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

Volume 1 of 2 – Introduction, Methods, and Results

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This report consists of two volumes. This volume (Volume 1) contains the project introduction, methods, and results, as well as literature cited, and appendices. 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:

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ABSTRACT

The following report describing the vegetation of the northern Sierra Nevada Foothills was completed by the California Native Plant Society (CNPS) for the California Department of Fish and Game (CDFG). CDFG contracted with CNPS to identify the range of vegetation types in the northern Foothills by collecting field samples across the region in 2005 and 2006. The National Fish and Wildlife Foundation (NFWF) rewarded CNPS two sequential grants to involve volunteers in collecting vegetation samples across the Sierra Nevada Foothills in the same timeframe. Additional field samples collected in the study area by collaborators were used to develop this inventory. The northern Foothills region, here defined by the two northern subsections of the Sierra Nevada Foothills Section of the USDA Ecological Subregions of California (Miles and Goudey 1997), includes 2.48 million acres of land, with approximately 15% under public ownership and 85% under private ownership. Vegetation sampling by means of the CNPS Relevé and Rapid Assessment Protocols was used to obtain a total of 710 Relevés and 1691 Rapid Assessments, which were used to develop a quantitative classification based on cluster and indicator species analyses. The resulting classification describes vegetation types according to the National Vegetation Classification System, which is now the state standard. A total of 57 vegetation alliances and 8 semi-natural types were identified, which included an additional 156 defined plant associations and 3 sub-alliances. The rarity of these vegetation types was ranked by the CDFG Senior Ecologist.

PROJECT STAFF AND COLLABORATORS

Project Staff

This classification project was completed by a team of CNPS and CDFG Vegetation Ecologists, a grant-funded Training Coordinator hired through the National Fish and Wildlife Foundation (NFWF), contract-funded field staff, and GIS analysts. The following lists the basic roles of the staff involved.

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NFWF Training Coordinator: Josie Crawford (CNPS)

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NFWF Training Coordinator – Josie Crawford
Vegetation Ecologists – Julie Evens, Diana Hickson, Anne Klein, Todd Keeler-Wolf, and Carol Witham

Database query development: Anne Klein and Julie Evens

Vegetation classification, description, key development, report preparation and editing: Josie Crawford, Julie Evens, Anne Klein, Diana Hickson and Todd Keeler-Wolf.

Rarity ranking of vegetation types: Todd Keeler-Wolf

Collaborators Contributing Additional Vegetation Data to this Project

California Native Plant Society, Bureau of Reclamation Peoria Wildlife Area (data from 2003)
Environmental Science Associates, Consulting Firm
Melanie Gogol-Prokurat, University of California, Davis, and CDFG
Ayzik Solomeshch, University of California, Davis
Carol Witham, Private Consultant
Eric Wood, Humboldt State University and CDFG

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INTRODUCTION

The northern Sierra Nevada Foothills is recognized as a region that supports a diverse assemblage of plant and animal habitats. Over 200 special status plant, animal, and invertebrate taxa inhabit various forest, woodland, riparian, shrubland, wetland, and herbaceous plant communities across the landscape. Due to the sensitivity of resources and the expected intensity of urban and suburban development in the Foothills, the Resource Assessment Program (RAP) of the California Department of Fish and Game (CDFG) has deemed the bioregion a high priority for conservation planning. In late 2004, RAP hired the California Native Plant Society (CNPS) to produce an alliance and association level vegetation classification of the northern Sierra Nevada Foothills. CNPS and CDFG believe that having a detailed, biologically-driven assessment of vegetation and wildlife resources will allow for informed conservation and development planning.

The primary objective of the CDFG-funded study is to collect vegetation data at sample sites that capture the range of vegetation types in the northern Foothills region. The resulting classification describes vegetation types in the region according to the National Vegetation Classification System (NVCS), which is now the state's standard. A significant component of this study is meant to determine the type of wildlife habitat data that should be collected along with vegetation data to make this classification most useful for wildlife habitat modeling. The establishment of these vegetation and habitat sample sites will serve as a basis for long-term monitoring of environmental change in the northern Foothills.

In 2005 and 2006, CNPS was rewarded two sequential grants from the National Fish and Wildlife Foundation (NFWF) to involve chapter members in the Sierra Nevada Foothills project. With matched funds from NFWF, CNPS hired a Training Coordinator to teach volunteers to collect plant community data beyond what was collected in the CDFG contract. CNPS has nearly 10,000 volunteers. Many of these volunteers have detailed knowledge of their local floras and a desire to learn about and contribute to vegetation projects, as well as access to properties for sampling.

The primary objectives of the NFWF project are to build public and volunteer involvement in vegetation sampling across the Sierra Foothills, through workshops and community support, and to contribute to the Sierra Foothills classification by analyzing volunteer data, writing reports and vegetation descriptions, and disseminating reports and other information to relevant stakeholders in the study area. The methods and results sections of this report have separate sections for the CDFG and NFWF projects where there are differences and merged sections where there are similarities.

METHODS

Study Area

CDFG - The project area falls within the northern portion of the Sierra Nevada Foothills Section, as defined by the USDA's Ecological Subregions of California (Miles and Goudey 1997). It includes the Tuscan Flows and Lower Foothills Metamorphic Belt subsections (M261Fa and M261Fb, respectively), which span 2.55 million acres of land area and include portions of 15 counties (see Figures 1 and 2). The elevation range is approximately 200 to 3100 feet, mean annual precipitation is 20 to 40 inches, and mean annual temperature is 52 to 64 degrees Fahrenheit. Broadly-defined, characteristic natural communities in both subsections include Foothill Pine, Blue Oak, California Buckeye, Interior Live Oak, Mixed Oak, Valley Oak, Birchleaf Mountain-mahogany, Scrub Oak, Wedgeleaf Ceanothus, California Annual Grassland, and Northern Vernal Pool types (Miles and Goudey 1997).

NFWF - The project area includes the CDFG study area described above and the southern two subsections of the Sierra Nevada Foothills Section (Miles and Goudey 1997). The southern portion of the Foothills includes the Lower Granitic Foothills and Southern Granitic Foothills (M261Fc and M261Fd, respectively), which span 1.77 million acres of land and include portions of 5 counties (see Figures 1 and 2). The elevation range is about 400 to 5000 feet, mean annual precipitation is 8 to 30 inches, and mean annual temperature is 50 to 64 degrees Fahrenheit. Broadly-defined, characteristic natural communities in both subsections include Foothill Pine, Blue Oak, California Buckeye, Interior Live Oak, Mixed Oak, Valley Oak, Birchleaf Mountain-mahogany, Chamise, Scrub Oak, Wedgeleaf Ceanothus, Whiteleaf Manzanita, and California Annual Grassland types (Miles and Goudey 1997).

Site Selection

CDFG - Field sampling took place during two field seasons, from early March to mid-July 2005 and mid-March to late June 2006. The field staff consisted of three Team Leaders and three Vegetation Assistants in 2006 and two Team Leaders and two Vegetation Assistants in 2005. Every week, two-person teams (each consisting of a Team Leader and Vegetation Assistant) traveled to different regions of the study area for sampling. During both seasons, Vegetation Ecologists with CDFG and CNPS provided training on vegetation sampling protocols and helped with data collection.

The primary goal of sampling was to collect replicate samples of as many vegetation types as possible across the study area. To aid field teams in identifying types that should be sampled, we developed a preliminary list of vegetation types for the northern and southern Sierra Nevada Foothills. In March 2005, the list was developed from existing California vegetation classifications (Allen et al. 1991, Atwater et al. 1979, Borchert et al. 1993a, Evens and San 2004, Evens et al. 2005, Fiedler and Leidy 1987, Fites 1993, Gordon and White 1994, Jimerson et al. 2000, Keeler-Wolf and Vaghti 2000, Keeler-Wolf and Moore 2001, Keeler-Wolf and Thomas 2000, Kepecko and Lathrop 1975, Klein and Evens 2006, Meier 1979, Mize 1973, Odion et al. 1992, Potter 2005, Stuart et al. 1992, Taylor 1975a, 1975b, Taylor and Randall 1977). In March 2006, it was updated with information from an intermediate classification that was derived from the 2005 samples. We recognized this list as preliminary and used it for project management to target stands for sampling in 2006. This preliminary inventory included around 150 alliances and suggested about 275 associations or phases (an informal subdivision of an association) across the northern and southern Sierra Nevada Foothills.

Approximately 15 percent of the land in the northern Foothills is under public ownership and the remaining 85 percent is privately owned. Because access to private lands was recognized as one of the challenges of attaining the full range of vegetation, we focused our first season on sampling public lands. In 2005, access to CDFG, California Department of Parks and Recreation, Bureau of Land Management, Bureau of Reclamation, California State University at Chico, City of Chico, East Bay Municipal Utilities Department, Sacramento Valley Conservancy, The Nature Conservancy, and U.S. Forest Service lands was made possible by the support of natural resource staff and land managers. In 2006, we placed more effort on sampling private lands and capturing new or under-sampled vegetation types. Access to private lands was established primarily through agricultural land trusts with management responsibilities over private ranches and conservation easements. Additional private contacts were made through volunteer, staff, and other connections. Field staff revisited some of the public lands sampled in 2005; additional public lands (not mentioned above) sampled in 2006 included those managed by Army Corps of Engineers, Butte Community College, Merced Irrigation District, and Turlock Irrigation District.

In 2005, survey sites were selected by subjectively identifying stands of vegetation. A *stand* is defined as a homogeneous patch of vegetation that has a characteristic combination of plant species, that is similar in age, size, and disturbance history, and that repeats across a landscape. A stand may be a small seep measuring several square meters in size or oak woodland

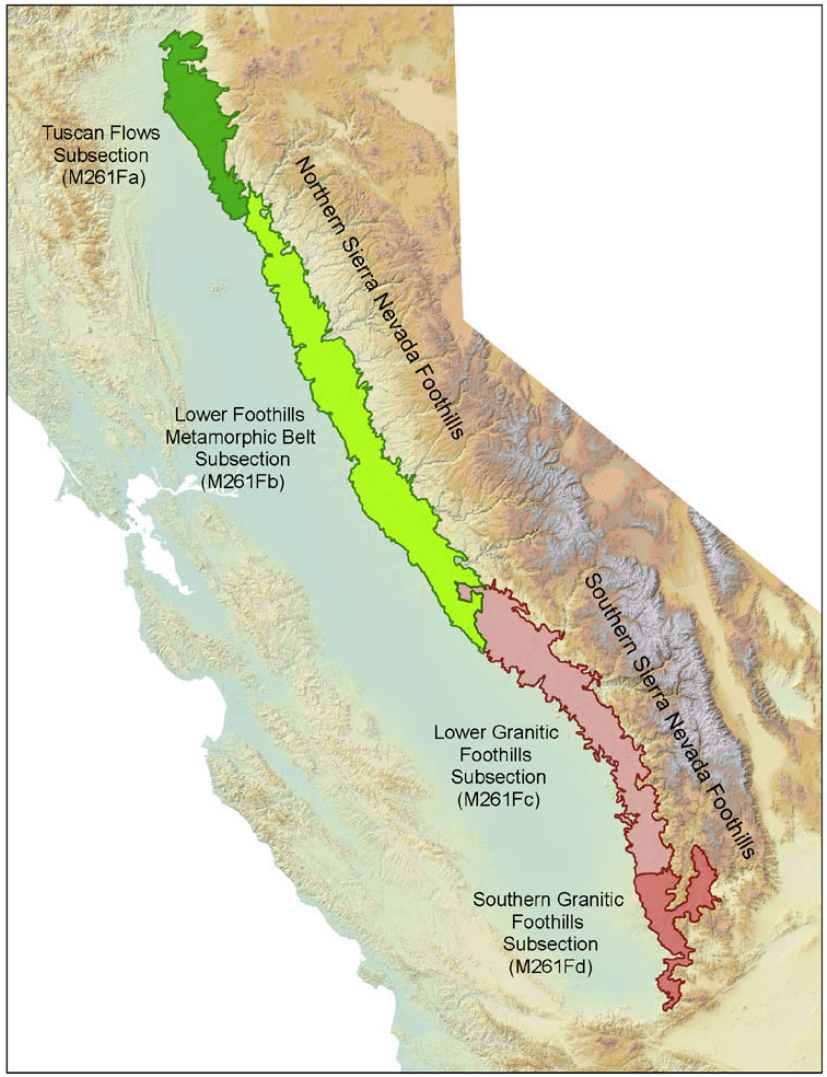

Figure 1. Map representing the four subsections included in the larger Sierra Nevada Foothills Ecological Section (M261), as described by the US Forest Service Ecological Subregions (Miles and Goudey 1997). Each subsection is indicated by a different colored polygon.

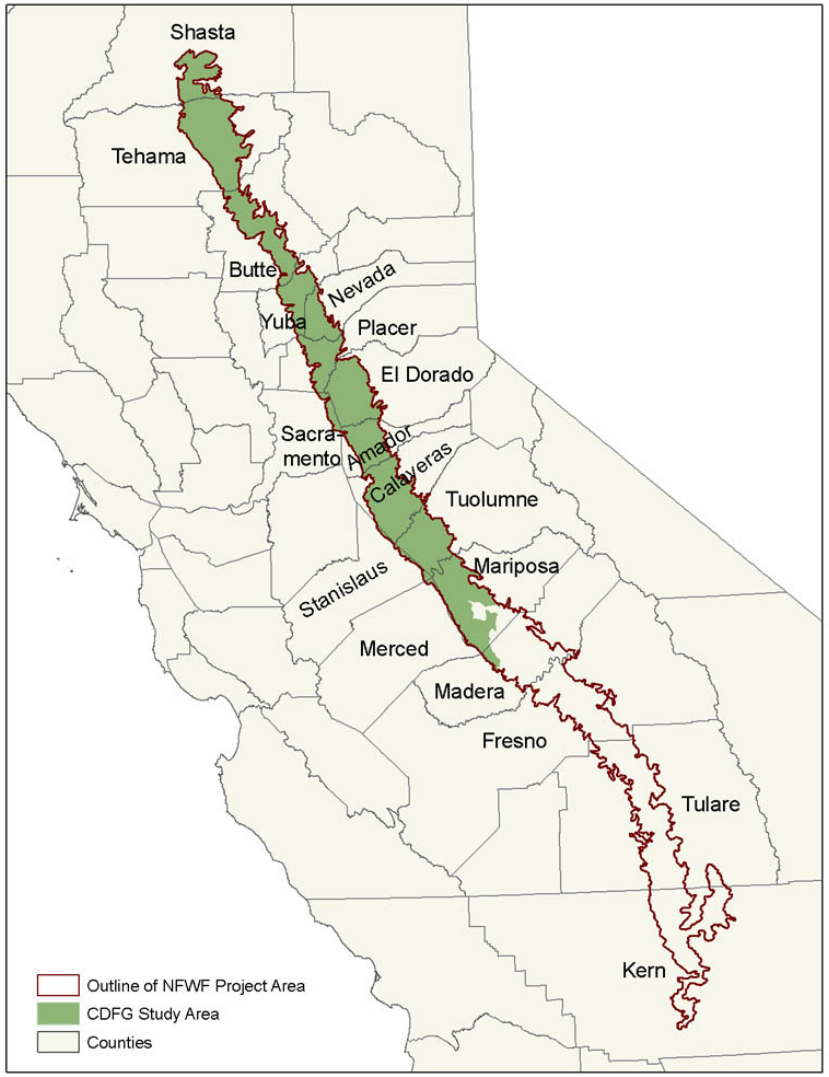

Figure 2. Map showing the CDFG and NFWF project areas with intersecting counties. The CDFG study area includes the northern Sierra Nevada Foothills region**.** The NFWF project area includes both the northern and southern Sierra Nevada Foothills regions.

measuring several acres in size. At each survey location, field staff selected stands to survey by keeping a tally of types sampled during the season and determining which stands were representative of the area.

In 2006, survey site selection included a stratified sampling design to target private lands and under-represented vegetation types. GIS staff with CDFG generated a gradient directed transect (GRADSECT) analysis based on the distribution of patterns along environmental gradients. This type of analysis intended to provide a description of the full range of vegetation patterning in the region by sampling along the range of environmental variability (TNC and ESRI 1994). We prioritized sampling in environments where the range of variability was under-represented on accessible lands. At all locations, priority areas were given more weight for sampling, and within each area, survey sites were selected subjectively as in 2005.

NFWF - Methods for site selection were the same except in the following ways. We extended field sampling through early August in 2005 and through mid-July in 2006. Also, sampling was extended into the southern Sierra Nevada foothills in 2005, where the Kern Chapter gained land access. The Training Coordinator conducted sampling as part of a CNPS field team, on her own, with volunteers, or while leading workshops. Site selection for workshops occurred in areas where we obtained permission to hold trainings for medium to large groups and where CNPS chapter members deemed the vegetation important to sample (e.g., unique or rare types). When sampling on her own or with volunteers, the Training Coordinator concentrated on sampling riparian and rare vegetation types wherever access was available, including along roadsides and trails (as described above).

Field Sampling

CDFG -The CNPS Vegetation Rapid Assessment and Relevé methods were used during both seasons to sample stands of vegetation. See Appendix 1A for protocol descriptions, including key to soil texture, and survey form code list. All surveys were collected using paper forms with examples provided in Appendix 1B. Similar types of environmental field data are collected using both methods (including elevation, slope, aspect, soil texture, and geology), but the Vegetation Rapid Assessment method is a shortened version of the Relevé method as it has fewer environmental and floristic variables. The Relevé involves collecting information within a plot that varies in size depending on the vegetation system (100 m^2 for herbaceous vegetation, 400 m^2 for shrublands, and 1000 m^2 for woodlands and forests). The Rapid Assessment is plot-less method, as information is collected across an entire stand of vegetation that may vary in size from <1 acre to >5 acres. The Relevé takes about 1-2 hours to complete, while the Rapid Assessment takes about 30-45 minutes to complete. Survey time for both methods also depends on species diversity and the size and accessibility of the plot or stand.

The general approach for field data collection was to collect Relevés in early season, herbaceous, new, and under-sampled vegetation types and Rapid Assessments in late season, woody, already defined, or well-represented vegetation types. The primary goal of sampling was to collect replicate samples of all significant vegetation types expressed in the study area. In 2005, the Relevé method was used primarily from early March to late April, while the Rapid Assessment method was used primarily from early May to early July 2005. In 2006, the Relevé method was used in herbaceous surveys from mid-March through May, while the Rapid Assessment method was used primarily in woody surveys throughout the season.

NFWF - The Training Coordinator used both methods described above in trainings with volunteers and during sampling sessions. The Rapid Assessment method was used more often, especially when working with volunteers and when sampling riparian vegetation. In total, the Training Coordinator and volunteers contributed 125 surveys in 2005 and 128 surveys in 2006, for the northern Foothills project.

Vegetation Classification and Key

Data analysis

For quantitative analysis of the collected field data, scientific names of the taxa were converted to alpha-numeric codes. Codes for tree and/or shrub taxa that frequently occurred in multiple strata were given modifiers indicating the layers in which they occurred (-t for tall layer, -m for medium layer, and -l for low layer). For example, *Quercus wislizeni* sampled in tall, medium, and low strata were coded as "pseudo-taxa" in this format: "QUWI2-t", "QUWI2-m", and "QUWI2-l", respectively. We did not create "pseudo-taxa" for tree/shrub taxa that occurred infrequently in multiple strata or that were transitional between different layers (e.g., *Salix exigua*, *S. lasiolepis*). For example, in most cases *Salix lasiolepis* was 1-5 meters tall (thus, technically the medium layer), however some individuals attained heights of slightly greater than 5 meters (technically the tall layer). For classification, the covers of these two layers were combined and treated as one taxon with no modifier, using the code SALA6.

Following the 2005 and 2006 field sampling efforts by CNPS staff and volunteers, the Vegetation Rapid Assessment (RA) and Relevé data were analyzed by CNPS and DFG vegetation ecologists. In 2005, 313 Relevé and 648 Vegetation RA surveys were analyzed preliminarily. In 2006, the 2005 surveys were re-analyzed with 135 Relevés and 754 Vegetation RAs collected in the second season. An additional 262 Relevés and 289 Vegetation RAs collected for other Foothills vegetation projects were merged with the CNPS dataset, for a total of 710 Relevés and 1691 Vegetation RAs. These included Relevé and/or Vegetation RAs conducted by the following: 1) CNPS (BOR) in 2003, 2) Environmental Science Associates in 2002, 3) Melanie Gogol-Prokurat (University of California, Davis) in 2005 and 2006, 4) Carol Witham and Ayzik Solomeshch (Private Consultants) in 2005, and 5) Eric Wood (Humboldt State University) in 2005 (See survey points in Figure 3). In 2005, 146 field surveys were collected at Deer Creek Hills in Sacramento County - 117 by Carol Witham or Ayzik Solomeshch and 29 by CNPS. Surveys points collected in the *southern* Sierra Nevada Foothills for the NFWF grant or other projects were not included in the analysis/classification. These points will be analyzed in the future as more data is collected in the region.

The analyses were undertaken using the PC-ORD software suite of classification and ordination tools (McCune and Mefford 1997). PC-ORD performs multivariate analyses to generate order out of complex ecological patterns. It can be used to objectively define groups of samples into a formalized classification of community types. Using cluster analysis (McCune and Mefford 1997), groups are defined by similarities in species composition and abundance.

Plant community datasets are inherently complex and multiple environmental variables may determine the heterogeneity in the patterns; thus, cluster analysis with a hierarchical agglomerative technique was employed using Sorenson distance and flexible beta linkage method at -0.25. This agglomerative technique was used instead of the TWINSPAN's divisive technique, which would be employed when a dataset has one main underlying environmental determinant (McCune and Grace 2002). The cluster analysis technique was based on species abundance (cover) values converted to 7 different classes using the following modified Braun-Blanquet (1932, 1951) cover categories: 1=<1%, 2=1-5%, 3=>5-15%, 4=>15-25%, 5=>25-50%, 6=>50-75%, 7=>75%. The majority of the species values fell within the first four cover classes.

In both years, the full Vegetation RA and Relevé datasets were analyzed separately because the complete species lists recorded with the Relevé method (up to 70 species/plot) are not directly comparable to the more streamlined species lists (usually <25 main species) collected using the RA method. Because of the size and heterogeneity of each initial dataset, a first-order cluster analysis was used to partition each dataset into more manageable subsets. The subsets were

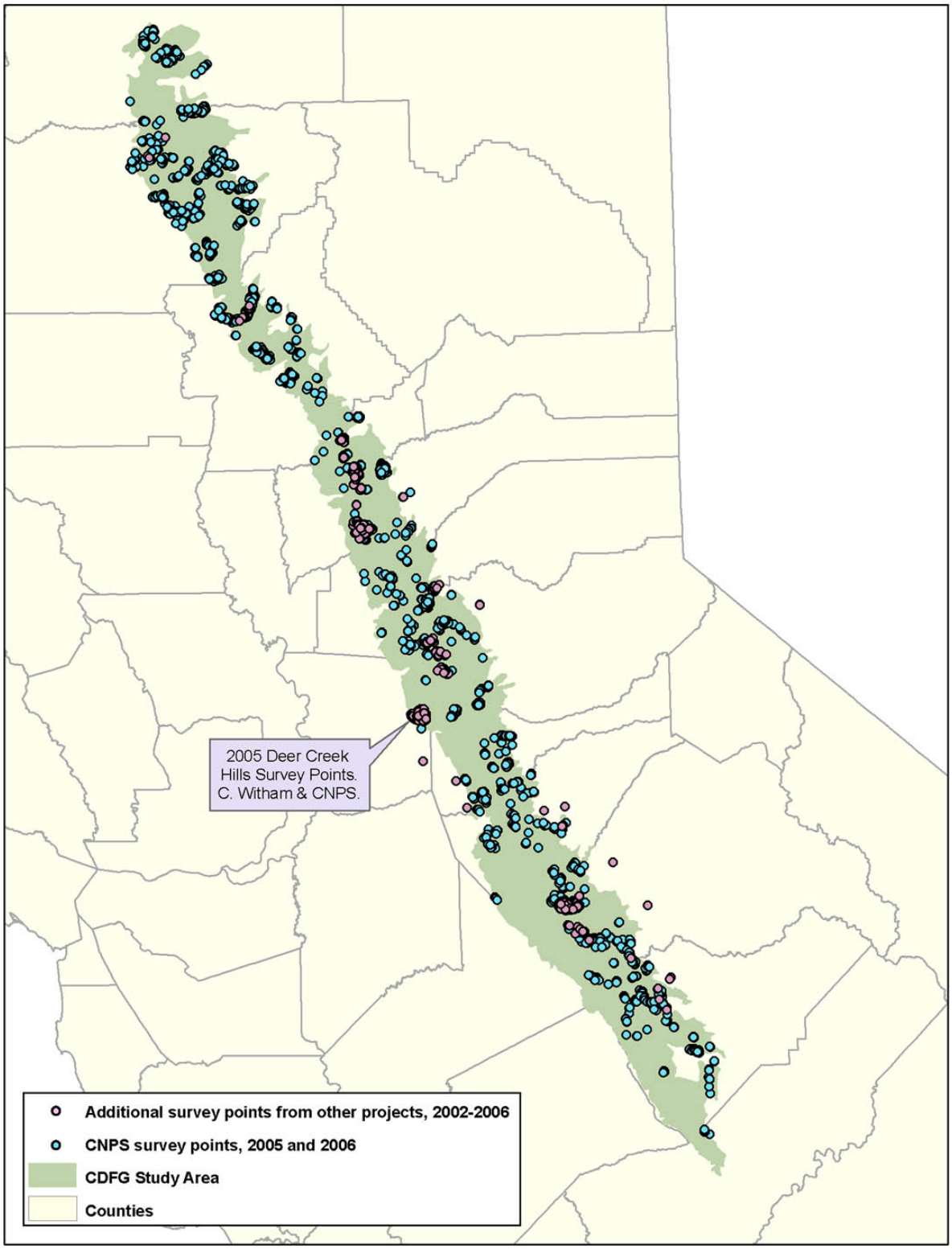

Figure 3. Locations of field survey points within the northern Sierra Nevada Foothills.

then reanalyzed using cluster analysis. The main cluster analysis dendrogram was produced for each full dataset, and this was progressively broken into distinct, smaller subsets of fewer samples in second-order cluster analyses. One of the second-order Vegetation RA datasets was further divided into subsets as there were distinct third-order groups. All of the second- and third-order subsets were then individually analyzed. Subsets usually included distinctly different vegetation types or habitats. Dendrograms were produced for all of the separate cluster analyses. Each of these dendrograms defined samples into a number of resulting groups (from 2 main group levels up to 55 finer group levels for both the Relevé and Vegetation RA subsets).

Prior to the separate cluster analysis runs, data were screened for outliers (extreme values of sample units or species), and outliers were removed to reduce heterogeneity and increase normality in the dataset. Samples that were more than three standard deviations away from the mean were flagged using outlier analysis in PC-ORD. These plots were removed when they had very different species composition from other samples and were retained when they had similar species composition to other samples. Species that were in less than 2-4 samples were removed from the relevé subsets and species that were in less than 2-7 samples from the Vegetation RA subsets were removed.

After the cluster analysis runs, indicator species analysis (ISA) was employed to decide objectively what group level to "cut" each dendrogram and explicitly interpret the groups. Further, ISA was used to designate which species indicate the different groups. ISA produced indicator values for each species in each of the groups within the dendrogram, and these species were tested for statistical significance using a Monte Carlo test with 1000 randomizations (Dufrene and Legendre 1997). ISA was repeated at successive group levels from the 2 main groups of the dendrogram on up to 25 groups in the relevé subsets and up to 49 groups in the Vegetation RA subsets (*i.e.*, the maximum number of groups allowable, where all groups have at least 2 samples per group). At each group level, the analysis was evaluated to obtain the total number of significant indicator species (p-value ≤0.5) within each group level and the mean p-value for all species. The group levels that had relatively higher numbers of significant indicators and relatively lower overall mean p-values were selected for the final evaluations of the community classification (McCune and Grace 2002). At these grouping levels, plant community names within floristic classes were applied to the samples of the different groups.

Each sample was revisited within the context of the cluster to which it had been assigned to quantitatively define membership rules for each association. The membership rules were defined by species constancy, indicator species, and species cover values. Upon revisiting each sample, samples misclassified in earlier iterations of the cluster analysis were reclassified based on the membership rules. The set of data collected throughout the study area was used as the principal means for defining the association composition and membership rules; however, existing classifications and floras were consulted to locate analogous/similar classifications or descriptions of vegetation.

A summary of the analysis process is provided in the following steps:

1. Run cluster analysis on complete dataset (Vegetation RA or Relevé) to determine general arrangement of samples and broad-level vegetation or habitat types.
2. Run cover category cluster analysis to display a more specific arrangement of plots based on species abundance as well as presence.
3. Break up the dataset into smaller, sizeable units for subsequent cluster analysis runs.
4. Run indicator species analysis (ISA) at each of the successive group levels for each of the cluster analysis dendrograms from 2 groups up to the maximum number of groups (all groups have at least 2 samples).
5. Settle on the final representative grouping levels of each cluster analysis to use in the preliminary labeling.
6. Label preliminary alliance and association names for each of the samples, and denote indicator species from the ISA.

7. Develop decision rules for each association and alliance based on most conservative group membership possibilities using review of species cover, species constancy, and indicator species on a sample-by-sample basis.
8. Re-label final alliance labels for each sample and arrange in table of database.
9. Use decision rules developed in the new data to assign alliance and association names to all analyzed data and all outlier samples removed from dataset.

Some vegetation types were under-represented in the sampling effort. They were often the only representatives of rare alliances known from areas within the study boundaries, or they were the only representatives of alliances that occur in other areas beyond the study boundaries in California. Additionally, the sampling effort was not able to survey the full spectrum of vegetation because of difficulties with accessibility and limited time and seasonality. For these reasons, adequate data may not be available in this report for all vegetation types. However, any relatively unique samples that are considered important are described separately in the results. In some cases, they represented unusual species groupings of previously undescribed plant communities, and they were described to afford perspective into unusual vegetation types that deserve additional sampling. These types are either described at a more generic alliance/habitat level or as unique stands. All described vegetation types based on fewer than 10 samples, and not previously defined, are designated as provisional.

Definitions for Classification and Key

The classification and key were produced to substantiate the vegetation types identified in the fieldwork of this project. They are based on the two floristic hierarchy levels of the U.S. National Vegetation Classification System (NVCS) per NatureServe (2007a) and Grossman et al. (1998). These levels are characterized by species composition, abundance, and habitat/environment as described below.

