in vernal pools, along valley bottoms to lower slopes, in wetlands on flat or gently sloping mesa/plateaus.


### DISTRIBUTION IN STUDY AREA

This association was sampled in Butte, El Dorado, Madera, Shasta, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb), Lower Granitic Foothills (M261Fc), and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 30.3 | 10-66 | - |
| Herb | 30.3 | 10-66 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | 10-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 12 | 0-64 | - |

### LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: Flat (9), NW (1), E (1)
Macrotopography: bottom (2), bottom to lower slope (1), lower slope (1), mesa/plateau (4), ridgetop (3)
Microtopography: concave (6), flat (4), undulating (1)
Parent Material: volcanic (8), metamorphic (2), granitic (1)
Soil Texture: silt or silt loam (5), sand (2), clay or clay loam (1), muck (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1851 ft. | 607-9146 ft. |
| Slope | 0.4º | 0-3º |
| Large rock cover | 5.2% | 0-30% |
| Small rock cover | 14.8% | 0-51% |
| Bare ground cover | 66.9% | 19-99% |
| Litter cover | 11.2% | 0.2-37% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)

**Rapid Assessments:** SNNR0124, SNNR0696, SNNR0831, SNNR0886, SNNR1171, SNNR1317 **Relevés:** SNFN0308, SNFN0370, SNFN0381, SNFN0383, SNFN0436

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills and adjacent Great Valley. According to Barbour et al. (2007), this basal community (or association) is similar to the *Downingia ornatissima - Lasthenia fremontii* and *Downingia cuspidata - Lasthenia fremontii* Associations in that they are found in the same geographic regions, geologic settings, and soils. However, this community differs in having an absence of *Downingia ornatissima* and *D. cuspidata*. In general, *Downingia* species have low persistence, and they might be temporarily absent from some vernal pool samples taken during dry years because these species' seeds may remain in the soil as a seed bank (Barbour et al. 2007). Some of the stands classified as this basal community may belong to associations of *Downingia ornatissima - Lasthenia fremontii* and *Downingia cuspidata - Lasthenia fremontii;* only further sampling and analysis will elucidate these relationships.

**STAND TABLE**

***Eryngium* (*vaseyi*, *castrense*) Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **ERCA33** | ***Eryngium castrense*** | **100** | **10.1** | **1** | **36** | | | **X** | |
| | PLSTM | *Plagiobothrys stipitatus* var. *micranthus* | 64 | 1.1 | 0.2 | 6 | | | | |
| | DEDA | *Deschampsia danthonioides* | 55 | 1.2 | 0.2 | 6 | | | | |
| | NALE | *Navarretia leucocephala* | 45 | 6.3 | 0.2 | 50 | | | | |
| | ISHO | *Isoetes howellii* | 45 | 3.4 | 0.2 | 15 | | | | |
| | ELMA5 | *Eleocharis macrostachya* | 45 | 2.8 | 0.2 | 26 | | | | |
| | GREB | *Gratiola ebracteata* | 45 | 1.5 | 0.2 | 8 | | | | |
| | PSBR | *Psilocarphus brevissimus* | 45 | 1.4 | 0.2 | 8 | | | | |
| | HOMA2 | *Hordeum marinum* | 36 | 1.3 | 0.2 | 6 | | | | X |
| | MITR3 | *Mimulus tricolor* | 36 | 0.4 | 0.2 | 2 | | | | |
| | POACXX | Poaceae | 36 | 0.2 | 0.2 | 2 | | | | |
| | DOCU | *Downingia cuspidata* | 36 | 0.1 | 0.2 | 1 | | | | |
| | LYHY2 | *Lythrum hyssopifolia* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOMU | *Lolium multiflorum* | 27 | 0.5 | 0.2 | 5 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 27 | 0.1 | 0.2 | 1 | | | | |
| | EPPA7 | *Epilobium pallidum* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | POZI | *Pogogyne ziziphoroides* | 27 | 0.1 | 0.2 | 0.2 | | | | |

***Lasthenia fremontii* Herbaceous Association (Provisional)**

**Fremont's Goldfields Herbaceous Association (Provisional)**

**SUMMARY**

In the stands sampled, the herbaceous canopy was open to intermittent, with the consistent presence of *Deschampsia danthonioides* (<1-4% cover), *Lasthenia fremontii* (7-30% cover), and *Lolium multiflorum* (<1-17% cover). *Achyrachaena mollis* and *Alopecurus saccatus* were characteristically present, while *Brodiaea*, *Eryngium castrense*, *Lepidium nitidum*, *Pogogyne ziziphoroides*, and *Triphysaria eriantha* subsp. *eriantha* were often present. These stands are related to other associations of the *Lasthenia fremontii* - *Downingia* (*bicornuta*) Alliance, but for various reasons, lack species of *Downingia*.

This association was sampled infrequently in the study area in the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) or infrequently on metamorphic substrates. They usually occupied vernal pools on flat, bottom slopes.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 43.2 | 27-55 | - |
| Herb | 42.4 | 26-55 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 11.6 | 1-28 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (5)
Macrotopography: bottom (5)
Microtopography: flat (4), concave (1)
Parent Material: volcanic (3), basalt (1), metamorphic (1)
Soil Texture: clay or clay loam (3), loam or sandy loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 285 ft. | 230-319 ft. |
| Slope | 0º | -º |
| Large rock cover | 0.2% | 0.2-0.2% |
| Small rock cover | 35% | 35-35% |
| Bare ground cover | 57% | 57-57% |
| Litter cover | 5% | 5-5% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=5)

**Rapid Assessments:** none **Relevés:** SNFN0077, SNFN0127, SNFN0302, SNFN0425, SNFN0428

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based currently upon the data collected for this project. Following Barbour et al. (2007), we may lump such stands into the *Downingia* (*ornatissima*) - *Lasthenia fremontii* Herbaceous Association. The lack of *Downingia* species in our plots may be the result of not sampling during peak phenology. This type remains provisional until further sampling can verify the presence or absence of *Downingia* species.

**STAND TABLE**

***Lasthenia fremontii* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **LAFR4** | ***Lasthenia fremontii*** | **100** | **13.0** | **7** | **30** | | | **X** | |
| | LOMU | *Lolium multiflorum* | 100 | 4.1 | 0.2 | 17 | | | X | X |
| | DEDA | *Deschampsia danthonioides* | 100 | 2.0 | 0.2 | 4 | | | X | |
| | ALSA3 | *Alopecurus saccatus* | 80 | 1.8 | 0.2 | 7 | | | X | |
| | ACMO2 | *Achyrachaena mollis* | 80 | 0.2 | 0.2 | 0.2 | | | X | |
| | BRODI | *Brodiaea* | 60 | 1.2 | 0.2 | 5 | | | | |
| | ERCA33 | *Eryngium castrense* | 60 | 0.8 | 0.2 | 2 | | | | |
| | POZI | *Pogogyne ziziphoroides* | 60 | 0.5 | 0.2 | 2 | | | | |
| | LENI | *Lepidium nitidum* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 60 | 0.1 | 0.2 | 0.2 | | | | |
| | LIDOR2 | *Limnanthes douglasii* subsp. *rosea* | 40 | 10.2 | 12 | 39 | | | | |
| | NALE | *Navarretia leucocephala* | 40 | 4.2 | 4 | 17 | | | | |
| | PLSTM | *Plagiobothrys stipitatus* var. *micranthus* | 40 | 1.2 | 2 | 4 | | | | |
| | CAMA3 | *Callitriche marginata* | 40 | 1.0 | 2 | 3 | | | | |
| | LAFR2 | *Layia fremontii* | 40 | 0.4 | 0.2 | 2 | | | | |
| | BLNAN | *Blennosperma nanum* var. *nanum* | 40 | 0.4 | 1 | 1 | | | | |
| | MICA7 | *Minuartia californica* | 40 | 0.2 | 0.2 | 1 | | | | |
| | ALLIU | *Allium* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | PLAU | *Plagiobothrys austiniae* | 40 | 0.1 | 0.2 | 0.2 | | | | |

### *Layia fremontii* Herbaceous Alliance
### Fremont's Tidytips Herbaceous Alliance

As defined in the state, *Layia fremontii* is an indicator (and may be dominant to sub-dominant) forming colorful early spring floral displays along edges of vernal pools, swales, and vernally moist upland flats (see photo on page 301). Stands have open to continuous canopies and usually occur with *Bromus hordeaceus*, *Triphysaria eriantha* subsp. *eriantha*, *Lasthenia californica*, and *Achyrachaena mollis*. This is a transitionally mesic alliance found in both uplands and vernal pools. *Cicendia quadrangularis*, *Vulpia microstachys*, *Plantago erecta*, and other upland species, may combine (usually with low cover) with vernally moist site indicators such as *Deschampsia danthonioides*, *Plagiobothrys austiniae*, *Navarretia leucocephala*, and others. Non-native species such as *Aira caryophyllea*, *Bromus hordeaceus*, *Hypochaeris glabra*, and *Taeniatherum caput-medusae* may be present, sometimes with just as much cover as the native species (or higher cover later in the season).

Barbour et al. (2007) define a synonymous *Layia fremontii - Achyrachaena mollis* Alliance, which they describe as occurring in hardpan vernal pools that develop on shallow rocky soils in the Northeastern Sacramento Valley and Northwestern Sacramento Valley vernal pool regions. These pools corresponds to the “Northern Hardpan” category of Sawyer and Keeler-Wolf (1995). Stands may include *Layia fremontii*, *Achyrachaena mollis*, *Triphysaria eriantha* subsp. *eriantha*, *Taeniatherum caput-medusae*, and *Clarkia purpurea*. However, we have found stands in non-pool settings dominated by *Layia fremontii*, including on Tuscan soils in vernally moist uplands that receive subsurface water flows in the spring. Thus, we are expanding the definition of the alliance and removing *A*. *mollis* from the name, since it is not a specific indicator of all associations.

In the Foothills, stands of *Layia fremontii* commonly occur in both upland flats and on wetland vernal pool edges with other herb species such as *Triphysaria eriantha* subsp. *eriantha*, *Bromus hordeaceus*, *Aira caryophyllea*, and *Navarretia tagetina*. Three associations described below contain a variety of forb species, including *Achyrachaena mollis*, *Lasthenia californica*, *Leontodon taraxacoides*, *Plagiobothrys austiniae*, and *P*. *greenei*. One sample (SNNR0880) showed additional variation and was classified to the alliance level only because of high cover of moss and grass.

---

### *Layia fremontii - Lasthenia californica - Achyrachaena mollis* Herbaceous Association
### Fremont's Tidytips - California Goldfields - Blow Wives Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous and characterized by *Layia fremontii* (<1-35% cover), *Lasthenia californica* (<1-20% cover), and *Triphysaria eriantha* subsp. *eriantha* (<1-6% cover). Other taxa that were present in at least 60% of the samples, include *Achyrachaena mollis*, *Aira caryophyllea*, *Brodiaea*, *Bromus hordeaceus*, *Lolium multiflorum*, *Navarretia tagetina*, *Plantago erecta*, *Vulpia microstachys*. Stands have a rich assortment of native forbs in the early to middle of spring, which then dry out and stands become dominated by grasses and later-flowering forbs in the late spring and summer.

In the study area, this association was sampled frequently within the Cascade Range Foothills and infrequently in the northern Sierra Nevada Foothills and Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) or metamorphic substrates, but were found rarely on sedimentary substrates. They occupied a variety of primarily

upland slope positions, from bottoms to upper slopes and ridgetops, sometimes on mesas/plateaus, and infrequently at the edge of a basin/wetland. Slopes were flat to moderate. These stands occurred on vernally moist upland flats on rocky, clay soils in areas that typically have moderate grazing. Although some samples were adjacent to vernal pools, stands were technically not part of the pool proper at many sites.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 37.2 | 10-72 | - |
| Herb | 36.8 | 6-72 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 27.1 | 0-78 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (7), NW (6), SW (4), W (2), Variable (1)
Macrotopography: bottom (5), lower slope (1), middle slope (3), upper slope (2), edge of basin/wetland (1), mesa/plateau (4), ridgetop (3)
Microtopography: flat (13), undulating (5), convex (2)
Parent Material: volcanic (9), metamorphic (8), sedimentary (2), basalt (1)
Soil Texture: clay or clay loam (13), loam or sandy loam (5), sand (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 488 ft. | 207-1428 ft. |
| Slope | 1.1º | 0-6º |
| Large rock cover | 2.9% | 0-15% |
| Small rock cover | 8.7% | 0-30% |
| Bare ground cover | 48.8% | 4-94% |
| Litter cover | 37.2% | 0.2-79% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=20)

**Rapid Assessments:** SNNR1502, SNNR1503 **Relevés:** SNFN0078, SNFN0115, SNFN0116, SNFN0119, SNFN0122, SNFN0123, SNFN0124, SNFN0125, SNFN0128, SNFN0301, SNFN0309, SNFN0310, SNFN0311, SNFN0342, SNFN0408, SNFN0699, SNFN0700, SNFN0708

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on data collected for this project. It is similar to the *Layia fremontii - Achyrachaena mollis* Herbaceous Association from

Barbour et al. (2007) where stands occur on vernal pool edges; however, some of our stands were found in uplands that still have shallow rocky soils that are winter-spring wet and summer dry.

**STAND TABLE**
***Layia fremontii - Lasthenia californica - Achyrachaena mollis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **LAFR2** | ***Layia fremontii*** | **95** | **6.7** | **0.2** | **35** | | | **X** | |
| | **LACA7** | ***Lasthenia californica*** | **85** | **3.5** | **0.2** | **20** | | | **X** | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 85 | 1.2 | 0.2 | 6 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 75 | 3.6 | 0.2 | 19 | | | | X |
| | PLER3 | *Plantago erecta* | 70 | 1.8 | 0.2 | 20 | | | | |
| | **ACMO2** | ***Achyrachaena mollis*** | **65** | **2.0** | **0.2** | **16** | | | | |
| | VUMI | *Vulpia microstachys* | 65 | 0.8 | 0.2 | 5 | | | | |
| | AICA | *Aira caryophyllea* | 65 | 0.3 | 0.2 | 2 | | | | X |
| | NATA3 | *Navarretia tagetina* | 60 | 1.7 | 0.2 | 10 | | | | |
| | BRODI | *Brodiaea* | 60 | 1.5 | 0.2 | 11 | | | | |
| | LOMU | *Lolium multiflorum* | 55 | 3.7 | 0.2 | 23 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 55 | 3.5 | 0.2 | 26 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 55 | 3.3 | 0.2 | 24 | | | | X |
| | ERBO | *Erodium botrys* | 55 | 0.8 | 0.2 | 7 | | | | X |
| | JUBU | *Juncus bufonius* | 55 | 0.6 | 0.2 | 4 | | | | |
| | HEFI | *Hemizonia fitchii* | 55 | 0.3 | 0.2 | 2 | | | | |
| | MIAC | *Microseris acuminata* | 55 | 0.2 | 0.2 | 2 | | | | |
| | POZI | *Pogogyne ziziphoroides* | 50 | 0.8 | 0.2 | 5 | | | | |
| | LIBI | *Linanthus bicolor* | 45 | 0.5 | 0.2 | 3 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 45 | 0.5 | 0.2 | 3 | | | | |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 40 | 0.5 | 0.2 | 5 | | | | |
| | TRDE | *Trifolium depauperatum* | 40 | 0.4 | 0.2 | 5 | | | | |
| | MICA | *Micropus californicus* | 40 | 0.4 | 0.2 | 2 | | | | |
| | LENI | *Lepidium nitidum* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | BLNAN | *Blennosperma nanum* var. *nanum* | 35 | 1.1 | 0.2 | 17 | | | | |
| | AVFA | *Avena fatua* | 35 | 0.9 | 0.2 | 12 | | | | X |
| | MICA7 | *Minuartia californica* | 35 | 0.5 | 0.2 | 3 | | | | |
| | NAVAR | *Navarretia* | 35 | 0.5 | 0.2 | 6 | | | | |
| | CHAN2 | *Chlorogalum angustifolium* | 35 | 0.1 | 0.2 | 1 | | | | |
| | ODHA | *Odontostomum hartwegii* | 35 | 0.1 | 0.2 | 1 | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 35 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 35 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 30 | 0.3 | 0.2 | 3 | | | | X |
| | PEDU2 | *Petrorhagia dubia* | 30 | 0.2 | 0.2 | 2 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 25 | 0.4 | 0.2 | 5 | | | | |

**STAND TABLE continued**
***Layia fremontii - Lasthenia californica - Achyrachaena mollis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 25 | 0.3 | 0.2 | 2 | | | | |
| | MESA | *Medicago sativa* | 25 | 0.2 | 0.2 | 2 | | | | X |
| | PAPU10 | *Parvisedum pumilum* | 25 | 0.1 | 0.2 | 1 | | | | |
| | LETA | *Leontodon taraxacoides* | 25 | 0.1 | 0.2 | 1 | | | | X |
| | TRHY3 | *Triteleia hyacinthina* | 25 | 0.1 | 0.2 | 1 | | | | |
| | LUBI | *Lupinus bicolor* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 60 | 2.2 | 0.2 | 15 | | | | |

***Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei* Herbaceous Association**

**Fremont's Tidytips - Lesser Hawkbit - Greene's Popcornflower Herbaceous Association**

**SUMMARY**

In the stands sampled, the herbaceous canopy was intermittent to continuous and characterized by *Layia fremontii* at <1-20% cover, *Leontodon taraxacoides* at 2-35% cover, and *Plagiobothrys greenei* at <1-3% cover. Other characteristic taxa included *Aira caryophyllea*, *Briza minor*, *Brodiaea*, *Bromus hordeaceus*, *Cicendia quadrangularis*, *Erodium botrys*, *Hemizonia fitchii*, *Juncus bufonius*, *Juncus capitatus*, *Linanthus bicolor*, *Navarretia tagetina*, *Trifolium dubium*, *Trifolium microcephalum*, *Trifolium variegatum*, *Triphysaria eriantha* subsp. *eriantha*, and *Vulpia bromoides*.

This association was sampled fairly frequently in the study area within the northern Sierra Nevada Foothills Subregion (Hickman 1993). Stands usually occurred on metamorphic (including slate) substrates and infrequently on mixed alluvium substrates. They occupied a variety of upland slope positions from lower to upper slopes that were gentle to moderate.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Sacramento County, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997). Much of the data supporting this association came from the Deer Creek Hills.

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 54.2 | 43-68 | - |
| Herb | 54.4 | 43-68 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 37.7 | 7-55 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: W (3), SW (2), NW (2), N (2), E (2)
Macrotopography: lower slope (1), middle slope (1), upper slope (3)
Microtopography: flat (5)
Parent Material: metamorphic (8), slate (2), mixed alluvium (1)
Soil Texture: clay or clay loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 468 ft. | 398-522 ft. |
| Slope | 4º | 1-7º |
| Large rock cover | 0.1% | 0-0.2% |
| Small rock cover | 2.2% | 0.2-8% |
| Bare ground cover | 42.8% | 9-85% |
| Litter cover | 50.2% | 11-87% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)

**Rapid Assessments:** none **Relevés:** SNFN0208, SNFN0230, SNFN0234, SNFN0274, SNFN0281, SNFN0450, SNFN0451, SNFN0463, SNFN0464, SNFN0467, SNFN0522

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based currently upon data analyzed for this project. It appears to be replaced further north in the study area by the *Layia fremontii - Lasthenia californica - Achyrachaena mollis* Association. Soil texture, moisture, and chemistry may play a role in distinguishing between these two associations.