Samples were classified to the association level, which is the finest unit in vegetation classification per the NVCS and the California Native Plant Society (Sawyer and Keeler-Wolf 1995). An association is characterized by multiple stands of vegetation that repeat in the landscape with definite floristic and environmental features. An association is defined by the presence of character and dominant species in the overstory and other important and indicator species in the understory, which are distinctively assembled in a particular environmental setting. Significant indicator species were drawn from the analyses and applied to the associations. Correlates to certain environmental variables or lack thereof helped in determining whether or not a particular cluster grouping should be ranked at the association level or higher.

Samples of similar associations or unique plots were classified to the alliance level, which is the next hierarchical floristic unit of the vegetation classification above association. An alliance is defined as the generic unit and is usually established by the dominant and/or characteristic plant species in the upper layer of vegetation (if this layer is at or above 10% average cover). For example, different types of interior live oak (*Quercus wislizeni*) woodlands are classified to the association level depending on the characteristic overstory and understory species (*e.g.*, *Quercus wislizeni*/*Arctostaphylos viscida* as compared to *Quercus wislizeni*-*Quercus kelloggii*), while the overarching *Quercus wislizeni* Alliance is based on the characteristic presence of this tree in the overstory. Associations are usually differentiated by environmental factors as well as floristic characteristics.

A key to the alliances and associations was produced to compare and distinguish types in the classification. The key provides general choices and information on the physiognomy of the vegetation and in some cases the different environments of the vegetation. The key is first broken into major units based on the dominant plant life-form: trees, shrubs and herbs. Within these groups, it is further divided by coniferous/broadleaf evergreen, chaparral/soft-leaved shrubs, wetland/upland distinctions, graminoid/forb distinctions, etc.

The approach of the key was chosen: 1) to reduce the length and redundancy that is common in dichotomous keys, and 2) to be a guide that can be easily used by non-botanists/plant ecologists. The vegetation key can be used as a stand-alone product, allowing anyone with some basic ecology background and knowledge of the main characteristic plant species to identify the vegetation. It was written from two perspectives: 1) a field team attempting to identify vegetation and 2) an office team attempting to place field samples into the proper category. Thus, heavy reliance is placed on correct identification of characteristic plant species and estimation of cover of these species.

Description Writing, Standards, and Definitions

Following the analysis of field data and development of the classification and key, standard alliance and association-level descriptions were written. They were based on field data and available literature. Scientific names of plants follow Hickman (1993), USDA-NRCS (2007), and UCB (2007). Common names follow the state classification (CDFG 2003), USDA-NRCS (2007), and Jepson Online Interchange (UCB 2007).

The following definitions and conventions were set in developing the descriptions and the keys:

Cover: The primary metric used to quantify the importance/abundance of a particular species or a particular vegetation layer within a plot. It was measured by estimating the aerial extent of the living plants, or the “bird’s-eye view” looking from above for each category. In this vegetation classification and mapping project, as in other similar projects such as National Park Service projects in California, cover is assessed using the concept of "porosity" or foliar cover rather than "opaque" or crown cover. Thus, field crews were trained to estimate the cover produced by the canopy of a plant or a stratum by taking into account the amount of shade it casts, whereby by the cover estimates exclude the openings it may have in the interstitial spaces (e.g., between leaves or branches). This is assumed to provide a more realistic estimate of the actual amount of cover cast by the individual or stratum, which, in turn relates to the actual amount of light available to individual species or strata beneath it.
Relative cover: Refers to the amount of the surface of the plot or stand sampled that is covered by one species (or physiognomic group) as compared to (relative to) the amount of surface of the plot or stand covered by all species (in that group). Thus, 50 percent relative cover means that half of the total cover of all species or physiognomic groups is composed of the single species or group in question. Relative cover values are proportional numbers and, if added, total 100 percent for each stand (sample).
Absolute cover: Refers to the actual percentage of the ground (surface of the plot or stand) that is covered by a species or group of species. For example, *Pinus sabiniana* covers between 5 percent and 10 percent of the stand. Absolute cover of all species or groups if added in a stand or plot may total greater or less than 100 percent because it is not a proportional number. The value “0.2” is used to denote an estimate that is less than 1 percent cover.
Dominant or co-dominant species: Must be in at least 75 percent of the samples, with at least 50 (co-dominance = 30) percent relative cover in all samples.
Consistent species: Must be present in 100 percent of the samples, with no restriction on cover.
Characteristic/Diagnostic species: Must be present in at least 80 percent of the samples, with no restriction on cover.
Abundant species: Must be present in at least 50 percent of the samples, with an average of at least 50 percent relative cover in all samples.
Frequently/Typically occurring species or Often/Usually occurring species: Must be present in at least 75 percent or at least 50 percent of the samples, respectively, with no restriction on cover.
Sometimes/Occasionally or Infrequently occurring: Present in 25 to 50 percent of the samples or in less than 25 percent of the samples, respectively, with no restriction on cover.
Sparse: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 10 percent absolute cover.

Open: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) with less than 33 percent absolute cover.
Intermittent: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) with 33-66 percent absolute cover.
Dense/Continuous: Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) with greater than 66 percent absolute cover.
Emergent: A plant (or vegetation layer) is considered emergent if it includes a sparse cover of the plant, which rises above a predominant vegetation layer, and it is considered as a member of the next tallest layer, but has an absolute cover < 10%. For example, individual *Pinus sabiniana* trees may comprise an emergent tree layer of 5% over a dense layer of *Arctostaphylos viscida* shrubs; the stand would be considered within the *Arctostaphylos viscida* shrubland alliance because the total tree cover is < 10% and the shrub cover is >10%. Medium to tall shrubs are not considered emergent over shorter shrubs, but short trees are considered emergent over tall shrubs.
Stand: The basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small such as wetland seeps, and some may be several square kilometers in size such as desert or forest types. A stand is defined by two main unifying characteristics:
a. It has *compositional* integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or gradual.
b. It has *structural* integrity. It has a similar history or environmental setting, affording relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest formerly dominated by the same species, but that has burned on the upper part of the slope and not the lower is divided into two stands. Likewise, a sparse woodland occupying a slope with shallow rocky soils is considered a different stand from an adjacent slope of a denser woodland/forest with deep moister soil and the same species.
Woody plant: Any species of plant that has noticeably woody stems. It does not include herbaceous species with woody underground portions such as tubers, roots, or rhizomes.
Tree: A one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases trees may be multiple-stemmed following ramifying after fire or other disturbance, but size of mature plants is typically greater than 5 m and undisturbed individuals of these species are usually single stemmed.
Overstory or Understory Tree: If trees are in the overstory layer, they are generally at canopy level (or the tallest emergent trees). If trees are in the understory layer, they are entirely below the general level of the canopy (i.e., younger stature trees with <5 m height) or they are short trees/tall shrubs (i.e., never reach the stature of the taller canopy layer and may be 4-15 m in height).
Shrub: Normally a multi-stemmed woody plant that generally has several erect, spreading, or prostrate stems and that is usually between 0.2 meters and 5 meters tall, giving it a bushy appearance. Definitions are blurred at the low and the high ends of the height scales. At the tall end, shrubs may approach trees based on disturbance frequencies (e.g., old-growth re-sprouting chaparral species such as *Cercocarpus betuloides*, *Heteromeles arbutifolia*, *Arctostaphylos viscida*, etc., may frequently attain “tree size”). At the low end, woody perennial herbs or sub-shrubs of various species are often difficult to categorize into a consistent life-form; usually sub-shrubs (per USDA-NRCS 2007) were categorized in the “shrub” category.
Herbaceous plant: Any vascular plant species that has no main woody stem-development, includes grasses, forbs, and perennial species that die-back seasonally.
Cryptogam: A nonvascular plant or plant-like organism without specialized water or fluid conductive tissue (xylem and phloem). Cryptogams include mosses, lichens, liverworts, hornworts, and algae.
Forest: In the National Vegetation Classification, a forest is defined as a tree-dominated stand of vegetation with 60 percent or greater cover of trees. Most forest alliances tend to have average cover of trees > 60%, but individual stands under certain conditions may drop lower than 60%. This reflects the “modal” concept of the characteristics of a particular alliance.
Woodland or Sparsely Wooded: In the National Classification of Vegetation, woodland is defined as a tree-dominated stand of vegetation with between 25 percent and 60 percent cover of

trees. There are stands with trees generally at least 10% absolute cover or more, which are still considered as woodlands in this report. However, the National Classification considers stands dominated by 10-25 percent cover as sparsely wooded over a shrub or herbaceous dominant canopy (*e.g.*, sparsely wooded shrubland or sparsely wooded herbaceous).
Rare Plant Species: Listed in the CNPS (2007) Online Inventory of Rare and Endangered Plants. Species were listed in descending order of occurrence within the vegetation type.
Distribution: Local ecological regions were listed in alphabetical order.
Non-Native Species: Any species of plant and animal not native (natural) to an area.
Minimum sample size for classification and description: n = 3. Descriptions of associations with fewer than three samples were attempted if (a) the association was sampled and described by previous authors or (b) the vegetation was confirmed as distinctive and repeatable based on field reconnaissance or observation.
Sample(s): Indicated as Vegetation Rapid Assessments or Relevés and listed sequentially by their survey identification number from the vegetation databases. Rapid Assessments begin with the alpha-code "SNNR" and relevés begin with "SNFN" and both are followed by a unique numeric code with leading zeros.
Conservation rank: Listed by the state NatureServe Natural Heritage Programs. All communities were ranked, though ones without much information were ranked with a "?" after the rank to denote that this rank may change with more information, but that the best knowledge to date (sometimes personal observation) was used in these situations. Ranks were assigned by the Senior Ecologist with the California Department of Fish and Game (T. Keeler-Wolf) and by using hard references. These ranks are the "Global" and "State" ranks as seen below:
a. **G1** and **S1**: Fewer than 6 viable occurrences worldwide and/or less than 2000 acres
b. **G2** and **S2**: 6-20 viable occurrences worldwide and/or 2000-10,000 acres
c. **G3** and **S3**: 21-100 viable occurrences worldwide and/or 10,000-50,000 acres
d. **G4** and **S4**: Greater than 100 viable occurrences worldwide and/or greater than 50,000 acres
Con, Avg, Min, Max: A species table is provided at the end of each association (or alliance) description. The "Con" column provides the overall constancy value for each species within all vegetation rapid assessments and relevés classified as that vegetation type. The constancy values are between 0 and 100. Species that occurred with at least 20% constancy are listed in the table. The "Avg" column provides the average cover value for each species, as calculated across all samples in that vegetation type per lifeform. The "Min" and "Max" values denote the minimum and maximum values when the species were estimated for cover in that vegetation type.

RESULTS

Basic Species and Vegetation Data

In the 2401 surveys conducted and compiled for this project, 1056 vascular plant taxa were identified to species, subspecies, or variety when possible. Four general names were given to non-vascular taxa (*i.e.*, algae, lichen, liverwort, and moss) and other taxa were identified to family, genus, or "unknown" when species identification was unknown. Appendix 2 provides a complete list of scientific and common names for all taxa identified and analyzed in the surveys included in this classification, along with their alpha-numeric codes used for data analyses. In addition, a number of sensitive plant species were recorded in the surveys, as determined per the local CNPS chapters and CNPS's Inventory of Rare and Endangered Plants (CNPS 2007), US Fish and Wildlife, and CDFG. Table 1 provides a list of 44 locally rare or sensitive plant taxa (identified at the species or subspecies level) as recorded in vegetation surveys between 2005 and 2006. The table also displays 38 additional taxa (identified at the genus or species level) that are potentially rare, but need further plant identification. Appendix 3 provides more detailed information about the sensitive plants recorded in the vegetation surveys, including state and federal ranking status, generalized habitat information, and the counties in which the plants have been found.

Table 1. Noteworthy plant taxa including their common name, CNPS listing (CNPS 2007), and number of county occurrences when recorded in vegetation surveys during 2005-2006. Taxa that are potentially rare (identified at the genus or species level) are denoted with an * (could be rare at the species or subspecies level but need further identification). See Appendix 3 for more detailed information regarding state and federal ranking status, generalized habitat information, and counties where the plants have been found.

Scientific Name (or Potentially Rare Taxon)	Name	CNPS List	Counties (Count)
Agrostis hendersonii	Henderson's bent grass	List 3.2	Shasta (3), Tuolumne (1)
Agrostis (**A. hendersonii*)	Henderson's bent grass	List 3.2	Calaveras (1), Shasta (1)
Allium sanbornii var. *congdonii*	Congdon's onion	List 4.3	Mariposa (1)
Allium sanbornii var. *sanbornii*	Sanborn's onion	List 4.2	El Dorado (4), Placer (1)
Allium tuolumnense	Rawhide Hill onion	List 1B.2	Tuolumne (4)
Allium (**A. jepsonii*, *A. sanbornii* var. *congdonii*, *A. s*. var. *sanbornii*, or *A. tuolumnense*)	onion	List 1B.2, List 4.3, List 4.2, List 1B.2	Butte (6), El Dorado (9), Mariposa (3), Nevada (2), Shasta (1), Tehama (10), Tuolumne (5), Yuba (1)
Arctostaphylos mewukka (**A. m.* subsp. *truei*)	True's manzanita	List 4.2	El Dorado (1)
Arctostaphylos myrtifolia	Ione manzanita	List 1B.2	Amador (1)
Astragalus pauperculus	depauperate milk-vetch	List 4.3	Tehama (3)
Balsamorhiza macrolepis var. *macrolepis*	big-scale balsamroot	List 1B.2	Mariposa (2)
Brodiaea (**B. pallida*)	Chinese Camp brodiaea	List 1B.1	Calaveras (6), Tuolumne (10)
Calochortus superbus (**C. syntrophus*)	Callahan's mariposa lily	List 3.1	Shasta (3)
Calycadenia oppositifolia	Butte County calycadenia	List 4.2	Butte (3)
Calycadenia (**C. oppositifolia* or *C. hooveri*)	Butte County or Hoover's calycadenia	List 4.2, List 1B.3	Butte (2), Calaveras (2), Mariposa (1), Tuolumne (6)
Calystegia stebbinsii	Stebbins' morning-glory	List 1B.1	El Dorado (31)
Calystegia (**C. atriplicifolia* subsp. *buttensis*)	Butte County morning-glory	List 1B.2	Butte (1), Tehama (4)
Castilleja (**C. campestris* subsp. *succulenta*)	succulent owl's-clover	List 1B.2	Mariposa (1)
Ceanothus roderickii	Pine Hill ceanothus	List 1B.2	El Dorado (64)
Chlorogalum grandiflorum	Red Hills soaproot	List 1B.2	El Dorado (40), Tuolumne (15)
Chlorogalum (**C. grandiflorum*)	Red Hills soaproot	List 1B.2	Calaveras (2), El Dorado (12), Nevada (1), Placer (1), Tuolumne (45)

Scientific Name (or Potentially Rare Taxon)	Name	CNPS List	Counties (Count)
Clarkia biloba subsp. *brandegeeae*	Brandegee's clarkia	List 1B.2	Placer (3)
Clarkia biloba (**C. b.* subsp. *australis* or *C. b.* subsp. *brandegeeae*)	Mariposa or Brandegee's clarkia	List 1B.2	El Dorado (4), Mariposa (3), Nevada (5), Placer (1), Tuolumne (13), Yuba (3)
Clarkia gracilis subsp. *albicaulis*	white-stemmed clarkia	List 1B.2	Butte (3)
Clarkia gracilis (**C. g.* subsp. *albicaulis*)	white-stemmed clarkia	List 1B.2	Butte (2)
Claytonia parviflora subsp. *grandiflora*	streambank spring beauty	List 4.2	El Dorado (1)
Claytonia parviflora (**C. p.* subsp. *grandiflora*)	streambank spring beauty	List 4.2	Amador (5), Butte (9), Calaveras (4), El Dorado (16), Placer (5), Tuolumne (5)
Cryptantha crinita	silky cryptantha	List 1B.2	Tehama (1)
Cupressus macnabiana	McNab cypress	Locally rare	Yuba (4)
Erigeron petrophilus var. *sierrensis*	northern Sierra daisy	List 4.3	Nevada (1)
Eriogonum prattenianum (**E. prattenianum* var. *prattenianum*	Nevada City buckwheat	Locally rare	Nevada (1), Placer (1)
Erythronium tuolumnense	Tuolumne fawn lily	List 1B.2	Tuolumne (2)
Fremontodendron californicum subsp. *decumbens*	Pine Hill flannelbush	List 1B.2	El Dorado (1)
Fritillaria pluriflora	adobe-lily	List 1B.2	Butte (1), Tehama (2)
Fritillaria (**F. agrestis*, *F. eastwoodiae*, or *F. pluriflora*)	fritillary	List 4.2, List 3.2, List 1B.2	Butte (1), Placer (3), Shasta (1), Tehama (3), Yuba (1)
Galium californicum subsp. *sierrae*	El Dorado bedstraw	List 1B.2	El Dorado (5)
Galium (**G. californicum* subsp. *sierrae*)	El Dorado bedstraw	List 1B.2	El Dorado (14), Placer (2), Sacramento (4)
Githopsis pulchella subsp. *serpentinicola*	serpentine bluecup	List 4.3	Butte (1), Mariposa (1), Tuolumne (9)
Githopsis pulchella (**G. p.* subsp. *serpentinicola*)	serpentine bluecup	List 4.3	El Dorado (1), Mariposa (2)
Githopsis (**G. pulchella* subsp. *serpentinicola*	serpentine bluecup	List 4.3	El Dorado (1), Mariposa (1)
Helianthemum suffrutescens	Bisbee Peak rush-rose	List 3.2	El Dorado (1)
Helianthemum (**H. suffrutescens*)	Bisbee Peak rush-rose	List 3.2	El Dorado (13)

Scientific Name (or Potentially Rare Taxon)	Name	CNPS List	Counties (Count)
Hesperevax caulescens	hogwallow starfish	List 4.2	Butte (4), Tehama (1)
Horkelia parryi	Parry's horkelia	List 1B.2	Amador (2), Calaveras (3), Mariposa (2)
Iris hartwegii (**I*. *h*. subsp. *columbiana*)	Tuolumne iris	List 1B.2	Amador (9)
Lathyrus sulphureus (**L*. *s*. var. *argillaceus*)	dubious pea	List 3	El Dorado (10), Placer (4), Nevada? (2), Shasta (3), Tehama (4)
Linanthus (**Leptosiphon serrulatus*)	Madera leptosiphon	List 1B.2	Mariposa (1)
Lilium humboldtii subsp. *humboldtii*	Humboldt lily	List 4.2	El Dorado (1)
Lilium (**L*. *humboldtii* subsp. *humboldtii*)	Humboldt lily	List 4.2	Butte (1), Placer (2), Tehama (1)
Limnanthes floccosa subsp. *californica*	Butte County meadowfoam	List 1B.1	Butte (6)
Limnanthes floccosa subsp. *floccosa*	woolly meadowfoam	List 4.2	Shasta (2), Tehama (2)
Limnanthes (**L*. *floccosa* subsp. *californica* or *L*. *f*. subsp. *floccosa*)	Butte County or woolly meadowfoam	List 1B.1 / List 4.2	Butte (1)
Lomatium congdonii	Congdon's lomatium	List 1B.2	Tuolumne (10)
Lomatium (**L*. *congdonii*)	Congdon's lomatium	List 1B.2	Tuolumne (6)
Lotus (**L*. *rubriflorus*)	red-flowered lotus	List 1B.1	Tehama (2)
Lupinus spectabilis	shaggyhair lupine	List 1B.2	Mariposa (9), Tuolumne (2)
Mimulus glaucescens	shield-bracted monkeyflower	List 4.3	Butte (4), Tehama (14)
Mimulus (**M*. *glaucescens* or *M*. *inconspicuous*)	shield-bracted or small-flowered monkeyflower	List 4.3, List 4.3	Butte (2), Tehama (1); Calaveras (1), Mariposa (2), Tuolumne (2)
Monardella douglasii subsp. *venosa*	veiny monardella	List 1B.1	Butte (1)
Monardella (**M*. *douglasii* subsp. *venosa*)	veiny monardella	List 1B.1	Butte (1), Calaveras (2)
Navarretia heterandra	Tehama navarretia	List 4.3	Butte (1), Shasta (2), Tehama (4)
Navarretia nigelliformis (**N*. *n*. subsp. *nigelliformis* or *N*. *n*. subsp. *radians*)	adobe navarretia	List 4.2, List 1B.2	Butte (1)
Navarretia (**N*. *heterandra*, *N*. *nigelliformis* subsp. *nigelliformis*, *N*. *n*. subsp. *radians*, or *N*. *prolifera* subsp. *lutea*)	navarretia	List 4.3, List 4.2, List 1B.2, List 4.3	Butte (5), Mariposa (2), Tehama (19), Yuba (1)
Orcuttia tenuis	slender Orcutt grass	List 1B.1	Tehama (1)
Paronychia ahartii	Ahart's paronychia	List 1B.1	Tehama (4)
Perideridia bacigalupii	Bacigalupi's yampah	List 4.2	Amador (1), Calaveras (1), Yuba (1)

Scientific Name (or Potentially Rare Taxon)	Name	CNPS List	Counties (Count)
Phacelia (**P. stebbinsii* or *P. vallicola*)	Stebbin's or Mariposa phacelia	List 1B.2, Locally rare	El Dorado (2)
Piperia michaelii	Michael's rein orchid	List 4.2	Tuolumne (1)
Piperia (**P. michaelii* or *P. leptopetala*)	rein orchid	List 4.2, List 4.3	Butte (3), El Dorado (1)
Polygonum bidwelliae	Bidwell's knotweed	List 4.3	Butte (4), Shasta (1), Tehama (13)
Polygonum (**P. bidwelliae*)	Bidwell's knotweed	List 4.3	Butte (2), Shasta (1), Tehama (3)
Psilocarphus (**P. brevissimus* var. *multiflorus*)	Delta woolly-marbles	List 4.2	Tuolumne (1)
Senecio clevelandii (**S. clevelandii* var. *heterophyllus*)	Red Hills ragwort	List 1B.2	Tuolumne (1)
Senecio layneae	Layne's ragwort	List 1B.2	El Dorado (28), Tuolumne (3)
Sidalcea robusta	Butte County checkerbloom	List 1B.2	Butte (4)
Sidalcea (**S. robusta*)	Butte County checkerbloom	List 1B.2	Butte (4), Tehama (1)
Trichostema rubisepalum	Hernandez bluecurls	List 4.3	El Dorado (2), Tuolumne (3)
Trifolium jokerstii	Butte County golden clover	List 1B.2	Butte (3)
Trifolium (**T. jokerstii*)	Butte County golden clover	List 1B.2	Butte (6)
Verbena californica	California vervain	List 1B.1	Tuolumne (2)
Verbena (**V. californica*)	California vervain	List 1B.1	Calaveras (1)
Wyethia reticulata	El Dorado County mule ears	List 1B.2	El Dorado (42)
Wyethia (**W. reticulata*)	El Dorado County mule ears	List 1B.2	El Dorado (5), Placer (1)

Classification Analyses

In 2005, an intermediate classification was developed based on 296 Relevés and 648 Vegetation Rapid Assessments (RA's) collected by CNPS. 513 tree-overstory, 202 shrub-overstory, and 229 herbaceous stands were classified. Indicator species analysis was applied to the second-and third-order cluster analyses for the Relevé and Vegetation RA subsets. The Relevé samples were divided into four second-order subsets representing oak woodland, chaparral, wetland, and herbaceous vegetation types and the Vegetation RA samples were divided into six second-order subsets representing blue oak, canyon live oak, interior live oak, riparian, chaparral, and herbaceous types. The herbaceous second-order Vegetation RA subset was further divided into two third-order subsets, representing wetland and grassland types. After combining all 12 of the separate analyses, 944 surveys were labeled with intermediate classification names to alliance and association.

In 2006, the classification was developed based on 710 Relevés and 1691 Vegetation RA's collected by CNPS (including those from 2005 above) and others working collaboratively on related projects (see page iii). Indicator species analysis was applied to the second- and third-order cluster analyses for each subset. Six groups were split out of the Relevé dataset and six groups were split out of the Vegetation RA dataset. These groups are summarized as follows:

- Second-order cluster groups in Relevé dataset
    - 58 surveys most strongly indicated by *Plagiobothrys stipitatus*, *Eleocharis macrostachya*, *Deschampsia danthonioides*, *Alopecurus saccatus*, *Eryngium castrense*, and *Navarretia leucocephala*
    - 194 surveys (two outliers removed) most strongly indicated by *Trifolium hirtum*, *Bromus hordeaceus*, *Bromus diandrus*, *Quercus douglasii*, *Galium parisiense*, and *Vicia villosa*
    - 117 surveys most strongly indicated by *Lasthenia californica*, *Plantago erecta*, *Vulpia microstachys*, *Lepidium nitidum*, *Triphysaria eriantha* subsp. *eriantha*, and *Layia fremontii*
    - 104 surveys most strongly indicated by *Toxicodendron diversilobum*, *Sanicula crassicaulis*, *Quercus wislizeni*, *Torilis*, *Galium aparine*, and *Lonicera hispidula* var. *vacillans*
    - 152 surveys most strongly indicated by *Leontodon taraxacoides*, *Trifolium variegatum*, *Vulpia bromoides*, *Trifolium dubium*, *Juncus bufonius*, and *Briza minor*
    - 83 surveys most strongly indicated by *Ceanothus cuneatus*, *Adenostoma fasciculatum*, *Eriodictyon californicum*, *Galium porrigens*, *Eriophyllum lanatum*, and *Pentagramma triangularis*
- Second-order cluster groups in Vegetation Rapid Assessment dataset. One subset further divided into third-order cluster groups as indicated below.
    - 336 surveys (two outliers removed) most strongly indicated by *Quercus douglasii*, *Trifolium hirtum*, *Bromus hordeaceus*, *Bromus diandrus*, *Carduus pycnocephalus*, and *Avena barbata*
    - 346 surveys most strongly indicated by *Quercus wislizeni*, *Toxicodendron diversilobum*, *Heteromeles arbutifolia*, *Torilis*, *Pinus sabiniana*, and *Aesculus californica*
    - 368 surveys most strongly indicated by *Ceanothus cuneatus*, *Vulpia microstachys*, *Taeniatherum caput-medusae*, *Plantago erecta*, *Petrorhagia dubia*, *Vulpia myuros*, and *Pentagramma triangularis*
        - Third-order cluster groups with 217 surveys most strongly indicated by *Eleocharis macrostachya*, *Lolium multiflorum*, *Mimulus guttatus*, *Trifolium variegatum*, *Briza minor*, and *Eryngium castrense*
        - Third-order cluster groups with 149 surveys (two outliers removed) most strongly indicated by *Bromus hordeaceus*, *Ceanothus cuneatus*, *Avena barbata*, *Vulpia microstachys*, *Vulpia myuros*, and *Aira caryophyllea*

- 241 surveys most strongly indicated by *Adenostoma fasciculatum*, *Arctostaphylos viscida*, *Salvia sonomensis*, *Ceanothus lemmonii*, *Ceanothus roderickii*, and *Wyethia reticulata*
- 180 surveys most strongly indicated by *Quercus chrysolepis*, *Quercus kelloggii*, *Pinus ponderosa*, *Umbellularia californica*, *Acer macrophyllum* and *Calocedrus decurrens*
- 217 surveys (one outlier removed) most strongly indicated by *Rubus discolor*, *Salix laevigata*, *Alnus rhombifolia*, *Artemisia douglasiana*, *Salix lasiolepis*, and *Vitis californica*

The 13 separate cluster analyses were interpreted and classified at the alliance and association levels. Two Relevé surveys and five Vegetation RA surveys were outliers and removed from the datasets (as indicated above). These surveys were later classified to alliance and association using membership rules. A total of 1271 woodland/forest, 463 shrubland, and 667 herbaceous/grassland stands were reviewed during the classification process. Of these, 78 surveys were marked as unclassifiable as there was either too little data to classify them into defined vegetation types or they occurred too far outside of the study area. After combining all of the separate analyses, 2323 surveys were re-labeled with final classification names into 57 different alliances and 8 semi-natural types (semi-natural types are equivalent to alliances but are dominated or characterized by non-native plants). Within these 65 alliance-level types, 156 associations and 3 sub-alliances were defined, including 74 woodland and forest types, 32 shrubland types, and 53 herbaceous types. See Figures 4 and 5 for example cluster dendrograms from the Relevé dataset. See Table 2 for a summary of the classification.

By providing as much information as possible in the classification, key, and descriptions, it is hoped that future efforts may build upon this method of vegetation classification in the Sierra Nevada Foothills. The data and floristic classification for this project provide detailed information for a variety of future research and management efforts. While this study has attempted to create a more comprehensive understanding of the vegetation types in the study area, additional alliance and association characteristics will likely emerge with future research, especially with increased access to private lands.

A total of 56 surveys were not classified to alliance or association as they were either outliers, had low sample size, or did not fit the definitions of other types in this or other related classifications. Table 3 summarizes these unclassified surveys with tentative vegetation names. Further field data collection and statistical analysis may increase our understanding of the vegetation associated with these surveys.

Upon review of the vegetation classification, the CDFG Senior Ecologist ranked the rarity of the vegetation alliances and associations identified within the project area. Table 4 provides a list of types deemed as rare based on current knowledge of the state classification and distribution of the vegetation types.

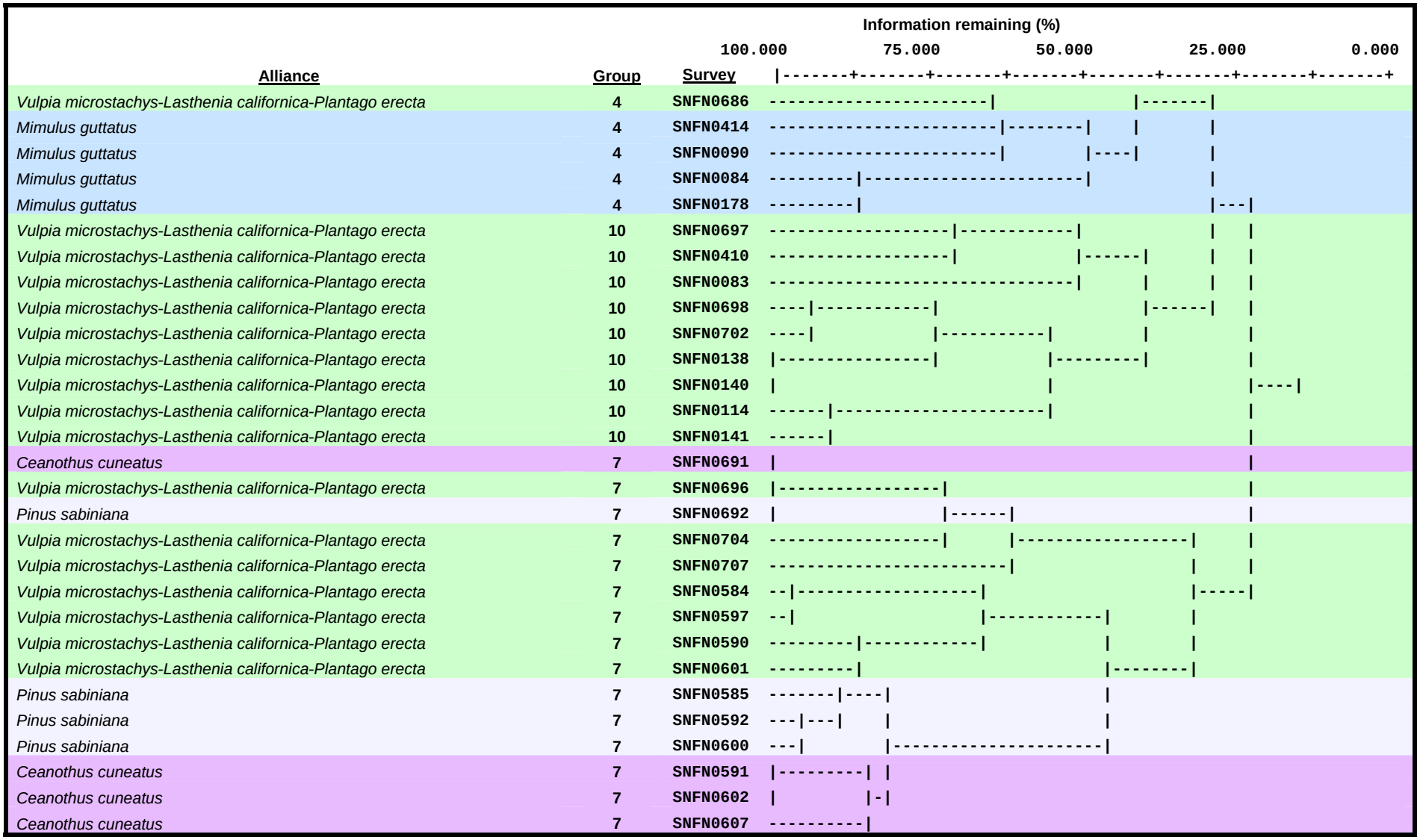

Figure 4. Example diagram showing the arrangement of samples from the cluster analysis in a subset of relevés found on serpentine and gabbro substrates. For this analysis, the subset was assigned 8 group levels. The diagram shows 3 of the 8 group levels. Plots that group to left are ecologically more closely related than those that group to right, and each colored group indicates a different alliance.

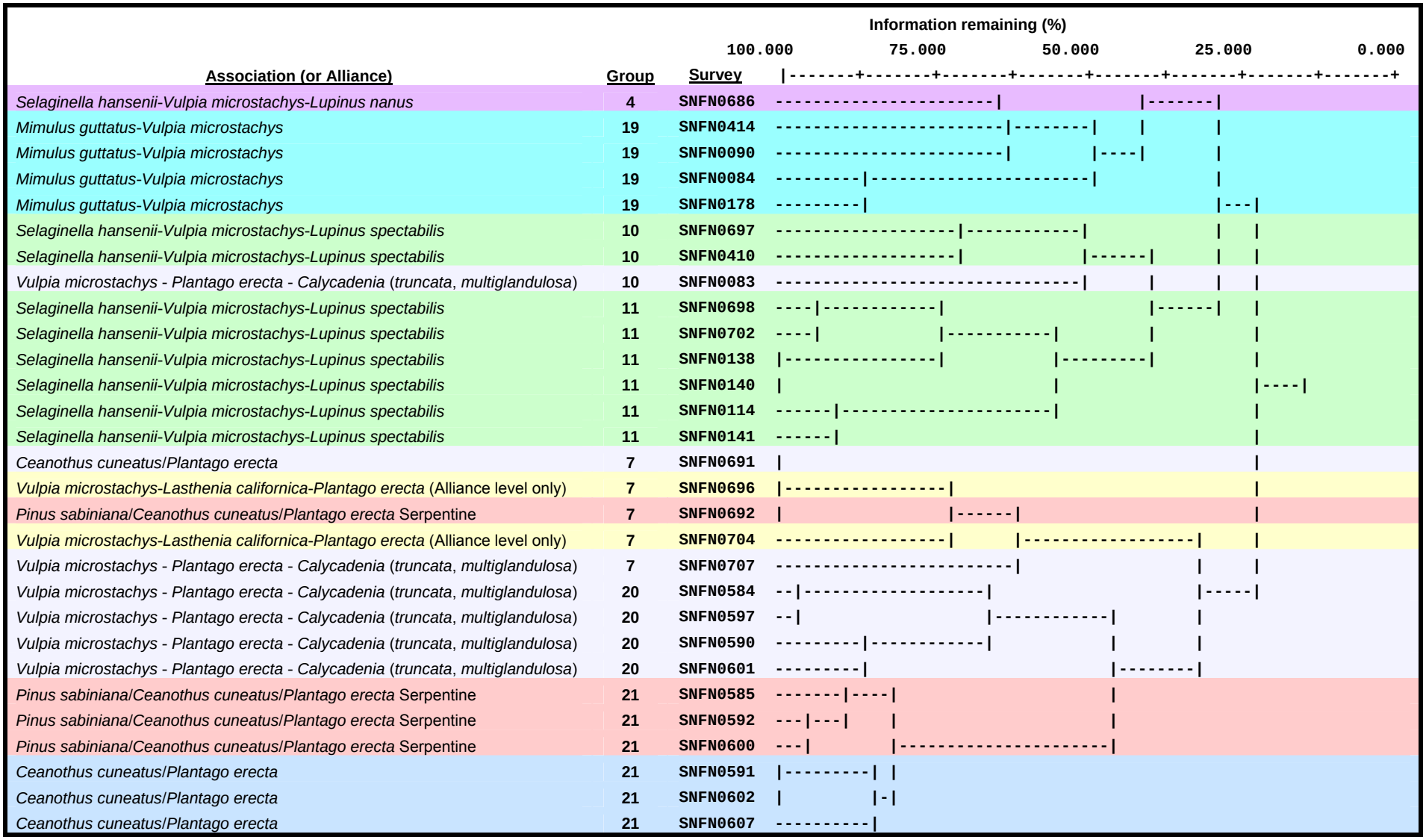

Figure 5. Example diagram showing the same portion of the cluster analysis as in Figure 4, but with finer grouping levels. This subset was assigned 16 group levels, and the diagram shows 7 of the 16 groups. This finer grouping level helped guide the classification of plots to association. Each colored group indicates a different association.

Table 2. Final vegetation classification from the northern Sierra Nevada Foothills, California. Alliances and Associations are nested within a higher-level hierarchy of Formations per the National Vegetation Classification System (NVCS). The table denotes which Alliances (highlighted in light gray) currently exist in the NVCS (per NatureServe 2007a). Other columns include number of surveys per type and elevation.

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
I. Forest							
	I.A.6.N.b.	**Lowland or submontane winter-rain evergreen sclerophyllous forest**					
			No	*Arbutus menziesii*			
					Alliance level only	1	no data
			Yes	*Quercus chrysolepis*			
					Alliance level only	4	1136-1767
					Quercus chrysolepis	8	1170-3710
					Quercus chrysolepis - Pinus ponderosa	7	1147-1675
					Quercus chrysolepis - Quercus kelloggii	14	331-3428
					Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum (Provisional)	7	564-2029
					Quercus chrysolepis - Quercus lobata / Vitis californica	15	476-2724
					Quercus chrysolepis - Quercus wislizeni	10	616-1740
					Quercus chrysolepis - Umbellularia californica	9	477-2222
					Quercus chrysolepis - Umbellularia californica / Vitis californica Riparian	22	630-2550
					Quercus chrysolepis / Arctostaphylos viscida	12	850-2359
			Yes	*Umbellularia californica*			
					Alliance level only	2	676-770
					Umbellularia californica - Alnus rhombifolia (Provisional)	2	555-1841
					Umbellularia californica - Quercus wislizeni	10	645-1668
			Yes	*Cupressus macnabiana*			
					Cupressus macnabiana / Arctostaphylos viscida (Provisional)	3	2295-2366
	I.A.8.N.c.	**Conical-crowned temperate or subpolar needle-leaved evergreen forest**					
			No	*Calocedrus decurrens*			
					Alliance level only	1	842
					Calocedrus decurrens - Alnus rhombifolia	2	725-850
			Yes	*Pseudotsuga menziesii*			

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Pseudotsuga menziesii	4	440-3670
					Pseudotsuga menziesii - Quercus chrysolepis	5	740-2721
	I.B.2.N.a.	**Lowland or submontane cold-deciduous forest**					
			Yes	*Acer macrophyllum*			
					Acer macrophyllum (Provisional)	4	970-2000
					Acer macrophyllum - Pseudotsuga menziesii / *Dryopteris arguta* (Provisional)	2	1410-1562
	I.B.2.N.d.	**Temporarily flooded cold-deciduous forest**					
			Yes	*Alnus rhombifolia*			
					Alliance level only	5	675-1749
					Alnus rhombifolia - Quercus chrysolepis	15	694-2267
					Alnus rhombifolia - Salix laevigata	15	247-2711
					Alnus rhombifolia - Salix laevigata - Platanus racemosa	8	220-960
					Alnus rhombifolia / *Carex*	23	267-2829
					Alnus rhombifolia / *Darmera peltata*	2	690-940
					Alnus rhombifolia / *Salix exigua*	15	382-2100
			Yes	*Fraxinus latifolia*			
					Alliance level only	6	195-1626
					Fraxinus latifolia - Alnus rhombifolia	14	329-1643
II. Woodland							
	II.A.4.N.a.	**Rounded-crowned temperate or subpolar needle-leaved evergreen woodland**					
			Yes	*Pinus ponderosa*			
					Pinus ponderosa / *Arctostaphylos viscida* (Provisional)	5	850-2040
					Pinus ponderosa Stream Terrace (Provisional)	5	897-2300
			Yes	*Pinus sabiniana*			
					Alliance level only	4	1168-2550
					Pinus sabiniana / *Rhamnus tomentella* (Provisional)	6	440-1578
					Pinus sabiniana / *Adenostoma fasciculatum*	10	821-3074
					Pinus sabiniana / *Arctostaphylos viscida* (Provisional)	8	818-2127
					Pinus sabiniana / *Ceanothus cuneatus*	10	525-2933
					Pinus sabiniana / *Ceanothus cuneatus* / *Plantago erecta* Serpentine (Provisional)	7	934-1232
	II.A.5.N.a.	**Sclerophyllous extremely xeromorphic evergreen woodland**					
			Yes	*Quercus wislizeni*			

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Alliance level only	7	999-2609
					Quercus wislizeni - Salix laevigata / *Rhamnus tomentella*	18	392-2270
					Quercus wislizeni - Aesculus californica	46	236-2075
					Quercus wislizeni - Pinus ponderosa	10	513-1514
					Quercus wislizeni - Pinus sabiniana	35	450-2390
					Quercus wislizeni - Pinus sabiniana / *Arctostaphylos manzanita*	11	690-2356
					Quercus wislizeni - Quercus douglasii - Aesculus californica	15	321-1839
					Quercus wislizeni - Quercus douglasii - Pinus sabiniana	35	350-2188
					Quercus wislizeni - Quercus douglasii / Herbaceous	38	208-1900
					Quercus wislizeni - Quercus kelloggii	23	490-1966
					Quercus wislizeni / *Arctostaphylos viscida*	16	670-2859
					Quercus wislizeni / *Heteromeles arbutifolia*	55	219-2798
					Quercus wislizeni / *Toxicodendron diversilobum*	43	400-2205
					Quercus wislizeni Mixed Shrub (Provisional)	6	1357-3265
	II.B.2.N.a.	**Cold-deciduous woodland**					
			Yes	*Aesculus californica*			
					Alliance level only	1	1295
					Aesculus californica / *Toxicodendron diversilobum* / *Moss*	14	300-1785
					Aesculus californica Riparian (Provisional)	6	499-1602
			No	*Juglans hindsii* Semi-Natural Stands			
					Juglans hindsii Semi-Natural Woodland Stands (no Associations defined)	1	649
			Yes	*Quercus douglasii*			
					Alliance level only	4	1327-2087
					Quercus douglasii - Aesculus californica / Herbaceous	11	892-1576
					Quercus douglasii - Pinus sabiniana / *Arctostaphylos viscida* / Herbaceous	9	677-2619
					Quercus douglasii - Pinus sabiniana / Herbaceous	43	466-2921
					Quercus douglasii - Quercus lobata / Herbaceous	3	466-874
					Quercus douglasii - Quercus wislizeni / Herbaceous	43	305-1627
					Quercus douglasii / Annual Grass-Forb	180	284-2800
					Quercus douglasii / *Arctostaphylos manzanita* / Herbaceous	12	448-2300

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Quercus douglasii / *Ceanothus cuneatus* / Herbaceous	8	862-2215
					Quercus douglasii / *Juniperus californica - Ceanothus cuneatus* (Provisional)	4	400-1546
					Quercus douglasii / Perennial Grass-Forb	13	170-3181
					Quercus douglasii / *Selaginella hansenii - Navarretia pubescens* (Provisional)	9	720-2202
			Yes	*Quercus lobata*			
					Alliance level only	3	902-1066
					Quercus lobata - Alnus rhombifolia	15	377-2115
					Quercus lobata - Quercus wislizeni	18	339-2157
					Quercus lobata / Herbaceous Semi-Riparian	16	303-1824
					Quercus lobata / *Rhus trilobata* (Provisional)	7	550-1509
					Quercus lobata / *Rubus discolor*	16	233-1565
	II.B.2.N.b.	**Temporarily flooded cold-deciduous woodland**					
			Yes	*Platanus racemosa*			
					Alliance level only	3	308-335
			Yes	*Populus fremontii*			
					Alliance level only	2	408-446
					Populus fremontii - Salix laevigata	25	187-1591
					Populus fremontii / *Vitis californica*	2	354-570
			Yes	*Quercus kelloggii*			
					Alliance level only	8	626-2520
					Quercus kelloggii - Pinus ponderosa	10	416-3268
					Quercus kelloggii - Pinus ponderosa / *Arctostaphylos viscida*	24	756-2386
					Quercus kelloggii - Pinus ponderosa / *Ceanothus integerrimus*	13	1061-3842
					Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica (Provisional)	6	1903-2212
					Quercus kelloggii - Quercus chrysolepis / *Toxicodendron diversilobum*	3	640-1351
					Quercus kelloggii / *Arctostaphylos viscida* (Provisional)	9	504-1969
					Quercus kelloggii / *Ceanothus integerrimus*	2	891-1194
					Quercus kelloggii / *Toxicodendron diversilobum - Styrax officinalis* / *Triteleia laxa*	3	560-810

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Quercus kelloggii / *Toxicodendron diversilobum* / Grass	29	555-3563
			Yes	*Salix gooddingii*			
					Alliance level only	1	1446
					Salix gooddingii (Provisional)	2	461-777
			Yes	*Salix laevigata*			
					Alliance level only	2	1150-2724
					Salix laevigata	16	213-2048
					Salix laevigata / *Salix lasiolepis*	6	374-1652
	II.A.5.N.a.	**Sclerophyllous extremely xeromorphic evergreen woodland**					
			Yes	*Cercocarpus betuloides*			
					Cercocarpus betuloides	4	968-2170
					Cercocarpus betuloides - *Ceanothus cuneatus* (Provisional)	8	500-3228
	II.B.2.N.c.	**Seasonally flooded cold-deciduous woodland**					
			Yes	*Salix exigua*			
					Alliance level only	1	1451
					Salix exigua	14	279-1681
					Salix exigua - *Brickellia californica* (Provisional)	5	422-1015
III. Shrubland							
	III.A.2.N.c.	**Sclerophyllous temperate broad-leaved evergreen shrubland**					
			Yes	*Adenostoma fasciculatum*			
					Alliance level only	1	2278
					Adenostoma fasciculatum	29	464-2915
					Adenostoma fasciculatum - *Arctostaphylos manzanita* (Provisional)	6	1032-1809
					Adenostoma fasciculatum - *Arctostaphylos viscida*	34	460-2496
					Adenostoma fasciculatum - *Eriodictyon californicum* - *Lotus scoparius*	20	540-2737
					Adenostoma fasciculatum / Herbaceous	4	1734-1740
			Yes	*Arctostaphylos viscida*			
					Alliance level only	3	260-1948
					(*Arctostaphylos viscida* - *Adenostoma fasciculatum*) / *Salvia sonomensis*	101	519-2427
					Arctostaphylos viscida	7	1443-3028

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Arctostaphylos viscida - Quercus wislizeni	14	1243-2962
					Arctostaphylos viscida / *Salvia sonomensis* (Provisional)	7	2000-2340
			Yes	*Ceanothus cuneatus*			
					Alliance level only	6	370-1338
					Adenostoma fasciculatum - Ceanothus cuneatus	4	718-2232
					Ceanothus cuneatus - Eriodictyon californicum - (*Fremontodendron californicum*) (Provisional)	9	2164-3477
					Ceanothus cuneatus / Herbaceous	24	410-2479
					Ceanothus cuneatus / *Plantago erecta*	28	610-2527
			No	*Eriodictyon californicum*			
					Eriodictyon californicum / Herbaceous	14	784-2618
			Yes	*Heteromeles arbutifolia*			
					Alliance level only	1	1022
					Heteromeles arbutifolia Serpentine (Provisional)	5	860-1458
			Yes	*Quercus berberidifolia*			
					Alliance level only	2	2485-3082
					Quercus berberidifolia - Ceanothus cuneatus	13	1402-3353
					Quercus berberidifolia - Fraxinus dipetala - Heteromeles arbutifolia	2	738-1557
			Yes	*Quercus durata*			
					Quercus durata (Provisional)	2	2250-2280
					Quercus durata - Adenostoma fasciculatum / *Salvia sonomensis* (Provisional)	7	487-1120
			No	*Frangula californica* (=*Rhamnus tomentella)*			
					Rhamnus tomentella - Hoita macrostachya (Provisional)	4	1000-1976
	III.A.4.N.c.	**Temporarily flooded microphyllous shrubland**					
			Yes	*Tamarix* spp. Semi-Natural Stands			
					Tamarix spp. Herbaceous Semi-Natural Stands (no Associations defined)	1	1285
	III.A.5.N.e.	**Extremely xeromorphic evergreen shrubland with a sparse tree layer**					
			Yes	*Juniperus californica*			
					Juniperus californica / Herbaceous	7	334-2692
	III.B.2.N.a.	**Temperate cold-deciduous shrubland**					
			Yes	*Ceanothus integerrimus*			
					Ceanothus integerrimus	3	1458-3975

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Ceanothus integerrimus - *Quercus garryana* var. *breweri* (Provisional)	9	2942-3860
			Yes	*Quercus garryana* var. *breweri* (Provisional)			
					Alliance level only	1	3233
					Quercus garryana var. *breweri* (Provisional)	5	2432-3689
	III.B.2.N.c.	**Intermittently flooded cold-deciduous shrubland**					
			No	*Rubus discolor* Semi-Natural Stands			
					Rubus discolor	8	539-2205
	III.B.2.N.d.	**Temporarily flooded cold-deciduous shrubland**					
			Yes	*Cornus sericea*			
					Alliance level only	1	1391
			Yes	*Salix lasiolepis*			
					Alliance level only	1	1420
					Salix lasiolepis / *Rubus* spp.	3	630-1415
	III.B.2.N.e.	**Seasonally flooded cold-deciduous shrubland**					
			Yes	*Cephalanthus occidentalis*			
					Cephalanthus occidentalis	8	638-1814
	III.C.2.N.a.	**Mixed evergreen - cold-deciduous shrubland**					
			Yes	*Toxicodendron diversilobum*			
					Toxicodendron diversilobum / Herbaceous	31	500-2240
V. Herbaceous Vegetation							
	V.A.5.N.d.	**Medium-tall bunch temperate or subpolar grassland**					
			Yes	*Muhlenbergia rigens*			
					Muhlenbergia rigens	8	296-1732
	V.A.5.N.f.	**Short bunch temperate or subpolar grassland**					
			Yes	*Nassella pulchra*			
					Alliance level only	1	935
					Nassella pulchra	11	360-1514
					Nassella pulchra - *Leontodon taraxacoides*	12	666-666
	V.A.5.N.k.	**Seasonally flooded temperate or subpolar grassland**					
			No	*Carex barbarae*			
					Carex barbarae (Provisional)	2	367-1022
			No	*Carex nudata*			
					Carex nudata	3	765-1058

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
			No	*Carex serratodens*			
					Carex serratodens (Provisional)	1	1128
			Yes	*Eleocharis acicularis* (Provisional)			
					Eleocharis acicularis - Eryngium castrense (Provisional)	3	1252-1260
			Yes	*Eleocharis macrostachya*			
					Alliance level only	4	956-2025
					Eleocharis macrostachya	13	377-2205
					Eleocharis macrostachya - (*Pleuropogon californicus*) (Provisional)	6	200-850
					Eleocharis macrostachya - Marsilea vestita (Provisional)	5	661-2800
			Yes	*Juncus* (*balticus*, *mexicanus*)			
					Juncus balticus	10	454-1452
					Juncus balticus - Carex praegracilis (Provisional)	3	330-749
			No	*Juncus* (*oxymeris*, *xiphioides*)			
					Juncus oxymeris (Provisional)	5	869-2061
					Juncus xiphioides (Provisional)	1	1370
			Yes	*Juncus effusus*			
					Juncus effusus	2	1008-1300
			No	*Phalaris aquatica* Semi-Natural Stands			
					Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis	3	1168-1960
	V.A.5.N.l.	**Semipermanently flooded temperate or subpolar grassland**					
			Yes	*Schoenoplectus* (=*Scirpus*) *acutus*			
					Schoenoplectus (=*Scirpus*) *acutus - Typha domingensis*	1	364
					Schoenoplectus (=*Scirpus*) *acutus* var. *occidentalis*	3	582-2800
			Yes	*Typha latifolia* (angustifolia, domingensis, latifolia)			
					Typha latifolia	2	921-2265
	V.D.2.N.d.	**Short temperate annual grassland**					
			Yes	*Avena* (*barbata*, *fatua*) Semi-Natural Stands			
					Avena barbata - Bromus hordeaceus (Provisional)	4	267-1309
			Yes	*Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Semi-Natural Stands			
					Brachypodium distachyon - Bromus diandrus / (*Quercus douglasii*)	38	316-2029
					Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus	11	282-1547

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Bromus hordeaceus - Leontodon taraxacoides	23	365-751
					Bromus hordeaceus - Lupinus nanus - Trifolium spp. (Provisional)	9	382-1810
					Trifolium hirtum - Bromus hordeaceus (Provisional)	8	460-1630
			No	*Bromus hordeaceus* - (*Holocarpha virgata*)			
					Holocarpha virgata - Bromus hordeaceus - Taeniatherum caput-medusae	25	735-2277
			No	*Bromus hordeaceus* - (*Plagiobothrys nothofulvus*)			
					Alliance level only	5	879-1430
					Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus	22	253-1225
			No	*Centaurea* (*melitensis*, *solstitialis*) Semi-Natural Stands			
					Centaurea solstitialis (Provisional)	8	567-1915
			No	*Lolium multiflorum* Semi-Natural Stands			
					Lolium multiflorum Herbaceous Semi-Natural Stands (no Associations defined)	2	327-965
					Lolium multiflorum - Centaurium muehlenbergii	13	316-1235
			No	*Lolium multiflorum* (*Zigadenus fremontii*) (Provisional)			
					Zigadenus fremontii (Provisional)	6	279-1071
			Yes	*Mimulus guttatus* (Provisional)			
					Alliance level only	1	1408
					Mimulus guttatus - Vulpia microstachys Serpentine (Provisional)	6	850-1079
			No	*Vulpia microstachys-Lasthenia californica-Plantago erecta*			
					Alliance level only	20	320-2309
					Selaginella hansenii - Vulpia microstachys	34	285-3111
					Selaginella hansenii - Vulpia microstachys - Lupinus nanus (Provisional)	7	1117-1933
					Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis (Provisional)	9	874-2501
					Vulpia microstachys - Elymus elymoides - Achnatherum lemmonii (Provisional)	6	3035-3753
					Vulpia microstachys - Lasthenia californica - Agrostis elliottiana	17	850-1428
					Vulpia microstachys - Lasthenia californica - Parvisedum pumilum	30	324-2250

Class	Formation Code	Formation	In NVCS 2007	Alliance	Association	N-surveys	Elevation (ft)
					Vulpia microstachys - Navarretia tagetina	20	312-2907
					Vulpia microstachys - Plantago erecta - Calycadenia (*truncata*, *multiglandulosa*)	14	660-2045
	V.D.2.N.e.	**Low temperate intermittently exposed annual forb vegetation**					
			No	*Lasthenia fremontii - Downingia* (*bicornuta*)			
					Alliance level only	3	865-1142
					Downingia (*cuspidata*, *bicornuta*)	5	361-881
					Downingia bicornuta - Lasthenia fremontii	1	174
					Downingia ornatissima - Lasthenia fremontii	9	206-880
					Eryngium (*vaseyi*, *castrense*)	11	607-9146
					Lasthenia fremontii (Provisional)	5	230-319
			No	*Layia fremontii*			
					Alliance level only	1	200
					Layia fremontii - Lasthenia californica - Achyrachaena mollis	20	207-1428
					Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei	11	398-522
					Plagiobothrys austiniae - Achyrachaena mollis	11	266-883
			No	*Trifolium variegatum*			
					Alliance level only	1	1907
					(*Trifolium variegatum - Vulpia bromoides*) - *Hypochaeris glabra - Leontodon taraxacoides*	15	207-522
					Trifolium variegatum	22	237-2253
					Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides	18	442-1888
					Trifolium variegatum - Vulpia bromoides - (*Hypochaeris glabra - Leontodon taraxacoides*)	33	250-862

Table 3. Summary of vegetation surveys that were not classified to Alliance or Association. Tentative vegetation names were assigned to these surveys because they had low sample size, did not fit the definitions of other classified types, and/or were outliers.

Tentative Vegetation Name	Taxa with Highest Average Cover in Dominant Layer (descending order)	N-surveys
Unclassified Woodland / Forest Vegetation		
Mixed Hardwood - Conifer	*Quercus kelloggii*, *Q. douglasii*, *Q. wislizeni*, *Pinus ponderosa*, *P. sabiniana*	6
Quercus douglasii - Aesculus californica	*Aesculus californica*, *Pinus sabiniana*, *Quercus wislizeni*, *Q. douglasii*	1
Unclassified Shrubland Vegetation		
Baccharis pilularis	*Baccharis pilularis*, *Eriodictyon californicum*, *Heteromeles arbutifolia*, *Arctostaphylos viscida*	2
Brickellia californica	*Brickellia californica*, *Salix melanopsis*	1
Mixed Chaparral Shrub / Moss	*Quercus wislizeni*, *Heteromeles arbutifolia*, *Arctostaphylos manzanita*, (Moss in understory)	1
Prunus subcordata	*Prunus subcordata*, *Philadelphus lewisii*	1
Rosa californica	*Rosa californica*, *Cephalanthus occidentalis* var. *californicus*	1
Unclassified Herbaceous Vegetation		
California Annual Grassland	*Bromus hordeaceus*, *Aira caryophyllea*, *Gastridium ventricosum*, *Trifolium hirtum*	1
California Annual Grassland	*Bromus hordeaceus*, *Hypochaeris glabra*, *Vulpia myuros*, *Erodium botrys*	1
California Annual Grassland	*Bromus hordeaceus*, *Taeniatherum caput-medusae*, *Hypochaeris glabra*, *Avena barbata*, *Trifolium hirtum*	9
California Annual Grassland	*Taeniatherum caput-medusae*, *Chondrilla juncea*, *Wyethia angustifolia*, *Hypericum perforatum*	2
Eleocharis parishii	*Eleocharis parishii*, *Muhlenbergia rigens*, *Briza minor*	1
Eleocharis thermalis	*Eleocharis thermalis*, *Helianthus annuus*, *Navarretia intertexta*, *Verbena californica*, *Stachys ajugoides*	1
Elymus glaucus	*Elymus glaucus*, *Vulpia microstachys*, *Vicia villosa*, *Bromus hordeaceus*	1
Holcus lanatus	*Holcus lanatus*, *Bromus secalinus*, *Asclepias fascicularis*, *Taeniatherum caput-medusae*, *Nassella pulchra*	1
Juncus dubius	*Juncus dubius*, *Hordeum marinum*, *Lolium multiflorum*	1

Tentative Vegetation Name	Taxa with Highest Average Cover in Dominant Layer (descending order)	N-surveys
Unclassified Herbaceous Vegetation continued		
Juncus dubius OR *Muhlenbergia richardsonis*	*Eleocharis* sp., *Juncus dubius*, *Muhlenbergia richardsonis*	1
Lotus purshianus OR *Hordeum brachyantherum*	*Lotus purshianus*, *Hordeum brachyantherum*, *Mimulus guttatus*	2
Lotus wrangelianus	*Lotus wrangelianus*, *Brodiaea* sp., *Clarkia purpurea* subsp. *quadrivulnera*	3
Ranunculus aquatilis	*Ranunculus aquatilis*, *Callitriche marginata*, *Isoetes howellii*	1
Selaginella hansenii	*Selaginella hansenii*, *Vulpia myuros*, *Bromus hordeaceus*, *Hypochaeris glabra*, *Bromus diandrus*	4
Serpentine Grassland	*Pentagramma triangularis*, *Allium obtusum* var. *conspicuum*, *Brachypodium distachyon*, *Melica californica*, *Mimulus guttatus*	1
Sidalcea hartwegii	*Sidalcea hartwegii*, *Lolium multiflorum*, *Eleocharis macrostachya*	1
Stachys stricta - Polypogon monspeliensis	*Polypogon monspeliensis*, *Stachys stricta*, *Helenium puberulum*	2
Typha domingensis	*Typha domingensis*, *Polygonum hydropiperoides*, *Ludwigia peploides*	1
Vernal Pool Edge	*Hordeum murinum* subsp. *Leporinum*, *Lolium multiflorum*, *Hemizonia fitchii*, *Microseris acuminata*, *Pogogyne zizyphoroides*	1
Vernally Wet Herbaceous	*Juncus bufonius*, *Bromus hordeaceus*, *Aira caryophyllea*, *Briza minor*	2
Vernally Wet Herbaceous	*Mimulus glaucescens*, *Eryngium* sp., *Lagophylla ramosissima* subsp. *ramosissima*, *Medicago polymorpha*	1
Vernally Wet Herbaceous	*Bromus hordeaceus*, *Hypochaeris glabra*, *Erodium botrys*, *Microseris acuminata*, *Trifolium hirtum*, *Achyrachaena mollis*	2
Vernally Wet Herbaceous	*Trifolium dubium*, *Gnaphalium luteoalbum*, *Horkelia californica* subsp. *dissita*, *Calandrinia ciliata*, *Lotus purshianus*	1
Wetland Herbaceous	*Ludwigia peploides*, *Polygonum hydropiperoides*, *Phalaris* sp.	2

Table 4. List of Alliances or Associations that have a Global rank at G3 or below and a State rank at S3 or below.