**STAND TABLE**

***Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **LETA** | ***Leontodon taraxacoides*** | **100** | **18.7** | **2** | **35** | | | **X** | **X** |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 100 | 15.3 | 4 | 30 | | | X | |
| | JUBU | *Juncus bufonius* | 100 | 4.5 | 1 | 15 | | | X | |
| | AICA | *Aira caryophyllea* | 100 | 2.7 | 1 | 7 | | | X | X |
| | TRVA | *Trifolium variegatum* | 100 | 2.5 | 0.2 | 8 | | | X | |
| | ERBO | *Erodium botrys* | 100 | 2.5 | 1 | 7 | | | X | X |
| | NATA3 | *Navarretia tagetina* | 100 | 2.0 | 0.2 | 8 | | | X | |
| | BRMI2 | *Briza minor* | 100 | 0.7 | 0.2 | 1 | | | X | X |
| | **PLGR** | ***Plagiobothrys greenei*** | **100** | **0.5** | **0.2** | **3** | | | **X** | |
| | CIQU3 | *Cicendia quadrangularis* | 100 | 0.3 | 0.2 | 1 | | | X | |
| | JUCA5 | *Juncus capitatus* | 100 | 0.3 | 0.2 | 1 | | | X | X |
| | **LAFR2** | ***Layia fremontii*** | **91** | **8.7** | **0.2** | **20** | | | **X** | |
| | LIBI | *Linanthus bicolor* | 91 | 0.5 | 0.2 | 2 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 82 | 2.7 | 0.2 | 6 | | | X | X |
| | BRODI | *Brodiaea* | 82 | 1.1 | 0.2 | 6 | | | X | |
| | TRDU2 | *Trifolium dubium* | 82 | 0.8 | 0.2 | 4 | | | X | X |
| | VUBR | *Vulpia bromoides* | 82 | 0.3 | 0.2 | 1 | | | X | X |
| | TRMI4 | *Trifolium microcephalum* | 82 | 0.2 | 0.2 | 1 | | | X | |
| | HEFI | *Hemizonia fitchii* | 82 | 0.2 | 0.2 | 0.2 | | | X | |
| | HYGL2 | *Hypochaeris glabra* | 73 | 2.7 | 0.2 | 12 | | | | X |
| | CEGL2 | *Cerastium glomeratum* | 73 | 0.1 | 0.2 | 0.2 | | | | X |
| | PLFU | *Plagiobothrys fulvus* | 73 | 0.1 | 0.2 | 0.2 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 73 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 64 | 1.1 | 0.2 | 4 | | | | |
| | LOMU | *Lolium multiflorum* | 64 | 1.1 | 0.2 | 10 | | | | X |
| | POZI | *Pogogyne ziziphoroides* | 64 | 0.5 | 0.2 | 2 | | | | |
| | CEMI | *Centunculus minimus* | 64 | 0.3 | 0.2 | 1 | | | | |
| | CAAT25 | *Castilleja attenuata* | 64 | 0.1 | 0.2 | 0.2 | | | | |
| | LACA7 | *Lasthenia californica* | 55 | 3.7 | 0.2 | 19 | | | | |
| | CHAN2 | *Chlorogalum angustifolium* | 55 | 0.2 | 0.2 | 1 | | | | |

**STAND TABLE continued**
***Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 55 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMI | *Lotus micranthus* | 45 | 0.1 | 0.2 | 0.2 | | | | |
| | MOFO | *Montia fontana* | 45 | 0.1 | 0.2 | 0.2 | | | | |
| | TRDE | *Trifolium depauperatum* | 36 | 1.8 | 2 | 9 | | | | |
| | AVBA | *Avena barbata* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | LENI | *Lepidium nitidum* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | SIGA | *Silene gallica* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | ANAR | *Anagallis arvensis* | 27 | 0.1 | 0.2 | 1 | | | | X |
| | CALU9 | *Calochortus luteus* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | HORDE | *Hordeum* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOMAG | *Hordeum marinum* subsp. *gussonianum* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | LYHY2 | *Lythrum hyssopifolia* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | POAN | *Poa annua* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 100 | 12.3 | 0.2 | 40 | X | | X | |

***Plagiobothrys austiniae - Achyrachaena mollis* Herbaceous Association**

**Austin's Popcornflower - Blow Wives Herbaceous Association**

**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous, with the frequent presence of *Achyrachaena mollis* at <1-22% cover and *Plagiobothrys austiniae* at <1-4% cover. Characteristic taxa included *Cicendia quadrangularis*, *Hypochaeris glabra*, *Layia fremontii*, *Pogogyne zizyphoroides*, *Taeniatherum caput-medusae*, and *Triphysaria eriantha* subsp. *eriantha*

In the study area, this association was sampled fairly frequently within the Cascade Range Foothills, and was sampled once in the northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) substrates. They usually occupied short-inundated vernal pool edges in valley bottoms or in wet portions of vernal swales in hummock/swale landscapes found in valleys and on mesas/plateaus – sometimes termed "Tuscan swales". Slopes varied from flat to moderate. This association may co-occur with the *Layia fremontii - Lasthenia californica - Achyrachaena mollis* Association, but tends to occur in situations where inundation from winter rains is somewhat longer.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 34.9 | 20-76 | - |
| Herb | 34.9 | 20-76 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 22.1 | 1-40 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (6), Variable (2), SE (1), N (1), E (1)
Macrotopography: bottom (8), upper slope (1), mesa/plateau (2)
Microtopography: flat (8), concave (2), undulating (1)
Parent Material: volcanic (8), basalt (3)
Soil Texture: clay or clay loam (4), loam or sandy loam (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 402 ft. | 266-883 ft. |
| Slope | 1.7º | 0-12º |
| Large rock cover | 0.5% | 0-3% |
| Small rock cover | 15.1% | 2.2-32% |
| Bare ground cover | 43.5% | 9-91% |
| Litter cover | 38.3% | 1-81% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)

**Rapid Assessments:** none **Relevés:** SNFN0080, SNFN0081, SNFN0082, SNFN0198, SNFN0200, SNFN0312, SNFN0314, SNFN0338, SNFN0427, SNFN0430, SNFN0434

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based currently upon the data collected for this project. It is likely restricted to the northern Sierra (including the southern Cascades) Foothills area. This association appears similar to the *Layia fremontii - Lasthenia californica - Achyrachaena mollis* Herbaceous Association; further sampling and analysis is needed to confirm if these two types should remain separate associations.

**STAND TABLE**

***Plagiobothrys austiniae - Achyrachaena mollis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | POZI | *Pogogyne ziziphoroides* | 100 | 2.3 | 0.2 | 12 | | | X | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 91 | 2.7 | 0.2 | 20 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 91 | 2.1 | 0.2 | 8 | | | X | X |
| | LAFR2 | *Layia fremontii* | 82 | 4.4 | 1 | 12 | | | X | |
| | HYGL2 | *Hypochaeris glabra* | 82 | 1.9 | 0.2 | 7 | | | X | X |
| | TACA8 | *Taeniatherum caput-medusae* | 82 | 1.2 | 0.2 | 4 | | | X | X |
| | CIQU3 | *Cicendia quadrangularis* | 82 | 0.3 | 0.2 | 1 | | | X | |
| | **ACMO2** | ***Achyrachaena mollis*** | **73** | **3.1** | **0.2** | **22** | | | | |
| | BLNAN | *Blennosperma nanum* var. *nanum* | 73 | 2.2 | 0.2 | 14 | | | | |
| | NATA3 | *Navarretia tagetina* | 73 | 1.4 | 0.2 | 7 | | | | |
| | AICA | *Aira caryophyllea* | 73 | 0.7 | 0.2 | 5 | | | | X |
| | **PLAU** | ***Plagiobothrys austiniae*** | **73** | **0.6** | **0.2** | **4** | | | | |
| | TRDE | *Trifolium depauperatum* | 73 | 0.2 | 0.2 | 1 | | | | |
| | LOMU | *Lolium multiflorum* | 64 | 3.4 | 0.2 | 14 | | | | X |
| | BRODI | *Brodiaea* | 64 | 0.4 | 0.2 | 2 | | | | |
| | HEFI | *Hemizonia fitchii* | 64 | 0.3 | 0.2 | 1 | | | | |
| | PLER3 | *Plantago erecta* | 64 | 0.3 | 0.2 | 2 | | | | |
| | LACA7 | *Lasthenia californica* | 55 | 7.1 | 0.2 | 45 | | | | |
| | LENI | *Lepidium nitidum* | 55 | 0.7 | 0.2 | 3 | | | | |
| | VUMI | *Vulpia microstachys* | 55 | 0.6 | 0.2 | 3 | | | | |
| | CHAN2 | *Chlorogalum angustifolium* | 55 | 0.1 | 0.2 | 0.2 | | | | |
| | LAFR4 | *Lasthenia fremontii* | 45 | 1.7 | 0.2 | 11 | | | | |
| | LIFLC2 | *Limnanthes floccosa* subsp. *californica* | 45 | 1.5 | 1 | 7 | | | | |
| | DEDA | *Deschampsia danthonioides* | 45 | 1.3 | 0.2 | 8 | | | | |
| | JUBU | *Juncus bufonius* | 45 | 0.5 | 0.2 | 3 | | | | |
| | LIBI | *Linanthus bicolor* | 45 | 0.4 | 0.2 | 4 | | | | |
| | LUNA3 | *Lupinus nanus* | 45 | 0.2 | 0.2 | 1 | | | | |

**STAND TABLE continued**
***Plagiobothrys austiniae* - *Achyrachaena mollis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | DOCLP | *Dodecatheon clevelandii* subsp. *patulum* | 36 | 0.3 | 0.2 | 2 | | | | |
| | ERBO | *Erodium botrys* | 36 | 0.1 | 0.2 | 1 | | | | X |
| | MIAC | *Microseris acuminata* | 36 | 0.1 | 0.2 | 1 | | | | |
| | ALLIU | *Allium* | 36 | 0.1 | 0.2 | 0.2 | | | | |
| | NALE | *Navarretia leucocephala* | 27 | 1.9 | 0.2 | 11 | | | | |
| | MICA7 | *Minuartia californica* | 27 | 0.5 | 0.2 | 5 | | | | |
| | LASE | *Lactuca serriola* | 27 | 0.2 | 0.2 | 1 | | | | X |
| | BRMI2 | *Briza minor* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | MEPO3 | *Medicago polymorpha* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 73 | 8.9 | 0.2 | 50 | | | | |
| | LIVER | Liverwort | 27 | 0.4 | 0.2 | 3 | | | | |

### *Lolium multiflorum* Herbaceous Semi-Natural Stands
### Italian Ryegrass Herbaceous Semi-Natural Stands

As defined in the state, *Lolium multiflorum* is dominant in these herbaceous stands with a slightly higher than ambient moisture regime. Other non-native annual grasses (e.g., *Bromus hordeaceus*, *Hordeum* spp.) may be present but in relatively low cover. This type is commonly found in California, within lowlands that have periodic flooding, within disked fields and managed uplands, and within coastal serpentine slopes that have well-developed clay soils with nitrogen deposition. The semi-natural type may extend into Alaska and eastern North America, though it is native to Europe (Keeler-Wolf and Vaghti 2001). It also was described previously by Pickart (2006) and Evens and San (2004).

In the study area, stands often occurred with other non-native grasses and herbs such as *Bromus hordeaceus*, *Taeniatherum caput-medusae*, *Centaurium muehlenbergii* and *Trifolium hirtum*. Two samples (SNFN0156 and SNFN0599) showed additional variation and were not classified to the association level because of significant presence or high cover of other forbs or grasses such as *Trifolium dubium* and *Hordeum marinum* subsp. *gussoneanum*. This semi-natural type is defined by strong dominance of *Lolium multiflorum*. Current taxonomic research denotes both *L*. *multiflorum* and *L*. *perenne* as a single species that includes *L*. *perenne* ssp. *multiflorum* (USDA-NRCS 2007), though other references suggest maintaining two separate species (UCB 2007). Most stands inventoried in this region appear to be dominated by annual rather than perennial plants.

### *Lolium multiflorum* - *Centaurium muehlenbergii* Herbaceous Association
### Italian Ryegrass - Muhlenberg's Centaury Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous and characterized by *Bromus hordeaceus* (<1-17% cover), *Centaurium muehlenbergii* (<1-25% cover), and *Lolium multiflorum* (3-45% cover). Other taxa that were often present included *Briza minor*, *Brodiaea elegans* subsp. *elegans*, *Eremocarpus setigerus*, *Taeniatherum caput-medusae*, and *Trifolium hirtum*.

In the study area, this association was sampled fairly frequently in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) substrates, but were also found occasionally on gabbro or metamorphic substrates. They occupied a variety of slope positions, from bottoms to middle slopes that were gentle to somewhat steep. Both *Centaurium* and *Lolium* are often associated with somewhat mesic settings within a larger upland grassland context.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, El Dorado, Mariposa, Tehama, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 55.6 | 23-85 | - |
| Herb | 55.6 | 23-85 | variable |
| Shrub | 0 | 0-0.2 | 1-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-1 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 82 | 33-98 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SW (3), Variable (2), SE (2), NW (2), W (1), S (1), NE (1), E (1)
Macrotopography: bottom (3), lower slope (4), lower to middle slope (1), middle slope (5)
Microtopography: flat (6), undulating (6), convex (1)
Parent Material: volcanic (8), gabbro (2), metamorphic (2), basalt (1)
Soil Texture: clay or clay loam (6), silt or silt loam (2), loam or sandy loam (1), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 630 ft. | 316-1235 ft. |
| Slope | 4.8º | 1-17º |
| Large rock cover | 2.3% | 0-15% |
| Small rock cover | 5.8% | 0-17% |
| Bare ground cover | 23.2% | 2-50% |
| Litter cover | 64.7% | 28-94% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=13)

**Rapid Assessments:** SNNR0207, SNNR0250, SNNR0371, SNNR0469, SNNR0476, SNNR0594, SNNR0930, SNNR0944, SNNR0949, SNNR0951, SNNR0952 **Relevés:** SNFN0159, SNFN0358

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on data collected for this project. It is likely to be found in the northern Sierra Foothills and Great Valley, and potentially west to the Central and North Coasts of California.

**STAND TABLE**

***Lolium multiflorum - Centaurium muehlenbergii* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 100 | 3.9 | 0.2 | 17 | | | X | X |
| | **CEMU2** | ***Centaurium muehlenbergii*** | **92** | **3.5** | **0.2** | **25** | | | **X** | |
| | **LOMU** | ***Lolium multiflorum*** | **85** | **13.8** | **3** | **45** | | | **X** | **X** |
| | TACA8 | *Taeniatherum caput-medusae* | 77 | 15.0 | 0.2 | 75 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 69 | 1.9 | 0.2 | 7 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 69 | 0.4 | 0.2 | 3 | | | | |
| | BRMI2 | *Briza minor* | 69 | 0.4 | 0.2 | 3 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 62 | 0.3 | 0.2 | 1 | | | | |
| | AVBA | *Avena barbata* | 46 | 1.3 | 0.2 | 8 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 46 | 0.2 | 0.2 | 2 | | | | |
| | CESO3 | *Centaurea solstitialis* | 38 | 1.6 | 0.2 | 10 | | | | X |
| | AETR | *Aegilops triuncialis* | 38 | 1.6 | 0.2 | 12 | | | | X |
| | LETA | *Leontodon taraxacoides* | 38 | 0.6 | 0.2 | 6 | | | | X |
| | HOMA2 | *Hordeum marinum* | 38 | 0.5 | 0.2 | 4 | | | | X |
| | LASE | *Lactuca serriola* | 38 | 0.4 | 0.2 | 4 | | | | X |
| | LOPU3 | *Lotus purshianus* | 31 | 2.4 | 1 | 20 | | | | |
| | AVFA | *Avena fatua* | 31 | 1.5 | 1 | 10 | | | | X |
| | NAPU4 | *Nassella pulchra* | 31 | 0.6 | 0.2 | 7 | | | | |
| | BRMA3 | *Bromus madritensis* | 31 | 0.6 | 0.2 | 4 | | | | X |
| | HEFI | *Hemizonia fitchii* | 31 | 0.6 | 0.2 | 6 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 31 | 0.3 | 0.2 | 2 | | | | X |
| | AICA | *Aira caryophyllea* | 31 | 0.2 | 0.2 | 2 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 31 | 0.2 | 0.2 | 2 | | | | |
| | HYRA3 | *Hypochaeris radicata* | 23 | 0.6 | 0.2 | 7 | | | | X |
| | TOAR | *Torilis arvensis* | 23 | 0.5 | 1 | 4 | | | | X |
| | GAPA5 | *Galium parisiense* | 23 | 0.0 | 0.2 | 0.2 | | | | X |

### *Lolium multiflorum* (*Zigadenus fremontii*) Herbaceous Alliance (Provisional)
### Italian Ryegrass (Fremont's Deathcamas) Herbaceous Alliance (Provisional)

Described for the first time in the state, this alliance has *Zigadenus fremontii* in relatively high cover, usually with *Lolium multiflorum*. Stands have open to intermittent cover. Other species often present are *Achyrachaena mollis*, *Lasthenia californica*, *Taeniatherum caput-medusae*, *Fritillaria pluriflora*, *Brodiaea* spp., and others. Stands form on vernally wet or saturated clay soils.

In the study area, this alliance is related to the *Layia fremontii* Alliance, but with *Layia fremontii* infrequently present (<25% of samples) and usually below 1%. It is also related to the *Lolium multiflorum* Semi-Natural Stands type but has more cover and a characteristic presence of native species. One association has been described in the study area for the Italian Ryegrass (Fremont's Deathcamas) Alliance.

---

### *Zigadenus fremontii* Herbaceous Association (Provisional)
### Fremont's Deathcamas Herbaceous Association (Provisional)

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and characterized by *Lolium multiflorum* (<1-16% cover), *Taeniatherum caput-medusae* (<1-25% cover), and *Zigadenus fremontii* (2-25% cover). Other taxa that were often present included *Achyrachaena mollis*, *Centaurea solstitialis*, *Erodium botrys*, *Fritillaria pluriflora*, *Geranium dissectum*, *Hypochaeris glabra*, *Lolium multiflorum*, *Medicago polymorpha*, *Taeniatherum caput-medusae*, *Triphysaria eriantha* subsp. *eriantha*, and *Zigadenus fremontii*.

This association was sampled infrequently in the study area within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred in clayey or silty alluvium soils, especially on volcanic (including basalt) substrates. They occupied vernally moist sites on bottomlands that sometimes trended into lower slopes or toeslopes and rarely, middle slopes. Slopes varied from flat to moderate.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Shasta, and Tehama Counties, within the Northern Eastside Terraces (262Ab) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 37.2 | 22-55 | - |
| Herb | 36.5 | 22-55 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 54.9 | 23-79 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (4), S (1), N (1)
Macrotopography: bottom (3), bottom to lower slope (1), middle slope (1), toeslope (1)
Microtopography: flat (4), undulating (1), convex (1)
Parent Material: volcanic (3), basalt (2), clayey alluvium (1)
Soil Texture: clay or clay loam (4), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 451 ft. | 279-1071 ft. |
| Slope | 1.3º | 0-6º |
| Large rock cover | 0.1% | 0-0.4% |
| Small rock cover | 2.2% | 0-5% |
| Bare ground cover | 43.4% | 25-90% |
| Litter cover | 50.2% | 2-68% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0882 **Relevés:** SNFN0032, SNFN0168, SNFN0295, SNFN0398, SNFN0400

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based upon data collected for this project. It appears to be restricted to vernally saturated, clayey, and silty soils in the northern Foothills. However, the broad distribution of the two characteristic taxa in this association suggests it should be found in other parts of cismontane California.

**STAND TABLE**

***Zigadenus fremontii* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **ZIFR** | ***Zigadenus fremontii*** | **100** | **8.0** | **2** | **25** | | | **X** | |
| | TACA8 | *Taeniatherum caput-medusae* | 100 | 7.9 | 0.2 | 25 | | | X | X |
| | LOMU | *Lolium multiflorum* | 83 | 5.0 | 0.2 | 16 | | | X | X |
| | HYGL2 | *Hypochaeris glabra* | 67 | 1.4 | 0.2 | 8 | | | | X |
| | GEDI | *Geranium dissectum* | 67 | 1.3 | 0.2 | 7 | | | | X |
| | ERBO | *Erodium botrys* | 67 | 0.3 | 0.2 | 1 | | | | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 67 | 0.1 | 0.2 | 0.2 | | | | |
| | CESO3 | *Centaurea solstitialis* | 50 | 2.6 | 0.2 | 15 | | | | X |
| | ACMO2 | *Achyrachaena mollis* | 50 | 0.9 | 0.2 | 3 | | | | |
| | FRPL | *Fritillaria pluriflora* | 50 | 0.8 | 1 | 3 | | | | |
| | MEPO3 | *Medicago polymorpha* | 50 | 0.7 | 0.2 | 4 | | | | X |
| | AVBA | *Avena barbata* | 33 | 1.2 | 2 | 5 | | | | X |
| | BRODI | *Brodiaea* | 33 | 0.9 | 0.2 | 5 | | | | |
| | TRHI4 | *Trifolium hirtum* | 33 | 0.7 | 1 | 3 | | | | X |
| | LUBI | *Lupinus bicolor* | 33 | 0.5 | 0.2 | 3 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 33 | 0.2 | 0.2 | 1 | | | | |
| | CEMU2 | *Centaurium muehlenbergii* | 33 | 0.2 | 0.2 | 1 | | | | |
| | TRIFO | *Trifolium* | 33 | 0.2 | 0.2 | 1 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HEFI | *Hemizonia fitchii* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LACA7 | *Lasthenia californica* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LENI | *Lepidium nitidum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PLER3 | *Plantago erecta* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SEVU | *Senecio vulgaris* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRDU2 | *Trifolium dubium* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 9.3 | 1 | 40 | | | | |

### *Mimulus guttatus* Herbaceous Alliance (Provisional)
### Seep Monkeyflower Herbaceous Alliance (Provisional)

In this alliance, *Mimulus guttatus* is dominant in the herbaceous layer with other wetland and upland herbs such as *Carex* sp., *Equisetum arvense*, *Juncus* sp., *Lactuca serriola*, *Lotus purshianus*, *Melilotus indicus*, *Poa tenerrima*, and *Sonchus asper* subsp. *asper*. Cover varies from sparse to continuous, depending on site environmental and disturbance conditions. Stands occur in seeps and springs, along streambanks, and in other wet places. Regular disturbance is likely to maintain stands with this rhizomatous forb. Willows such as *Salix laevigata* or *S. lucida* may be trace in cover. The species, *M. guttatus*, commonly occurs throughout California and the western states below 3,100 m. *M. guttatus* is a very widespread and genetically and phenotypic ally plastic annual. In California, the *M. guttatus* alliance is defined from this project and a study from Pinnacles National Monument (NatureServe 2007b), and it also is defined in Colorado and Utah (NatureServe 2007a, 2007b). Many other stands are likely to be identified throughout the state. It seems to be particularly diagnostic of vernally wet skeletal, oligotrophic soils, across a wide variety of substrates from volcanic to ultramafic.

In the Foothills, one provisional association was defined below. One survey (SNFN0341) showed additional variation with high cover of *Mimulus guttatus*, moss, and *Trifolium depauperatum* growing along a rocky stream corridor on volcanic substrate in Tehama County.

---

### *Mimulus guttatus* - *Vulpia microstachys* Serpentine Herbaceous Association (Provisional)
### Seep Monkeyflower - Small Fescue Serpentine Herbaceous Association (Provisional)

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous and dominated by *Mimulus guttatus* at 1-67% cover. Other taxa that were characteristic included *Lotus purshianus*, *Pentagramma triangularis*, and *Vulpia microstachys*; additional herbs that were often present included *Agoseris heterophylla*, *Agrostis microphylla*, *Poa tenerrima*, *Pseudobahia heermannii*, *Thysanocarpus curvipes*, *Trifolium microcephalum*, and *Triteleia hyacinthina*. Shrubs such as *Ceanothus cuneatus* sometimes occurred as emergents.

This association was sampled infrequently in the study area within the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands consistently occurred on serpentine substrates, along rocky streambeds with seasonal flooding. They occupied riparian areas in draws, stream bottoms, or terraces with slopes that were flat to gentle.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in El Dorado and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 55.5 | 13-85 | - |
| Herb | 55 | 10-85 | variable |
| Shrub | 0.3 | 0-2 | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |

| | | | |
|---|---|---|---|
| Conifer | 0 | - | - |
| Relative non-native to native cover | 4.9 | 0-22 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (1), NW (1), Flat (1), E (1), SW (1), SE (1)
Macrotopography: draw (2), lower slope (2), bottom (1), terrace (1)
Microtopography: concave (4), flat (1), undulating (1)
Parent Material: serpentine (6)
Soil Texture: clay or clay loam (2), sand (2), loam or sandy loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 997 ft. | 850-1079 ft. |
| Slope | 1.2º | 0-2º |
| Large rock cover | 2.8% | 1-5% |
| Small rock cover | 38% | 6-73% |
| Bare ground cover | 19.3% | 10-30% |
| Litter cover | 36.8% | 10-57% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0219, SNNR0221 **Relevés:** SNFN0084, SNFN0090, SNFN0131, SNFN0178

**Rank:** G3S3?

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based on the data collected for this project. The relationship of this association to associations of the *Vulpia microstachys-Lasthenia californica-Plantago erecta* Herbaceous Alliance needs further clarification, but basic hydrology and species compositions appear different between this *Mimulus guttatus* - *Vulpia microstachys* Association and associations of that alliance.

**STAND TABLE**

***Mimulus guttatus* - *Vulpia microstachys* Serpentine Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 33 | 0.1 | 0.20 | 0.40 | | | | |
| **Herb** | | | | | | | | | | |
| | **MIGU** | ***Mimulus guttatus*** | **100** | **24.0** | **1** | **67** | | **X** | **X** | |
| | **VUMI** | ***Vulpia microstachys*** | **100** | **5.1** | **0.20** | **22** | | | **X** | |
| | LOPU3 | *Lotus purshianus* | 83 | 0.6 | 0.20 | 3 | | | X | |
| | PETR7 | *Pentagramma triangularis* | 83 | 0.2 | 0.20 | 0.20 | | | X | |
| | AGHE2 | *Agoseris heterophylla* | 67 | 1.4 | 0.20 | 8 | | | | |
| | TRHY3 | *Triteleia hyacinthina* | 67 | 0.1 | 0.20 | 0.20 | | | | |
| | PSHE | *Pseudobahia heermannii* | 50 | 3.7 | 0.20 | 15 | | | | |
| | POTE5 | *Poa tenerrima* | 50 | 2.9 | 0.20 | 12 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 50 | 2.0 | 1 | 8 | | | | |
| | AGMI3 | *Agrostis microphylla* | 50 | 0.4 | 0.20 | 2 | | | | |
| | THCU | *Thysanocarpus curvipes* | 50 | 0.1 | 0.20 | 0.20 | | | | |
| | ESCA2 | *Eschscholzia californica* | 33 | 7.8 | 12 | 35 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 33 | 2.2 | 3 | 10 | | | | X |
| | ODHA | *Odontostomum hartwegii* | 33 | 1.7 | 0.20 | 10 | | | | |
| | TRRU | *Trichostema rubisepalum* | 33 | 1.2 | 3 | 4 | | | | |
| | CEVE3 | *Centaurium venustum* | 33 | 1.0 | 2 | 4 | | | | |
| | CASE2 | *Carex serratodens* | 33 | 0.5 | 0.20 | 3 | | | | |
| | HOBR2 | *Hordeum brachyantherum* | 33 | 0.4 | 0.20 | 2 | | | | |
| | DAPU3 | *Daucus pusillus* | 33 | 0.3 | 1 | 1 | | | | |
| | SICAC3 | *Sidalcea calycosa* subsp. *calycosa* | 33 | 0.2 | 0.20 | 1 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 33 | 0.2 | 0.20 | 1 | | | | |
| | AVBA | *Avena barbata* | 33 | 0.1 | 0.20 | 0.20 | | | | X |
| | CACI2 | *Calandrinia ciliata* | 33 | 0.1 | 0.20 | 0.20 | | | | |
| | GAAP2 | *Galium aparine* | 33 | 0.1 | 0.20 | 0.20 | | | | |
| | HERA3 | *Heterocodon rariflorum* | 33 | 0.1 | 0.20 | 0.20 | | | | |
| | LEVI8 | *Lessingia virgata* | 33 | 0.1 | 0.20 | 0.20 | | | | |
| | PLER3 | *Plantago erecta* | 33 | 0.1 | 0.20 | 0.20 | | | | |
| | HERBAC | *unknown* | 33 | 0.1 | 0.20 | 0.20 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 1.8 | 1 | 5 | | | | |

### *Muhlenbergia rigens* Herbaceous Alliance
### Deergrass Herbaceous Alliance

As described in the state, stands of *Muhlenbergia rigens* are characterized by an open to continuous herbaceous layer, where *Muhlenbergia rigens* dominates or co-dominates. The shrub layer is open. Stands of this alliance may have *Muhlenbergia rigens* as the dominant grass, or may include other graminoids such as *Elymus glaucus* and *Juncus* spp. The shrub layer may include *Eriogonum fasciculatum* or *Eriogonum wrightii* (Klein and Evens 2006).

In the Foothills, stands usually form along edges of streams or swales surrounded by grasslands or oak woodlands, often with *Bromus hordeaceus* and occasionally with *Trifolium hirtum* and many other non-native herbs and grasses (occasionally shrubs). One association of the Deergrass Alliance, described below, was classified in the study area. Stands of this alliance have been inventoried intermittently throughout much of the state, including cismontane and warm desert portions of central and southern California (Klein and Evens 2006, NatureServe 2007b), and the lower Sierra Nevada Foothills. This report provides sufficient samples for an association level description.

---

### *Muhlenbergia rigens* Herbaceous Association
### Deergrass Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous and dominated by *Muhlenbergia rigens* at 14-65% cover. Other taxa that were often present included *Bromus hordeaceus*, *Petrorhagia dubia*, and *Trifolium hirtum*. Shrubs such as *Cytisus scoparius*, *Rubus discolor*, and *Toxicodendron diversilobum* sometimes occurred as emergents.

In the study area, this association was sampled fairly infrequently in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands sometimes occurred on mixed alluvium, metamorphic (including serpentine), or volcanic (including basalt) substrates. They usually occupied wetland bottoms, lower slopes, or benches, along riparian corridors or edges of wetlands. However, they were also found on upland middle and upper slopes, that were flat to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, El Dorado, Mariposa, Nevada, Placer, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 57.6 | 48-80 | - |
| Herb | 55.5 | 35-80 | variable |
| Shrub | 1.5 | 0-5 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 2.3 | 0-18 | 10-20 |

| | | | |
|---|---|---|---|
| Conifer | 0.4 | 0-3 | 20-35 |
| Relative non-native to native cover | 29.1 | 5-84 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (2), Flat (2), W (1), SW (1), S (1), N (1)
Macrotopography: bottom (2), bottom to lower slope (1), lower slope (2), middle slope (1), upper slope (1), bench (1)
Microtopography: flat (4), undulating (3), concave (1)
Parent Material: mixed alluvium (3), metamorphic (2), basalt (1), serpentine (1), volcanic (1)
Soil Texture: sand (4), loam or sandy loam (2), clay or clay loam (1), silt or silt loam (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 791 ft. | 296-1732 ft. |
| Slope | 5.1º | 0-23º |
| Large rock cover | 12.2% | 0.2-50% |
| Small rock cover | 26% | 1-55% |
| Bare ground cover | 27.6% | 12-62% |
| Litter cover | 29.4% | 3-72% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=8)

**Rapid Assessments:** SNNR0286, SNNR0628, SNNR0725, SNNR0877, SNNR1105 **Relevés:** SNFN0292, SNFN0294, SNFN0317

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills, based largely upon the data collected for this project and another from central California in Pinnacles National Monument (NatureServe 2007b). At this point, it is unclear whether more than one association of this alliance occurs in the state.

**STAND TABLE**

***Muhlenbergia rigens* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | RUDI2 | *Rubus discolor* | 25 | 0.4 | 1 | 2 | | | | X |
| | CYSC4 | *Cytisus scoparius* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | TODI | *Toxicodendron diversilobum* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **MURI2** | ***Muhlenbergia rigens*** | **100** | **34.5** | **14** | **65** | **X** | | **X** | |
| | BRHO2 | *Bromus hordeaceus* | 75 | 3.7 | 0.2 | 15 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 50 | 3.6 | 0.2 | 24 | | | | X |
| | PEDU2 | *Petrorhagia dubia* | 50 | 0.2 | 0.2 | 1 | | | | X |
| | LOMU | *Lolium multiflorum* | 38 | 2.2 | 0.2 | 16 | | | | X |
| | HYGL2 | *Hypochaeris glabra* | 38 | 1.4 | 1 | 6 | | | | X |
| | BRMA3 | *Bromus madritensis* | 38 | 0.3 | 0.2 | 2 | | | | X |
| | HYPE | *Hypericum perforatum* | 38 | 0.2 | 0.2 | 1 | | | | X |
| | LOPU3 | *Lotus purshianus* | 38 | 0.2 | 0.2 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 38 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPA5 | *Galium parisiense* | 38 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRDI3 | *Bromus diandrus* | 25 | 0.9 | 0.2 | 7 | | | | X |
| | TRDU2 | *Trifolium dubium* | 25 | 0.7 | 0.2 | 5 | | | | X |
| | VELI | *Verbena litoralis* | 25 | 0.5 | 2 | 2 | | | | X |
| | GRCA | *Grindelia camporum* | 25 | 0.3 | 0.2 | 2 | | | | |
| | TOAR | *Torilis arvensis* | 25 | 0.3 | 0.2 | 2 | | | | X |
| | VISA | *Vicia sativa* | 25 | 0.3 | 0.2 | 2 | | | | X |
| | GRHID2 | *Grindelia hirsutula* var. *davyi* | 25 | 0.2 | 0.2 | 1 | | | | |
| | MEAL2 | *Melilotus albus* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | PLER3 | *Plantago erecta* | 25 | 0.2 | 0.2 | 1 | | | | |
| | BRCA4 | *Brodiaea californica* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | CYEC | *Cynosurus echinatus* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | DAPU3 | *Daucus pusillus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERSE3 | *Eremocarpus setigerus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCI6 | *Erodium cicutarium* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOWR2 | *Lotus wrangelianus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | MIGU | *Mimulus guttatus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMI | *Vulpia microstachys* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 25 | 0.8 | 3 | 3 | | | | |

### *Nassella pulchra* Herbaceous Alliance
### Purple Needlegrass Herbaceous Alliance

As described in the state, stands dominated or characterized by *Nassella pulchra* may also contain additional native and non-native grasses and forbs. *N*. *pulchra* may range as low as 5% cover, but is always well-distributed throughout a stand. This alliance consistently occurs in herbaceous stands that have deep soils with high clay content. Some locations are type-converting to annual non-native grasslands with minor components of native bunchgrass and forbs, whereby *N*. *pulchra* and native forbs are sub-dominant to non-native grass species. However, *N*. *pulchra* is still the indicator for such areas. Also described on Ring Mountain in Marin County, Fiedler and Leidy (1987) have described this community as serpentine bunchgrass, occurring on upper slopes and ridge tops that are flat to moderately steep (0-25%). Characteristic species include *Lolium multiflorum*, *Nassella pulchra*, and *Chlorogalum pomeridianum*. Other associations have been defined from northern to southern California (cf. Sawyer and Keeler-Wolf 1995), with the alliance extending into Baja California

In the study area, stands of *Nassella pulchra* often contain few other native species and many non-native species, such as *Leontodon taraxacoides*, *Taeniatherum caput-medusae*, and *Trifolium hirtum*. Two associations of the Purple Needlegrass Alliance were described below. One survey (SNFN0066) showed additional variation where *Trifolium hirtum* and *Bromus hordeaceus* had high cover as co-dominants with *N*. *pulchra*. This survey was classified to the alliance level only.

---

### *Nassella pulchra* Herbaceous Association
### Purple Needlegrass Herbaceous Association

#### SUMMARY
In the stands sampled, the herbaceous canopy was intermittent to continuous and dominated by *Nassella pulchra* at 20-75% cover. Other taxa that were often present included non-natives *Bromus hordeaceus*, *Taeniatherum caput-medusae*, and *Torilis arvensis*.

This association was sampled somewhat frequently in the study area within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) substrates, but were sometimes found on metamorphic (including greenstone) substrates. They usually occupied lower slopes, sometimes bottoms, and infrequently occurred on upper slopes or edges of basins/wetlands. Slopes varied from flat to gentle.

#### DISTRIBUTION IN STUDY AREA
This association was sampled in Butte, El Dorado, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

#### LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 61.3 | 35-80 | - |
| Herb | 61.5 | 35-80 | variable |

| | | | |
|---|---|---|---|
| Shrub | 0 | 0-0.2 | <1 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.2 | 0-2 | 5-35 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 36.2 | 7-66 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (3), S (3), Flat (2), Variable (1), SE (1), NW (1)
Macrotopography: bottom (2), bottom to lower slope (1), lower slope (6), upper slope (1), edge of basin/wetland (1)
Microtopography: flat (6), concave (3), undulating (2)
Parent Material: volcanic (5), metamorphic (4), basalt (1), greenstone (1)
Soil Texture: clay or clay loam (5), silt or silt loam (4), loam or sandy loam (2)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1002 ft. | 360-1514 ft. |
| Slope | 2.3º | 0-5º |
| Large rock cover | 0.1% | 0-1% |
| Small rock cover | 1.5% | 0-5% |
| Bare ground cover | 13% | 0.2-40% |
| Litter cover | 79.4% | 50-96% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=11)

**Rapid Assessments:** SNNR0119, SNNR0209, SNNR0509, SNNR0682, SNNR0691, SNNR0693, SNNR0695 **Relevés:** SNFN0160, SNFN0165, SNFN0290, SNFN0359

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based primarily upon the data collected for this project. Similar stands have been observed and sampled in the adjacent Great Valley and in the North Coast Ranges, including Marin Municipal Water District (Evens and Kentner 2006). Other associations of this alliance described from the Coast Ranges and southern California appear to be sufficiently distinct.

**STAND TABLE**

***Nassella pulchra* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **NAPU4** | ***Nassella pulchra*** | **100** | **36.4** | **20** | **75** | **X** | | **X** | |
| | TACA8 | *Taeniatherum caput-medusae* | 100 | 9.8 | 0.2 | 26 | | | X | X |
| | TOAR | *Torilis arvensis* | 64 | 0.4 | 0.2 | 2 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 55 | 1.5 | 0.2 | 10 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 45 | 0.3 | 0.2 | 3 | | | | |
| | GAPA5 | *Galium parisiense* | 45 | 0.2 | 0.2 | 1 | | | | X |
| | BRMI2 | *Briza minor* | 45 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 36 | 2.3 | 1 | 16 | | | | X |
| | CYEC | *Cynosurus echinatus* | 36 | 1.2 | 0.2 | 12 | | | | X |
| | HYPE | *Hypericum perforatum* | 36 | 0.9 | 0.2 | 8 | | | | X |
| | LOMU | *Lolium multiflorum* | 36 | 0.8 | 0.2 | 6 | | | | X |
| | AVBA | *Avena barbata* | 36 | 0.2 | 0.2 | 2 | | | | X |
| | ANAR | *Anagallis arvensis* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | VEBL | *Verbascum blattaria* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | CESO3 | *Centaurea solstitialis* | 27 | 0.9 | 1 | 5 | | | | X |
| | BRMA3 | *Bromus madritensis* | 27 | 0.7 | 1 | 6 | | | | X |
| | VUMY | *Vulpia myuros* | 27 | 0.7 | 0.2 | 6 | | | | X |
| | SOAS | *Sonchus asper* | 27 | 0.3 | 0.2 | 3 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 27 | 0.1 | 0.2 | 1 | | | | |
| | CLPU2 | *Clarkia purpurea* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 36 | 3.8 | 0.2 | 40 | | | | |

***Nassella pulchra - Leontodon taraxacoides* Herbaceous Association**

**Purple Needlegrass - Lesser Hawkbit Herbaceous Association**

**SUMMARY**

In the stands sampled, the herbaceous canopy was intermittent to continuous, with the consistent presence of *Leontodon taraxacoides* at 5-27% cover and *Nassella pulchra* at 1-15% cover. Additional taxa that were characteristically present included *Aira caryophyllea*, *Briza minor*, *Bromus hordeaceus*, *Erodium botrys*, *Hypochaeris glabra*, *Juncus bufonius*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium microcephalum*, *Triphysaria eriantha* subsp. *eriantha*, and *Vulpia bromoides*.

This association was sampled somewhat frequently in the study area within the northern Sierra Nevada Foothills and Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates, but were occasionally found on sedimentary substrates. They occupied middle slopes that were gentle to very steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Calaveras and Sacramento Counties, within the Camanche Terraces (262Ao) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.1 | 40-90 | - |
| Herb | 73.1 | 40-90 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | 0-0.2 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 76.4 | 63-86 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SE (3), NE (3), SW (2), NW (2), W (1), S (1)
Macrotopography: middle slope (1)
Microtopography: flat (1)
Parent Material: metamorphic (10), sedimentary (2)
Soil Texture: loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 666 ft. | 666-666 ft. |
| Slope | 12.9º | 2-50º |
| Large rock cover | 0% | -% |
| Small rock cover | 7% | 7-7% |
| Bare ground cover | 16% | 16-16% |
| Litter cover | 70% | 70-70% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=12)

**Rapid Assessments:** none **Relevés:** SNFN0248, SNFN0470, SNFN0476, SNFN0481, SNFN0512, SNFN0515, SNFN0526, SNFN0528, SNFN0558, SNFN0561, SNFN0564, SNFN0565

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills, based primarily upon data collected in the central Sierra Nevada Foothills. Data from the Deer Creek Hills is particularly representative of this association. Further data collection and analysis statewide is needed to provide a broader perspective on this type, as it could be viewed as a phase of a more widespread vegetation type.