Woodland/Forest Vegetation Types			
Alliance			
Association	**Ranking**	**Counties**	**General Substrate**
Acer macrophyllum (Big-leaf Maple) Woodland/Forest Alliance			
Acer macrophyllum	G4 S3	Butte	mostly volcanic
Acer macrophyllum - Pseudotsuga menziesii / Dryopteris arguta	G3 S3	Butte	volcanic
Aesculus californica (California Buckeye) Woodland/Forest Alliance			
Aesculus californica Riparian	G3 S3	Butte, Calaveras, El Dorado, Mariposa, Nevada	mostly metamorphic
Alnus rhombifolia (White Alder) Woodland/Forest Alliance			
Alnus rhombifolia - Quercus chrysolepis	G3 S3	Amador, Butte, Calaveras, Nevada, Placer, Shasta, Tehama	variable
Alnus rhombifolia - Salix laevigata	G3 S3	Butte, Calaveras, Mariposa, Placer, Tehama, Tuolumne	variable
Alnus rhombifolia - Salix laevigata - Platanus racemosa	G3 S3	Placer, Tehama, Yuba	variable
Alnus rhombifolia / Darmera peltata	G3 S3	Butte	variable
Calocedrus decurrens (Incense-cedar) Woodland/Forest Alliance			
Calocedrus decurrens - Alnus rhombifolia	G3 S3	Butte, El Dorado	variable
Cupressus macnabiana (McNab Cypress) Woodland/Forest Alliance			
Cupressus macnabiana / Arctostaphylos viscida	G3 S3	Yuba	gabbro
Fraxinus latifolia (Oregon Ash) Woodland/Forest Alliance			
Alliance level only	G4 S3	Calaveras, Nevada, Tehama, Yuba	variable (alluvium)
Fraxinus latifolia - Alnus rhombifolia	G3 S3	Calaveras, El Dorado, Nevada, Shasta, Tehama, Tuolumne, Yuba	variable
Pinus ponderosa (Ponderosa Pine) Woodland/Forest Alliance			
Pinus ponderosa Stream Terrace	G3 S3	Butte, Nevada, Tehama	mostly volcanic
Pinus sabiniana (Foothill Pine) Woodland/Forest Alliance			
Pinus sabiniana	G3 S3	Tehama, Yuba	mostly metamorphic

Woodland/Forest Vegetation Types (continued)

Alliance / Association	Ranking	Counties	General Substrate
Pinus sabiniana / *Arctostaphylos viscida*	G3 S3?	Amador, Butte, Calaveras, El Dorado	predom ultramafic - gabbro and serpentine
Pinus sabiniana / *Ceanothus cuneatus* / *Plantago erecta* Serpentine	G3 S3	Mariposa, Tuolumne	predom serpentine
Platanus racemosa (California Sycamore) Woodland/Forest Alliance			
Platanus racemosa	G3 S3	Butte, Tehama	volcanic
Populus fremontii (Fremont Cottonwood) Woodland/Forest Alliance			
Populus fremontii - Salix laevigata	G4 S3	Amador, Calaveras, El Dorado, Madera, Mariposa, Nevada, Placer, Tehama, Tuolumne, Yuba	variable
Populus fremontii / *Vitis californica*	G3 S3	Butte, Nevada	variable
Quercus chrysolepis (Canyon Live Oak) Woodland/Forest Alliance			
Quercus chrysolepis - Pinus ponderosa	G3 S3	Amador, Butte, El Dorado, Placer, Tehama, Tuolumne	mostly metamorphic
Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum	G3 S3	Amador, Butte, Calaveras, Nevada	variable
Quercus chrysolepis - Quercus lobata / *Vitis californica*	G3 S3	Amador, Butte, Calaveras, Nevada, Tehama, Yuba	mostly igneous
Quercus chrysolepis - Umbellularia californica	G4 S4	Butte, Placer	mostly volcanic
Quercus chrysolepis - Umbellularia californica / *Vitis californica* Riparian	G3 S3	Butte, Calaveras, Shasta, Tehama	mostly volcanic
Quercus douglasii (Blue Oak) Woodland/Forest Alliance			
Quercus douglasii - Quercus lobata / Herbaceous	G3 S3	Calaveras, Nevada, Shasta	variable
Quercus douglasii / *Juniperus californica - Ceanothus cuneatus*	G3 S3	Butte, Shasta, Tehama	volcanic
Quercus douglasii / *Selaginella hansenii - Navarretia pubescens*	G3 S3	Tehama	volcanic
Quercus kelloggii (Black Oak) Woodland/Forest Alliance			
Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica	G3 S3	Butte	mostly volcanic

Woodland/Forest Vegetation Types (continued)			
Alliance			
Association	**Ranking**	**Counties**	**General Substrate**
Quercus kelloggii / *Toxicodendron diversilobum* - *Styrax officinalis* / *Triteleia laxa*	G3 S3	El Dorado	gabbro
Quercus lobata (Valley Oak) Woodland/Forest Alliance			
Quercus lobata - *Alnus rhombifolia*	G3 S3	Amador, Nevada, Placer, Shasta, Tehama	mostly igneous
Quercus lobata - *Quercus wislizeni*	G3 S3	Amador, Calaveras, El Dorado, Mariposa, Tehama, Yuba	mostly igneous
Quercus lobata / Herbaceous Semi-*Riparian*	G3 S3	Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, Shasta, Tehama, Yuba	variable
Quercus lobata / *Rhus trilobata*	G3 S3	Butte, Tehama	mostly volcanic
Quercus lobata / *Rubus discolor*	G3 S3	Amador, Calaveras, El Dorado, Nevada, Placer, Shasta, Tehama	variable
Quercus wislizeni (Interior Live Oak) Woodland/Forest Alliance			
Quercus wislizeni - *Salix laevigata* / *Rhamnus tomentella*	G3 S3	Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Shasta, Yuba	metamorphic (alluvium)
Quercus wislizeni - *Pinus ponderosa*	G3 S3	Butte, El Dorado, Placer, Yuba	mostly metamorphic
Quercus wislizeni - *Pinus sabiniana* / *Arctostaphylos manzanita*	G3 S3?	Amador, Butte, El Dorado, Tehama, Tuolumne	variable
Salix gooddingii (Black Willow) Woodland/Forest Alliance			
Alliance level only	G4 S3	El Dorado	metamorphic
Salix gooddingii	G4 S3	Placer	igneous
Salix laevigata (Red Willow) Woodland/Forest Alliance			
Salix laevigata	G4 S3	Amador, Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer	alluvium
Salix laevigata / *Salix lasiolepis*	G3 S3	El Dorado, Nevada, Placer, Yuba	metamorphic (alluvium)
Umbellularia californica (California Bay) Woodland/Forest Alliance			
Umbellularia californica - *Alnus rhombifolia*	G3 S3	Shasta, Tehama	alluvium
Umbellularia californica - *Quercus wislizeni*	G3 S3	Butte, Tehama	volcanic

Shrubland Vegetation Types			
Alliance			
Association	**Ranking**	**Counties**	**General Substrate**
Adenostoma fasciculatum (Chamise) Shrubland Alliance			
Adenostoma fasciculatum - Arctostaphylos manzanita	G3 S3	Calaveras, Tuolumne	variable
Arctostaphylos viscida (Whiteleaf Manzanita) Shrubland Alliance			
(*Arctostaphylos viscida - Adenostoma fasciculatum*) / *Salvia sonomensis*	G3 S3	Calaveras, El Dorado, Nevada	mostly gabbro
Arctostaphylos viscida / *Salvia sonomensis*	G3 S3	Yuba	gabbro
Ceanothus cuneatus (Wedgeleaf Ceanothus) Shrubland Alliance			
Ceanothus cuneatus - Eriodictyon californicum - (*Fremontodendron californicum*)	G3? S3?	Tehama	volcanic
Ceanothus cuneatus / *Plantago erecta*	G3 S3	Mariposa, Tehama, Tuolumne	mostly serpentine
Ceanothus integerrimus (Deerbrush) Shrubland Alliance			
Ceanothus integerrimus - Quercus garryana var. breweri	G3 S3	Tehama	volcanic
Cephalanthus occidentalis (Button-willow) Shrubland Alliance			
Cephalanthus occidentalis	G4 S3	Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Shasta	alluvium
Cornus sericea (Red-osier Dogwood) Shrubland Alliance			
Alliance level only	G4 S3	Tehama	volcanic
Heteromeles arbutifolia (Toyon) Shrubland Alliance			
Heteromeles arbutifolia Serpentine	G3 S3	Mariposa, Tuolumne	serpentine
Quercus durata (Leather Oak) Shrubland Alliance			
Quercus durata - Adenostoma fasciculatum / *Salvia sonomensis*	G3 S3	El Dorado	gabbro
Quercus garryana var. breweri (Brewer Oak) Shrubland Alliance			
Quercus garryana var. breweri	G3 S3	Tehama	volcanic
Frangula californica (=*Rhamnus tomentella)* (Hoary Coffeeberry) Shrubland Alliance			
Rhamnus tomentella - Hoita macrostachya	G3 S3	Tehama, Tuolumne	serpentine
Salix exigua (Narrow-leaf Willow) Shrubland Alliance			
Salix exigua - Brickellia californica	G3 S3	El Dorado, Placer	metamorphic (alluvium)

Herb-Grassland Vegetation Types **Alliance** **Association**	**Ranking**	**Counties**	**General Substrate**
Carex barbarae (Santa Barbara Sedge) Herbaceous Alliance			
Carex barbarae	G3 S3	El Dorado, Placer	metamorphic (alluvium)
Carex nudata (Naked Sedge) Herbaceous Alliance			
Carex nudata	G3 S3	Tuolumne	serpentine
Carex serratodens (Twotooth Sedge) Herbaceous Alliance			
Carex serratodens	G3 S3	Tuolumne	serpentine
Lasthenia fremontii - Downingia (*bicornuta*) (Fremont's Goldfields - Calicoflower) Herbaceous Alliance			
Downingia (*cuspidata*, *bicornuta*)	G3 S3	Tehama	volcanic
Downingia bicornuta - Lasthenia fremontii	G3 S3	Sacramento	alluvium
Downingia ornatissima - Lasthenia fremontii	G3 S3	Butte, Shasta	volcanic or sedimentary
Eryngium (*vaseyi*, *castrense*)	G3 S3	Butte, El Dorado, Madera, Shasta, Tehama, Tuolumne	mostly volcanic
Lasthenia fremontii	G3 S3	Butte	volcanic
Eleocharis acicularis (Pale Spikerush) Herbaceous Alliance			
Eleocharis acicularis - Eryngium castrense	G3 S3	Shasta	volcanic
Eleocharis macrostachya Herbaceous Alliance			
Eleocharis macrostachya - (*Pleuropogon californicus*)	G4 S3?	Amador, Calaveras, Mariposa, Sacramento	metamorphic
Eleocharis macrostachya - Marsilea vestita	G4 S3?	Shasta, Tehama	volcanic (alluvium)
Juncus (*balticus*, *mexicanus*) (Rush (Baltic, Mexican) Herbaceous Alliance			
Juncus balticus - Carex praegracilis	G4 S3	El Dorado, Yuba	metamorphic (alluvium)
Juncus (*oxymeris*, *xiphioides*) (Rush (Pointed, Irisleaf)) Herbaceous Alliance			
Juncus oxymeris	G3 S3?	El Dorado, Mariposa, Tehama, Tuolumne	variable
Juncus xiphioides	G3 S3?	Shasta	volcanic

Herb-Grassland Vegetation Types (continued) Alliance Association	Ranking	Counties	General Substrate
Layia fremontii (Fremont's Tidytips) Herbaceous Alliance			
Alliance level only	G3 S3	Tehama	volcanic
Layia fremontii - Lasthenia californica - Achyrachaena mollis	G3 S3	Butte, Tehama	volcanic or sedimentary
Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei	G3 S3	Sacramento	metamorphic
Plagiobothrys austiniae - Achyrachaena mollis	G3 S3	Butte, Tehama	volcanic
Lolium multiflorum (Italian Ryegrass) Herbaceous Alliance			
Lolium multiflorum - Centaurium muehlenbergii	G3 S3?	Butte, El Dorado, Mariposa, Tehama, Yuba	mostly volcanic
Lolium multiflorum (*Zigadenus fremontii*) (Italian Ryegrass (Fremont's Deathcamas)) Herbaceous Alliance			
Zigadenus fremontii	G3 S3?	Butte, Shasta, Tehama	volcanic (alluvium)
Mimulus guttatus (Seep Monkeyflower) Herbaceous Alliance			
Alliance level only	G3 S3	Tehama	alluvium
Mimulus guttatus - Vulpia microstachys Serpentine	G3 S3?	Calaveras, El Dorado, Tuolumne	serpentine
Muhlenbergia rigens (Deergrass) Herbaceous Alliance			
Muhlenbergia rigens	G3 S3	Butte, El Dorado, Mariposa, Nevada, Placer, Tehama	variable (alluvium)
Nassella pulchra (Purple Needlegrass) Herbaceous Alliance			
Nassella pulchra	G3 S3	Butte, El Dorado, Tehama	volcanic or sedimentary
Nassella pulchra - Leontodon taraxacoides	G3 S3	Calaveras, Sacramento	mostly metamorphic
Schoenoplectus (=*Scirpus*) *acutus* (Common Tule) Herbaceous Alliance			
Schoenoplectus (=*Scirpus*) *acutus - Typha domingensis*	G4 S3?	Tehama	volcanic
Trifolium variegatum (Whitetip Clover) Herbaceous Alliance			
(*Trifolium variegatum - Vulpia bromoides*) - *Hypochaeris glabra - Leontodon taraxacoides*	G3 S3	Butte, El Dorado, Sacramento	mostly metamorphic

Herb-Grassland Vegetation Types (continued)

Alliance

Association	Ranking	Counties	General Substrate
Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides	G3 S3	Amador, Calaveras, Mariposa, Sacramento, Shasta, Tehama	metamorphic or sedimentary
Trifolium variegatum - Vulpia bromoides - (*Hypochaeris glabra - Leontodon taraxacoides*)	G3 S3	Sacramento, Tuolumne	metamorphic
Vulpia microstachys-Lasthenia californica-Plantago erecta (Small Fescue - California Goldfields - Dwarf Plantain) Herbaceous Alliance			
Selaginella hansenii - Vulpia microstachys	G3 S3	Butte, Shasta, Tehama, Tuolumne	volcanic
Selaginella hansenii - Vulpia microstachys - Lupinus nanus	G3 S3	Butte, Tuolumne	volcanic
Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis	G3 S3	Mariposa, Tuolumne	serpentine
Vulpia microstachys - Elymus elymoides - Achnatherum lemmonii	G3 S3	Tehama	volcanic
Vulpia microstachys - Lasthenia californica - Agrostis elliottiana	G3 S3	Sacramento, Shasta	volcanic or sedimentary
Vulpia microstachys - Navarretia tagetina	G3 S3	Butte, Tehama	volcanic
Vulpia microstachys - Plantago erecta - Calycadenia (*truncata*, *multiglandulosa*)	G3 S3	Butte, El Dorado, Tehama, Tuolumne, Yuba	mostly ultramafic, volcanic

Volunteer Involvement and Workshops

NFWF - Funds from NFWF grant supported the CNPS Vegetation Program's efforts to provide workshops, collect data, support chapter sampling projects, analyze data, derive a classification, and write descriptions for vegetation types in the Sierra Nevada Foothills. CNPS presented workshops for all six CNPS chapters that cover the Sierra Nevada Foothills study area, with several chapters receiving two or three workshops. We also held workshops open to the public and agency staff at several locations. In all, we held sixteen trainings and taught over 150 people
to use the standardized methods for collecting vegetation data over a two-year time period. The workshops and sampling efforts focused sampling in counties threatened by large-scale urban development, such as Placer, Nevada, El Dorado, Sacramento, and Butte counties or counties that are working on Habitat Conservation Plans (HCP's) or Natural Community Conservation Plans (NCCP's). NFWF funds allowed us to contribute an additional 278 survey points that were collected by the training coordinator, volunteers, interns, and workshops participants in the greater Foothills project.

In 2005, 98 people were trained to use CNPS Vegetation Rapid Assessment sampling methods. Six of these workshops were for CNPS chapters (including one workshop for the Redbud, El Dorado, and Kern Chapters, and greater Chapter Council and two for Sacramento Valley Chapter). Three others were public/agency workshops, hosted by Placer Legacy (in Placer County), Sacramento State University (Sacramento County), and The Nature Conservancy at Dye Creek Preserve (Tehama County).

In 2006, 59 people were trained on vegetation sampling methods. Five chapter workshops were held in Shasta, Butte, Tuolumne, Nevada, and El Dorado counties. We provided public/agency workshops on a BLM parcel in El Dorado County, and CDFG training on Table Mountain in Butte County. In addition, we developed and distributed training manuals for the participating chapters to support their efforts to survey local plant communities.

In spring and summer of 2005 and 2006, the CNPS Training Coordinator worked with interns, volunteers, and workshop participants to collect vegetation surveys. In 2006, we targeted surveys in vernal pools on foothill and valley floors, grasslands on table mountain formations, and riparian stands in creek and river drainages. Six existing or new volunteers and interns contributed approximately 105 hours in collecting vegetation rapid assessment surveys in these habitats.

We used three outreach tools to inform and involve people in the project: presentations, newsletter articles, and an interim report on the results of the first field season. The Training Coordinator gave presentations to five CNPS chapters (Shasta, Mt Lassen, Redbud, El Dorado, and Sierra Foothills). The presentations covered the use of vegetation classification and mapping in local land use planning and conservation, the results from the first year of the study, and how chapter members could participate. During the presentations, chapter members provided us with contacts for private landowners and suggestions for important survey locations. We published two issues of *The Sampler* newsletter, in June 2006 and July 2007, which we distributed widely within CNPS, collaborating agencies, and university staff. The newsletters included articles on the Sierra Nevada Foothills vegetation workshops and classification project.

Crosswalks to Other Classifications

A crosswalk is a term commonly used in vegetation classification and mapping projects that refers to developing relationships between different classification systems. The need for creating a crosswalk arises when more than one classification system has been used for a given area. The crosswalk produced for this project (Appendix 4) relates the vegetation classification of alliances and associations per state and national standards per Sawyer and Keeler-Wolf (1995) and NatureServe (2007a) to the vertebrate habitat models used by CDFG's California Wildlife Habitat Relationships per Mayer and Laudenslayer (1988).

Assuming that classifications arise independently, classification units derived in one system may not always completely encompass or be nested within the other classification units to which they are being related.

Thus, choices were made about those classification units that were partially included within two or more types of the other classification system. For example, the Wildlife Habitat Relationships (WHR) unit of *Freshwater Emergent Wetland* actually includes many vegetation alliances. Likewise, the *Canyon Live Oak* Alliance of the state and national classification includes both *Montane Hardwood* and *Montane Hardwood - Conifer* of WHR.

The complexity and uncertainty of such relationships arise not only from independent evolution of other habitat classifications, but also from their imprecise definitions, without quantitative rules for proper interpretation. The best crosswalks are those that have been developed with a good understanding of the meaning and definitions of each classification system.

Diagnostic Vegetation Key and Descriptions

Table 5 contains a key for distinguishing the classified vegetation types in the northern Sierra Nevada Foothills. Due to the diversity of vegetation in the fine-scale mapping area, and to avoid an excessively long document, a series of paired statements (or couplets) was not developed for each option. Instead, sets of characteristics with choices beneath them are provided. The key will first lead the user to the general options, and the individual selections for the vegetation associations will be listed beneath these options. The user will need to work through the numbered list of types from the more general to the most specific options until the best fit is reached. The choices are identified by a combination of alpha-numeric codes, using capital letters, numerals, upper- and lowercase letters, and decimal points to distinguish the different key levels. The most basic, general levels in the key are on the left side of the alpha-numeric code, and the most specific are on the right side. This coding system in the key relates to a series of left indentations. Thus, the major groupings are down the left-hand side of the pages; nested within them are the sub-groupings. The preliminary key will direct you to the major groups, such as forest/woodland, shrubland, and herbaceous, with the more specific choices beneath them. The more specific lists within these are generally based on presence/absence or dominance/sub-dominance of species. Some alliances thought to occur in the Foothills, but not sampled, are included in the key. Common names are included in the tree- and shrub-overstory sections, but are not in the herbaceous section due to the difficulty in identifying common names for herbaceous taxa. ***Please note: since there may be more than two alternatives in a group, be sure to work through all of the options in a list before you decide on the best choice.***

Vegetation descriptions are included in a separate document in Volume 2, where the alliances and associations are included in separate tree-overstory (woodland/forest), shrub-overstory, and herbaceous sections. The key and descriptions hopefully will afford further refinement to the understanding of vegetation from the northern Sierra Nevada Foothills, both from the standpoint of classification and mapping.

Table 5. Key for distinguishing classified vegetation types in the northern Sierra Nevada Foothills.

Class A. Vegetation with an overstory of trees (at least 5 m tall). Tree canopy is generally greater than 10%, but occasionally may be less than 10% over a denser understory of shrub and/or herbaceous species = **Tree-Overstory (Woodland / Forest Vegetation)**

Class B. Vegetation characterized by woody shrubs in the canopy. Tree species, if present, generally total less than 10% absolute cover. Herbaceous species may total higher cover than shrubs. Shrubs are usually at least 10% cover = **Shrubland Vegetation**

Class C. Vegetation characterized by non-woody, herbaceous species in the canopy including grass, graminoid, and broad-leaved herbaceous species. Shrubs, if present, usually comprise <10% of the vegetation. Trees, if present, generally compose <5% cover: **= Herbaceous Vegetation**

Class A. Tree-Overstory (Woodland / Forest Vegetation)

Group I: Woodlands and forests characterized by needle or scale-leaved conifer trees, including pine (*Pinus*), fir (*Abies*), incense cedar (*Calocedrus*), etc. The conifers may only occur intermittently in the overstory and may be associated with tree oaks or shrubs.

I.A. The overstory is dominated by pine (*Pinus*) trees alone or in shared dominance with broadleaf evergreen trees or shrubs…

IA.1. Foothill pine (*Pinus sabiniana*) is the dominant tree in the overstory, and it is generally >10% absolute cover in overstory (but as low as 8% on serpentine)…

***Pinus sabiniana* Woodland/Forest Alliance**

IA1.a. Foothill pine occurs over a chamise (*Adenostoma fasciculatum*) shrub understory; found on a variety of substrates including metamorphic and ultramafic…

***Pinus sabiniana* / *Adenostoma fasciculatum* Woodland Association**

IA1.b. Foothill pine occurs over whiteleaf manzanita (*Arctostaphylos viscida*). Other shrubs may also occur in the understory at lower cover than the manzanita. Found mostly on gabbro and other ultramafic substrates such as serpentinite…

***Pinus sabiniana* / *Arctostaphylos viscida* Woodland Association (Provisional)**

IA1.c. Foothill pine occurs over an herbaceous and shrub understory with hoary coffeeberry (*Rhamnus tomentella*) at 2% or greater absolute cover; typically found on metamorphic or other non-serpentine substrates…

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

IA1.d. Foothill pine occurs over other shrubs including wedgeleaf ceanothus (*Ceanothus cuneatus*), as well as toyon (*Heteromeles arbutifolia*), common manzanita (*Arctostaphylos manzanita*), birchleaf Mountain-mahogany (*Cercocarpus betuloides*), and poison oak (*Toxicodendron diversilobum*). The understory also has abundant herbs, including natives and non-natives, on a variety of soil types including volcanic, metamorphic, and ultramafic (non-serpentine) soils…

***Pinus sabiniana* / *Ceanothus cuneatus* Woodland Association**

IA1.e. Foothill pine occurs scattered over an open shrub understory of wedgeleaf ceanothus (*Ceanothus cuneatus*) and other shrubs. The understory has a high diversity and cover of native species, including dwarf plantain (*Plantago erecta*) and small fescue (*Vulpia microstachys*). Occurs on serpentine soil…

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

IA.2. Knobcone pine (*Pinus attenuata*) occurs as the dominant conifer or co-occurs with other conifers in an open to intermittent overstory…

***Pinus attenuata* Woodland/Forest Alliance**
(No Association or description provided)

IA.3. Ponderosa pine (*Pinus ponderosa*) is dominant in the tree canopy with >50% relative cover, while hardwoods (such as *Quercus chrysolepis* and *Q*. *kelloggii*) are low in cover, if present…

***Pinus ponderosa* Woodland/Forest Alliance**

IA3.a. Shrubs make up the intermittent cover in the understory, with whiteleaf manzanita (*Arctostaphylos viscida*) dominant. Stands are typical on convex middle slopes to ridgetops…

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

IA3.b. Shrubs, if present, are usually low cover in the understory. Stands are typical of stream terraces where canyons emerge from the mountains…

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

IA.4. Black oak (*Quercus kelloggii*) has >30% relative cover with Ponderosa pine (*Pinus ponderosa*) ranging from merely present to co-dominant. Three associations with this hardwood-conifer mix are defined in the ***Quercus kelloggii* Woodland/Forest Alliance** in the study area, and they have varying understory composition…

IA4.a. The shrub understory is sparse to open with poison oak (*Toxicodendron diversilobum*) often present…

***Quercus kelloggii - Pinus ponderosa* Woodland Association**

IA4.b. The shrub understory is open to dense with whiteleaf manzanita (*Arctostaphylos viscida*) characteristically present with toyon (*Heteromeles arbutifolia*)…

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

IA4.c. The shrub understory is open to intermittent with deerbrush (*Ceanothus integerrimus*) characteristically present with other shrubs such as poison oak (*Toxicodendron diversilobum*) and skunkbush (*Rhus trilobata*)…

***Quercus kelloggii - Pinus ponderosa* / *Ceanothus integerrimus* Woodland Association**

IA.5. Interior live oak (*Quercus wislizeni*) has >30% relative cover with Ponderosa pine (*Pinus ponderosa*) ranging from merely present to co-dominant…

***Quercus wislizeni - Pinus ponderosa* Woodland Association of the *Quercus wislizeni* Woodland/Forest Alliance**

IA.6. Vegetation consists of mixed hardwood-conifer stands that do not key to the above types in this group (I.A). May include a variety of oak (*Quercus*) and pine (*Pinus*) species. See Table 3, which provides some detail on surveys that were placed into this artificial group…

Mixed Hardwood – Conifer Unclassified Stand
(No description provided)

IB. The overstory is dominated by one or more other, non-pine conifers, such as incense cedar (*Calocedrus*), Douglas-fir (*Pseudotsuga*), cypress (*Cupressus*), or these conifers may share dominance with broadleaf evergreen trees or shrubs…

1B.1. Incense cedar (*Calocedrus decurrens*) is the dominant tree in the overstory…

***Calocedrus decurrens* Woodland/Forest Allliance**

Incense cedar has >5% absolute cover, and either white alder (*Alnus rhombifolia*) or big-leaf maple (*Acer macrophyllum*) is characteristically present and may be co-dominant with incense cedar…

***Calocedrus decurrens - Alnus rhombifolia* Forest Association**

IB.2. Douglas-fir (*Pseudotsuga menziesii*) occurs as the dominant in the overstory as a canopy tree, and a sub-canopy of hardwoods such as oaks (*Quercus*) may be present at low cover…

***Pseudotsuga menziesii* Woodland/Forest Alliance**

Douglas-fir is the principal dominant in overstory, and the understory is open to intermittent, with no diagnostic understory species…

***Pseudotsuga menziesii* Forest Association**

IB.3. Douglas-fir (*Pseudotsuga menziesii*) is co-dominant with canyon live oak (*Quercus chrysolepis*) in the tree overstory or midstory. One association of this hardwood-conifer mix is defined in the study area and classified within the *Quercus chrysolepis* Forest Alliance…

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

IB.3. Douglas-fir (*Pseudotsuga menziesii*) is co-dominant with black oak in the tree overstory. One association of this hardwood-conifer mix is classified within the *Quercus kelloggii* Alliance…

***Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica* Forest Association (Provisional) of the *Quercus kelloggii* Alliance**

IB.4. Douglas-fir (*Pseudotsuga menziesii*) is co-dominant with big-leaf maple (*Acer macrophyllum*) in the tree overstory or midstory. Found in the Lassen volcanic foothills. This hardwood-conifer mix is classified in the *Acer macrophyllum* Forest Alliance. The understory is mixed with upland and riparian herbs, including wood fern (*Dryopteris arguta*) and California maiden-hair fern (*Adiantum jordanii*)…

***Acer macrophyllum - Pseudotsuga menziesii / Dryopteris arguta* Forest Association (Provisional) of the *Acer macrophyllum* Alliance**

1B.5. McNab cypress (*Cupressus macnabiana*) is the dominant in the overstory…

***Cupressus macnabiana* Woodland/Forest Alliance**

McNab cypress is dominant with whiteleaf manzanita (*Arctostypylos viscida*) present in the understory. Other shrubs may be dominant or co-dominant…

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

IB.6. Vegetation consists of mixed hardwood-conifer stands that do not key to the above types in this group (I.B). May include a variety of oak (*Quercus*) and pine (*Pinus*) species. See Table 3, which provides some detail on surveys that were placed into this artificial group…

Mixed Hardwood – Conifer Unclassified Stand (No description provided)

Group II. Woodlands and forests characterized mainly by broad-leaved evergreen and deciduous tree species such as oaks (*Quercus*), willows (*Salix*), etc.