**STAND TABLE**
***Nassella pulchra - Leontodon taraxacoides* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **LETA** | ***Leontodon taraxacoides*** | **100** | **16.6** | **5** | **27** | | | **X** | **X** |
| | BRHO2 | *Bromus hordeaceus* | 100 | 14.3 | 2 | 25 | | | X | X |
| | **NAPU4** | ***Nassella pulchra*** | **100** | **6.0** | **1** | **15** | | | **X** | |
| | TRDU2 | *Trifolium dubium* | 100 | 5.6 | 0.2 | 18 | | | X | X |
| | ERBO | *Erodium botrys* | 100 | 2.3 | 0.2 | 10 | | | X | X |
| | TRHI4 | *Trifolium hirtum* | 100 | 2.1 | 0.2 | 5 | | | X | X |
| | AICA | *Aira caryophyllea* | 100 | 1.5 | 0.2 | 5 | | | X | X |
| | BRMI2 | *Briza minor* | 100 | 0.4 | 0.2 | 2 | | | X | X |
| | VUBR | *Vulpia bromoides* | 92 | 5.9 | 1 | 25 | | | X | X |
| | JUBU | *Juncus bufonius* | 92 | 1.0 | 0.2 | 5 | | | X | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 83 | 1.7 | 0.2 | 8 | | | X | |
| | HYGL2 | *Hypochaeris glabra* | 83 | 1.3 | 0.2 | 10 | | | X | X |
| | TRMI4 | *Trifolium microcephalum* | 83 | 0.4 | 0.2 | 3 | | | X | |
| | LOMU | *Lolium multiflorum* | 75 | 1.4 | 0.2 | 5 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 75 | 0.2 | 0.2 | 0.2 | | | | |
| | LIBI | *Linanthus bicolor* | 67 | 0.6 | 0.2 | 6 | | | | |
| | SOSE2 | *Soliva sessilis* | 67 | 0.3 | 0.2 | 1 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 58 | 3.3 | 0.2 | 15 | | | | X |
| | HOVIV | *Holocarpha virgata* subsp. *virgata* | 58 | 1.6 | 0.2 | 8 | | | | |
| | TRVA | *Trifolium variegatum* | 58 | 0.4 | 0.2 | 2 | | | | |
| | AVBA | *Avena barbata* | 58 | 0.3 | 0.2 | 1 | | | | X |
| | CYEC | *Cynosurus echinatus* | 50 | 0.5 | 0.2 | 5 | | | | X |
| | MICA | *Micropus californicus* | 50 | 0.4 | 0.2 | 2 | | | | |
| | ANAR | *Anagallis arvensis* | 50 | 0.3 | 0.2 | 3 | | | | X |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 50 | 0.3 | 0.2 | 2 | | | | |
| | GEDI | *Geranium dissectum* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | SIGA | *Silene gallica* | 50 | 0.1 | 0.2 | 0.2 | | | | X |

**STAND TABLE continued**
***Nassella pulchra - Leontodon taraxacoides* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | AETR | *Aegilops triuncialis* | 42 | 2.9 | 0.2 | 10 | | | | X |
| | LOPU3 | *Lotus purshianus* | 42 | 2.0 | 0.2 | 10 | | | | |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 42 | 0.2 | 0.2 | 1 | | | | |
| | HEFI | *Hemizonia fitchii* | 42 | 0.2 | 0.2 | 1 | | | | |
| | BRDI2 | *Brachypodium distachyon* | 33 | 2.2 | 1 | 16 | | | | X |
| | CALU9 | *Calochortus luteus* | 33 | 1.1 | 0.2 | 12 | | | | |
| | CEMU2 | *Centaurium muehlenbergii* | 33 | 0.1 | 0.2 | 1 | | | | |
| | GAPA5 | *Galium parisiense* | 33 | 0.1 | 0.2 | 1 | | | | X |
| | BRODI | *Brodiaea* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | FIGA | *Filago gallica* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUCA5 | *Juncus capitatus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | NAINI | *Navarretia intertexta* subsp. *intertexta* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | NATA3 | *Navarretia tagetina* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PLFU | *Plagiobothrys fulvus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SABI3 | *Sanicula bipinnatifida* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HOMAG | *Hordeum marinum* subsp. *gussonianum* | 25 | 0.2 | 0.2 | 1 | | | | X |
| | HYPE | *Hypericum perforatum* | 25 | 0.1 | 0.2 | 1 | | | | X |
| | CIQU3 | *Cicendia quadrangularis* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOMI | *Lotus micranthus* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| | TRGL4 | *Trifolium glomeratum* | 25 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRHY3 | *Triteleia hyacinthina* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 58 | 1.1 | 0.2 | 7 | | | | |

## *Phalaris aquatica* Herbaceous Semi-Natural Stands
## Harding Grass Herbaceous Semi-Natural Stands

As described in the state, *Phalaris aquatica* is dominant in an intermittent to continuous herbaceous layer. This semi-natural type is found in low elevation, inland sites in California. Significant variation in species composition and environmental settings (both upland and moist) occur across the stands. Most stands likely originate from intentional seeding for livestock forage. This type has been described in upland grasslands with *Avena barbata* in Santa Clara County (Evens and San 2006), with *Bromus hordeaceus* and *Centaurea solstitialis* in grasslands of the southern portion of the inner North Coast Ranges (Jimerson et al. 2000), and as a pure association in Suisun Marsh in small stands along levees (Keeler-Wolf and Vaghti 2000). It has also been inventoried in Southern California, in the Santa Monica Mountains (Keeler-Wolf and Evens (2006) and on Santa Cruz Island (AIS 2007). This type is native to Mediterranean Europe.

In the study area, stands are typically found in mesic settings, with underground water sources close to the soil surface and with a variety of non-native species. One association was described for the Harding Grass Semi-Natural Stands type, which included *Bromus hordeaceus* and *Centaurea solstitialis*.

### *Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis* Herbaceous Association
### Harding Grass - Soft Chess - Yellow Star Thistle Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous, where *Phalaris aquatica* was dominant at 25-45% cover and *Centaurea solstitialis* was characteristic at <1-7% cover. Other taxa that were often present included *Bromus hordeaceus*, *Lactuca serriola*, *Taeniatherum caput-medusae*, *Trifolium hirtum*, and *Verbascum thapsus*. *Ailanthus altissima*, *Quercus lobata*, and *Salix laevigata* sometimes occurred as a scattered emergent trees, and *Cephalanthus occidentalis* var. *californicus* sometimes occurred as an emergent shrub.

This association was sampled infrequently in the study area within the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on metamorphic, mixed alluvium, or sedimentary substrates. The three surveys occupied a bottom, a lower slope, and a ridgetop, in upland or wetland habitats, on slopes that were flat to gentle.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, Calaveras, and Mariposa Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 68.7 | 60-76 | - |
| Herb | 68.7 | 60-76 | >0.3 |
| Shrub | 0.1 | 0-0.2 | 2.1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-0.2 | 10-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 87.7 | 68-99 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (1), Variable (1), Flat (1)
Macrotopography: bottom (1), lower slope (1), ridgetop (1)
Microtopography: convex (1), flat (1), undulating (1)
Parent Material: metamorphic (1), mixed alluvium (1), sedimentary (1)
Soil Texture: clay or clay loam (2), sand (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1644 ft. | 1168-1960 ft. |
| Slope | 2º | 0-4º |
| Large rock cover | 13.7% | 1-38% |
| Small rock cover | 16.3% | 2-44% |
| Bare ground cover | 14.3% | 5-33% |
| Litter cover | 52.3% | 10-87% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0048, SNNR0758, SNNR0992 **Relevés:** none

**Rank:** Unranked, non-native type

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills and the inner North Coast Ranges (Jimerson et al. 2000) in upland sites that are usually disturbed and grazed. It is likely that this association occurs elsewhere in warm and less coastal portions of the state.

**STAND TABLE**
***Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | AIAL | *Ailanthus altissima* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | QULO-T | *Quercus lobata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | SALA3-T | *Salix laevigata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | HOMA4 | *Hoita macrostachya* | 33 | 0.3 | 1 | 1 | | | | |
| | CEOCC2 | *Cephalanthus occidentalis* var. *californicus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **PHAQ** | ***Phalaris aquatica*** | **100** | **38.3** | **25** | **45** | **X** | | **X** | **X** |
| | **CESO3** | ***Centaurea solstitialis*** | **100** | **2.5** | **0.2** | **7** | | | **X** | **X** |
| | **BRHO2** | ***Bromus hordeaceus*** | **67** | **2.7** | **3** | **5** | | | | **X** |
| | TACA8 | *Taeniatherum caput-medusae* | 67 | 2.4 | 0.2 | 7 | | | | X |
| | LASE | *Lactuca serriola* | 67 | 0.7 | 0.2 | 2 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 67 | 0.4 | 0.2 | 1 | | | | X |
| | VETH | *Verbascum thapsus* | 67 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOFI | *Holozonia filipes* | 33 | 6.7 | 20 | 20 | | | | |
| | AICA | *Aira caryophyllea* | 33 | 4.0 | 12 | 12 | | | | X |
| | BRDI3 | *Bromus diandrus* | 33 | 3.3 | 10 | 10 | | | | X |

**STAND TABLE continued**

***Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| **Herb** | | | | | | | | | | |
| | CYDA | *Cynodon dactylon* | 33 | 1.7 | 5 | 5 | | | | X |
| | CAPY2 | *Carduus pycnocephalus* | 33 | 1.3 | 4 | 4 | | | | X |
| | DAPU3 | *Daucus pusillus* | 33 | 0.3 | 1 | 1 | | | | |
| | SOAS | *Sonchus asper* | 33 | 0.3 | 1 | 1 | | | | X |
| | STST | *Stachys stricta* | 33 | 0.3 | 1 | 1 | | | | |
| | ACMI2 | *Achillea millefolium* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | AGGR | *Agoseris grandiflora* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ASFA | *Asclepias fascicularis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | BRMA3 | *Bromus madritensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CECY2 | *Centaurea cyanus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEME2 | *Centaurea melitensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | COTI | *Collinsia tinctoria* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | CYER | *Cyperus eragrostis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | DIVO | *Dichelostemma volubile* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | ELMA5 | *Eleocharis macrostachya* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | GAPA5 | *Galium parisiense* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | GEDI | *Geranium dissectum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | GNCA | *Gnaphalium californicum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | HYPE | *Hypericum perforatum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUNCU | *Juncus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LETA | *Leontodon taraxacoides* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | MAGR3 | *Madia gracilis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PHNO2 | *Phyla nodiflora* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | SIMA3 | *Silybum marianum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | SPIRA2 | *Spiranthes* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TRAGO | *Tragopogon* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRPO | *Tragopogon porrifolius* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRDU2 | *Trifolium dubium* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | VISA | *Vicia sativa* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | VUMY | *Vulpia myuros* | 33 | 0.1 | 0.2 | 0.2 | | | | X |

## *Schoenoplectus* (=*Scirpus*) *acutus* Herbaceous Alliance
## Common Tule Herbaceous Alliance

As described for the western and Midwestern United States to central Canada, NatureServe (2007a) classifies this as the *Schoenoplectus acutus* - (*Schoenoplectus tabernaemontani*) Semipermanently Flooded Herbaceous Alliance, where the most abundant species are typically *Schoenoplectus acutus* (=*Scirpus acutus*), *Schoenoplectus fluviatilis* (=*Scirpus fluviatilis*), and *Schoenoplectus tabernaemontani* (=*Scirpus tabernaemontani*). Species composition and abundance may vary yearly, particularly dependent on water level fluctuations. Species typically include *Lemna* spp., *Phragmites australis*, and *Typha latifolia* in freshwater to tidally influenced stands, and *Schoenoplectus americanus* (=*Scirpus americanus*) and *Triglochin maritima* in alkaline stands. In deeper wetland stands of this alliance, *Potamogeton* sp. often occurs, and emergent species are not densely packed. Shrubs, such as *Salix* spp., are not common but may become established in shallow water areas. During droughts, species more tolerant of low water, such as *Polygonum amphibium*, may invade and alter the species composition of stands (NatureServe 2007a).

In the study area, two associations of the Common Tule Alliance are described. They occur along lake margins, stream banks, and ponds as freshwater emergent wetlands.

## *Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis* Herbaceous Association
## Common Tule Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to continuous and dominated by *Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis* at 38-70% cover. A variety of facultative and obligate wetland species were present (see stand table below). Shrubs such as *Rosa eglanteria* and *Toxicodendron diversilobum* sometimes occurred as emergents.

This association was sampled infrequently in the study area within the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on metamorphic (including slate) or volcanic substrates. They occupied wetlands on bottom slopes that were flat to moderate.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Amador, El Dorado, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 57.7 | 38-70 | - |
| Herb | 45.1 | 0-70 | variable |
| Shrub | 19 | 0-38 | 2.1-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 1 | 0-3 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: SE (1), N (1), Flat (1)
Macrotopography: bottom (3)
Microtopography: flat (1), undulating (1), concave (1)
Parent Material: metamorphic (1), slate (1), volcanic (1)
Soil Texture: muck (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1597 ft. | 582-2800 ft. |
| Slope | 2.7º | 0-7º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 1% | 1-1% |
| Litter cover | 10% | 10-10% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=3)

**Rapid Assessments:** SNNR0193, SNNR0697, SNNR1199 **Relevés:** none

**Rank:** G5S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills. Similar, if not identical stands have been described for the Sacramento-San Joaquin River Delta as *Schoenoplectus acutus* – Pure Provisional Association (Hickson and Keeler-Wolf 2007).

**STAND TABLE**
***Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | ROEG | *Rosa eglanteria* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TODI | *Toxicodendron diversilobum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **SCACO2** | ***Schoenoplectus acutus* var. *occidentalis*** | **100** | **57.7** | **38** | **70** | **X** | | **X** | |
| | POTAM | *Potamogeton* | 33 | 1.7 | 5 | 5 | | | | |
| | ANCA14 | *Anthriscus caucalis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | BRMI2 | *Briza minor* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | GEDI | *Geranium dissectum* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUBA | *Juncus balticus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | JUME4 | *Juncus mexicanus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | RUCR | *Rumex crispus* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUPU3 | *Rumex pulcher* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | TYDO | *Typha domingensis* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | ALGAE | *Algae* | 33 | 0.3 | 1 | 1 | | | | |

***Schoenoplectus* (=*Scirpus*) *acutus* - *Typha domingensis* Herbaceous Association**

**Common Tule - Southern Cattail Herbaceous Association**

**SUMMARY**

In the one stand sampled, the herbaceous canopy was continuous and dominated by *Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis* at 40% cover. Other taxa that were present included *Deschampsia danthonioides*, *Eleocharis macrostachya*, *Juncus nevadensis*, *Lolium multiflorum*, and *Typha domingensis*.

This association was sampled once in the study area within the Cascade Range Foothills Subregion (Hickman 1993). The stand occurred on a volcanic substrate. It occupied a flat wetland on a bottom slope.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Tehama County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 80 | 80-80 | - |
| Herb | 80 | 80-80 | >0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 0.2 | - | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (1)
Macrotopography: bottom (1)
Microtopography: flat (1)
Parent Material: volcanic (1)
Soil Texture: muck (1)

| | Mean | Range |
|---|---|---|
| Elevation | 364 ft. | 364-364 ft. |
| Slope | 0º | -º |
| Large rock cover | 0% | -% |
| Small rock cover | 0% | -% |
| Bare ground cover | 0% | -% |
| Litter cover | 0% | -% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=1)

**Rapid Assessments:** SNNR0117 **Relevés:** none

**Rank:** G4S3?

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills and the transmontane eastern Sierra Nevada region (Fish Creek Slough, Mono County; Odion et al. 1992) in alkaline marshes. It is likely to occur elsewhere in the intermontane west. Other studies have documented more generic vegetation types such as *Schoenoplectus* (=*Scirpus*) spp. - *Typha* spp.(Atwater et al. 1979, NatureServe 2007a).

**STAND TABLE**

***Schoenoplectus* (=*Scirpus*) *acutus* - *Typha domingensis* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **SCACO2** | ***Schoenoplectus acutus* var. *occidentalis*** | **100** | **40.0** | **40** | **X** | | **X** | | |
| | ELMA5 | *Eleocharis macrostachya* | 100 | 19.0 | 19 | 19 | | | X | |
| | TYDO | *Typha domingensis* | 100 | 17.0 | 17 | 17 | | | X | |
| | DEDA | *Deschampsia danthonioides* | 100 | 11.0 | 11 | 11 | | | X | |
| | JUNE | *Juncus nevadensis* | 100 | 2.0 | 2 | 2 | | | X | |
| | LOMU | *Lolium multiflorum* | 100 | 0.2 | 0.2 | 0.2 | | | X | X |

### *Trifolium variegatum* Herbaceous Alliance
### Whitetip Clover Herbaceous Alliance

As described in the state, *Trifolium variegatum* is conspicuously dominant to co-dominant with other forbs and grasses in the early to mid spring. Stands occur in swales, seeps, moist grassy flats, and intermittent streams. They often have the following equally conspicuous non-native species, especially in late spring: *Erodium botrys*, *Hypochaeris glabra*, *Leontodon taraxacoides*, *Lolium multiflorum*, and *Vulpia bromoides*. Native species may be prominent including *Castilleja attenuata*, *Juncus bufonius*, *Hemizonia fitchii*, *Trifolium depauperatum*, *T. microcephalum*, and *Triphysaria eriantha* subsp. *eriantha*.

This alliance has been recognized in other reports with few data samples (Evens et al. 2004, Evens and Kentner 2006), and this report provides strong documentation of this alliance. Associations previously categorized for vernal pools had *Trifolium variegatum* as an important species (Barbour et al. 2003, 2005), though the most recent vernal pool classification placed associations with *T. variegatum* in a *Lasthenia glaberrima* Alliance (Barbour et al. 2007). While the work of Barbour et al. (2003, 2005, 2007) focused on vernal pools, many of the stands sampled for this project are not in vernal pools, but in seasonally moist or saturated upland settings. These stands provide a broader perspective of associations contained in this recently designated alliance.

In the study area, three associations of the Whitetip Clover Alliance have been described. One sample (SNNR0253) showed additional variation and was classified at the alliance level only because of high cover by *Deschampsia danthonioides*, *Hemizonia fitchii*, and *Lessingia virgata* (sampled late in season).

---

### *Trifolium variegatum* Herbaceous Association
### Whitetip Clover Herbaceous Association

**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous and dominated by *Trifolium variegatum* at <1-60% cover. Other taxa that were often present included *Aira caryophyllea*, *Briza minor*, *Bromus hordeaceus*, *Hypochaeris glabra*, *Juncus bufonius*, *Lolium multiflorum*, *Mimulus guttatus*, and *Triphysaria eriantha* subsp. *eriantha*.

In the study area, this association was sampled frequently in the Cascade Range Foothills, less frequently in the central and northern Sierra Nevada Foothills, and infrequently in the Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on volcanic substrates (including basalt), but were also found on metamorphic (including slate) substrates. They often occupied bottoms and occasionally occupied lower slopes to upper slopes, on benches, mesas/plateaus, or ridgetops. Stands occurred slightly more often in wetland than in upland habitats. Slopes varied from flat to somewhat steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Mariposa, Sacramento, Shasta, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 56.4 | 15-80 | - |
| Herb | 56.3 | 15-80 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | 0-0.2 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 22.6 | 1-74 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: NW (5), Flat (5), W (4), S (3), SW (2), NE (1), N (1), E (1)
Macrotopography: bottom (7), lower slope (2), middle slope (4), upper slope (3), bench (1), mesa/plateau (4), ridgetop (1)
Microtopography: flat (12), concave (7), undulating (2)
Parent Material: volcanic (15), metamorphic (4), basalt (2), slate (1)
Soil Texture: clay or clay loam (9), loam or sandy loam (6), sand (3), silt or silt loam (2), peat (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1146 ft. | 237-2253 ft. |
| Slope | 3.4º | 0-16º |
| Large rock cover | 14.1% | 0-92% |
| Small rock cover | 14.8% | 0-88% |
| Bare ground cover | 48% | 2-91% |
| Litter cover | 18.3% | 1-66% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=22)

**Rapid Assessments** SNNR0744, SNNR0826, SNNR0965, SNNR1027, SNNR1075
**Relevés:** SNFN0073, SNFN0098, SNFN0101, SNFN0285, SNFN0297, SNFN0304, SNFN0305, SNFN0336, SNFN0379, SNFN0390, SNFN0405, SNFN0416, SNFN0418, SNFN0433, SNFN0444, SNFN0446, SNFN0640

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills, based primarily upon the data collected for this project. Further relationships with the aforementioned *Lasthenia glaberrima* should be investigated; however, this study provides clear evidence that *T*. *variegatum* extends its influence far beyond vernal pools and away from settings where *Lasthenia glaberrima* is characteristic. Similar stands have been observed in the inner North Coast Ranges of Napa County, in the central Coast Ranges of Monterey County (T. Keeler-Wolf pers. obs. 2002-2007), and in Marin County (Evens and Kentner 2006).

**STAND TABLE**

***Trifolium variegatum* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **TRVA** | ***Trifolium variegatum*** | **100** | **26.2** | **0.2** | **60** | | **X** | **X** | |
| | LOMU | *Lolium multiflorum* | 91 | 3.5 | 0.2 | 18 | | | X | X |
| | HYGL2 | *Hypochaeris glabra* | 77 | 1.0 | 0.2 | 4 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 68 | 2.0 | 0.2 | 8 | | | | X |
| | JUBU | *Juncus bufonius* | 64 | 3.0 | 0.2 | 30 | | | | |
| | MIGU | *Mimulus guttatus* | 59 | 7.0 | 0.2 | 37 | | | | |
| | AICA | *Aira caryophyllea* | 59 | 0.4 | 0.2 | 3 | | | | X |
| | BRMI2 | *Briza minor* | 55 | 0.4 | 0.2 | 4 | | | | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 50 | 0.2 | 0.2 | 1 | | | | |
| | DEDA | *Deschampsia danthonioides* | 45 | 1.1 | 0.2 | 16 | | | | |
| | MOFO | *Montia fontana* | 45 | 0.4 | 0.2 | 5 | | | | |
| | HOMA2 | *Hordeum marinum* | 41 | 3.2 | 0.2 | 38 | | | | X |
| | POAN | *Poa annua* | 41 | 0.6 | 0.2 | 6 | | | | X |
| | ERBO | *Erodium botrys* | 41 | 0.3 | 0.2 | 4 | | | | X |
| | VUBR | *Vulpia bromoides* | 41 | 0.3 | 0.2 | 3 | | | | X |
| | BRODI | *Brodiaea* | 41 | 0.2 | 0.2 | 1 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 41 | 0.1 | 0.2 | 1 | | | | X |
| | GEDI | *Geranium dissectum* | 36 | 0.5 | 0.2 | 10 | | | | X |
| | HEFI | *Hemizonia fitchii* | 36 | 0.3 | 0.2 | 2 | | | | |
| | LENI | *Lepidium nitidum* | 36 | 0.2 | 0.2 | 2 | | | | |
| | LACA7 | *Lasthenia californica* | 32 | 0.3 | 0.2 | 2 | | | | |
| | ERCA33 | *Eryngium castrense* | 32 | 0.3 | 0.2 | 2 | | | | |
| | BLNAN | *Blennosperma nanum* var. *nanum* | 27 | 0.8 | 0.2 | 17 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 27 | 0.3 | 0.2 | 5 | | | | X |
| | VUMI | *Vulpia microstachys* | 27 | 0.2 | 0.2 | 2 | | | | |
| | RAMU2 | *Ranunculus muricatus* | 27 | 0.1 | 0.2 | 1 | | | | X |
| | LETA | *Leontodon taraxacoides* | 27 | 0.1 | 0.2 | 0.2 | | | | X |
| | PLAU | *Plagiobothrys austiniae* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| | TRDU2 | *Trifolium dubium* | 23 | 0.6 | 0.2 | 7 | | | | X |
| | TRDE | *Trifolium depauperatum* | 23 | 0.2 | 0.2 | 3 | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 23 | 0.1 | 0.2 | 2 | | | | |
| | HERA3 | *Heterocodon rariflorum* | 23 | 0.1 | 0.2 | 1 | | | | |
| | LIBI | *Linanthus bicolor* | 23 | 0.1 | 0.2 | 1 | | | | |
| | CAAT25 | *Castilleja attenuata* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| | ERSE3 | *Eremocarpus setigerus* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| | GAPA5 | *Galium parisiense* | 23 | 0.0 | 0.2 | 0.2 | | | | X |
| | PAPU10 | *Parvisedum pumilum* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 50 | 2.9 | 0.2 | 20 | | | | |

***Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides* Herbaceous Association**

**Whitetip Clover - Italian Ryegrass - Lesser Hawkbit Herbaceous Association**


**SUMMARY**

In the stands sampled, the herbaceous canopy was intermittent to continuous and most strongly characterized by *Lolium multiflorum* (1-40% cover), *Leontodon taraxacoides* (<1-32% cover), and *Trifolium variegatum* (<1-34% cover). Additional characteristic taxa included *Juncus bufonius* and *Trifolium dubium*, and taxa that were often present included *Aira caryophyllea*, *Briza minor*, *Bromus hordeaceus*, *Geranium dissectum*, *Hemizonia fitchii*, *Hordeum marinum* subsp. *gussonianum*, *Lotus purshianus*, *Lythrum hyssopifolia*, *Navarretia intertexta* subsp. *intertexta*, *Ranunculus muricatus*, *Rumex pulcher*, and *Vulpia bromoides*.

In the study area, this association was sampled frequently in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Cascade Range Foothills Subregions (Hickman 1993). Stands sometimes occurred on metamorphic or sedimentary substrates, and rarely on volcanic substrates. They occupied bottoms, middle slopes, ridgetops, benches, and edges of basins/wetlands. Stands were usually in uplands, but occasionally in wetland habitats, on slopes that were flat to moderate.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Amador, Calaveras, Mariposa, Sacramento, Shasta, and Tehama Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.6 | 35-95 | - |
| Herb | 73.6 | 35-95 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-1 | 5-20 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 64.5 | 37-87 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (5), W (4), SW (3), E (2), Variable (1), S (1), NE (1), N (1)
Macrotopography: bottom (2), middle slope (1), bench (1), edge of basin/wetland (1), ridgetop (2)
Microtopography: concave (4), flat (3)
Parent Material: metamorphic (8), sedimentary (7), volcanic (3)
Soil Texture: clay or clay loam (4), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1046 ft. | 442-1888 ft. |
| Slope | 3.1º | 0-10º |
| Large rock cover | 0.7% | 0-3% |
| Small rock cover | 7.7% | 0.2-25% |
| Bare ground cover | 53.8% | 27-86% |
| Litter cover | 32.5% | 5-65% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=18)

**Rapid Assessments:** SNNR0014, SNNR1320, SNNR1326 **Relevés:** SNFN0276, SNFN0337, SNFN0392, SNFN0395, SNFN0482, SNFN0542, SNFN0543, SNFN0546, SNFN0547, SNFN0548, SNFN0549, SNFN0550, SNFN0551, SNFN0552, SNFN0553

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon data collected for this project. It was sampled extensively at Deer Creek Hills, Sacramento County. Compared to the previous association of the *Trifolium variegatum* Herbaceous Alliance, this type is more restricted to deeper, fine-textured soils. It is likely to occur elsewhere in cismontane northern and central California.

**STAND TABLE**
***Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **LOMU** | ***Lolium multiflorum*** | **100** | **21.7** | **1** | **40** | | | **X** | **X** |
| | **LETA** | ***Leontodon taraxacoides*** | **94** | **12.2** | **0.2** | **32** | | | **X** | **X** |
| | **TRVA** | ***Trifolium variegatum*** | **94** | **12.1** | **0.2** | **34** | | | **X** | |
| | JUBU | *Juncus bufonius* | 89 | 6.2 | 0.2 | 22 | | | X | |
| | TRDU2 | *Trifolium dubium* | 83 | 8.7 | 0.2 | 35 | | | X | X |
| | BRMI2 | *Briza minor* | 78 | 0.5 | 0.2 | 3 | | | | X |
| | LYHY2 | *Lythrum hyssopifolia* | 72 | 3.7 | 0.2 | 12 | | | | X |
| | HEFI | *Hemizonia fitchii* | 72 | 0.7 | 0.2 | 5 | | | | |
| | HOMAG | *Hordeum marinum* subsp. *gussonianum* | 61 | 2.0 | 0.2 | 10 | | | | X |
| | BRHO2 | *Bromus hordeaceus* | 56 | 1.8 | 0.2 | 20 | | | | X |
| | VUBR | *Vulpia bromoides* | 56 | 0.4 | 0.2 | 3 | | | | X |
| | RAMU2 | *Ranunculus muricatus* | 56 | 0.3 | 0.2 | 2 | | | | X |
| | RUPU3 | *Rumex pulcher* | 56 | 0.2 | 0.2 | 1 | | | | X |
| | LOPU3 | *Lotus purshianus* | 50 | 1.9 | 0.2 | 15 | | | | |
| | NAINI | *Navarretia intertexta* subsp. *intertexta* | 50 | 1.4 | 0.2 | 18 | | | | |
| | GEDI | *Geranium dissectum* | 50 | 0.3 | 0.2 | 3 | | | | X |
| | AICA | *Aira caryophyllea* | 50 | 0.2 | 0.2 | 2 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 44 | 0.5 | 0.2 | 7 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 44 | 0.1 | 0.2 | 1 | | | | |
| | ERCA33 | *Eryngium castrense* | 39 | 0.4 | 0.2 | 3 | | | | |
| | MEPO3 | *Medicago polymorpha* | 39 | 0.2 | 0.2 | 2 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 39 | 0.1 | 0.2 | 1 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 39 | 0.1 | 0.2 | 0.2 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 39 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOVIV | *Holocarpha virgata* subsp. *virgata* | 33 | 1.1 | 0.2 | 10 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 33 | 0.9 | 0.2 | 10 | | | | X |
| | JUTE | *Juncus tenuis* | 33 | 0.5 | 0.2 | 2 | | | | |
| | ANAR | *Anagallis arvensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | HOMA2 | *Hordeum marinum* | 28 | 1.4 | 0.2 | 24 | | | | X |
| | ELMA5 | *Eleocharis macrostachya* | 28 | 1.0 | 0.2 | 10 | | | | |
| | CAAT25 | *Castilleja attenuata* | 28 | 0.1 | 0.2 | 1 | | | | |
| | SIGA | *Silene gallica* | 28 | 0.1 | 0.2 | 0.2 | | | | X |
| | SOSE2 | *Soliva sessilis* | 22 | 0.5 | 0.2 | 8 | | | | X |
| | ERBO | *Erodium botrys* | 22 | 0.1 | 0.2 | 1 | | | | X |
| | EPTO4 | *Epilobium torreyi* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | MIGU | *Mimulus guttatus* | 22 | 0.0 | 0.2 | 0.2 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 22 | 0.0 | 0.2 | 0.2 | | | | |

***Trifolium variegatum - Vulpia bromoides* - (*Hypochaeris glabra - Leontodon taraxacoides*) Herbaceous Association**

**Whitetip Clover - Brome Fescue - (Smooth Cat's-Ear - Lesser Hawkbit) Herbaceous Association**


**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous and characterized by *Hypochaeris glabra* (<1-40% cover), *Leontodon taraxacoides* (<1-45% cover), *Trifolium variegatum* (<1-40% cover), and *Vulpia bromoides* (<1-25% cover). Additional taxa that were characteristically present included *Aira caryophyllea*, *Briza minor*, *Bromus hordeaceus*, *Castilleja attenuata*, *Cerastium glomeratum*, *Erodium botrys*, *Hemizonia fitchii*, *Juncus bufonius*, *Trifolium dubium*, and *Trifolium microcephalum*.

In the study area, this association was sampled frequently in the northern Sierra Nevada Foothills and infrequently in the central Sierra Nevada Foothills and Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic (including slate) and rarely on mixed alluvium substrates. They occupied a variety of upland slope positions, often bottoms and middle slopes, but also upper slopes, ridgetops, and draws. Slopes varied from flat to steep.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Sacramento, and Tuolumne Counties, within the Camanche Terraces (262Ao) and Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 73.6 | 55-90 | - |
| Herb | 73.6 | 55-90 | variable |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 64.4 | 29-89 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: E (7), SE (6), S (5), W (4), SW (3), NW (3), Flat (2), N (2), NE (1)
Macrotopography: bottom (3), middle slope (3), upper slope (1), draw (1), ridgetop (1)
Microtopography: flat (7), concave (1), undulating (1)
Parent Material: metamorphic (30), slate (2), mixed alluvium (1)
Soil Texture: clay or clay loam (4), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 472 ft. | 250-862 ft. |
| Slope | 6.6º | 0-35º |
| Large rock cover | 0.9% | 0-6.2% |
| Small rock cover | 5.9% | 0.2-23% |
| Bare ground cover | 29.4% | 5-70% |
| Litter cover | 58.4% | 24-92% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=33)

**Rapid Assessments:** none **Relevés:** SNFN0204, SNFN0210, SNFN0212, SNFN0266, SNFN0268, SNFN0280, SNFN0286, SNFN0289, SNFN0347, SNFN0449, SNFN0453, SNFN0454, SNFN0455, SNFN0456, SNFN0460, SNFN0461, SNFN0465, SNFN0468, SNFN0508, SNFN0509, SNFN0517, SNFN0524, SNFN0529, SNFN0531, SNFN0532, SNFN0533, SNFN0534, SNFN0535, SNFN0536, SNFN0537, SNFN0538, SNFN0539, SNFN0540

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon the data collected for this project. It was sampled extensively at Deer Creek Hills, Sacramento County. It is clearly related to the previously described *Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides* Herbaceous Association, but lacks the constant high cover of *Lolium multiflorum* and tends to have higher cover of other non-native plants such as *Erodium botrys*. It is also clearly related to the following described (*Trifolium variegatum - Vulpia bromoides*) - *Hypochaeris glabra - Leontodon taraxacoides* Herbaceous Association, which has higher abundance of the yellow-flowered, non-native plants. See comments in the following description, where that association may be seen as a phase of this *T. variegatum - V. bromoides* (*H. glabra – L. taraxacoides*) Association. The constancy of *T. variegatum* and associated species is apparent in these types, and differences across types may be an artifact of time, location of sampling, and/or amount of disturbance. Since it is currently unclear how these floristic differences are related to environmental distinctions, further data and analysis are needed to determine differences among these associations.

**STAND TABLE**

***Trifolium variegatum - Vulpia bromoides* - (*Hypochaeris glabra - Leontodon taraxacoides*) Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **LETA** | ***Leontodon taraxacoides*** | **100** | **13.0** | **0.2** | **45** | | | **X** | **X** |
| | BRHO2 | *Bromus hordeaceus* | 100 | 10.1 | 2 | 35 | | | X | X |
| | ERBO | *Erodium botrys* | 100 | 4.5 | 0.2 | 13 | | | X | X |
| | AICA | *Aira caryophyllea* | 97 | 2.5 | 0.2 | 7 | | | X | X |
| | **TRVA** | ***Trifolium variegatum*** | **94** | **9.0** | **0.2** | **40** | | | **X** | |
| | **VUBR** | ***Vulpia bromoides*** | **94** | **9.0** | **0.2** | **25** | | | **X** | **X** |
| | JUBU | *Juncus bufonius* | 94 | 6.7 | 0.2 | 28 | | | X | |
| | TRDU2 | *Trifolium dubium* | 94 | 2.1 | 0.2 | 12 | | | X | X |
| | BRMI2 | *Briza minor* | 94 | 0.9 | 0.2 | 4 | | | X | X |
| | CAAT25 | *Castilleja attenuata* | 94 | 0.2 | 0.2 | 1 | | | X | |
| | TRMI4 | *Trifolium microcephalum* | 91 | 1.7 | 0.2 | 18 | | | X | |
| | **HYGL2** | ***Hypochaeris glabra*** | **88** | **11.5** | **0.2** | **40** | | | **X** | **X** |
| | HEFI | *Hemizonia fitchii* | 88 | 0.6 | 0.2 | 3 | | | X | |
| | CEGL2 | *Cerastium glomeratum* | 85 | 0.3 | 0.2 | 2 | | | X | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 79 | 2.4 | 0.2 | 10 | | | | |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 79 | 1.4 | 0.2 | 5 | | | | |

**STAND TABLE continued**

***Trifolium variegatum* - *Vulpia bromoides* - (*Hypochaeris glabra* - *Leontodon taraxacoides*) Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 73 | 0.3 | 0.2 | 4 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 70 | 1.2 | 0.2 | 10 | | | | X |
| | PLFU | *Plagiobothrys fulvus* | 70 | 0.9 | 0.2 | 10 | | | | |
| | SIGA | *Silene gallica* | 70 | 0.2 | 0.2 | 1 | | | | X |
| | TRCI | *Trifolium ciliolatum* | 67 | 1.3 | 0.2 | 18 | | | | |
| | LOMU | *Lolium multiflorum* | 64 | 2.1 | 0.2 | 22 | | | | X |
| | JUCA5 | *Juncus capitatus* | 61 | 0.2 | 0.2 | 1 | | | | X |
| | NATA3 | *Navarretia tagetina* | 55 | 0.7 | 0.2 | 6 | | | | |
| | TRHI4 | *Trifolium hirtum* | 55 | 0.6 | 0.2 | 5 | | | | X |
| | DIMU5 | *Dichelostemma multiflorum* | 55 | 0.2 | 0.2 | 1 | | | | |
| | LIBI | *Linanthus bicolor* | 48 | 0.8 | 0.2 | 7 | | | | |
| | TRLA4 | *Trichostema lanceolatum* | 45 | 0.1 | 0.2 | 1 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 45 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 42 | 0.4 | 0.2 | 3 | | | | |
| | AVBA | *Avena barbata* | 42 | 0.4 | 0.2 | 3 | | | | X |
| | BRODI | *Brodiaea* | 42 | 0.3 | 0.2 | 4 | | | | |
| | FIGA | *Filago gallica* | 42 | 0.1 | 0.2 | 0.4 | | | | X |
| | TRHY3 | *Triteleia hyacinthina* | 39 | 0.1 | 0.2 | 1 | | | | |
| | CEMI | *Centunculus minimus* | 36 | 0.1 | 0.2 | 1 | | | | |
| | ERSE3 | *Eremocarpus setigerus* | 36 | 0.1 | 0.2 | 1 | | | | |
| | AETR | *Aegilops triuncialis* | 33 | 1.4 | 0.2 | 10 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 30 | 0.4 | 0.2 | 2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 30 | 0.1 | 0.2 | 2 | | | | |
| | AVFA | *Avena fatua* | 30 | 0.1 | 0.2 | 2 | | | | X |
| | EPTO4 | *Epilobium torreyi* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| | SADEO | *Sagina decumbens* subsp. *occidentalis* | 30 | 0.1 | 0.2 | 0.2 | | | | |
| | LOMI | *Lotus micranthus* | 27 | 0.1 | 0.2 | 2 | | | | |
| | HOMAG | *Hordeum marinum* subsp. *gussonianum* | 24 | 0.4 | 0.2 | 5 | | | | X |
| | CRTI | *Crassula tillaea* | 24 | 0.1 | 0.2 | 2 | | | | X |
| | LYHY2 | *Lythrum hyssopifolia* | 24 | 0.0 | 0.2 | 0.2 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 21 | 0.4 | 0.2 | 7 | | | | X |
| | GAPA5 | *Galium parisiense* | 21 | 0.0 | 0.2 | 0.2 | | | | X |
| | HOVIV | *Holocarpha virgata* subsp. *virgata* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 70 | 4.3 | 0.2 | 20 | | | | |

**(*Trifolium variegatum* - *Vulpia bromoides*) - *Hypochaeris glabra* - *Leontodon taraxacoides* Herbaceous Association**

**(Whitetip Clover - Brome Fescue) - Smooth Cat's-Ear - Lesser Hawkbit Herbaceous Association**


## SUMMARY

In the stands sampled, the herbaceous canopy was open to continuous and characterized by *Hypochaeris glabra* (<1-36% cover), *Leontodon taraxacoides* (<1-20% cover), *Trifolium variegatum* (<1-2% cover), and *Vulpia bromoides* (<1-25% cover). Additional characteristic taxa included *Aira caryophyllea*, *Bromus hordeaceus*, *Castilleja attenuata*, *Erodium botrys*, *Juncus bufonius*, *Trifolium dubium*, *Trifolium hirtum*, and *Trifolium microcephalum*.

In the study area, this association was sampled frequently within the northern Sierra Nevada Foothills and infrequently in the Sacramento Valley Subregions (Hickman 1993). Stands usually occurred on metamorphic substrates, and infrequently on mixed alluvium or granitic substrates. They consistently occupied upland slope positions, from bottoms to middle slopes that varied from flat to steep.


## DISTRIBUTION IN STUDY AREA

This association was sampled in Butte, El Dorado, and Sacramento Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

## LOCAL VEGETATION DESCRIPTION

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 66.1 | 22-95 | - |
| Herb | 66.1 | 22-95 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 76.2 | 46-90 | - |

## LOCAL ENVIRONMENTAL DESCRIPTION

Aspect: SW (4), S (2), NW (2), NE (2), N (2), SE (1), Flat (1), E (1)
Macrotopography: bottom (1), lower slope (1), middle slope (1), edge of basin/wetland (1)
Microtopography: flat (2), undulating (1), convex (1)
Parent Material: metamorphic (12), mixed alluvium (2), granitic (1)
Soil Texture: clay or clay loam (2), loam or sandy loam (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 421 ft. | 207-522 ft. |
| Slope | 14.3º | 0-40º |
| Large rock cover | 0.2% | 0-0.2% |
| Small rock cover | 17.8% | 1-56% |
| Bare ground cover | 25.8% | 7-43% |
| Litter cover | 52.8% | 1-75% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=15)

**Rapid Assessments:** none **Relevés:** SNFN0121, SNFN0269, SNFN0272, SNFN0355, SNFN0458, SNFN0459, SNFN0462, SNFN0503, SNFN0506, SNFN0516, SNFN0518, SNFN0519, SNFN0520, SNFN0523, SNFN0541

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon the data collected for this project and sampled extensively at Deer Creek Hills, Sacramento County. The relationship between this and the previous *Trifolium variegatum* - *Vulpia bromoides* - (*Hypochaeris glabra* - *Leontodon taraxacoides*) Herbaceous Association is evident by the similar names. The parentheses around the first two nominate species of the association discussed herein, imply a stronger dominance by *H*. *glabra*, *L*. *taraxacoides*, and other non-native species compared to a much lower but relatively constant presence of *T*. *variegatum*. Stands of this association are also verging upon the *Bromus hordeaceus* - *Erodium botrys* - *Plagiobothrys fulvus* Association of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Semi-Natural Stands type (see similarities in constancy and cover values for many of the main species), but this association maintains sufficient presence and constancy of the native white-tipped clover to be placed in the *Trifolium variegatum* Herbaceous Alliance. This underscores the importance of *T*. *variegatum* as an important indicator, despite its relatively low cover in this association.