II.A. One or more oak (*Quercus* spp.) species are the primary overstory canopy tree, or oaks share dominance with conifers…

IIA.1. Blue oak (*Quercus douglasii*) is the dominant oak species at >50% relative cover in the overstory. Other trees, such as foothill pine (*Pinus sabiniana*), buckeye (*Aesculus californica*), or other oaks, may be present, but blue oak generally has greater cover…

***Quercus douglasii* Woodland/Forest Alliance**

IIA1.a. California buckeye (*Aesculus californica*) is present and conspicuous in the overstory at >2% cover with blue oak. Other tree species may be present, but at relatively lower cover. The understory is usually well-developed with herbs…

***Quercus douglasii - Aesculus californicus* / Herbaceous Woodland Association**

IIA1.b. Other oaks, not just blue oak, occur in the overstory. California buckeye (Aesculus californica) is absent or inconspicuous…

IIA1b.i. Valley oak (*Quercus lobata*) is present and conspicuous in the overstory at >5% cover with blue oak. Other tree species, such as interior live oak (*Quercus wislizeni*), may be present. The understory is usually well-developed with herbs…

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

IA1b.ii. Interior live oak (*Quercus wislizeni*) is present and conspicuous in the overstory at >2% cover, with blue oak having >50% relative cover. Foothill pine may be present. The understory is open to dense with herbs…

***Quercus douglasii - Quercus wislizeni* / Herbaceous Woodland Association**

IIA1.c. Other broad-leaf tree species are not conspicuous with blue oak. Instead, foothill pine is present and conspicuous in the overstory at >2% cover. Shrubs are present in the understory, including chaparral species and poison oak…

IIA1c.i. Whiteleaf manzantita (*Arctostaphylos viscida*) is charactistically present in the understory at >2% cover, and the herb layer is usually well-developed…

***Quercus douglasii - Pinus sabiniana* / *Arctostapylos viscida* / Herbaceous Woodland Association**

IIA1c.ii. Common manzanita (*Arctostaphylos manzanita*) is characteristically present in the understory at >2% cover, and the herb layer is usually intermittent to dense…

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

IIA1.d. Foothill pine is present at >2% cover, and shrubs are missing from the understory. The herbaceous layer is usually intermittent to dense in cover…

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

IIA1.e. Blue oak is the only tree in the overstory. The understory may be shrubby or grassy…

IIA1e.i. Common manzanita (*Arctostaphylos manzanita*) is characteristically present in the understory at >2% cover, and the herb layer is usually intermittent to dense…

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

IIA1e.ii. Wedgeleaf ceanothus (*Ceanothus cuneatus*) is characteristically present in the understory at >2% cover, and the herbaceous layer is open to dense…

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

IIA1e.iii. California juniper (*Juniperus californica*) and wedgeleaf ceanothus (*Ceanothus cuneatus*) are characteristically present in the understory; if mountain-mahagony (*Cercocarpus betuloides*) is present, it occurs at low cover. Found on the northern Lassen volcanics…

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

IIA1e.iv. Annual grasses, forbs, and bulbs dominate the understory, and shrubs are low in cover. The most common species include non-natives (*Bromus hordeaceus*, *Trifolium hirtum*, *Torilis arvensis*, *Avena barbata*, and *Lolium multiflorum*). However, annual species vary significantly both seasonally and annually, and further research likely could identify a variety of finer-scale associations…

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

Annual native forbs (*Navarretia pubescens*, *Centaurium muehlenbergii*, *Clarkia purpurea*, and *Selaginella hansenii*) occur with non-native grasses (*Avena barbata*, *Bromus hordeaceus*, and*Trifolium hirtum*) in the understory. Found on volcanic substrates in the Lassen Foothills…

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

IIA1e.v. Perennial grasses, annual grasses and forbs, and bulbs dominate the understory, and shrubs are low in cover. Common species include non-native annuals (*Trifolium hirtum*, *Avena barbata*, and *Torilis arvensis*) and native perennial grasses (*Elymus glaucus*, *Nassella pulchra*, *Melica californica*, and *E. elymoides*)…

***Quercus douglasii* / Perennial Grass - Forb Woodland Sub-Alliance**

IIA.2. Interior live oak (*Quercus wislizeni*) is dominant or co-dominant at >30% relative cover, with other tree species in the overstory. Scrub oak (*Quercus berberidifolia*) and canyon live oak (*Quercus chrysolepis*), if present, occur at low cover…

***Quercus wislizeni* Woodland/Forest Alliance**
(Also see Class B, Group IF.3. for key to shrub Associations)

IIA2.a. Black oak (*Quercus kellogii*) is conspicuous in the overstory with at least 5% cover, though interior live oak occurs at higher cover in most stands. Other trees may include foothill pine (*Pinus sabiniana*), canyon live oak (Quercus chrysolepis), and blue oak (*Quercus douglasii*). The understory can have significant shrub cover with toyon (*Heteromeles arbutifolia*), manzanita (*Arctostaphylos* spp.), poison oak (*Toxicodendron diversilobum*), and others…

***Quercus wislizeni - Quercus kelloggii* Forest Association**

IIA2.b. Interior live oak occurs as a riparian (or semi-riparian) forest/tall shrubland with riparian indicators such as red willow (*Salix laevigata*), big-leaf maple (*Acer macrophyllum*), hoary coffeeberry (*Rhamnus tomentella*), mugwort (*Artemisia douglasiana*), Himalaya blackberry (*Rubus discolor*), and others…

***Quercus wislizenii - Salix laevigata / Rhamnus tomentella* Forest Association**

IIA2.c. California buckeye (*Aesculus californica*) occurs as a conspicuous member of the canopy with interior live oak, and it has a higher cover than foothill pine (if present)…

IIA2c.i. Blue oak (*Quercus douglasii*) is conspicuous with at least 5% cover in the overstory with interior live oak and buckeye…

***Quercus wislizenii - Quercus douglasii - Aesculus californica* Woodland Association**

IIA2c.ii. Blue oak (*Quercus douglasii*) occurs at <5% cover in the overstory with interior live oak and buckeye…

***Quercus wislizenii - Aesculus californica* Woodland Association**

IIA2.d. Ponderosa pine (*Pinus ponderosa*) is present and conspicuous with at least 5% cover. In this hardwood-conifer mix, interior live oak may be dominant or co-dominant with Ponderosa pine…

***Quercus wislizeni - Pinus ponderosa* Woodland Asssociation**

IIA2.e. Both blue oak (*Quercus douglasii*) and Foothill pine (*Pinus sabiniana*) are present and conspicuous (with both usually having at least 5% cover) in the overstory, though interior live oak is usually greater in cover than other trees. Poison oak (*Toxicodendron diversilobum*) is most constant in the understory with annual grasses and forbs. Other shrubs such as toyon (*Heteromeles arbutifolia*) and common manzanita (*Arctostaphylos manzanita*) may be present…

***Quercus wislizeni - Quercus douglasii - Pinus sabiniana* Woodland Association**

IIA2.f. Blue oak (*Quercus douglasii*) is either sub-dominant or co-dominant with interior live oak. No other tree species is conspicuous in the overstory…

***Quercus wislizeni - Quercus douglasii* / Herbaceous Woodland Association**

IIA2.g. Foothill pine (*Pinus sabiniana*) is usually at least 5% cover with interior live oak dominant in tree layer, and blue oak is less than 5% cover. The understory has no significant cover of toyon (*Heteromeles arbutifolia*) or whiteleaf manzanita (*Arctostaphylos viscida*), but may have other shrubs significant in cover…

IIA2g.i. Common manzanita (*Arctostaphylos manzanita*) is present with at least 5% cover in a mixed shrub layer, and interior live oak is in the tree or tall shrub layer…

***Quercus wislizeni - Pinus sabiniana* /*Arctostaphylos manzanita* Woodland Association**

IIA2g.ii. Common manzanita (*Arctostaphylos manzanita*) is absent, though other shrubs may be present in the understory…

***Quercus wislizeni - Pinus sabiniana* Woodland Association**

IIA2.h. Interior live oak is the primary species in the overstory, occurring as a tree or a tall shrub with whiteleaf manzanita (*Arctostaphylos viscida*). Both species typically have at least 5% absolute cover. May include toyon (*Heteromeles arbutifolia*) and other shrubs. Typically of upper slopes and relatively exposed, upland settings…

***Quercus wislizeni* / *Arctostaphylos viscida* Woodland Association**

IIA2.i. Interior live oak occurs as a tree or tall shrub with toyon (*Heteromeles arbutifolia*) as the major shrub associate (at least 5% cover). May include up to 5% cover of whiteleaf manzanita (*Arctostaphylos viscida*), but if so, toyon has at least two times the cover of manzanita. Poison oak (*Toxicodendron diversilobum*) may be significant. Typically of mesic settings (concavities and northerly-facing slopes)…

***Quercus wislizenii* / *Heteromeles arbutifolia* Forest Association**

IIA2.j. Interior live oak occurs as an intermittent to dense forest or tall shrubland in mesic settings. Poison oak (*Toxicodendron diversilobum*) is the major understory shrub species and is typically high in cover. If toyon (*Heteromeles arbutifolia*) or whiteleaf manzanita (*Arctostaphylos viscida*), are present, they each comprise no more than 5% cover and poison oak has two times the cover of either species…

***Quercus wislizenii* / *Toxicodendron diversilobum* Forest Association**

IIA.3. Black oak (*Quercus kelloggii*) is dominant or co-dominant in the overstory. Stands may have conifers such as Douglas-fir (*Pseudotsuga menziesii*) or Ponderosa pine (*Pinus ponderosa*) with equal or slightly higher cover than black oak…

***Quercus kelloggii* Woodland/Forest Alliance**

IIA3.a. Black oak is the dominant overstory tree, and conifers are not conspicuous…

IIA3a.i. The understory usually has a high cover of poison oak (*Toxicodendron diversilobum*) and a conspicuous mixture of native and non-native grasses and herbs…

***Quercus kelloggii* / *Toxicodendron diversilobum* / Grass Woodland Association**

IIA3a.ii. Snowdrop bush (*Styrax officinalis*) is present in understory with poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and a variety of herbs…

***Quercus kelloggii* /*Toxicodendron diversilobum* - *Styrax officinalis* / *Triteliea laxa* Woodland Association**

IIA3a.iii. The understory has whiteleaf manzanita (*Arctostaphylos manzanita*) present with poison oak, toyon, and other shrubs and herbs…

***Quercus kelloggii* / *Arctostaphylos viscida* Woodland Association (Provisional)**

IIA3a.iv. The understory has deerbrush (*Ceanothus integerrimus*) present with poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*),, and other shrubs and herbs…

***Quercus kelloggii* / *Ceanothus integerrimus* Woodland Association**

IIA3a.v. Canyon live oak (*Quercus chrysolepis*) is a major subdominant, and the understory has strong presence of poison oak (*Toxicodendron diversilobum*) along with other shrubs and herbs…

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

IIA3.b. Black oak has >30% relative cover with conifer Douglas-fir (*Pseudotsuga menziesii*) and hardwood California bay (*Umbellularia californica*) as major associates. Other conifers such as Ponderosa pine (*Pinus ponderorsa*) or incense cedar (*Calocedrus decurrens*) may also be present…

***Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica* Forest Association**

IIA3.c. Black oak has >30% relative cover with conifer Ponderosa pine (*Pinus ponderorsa*) ranging from merely present at <5% cover to co-dominant. Three associations with this hardwood-conifer mix are defined within the *Quercus kelloggii* Alliance, with varying understory composition…

IIA3c.i. The shrub understory is sparse to open…

***Quercus kelloggii - Pinus ponderosa* Woodland Association**

IIA3c.ii. The shrub understory is open to dense with whiteleaf manzanita (*Arctostaphylos viscida*) and toyon characteristically present…

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

IIA3c.iii. The shrub understory is open to intermittent with deerbrush (*Ceanothus integerrimus*) characteristically present with other shrubs such as poison oak (*Toxicodendron diversilobum*) and skunkbush (*Rhus trilobata*)*…*

***Quercus kelloggii - Pinus ponderosa / Ceanothus integerrimus* Woodland Association**

IIA.4. Canyon live oak (*Quercus chrysolepis*) is usually the dominant species in the overstory. Conifers may be emergent, or in the case of Douglas-fir (*Pseudotsuga menziesii*) or Ponderosa pine (*Pinus ponderorsa*), they may be co-dominant…

***Quercus chrysolepis* Woodland/Forest Alliance**

IIA4.a. Canyon live oak shares cover with Douglas-fir, which is usually >30% cover in the overstory…

***Pseudotsuga menziesii - Quercus chrysolepis* Forest Association of the *Pseudotsuga menziesii* Woodland/Forest Alliance**

IIA4.b. Ponderosa pine is characteristically present and usually has low cover compared to canyon live oak; incense cedar (*Calocedrus decurrens*) also may be present in the overstory. Black oak (*Quercus kelloggii*) is absent or has very low cover. Usually on lower to mid slopes…

***Quercus chrysolepis - Pinus ponderosa* Forest Association**

IIA4.c. Black oak (*Quercus kelloggii*) is conspicuous in the overstory with canyon live oak usually dominant. Ponderosa pine is also often present. Usually occurs on upland, northerly-facing slopes…

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

IIA4.d. Big-leaf maple (*Acer macrophyllum*) and black oak (*Quercus kelloggii*) are conspicuous trees with canyon live oak usually dominant. Typically found in riparian settings or on northerly slopes above drainages…

***Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum* Forest Association (Provisional)**

IIA4.e. Canyon live oak forest occurs with indicators such as valley oak (*Quercus lobata*), California wild grape (*Vitis californica*), dutchman's pipe (*Aristolochia californica*), and other diagnostic riparian species. Usually in riparian settings (or sheltered lower slopes)…

***Quercus chrysolepis - Quercus lobata / Vitis californica* Forest Association**

IIA4.f. California bay (*Umbellularia californica*) occurs as a sub-dominant to co-dominant with canyon live oak…

IIA4f.i. California wild grape (*Vitis californica*) and other riparian or mesophyllic species are typically present. Found in semi-riparian settings, often along stream terraces or on bottomlands or lower slopes…

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

IIA4f.ii. Poison oak (*Toxicodendron diversilobum*) and toyon (*Heteromeles arbutifolia*) are typically present in the understory. Found in upland settings, often on middle to upper slopes. …

***Quercus chrysolepis - Umbellularia californica* Association**

IIA4.g. Interior live oak is conspicuous with at least 5% cover in the overstory. Canyon live oak (*Quercus chrysolepis*), toyon (*Heteromeles arbutifolia*), and poison oak (*Toxicodendron diversilobum*) are usually present in the understory. Usually on neutral lower to middle slopes…

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

IIA4.h. Whiteleaf manzanita (*Arctostaphylos viscida*) is characteristic in the shrub understory, with at least 1% absolute cover. Toyon (*Heteromeles arbutifolia*) is also typically present and may have higher cover than manzanita in the understory. Usually on neutral to northerly, middle to upper slopes…

***Quercus chrysolepis / Arctostaphylos viscida* Forest Association**

IIA4.i. Canyon live oak is typically strongly dominant in the overstory (>60% relative cover), and sometimes conifers such as foothill pine (*Pinus sabiniana*) are emergent at low cover. No significant indicator species are identified in the understory, though shrubs may be intermittent in cover. Usually on northerly slopes…

***Quercus chrysolepis* Woodland Association**

IIA.5. Valley oak (*Quercus lobata*) is usually the dominant species in the overstory, though sometimes other oaks or riparian species may be co-dominant…

***Quercus lobata* Woodland/Forest Alliance**

IIA5.a. Valley oak is usually dominant in the overstory. Himalaya berry (*Rubus discolor*) usually has 20% or more cover in the understory, although when absent it is replaced by California rose (*Rosa californica*) or California blackberry (*Rubus ursinus*). Found in riparian settings*…*

***Quercus lobata / Rubus discolor* Woodland Association**

IIA5.b. Valley oak is usually dominant, while white alder (*Alnus rhombifolia*) is present and averages >5% absolute cover. Himalaya blackberry (*Rubus discolor*) and California wild grape (*Vitis californica*) are often present and variable in cover. Found in riparian settings…

***Quercus lobata - Alnus rhombifolia* Woodland Association**

IIA5.c. Valley oak is usually dominant to co-dominant with interior live oak in the overstory. Poison oak is usually present and variable in cover, while Himalaya blackberry (*Rubus discolor*) is sometimes present with low cover. Other trees may be present, including California buckeye (*Aesculus californica*), foothill pine (*Pinus sabiniana*) and California sycamore (*Platanus racemosa*). Found in riparian settings…

***Quercus lobata - Quercus wislizeni* Woodland Association**

IIA5.d. Valley oak is the dominant in the overstory, and skunkbrush (*Rhus trilobata*) is the major understory species (1% or greater cover). Found in riparian or semi-riparian settings of the northern Foothills…

***Quercus lobata / Rhus trilobata* Woodland Association (Provisional)**

IIA5.e. Valley oak is the sole dominant over a grassy or herbaceous understory (especially *Bromus diandrus*). Shrubs may sometimes be present and intermittent. Usually associated with small creeks, stream terraces, bottomlands and other low-lying features…

***Quercus lobata* / Herbaceous Semi-Riparian Woodland Association**

II.B. California bay (*Umbellularia californica*) is dominant in the overstory as a tree or tall shrub; however, it is sometimes co-dominant with white alder or interior live oak…

***Umbellularia californica* Woodland/Forest Alliance**

IIB.1. Interior live oak (*Quercus* wislizeni) occurs with California bay at variable cover, and California buckeye (*Aesculus californica*) is often present…

***Umbellularia californica - Quercus wislizeni* Woodland Association**

IIB.2. Red willow (*Alnus rhombifolia*) is characteristically present with California bay, and other riparian species are also found in the understory…

***Umbellularia californica - Alnus rhombifolia* Woodland Association (Provisional)**

II.C. Pacific Madrone (*Arbutus menziesii*) is dominant in the overstory, usually with California bay (*Umbellularia californica*) and/or black oak (*Quercus kelloggii*). This appears to be an early seral type that may transition to the Black Oak or Canyon Live Oak (*Quercus chrysolepis*) Alliance without significant disturbance…

***Arbutus menziesii* Woodland/Forest Alliance**
(No Associations defined)

II.D. California buckeye (*Aesculus californica*) is dominant (>60% relative cover) as a tree or tall shrub in the overstory. If buckeye is co-dominant with an oak species, see the Blue Oak (*Quercus douglasii*) and Interior Live Oak (*Quercus wislizeni*) Alliances…

***Aesculus californica* Woodland/Forest Alliance**

IID.1. California buckeye is dominant, though valley oak (*Quercus lobata*) and/or interior live oak (*Quercus wislizeni*) may be present along with riparian species in the overstory or understory. Found in riparian settings…

***Aesculus californica* Riparian Woodland Association (Provisional)**

IID.2. California buckeye is dominant as a tree or shrub; oaks may be present but not abundant. Poison oak (*Toxicodendron diversilobum*), herbs, and moss characteristically occur in the understory. Usually on very rocky, upland substrates…

***Aesculus californica* / *Toxicodendron diversilobum* / Moss Woodland Association**

II.E. Big-leaf maple (*Acer macrophyllum*) is dominant or co-dominant with >30% relative cover in the canopy. Stands may include equal or higher cover of Douglas-fir (*Pseudotsuga menziesii*)…

***Acer macrophyllum* Woodland/Forest Alliance**

IIE.1. Big-leaf maple is dominant (with >60% relative cover) in the tree or shrub layer; other trees may include canyon live oak (*Quercus chrysolepis*) and white alder (*Alnus rhombifolia*) at lower cover. The understory is variable with shrubs and herbs, including hoary coffeeberry (*Rhamnus tomentella*), Pacific dogwood (*Cornus nuttallii*), and *Elymus glaucus*…

***Acer macrophyllum* Forest Association (Provisional)**

IIE.2. Douglas-fir and big-leaf maple are co-dominants on volcanic substrate in the Lassen foothills. The understory is mixed with upland and riparian herbs, including wood fern (*Dryopteris arguta*) and California maiden-hair fern (*Adiantum jordanii*)…

***Acer macrophyllum - Pseudotsuga menziesii* / *Dryopteris arguta* Forest Association (Provisional)**

II.F. Hind's Walnut (*Juglans hindsii*) is dominant in the overstory. All stands in the Foothills are planted or of hybrid origin…

***Juglans hindsii* Alliance and Semi-Natural Woodland/Forest Stands (No Associations defined)**

II.G. Stands dominated or characterized by other typical riparian winter deciduous trees or tall shrubs in the following genera: *Populus*, *Salix*, *Fraxinus*, *Platanus*, or *Alnus*…

IIG.1. Fremont cottonwood (*Populus fremontii*) has equal or greater than 5% cover in overstory, usually as a dominant or co-dominant in the overstory with willows…

***Populus fremontii* Woodland/Forest Alliance**

IIG1.a. Fremont cottonwood is the sole dominant tree; California wild grape (*Vitis californica*) is conspicuous and usually has >10% cover…

***Populus fremontii* / *Vitis californica* Woodland Association**

IIG1.b. Fremont cottonwood occurs in an association with red willow (*Salix laevigata*), where red willow usually has >5% absolute cover. Other riparian trees may be present and co-dominant, including valley oak (*Quercus lobata*), white alder (*Alnus rhombifolia*), and/or Oregon ash (*Fraxinus latifolia*)…

***Populus fremontii* - *Salix laevigata* Woodland Association**

IIG.2. California sycamore (*Platanus racemosa*) has >5% absolute cover in the overstory. Other species may intermix in the overstory, including California buckeye (*Aesculus californica*), California bay (*Umbellularia californica*), and/or Oregon ash (*Fraxinus latifolia*)…

***Platanus racemosa* Woodland/Forest Alliance**
(No Associations defined)

IIG.3. White alder (*Alnus rhombifolia*) is the dominant or co-dominant with other riparian species in the overstory…

***Alnus rhombifolia* Woodland/Forest Alliance**

IIG3.a. Canyon live oak (*Quercus chrysolepis*) occurs with white alder along with a mix of other hardwoods and conifers like California bay (*Umbellularia californica*), Ponderosa pine (*Pinus ponderosa*), incense cedar (*Calocedrus decurrens*) and/or big-leaf maple (*Acer macrophyllum*)…

***Alnus rhombifolia* - *Quercus chrysolepis* Woodland Association**

IIG3.b. California sycamore (*Platanus racemosa*) is present with red willow (*Salix laevigata*), and both trees usually have >5% absolute cover in a mix with white alder…

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

IIG3.c. Red willow (*Salix laevigata*) is >5% cover in the tree and/or shrub layer, and it may be higher in cover than the white alder. There is not significant California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), or Oregon ash (*Fraxinus latifolia*) in the overstory…

***Alnus rhombifolia* - *Salix laevigata* Woodland Association**

IIG3.d. Narrow-leaf willow (*Salix exigua*) is usually >5% cover in the shrub layer, and white alder is usually the dominant tree…

***Alnus rhombifolia* / *Salix exigua* Woodland Association**

IIG3.e. Naked sedge (*Carex nudata*) and/or other *Carex* or *Juncus* sp. are present at >5% cover and white alder is the sole dominant tree. Shrubby arroyo willow (*Salix lasiolepis*) may be present, and alder may be low and shrubby or young. Usually in active, rocky stream channels…

***Alnus rhombifolia* / *Carex* sp. Association**

IIG3.f. Indian rhubarb (*Darmera peltata*) is characteristically present with >2% cover as an understory herb. White alder is the sole dominant tree in the canopy…

***Alnus rhombifolia* / *Darmera peltata* Association**

IIG.4. Black willow (*Salix gooddingii*) has the highest cover in the canopy with at least 10% cover…

***Salix gooddingii* Woodland/Forest Alliance**

IIG4.a. Black willow is the dominant tree, while other tall woody shrubs may be subdominant. Himalaya blackberry (*Rubus discolor*) usually has high cover in the understory…

***Salix gooddingii* Woodland Association (Provisional)**

IIG.5. Red willow (*Salix laevigata*) is the sole dominant in the overstory layer with at least 10% cover. Arroyo willow (*Salix lasiolepis*) may occur as a sub- or co-dominant in the shrub or low tree layer…

***Salix laevigata* Woodland/Forest Alliance**

IIG5.a. Arroyo willow has at least 10% cover in the shrub layer, while Himilaya blackberry (*Rubus discolor*) and mugwort (*Artemisia douglasiana*) are usually present in the understory with a variety of other herbs and shrubs, including cattail (*Typha*)…

***Salix laevigata* - *Salix lasiolepis* Woodland Association**

IIG5.b. Red willow is dominant in the overstory with an absence or relative low cover of arroyo willow. Himalaya blackberry (*Rubus discolor*) is often present with variable cover in the understory…

***Salix laevigata* Woodland Association**

IIG.6. Oregon ash (*Fraxinus latifolia*) makes up more than 5% of the overstory tree canopy. This species is a strong indicator as a dominant or co-dominant tree…

***Fraxinus latifolia* Alliance**

IIG6.a. Oregon ash mixes with white alder (*Alnus rhombifolia*) and/or red willow (*Salix laevigata*) and the two species are often co-dominant…

***Fraxinus latifolia* - *Alnus rhombifolia* Woodland Association**

IIG.7. Narrow-leaf willow (*Salix exigua*) is characteristically present as a dominant or co-dominant shrub. It forms an open to continuous canopy along riparian corridors. Other willow species may be present as sub-dominants with low cover…

***Salix exigua* Shrubland Alliance**

IIG7.a. Narrow-leaf willow (*Salix exigua*) and California brickellbush (*Brickellia californica*) form an open shrub canopy along exposed, sandy/cobbly river terraces…

***Salix exigua* - *Brickellia californica* Shrubland Association (Provisional)**

IIG7.b. Narrow-leaf willow (*Salix exigua*) is the sole dominant and forms an intermittent to continuous shrub canopy over a variety of wetland shrubs and herbs such as Himalaya blackberry (*Rubus discolor*) and mugwort (*Artemisia douglasiana*)…

***Salix exigua* Shrubland Association**

IIG.8. Arroyo willow (*Salix lasiolepis*) is dominant as a shrub or low tree, with at least 10% absolute cover (and >60% relative cover)…

***Salix lasiolepis* Shrubland Alliance**

Arroyo willow (*Salix lasiolepis*) is dominant in the canopy. Himalaya blackberry (*Rubus discolor*), is characteristic in the understory with a variety of wetland shrubs and herbs. Additional willow species and California rose (*Rosa californica*) may be present with low cover…

***Salix lasiolepis* / *Rubus* spp. Shrubland Association**

Class B. Shrubland Vegetation

Group I. Shrublands dominated by sclerophyllous temperate shrubs (with leaves hardened by a waxy cuticle). They are dominated by typical chaparral shrub genera, including chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos*), scrub oaks (*Quercus*), etc.

I.A. Hoary coffeeberry (*Rhamnus tomentella*) dominates the shrub canopy…
***Frangula californica* (=*Rhamnus tomentella*) Shrubland Alliance**

Large leather-root (*Hoita macrostachya*) is frequently present in the herbaceous understory with one or more species of monkeyflower (*Mimulus* spp.) and a variety of upland and wetland taxa…
***Rhamnus tomentella - Hoita macrostachya* Shrubland Association (Provisional)**

I.B. California yerba santa (*Eriodictyon californicum*) and/or deer weed (*Lotus scoparius*) form an open to continuous shrub canopy with chamise (*Adenostoma fasciculatum*). No other shrub species has significant cover in the overstory. The understory is comprised of non-native forbs and grasses…
***Adenostoma fasciculatum - Eriodictyon californicum - Lotus scoparius* Shrubland Association of the *Adenostoma fasciculatum* Alliance**

I.C. California yerba santa (*Eriodictyon californicum*) dominates the shrub canopy with low to moderate cover…
***Eriodictyon californicum* Shrubland Alliance**

California yerba santa forms an open to intermittent shrub canopy over annual grasses and forbs. Shrubs such as wedgeleaf ceanothus (*Ceanothus cuneatus*) and chamise (*Adenostoma fasciculatum*) may intermix with low cover…
***Eriodictyon californicum* / Herbaceous Shrubland Association**

I.D. Deerbrush (*Ceanothus integerrimus*) dominates or co-dominates with other chaparral shrubs in the canopy…
***Ceanothus integerrimus* Shrubland Alliance**

ID.1. Deerbrush dominates and forms an intermittent shrub canopy with other shrub taxa such as toyon (*Heteromeles arbutifolia*), hoary coffeeberry (*Rhamnus tomentella*), and California yerba santa (*Eriodictyon californicum*)…
***Ceanothus integerrimus* Shrubland Association**

ID.2. Deerbrush forms an intermittent to continuous shrub canopy with Brewer oak (*Quercus garryana* var. *breweri*) characteristically present as a sub-dominant. Woodbalm (*Lepechinia calycina*) and California redbud (*Cercis occidentalis*) are frequently present with low to moderate cover …
***Ceanothus integerrimus - Quercus garryana* var. *breweri* Shrubland Association (Provisional)**

I.E. Birchleaf Mountain-mahogany (*Cercocarpus betuloides*) characterizes the shrub overstory alone or with wedgeleaf ceanothus, forming an open to intermittent canopy…
***Cercocarpus betuloides* Shrubland Alliance**

IE.1. Birchleaf Mountain-mahogany is the sole dominant in the overstory with a variety of other shrubs such as California brickellbush (*Brickellia californica*) and California redbud (*Cercis occidentalis*) occurring at sparse cover. The herb understory is open…
***Cercocarpus betuloides* Shrubland Association**

IE.2. Birchleaf Mountain-mahogany and wedgeleaf ceanothus (*Ceanothus cuneatus*) form an open to intermittent shrub canopy, where the two species usually co-dominate. Other shrub species including poison oak (*Toxicodendron diversilobum*) and chaparral honeysuckle (*Lonicera interrupta*) may intermix at low cover. Found primarily on volcanic soils in the northern portion of the study area…
***Cercocarpus betuloides - Ceanothus cuneatus* Shrubland Association (Provisional)**

I.F. The overstory is characterized by a species of oak (*Quercus*) that is dominant or has shared dominance with another chaparral species in the shrub overstory…

IF.1. Brewer oak (*Quercus garryana* var. *breweri*) occurs alone or with other chaparral shrub species in the overstory. Found primarily on volcanic substrates in the northern portion of the study area…

IF1.a. Brewer oak is typically present as a sub-dominant shrub to deerbrush (*Ceanothus integerrimus*). Woodbalm (*Lepechinia calycina*) and California redbud (*Cercis occidentalis*) are frequently present with low to moderate cover…
***Ceanothus integerrimus* - *Quercus garryana* var. *breweri* Shrubland Association (Provisional)**

IF1.b. Brewer oak is dominant to co-dominant in the shrub canopy…
***Quercus garryana* var. *breweri* Shrubland Alliance (Provisional)**

Brewer oak forms an intermittent to continuous shrub canopy with other shrubs such as birchleaf Mountain-mahogany (*Cercocarpus betuloides*) and poison oak (*Toxicodendron diversilobum*)…
***Quercus garryana* var. *breweri* Shrubland Association (Provisional)**

IF.2. Leather oak (*Quercus durata*) is dominant or co-dominant in the shrub canopy. Found primarily on gabbro or serpentine substrates…
***Quercus durata* Shrubland Alliance**

IF2.a. Chamise (*Adenostoma fasciculatum*) intermixes in the shrub canopy and is typically similar or lower in cover to leather oak. Whiteleaf manzanita (*Arctostaphylos viscida*) is usually present in the overstory and creeping sage (*Salvia sonomensis*) is usually present in the understory with native forbs and grasses…
***Quercus durata* - *Adenostoma fasciculatum* / *Salvia sonomensis* Shrubland Association (Provisional)**