**STAND TABLE**

**(*Trifolium variegatum* - *Vulpia bromoides*) - *Hypochaeris glabra* - *Leontodon taraxacoides* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **HYGL2** | ***Hypochaeris glabra*** | **100** | **16.0** | **0.2** | **36** | | | **X** | **X** |
| | **VUBR** | ***Vulpia bromoides*** | **100** | **8.3** | **0.2** | **25** | | | **X** | **X** |
| | BRHO2 | *Bromus hordeaceus* | 93 | 20.2 | 0.2 | 38 | | | X | X |
| | **LETA** | ***Leontodon taraxacoides*** | **93** | **5.7** | **0.2** | **20** | | | **X** | **X** |
| | TRHI4 | *Trifolium hirtum* | 93 | 4.4 | 0.2 | 20 | | | X | X |
| | ERBO | *Erodium botrys* | 93 | 4.1 | 0.2 | 17 | | | X | X |
| | CAAT25 | *Castilleja attenuata* | 93 | 1.8 | 0.2 | 18 | | | X | |
| | AICA | *Aira caryophyllea* | 93 | 0.7 | 0.2 | 3 | | | X | X |
| | TRDU2 | *Trifolium dubium* | 87 | 1.6 | 0.2 | 7 | | | X | X |
| | TRMI4 | *Trifolium microcephalum* | 87 | 1.5 | 0.2 | 8 | | | X | |
| | JUBU | *Juncus bufonius* | 80 | 0.6 | 0.2 | 2 | | | X | |
| | **TRVA** | ***Trifolium variegatum*** | **80** | **0.6** | **0.2** | **2** | | | **X** | |
| | PLFU | *Plagiobothrys fulvus* | 67 | 1.8 | 0.2 | 12 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 67 | 1.3 | 0.2 | 7 | | | | |
| | BRMI2 | *Briza minor* | 67 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 60 | 2.2 | 0.2 | 15 | | | | |
| | TRCI | *Trifolium ciliolatum* | 60 | 1.1 | 0.2 | 10 | | | | |
| | HEFI | *Hemizonia fitchii* | 53 | 0.7 | 0.2 | 4 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 53 | 0.5 | 0.2 | 5 | | | | X |
| | AVFA | *Avena fatua* | 53 | 0.3 | 0.2 | 2 | | | | X |
| | CEGL2 | *Cerastium glomeratum* | 53 | 0.3 | 0.2 | 2 | | | | X |
| | LOMI | *Lotus micranthus* | 47 | 0.5 | 0.2 | 3 | | | | |
| | DIMU5 | *Dichelostemma multiflorum* | 47 | 0.3 | 0.2 | 2 | | | | |
| | SIGA | *Silene gallica* | 47 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOMU | *Lolium multiflorum* | 40 | 1.6 | 0.2 | 23 | | | | X |
| | BRDI3 | *Bromus diandrus* | 40 | 0.5 | 0.2 | 5 | | | | X |
| | TRHY3 | *Triteleia hyacinthina* | 40 | 0.1 | 0.2 | 1 | | | | |
| | LUBI | *Lupinus bicolor* | 33 | 1.0 | 0.2 | 9 | | | | |
| | BRODI | *Brodiaea* | 33 | 0.1 | 0.2 | 1 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | LOPU3 | *Lotus purshianus* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 27 | 0.3 | 0.2 | 2 | | | | X |
| | TRLA4 | *Trichostema lanceolatum* | 27 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 40 | 4.7 | 0.2 | 40 | | | | |

## *Typha* (*angustifolia*, *domingensis*, *latifolia*) Herbaceous Alliance
## Cattail (Narrowleaf, Broad, Southern) Herbaceous Alliance

As described in the state, *Typha latifolia*, *T angustifolia*, and/or *T*. *domingensis* dominate(s) the herbaceous layer with intermittent to continuous cover. This alliance occurs near streams, rivers, and ponds that are typically freshwater wetlands. NatureServe (2007a) classifies this as the *Typha* (*latifolia*, *angustifolia*) Herbaceous Alliance, where the dominant species, either *Typha latifolia* or *Typha angustifolia*, often form dense, almost monotypic stands. Other species typical of wetlands may be found in lesser amounts; they include shallower wetland emergents such as *Carex* spp., *Eleocharis macrostachya*, *Eleocharis palustris*, *Glyceria* spp., *Juncus balticus*, *Juncus torreyi*, *Mentha arvensis*, *Schoenoplectus acutus*, and *Veronica* spp. In deeper water, *Lemna minor*, *Potamogeton* spp., *Sagittaria* spp., *Azolla filiculoides*, and other aquatics may be present in lesser amounts.

In the study area, one association of the Cattail (Narrowleaf, Broad, Southern) Alliance was classified and described below. It was dominated strongly by *T*. *latifolia* and found in drainage bottoms and ponds.

### *Typha latifolia* Herbaceous Association
### Broadleaf Cattail Herbaceous Association

**SUMMARY**
In the stands sampled, the herbaceous canopy was intermittent and dominated by *Typha latifolia* at 38-64% cover. Other taxa that were characteristically present included *Juncus effusus* and *Mimulus guttatus*. A variety of additional facultative and obligate wetland taxa were present (see stand table below). Trees such as *Juglans californica* var. *hindsii*, *Quercus wislizeni*, and *Salix laevigata* sometimes occurred as scattered emergents, and shrubs such as *Rubus discolor*, *Salix lasiolepis*, *Salix melanopsis*, and *Sambucus mexicana* sometimes occurred as emergents.

This association was sampled twice in the study area within the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands occurred on metamorphic or mixed alluvium substrates. They occupied wetland bottom slopes that were flat to gentle. As currently understood in the state, stands dominated strongly by *T*. *latifolia* are similar and are defined as an association of this mixed species alliance (Sawyer et al. 2007 MS).

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Mariposa, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 63 | 60-66 | - |
| Herb | 61.5 | 58-65 | >0.3 |
| Shrub | 2.6 | 0-5 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 1 | 0-2 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 1.2 | 0-2 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: W (1), Flat (1)
Macrotopography: bottom (2)
Microtopography: concave (2)
Parent Material: metamorphic (1), mixed alluvium (1)
Soil Texture: clay or clay loam (1), muck (1)

| | **Mean** | **Range** |
|---|---|---|
| Elevation | 1593 ft. | 921-2265 ft. |
| Slope | 1º | 0-2º |
| Large rock cover | 0.1% | 0-0.2% |
| Small rock cover | 2.5% | 0-5% |
| Bare ground cover | 20% | 10-30% |
| Litter cover | 60% | 55-65% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=2)

**Rapid Assessments:** SNNR0473, SNNR1033 **Relevés:** none

**Rank:** G5S4

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada, Great Valley (e.g. Hickson and Keeler-Wolf 2007), inner Central Coast (Evens et al. 2006), and San Dieguito River watershed in southern California (Evens and San 2006). The *Typha latifolia* Southern Herbaceous Association, which is corollary with this association in California, has been identified across the southeastern United States (NatureServe 2007a).

**STAND TABLE**
***Typha latifolia* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | | | | |
| | SALA3-L | *Salix laevigata* | 50 | 1.0 | 2 | 2 | | | | |
| | JUCAH | *Juglans californica* var. *hindsii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | QUWI2-L | *Quercus wislizeni* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Shrub** | | | | | | | | | | |
| | SAME2 | *Salix melanopsis* | 50 | 1.5 | 3 | 3 | | | | |
| | RUDI2 | *Rubus discolor* | 50 | 0.5 | 1 | 1 | | | | X |
| | SALA6 | *Salix lasiolepis* | 50 | 0.5 | 1 | 1 | | | | |
| | HOMA4 | *Hoita macrostachya* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | SAME5 | *Sambucus mexicana* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| **Herb** | | | | | | | | | | |
| | **TYLA** | ***Typha latifolia*** | **100** | **51.0** | **38** | **64** | **X** | | **X** | |
| | JUEF | *Juncus effusus* | 100 | 5.6 | 0.2 | 11 | | | X | |
| | MIGU | *Mimulus guttatus* | 100 | 0.2 | 0.2 | 0.2 | | | X | |
| | CYER | *Cyperus eragrostis* | 50 | 2.5 | 5 | 5 | | | | |
| | MICA3 | *Mimulus cardinalis* | 50 | 0.5 | 1 | 1 | | | | |
| | URDI | *Urtica dioica* | 50 | 0.5 | 1 | 1 | | | | |
| | XAST | *Xanthium strumarium* | 50 | 0.5 | 1 | 1 | | | | |
| | CADE8 | *Carex densa* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CEMU2 | *Centaurium muehlenbergii* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CIRSI | *Cirsium* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | EPCIC | *Epilobium ciliatum* subsp. *ciliatum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | LASE | *Lactuca serriola* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | PAUR2 | *Paspalum urvillei* | 50 | 0.1 | 0.2 | 0.2 | | | | X |
| | RUSA | *Rumex salicifolius* | 50 | 0.1 | 0.2 | 0.2 | | | | |

### *Vulpia microstachys-Lasthenia californica-Plantago erecta* Herbaceous Alliance
### Small Fescue - California Goldfields - Dwarf Plantain Herbaceous Alliance

Described for the first time in the state, this alliance represents a broad complex of herbaceous stands with the characteristic presence of *Lasthenia californica*, *Plantago erecta*, and/or *Vulpia microstachys*. Stands typically contain at least two, if not all three of these commonly occurring native species. Previously, three separate alliances have been classified with these species as indicators (Taylor et al. 1992, Evens et al. 2004, Evens and San 2004, Hickson and Keeler-Wolf 2007). Currently, we are taking a more expansive approach since these three species regularly co-occur at varying cover intervals. Cover variability may be due to inter-annual climatic or disturbance differences, including disruption of the soil by gophers (Hobbs and Mooney 1991). As currently understood, this alliance encompasses what is thought of as the "native annual herblands" in the California Floristic Province, including wildflower fields (sensu Holland 1986). One of the long standing questions of California plant ecology is, "what vegetation might have been present prior to the domination by the diverse suite of non-natives that occurs today across much of the state?". We have moved away from the standard pat answer of "*Nassella pulchra* Grassland" (e.g., Clements 1934) in many areas of the state, where soils are relatively rocky or otherwise shallow. Although the *Vulpia microstachys - Lasthenia californica - Plantago erecta* Herbaceous Alliance appears restricted to shallow, non-fertile, "oligotrophic" soils, where the non-natives do not grow as well, this alliance may have been more widespread on somewhat deeper soils in pre-European days.

Nine associations of the Small Fescue - California Goldfields - Dwarf Plantain Alliance were sampled in the study area and are described below. These types represent a diversity of native-dominated vegetation. A number of mixed forb and grass samples were classified to this alliance, but did not conform to any of the associations. A total of twenty samples were classified to the alliance level only (SNNR0792, SNFN0299, SNFN0300, SNFN0303, SNFN0346, SNFN0397, SNNR0789, SNFN0704, SNFN0443, SNNR1505, SNNR1526, SNNR1528, SNFN0031, SNFN0076, SNFN0216, SNNR0427, SNNR0574, SNFN0426, SNFN0440, and SNFN0696). Along with the indicator species for the alliance, these stands included both native and non-native species such as *Aira caryophyllea*, *Hypochaeris glabra*, *Avena barbata*, *Taeniatherum caput-medusae*, and *Vulpia myuros* and native species such as *Dichelostemma capitatum* subsp. *capitatum*, *Trifolium hirtum*, *Micropus californicus*, *Linanthus bicolor*, and *Triphysaria eriantha* subsp. *eriantha*. The first three associations all contain high constancy of *Selaginella hansenii*, indicating shallow, rocky substrates that may be volcanic or ultramafic.

---

### *Selaginella hansenii - Vulpia microstachys* Herbaceous Association
### Hansen's Spikemoss - Small Fescue Herbaceous Association

**SUMMARY**

In the stands sampled, the canopy was open to continuous, with the cryptogam *Selaginella hansenii* dominant at 1-76% cover and native grass *Vulpia microstachys* characteristic at 7-35% cover. Other herbaceous taxa that were often present included *Avena barbata*, *Bromus hordeaceus*, *Lessingia virgata*, *Petrorhagia dubia*, and *Plantago erecta*. *Ceanothus cuneatus* sometimes occurred as a scattered emergent shrub.

This association was sampled throughout the study area - frequently in the Cascade Range Foothills, somewhat frequently in the northern Sierra Nevada Foothills and High Cascade Range, and infrequently in the central Sierra Nevada Foothills Subregions (Hickman 1993). Stands

consistently occurred on volcanic (including basalt) substrates. They occupied a variety of upland slope positions from bottoms to ridgetops. They were found occasionally on mesas/plateaus, on slopes that varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte, Shasta, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsection(s) (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 38.4 | 18-80 | - |
| Herb | 38.4 | 18-80 | variable |
| Shrub | 0.3 | 0-4 | 0-5 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.2 | 0-5 | <5 |
| Conifer | 0.2 | 0-3 | <5-20 |
| Relative non-native to native cover | 18.2 | 1-48 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: S (8), SW (7), SE (6), W (5), Variable (2), E (2), NW (1), NE (1), Flat (2)
Macrotopography: entire slope (1), bottom (2), lower slope (4), middle slope (12), upper slope (6), upper slope to ridgetop (1), mesa/plateau (3), ridgetop (4)
Microtopography: undulating (17), convex (8), flat (8), concave (1)
Parent Material: volcanic (32), basalt (2)
Soil Texture: loam or sandy loam (14), clay or clay loam (4), sand (3), silt or silt loam (2)

| | Mean | Range |
|---|---|---|
| Elevation | 1352 ft. | 285-3111 ft. |
| Slope | 11.9º | 0-36º |
| Large rock cover | 21.2% | 0.2-72.2% |
| Small rock cover | 25.9% | 1.2-88.2% |
| Bare ground cover | 25.4% | 2-75% |
| Litter cover | 23.4% | 1-70% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=34)

**Rapid Assessments:** SNNR0029, SNNR0033, SNNR0075, SNNR0178, SNNR0195, SNNR0196, SNNR0243, SNNR0325, SNNR0426, SNNR0448, SNNR0457, SNNR0465, SNNR0572, SNNR0791, SNNR0794, SNNR0957, SNNR0958, SNNR1071, SNNR1072, SNNR1304, SNNR1306 **Relevés:** SNFN0052, SNFN0096, SNFN0100, SNFN0171, SNFN0202, SNFN0203, SNFN0351, SNFN0353, SNFN0372, SNFN0403, SNFN0431, SNFN0439, SNFN0445

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills. It is likely to be endemic to the northern and central Foothills.

**STAND TABLE**

***Selaginella hansenii - Vulpia microstachys* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 24 | 0.1 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | **VUMI** | ***Vulpia microstachys*** | **94** | **4.1** | **0.2** | **21** | | | **X** | |
| | PLER3 | *Plantago erecta* | 76 | 1.9 | 0.2 | 15 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 71 | 1.7 | 0.2 | 11 | | | | X |
| | PEDU2 | *Petrorhagia dubia* | 71 | 1.6 | 0.2 | 15 | | | | X |
| | LEVI8 | *Lessingia virgata* | 62 | 1.7 | 0.2 | 12 | | | | |
| | AVBA | *Avena barbata* | 62 | 0.4 | 0.2 | 2 | | | | X |
| | AICA | *Aira caryophyllea* | 47 | 0.6 | 0.2 | 9 | | | | X |
| | BRMA3 | *Bromus madritensis* | 44 | 0.1 | 0.2 | 1 | | | | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 44 | 0.1 | 0.2 | 1 | | | | |
| | HYGL2 | *Hypochaeris glabra* | 38 | 1.2 | 0.2 | 11 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 38 | 0.1 | 0.2 | 1 | | | | |
| | CATR3 | *Calycadenia truncata* | 35 | 1.0 | 0.2 | 10 | | | | |
| | CLPU2 | *Clarkia purpurea* | 35 | 0.7 | 0.2 | 7 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 35 | 0.1 | 0.2 | 1 | | | | |
| | TRHI4 | *Trifolium hirtum* | 32 | 0.4 | 0.2 | 4 | | | | X |
| | ERBO | *Erodium botrys* | 29 | 0.6 | 0.2 | 12 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 26 | 1.0 | 0.2 | 12 | | | | |
| | VUMY | *Vulpia myuros* | 26 | 0.6 | 0.2 | 6 | | | | X |
| | LACA7 | *Lasthenia californica* | 26 | 0.5 | 0.2 | 8 | | | | |
| | GITR2 | *Gilia tricolor* | 26 | 0.5 | 0.2 | 6 | | | | |
| | MICA | *Micropus californicus* | 26 | 0.1 | 0.2 | 1 | | | | |
| | BRDI3 | *Bromus diandrus* | 24 | 0.1 | 0.2 | 2 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 24 | 0.1 | 0.2 | 2 | | | | |
| | LUNA3 | *Lupinus nanus* | 24 | 0.1 | 0.2 | 1 | | | | |
| | TRDE | *Trifolium depauperatum* | 24 | 0.1 | 0.2 | 1 | | | | |
| | ERCI6 | *Erodium cicutarium* | 24 | 0.0 | 0.2 | 0.2 | | | | X |
| | MICA7 | *Minuartia californica* | 21 | 0.6 | 0.2 | 15 | | | | |
| | CEMU2 | *Centaurium muehlenbergii* | 21 | 0.3 | 0.2 | 7 | | | | |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 21 | 0.2 | 0.2 | 5 | | | | |
| | PAPU10 | *Parvisedum pumilum* | 21 | 0.1 | 0.2 | 2 | | | | |
| | LENI | *Lepidium nitidum* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | **SEHA2** | ***Selaginella hansenii*** | **100** | **18.6** | **1** | **76** | **X** | | **X** | |
| | MOSS | Moss | 53 | 3.8 | 0.2 | 30 | | | | |

***Selaginella hansenii - Vulpia microstachys - Lupinus nanus* Herbaceous Association (Provisional)**

**Hansen's Spikemoss - Small Fescue - Sky Lupine Herbaceous Association (Provisional)**


**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous, with cryptogam *Selaginella hansenii* occurring often at 1-55% cover, and with characteristic species *Lupinus nanus* at <1-17% cover and *Vulpia microstachys* at 3-35% cover. These species were usually co-dominant. Additional characteristic taxa included *Bromus hordeaceus*, *Dichelostemma capitatum* subsp. *capitatum*, *Hypochaeris glabra*, and *Triphysaria eriantha* subsp. *eriantha*. Shrubs such as *Eriodictyon californicum* and *Eriophyllum lanatum* var. *grandiflorum* sometimes occurred as emergents.


This association was sampled infrequently in the study area within the central and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands consistently occurred on volcanic (including basalt) substrates. These upland stands occurred on lower slopes, upper slopes, ridgetops, and occasionally on mesas/plateaus. Slopes varied from flat to steep.

**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 52.1 | 27-75 | - |
| Herb | 51.9 | 27-75 | <0.3 |
| Shrub | 0.3 | 0-2 | 0-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 21.8 | 1-75 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: Flat (3), SW (2), W (1), Variable (1)
Macrotopography: lower slope (1), upper slope (1), mesa/plateau (2), ridgetop (3)
Microtopography: flat (3), undulating (3), convex (1)
Parent Material: volcanic (5), basalt (2)
Soil Texture: loam or sandy loam (3), sand (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1586 ft. | 1117-1933 ft. |
| Slope | 6.9º | 0-40º |
| Large rock cover | 27.5% | 0-80% |
| Small rock cover | 30.1% | 2-60% |
| Bare ground cover | 29.3% | 2-72% |
| Litter cover | 9.1% | 1-22% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=7)

**Rapid Assessments:** none **Relevés:** SNFN0069, SNFN0102, SNFN0437, SNFN0589, SNFN0595, SNFN0596, SNFN0686

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon data collected for this project and for the Peoria Wildlife Area project in Tuolumne County (Evens et al. 2004). It is likely to be endemic to the northern and central Foothills. It is indicative of slightly deeper soils than the *Selaginella hansenii - Vulpia microstachys* Herbaceous Association of this alliance.

.

**STAND TABLE**

***Selaginella hansenii - Vulpia microstachys - Lupinus nanus* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | ERCA6 | *Eriodictyon californicum* | 29 | 0.3 | 0.2 | 2 | | | | |
| | ERLAG | *Eriophyllum lanatum* var. *grandiflorum* | 29 | 0.2 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | **LUNA3** | ***Lupinus nanus*** | **100** | **7.3** | **0.2** | **17** | | | **X** | |
| | HYGL2 | *Hypochaeris glabra* | 100 | 1.4 | 0.2 | 4 | | | X | X |
| | **VUMI** | ***Vulpia microstachys*** | **86** | **14.3** | **3** | **35** | | **X** | **X** | |
| | BRHO2 | *Bromus hordeaceus* | 86 | 1.6 | 0.2 | 7 | | | X | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 86 | 0.2 | 0.2 | 0.2 | | | X | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 86 | 0.2 | 0.2 | 0.2 | | | X | |
| | LACA7 | *Lasthenia californica* | 71 | 0.9 | 0.2 | 3 | | | | |
| | MICA7 | *Minuartia californica* | 71 | 0.1 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 57 | 0.9 | 0.2 | 4 | | | | X |
| | PLER3 | *Plantago erecta* | 57 | 0.9 | 1 | 2 | | | | |
| | BRMA3 | *Bromus madritensis* | 57 | 0.6 | 0.2 | 3 | | | | X |
| | AICA | *Aira caryophyllea* | 57 | 0.2 | 0.2 | 1 | | | | X |
| | POCA7 | *Polygonum californicum* | 57 | 0.2 | 0.2 | 1 | | | | |
| | TRHY3 | *Triteleia hyacinthina* | 57 | 0.1 | 0.2 | 0.2 | | | | |
| | PAPU10 | *Parvisedum pumilum* | 43 | 0.9 | 0.2 | 5 | | | | |
| | ERNUP4 | *Eriogonum nudum* var. *pubiflorum* | 43 | 0.5 | 0.2 | 2 | | | | |
| | TRVA | *Trifolium variegatum* | 43 | 0.3 | 0.2 | 2 | | | | |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | PSTEG | *Psilocarphus tenellus* var. *globiferus* | 43 | 0.1 | 0.2 | 0.2 | | | | |
| | TRDE | *Trifolium depauperatum* | 43 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE**
***Selaginella hansenii - Vulpia microstachys - Lupinus nanus* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | TRWI3 | *Trifolium willdenovii* | 29 | 1.2 | 0.2 | 8 | | | | |
| | ERBR14 | *Erodium brachycarpum* | 29 | 1.0 | 0.2 | 7 | | | | X |
| | LOMI | *Lotus micranthus* | 29 | 0.7 | 1 | 4 | | | | |
| | LETA | *Leontodon taraxacoides* | 29 | 0.3 | 0.2 | 2 | | | | X |
| | TRDET | *Trifolium depauperatum* var. *truncatum* | 29 | 0.3 | 0.2 | 2 | | | | |
| | CHLOR3 | *Chlorogalum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | CLARK | *Clarkia* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | CRCOE | *Crassula connata* var. *Erectoides* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | ERCI6 | *Erodium cicutarium* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | NAIN2 | *Navarretia intertexta* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | SIGA | *Silene gallica* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | **SEHA2** | ***Selaginella hansenii*** | **71** | **23.3** | **1** | **55** | | | | |
| | MOSS | Moss | 43 | 3.6 | 2 | 20 | | | | |
| | LICHEN | Lichen | 29 | 2.3 | 4 | 12 | | | | |

***Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis* Herbaceous Association (Provisional)**

**Hansen's Spikemoss - Small Fescue - Shaggyhair Lupine Herbaceous Association (Provisional)**


**SUMMARY**

In the stands sampled, the canopy was open to intermittent, with *Selaginella* (*hansenii*) characterizing the cryptogam layer at <1-55% cover. *Lupinus spectabilis* (<1-7% cover), *Plantago erecta* (<1-5% cover), and *Vulpia microstachys* (<1-2% cover) were frequently present in the herbaceous canopy. Other taxa that were often present included *Dudleya cymosa* subsp. *cymosa*, *Eschscholzia lobbii*, *Holocarpha virgata* subsp. *virgata*, and *Trifolium willdenovii*.

In the study area, this association was sampled somewhat frequently in the central Sierra Nevada Foothills Subregion (Hickman 1993). Stands consistently occurred on serpentine substrates. They occupied a variety of upland slope positions, from lower to upper slopes and ridgetops, with moderate to steep slopes.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Mariposa and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 28.3 | 9-65 | - |
| Herb | 28.2 | 7-65 | <0.3 |
| Shrub | 0.4 | 0-2 | 1-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 11.9 | 0-47 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: S (3), E (2), W (1), SE (1), NE (1), Flat (1)
Macrotopography: lower slope (1), middle slope (5), upper slope (1), ridgetop (2)
Microtopography: undulating (6), flat (3)
Parent Material: serpentine (9)
Soil Texture: sand (3), unknown (2), clay or clay loam (1), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1719 ft. | 874-2501 ft. |
| Slope | 22.4º | 8-35º |
| Large rock cover | 20% | 5.2-50.4% |
| Small rock cover | 52.7% | 28-74.2% |
| Bare ground cover | 18.8% | 9-43% |
| Litter cover | 6% | 1-20% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=9)

**Rapid Assessments:** none **Relevés:** SNFN0114, SNFN0138, SNFN0140, SNFN0141, SNFN0410, SNFN0697, SNFN0701, SNFN0702, SNFN0703

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based upon the data collected for this project. This association is endemic to serpentine substrates of the central Sierra Foothills and often contains sensitive and localized species.

**STAND TABLE**
***Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | ERCA6 | *Eriodictyon californicum* | 22 | 0.2 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | **LUSP3** | ***Lupinus spectabilis*** | **78** | **3.1** | **0.2** | **7** | | | | |
| | PLER3 | *Plantago erecta* | 78 | 1.4 | 0.2 | 5 | | | | |
| | **VUMI** | ***Vulpia microstachys*** | **78** | **0.7** | **0.2** | **2** | | | | |
| | ESLO | *Eschscholzia lobbii* | 67 | 0.7 | 0.2 | 2 | | | | |
| | HOVIV | *Holocarpha virgata* subsp. *virgata* | 56 | 2.4 | 0.2 | 18 | | | | |
| | TRWI3 | *Trifolium willdenovii* | 56 | 0.2 | 0.2 | 1 | | | | |
| | DUCYC3 | *Dudleya cymosa* subsp. | 56 | 0.1 | 0.2 | 0.2 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 44 | 0.7 | 0.2 | 5 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 44 | 0.4 | 0.2 | 3 | | | | |
| | BRMA3 | *Bromus madritensis* | 44 | 0.3 | 0.2 | 1 | | | | X |
| | ERNU3 | *Eriogonum nudum* | 44 | 0.2 | 0.2 | 1 | | | | |
| | LOWR2 | *Lotus wrangelianus* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| | TRAL5 | *Trifolium albopurpureum* | 44 | 0.1 | 0.2 | 0.2 | | | | |
| | LACA7 | *Lasthenia californica* | 33 | 0.8 | 1 | 5 | | | | |
| | CRFL4 | *Cryptantha flaccida* | 33 | 0.2 | 0.2 | 1 | | | | |
| | PETR7 | *Pentagramma triangularis* | 33 | 0.2 | 0.2 | 1 | | | | |
| | ERIOG | *Eriogonum* | 33 | 0.1 | 0.2 | 0.4 | | | | |
| | ASTEXX | Asteraceae | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CAAT25 | *Castilleja attenuata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | GICA5 | *Gilia capitata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | MIAC | *Microseris acuminata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | PEMU | *Pellaea mucronata* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | THCU | *Thysanocarpus curvipes* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | URLI5 | *Uropappus lindleyi* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | TRHI4 | *Trifolium hirtum* | 22 | 0.4 | 1 | 3 | | | | X |
| | BRMAR | *Bromus madritensis* subsp. *rubens* | 22 | 0.4 | 0.2 | 3 | | | | X |
| | MIDO | *Microseris douglasii* | 22 | 0.4 | 0.2 | 3 | | | | |
| | VUBR | *Vulpia bromoides* | 22 | 0.1 | 0.2 | 1 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | **SEHA2** | ***Selaginella hansenii*** | **56** | **10.1** | **0.2** | **55** | | | | |
| | MOSS | Moss | 44 | 4.9 | 3 | 20 | | | | |
| | **SELAG** | ***Selaginella*** | **33** | **4.6** | **0.2** | **40** | | | | |

***Vulpia microstachys - Elymus elymoides - Achnatherum lemmonii* Herbaceous Association (Provisional)**

**Small Fescue - Squirreltail - Lemmon's Needlegrass Herbaceous Association (Provisional)**


**SUMMARY**

In the stands sampled, the herbaceous canopy was open to intermittent and characterized by *Elymus elymoides* (<1-7% cover), *Petrorhagia dubia*, (1-6% cover), and *Vulpia microstachys* (<1-5% cover). Other taxa that were often present included *Achnatherum lemmonii*, *Aira caryophyllea*, *Brodiaea elegans* subsp. *elegans*, *Calycadenia*, *Clarkia purpurea*, *Eriogonum*, *Lessingia virgata*, *Minuartia*, *Poa secunda*, *Polygonum bolanderi*, *Trifolium*, *Vulpia microstachys*, and *Vulpia myuros*. Shrubs such as *Ceanothus cuneatus* and *Eriodictyon californicum* sometimes occurred as emergents.

This association was sampled somewhat infrequently in the study area within the High Cascade Range Subregion (Hickman 1993). Stands consistently occurred on volcanic substrates. They occupied middle to upper slopes and ridgetops, on gentle to somewhat steep slopes.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Tehama County, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 28.3 | 15-50 | - |
| Herb | 27.2 | 15-45 | variable |
| Shrub | 2 | 0-5 | 0-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0.1 | 0-0.2 | <5-10 |
| Conifer | 0 | 0-0.2 | 10-20 |
| Relative non-native to native cover | 22 | 4-45 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: NE (2), Variable (1), SW (1), SE (1), N (1)
Macrotopography: middle to upper slope (1), upper slope (3), ridgetop (2)
Microtopography: convex (3), flat (2), undulating (1)
Parent Material: volcanic (6)
Soil Texture: sand (4), loam or sandy loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 3366 ft. | 3035-3753 ft. |
| Slope | 13.2º | 2-24º |
| Large rock cover | 9% | 3-15% |
| Small rock cover | 51.2% | 24-67% |
| Bare ground cover | 22.5% | 10-45% |
| Litter cover | 13.5% | 3-43% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=6)

**Rapid Assessments:** SNNR0374, SNNR0387, SNNR0439, SNNR0443, SNNR0450, SNNR0491 **Relevés:** none

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based on data collected for this project. It is characteristic of extremely shallow, rocky volcanic soils over the Tuscan and related geologic formations of the northern Foothills. Save the *Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis* Serpentine Association, this association has the lowest cover of plants and the highest cover of small and large rocks of the other regionally occurring associations in this alliance.

**STAND TABLE**

***Vulpia microstachys - Elymus elymoides - Achnatherum lemmonii* Herbaceous Association (Provisional)**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 100 | 1.5 | 0.2 | 5 | X | | X | |
| | ERCA6 | *Eriodictyon californicum* | 67 | 0.6 | 0.2 | 2 | | | | |
| **Herb** | | | | | | | | | | |
| | PEDU2 | *Petrorhagia dubia* | 100 | 2.8 | 1 | 6 | | | X | X |
| | **VUMI** | ***Vulpia microstachys*** | **100** | **2.4** | **0.2** | **5** | | | **X** | |
| | **ELEL5** | ***Elymus elymoides*** | **83** | **1.3** | **0.2** | **7** | | | **X** | |
| | **ACLE8** | ***Achnatherum lemmonii*** | **67** | **3.4** | **0.2** | **20** | | | | |
| | TRIFO | *Trifolium* | 67 | 0.7 | 0.2 | 3 | | | | |
| | VUMY | *Vulpia myuros* | 67 | 0.7 | 0.2 | 2 | | | | X |
| | POBO3 | *Polygonum bolanderi* | 67 | 0.7 | 0.2 | 2 | | | | |
| | LEVI8 | *Lessingia virgata* | 50 | 3.7 | 1 | 12 | | | | |
| | MINUA | *Minuartia* | 50 | 1.7 | 1 | 6 | | | | |
| | CALYC | *Calycadenia* | 50 | 0.5 | 1 | 1 | | | | |
| | AICA | *Aira caryophyllea* | 50 | 0.2 | 0.2 | 1 | | | | X |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | CLPU2 | *Clarkia purpurea* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | ERIOG | *Eriogonum* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | POSE | *Poa secunda* | 50 | 0.1 | 0.2 | 0.2 | | | | |
| | LESSI | *Lessingia* | 33 | 3.0 | 3 | 15 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 33 | 1.5 | 1 | 8 | | | | X |
| | AVBA | *Avena barbata* | 33 | 0.7 | 0.2 | 4 | | | | X |
| | POBI4 | *Polygonum bidwelliae* | 33 | 0.5 | 0.2 | 3 | | | | |
| | CESO3 | *Centaurea solstitialis* | 33 | 0.2 | 0.2 | 1 | | | | X |
| | CHST5 | *Chorizanthe stellulata* | 33 | 0.2 | 0.2 | 1 | | | | |
| | MICA7 | *Minuartia californica* | 33 | 0.2 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 33 | 0.1 | 0.2 | 0.2 | | | | X |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 33 | 0.1 | 0.2 | 0.2 | | | | |
| | LUNA3 | *Lupinus nanus* | 33 | 0.1 | 0.2 | 0.2 | | | | |

***Vulpia microstachys - Lasthenia californica - Agrostis elliottiana* Herbaceous Association**
**Small Fescue - California Goldfields - Elliott's Bentgrass Herbaceous Association**

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and most strongly characterized by *Aira caryophyllea* (<1-27% cover), *Bromus hordeaceus* (<1-7% cover), *Juncus bufonius* (<1-5% cover), and *Lasthenia californica* (<1-12% cover). Additional taxa that occurred frequently included *Briza minor*, *Chlorogalum angustifolium*, *Cicendia quadrangularis*, *Hypochaeris glabra*, *Navarretia tagetina*, *Plantago erecta*, and *Vulpia microstachys*.

This association was sampled fairly frequently in the study area within the Cascade Range Foothills and Sacramento Valley Subregions (Hickman 1993). Stands often occurred on volcanic (including basalt), sometimes on sedimentary, and rarely on metamorphic substrates. These upland stands were found on bottoms, upper slopes and ridgetops, and sometimes on mesas/plateaus. Slopes were flat to somewhat steep.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Sacramento and Shasta Counties, within the Camanche Terraces (262Ao) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 38.9 | 22-60 | - |
| Herb | 38.9 | 22-60 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | 0-0.2 | 5-10 |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 31.8 | 5-81 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: N (5), Flat (4), W (3), S (2), Variable (1), SE (1), E (1)
Macrotopography: bottom (1), upper slope to ridgetop (1), mesa/plateau (6), ridgetop (2)
Microtopography: flat (4), concave (3), convex (2), undulating (1)
Parent Material: volcanic (9), sedimentary (6), basalt (1), metamorphic (1)
Soil Texture: silt or silt loam (5), loam or sandy loam (2), clay or clay loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 962 ft. | 850-1428 ft. |
| Slope | 4.8º | 0-19º |
| Large rock cover | 2.3% | 0-5% |
| Small rock cover | 13.8% | 0.2-45% |
| Bare ground cover | 64.1% | 29-85% |
| Litter cover | 16.9% | 5-50% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=17)

**Rapid Assessments:** SNNR0817, SNNR0978, SNNR1328 **Relevés:** SNFN0360, SNFN0361, SNFN0363, SNFN0366, SNFN0369, SNFN0371, SNFN0380, SNFN0471, SNFN0472, SNFN0473, SNFN0474, SNFN0510, SNFN0525, SNFN0527

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based upon the data collected for this project. The presence of *Lasthenia californica* as a strong indicator with other species such as *Chlorogalum angustifolium*, appears to be associated with relatively fine-textured mesic soils, compared with the above described associations of this alliance.

**STAND TABLE**
***Vulpia microstachys - Lasthenia californica - Agrostis elliottiana* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | AICA | *Aira caryophyllea* | 100 | 3.4 | 0.2 | 27 | | | X | X |
| | **LACA7** | ***Lasthenia californica*** | **94** | **5.6** | **0.2** | **12** | | | **X** | |
| | BRHO2 | *Bromus hordeaceus* | 94 | 2.5 | 0.2 | 7 | | | X | X |
| | JUBU | *Juncus bufonius* | 94 | 1.8 | 0.2 | 5 | | | X | |
| | CHAN2 | *Chlorogalum angustifolium* | 88 | 0.6 | 0.2 | 3 | | | X | |
| | PLER3 | *Plantago erecta* | 88 | 0.4 | 0.2 | 1 | | | X | |
| | BRMI2 | *Briza minor* | 88 | 0.2 | 0.2 | 0.2 | | | X | X |
| | **VUMI** | ***Vulpia microstachys*** | **76** | **2.1** | **0.2** | **10** | | | | |
| | HYGL2 | *Hypochaeris glabra* | 76 | 1.6 | 0.2 | 6 | | | | X |
| | NATA3 | *Navarretia tagetina* | 76 | 1.3 | 0.2 | 8 | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 76 | 0.2 | 0.2 | 1 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 65 | 1.8 | 0.2 | 12 | | | | |
| | ERBO | *Erodium botrys* | 65 | 1.8 | 0.2 | 10 | | | | X |
| | HEFI | *Hemizonia fitchii* | 65 | 0.4 | 0.2 | 1 | | | | |
| | **AGEL4** | ***Agrostis elliottiana*** | **65** | **0.1** | **0.2** | **0.2** | | | | |
| | LETA | *Leontodon taraxacoides* | 53 | 3.9 | 0.2 | 30 | | | | X |
| | TRDU2 | *Trifolium dubium* | 53 | 1.3 | 0.2 | 13 | | | | X |
| | POZI | *Pogogyne ziziphoroides* | 53 | 0.5 | 0.2 | 3 | | | | |
| | TRDE | *Trifolium depauperatum* | 53 | 0.5 | 0.2 | 2 | | | | |
| | MIAC | *Microseris acuminata* | 53 | 0.2 | 0.2 | 1 | | | | |
| | LAFR2 | *Layia fremontii* | 47 | 0.9 | 0.2 | 10 | | | | |
| | DEDA | *Deschampsia danthonioides* | 47 | 0.2 | 0.2 | 1 | | | | |
| | BRODI | *Brodiaea* | 47 | 0.2 | 0.2 | 1 | | | | |
| | CAAT25 | *Castilleja attenuata* | 47 | 0.1 | 0.2 | 1 | | | | |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 41 | 0.5 | 0.2 | 3 | | | | |
| | LOMU | *Lolium multiflorum* | 41 | 0.1 | 0.2 | 1 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 41 | 0.1 | 0.2 | 1 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 41 | 0.1 | 0.2 | 0.2 | | | | |
| | FIGA | *Filago gallica* | 41 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRMI4 | *Trifolium microcephalum* | 41 | 0.1 | 0.2 | 0.2 | | | | |

**STAND TABLE continued**

***Vulpia microstachys - Lasthenia californica - Agrostis elliottiana* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | VUBR | *Vulpia bromoides* | 35 | 0.8 | 1 | 5 | X | | | |
| | TRVA | *Trifolium variegatum* | 35 | 0.3 | 0.2 | 4 | | | | |
| | TRHY3 | *Triteleia hyacinthina* | 35 | 0.2 | 0.2 | 3 | | | | |
| | LIBI | *Linanthus bicolor* | 35 | 0.2 | 0.2 | 1 | | | | |
| | ALAM2 | *Allium amplectens* | 35 | 0.1 | 0.2 | 1 | | | | |
| | NALE | *Navarretia leucocephala* | 29 | 3.6 | 0.2 | 34 | | | | |
| | HOMA2 | *Hordeum marinum* | 29 | 2.2 | 0.2 | 35 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 29 | 0.3 | 0.2 | 2 | | | | X |
| | CAMU3 | *Calycadenia multiglandulosa* | 29 | 0.3 | 0.2 | 3 | | | | |
| | ODHA | *Odontostomum hartwegii* | 29 | 0.2 | 0.2 | 1 | | | | |
| | GAVE3 | *Gastridium ventricosum* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | JUCA5 | *Juncus capitatus* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | SIGA | *Silene gallica* | 29 | 0.1 | 0.2 | 0.2 | | | | X |
| | CEMI | *Centunculus minimus* | 24 | 0.3 | 0.2 | 4 | | | | |
| | ERCA33 | *Eryngium castrense* | 24 | 0.3 | 0.2 | 2 | | | | |
| | AVBA | *Avena barbata* | 24 | 0.0 | 0.2 | 0.2 | | | | X |
| | LENI | *Lepidium nitidum* | 24 | 0.0 | 0.2 | 0.2 | | | | |
| | LOCA5 | *Lomatium caruifolium* | 24 | 0.0 | 0.2 | 0.2 | | | | |
| | POAN | *Poa annua* | 24 | 0.0 | 0.2 | 0.2 | | | | X |
| | SCBO | *Scribneria bolanderi* | 24 | 0.0 | 0.2 | 0.2 | | | | |
| | VUMY | *Vulpia myuros* | 24 | 0.0 | 0.2 | 0.2 | | | | X |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 82 | 8.7 | 0.2 | 40 | X | | X | |

***Vulpia microstachys - Lasthenia californica - Parvisedum pumilum* Herbaceous Association**

**Small Fescue - California Goldfields - Sierra Mock Stonecrop Herbaceous Association**


**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous and characterized most strongly by *Lasthenia californica* (<1-34% cover), *Plantago erecta* (<1-5% cover), and *Vulpia microstachys* (<1-55% cover). Additional characteristic taxa included *Hypochaeris glabra*, *Lepidium nitidum*, *Parvisedum pumilum*, and *Triphysaria eriantha* subsp. *eriantha*.

In the study area, this association was sampled frequently in the Cascade Range Foothills and somewhat frequently in the northern and central Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on volcanic (including basalt) and rarely on metamorphic (including serpentine) substrates. They occupied a variety of upland slope positions, from bottoms to upper slopes and ridgetops, and were sometimes found on mesas/plateaus. Slopes were flat to somewhat steep.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, Mariposa, Shasta, Tehama, and Tuolumne Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 32.2 | 3-72 | - |
| Herb | 32.1 | 3-72 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 13.7 | 0-59 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: N (7), NW (6), Flat (6), W (5), SW (2), SE (2), S (1), E (1)
Macrotopography: bottom (1), lower slope (5), middle slope (3), upper slope (5), mesa/plateau (10), ridgetop (5), toeslope (1)
Microtopography: flat (17), undulating (10), convex (2), concave (1)
Parent Material: volcanic (20), basalt (8), metamorphic (1), serpentine (1)
Soil Texture: clay or clay loam (13), loam or sandy loam (11), sand (1), silt or silt loam (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1115 ft. | 324-2250 ft. |
| Slope | 2.6º | 0-19º |
| Large rock cover | 12% | 0-65% |
| Small rock cover | 27.7% | 1.2-79% |
| Bare ground cover | 43.6% | 1-88% |
| Litter cover | 15% | 0.2-90% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=30)

**Rapid Assessments:** SNNR1029, SNNR1172 **Relevés:** SNFN0029, SNFN0034, SNFN0053, SNFN0054, SNFN0071, SNFN0072, SNFN0293, SNFN0313, SNFN0335, SNFN0340, SNFN0343, SNFN0345, SNFN0354, SNFN0386, SNFN0396, SNFN0401, SNFN0402, SNFN0404, SNFN0406, SNFN0407, SNFN0415, SNFN0417, SNFN0432, SNFN0438, SNFN0441, SNFN0442, SNFN0586, SNFN0587

**Rank:** G4S4

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon data collected for this project. The presence of *Lasthenia californica* as a major indicator is related to the relatively fine-textured, mesic soils in these stands; shallow and rocky soils also appear to be characteristic of most of these stands.