IF2.b. Leather oak dominates the shrub canopy and intermixes with other shrubs such as holly-leaf redberry (*Rhamnus ilicifolia*), hoary coffeberry (*Rhamnus tomentella*), and whiteleaf manzanita (*Arctostaphylos viscida*). Foothill pine (*Pinus sabiniana*) or other trees may occur as scattered emergents. Perennial native grasses are typically present in the understory…
***Quercus durata* Shrubland Association (Provisional)**

IF.3. Interior live oak (*Quercus wislizeni*) is dominant or co-dominant in the shrub canopy…

IF3.a. Interior live oak (*Quercus wislizeni*) is dominant or co-dominant at >30% relative cover, with other species in the overstory. Scrub oak (*Quercus berberidifolia*) and canyon live oak (*Quercus chrysolepis*), if present, occur at low cover…
***Quercus wislizeni* Alliance**
(Also see Class A, Group IIA.2. for key to tree Associations)

Interior live oak occurs as the sole dominant shrub or may be associated with north-slope chaparral species such as ceanothus, California yerba santa (*Eriodictyon californicum*), or holly-leaf redberry (*Rhamnus ilicifolia*). Found primarily on volcanic soils in the northern portion of the study area…
***Quercus wislizeni* Mixed Shrub Association (Provisional)**

IF3.b. Interior live oak is characteristically present with >5% cover in the shrub and/or tree layer(s). Whiteleaf manzanita (*Arctostaphylos viscida*) is typically dominant to co-dominant with interior live oak. If chamise (*Adenostoma fasciculatum*) is present, it usually has lower relative cover than interior live oak…
***Arctostaphylos viscida* - *Quercus wislizeni* Shrubland Association of the *Arctostaphylos viscida* Alliance**

IF.4. Scrub oak (*Quercus berberidifolia*) is dominant or co-dominant with other shrubs in the canopy. This vegetation type is relatively localized in the northern portion of the study area…

***Quercus berberidifolia* Shrubland Alliance**

IF4.a. Wedgeleaf ceanothus (*Ceanothus cuneatus*) and scrub oak form an open to continuous shrub canopy with other chaparral shrubs such as birchleaf Mountain-mahogany (*Cercocarpus betuloides*), California yerba santa (*Eriodictyon californicum*), and manzanita (*Arctostaphylos*)…

***Quercus berberidifolia - Ceanothus cuneatus* Shrubland Association**

IF4.b. Foothill ash (*Fraxinus dipetala*), toyon (*Heteromeles arbutifolia*), and scrub oak form an intermittent to continuous shrub canopy on north-facing slopes…

***Quercus berberidifolia - Fraxinus dipetala - Heteromeles arbutifolia* Shrubland Association**

I.G. The overstory is dominated by wedgeleaf ceanothus (*Ceanothus cuneatus*) alone or in shared dominance with other chaparral species such as birchleaf Mountain-mahogany (*Cercocarpus betuloides*), Brewer oak (*Quercus berberidifolia*), and common manzanita (*Arctostaphylos manzanita*)…

***Ceanothus cuneatus* Shrubland Alliance**

IG.1. Wedgeleaf ceanothus forms an open to intermittent shrub canopy as the sole dominant shrub. Other chaparral shrubs such as California yerba santa (*Eriodictyon californicum*), toyon (*Heteromeles arbutifolia*), and holly-leaf redberry (*Rhamnus ilicifolia*) may occur occasionally with low cover. Native herbs that are characteristically present in the open to intermittent understory include dwarf plantain (*Plantago erecta*), and small fescue (*Vulpia microstachys*). Found primarily on serpentine substrate…

***Ceanothus cuneatus* /*Plantago erecta* Shrubland Association**

IG.2. Wedgeleaf ceanothus dominates an intermittent to continuous shrub canopy and intermixes with at least three other shrub species. California yerba santa (*Eriodictyon californicum*) is characteristically present, while California Redbud (*Cercis occidentalis*), flannelbush (*Fremontodendron californicum*), and poison oak (*Toxicodendron diversilobum*) are often present. The understory is comprised mostly of non-native grasses and forbs. Found on volcanic soils in the northern portion of the study area…

***Ceanothus cuneatus - Eriodictyon californicum* - (*Fremontodendron californicum*) Shrubland Association (Provisional)**

IG.3. Wedgeleaf ceanothus forms on open to continuous shrub canopy as the sole dominant shrub. Other chaparral shrubs such as California yerba santa (*Eriodictyon californicum*) and poison oak (*Toxicodendron diversilobum*) may occur occasionally with low cover. The understory is comprised mostly of non-native grasses and forbs. Found primarily on volcanic substrates…

***Ceanothus cuneatus* / Herbaceous Shrubland Association**

IG.4. Wedgeleaf ceanothus and chamise (*Adenostoma fasciculatum*) co-dominate in an intermittent to continuous shrub canopy with California yerba santa (*Eriodictyon californicum*), holly-leaf redberry (*Rhamnus ilicifolia*), and other chaparral species intermixing at low cover. The herb layer is sparse with silver European hairgrass (*Aira caryophyllea*) and other herbs comprising an open understory…

***Adenostoma fasciculatum - Ceanothus cuneatus* Shrubland Association**

IG.5. Birchleaf Mountain-mahogany and wedgeleaf ceanothus form an open to intermittent shrub canopy, where the two species may co-dominate, or either species may be dominant. Other shrub species including poison oak (*Toxicodendron diversilobum*) and chaparral honeysuckle (*Lonicera interrupta*) may intermix at low cover. Found primarily on volcanic soils in the northern portion of the study area…

***Cercocarpus betuloides - Ceanothus cuneatus* Shrubland Association of the *Cercocarpus betuloides* Shrubland Alliance**

I.H. Whiteleaf manzanita (*Arctostaphylos viscida*) intermixes with a variety of associated shrubs in the canopy…

***Arctostaphylos viscida* Shrubland Alliance**

IH.1. Creeping sage (*Salvia sonomensis*) and Brainerd's sedge (*Carex brainerdii*) are characteristically present with variable in cover in the understory. Chamise and interior live oak are typically absent, but may be present with sparse cover. This association is a regionally defined type that occurs on gabbro substrate in Yuba County…

***Arctostaphylos viscida* / *Salvia sonomensis* Shrubland Association (Provisional)**

IH.2. Whiteleaf manzanita forms an intermittent to continuous canopy as the sole dominant shrub. Chamise is typically absent. Other chaparral shrubs such as toyon (*Heteromeles arbutifolia*) and interior live oak may occur with <5% cover…

***Arctostaphylos viscida* Shrubland Association**

IH.3. Whiteleaf manzanita and chamise characterize an open to continuous shrub overstory while creeping sage (*Salvia sonomensis*) characterizes the understory. All three associated species have variable cover and may or may not be present. If interior live oak is present, it typically has lower relative cover than chamise. Found primarily on gabbro substrate from Butte county to southern portion of study area…

(*Arctostaphylos viscida* - *Adenostoma fasciculatum*) / *Salvia sonomensis* Shrubland Association

IH.4. Whiteleaf manzanita typically dominates or co-dominates in an open to continuous shrub canopy. Interior live oak (*Quercus wislizeni*) is frequently present with >5% cover, usually as a shrub, but sometimes as a tree. If chamise (*Adenostoma fasciculatum*) is present, it is generally sub-dominant to whiteleaf manzanita and interior live oak…

***Arctostaphylos viscida* - *Quercus wislizeni* Shrubland Association**

IH.5. Interior live oak (*Quercus wislizeni*) is the primary species in the overstory, usually occurring as a tree, but occasionally as a tall shrub with whiteleaf manzanita (*Arctostaphylos viscida*). Both species typically have at least 5% absolute cover. May include toyon (*Heteromeles arbutifolia*) and other shrubs. Typically of upper slopes and relatively exposed, upland settings…

***Quercus wislizeni* / *Arctostaphylos viscida* Woodland Association of the *Quercus wislizeni* Alliance**

IH.6. Whiteleaf manzanita is present as a co-dominant or sub-dominant shrub with chamise. Toyon (*Heteromeles arbutifolia*) is often present and may be similar in cover to the manzanita. Creeping sage (*Salvia sonomensis*) is absent. Found primarily on sedimentary, volcanic, and serpentine substrates (not found on gabbro substrate)…

***Adenostoma fasciculatum* - *Arctostaphylos viscida* Shrubland Association of the *Adenostoma fasciculatum* Alliance**

I.I. The overstory is dominated by chamise (*Adenostoma fasciculatum*) alone or in shared dominance with other chaparral species such as manzanita, wedgeleaf ceanothus (*Ceanothus cuneatus*), or California yerba santa (*Eriodictyon californicum*)…

***Adenostoma fasciculatum* Shrubland Alliance**

II.1. Common manzanita (*Arctostaphylos manzanita*) is characteristically present, having similar or lower cover to chamise. Toyon (*Heteromeles arbutifolia*) is often present, sometimes having higher cover than chamise. Whiteleaf manzanita (*Arctostaphylos viscida*) and wedgeleaf ceanothus are typically absent, but may occasionally have sparse cover…

***Adenostoma fasciculatum* - *Arctostaphylos manzanita* Shrubland Association (Provisional)**

II.2. Whiteleaf manzanita (*Arctostaphylos* viscida) is present as a co-dominant or sub-dominant shrub with chamise. Toyon (*Heteromeles arbutifolia*) is often present and may be similar in cover to the manzanita. Creeping sage (*Salvia sonomensis*) is absent. Found primarily on sedimentary, volcanic, and serpentine substrates (not found on gabbro substrate)…

***Adenostoma fasciculatum* - *Arctostaphylos viscida* Shrubland Association**

II.3. Chamise characterizes an open to continuous shrub overstory while creeping sage (*Salvia sonomensis*) characterizes the understory. Whiteleaf manzanita is typically present, but may

occasionally be absent. If interior live oak is present, it typically has lower relative cover than chamise. Found primarily on gabbro substrate from Butte county to southern portion of study area…

(*Arctostaphylos viscida* - *Adenostoma fasciculatum*) / *Salvia sonomensis* Shrubland Association of the *Arctostaphylos viscida* Alliance

II.4. Wedgeleaf ceanothus (*Ceanothus cuneatus*) and chamise (*Adenostoma fasciculatum*) co-dominate in the overstory with other chaparral shrubs occurring as sub-dominants…

***Ceanothus cuneatus* Shrubland Alliance**

Wedgeleaf ceanothus and chamise form an intermittent to continuous shrub canopy with California yerba santa (*Eriodictyon californicum*), holly-leaf redberry (*Rhamnus ilicifolia*), and other chaparral species intermixing at low cover. The herb layer is sparse with silver European hairgrass (*Aira caryophyllea*) and other herbs comprising an open understory…

***Ceanothus cuneatus* - *Adenostoma fasciculatum* Shrubland Association**

II.5. Chamise (*Adenostoma fasciculatum*) forms an open to continuous shrub canopy with California yerba santa (*Eriodictyon californicum*) and/or deer weed (*Lotus scoparius*). No other shrub species has significant cover in the overstory. The understory is comprised of non-native forbs and grasses…

***Adenostoma fasciculatum* - *Eriodictyon californicum* - *Lotus scoparius* Shrubland Association**

II.6. Chamise (*Adenostoma fasciculatum*) is strongly dominant in the shrub overstory with no other large shrub species having significant cover. The understory is open and comprised of a variety of non-native forbs and grasses. Found primarily on sedimentary and ultramafic substrates…

***Adenostoma fasciculatum* Shrubland Association**

II.7. Chamise (*Adenostoma fasciculatum*) is strongly dominant in the shrub overstory with no other large shrub species having significant cover. The understory is dense and comprised of a variety of forbs and grasses. Native forbs that are characteristically present include tomcat clover (*Trifolium willdenovii*), frosted Indian paintbrush (*Castilleja pruinosa*), and wild carrot (*Daucus pusillus*). Found primarily on volcanic substrates…

***Adenostoma fasciculatum* / Herbaceous Shrubland Association**

I.J. Toyon (*Heteromeles arbutifolia*) typically dominates the shrub canopy, though other shrubs may be present with low to moderate cover…

***Heteromeles arbutifolia* Shrubland Alliance**

Toyon forms an intermittent shrub canopy and often intermixes with other shrubs such as wedgeleaf ceanothus (*Ceanothus cuneatus*), poison oak (*Toxicodendron diversilobum*) and holly-leaf redberry (*Rhamnus ilicifolia*). Found primarily on serpentine substrate…

***Heteromeles arbutifolia* Serpentine Shrubland Association (Provisional)**

Group II. Shrublands dominated by scale-like or broad-leaved species. These are generally considered to be part of desert transition, riparian, or other more soft - leaved shrub habitats; including Coyote brush (*Baccharis pilularis*), California Juniper (*Juniperus californica*), poison oak (*Toxicodendron diversilobum*), willows (*Salix* spp.) as well as dogwood (*Cornus sericea*) and the introduced blackberry (*Rubus discolor*).

II.A. California Juniper (*Juniperus californica*) is the sole dominant shrub in the overstory. In the active growing season, a variety of herbs may be abundant in the understory…

***Juniperus californica* Shrubland Alliance**

California Juniper forms an open to intermittent canopy over annual grasses and forbs…

***Juniperus californica* / Herbaceous Shrubland Association**

II.B. Upland stands dominated by shrubs that have broad-leaved, deciduous leaves…

IIB.1. Red-osier dogwood (*Cornus sericea*) dominates the shrub overstory. Other shrubs such as California redbud (*Cercis occidentalis*) and poison oak (*Toxicodendron diversilobum*) may be sub-dominant in the understory…

***Cornus sericea* Shrubland Alliance**

IIB.2. Poison oak (*Toxicodendron diversilobum*) dominates the shrub overstory. Other shrubs such as holly-leaf redberry (*Rhamnus ilicifolia*), wedgeleaf ceanothus (*Ceanothus cuneatus*), and blue elderberry (*Sambucus mexicana*) may intermix at low cover…

***Toxicodendron diversilobum* Shrubland Alliance**

IIB2.a. Poison oak (*Toxicodendron diversilobum*) forms an open to continuous shrub canopy over annual grasses and forbs…

***Toxicodendron diversilobum* / Herbaceous Shrubland Association**

IIB.3. Deerbrush (*Ceanothus integerrimus*) dominates or co-dominates with other chaparral shrubs in the canopy…

***Ceanothus integerrimus* Shrubland Alliance**

IIB3.i. Deerbrush dominates and forms an intermittent shrub canopy with other shrub species such as toyon (*Heteromeles arbutifolia*), hoary coffeeberry (*Rhamnus tomentella*), California yerba santa (*Eriodictyon californicum*), and manzanita (*Arctostaphylos*)…

***Ceanothus integerrimus* Shrubland Association**

IIB3.ii. Deerbrush forms an intermittent to continuous shrub canopy with Brewer oak (*Quercus garryana* var. *breweri*) and woodbalm (*Lepechinia calycina*) on volcanic bedrock…

***Ceanothus integerrimus - Quercus garryana* var. *breweri* Shrubland Association**

IIB.4. California brickellbush (*Brickellia californica*) dominates an open shrub canopy with low cover. Typically found on gravel bars adjacent to riparian corridors. Riparian trees and/or shrubs may dominate adjacent vegetation and have low cover in these stands. See Table 3 for an example of a survey that was placed into this unclassified type…

***Brickellia californica* Unclassified Stand (No description provided)**

IIB.5. Coyote brush (*Baccharis pilularis*) dominates the shrub overstory in disturbed areas that may have been cleared or burned. Emergent trees, additional shrub species, and a variety of forbs and grasses often intermix with low cover. See Table 3, which provides some detail of surveys that were placed into this unclassified type…

***Baccharis pilularis* Unclassified Stand (No description provided)**

II.C. Stands dominated by one or more riparian and/or wetland species, including Himalaya blackberry (*Rubus discolor*), Button-willow, (*Cephalanthus occidentalis*), tamarisk (*Tamarix*), or willow (*Salix*)…

IIC.1. Himilaya blackberry is the sole dominant in the shrub overstory. Stands may occur adjacent to riparian tree or wetland herbaceous types…

***Rubus discolor* Herbaceous Semi-Natural Stands**

Himalaya blackberry forms an open to continuous shrub canopy. Other shrubs such as California wild grape (*Vitis californica*), coyote brush (*Baccharis pilularis*), and hoary coffeeberry (*Rhamnus tomentella*) may occur at low cover…

***Rubus discolor* Shrubland Association**

IIC.2. Button-willow (*Cephalanthus occidentalis*) forms an open to intermittent shrub canopy along exposed, sandy/cobbly streambeds…

***Cephalanthus occidentalis* Shrubland Alliance**

Oregon ash (*Fraxinus latifolia*) or red willow (*Salix laevigata*) may intermix in the overstory. A variety of riparian/wetland shrubs and herbs occur in the understory…

***Cephalanthus occidentalis* Shrubland Association**

IIC.3. Tamarisk (*Tamarix*) dominates in the shrub canopy. Other trees or shrubs may be present at low cover, including oaks (*Quercus* spp.), willows (*Salix* spp.) and blackberries (*Rubus* spp.)…

***Tamarix* sp. Herbaceous Semi-Natural Stands**
(No Associations defined)

IIC.4. California brickellbush (*Brickellia californica*) dominates an open shrub canopy with low cover. Typically found on gravel bars adjacent to riparian corridors. Riparian trees and/or shrubs may dominate adjacent vegetation and have low cover in these stands. See Table 3 for an example survey that was placed into this unclassified type…

***Brickellia californica* Unclassified Stand**
(No description provided)

IIC.5. One or more willow species (*Salix spp*.) dominate the shrub layer, generally considered to be 5 m or less in height. (Note: some shrub willows may be tall enough to be identified as trees in the Foothills and thus, are also included in the tree-overstory section of this key)…

IIC5.a. Arroyo willow (*Salix lasiolepis*) is dominant as a shrub or low tree, with at least 10% absolute cover (and >60% relative cover)…

***Salix lasiolepis* Shrubland Alliance**

Arroyo willow (*Salix lasiolepis*) is dominant in the canopy. Himalaya blackberry (*Rubus discolor*), is characteristic in the understory with a variety of wetland shrubs and herbs. California rose and other willow species may be present at low cover…

***Salix lasiolepis* / *Rubus* spp. Shrubland Association**

IIC5.b. Narrow-leaf willow (*Salix exigua*) is characteristically present as a dominant or co-dominant shrub. It forms an open to continuous canopy along riparian corridors. Other willow species may be present as sub-dominants with low cover…

***Salix exigua* Shrubland Alliance**

IIC5b.i. Narrow-leaf willow (*Salix exigua*) and California brickellbush (*Brickellia californica*) form an open shrub canopy along exposed, sandy/cobbly river terraces…

***Salix exigua - Brickellia californica* Shrubland Association (Provisional)**

IIC5b.ii. Narrow-leaf willow (*Salix exigua*) is the sole dominant and forms an intermittent to continuous shrub canopy over a variety of wetland shrubs and herbs such as Himalaya blackberry (*Rubus discolor*) and mugwort (*Artemisia douglasiana*)…

***Salix exigua* Shrubland Association**

IIC5.c. Red willow (*Salix laevigata*) is the sole dominant in the overstory layer with at least 10% cover. Arroyo willow (*Salix lasiolepis*) may occur as a sub- or co-dominant in the shrub or low tree layer…

***Salix laevigata* Woodland/Forest Alliance**

IIC5c.i. Arroyo willow has at least 10% cover in the shrub layer, while Himilaya blackberry (*Rubus discolor*) and mugwort (*Artemisia douglasiana*) are usually present in the understory with a variety of other herbs and shrubs, including cattail (*Typha*)…

***Salix laevigata - Salix lasiolepis* Woodland Association**

IIC5c.ii. Red willow is dominant in the overstory with an absence or relative low cover of arroyo willow. Himalaya blackberry (*Rubus discolor*) is often present with variable cover in the understory…

***Salix laevigata* Woodland Association**

Class C. Herbaceous Vegetation

Group I. Stands found in wetland settings (water or wet ground present throughout the growing season). Includes >30% absolute cover of true wetland herbs (such as emergent wetland graminoid genera *Typha*, *Carex*, *Eleocharis*, *Juncus*, or *Schoenoplectus* (=*Scirpus*)) or grasses *Phalaris aquatica* or *Muhlenbergia rigens*. *Note:* some stands may occur in ephemeral wetlands and can also be keyed in the ephemeral wetland category (Group II)…

I.A. A species of *Typha* is dominant in the herbaceous layer…

***Typha* (*angustifolia*, *domingensis*, *latifolia*) Herbaceous Alliance**

Typha latifolia is dominant and intermixes with a variety of subdominant wetland herbs such as *Juncus effusus*, *Mimulus guttatus*, *Carex* spp. *Epilobium* spp., and others…

***Typha latifolia* Herbaceous Association**

I.B. *Schoenoplectus* (=*Scirpus*) *acutus* has the highest absolute cover and typically dominates the herbaceous layer. *Typha latifolia* may intermix as a sub- to co-dominant…

***Schoenoplectus* (=*Scirpus*) *acutus* Herbaceous Alliance**

IB.1. *Schoenoplectus* (=*Scirpus*) *acutus* is strongly dominant in the herbaceous layer. A variety of taxa such as *Juncus* spp., *Rumex* spp., and *Typha* spp. may intermix with sparse cover….

***Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis* Herbaceous Association**

IB.2. *Schoenoplectus* (=*Scirpus*) *acutus* is co-dominant to dominant with *Typha domingensis*, which typically has >5% absolute cover. Other wetland taxa such as *Eleocharis* spp. and *Juncus* intermix with low to moderate cover…

***Schoenoplectus* (=*Scirpus*) *acutus* - *Typha domingensis* Herbaceous Association**

I.C. Spikerushes (*Eleocharis* spp.) dominate the herb layer…

IC.1. *Eleocharis acicularis* is constant and usually co-dominant to dominant with other wetland herbaceous species. Stands may appear in flashy vernal pools or swales….

***Eleocharis acicularis* Herbaceous Alliance (Provisional)**

Eryngium castrense occurs at low cover with *Eleocharis acicularis*. Other herbs such as *Rorippa nasturtium-aquaticum*, *Mimulus guttatus*, *Lolium multiflorum*, *Paspalum dilatatum*, *Epilobium pallidum*, and others are often present. Found in the northern portion of the study area on volcanic soils…

***Eleocharis acicularis* - *Eryngium castrense* Herbaceous Association (Provisional)**

IC.2. *Eleocharis macrostachya* has at least 2% cover, and is often dominant. Stands are usually found in wetland ponds for much of the spring season. Stands may contain a high combined cover of other species including *Lolium multiflorum*. In vernal pools and swales, stands may contain *Eryngium castrense*, but do not include other typical vernal pool species such as *Lasthenia fremontii* and *Downingia* spp.…

***Eleocharis macrostachya* Herbaceous Alliance**

IC2.a. *Pleuropogon californicus*, *Glyceria declinata*, or *G. occidentalis* are present with *Eleocharis macrostachya* in wetlands (draws and basins inundated during springtime). Stands usually support a high cover of disturbance-related, non-native wetland species such as *Ranunculus muricatus*, *Rorippa nasturtium-aquaticum*, *Hordeum murinum*, or *Rumex* spp. Note: there is some question about the identification of the grass *Glyceria declinata* in some of these stands. It is very similar in habit and ecology to the native *Pleuropogon californicus*, also found in the northern Sierra Foothills. Thus, some of these stands may have species misidentification …

***Eleocharis macrostachya* - (*Pleuropogon californicus*) Herbaceous Association (Provisional)**

IC2.b. *Eleocharis macrostachya* is dominant to co-dominant with a variety of native and non-native wetland species such as *Lolium multiflorum*, *Lythrum hyssopifolia*, and *Mimulus guttatus*. Stands are inundated until late spring…

***Eleocharis macrostachya* Herbaceous Association**

IC2.c. *Eleocharis macrostachya* is dominant and co-occurs with *Marsilea vestita*. *Eleocharis acicularis* is often present with other shallow-water ephemerals. Stands are usually in creek beds, vernal pools, and swales…

***Eleocharis macrostachya - Marsilea vestita* Herbaceous Association (Provisional)**

IC.3. Other spikerush species (*Eleocharis parishii* or *E*. *thermalis*) are characteristic and co-dominant to dominant in the herbaceous layer…

IC3.a. *Eleocharis parishii* dominates the herbaceous layer. Other taxa may include *Muhlenbergia rigens*, *Briza minor*, *Carex praegracilis*, and *Juncus* spp. See Table 3 for an example survey that was placed into this unclassified type…

***Eleocharis parishii* Unclassified Stand**
(No description provided)

IC3.b. *Eleocharis thermalis* is characteristic with moderate to high relative cover in the herbaceous layer. Other taxa may include *Cynodon dactylon*, *Eleocharis thermalis*, and *Navarretia intertexta*. See Table 3 for an example survey that was placed into this unclassified type…

***Eleocharis thermalis* Unclassified Stand**
(No description provided)

I.D. Rushes (*Juncus* spp.) dominate the herb layer…

ID.1. *Juncus effusus* dominates a continuous herbaceous layer and intermixes with other wetland herbs…

***Juncus effusus* Herbaceous Alliance**

Epilobium ciliatum and a variety of other herbs occur as sub-dominants to *Juncus effusus*. *Rubus discolor* and other woody plants may have sparse cover as emergent trees or shrubs…

***Juncus effusus* Herbaceous Association**

ID.2. *Juncus balticus* and/or *J. mexicanus* are dominant or co-dominant with a variety of other wetland species. In some cases, *Carex praegracilis* may be dominant, but either *J. balticus* and/or *J. mexicanus* are present and usually have >5% cover…

***Juncus* (*balticus*, *mexicanus*) Herbaceous Alliance**

ID2.a. *Juncus balticus* is typically co-dominant to dominant with other wetland species, such as species of *Geranium*, *Mimulus*, *Rumex*, and *Epilobium*…

***Juncus balticus* Herbaceous Association**

ID2.b. *Juncus mexicanus* dominates and occurs with a variety of other wetland species…

***Juncus mexicanus* Herbaceous Association**
(No description provided)

ID2.c. *Carex praegracilis* is co-dominant to dominant with *Juncus balticus* and/or *Juncus mexicanus* in seepy swales or other moist places, often surrounded by open grasslands…

***Juncus balticus - Carex praegracilis* Herbaceous Association (Provisional)**

ID.3. *Juncus dubius* dominates and occurs with a variety of wetland grasses and forbs. See Table 3 for an example survey that was placed into this unclassified type…

***Juncus dubius* Unclassified Stand**
(No description provided)

ID.4. *Juncus oxymeris* or *Juncus xiphioides* is dominant in the herbaceous layer. Stands are in wet to moist seeps and on riparian margins, sometimes in ultramafic soils. Some stands are ecologically related to the *Hordeum brachyantherum* Alliance…

***Juncus* (*oxymeris*, *xiphioides*) Herbaceous Alliance**

ID4.a. *Juncus oxymeris* dominates a moderate to dense herbaceous layer. *Lotus purshianus* is characteristically present…

***Juncus oxymeris* Herbaceous Association (Provisional)**

ID4.b. *Juncus xiphioides* dominates the herbaceous layer and occurs with a variety of obligate wetland species…

***Juncus xiphioides* Herbaceous Association (Provisional)**

I.E. Sedges (*Carex* spp.) dominate the herbaceous layer…

IE.1. *Carex barbarae*, a species often associated with stream terraces, is the dominant species in the herbaceous layer…

***Carex barbarae* Herbaceous Alliance**

Carex barbarae intermixes with various native and non-native forbs and grasses. *Rubus discolor* and other woody plants may have sparse cover as emergent trees or shrubs…

***Carex barbarae* Herbaceous Association (Provisional)**

IE.2. *Carex nudata*, a species often associated with bouldery stream channels, is the dominant species in the herbaceous layer…

***Carex nudata* Herbaceous Alliance**

Carex nudata intermixes with various native and non-native taxa, including species of *Juncus*, *Rumex*, *Mimulus*, *Epilobium* and other *Carex…*

***Carex nudata* Herbaceous Association**

IE.3. *Carex serratodens* dominates the herbaceous layer and occurs with *Juncus* (rushes) and other wetland species…

***Carex serratodens* Herbaceous Alliance (Provisional)**

IE3.a. *Hordeum brachyantherum*, *Juncus* spp., *Mimulus guttatus*, and other wetland species occur with low cover and *Carex serratodens* is dominant in the herbaceous layer. Often found in serpentine seeps in the study area …

***Carex serratodens* Herbaceous Association**

I.F. Perennial grasses *Muhlenbergia rigens* or *Phalaris aquatica* dominate or are characteristic in the herbaceous layer; usually of moist meadow or riparian margins. Other wetland graminoids (*Juncus* sp., *Carex* sp.) may be present…

IF.I. *Muhlenbergia rigens* is constant and typically dominant with greater than 10% absolute cover. Non-native forbs or grasses may occasionally intermix with relatively high cover, but *Muhlenbergia rigens* dominates the native component of the herbaceous layer…

***Muhlenbergia rigens* Herbaceous Alliance**

Other species such as *Bromus hordeaceus*, *Trifolium hirtum*, or *Lolium multiflorum* may be present. Usually found along edges of streams, or on swales surrounded by grasslands or oak woodlands…

***Muhlenbergia rigens* Herbaceous Association**

IF.2. The stout non-native perennial *Phalaris aquatica* dominates a moderate to continuous herbaceous layer in upland or moist environmental settings. Most stands originated by intentional seeding for livestock forage…

***Phalaris aquatica* Herbaceous Semi-Natural Stands**

Phalaris aquatica dominates with moderate cover and *Centaurea solstitialis* is characteristically present as a sub-dominant. Occurs in both upland and wetland stands with a variety of non-native forbs and grasses…

***Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis* Herbaceous Association**

I.G. *Lotus purshianus* and *Hordeum brachyantherum* co-occur in wetland stands that do not key to the above types in this group (Group I). See Table 3, which provides some detail on surveys that were placed into this unclassified type…

***Lotus purshianus* OR *Hordeum brachyantherum* Unclassified Stand**
(No description provided)

I.H. *Stachys stricta* is conspicuous with other species in wetland stands that do not key to the above types in this group (Group I). See Table 3, which provides some detail on surveys that were placed into this unclassified type…

***Stachys stricta* Unclassified Stand**
(No description provided)

I.I. Vegetation consists of wetland herbaceous stands that do not key to the above types in this group (Group I). See Table 3, which provides some detail on surveys that were placed into this artificial group…

Wetland Herbaceous Unclassified Stand
(No description provided)

Group II. Vegetation is dominated by herbaceous species of seasonally moist to dry areas (but not usually wet conditions throughout the growing season). This includes upland grasslands, mesa tops, or vernally wet to moist habitats, including swales and vernal pools. Species include native and non-native grasses, forbs, and cryptogammic species. Stand identification is contingent upon appropriate phenology. Stands should be identified in early to mid spring and will be more difficult to identify in late spring and into summer in most years…