**STAND TABLE**

***Vulpia microstachys - Lasthenia californica - Parvisedum pumilum* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **VUMI** | ***Vulpia microstachys*** | **100** | **5.9** | **0.2** | **55** | | | **X** | |
| | **LACA7** | ***Lasthenia californica*** | **97** | **9.6** | **0.2** | **34** | | | **X** | |
| | PLER3 | *Plantago erecta* | 97 | 1.2 | 0.2 | 5 | | | X | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 90 | 0.8 | 0.2 | 5 | | | X | |
| | **PAPU10** | ***Parvisedum pumilum*** | **80** | **2.8** | **0.2** | **20** | | | **X** | |
| | HYGL2 | *Hypochaeris glabra* | 80 | 1.0 | 0.2 | 7 | | | X | X |
| | LENI | *Lepidium nitidum* | 80 | 0.3 | 0.2 | 2 | | | X | |
| | ERBO | *Erodium botrys* | 73 | 1.9 | 0.2 | 30 | | | | X |
| | TRDE | *Trifolium depauperatum* | 70 | 1.4 | 0.2 | 10 | | | | |
| | BRHO2 | *Bromus hordeaceus* | 67 | 1.5 | 0.2 | 12 | | | | X |
| | AICA | *Aira caryophyllea* | 63 | 0.6 | 0.2 | 10 | | | | X |
| | MICA7 | *Minuartia californica* | 57 | 0.4 | 0.2 | 2 | | | | |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 50 | 0.2 | 0.2 | 2 | | | | |
| | JUBU | *Juncus bufonius* | 47 | 0.5 | 0.2 | 3 | | | | |
| | HEFI | *Hemizonia fitchii* | 47 | 0.2 | 0.2 | 4 | | | | |
| | CRTI | *Crassula tillaea* | 43 | 0.6 | 0.2 | 15 | | | | X |
| | NATA3 | *Navarretia tagetina* | 40 | 0.4 | 0.2 | 4 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 40 | 0.2 | 0.2 | 3 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 40 | 0.2 | 0.2 | 3 | | | | X |
| | MIAC | *Microseris acuminata* | 40 | 0.2 | 0.2 | 2 | | | | |
| | CRCO34 | *Crassula connata* | 40 | 0.1 | 0.2 | 0.2 | | | | |
| | LAFR2 | *Layia fremontii* | 37 | 0.7 | 0.2 | 5 | | | | |
| | TRHI4 | *Trifolium hirtum* | 37 | 0.1 | 0.2 | 2 | | | | X |
| | LIBI | *Linanthus bicolor* | 33 | 0.7 | 0.2 | 10 | | | | |
| | BRODI | *Brodiaea* | 33 | 0.5 | 0.2 | 6 | | | | |

**STAND TABLE continued**
***Vulpia microstachys - Lasthenia californica - Parvisedum pumilum* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | CHAN2 | *Chlorogalum angustifolium* | 33 | 0.1 | 0.2 | 2 | | | | |
| | PLAU | *Plagiobothrys austiniae* | 33 | 0.1 | 0.2 | 1 | | | | |
| | TRVA | *Trifolium variegatum* | 30 | 0.2 | 0.2 | 3 | | | | |
| | MICA | *Micropus californicus* | 30 | 0.1 | 0.2 | 1 | | | | |
| | CIQU3 | *Cicendia quadrangularis* | 30 | 0.1 | 0.2 | 1 | | | | |
| | CEGL2 | *Cerastium glomeratum* | 30 | 0.1 | 0.2 | 0.2 | | | | X |
| | LEVI8 | *Lessingia virgata* | 27 | 0.1 | 0.2 | 1 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 27 | 0.1 | 0.2 | 1 | | | | |
| | BRMA3 | *Bromus madritensis* | 23 | 0.1 | 0.2 | 3 | | | | X |
| | AVBA | *Avena barbata* | 23 | 0.0 | 0.2 | 0.2 | | | | X |
| | CLPU2 | *Clarkia purpurea* | 23 | 0.0 | 0.2 | 0.2 | | | | |
| | MEPO3 | *Medicago polymorpha* | 23 | 0.0 | 0.2 | 0.2 | | | | X |
| | POAN | *Poa annua* | 23 | 0.0 | 0.2 | 0.2 | | | | X |
| | HERBAC | unknown | 23 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 90 | 14.8 | 0.2 | 60 | X | | X | |
| | SEHA2 | *Selaginella hansenii* | 47 | 2.6 | 0.2 | 50 | | | | |
| | LIVER | Liverwort | 27 | 0.2 | 0.2 | 3 | | | | |

***Vulpia microstachys - Navarretia tagetina* Herbaceous Association**

**Small Fescue - Marigold Pincushionplant Herbaceous Association**

**SUMMARY**
In the stands sampled, the herbaceous canopy was open to intermittent and characterized most strongly by *Navarretia tagetina* at <1-14% cover and *Vulpia microstachys* at <1-40% cover. Additional characteristic taxa included *Bromus hordeaceus*, *Hemizonia fitchii*, and *Plantago erecta*.

In the study area, this association was sampled frequently within the Cascade Range Foothills and infrequently in the High Cascade Range Subregions (Hickman 1993). Stands consistently occurred on volcanic (including basalt) substrates. They occupied a variety of upland slope positions, from bottoms to upper slopes and ridgetops, and were found occasionally on mesas/plateaus. Slopes twere flat to moderate.

**DISTRIBUTION IN STUDY AREA**
This association was sampled in Butte and Tehama Counties, within the Tuscan Flows (M261Fa) USDA Ecological Subsection (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 38.3 | 18-65 | - |
| Herb | 38.2 | 18-65 | <0.3 |
| Shrub | 0 | - | - |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0 | - | - |
| Relative non-native to native cover | 10.9 | 2-45 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**
Aspect: Flat (6), SE (5), W (3), NW (3), SW (2), E (1)
Macrotopography: bottom (1), lower slope (1), middle slope (6), upper slope (6), mesa/plateau (3), ridgetop (3)
Microtopography: flat (13), undulating (7)
Parent Material: volcanic (16), basalt (4)
Soil Texture: clay or clay loam (8), loam or sandy loam (7), silt or silt loam (3)

| | Mean | Range |
|---|---|---|
| Elevation | 1039 ft. | 312-2907 ft. |
| Slope | 4.1º | 0-12º |
| Large rock cover | 6.5% | 0-48% |
| Small rock cover | 21.5% | 2-43% |
| Bare ground cover | 25.9% | 6-55% |
| Litter cover | 42.1% | 12-87% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=20)

**Rapid Assessments:** SNNR0071, SNNR0091, SNNR0121, SNNR0166, SNNR0167, SNNR0170, SNNR0315, SNNR0391 **Relevés:** SNFN0157, SNFN0161, SNFN0167, SNFN0169, SNFN0235, SNFN0241, SNFN0242, SNFN0243, SNFN0318, SNFN0319, SNFN0328, SNFN0378

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**

This association has been described for the Sierra Nevada Foothills based upon the data collected for this project. This is another association that is characteristic of shallow volcanic soils, but it tends to have slightly higher cover and greater soil depth than several others. Soil textures are intermediate between associations in this alliance with high *Lasthenia* cover and those with high *Selaginella* cover. This association appears related to the *Layia fremontii - Lasthenia californica - Achyrachaena mollis* and the *Layia fremontii - Achyrachaena mollis* Herbaceous Associations; stands of these associations may be adjacent to stands of this *V. microstachys* alliance. These related types overlap in species composition (e.g., *Navarretia tagetina*, *Triphysaria eriantha*, *Lasthenia californica*, etc.) and environmental setting (e.g., on Tuscan soils in Butte and Tehama Counties).

**STAND TABLE**

***Vulpia microstachys - Navarretia tagetina* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | **VUMI** | ***Vulpia microstachys*** | **95** | **5.8** | **0.2** | **40** | | | **X** | |
| | **NATA3** | ***Navarretia tagetina*** | **95** | **4.4** | **0.2** | **14** | | | **X** | |
| | PLER3 | *Plantago erecta* | 90 | 2.5 | 0.2 | 10 | | | X | |
| | BRHO2 | *Bromus hordeaceus* | 90 | 1.0 | 0.2 | 8 | | | X | X |
| | HEFI | *Hemizonia fitchii* | 85 | 2.9 | 0.2 | 30 | | | X | |
| | PEDU2 | *Petrorhagia dubia* | 75 | 0.8 | 0.2 | 5 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 70 | 0.7 | 0.2 | 4 | | | | X |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 65 | 0.5 | 0.2 | 3 | | | | |
| | AICA | *Aira caryophyllea* | 60 | 0.7 | 0.2 | 4 | | | | X |
| | JUBU | *Juncus bufonius* | 55 | 1.9 | 0.2 | 12 | | | | |
| | AVBA | *Avena barbata* | 55 | 0.2 | 0.2 | 1 | | | | X |
| | CEMU2 | *Centaurium muehlenbergii* | 50 | 1.3 | 0.2 | 7 | | | | |
| | TACA8 | *Taeniatherum caput-medusae* | 50 | 0.5 | 0.2 | 3 | | | | X |
| | CLPUQ | *Clarkia purpurea* subsp. *quadrivulnera* | 50 | 0.4 | 0.2 | 3 | | | | |
| | POBI4 | *Polygonum bidwelliae* | 45 | 1.1 | 0.2 | 6 | | | | |
| | POZI | *Pogogyne ziziphoroides* | 45 | 0.6 | 0.2 | 6 | | | | |
| | PAPU10 | *Parvisedum pumilum* | 45 | 0.2 | 0.2 | 2 | | | | |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 40 | 0.4 | 0.2 | 5 | | | | |
| | TRLA4 | *Trichostema lanceolatum* | 40 | 0.4 | 0.2 | 2 | | | | |
| | CLPU2 | *Clarkia purpurea* | 40 | 0.3 | 0.2 | 2 | | | | |
| | LACA7 | *Lasthenia californica* | 40 | 0.3 | 0.2 | 2 | | | | |
| | ALAM2 | *Allium amplectens* | 35 | 1.8 | 0.2 | 17 | | | | |
| | DEDA | *Deschampsia danthonioides* | 35 | 0.8 | 0.2 | 6 | | | | |
| | CHAN2 | *Chlorogalum angustifolium* | 35 | 0.2 | 0.2 | 2 | | | | |
| | VUMY | *Vulpia myuros* | 35 | 0.2 | 0.2 | 2 | | | | X |
| | MIAC | *Microseris acuminata* | 35 | 0.2 | 0.2 | 1 | | | | |
| | TRDE | *Trifolium depauperatum* | 35 | 0.2 | 0.2 | 1 | | | | |

**STAND TABLE continued**
***Vulpia microstachys - Navarretia tagetina* Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | ERSE3 | *Eremocarpus setigerus* | 35 | 0.1 | 0.2 | 0.2 | | | | |
| | TRHI4 | *Trifolium hirtum* | 35 | 0.1 | 0.2 | 0.2 | | | | X |
| | NAPU2 | *Navarretia pubescens* | 30 | 2.9 | 1 | 26 | | | | |
| | BRCA4 | *Brodiaea californica* | 30 | 1.1 | 0.2 | 15 | | | | |
| | LAFR2 | *Layia fremontii* | 30 | 0.5 | 0.2 | 5 | | | | |
| | POCA7 | *Polygonum californicum* | 30 | 0.3 | 0.2 | 4 | | | | |
| | FIGA | *Filago gallica* | 30 | 0.1 | 0.2 | 0.2 | | | | X |
| | LEVI8 | *Lessingia virgata* | 25 | 1.0 | 0.2 | 15 | | | | |
| | TRDED | *Trifolium depauperatum* var. *depauperatum* | 25 | 0.2 | 0.2 | 2 | | | | |
| | MICA7 | *Minuartia californica* | 25 | 0.1 | 0.2 | 1 | | | | |
| | ODHA | *Odontostomum hartwegii* | 25 | 0.1 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 55 | 10.3 | 1 | 54 | | | | |

***Vulpia microstachys* - *Plantago erecta* - *Calycadenia* (*truncata*, *multiglandulosa*) Herbaceous Association**

**Small Fescue - Dwarf Plantain - Rosinweed (Oregon Western, Sticky Western) Herbaceous Association**


**SUMMARY**

In the stands sampled, the herbaceous canopy was open to continuous with *Plantago erecta* (1-10% cover) and *Vulpia microstachys* (<1-18% cover) occurring frequently, and either *Calycadenia multiglandulosa* or *Calycadenia truncata* occurring in most stands. Other taxa that were often present included *Avena barbata*, *Bromus hordeaceus*, *Castilleja lacera*, *Trifolium willdenovii*, and/or other *Calycadenia* species.

In the study area, this association was sampled somewhat frequently within the central Sierra Nevada Foothills, and infrequently in the Cascade Range Foothills and northern Sierra Nevada Foothills Subregions (Hickman 1993). Stands usually occurred on serpentine and other ultramafic (including gabbro) substrates, occasionally on volcanic (including basalt) substrates, and rarely on metamorphic substrates. These stands were typically found in upland settings, on bottoms, lower to upper slopes, ridgetops, and rarely edges of basins/wetlands. Slopes were flat to somewhat steep.


**DISTRIBUTION IN STUDY AREA**

This association was sampled in Butte, El Dorado, Tehama, Tuolumne, and Yuba Counties, within the Lower Foothills Metamorphic Belt (M261Fb) and Tuscan Flows (M261Fa) USDA Ecological Subsections (Miles and Goudey 1997).

**LOCAL VEGETATION DESCRIPTION**

| | Mean % | Range % | Height (m) |
|---|---|---|---|
| Total vegetation cover | 41.5 | 10-75 | - |
| Herb | 40.9 | 7-75 | variable |
| Shrub | 0.9 | 0-5 | 0.9-2 |
| Low Tree/Tall Shrub | 0 | - | - |
| Hardwood | 0 | - | - |
| Conifer | 0.3 | 0-4 | 10-20 |
| Relative non-native to native cover | 31.4 | 2-67 | - |

**LOCAL ENVIRONMENTAL DESCRIPTION**

Aspect: SW (3), Flat (3), S (2), NE (2), W (1), Variable (1), SE (1), NW (1)
Macrotopography: bottom (2), lower slope (2), middle slope (3), upper slope (4), edge of basin/wetland (1), ridgetop (2)
Microtopography: flat (5), undulating (4), concave (4), convex (1)
Parent Material: serpentine (7), ultramafic (2), volcanic (2), basalt (1), gabbro (1), metamorphic (1)
Soil Texture: clay or clay loam (5), loam or sandy loam (5), unknown (1)

| | Mean | Range |
|---|---|---|
| Elevation | 1073 ft. | 660-2045 ft. |
| Slope | 8.9º | 0-24º |
| Large rock cover | 11.3% | 0-50% |
| Small rock cover | 25.6% | 1-70% |
| Bare ground cover | 26.7% | 5-60% |
| Litter cover | 32.9% | 3-69% |

**SAMPLES USED TO DESCRIBE ASSOCIATION** (n=14)

**Rapid Assessments:** SNNR0153, SNNR0205, SNNR0249, SNNR1488, SNNR1494, SNNR1496 **Relevés:** SNFN0083, SNFN0173, SNFN0201, SNFN0584, SNFN0590, SNFN0597, SNFN0601, SNFN0707

**Rank:** G3S3

**GLOBAL DISTRIBUTION AND COMMENTS**
This association has been described for the Sierra Nevada Foothills based upon data collected for this project and for the Peoria Wildlife Area project in Tuolumne County (Evens et al. 2004). It appears largely restricted to serpentine or other ultramafic substrates in the northern and central Sierra Nevada Foothills.

**STAND TABLE**
***Vulpia microstachys - Plantago erecta - Calycadenia* (*truncata*, *multiglandulosa*)**
**Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrub** | | | | | | | | | | |
| | CECU | *Ceanothus cuneatus* | 21 | 0.1 | 0.2 | 1 | | | | |
| **Herb** | | | | | | | | | | |
| | BRHO2 | *Bromus hordeaceus* | 100 | 8.6 | 0.2 | 50 | | | X | X |
| | **VUMI** | ***Vulpia microstachys*** | **71** | **4.0** | **0.2** | **18** | | | | |
| | **PLER3** | ***Plantago erecta*** | **64** | **2.6** | **1** | **10** | | | | |
| | CALA68 | *Castilleja lacera* | 57 | 1.0 | 0.2 | 3 | | | | |
| | AVBA | *Avena barbata* | 50 | 3.6 | 0.2 | 25 | | | | X |
| | TRWI3 | *Trifolium willdenovii* | 50 | 0.8 | 0.2 | 6 | | | | |
| | **CATR3** | ***Calycadenia truncata*** | **43** | **7.6** | **10** | **30** | | | | |
| | HYGL2 | *Hypochaeris glabra* | 43 | 1.7 | 0.2 | 15 | | | | X |
| | BRMA3 | *Bromus madritensis* | 43 | 0.2 | 0.2 | 1 | | | | X |
| | GAVE3 | *Gastridium ventricosum* | 43 | 0.1 | 0.2 | 0.2 | | | | X |
| | TRHI4 | *Trifolium hirtum* | 36 | 2.4 | 0.2 | 16 | | | | X |
| | AICA | *Aira caryophyllea* | 36 | 1.2 | 0.2 | 15 | | | | X |
| | LOWR2 | *Lotus wrangelianus* | 36 | 0.8 | 0.2 | 10 | | | | |
| | TRMI4 | *Trifolium microcephalum* | 36 | 0.7 | 0.2 | 5 | | | | |
| | DAPU3 | *Daucus pusillus* | 36 | 0.2 | 0.2 | 2 | | | | |
| | TRERE2 | *Triphysaria eriantha* subsp. *eriantha* | 36 | 0.1 | 0.2 | 1 | | | | |
| | CEME2 | *Centaurea melitensis* | 36 | 0.1 | 0.2 | 0.2 | | | | X |
| | **CAMU3** | ***Calycadenia multiglandulosa*** | **29** | **5.7** | **2** | **40** | | | | |
| | BRDI2 | *Brachypodium distachyon* | 29 | 2.1 | 0.2 | 20 | | | | X |
| | GITR2 | *Gilia tricolor* | 29 | 1.4 | 0.2 | 8 | | | | |
| | LACA7 | *Lasthenia californica* | 29 | 1.0 | 0.2 | 12 | | | | |
| | CHME2 | *Chorizanthe membranacea* | 29 | 0.3 | 0.2 | 3 | | | | |

**STAND TABLE continued**

***Vulpia microstachys - Plantago erecta* - (*Calycadenia truncata - Calycadenia multiglandulosa*) Herbaceous Association**

| Lifeform | Code | Species Name | Con | Avg | Min | Max | D | cD | C | N |
|---|---|---|---|---|---|---|---|---|---|---|
| **Herb** | | | | | | | | | | |
| | BRELE | *Brodiaea elegans* subsp. *elegans* | 29 | 0.1 | 0.2 | 1 | | | | |
| | CASU3 | *Calochortus superbus* | 29 | 0.1 | 0.2 | 1 | | | | |
| | SIGA | *Silene gallica* | 29 | 0.1 | 0.2 | 1 | | | | X |
| | DICAC5 | *Dichelostemma capitatum* subsp. *capitatum* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | PETR7 | *Pentagramma triangularis* | 29 | 0.1 | 0.2 | 0.2 | | | | |
| | NAPU2 | *Navarretia pubescens* | 21 | 0.9 | 0.2 | 12 | | | | |
| | SIHI2 | *Sidalcea hirsuta* | 21 | 0.8 | 0.2 | 10 | | | | |
| | PEDU2 | *Petrorhagia dubia* | 21 | 0.2 | 0.2 | 3 | | | | X |
| | GAPA5 | *Galium parisiense* | 21 | 0.2 | 0.2 | 1 | | | | X |
| | TACA8 | *Taeniatherum caput-medusae* | 21 | 0.2 | 0.2 | 1 | | | | X |
| | CYEC | *Cynosurus echinatus* | 21 | 0.1 | 0.2 | 1 | | | | X |
| | ERSE3 | *Eremocarpus setigerus* | 21 | 0.1 | 0.2 | 1 | | | | |
| | ASGA | *Astragalus gambelianus* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| | CAAT25 | *Castilleja attenuata* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| | CHLOR3 | *Chlorogalum* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| | ELMU3 | *Elymus multisetus* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| | PTDR | *Pterostegia drymarioides* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| | TRAL5 | *Trifolium albopurpureum* | 21 | 0.0 | 0.2 | 0.2 | | | | |
| | HERBAC | unknown | 21 | 0.0 | 0.2 | 0.2 | | | | |
| **Cryptogam** | | | | | | | | | | |
| | MOSS | Moss | 36 | 0.1 | 0.2 | 1 | | | | |
| | LICHEN | Lichen | 21 | 0.4 | 0.2 | 5 | | | | |