II.A. Stands are in relatively moist areas (at least in modal springtime conditions from mid-March through April) that are associated with flat to gradually sloping terrain. Landforms may include vernal pools or shallow ponds, lake margins, swales, and vernal seeps on slopes…

IIA.1. Stands are on moist edges of vernal pools, swales, and seeps, and are usually not inundated for multiple days during the pool or swale wetting phases, although they may have sheet flow across slopes. Stands include significant cover of native annual forbs and grasses, but may be dominated in cover by non-native annual grasses and forbs. Seasonality is extremely important when assessing these stands, since dominance shifts rapidly from early spring dominants (*Blennosperma*, *Limnanthes*) to mid and late season dominants (*Deschampsia danthonioides*, *Achyrachaena mollis*, *Layia fremontii*, *Trifolium variegatum*, *Leontodon taraxacoides*)…

IIA1.a. *Trifolium variegatum* is characteristic of stands in the early- to mid-spring, growing in swales, seeps, and moist grassy areas. Often found with the following non-native species: *Vulpia bromoides*, *Hypochaeris glabra*, *Leontodon taraxacoides*, and *Lolium multiflorum…*

***Trifolium variegatum* Herbaceous Alliance**

IIA1a.i. *Trifolium variegatum* is typically dominant or co-dominant with natives such as *Mimulus guttatus* or other herbs of vernally moist settings. If present, *Vulpia bromoides*, *Hypochaeris glabra*, and/or *Leontodon taraxacoides* each have less than 5% absolute cover…

***Trifolium variegatum* Herbaceous Association**

IIA1a.ii. *Trifolium variegatum*, *Leontodon taraxacoides* and/or *Lolium multiflorum* collectively have significant cover in the herbaceous layer, while *Juncus bufonius* and *Trifolium dubium* are characteristically present. *Vulpia bromoides* and *Hypochaeris glabra* are often absent or insignificant…

***Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides* Herbaceous Association**

IIA1a.iii. *Trifolium variegatum*, *Vulpia bromoides*, *Hypochaeris glabra*, and *Leontodon taraxacoides* collectively characterize the herbaceous layer, though occasionally 1-2 of these species may not be evident. A number of grass and broad-leaf annuals intermix. Found on relatively clay rich sites…

IIA1aiii.1. *Hypochaeris glabra* is usually co-dominant to dominant in the herbaceous layer. If present, *Trifolium variegatum* and *Juncus bufonius* each tend to have <2% cover. Often found in late season or degraded settings…

(*Trifolium variegatum* - *Vulpia bromoides*) - *Hypochaeris glabra* - *Leontodon taraxacoides* Herbaceous Association

IIA1aiii.2. *Trifolium variegatum* and *Juncus bufonius* characterize stands, frequently with more than 5% combined cover. Stands are found primarily in early season or moist (but not wet) settings, when *Hypochaeris glabra* and *Leontodon taraxacoides* are less significant than in previous association…

***Trifolium variegatum* - *Vulpia bromoides* (*Hypochaeris glabra* - *Leontodon taraxacoides*) Herbaceous Association**

IIA1.b. *Layia fremontii* is an indicator (may be dominant to sub-dominant), forming early spring displays along edges of vernal pools, and in vernally moist flats and swales. It often occurs with *Triphysaria eriantha* subsp. *eriantha*, *Navarretia tagetina*, and *Lasthenia californica*. This is a transitional alliance, occurring between upland and vernal pool settings (see IIA.2. group). *Cicendia quadrangularis*, *Plantago erecta*, and other more upland species, usually occur with low cover and combine with vernally moist site indicators such as *Plagiobothrys austiniae*, *Navarretia tagetina*, and *Deschampsia danthonioides*. Non-native species such as *Hypochaeris glabra*, *Bromus hordeaceus*, and *Taeniatherum caput-medusae* may be present with as much cover as the native species, especially later in the season…

***Layia fremontii* Herbaceous Alliance**

IIA1b.i. *Leontodon taraxacoides* and *Plagiobothrys greenei* are constant, with *L. taraxacoides* usually having high relative cover and *P. greenei* having sparse cover. *Layia fremontii* is frequently present with other natives such as *Triphysaria eriantha*, *Juncus bufonius*, *Navarretia tagetina*, *Cicendia quadrangularis*, and *Linanthus bicolor*. Non-native herbs intermix with variable cover. Well-sampled in Deer Creek Hills, but not sampled elsewhere…

***Layia fremontii* - *Leontodon taraxacoides* - *Plagiobothrys greenei* Herbaceous Association**

IIA1b.ii. *Plagiobothrys austiniae* and *Achyrachaena mollis* are often present as sub-dominant herbs on volcanic basalt flows, volcanic mudflows in vernal pools, or moist swales in the northern Foothills study area. *Layia fremontii*, *Pogogyne zizyphoroides Triphysaria eriantha*, *Bromus hordeaceus*, *Hypochaeris glabra*, *Taeniatherum caput-medusae*, and *Cicendia quadrangularis* are characteristic with variable cover. May include Butte County meadowfoam (*Limnanthes floccosa*). Compare with following related association…

***Plagiobothrys austiniae* - *Achyrachaena mollis* Herbaceous Association**

IIA1b.iii. *Plagiobothrys austiniae* is typically absent, while *Layia fremontii*, *Lasthenia californica*, and *Triphysaria eriantha* are characteristic with variable cover. *Achyrachaena mollis* is often present with other herbs such as *Bromus hordeaceus* and *Aira caryophyllea*. Usually found on swale edges, vernal pools, or broad vernally wet flats in open grasslands on volcanic soils in the northern Foothills study area. Generally differentiated from previous association by occupying less mesic sites and having lower frequency of *Plantago erecta* and *Vulpia microstachys*. A broadly defined association with multiple phases…

***Layia fremontii* - *Lasthenia californica* - *Achyrachaena mollis* Herbaceous Association**

Note: This is related to the *Vulpia microstachys* - *Lasthenia californica* - *Agrostis elliottiana* and *V. microstachys* - *L. californica* - *Parvisedum pumilum* Associations (see IIB2a.iv. and IIB2a.v.)

IIA1.c. Native *Zigadenus fremontii* is present with characteristic non-natives *Lolium multiflorum* and *Taeniatherum caput-medusae*. Clearly related to *Layia fremontii* Alliance, but *Layia fremontii* is absent or present with trace cover. Also related to the *Lolium multiflorum* Alliance, but this type has more cover and characteristic presence of native species…

***Lolium multiflorum* - (*Zigadenus fremontii*) Herbaceous Alliance (Provisional)**

Zigadenus fremontii is constant and often intermixes with natives *Triphysaria eriantha* subsp. *eriantha*, *Achyrachaena mollis*, *Fritillaria pluriflora* and non-natives *Lolium multiflorum*, *Taeniatherum caput-medusae*, *Hypochaeris glabra*, *Geranium dissectum*, *Erodium botrys*, and *Medicago polymorpha*. Found on vernally wet or saturated clay soils…

***Zigadenus fremontii* Herbaceous Association (Provisional)**

IIA.2. Vegetation is characterized by herbs of ephemeral wetlands with very gradual or no significant slope in swales and vernal pools. All have standing water during the winter and early spring, which may fill and evaporate multiple times during a normal rainy season ("flashy" hydrology). *Deschampsia danthonioides*, *Plagiobothrys stipitatus*, *Lasthenia fremontii*, *Downingia bicornuta*, *D. cuspidata*, or *D. ornatissima*, and/or *Eryngium castrense* may be characteristic. *Layia fremontii*, *Trifolium variegatum*, and other species of moist stands described above typically absent or not in high cover. Deeper pools with longer inundation periods and *Eleocharis* spp. diagnostically present may also be keyed here...

Northern Hardpan, Northern Mudflow, and Northern Basalt Flow Vernal Pool Habitats

IIA2.a. *Lasthenia fremontii*, *Downingia* spp., *Navarretia leucocephala*, and/or *Eryngium* (*castrense*, *vaseyi*) are present and *Deschampsia danthonioides* is characteristic. Upland species such as *Holocarpha virgata*, *Trifolium variegatum*, *Trifolium depauperatum*, *Hypochaeris glabra*, *Erodium botrys*, *Bromus hordeaceus*, and *Vulpia bromoides* are typically absent. Found in shallow pools and broad pool margins throughout the region…

***Lasthenia fremontii* - *Downingia* (*bicornuta*) Herbaceous Alliance**

IIA2a.i. *Downingia bicornuta* and *Lasthenia fremontii* are conspicuous in the herb layer, while *Ranunculus bonariensis* var. *trisepalus*, *Gratiola ebracteata*, and *Castilleja campestris* subsp. *campestris* are present in part or collectively. Found in hardpan pools on low terrace, high terrace, and (occasionally) on volcanic landforms…

***Downingia bicornuta* - *Lasthenia fremontii* Herbaceous Association**

IIA2a.ii. *Downingia ornatissima* is constant with characteristic herbs *Alopecurus saccatus*, *Deschampsia danthonioides*, and *Plagiobothrys stipitatus*. Other species that are often present include natives *Lasthenia fremontii*, *Navarretia leucocephala*, *Eryngium castrense*, and *Blennosperma nanum*. Found in northeastern and northwestern Sacramento Valley regions on northern hardpan and volcanic mudflow vernal pools…

***Downingia ornatissima* - *Lasthenia fremontii* Herbaceous Association**

IIA2a.iii. *Downingia cuspidata* and/or *Downingia bicornuta* are present with characteristic species *Psilocarphus brevissimus*, *Deschampsia danthonioides*, and *Eryngium castrense*. *Gratiola ebracteata* and *Lasthenia fremontii* are either absent or insignificant. Found in the northeastern Sacramento Valley region in volcanic vernal pools including high terrace and mudflows…

***Downingia* (*cuspidata*, *bicornuta*) Herbaceous Association**

IIA2a.iv. *Downingia ornatissima*, *Downingia cuspidata*, *Downingia bicornuta*, and *Lasthenia fremontii* are absent or insignificant in the herbaceous layer. *Eryngium vaseyi* or *E. castrense* is constant and conspicuous with other vernal pool taxa such as *Plagiobothrys stipitatus* and *Isoetes* spp. Usually found in vernal pools with deeper or longer inundation, hardpan pools, and volcanic mudflows in the northeastern and northwestern Sacramento Valley regions…

***Eryngium* (*vaseyi*, *castrense*) Herbaceous Association**

IIA2a.v. *Lasthenia fremontii* is constant and conspicuous while species of *Downingia* are absent or insignificant. *Lolium multiflorum*, *Deschampsia danthanioides*, *Alopecurus saccatus*, *Achyrachaena mollis*, and *Navarretia* spp. are characteristic*…*

***Lasthenia fremontii* Herbaceous Association (Provisional)**

IIA2.b. Vegetation consists of vernally wet herbaceous stands that are not sampled at peak phenology, or do not key to the above types in this group (IIA.2). See Table 3, which provides some detail on surveys that were placed into this artificial group…

Vernally Wet Herbaceous Unclassified Stand (No description provided)

IIA2.c. Spikerushes (*Eleocharis* spp.) dominate the herb layer…

IIA2c.i. *Eleocharis acicularis* is constant and usually co-dominant to dominant with other wetland herbaceous species. Stands may appear in flashy vernal pools or swales….

***Eleocharis acicularis* Herbaceous Alliance (Provisional)**

Eryngium castrense occurs at low cover with *Eleocharis acicularis*. Other herbs such as *Rorippa nasturtium-aquaticum*, *Mimulus guttatus*, *Lolium multiflorum*, *Paspalum dilatatum*, *Epilobium pallidum*, and others are often present. Found in the northern portion of the study area on volcanic soils…

***Eleocharis acicularis - Eryngium castrense* Herbaceous Association (Provisional)**

IIA2c.ii. *Eleocharis macrostachya* has at least 2% cover, and is often dominant. Stands are usually found in wetland ponds for much of the spring season. Stands may contain a high combined cover of other species including *Lolium multiflorum*. In vernal pools and swales, stands may contain *Eryngium castrense*, but do not include other typical vernal pool species such as *Lasthenia fremontii* and *Downingia* spp…

***Eleocharis macrostachya* Herbaceous Alliance**

IIA2cii.a. *Pleuropogon californicus*, *Glyceria declinata*, or *G*. *occidentalis* are present with *Eleocharis macrostachya* in wetlands (draws and basins inundated during springtime). Stands usually support a high cover of disturbance-related, non-native wetland species such as *Ranunculus muricatus*, *Rorippa nasturtium-aquaticum*, *Hordeum murinum*, or *Rumex* spp. Note: there is some question about the identification of the grass *Glyceria declinata* in some of these stands. It is very similar in habit and ecology to the native *Pleuropogon californicus*, also found in the northern Sierra Foothills. Thus, some of these stands may be misidentified…

***Eleocharis macrostachya* - (*Pleuropogon californicus*) Herbaceous Association (Provisional)**

IIA2cii.b. *Eleocharis macrostachya* is dominant to co-dominant with a variety of native and non-native wetland species such as *Lolium multiflorum*, *Lythrum hyssopifolia*, and *Mimulus guttatus*. Stands are inundated until late spring…

***Eleocharis macrostachya* Herbaceous Association**

IIA2cii.c. *Eleocharis macrostachya* is dominant and co-occurs with *Marsilea vestita*. *Eleocharis acicularis* is often present with other shallow-water ephemerals. Stands are usually in creek beds, vernal pools, and swales…

***Eleocharis macrostachya - Marsilea vestita* Herbaceous Association (Provisional)**

IIA2c.iii. Other spikerush species (*Eleocharis parishii* or *E*. *thermalis*) are characteristic and co-dominant to dominant in the herbaceous layer…

IIA2ciii.a. *Eleocharis parishii* dominates the herbaceous layer. Other taxa may include *Muhlenbergia rigens*, *Briza minor*, *Carex praegracilis*, and *Juncus* spp. See Table 3 for an example survey that was placed into this unclassified type…

***Eleocharis parishii* Unclassified Stand (No description provided)**

IIA2ciii.b. *Eleocharis thermalis* is characteristic with moderate to high relative cover in the herbaceous layer. Other taxa may include *Cynodon dactylon*, *Eleocharis thermalis*, and *Navarretia intertexta*. See Table 3 for an example survey that was placed into this unclassified type…

***Eleocharis thermalis* Unclassified Stand**
(No description provided)

II.B. Stands occur in upland areas usually drying quickly by mid to late spring; not on flats or swales. *Trifolium variegatum* and *Layia fremontii* are not typically conspicuous. Stands may be dominated or characterized by native or non-native annual or perennial grasses or forbs. Settings include steep rocky slopes, rock outcrops, or moderately sloping uplands…

IIB.1. *Mimulus guttatus* is dominant and/or present with *Vulpia microstachys* and a variety of other native herbs. *Eleocharis acicularis* is typically absent. Usually occurs in seeps on serpentine or other rocky slopes…

***Mimulus guttatus* Herbaceous Alliance (Provisional)**

IIB.1.a. *Mimulus guttatus* and *Vulpia microstachys* are constant with characteristic species *Lotus purshianus* and *Pentagramma triangularis*. Found on rocky vernally wet serpentine substrates…
***Mimulus guttatus* - *Vulpia microstachys* Serpentine Herbaceous Association (Provisional)**

IIB.2. A combination of one to all three of the native annual species *Vulpia microstachys*, *Plantago erecta* and *Lasthenia californica* are characteristically present in stands with high native species composition. Usually, native species have >50% relative cover in the herbaceous layer. *Lasthenia californica* usually expresses dominance in the early spring, while *Vulpia microstachys* develops later. *Plantago erecta* typically has intermediate phenology…
***Vulpia microstachys* - *Lasthenia californica* - *Plantago erecta* Herbaceous Alliance**

IIB2.a. Stands are without a significant cover of *Selaginella hansenii*…

IIB2a.i. *Mimulus guttatus* and *Vulpia microstachys* are constant with characteristic species *Lotus purshianus* and *Pentagramma triangularis*. Found on rocky vernally wet serpentine substrates…
***Mimulus guttatus* - *Vulpia microstachys* Serpentine Herbaceous Association (Provisional) of the *Mimulus guttatus* Herbaceous Alliance (Provisional)**

IIB2a.ii. *Vulpia microstachys* is constant with low cover while *Elymus elymoides* and/or *Achnatherum lemmonii* are present. Shrub species *Ceanothus cuneatus* and *Eriodictyon* are frequently present with sparse cover. Found on Lassen National Forest Tuscan flows…
***Vulpia microstachys* - *Elymus elymoides* - *Achnatherum lemmonii* Herbaceous Association (Provisional)**

IIB2a.iii. *Vulpia microstachys* and/or *Plantago erecta* are typically present on ultramafic (including gabbro and serpentine) or volcanic substrates, with other native species such as *Calycadenia truncata*, *Calycadenia multiglandulosa* (or *C. oppositifolia*), *Castilleja lacera*, *Castilleja tenuis*, and *Trifolium wildenovii*…
***Vulpia microstachys* - *Plantago erecta* - *Calycadenia* (*truncata*, *multiglandulosa*) Herbaceous Association**

IIB2a.iv. *Vulpia microstachys*, *Lasthenia californica*, and/or *Plantago erecta* occur with characteristic species such as *Bromus hordeaceus*, *Juncus bufonius*, *Chlorogalum angustifolium*, and *Briza minor*. *Agrostis elliottiana* and other species of weathered volcanic clay soils (e.g., *Cicendia quadrangularis* and *Navarretia tagetina*) are often present. Found mostly on volcanic flow substrate in Shasta County…
***Vulpia microstachys* - *Lasthenia californica* - *Agrostis elliottiana* Herbaceous Association (Provisional)**
Note: This is related to the *Layia fremontii* - *Lasthenia californica* - *Achyrachaena mollis* Association (see IIA1b.iii.)

IIB2a.v. *Vulpia microstachys*, *Lasthenia californica*, and *Plantago erecta* occur with characteristic species *Parvisedum pumilum*, *Triphysaria eriantha*, *Hypochaeris glabra*, and *Lepidium nitidum*. Found on skeletal soils of rocky volcanic tablelands and ridge-top mudflows…

Vulpia microstachys - Lasthenia californica - Parvisedum pumilum **Herbaceous Association**

Note: This is related to the *Layia fremontii - Lasthenia californica - Achyrachaena mollis* Association (see IIA1b.iii.)

IIB2a.vi. *Vulpia microstachys* and/or *Plantago erecta* occur with characteristic species *Navarretia tagetina*, *Bromus hordeaceus*, and *Hemizonia fitchii*. *Agrostis elliottiana*, *Elymus elymoides*, and *Calycadenia* spp. are typically absent…

Vulpia microstachys - Navarretia tagetina **Herbaceous Association**

IIB2.b. *Selaginella hansenii*, *Lupinus spectabilis*, and/or *Lupinus nanus* are conspicuously present while *Vulpia microstachys* is characteristic. Generally restricted to rocky substrates, including slate, metamorphic, ultramafic, or volcanic rock. Stands contain low cover of a variety of native annual species such as *Lasthenia californica*, *Minuartia californica*, and *Dichelostemma capitatum*…

Selaginella hansenii **Sub-group of** ***Vulpia microstachys - Lasthenia californica - Plantago erecta*** **Herbaceous Alliance**

IIB2b.i. *Selaginella hansenii*, *Vulpia microstachys*, and/or *Plantago erecta* occur on serpentine substrate, intermixing with a variety of other native species including *Lupinus spectabilis*, *Eschscholzia lobbii*, *Holocarpha virgata* subsp. *virgata*, *Plantago erecta*, *Dudleya cymosa* subsp. *cymosa*, and *Trifolium willdenovii…*

Selaginella hansenii - Vulpia microstachys - Lupinus spectabilis **Herbaceous Association (Provisional)**

IIB2b.ii. *Selaginella hansenii* and *Vulpia microstachys* occur in stands on rocky volcanic substrate, intermixing with other native species such as *Plantago erecta*, *Lessingia virgata*, *Triphysaria eriantha* subsp. *eriantha*, or *Calycadenia truncata*…

Selaginella hansenii - Vulpia microstachys **Herbaceous Association**

IIB2b.iii. *Selaginella hansenii* and *Vulpia microstachys* occur on volcanic substrate with a higher degree of soil development than above stands. Stands share several species with previous associations, but have conspicuous relative cover of *Lupinus nanus* (which changes greatly in cover from year to year). *Hypochaeris glabra*, *Dichelostemma capitatum*, and *Triphysaria eriantha* are characteristic…

Selaginella hansenii - Vulpia microstachys - Lupinus nanus **Herbaceous Association (Provisional)**

IIB2b.iv. *Vulpia microstachys*, *Lasthenia californica*, and *Plantago erecta* occur with characteristic species *Parvisedum pumilum*, *Triphysaria eriantha*, *Hypochaeris glabra*, and *Lepidium nitidum*. *Selaginella hansenii*, if present, typically has low cover. Found on skeletal soils of rocky volcanic tablelands and ridge-top mudflows…

Vulpia microstachys - Lasthenia californica - Parvisedum pumilum **Herbaceous Association**

IIB2b.iiv. Vegetation on rock outcrops with *Selaginella hansenii* that do not key to the above types in this group (II.B). May include a variety of oak (*Quercus*) and pine (*Pinus*) species. See Table 3, which provides some detail on surveys that were placed into this artificial group…

Mixed Hardwood – Conifer Unclassified Stand (No description provided)

IIB.3. Stands are characterized or dominated by perennial grasses such as *Nassella pulchra*, *Muhlenbergia rigens*, or the non-native *Phalaris aquatica*. Non-native annuals including *Bromus* sp., *Avena* sp., and *Brachypodium distachyon* may be more abundant than the perennials. Stands usually occur in upland to moist riparian settings and are not a component of wet meadows or marsh vegetation…

IIB3.a. *Nassella pulchra* may be dominant or sparsely present as a characteristic herb with *Leontodon taraxacoides* and other species. Native and non-native species intermix with variable cover…

***Nassella pulchra* Herbaceous Alliance**

IIB3a.i. *Nassella pulchra* is constant (generally with less than 15% cover) and occurs with *Leontodon taraxacoides*, *Juncus bufonius*, *Vulpia bromoides*, and variety of *Trifolium* spp…

***Nassella pulchra - Leontodon taraxacoides* Herbaceous Association**

IIB3a.ii. *Nassella pulchra* is dominant and usually exceeds 20% cover. Non-natives such as *Taeniatherum caput-medusae*, *Torilis arvensis*, and *Bromus hordeaceus* are often present and collectively may have moderate cover…

***Nassella pulchra* Herbaceous Association**

IIB3.b. *Muhlenbergia rigens* is conspicuous in the herbaceous layer as a co-dominant to dominant species…

***Muhlenbergia rigens* Herbaceous Alliance**

Muhlenbergia rigens typically exceeds 10% cover and other graminoids (*Lolium multiflorum*, *Bromus hordeaceus*, *Taeniatherum caput-medusae*, *Carex* spp.) may be present. Stands are usually on the edges of streams, or of swales surrounded by grasslands or oak woodlands…

***Muhlenbergia rigens* Herbaceous Association**

IIB3.c. The stout non-native perennial *Phalaris aquatica* dominates a moderate to continuous herbaceous layer in upland or moist environmental settings. Most stands originated by intentional seeding for livestock forage…

***Phalaris aquatica* Herbaceous Semi-Natural Stands**

Phalaris aquatica dominates with moderate cover and *Centaurea solstitialis* is characteristically present as a sub-dominant. Occurs in both upland and wetland settings with a variety of non-native forbs and grasses…

***Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis* Herbaceous Association**

IIB.4. Stands have a characteristic presence in the spring of upland native forbs, though non-natives are often present with conspicuous cover. Diagnostic natives include *Plagiobothrys nothofulvus*, *P. fulvus*, *Lupinus nanus*/*L. bicolor*, *Holocarpha virgata*, *Trifolium* spp., and/or *Lotus wrangelianus*/*L. micranthus…*

IIB4.a. Native *Plagiobothrys nothofulvus* is diagnostic (or an indicator species) with variable cover (usually 5-35%) while *Bromus hordeaceus* is constant and may be dominant. An upland, largely annual grassland/forbland type that is widespread in the Foothills where grazing, fire, and other disturbances are moderately frequent…

***Bromus hordeaceus* - (*Plagiobothrys nothofulvus*) Herbaceous Alliance**

Plagiobothrys nothofulvus and *Daucus pusillus* are characteristic and typically sub-dominant to *Bromus hordeaceus*. Native species *Trifolium microcephalum*, *Castilleja attenuata*, and *Amsinckia menziesii* are often present with a variety of non-native forbs and grasses*…*

***Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus* Herbaceous Association**

IIB4.b. Native *Holocarpha virgata* has low to moderate cover (usually 5-35% cover) as a late spring to late summer diagnostic (or indicator species) in heavy soils, usually occurring with *Bromus hordeaceus*, other non-native grasses, and native forbs. Stands may key to different alliances early in the season, when other species (e.g. *Plantago erecta*, *Vulpia* spp.) are more prevalent…

***Bromus hordeaceus* - (*Holocarpha virgata*) Herbaceous Alliance**

Non-natives *Bromus hordeaceus*, *Trifolium hirtum*, *Taeniatherum caput-medusae*, and *Hypochaeris glabra* are characteristic and may co-dominate with *Holocarpha virgata …*

***Holocarpha virgata - Bromus hordeaceus - Taeniatherum caput-medusae* Herbaceous Association**

IIB4.c. *Lupinus nanus* or *L. bicolor* has low to moderate cover and frequently intermixes with *Trifolium hirtum*, *Hypochaeris glabra*, *Bromus hordeaceus*, *Trifolium dubium*, *Erodium botrys*, *Lotus micranthus*, and *Castilleja attenuata*. Other species of *Trifolium* that may intermix include natives *T. willdenovii*, *T. microcephalum*, *T. variegatum*, and/or *T. depauperatum*…

***Bromus hordeaceus - Lupinus nanus - Trifolium* spp. Herbaceous Association (Provisional)**

of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands

IIB4.d. *Plagiobothrys fulvus* is characteristic with low cover in stands that are dominated by or have significant cover of *Bromus hordeaceus* and/or *Erodium botrys*. *Eschscholzia lobbii* is frequently present, though there is generally low overall native diversity. Stands are often on intervening uplands between vernal pools in Lassen Foothills area…

***Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus* Herbaceous Association**

of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands

IIB.4.e. Stands are characterized by the presence of natives *Lotus wrangelianus*, *Brodiaea* spp. and *Clarkia purpurea* subsp. *quadrivulnera*. Samples appear to be auto-correlated on deeper soil bands above big Chico Creek. These stands may be related to the *Lasthenia californica - Vulpia microstachys - Plantago erecta* Alliance, and may be post-fire and have had recent shrub cover (e.g., *Toxicodendron diversilobum*)…

***Lotus wrangelianus* Unclassified Stand**

(No description provided)

IIB.5. Stands have low or insignificant cover of native grasses or forbs, even during peak phenology. Stands are strongly dominated by non-native annual grasses and/or forbs including species of *Lolium*, *Bromus*, *Avena*, *and Trifolium*...

IIB5.a. *Lolium multiflorum* is diagnostic in the herbaceous layer in late spring to summer. *Taeniatherum caput-medusae* and *Bromus hordeaceus* are often present. Stands found in settings that have a slightly higher than ambient moisture regime…

***Lolium multiflorum* Herbaceous Semi-Natural Stands**

Centaurium muehlenbergii and/or *Lolium multiflorum* are present with low to moderate cover. *Bromus hordeaceus*, *Taeniatherum caput-medusae*, *Trifolium hirtum*, *Brodiaea elegans* subsp. *elegans*, *Briza minor*, and *Eremocarpus setigerus* are often present…

***Lolium multiflorum - Centaurium muehlenbergii* Herbaceous Association**

IIB5.b. A*vena barbata* or *Avena fatua* dominates the herbaceous layer…

***Avena* (*barbata*, *fatua*) Semi-Natural Stands**

Bromus hordeaceus is sub-dominant to *Avena barbata*. Additional non-native herbs intermix with sparse cover. Usually found in stands with shallow soils and higher nativity than other types dominated by non-natives…

***Avena barbata - Bromus hordeaceus* Herbaceous Association (Provisional)**

IIB5.c. *Bromus hordeaceus* and *Trifolium hirtum* collectively dominate stands and often have similar cover. Stands are composed largely of non-natives, including *Centaurea solstitialis* and *Bromus diandrus*, which are often present with low to moderate cover…

***Trifolium hirtum - Bromus hordeaceus* Herbaceous Association (Provisional)**

of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands

IIB5.d. *Bromus hordeaceus* and *Leontodon taraxacoide*s collectively dominate stands and often have similar cover. Stands are composed largely of non-natives, including characteristic species *Aira caryophyllea*, *Erodium botrys*, *Trifolium dubium*, *Hypochaeris glabra*, *Briza minor*, and *Trifolium hirtum…*

***Bromus hordeaceus - Leontodon taraxacoides* Herbaceous Association of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands**

IIB5.e. *Plagiobothrys fulvus* is characteristic with low cover in stands that are dominated by or have significant cover of *Bromus hordeaceus* and/or *Erodium botrys*. *Eschscholzia lobbii* is frequently present, though there is generally low overall native diversity. Stands are often on intervening uplands between vernal pools in Lassen Foothills area…

***Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus* Herbaceous Association of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands**

IIB5.f. *Bromus hordeaceus* is constant, and occurs with *Brachypodium distachyon* and/or *Bromus diandrus*, and/or *Vicia villosa*. Each combination of these species has high collective cover and often occurs with *Trifolium hirtum*, *Avena barbata*, *Carduus pycnocephalus*, and emergent *Quercus douglasii*. These weedy stands are found in moist, semi-shaded settings that may be adjacent to or derived from recently burned *Quercus douglasii* woodland or occur on deeper soils. Since this association is related to open *Quercus douglasii* types, see that Alliance key for similarities…

***Brachypodium distachyon – Bromus diandrus* (*Quercus douglasii*) Herbaceous Association of the *Bromus* (*diandrus*, *hordeaceus*, *madritensis*) Herbaceous Semi-Natural Stands**

IIB5.g. *Centaurea solstitialis* (in late season) is conspicuous in the herbaceous layer, with virtually no significant cover of native species (at least in the late season)...

***Centaurea* (*melitensis*, *solstitialis*) Herbaceous Semi-Natural Stands**

Centaurea solstitialis intermixes with other non-natives, such as *Bromus hordeaceus*, *B. diandrus*, *Taeniatherum caput-medusae*, *Trifolium hirtum*, *Vulpia myuros* and *Torilis arvensis* …

***Centaurea solstitialis* Herbaceous Association (Provisional)**

IIB5.h. Vegetation consists of annual grassland/forbland stands that do not key to the above types in this group (IIB.5). See Table 3, which provides some detail on surveys that were placed into this artificial group…

California Annual Grassland Unclassified Stand
(No description provided)

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APPENDIX 1A. Vegetation Relevé and Rapid Assessment protocols used for the vegetation sampling. Key to Soil Texture and Survey Form Code List follow after protocols.

CALIFORNIA NATIVE PLANT SOCIETY
SIERRA NEVADA FOOTHILLS VEGETATION RELEVÉ PROTOCOL
CNPS VEGETATION COMMITTEE
October 20, 2000 (Revised 4/5/05)

Introduction

In *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), CNPS published a Vegetation Sampling Protocol that was developed as a simple quantitative sampling technique applicable to many vegetation types in California. Investigators use an ocular estimation technique called a relevé to classify and map large areas in a limited amount of time.

The relevé method of sampling vegetation was developed in Europe and was largely standardized by the Swiss ecologist Josias Braun-Blanquet. He helped classify much of Europe's vegetation, founded and directed a synecology center in France, and was editor of *Vegetatio* for many years. The relevé was, and is, a method used by many European ecologists, and others around the world. These ecologists refer to themselves as phytosociologists. The use of relevé in the United States has not been extensive with the exception of the US Forest Service.

The relevé is particularly useful when observers are trying to quickly classify the range of diversity of plant cover over large units of land. In general, it is faster than the point intercept technique. One would use this method when developing a classification that could be used to map of a large area of vegetation, for example. This method may also be more useful than the line intercept method when one is trying to validate the accuracy of mapping efforts.

The relevé is generally considered a "semiquantitative" method. It relies on ocular estimates of plant cover rather than on counts of the "hits" of a particular species along a transect line or on precise measurements of cover/biomass by planimetric or weighing techniques.

Selecting a stand to sample

A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as alpine meadow or tundra types, and some may be several square kilometers in size, such as desert or forest types. A stand is defined by two main unifying characteristics:

1) It has <u>compositional</u> integrity. Throughout the site the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct, and
2) It has <u>structural</u> integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species throughout.
   For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called <u>homogeneity</u>. For an area of vegetated ground to meet the requirements of a stand it must be homogeneous.

Stands to be sampled may be selected by assessment prior to a site visit (e.g. delineated from aerial photos or satellite images), or may be selected on site (during reconnaissance to determine extent and boundaries, location of other similar stands, etc.). Depending on the project goals, you may want to select just one or a few representative stands for sampling (e.g., for developing a classification for a vegetation mapping project), or you may want to sample all of them (e.g., to define a rare vegetation type and/or compare site quality between the few remaining stands).

Selecting a plot to sample within in a stand

Because most stands are large, it is difficult to summarize the species composition, cover, and structure of an entire stand. We are also usually trying to capture the most information with the least amount of effort. Thus, we are typically forced to select a representative portion to sample.

When sampling a vegetation stand, the main point to remember is to select a sample that, in as many ways possible, is representative of that stand. This means that you are not randomly selecting a plot; on the contrary, you are actively using your own best judgment to find a representative example of the stand.

Selecting a plot requires that you see enough of the stand you are sampling to feel comfortable in choosing a representative plot location. Take a brief walk through the stand and look for variations in species composition and in stand structure. In many cases in hilly or mountainous terrain look for a vantage point from which you can get a representative view of the whole stand. Variations in vegetation that are repeated throughout the stand should be included in your plot. Once you assess the variation within the stand, attempt to find an area that captures the stand's common species composition and structural condition to sample.

Plot Size

All relevé of the same type of vegetation to be analyzed in a study need to be the same size. It wouldn't be fair, for example, to compare a 100 m2 plot with a 1000 m2 plot as the difference in number of species may be due to the size of the plot, not a difference in the stands.

A minimal area to sample is defined by species/area relationships; as the sampler identifies species present in an area of homogeneous vegetation, the number will increase quickly as more area is surveyed. Plot shape and size are somewhat dependent on the type of vegetation under study. Therefore general guidelines for plot sizes of tree-, shrub-, and herb-dominated upland, and fine-scale herbaceous communities have been established. Sufficient work has been done in temperate vegetation to be confident the following conventions will capture species richness:

Alpine meadow and montane wet meadow: 100 sq. m
Herbaceous communities: 10 sq. m plot, 100 sq. m plot or 400 sq. m plot (Consult with CNPS, and use one consistent size)
Shrublands: 400 sq. m plot
Forest and woodland communities: 1000 sq. m plot
Open desert vegetation: 1000 sq. m plot

Plot Shape

A relevé has no fixed shape, plot shape should reflect the character of the stand. If the stand is about the same size as a relevé, you need to sample the entire stand. If we are sampling a desert wash, streamside riparian, or other linear community our plot dimensions should not go beyond the community's natural ecological boundaries. Thus, a relatively long, narrow plot capturing the vegetation within the stand, but not outside it would be appropriate. Species present along the edges of the plot that are clearly part of the adjacent stand should be excluded.

If we are sampling broad homogeneous stands, we would most likely choose a shape such as a circle (which has the advantage of the edges being equidistant to the center point) or a square (which can be quickly laid out using perpendicular tapes). If we are trying to capture a minor bit of variety in the understory of a forest, for example a bracken fern patch within a ponderosa pine stand, we would want both bracken and non-bracken understory. Thus, a rectangular shape would be appropriate.

GENERAL PLOT INFORMATION

The following items appear on each data sheet and are to be collected for all plots. Where indicated, refer to attached code sheet.

Polygon or Relevé number: Assigned either in the field or in the office prior to sampling.

Date: Date of sampling.

County: County in which located.

USGS Quad: The name of the USGS map the relevé is located on; note series (15' or 7.5').

CNPS Chapter: CNPS chapter, or other organization or agency if source is other than CNPS chapter.

Landowner: Name of landowner or agency acronym if known. Otherwise, list as private.

Contact Person: Name, address, and phone number of individual responsible for data collection.

Observers: Names of individuals assisting. Circle name of recorder.

Plot shape: indicate the sample shape as: square, rectangle, circle, or the entire stand.

Plot size: length of rectangle edges, circle radius, or size of entire stand.

NOTE: See page 2 for standard plot sizes.

Study Plot Revisit: If the relevé plot is being revisited for repeated sampling, please circle "Yes".

Photo interpreter community code: If the sample is in area for which delineation and photo interpretation has already been done, the code which the photointerpreters applied to the polygon. If the sample site has not been photointerpreted, leave blank.

Other polygons of same type (yes or no, if applicable), if yes, mark on map: Other areas within view that appear to have similar vegetation composition. Again, this is most relevant to areas that have been delineated as polygons on aerial photographs as part of a vegetation-mapping project. If one is not working from aerial photographs, draw the areas as on a topographic map.

Is plot representative of whole polygon? (yes or no, if applicable), if no explain: Detail what other vegetation types occur in the polygon, and what the dominant vegetation type is if there is more than one type.

Global Positioning System Readings: Due to the recent availability of very accurate and relatively low cost GPS units, we highly recommend obtaining and using these as a standard piece of sampling equipment. Now that the military intentional imprecision (known as "selective availability") has been "turned off" (as of July 2000), it is typical for all commercial GPS units these units to be accurate to within 5 m of the actual location. Also note that the GPS units can be set to read in UTM or Latitude and Longitude coordinates and can be easily translated. Thus, the following fields for Latitude, Longitude, and legal description are now optional. In order for all positional data to be comparable within the CNPS vegetation dataset, we request using UTM coordinates set for the NAD 83 projection (see your GPS users manual for instructions for setting coordinates and projections).

Caveat: Although GPS units are valuable tools, they may not function properly due to the occasionally poor alignment of satellites or due to the complexity of certain types of terrain, or vegetation. We thus also recommend that you carry topographic maps and are aware of how to note your position on them in the event of a non-responsive or inaccurate GPS.

UTMN and UTME: Northing and easting coordinates using the Universal Transverse Mercator (UTM) grid as delineated on the USGS topographic map, or using a Global Positioning System.

UTM zone: Universal Transverse Mercator zone. Zone 10S for California west of the 120th longitude; zone 11S for California east of 120th longitude.

Legal Description: Township/Range/Section/Quarter Section/Quarter-Quarter section/Meridian: Legal map location of the site; this is useful for determining ownership of the property. California Meridians are Humboldt, Mt. Diablo, or San Bernardino. (This is optional, see above discussion of GPS units)

Latitude and Longitude: Degrees north latitude and east longitude. This is optional (see above)

Elevation: Recorded in feet or meters. Please indicate units.

Slope: Degrees, read from clinometer or compass, or estimated; averaged over relevé

Aspect: Degrees from true north (adjust declination), read from a compass or estimated; averaged over relevé.

Macrotopography: Characterize the large-scale topographic position of the relevé. This is the general position of the sample along major topographic features of the area. *See attached code list*.

Microtopography: Characterize the local relief of the relevé. Choose the shape that mimics the lay of the ground along minor topographic features of the area actually within the sample. *See attached code list*.

VEGETATION DESCRIPTION

Dominant layer: Indicate whether the community is dominated by the Low layer (L), Mid-layer (M), or Tall (T) layer.

Preliminary Alliance name: Name of series, stand, or habitat according to CNPS classification (per Sawyer and Keeler-Wolf 1995); if the type is not defined by the CNPS classification, note this in the space.

Adjacent alliance: Adjacent vegetation series, stands or habitats according to CNPS classification; list in order of most extensive to least extensive.

Structure: Characterize the structure of each layer.

> Continuous = greater than 2/3 (67%) cover; crowns touching
> Intermittent = between 1/3 and 2/3 cover (33% to 66 %); interlocking or touching crowns interrupted by openings.
> Open = less than 1/3 (33%) cover; crowns not touching or infrequently touching.

Phenology: Based on the vegetative condition of he principal species, characterize the phenology of each layer as early (E), peak (P), or late (L).

WETLAND COMMUNITY TYPES

Community type: Indicate if the sample is in a wetland or an upland; note that a site need not be officially delineated as a wetland to qualify as such in this context.

Dominant vegetation form: This is a four letter code which relates the vegetation of the plot to the higher levels of the NBS/NPS National Vegetation Classification System hierarchy. *See attached code list*.

Cowardin class: See "Artificial Keys to Cowardin Systems and Names" (attached). If the plot is located in a wetland, record the proper Cowardin system name. Systems are described in detail in Cowardin et al. 1979. Classification of wetlands and deepwater habitats of the United States. US Dept. of the Interior, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Marine: habitats exposed to the waves and currents of the open ocean (subtidal and intertidal habitats).

Estuarine: includes deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land (i.e. estuaries and lagoons).

Riverine: includes all wetlands and deepwater habitats contained within a channel, excluding any wetland dominated by trees, shrubs, persistent emergent plants, emergent mosses, or lichens. Channels that contain oceanic-derived salts greater than 0.5% are also excluded.

Lacustrine: Includes wetlands and deepwater habitats with all of the following characteristics: 1) situated in a topographic depression or a dammed river channel; 2) lacking trees or shrubs, persistent emergents, emergent

mosses or lichens with greater than 30% aerial coverage; and total area exceeds 8 ha (20 acres). Similar areas less than 8 ha are included in the lacustrine system if an active wave-formed or bedrock shoreline feature makes up all or part of the low tide boundary, of if the water in the deepest part of the basin exceeds 2 m (6.6 feet) at low tide. Oceanic derived salinity is always less than 0.5%.

Palustrine: Includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity derived from oceanic salts is less than 0.5%. Also included are areas lacking vegetation, but with all of the following four characteristics: 1) areas less than 8 ha (20 acres); active wave-formed or bedrock shoreline features lacking; 3) water depth in the deepest part of the basin less than 2 m (6.6 feet) at low water; and 4) salinity due to ocean-derived salts less than 0.5%.

Vertical distance from high water mark of active stream channel: If the plot is in or near a wetland community, record to the nearest meter or foot the estimated vertical distance from the middle of the plot to the average water line of the channel, basin, or other body of water.

Horizontal distance from high water mark of active stream channel: If the plot is in or near a wetland community, record to the nearest meter or foot the estimated horizontal distance from the middle of the plot to the average water line of the channel, basin, or other body of water.

Stream channel form: If the plot is located in or near a community along a stream, river, or dry wash, record the channel form of the waterway. The channel form is considered S (single channeled) if it consists of predominately a single primary channel, M (meandering) if it is a meandering channel, and B (braided) if it consists of multiple channels interwoven or braided.

Photographs: Describe the number of color photographs taken at the relevé, and the camera's view direction from compass bearings. It is helpful to take a photograph of the relevé from the intersection of the tapes (if tapes were used to define the plot), and another from inside the relevé. Additional photos of the stand may also be helpful. If using a digital camera or scanning in the image into a computer, relevé numbers and compass directions can be recorded digitally. If using a 35mm camera, please note the roll number, frame number, compass direction, and the initials of the person whose camera is being used. (e.g. Roll 5, #1, to the NW, SS)

STAND AND ENVIRONMENTAL INFORMATION

Vegetation trend: Based on the regenerating species and relationship to surrounding vegetation, characterize the stand as either increasing (expanding), stable, decreasing, fluctuating, or unknown.

Impacts: Enter codes for potential or existing impacts on the stability of the plant community. Characterize each as either 1. Light, 2. Moderate, of 3. Heavy. *See attached code list.*

Site location and plot description: A concise, but careful description that makes locating and/or revisiting the vegetation stand and plots possible; give landmarks and directions. Used in conjunction with the GPS position recorded earlier, this should enable precise re-location of the plot. Indicate where the GPS reading was taken within the plot. In general, the location of the GPS reading should be on the Northwestern corner of the plot, if the plot is rectangular (or square), or in the center if the plot is circular. It is also helpful to briefly describe the topography, aspect, and vegetation structure of the site. If you can't take the GPS reading at the Northwest corner (an obstacle in the way) then note where the GPS point was taken. If you can't get a GPS reading, then spend extra time marking the plot location as precise as possible on a topo map.

Site history: Briefly describe the history of the stand, including type and year of disturbance (e.g. fire, landslides or avalanching, drought, flood, or pest outbreak). Also note the nature and extent of land use such as grazing, timber harvest, or mining.

Unknown plant specimens: List the numbers of any unknown plant specimens, noting any information such as family or genus (if known), important characters, and whether or not there is adequate material for identification. Do not take samples of plants of which there are only a few individuals or which you think may be rare. Document these plants with photographs.

Additional comments: Feel free to note any additional observations of the site, or deviations from the standard sampling protocol. If additional data were recorded, e.g. if tree diameters were measured, please indicate so here.

COARSE FRAGMENTS AND SOIL INFORMATION

Coarse fragments, litter: Estimate the cover class of each size at or near the ground surface averaged over the plot. Always remember to estimate what you actually see on the surface as opposed to what you think is hiding under, organic litter, big rocks, etc. However, rocks, organic litter, or fine material visible under the canopy of shrubs or trees should be included in the cover estimate.

One way to consider this is to assume that all of the components of coarse fragments plus the basal cross-section of living plant stems and trunks (at ground level) will add up to 100%. Thus, estimate the cover value of each of the items in the box on the form for coarse fragments (including the basal area of plant stems) so that they will add up to 100%. Remember that the basal area of plant stems is usually minimal (e.g., if there were 10 trees, each 1 m in diameter at ground level on a 1000 square meter plot, they would cover less than 1% {0.79%} of the plot).

These data are asked for because certain categories of coarse fragments of rock and other materials have been shown to correlate with certain vegetation types and are thus likely influencing the type of vegetation that is growing in a given area. These estimates should be made quickly with the main point to keep in mind being a rough estimate of the relative proportions of different coarse fragments on the plot.

Fines: Fine mineral fragments including sand, silt, soil, "dirt" < 2 mm in diameter

Gravel: rounded and angular fragments 0.2-7.5 cm (0.08 -3 in.) diameter

Cobble: rounded and angular fragments >7.5-25 cm (3 -10 in.) in diameter

Stone: rounded and angular coarse fragments >25 cm-60 cm (10 -24 in.) in diameter

Boulder: rounded and angular coarse fragments >60 cm (>24 in.) in diameter

Bedrock: continuous, exposed, non-transported rock

Litter: extent of undecomposed litter on surface of plot (this includes all organic matter, e.g. fallen logs, branches, and twigs down to needles and leaves).

Living stems: basal area of living stems of plants at the ground surface

Soil moisture: Estimation of the following three categories should total 100 percent.

% Soil Saturated: estimate the total coverage of the plot that consists of saturated soils. Measured by water accumulation when ground is depressed and/or water accumulates around foot when standing.

% Soil moist: estimate the total coverage of the plot that consists of moist soils. Soil is moist to the touch.

% Soil dry: estimate the total coverage of the plot that consists of dry soils.

Flowing Water Present: circle yes or no if flowing water is present in the plot.

% Bioturbation: Estimate percent cover of ground disturbance by animals (e.g., small mammal burrowing trails, cow hoof marks) across the entire plot surface.

Soil texture: Record the texture of the upper soil horizon, below the organic layer if one is present. *See attached key and code list.*

Parent Material: Geological parent material of site. *See attached code list.*

VEGETATION DATA

Assessment of Layers

This first step is described in the CNPS point-intercept transect protocol. Estimates the maximum height for the low and mid layers and the minimum height for the tall layer are recorded. These estimates are made after a quick assessment of the vegetation and its structure. The estimates need not be overly precise and will vary among vegetation types. A caveat: if several relevés are being sampled within the same vegetation type, it is important to be consistent when assigning layers. Some types will have more than three layers (e.g. two tree layers of different maximum height); this should be indicated in the relevé description. However, data are recorded for only three layers (low, mid, and tall). The layer a species occupies will often be determined by growth form, but exceptions do occur. For example, with trees young seedlings may occupy the low layer, saplings the mid layer, and mature individuals the tall layer for some taxa, for example.

Species List

The collection of vegetation data continues with making a comprehensive species list of all vascular plants within the relevé. This list is achieved by meandering through the plot to see all microhabitats. During list development, observers document each taxon present in each layer in which it occurs separately, recording it on a different line of the data form and noting which layer is represented. This is important for data entry because each layer of each represented taxon will be entered separately. Each individual plant is recorded in only one layer, the layer in which the tallest portion of the individual is found. One should reach a point at which new taxa are added to the list only very slowly, or sporadically. When one has reached that point, the list is probably done.

The following sections explain how to perform the actual relevé, the Estimation of Cover Values. The sections prefaced by bold-faced titles explain the technique, and the sections with regular font titles refer to the steps needed to complete the accompanying Field Form.

DBH – see separate field form

<u>DBH if >10 cm</u>:

The diameter at breast height (dbh) is important in certain studies. It may be recorded next to each tree species name. First indicate the species name by code and then record the number of sprouts/trunks in clonal trees. You should measure the tree dbh of every tree trunk/sprout that has diameter > or = 10 cm at breast height in the plot, and each measurement should be in centimeters (cm) using a dbh tape measure. For trunks that may be fused below breast height and branched at breast height, each trunk at breast height gets a separate measurement.

Also indicate if each tree/clone is in the overstory or understory. Trees in the overstory are generally at canopy level. Trees in the understory are entirely below the general level of the canopy.

If snags are encountered in plot, record the dbh and denote it as dead by circling its dbh measurement. If you are unable to identify the snag to species, put the four letter code "SNAG" in the species column.

Depending on the density of trees in each plot, you can record dbh of trees for every tree trunk in the plot, or you can sub-sample the trunks to estimate dbh for every tree species in relatively dense plots. For woodland/forest plots, sub-sampling is appropriate for half the plot if there are at least 20 trees/resprouts present (e.g., 200 m^2 sub-sample in riparian and 500 m^2 sub-sample in upland).

When sub-sampling, make sure to denote this as a sub-sample (note on the data form) and record the sub-sample of dbh's for each tree species in the appropriate row on the Field Form. Once the data are post-processed and entered into a database, then you will need to record each sub-sampled dbh reading three additional times to come up with a full sample of dbh readings. For example, with a sub-sampled tree dbh of 15 cm, this value of 15 should be entered four times (not just once) when it is entered in the database.

<u>Lifeform and size class</u>: If dbh <15.2 cm, counts should be made for conifers and hardwoods in two different size classes. Count seedlings (≤ 2.54 cm) and saplings (> 2.54 but < 15.2 cm). First estimate if there are more than 20

seedlings in one half (50% subsample) of the plot. If so, then do counts of seedlings and saplings in five sub-plots of 2x2 m squares. If the plot shape is a circle, place one square in the center of the plot, and four other squares 10 m to the N, S, E, and W of the plot center. If there are less than 20 seedlings in the 50% subsample plot, then record counts for that subsample instead.

Estimating Cover:

There are many ways to estimate cover. Many people who have been in the cover estimation "business" for a long time can do so quickly and confidently without any props and devices. However, to a novice, it may seem incomprehensible and foolhardy to stand in a meadow of 50 different species of plants and systematically be able to list by cover value each one without actually "measuring" them in some way.

Of course, our minds make thousands of estimates of various types every week. We trust that estimating plant cover can be done by anyone with an open mind and an "eye for nature." It's just another technique to learn.

It is very helpful to work initially with other people who know and are learning the technique. In such a group setting, typically a set of justifications for each person's estimate is made and a "meeting of the minds" is reached. This consensus approach and the concomitant calibration of each person's internal scales is a very important part of the training for any cover estimate project.

An underlying point to remember is that estimates must provide some level of reliable values that are within acceptable bounds of accuracy. If we require an accuracy level that is beyond the realm of possibility, we will soon reject the method for one more quantitative and repeatable. As with any scientific measurement, the requirement for accuracy in the vegetation data is closely related to the accuracy of the information needed to provide a useful summary of it. Put into more immediate perspective - **to allow useful and repeatable analysis of vegetation data, one does not need to estimate down to the exact percent value the cover of a given plant species in a given stand**.

This point relates to two facts: there is inherent variability of species cover in any environment. For example, you would not expect to always have 23% *Pinus ponderosa*, 14% *Calocedrus decurrens*, and 11% *Pinus lambertiana* over an understory of 40% *Chamaebatia foliosa*, 3% *Clarkia unguiculata*, and 5% *Galium bolanderi* to define the Ponderosa pine-Incense cedar/mountain misery/bolander bedstraw plant community. Anyone who has looked at plant composition with a discerning eye can see that plants don't space themselves in an environment by such precise rules. Thus, we can safely estimate the representation of species in a stand by relatively broad cover classes (such as <1%, 1-5 %, 5-25%, etc.) rather than precise percentages.

The data analysis we commonly use to classify vegetation into different associations and series (TWINSPAN and various cluster analysis programs, for example) is likewise forgiving. When analyzed by quantitative mutivariate statistics information on species cover responds to coarse differences in cover and presence and absence of species, but not to subtle percentage point differences. This has been proven time and again through quantitative analysis of vegetation classification. Many of the world's plant ecologists estimate cover rather than measure it precisely. Some of the seminal works in vegetation ecology have been based on cover estimates taken by discerning eyes.

With this as a preamble, below we offer some suggestions on estimating cover that have proven helpful. These are simply "tricks" to facilitate estimation, some work better for different situations. You may come up with other methods of estimation that may seem more intuitive, and are equally reliable in certain settings. All values on the relevé protocol that require a cover class estimate, including coarse fragment and vegetation layer information, may rely on these techniques. Just make the appropriate substitutions (using the coarse fragment example substitute, bedrock, stone, cobbles, gravel, and litter for vegetation).

Method 1: The invisible point-intercept transect:

This method works well in relatively low, open vegetation types such as grasslands and scrubs where you can see over the major stand components. For those who have worked with the original CNPS line intercept methodology it's like counting hits along an imaginary line at regular intervals of the 50 m tape. Here's how it goes:

Envision an imaginary transect line starting from your vantage point and running for 50 m (or however many meters you wish, as long as you are still ending up within the same stand of vegetation you're sampling - never

keep counting outside of your homogeneous stand). Now "walk" your eye along this tape for 50 m and visually "take a point" every 0.5 m. Don't worry about precision, just try to "walk" your eye along the line and stop every 0.5 m or at any other regular interval until you reach its end and mentally tally what species you hit. Once you come up with a number of hits for each major species in one imaginary transect, take another transect in another direction and estimate the number of hits on that one. Do this several times (usually 3-4 is enough if you are in a homogeneous stand), then average your results.

This can go quickly in simple environments and in environments where the major species are easily discernable (chaparral, bunch-grassland, coastal scrub, desert scrub). Your average number of hits need not be a total of 100 as in the original transect method, but could be 50 along a 25 m imaginary line (in which case you would multiply by two to get your estimated cover), or 25 along a 12.5 m line (multiply average by 4), etc.

Method 2: Subdivision of sample plot into quadrants:

Many plots, whether they are square, circular, or rectangular, may be "quartered" and have each quadrant's plant cover estimated separately. If the plot is a given even number of square meters (such as 100, 400, or 1000 m^2) then you know that a quarter of that amount is also an easily measurable number. If you can estimate the average size of the plants in each of the quarters (e.g., small pinyon pines may be 5 m^2 (2.2m x 2.2m), creosote bush may be $2m^2$ (or 1.41 m x 1.41 m), burrobush may be $0.5m^2$) then you simply count the number of plants in each size class and multiply by their estimated size for the cover in a given quadrant. Then you average the 4 quadrants together for your average cover value.

This method works well in vegetation with open-to-dense cover of low species such as grasses or low shrubs, in open woodlands, and desert scrubs.

Method 3; "Squash" all plants into a continuous cover in one corner of the plot :

Another way to estimate how much of the plot is covered by a particular species is to mentally group (or "march", or "squash") all members of that species into a corner of the plot and estimate the area they cover. Then calculate that area as a percentage of the total plot area. This technique works well in herb and shrub dominated plots but is not very useful in areas with trees.

Method 4: How to estimate tree cover:

Cover estimates of tall trees is one of the most difficult tasks for a beginning relevé sampler. However it is possible to do this with consistency and reliability using the following guidelines.

1. Have regular sized and shaped plots that you can easily subdivide.
2. Estimate average crown spread of each tree species separately by pacing the crown diameter of representative examples of trees of each species and then roughly calculating the crown area of each representative species.
3. Add together the estimated crown area of each individual of each species of tree on the plot for your total cover.

Method 5: The process of elimination technique:

This method is generally good for estimating cover on sparsely vegetated areas where bare ground, rocks, or cobbles cover more area than vegetation. In such a situation it would be advisable to first estimate how much of the ground is not covered by plants and then subdivide the portion that is covered by plants into rough percentages proportional to the different plant species present. For example, in a desert scrub the total plot not covered by plants may be estimated at 80%. Of the 20% covered by plants, half is desert sunflower (10% cover), a quarter is California buckwheat (5% cover), an eighth brittlebush (2.5% cover), and the rest divided up between 10 species of herbs and small shrubs (all less than 1% cover).

Any of these techniques may be used in combination with one another for a system of checks and balances, or in stands that have characteristics lending themselves for a different technique for each layer of vegetation.

In a relevé, cover estimates, using the techniques described above, are made for each taxon as it is recorded on the species list. Estimates are made for each layer in which the taxon was recorded. For example, if individuals of coast live oak occur in the tall, the mid, and the low layer, an estimate is made for Tall CLO, for mid CLO, and for low CLO.

In a traditional relevé, cover is estimated in "cover classes," not percentages, because of the variability of plant populations over time and from one point to another, even within a small stand. This protocol uses the following 6 cover classes:

Cover Class 1: the taxon in that layer covers < 1 % of the plot area
Cover Class 2: the taxon in that layer covers >1 % - 5 % of the plot area
Cover Class 3a: the taxon in that layer covers >5 - 15 % of the plot area
Cover Class 3b: the taxon in that layer covers >15 - 25 % of the plot area
Cover Class 4: the taxon in that layer covers >25 - 50 % of the plot area
Cover Class 5: the taxon in that layer covers >50 - 75 % of the plot area
Cover Class 6: the taxon in that layer covers > 75% of the plot area

Percentages (optional)

This CNPS protocol also encourages observers to estimate percentages if they feel confident in their estimation abilities. This optional step allows the data to be compared more easily to data collected using different methods, such as a line or point intercept. It also instills confidence in the cover estimate of borderline species that are close calls between two cover classes (e.g., a cover class 2 at 5% as opposed to a cover class 3 at 6%). It is particularly useful for calculating cover by the process of elimination techniques and for estimating total vegetation cover (see below) and coarse fragment cover.

In addition to cover of individual taxa described above, total cover is also estimated for each vegetation layer (e.g. tall, medium, low). This is done using the same cover classes as described above but combines all taxa of a given category. They can be calculated from the species percent cover estimates, but please make sure to disregard overlap of species within each layer. These estimates should be absolute aerial cover, or the "bird's eye view" of the vegetation cover, in which each category cannot be over 100%.

Height Classes and Cover Estimates for Vegetation Strata

The relevé method just described calls for estimates of plant cover for each taxon. It is strongly floristically oriented. Another way of considering the relationships between plants in vegetation is by evaluating structure, or physiognomy. The underlying thinking is that life forms within a stand of vegetation occur in response to similar ecological pressures (TNC 1998). Estimation of cover within predetermined height classes is one way to describe the structure of vegetation. Structure of a stand of vegetation also is used in modeling wildlife use of the vegetation (WHR).

Lichen/Moss: Estimate percent cover of lichen and moss in three categories. Each estimate should be recorded as a relative cover to the surface on which the lichen/moss is found.

Tree: Estimate percent cover for living trees in the conifer and hardwood categories. Then estimate cover for conifers and hardwoods in each of the five height classes.

Shrub Crown Decadence: Estimate percent cover of living shrubs within the four decadence classes.

Shrub: Estimate total percent cover of living shrubs and then estimate percentage of living shrubs in each of the four height classes.

Herb: Estimate total percent cover of living herbs and then estimate percentage of living herbs in each of the four height classes.

Notes on the Order and Division of Labor for Data Collection: As with every procedure there are always more and less efficient ways to collect the information requested. Although we respect each field crews' option to choose in what order they collect the data, we suggest the following general rules:

- Work with teams of two for each plot collected.
- Both team members can determine the plot shape and size and lay out the tapes and mark the edges for the plot boundary (see below).
- The two person teams can also divide up tasks of data collection with one member collecting location, environmental (slope, aspect, geology, soil texture, etc.) and plot description information while the other begins the species list. Thus, two clipboards are useful and data sheets that are at first separated (not stapled).
- Following the making of the initial species list and collection of location and environmental data both team members convene to do the estimation of plant cover by species followed by the estimation of total vegetation cover and cover by layer.
- Following that process, the estimation of cover by the up to 10 height strata classes and the listing of the diagnostic species for each is done collaboratively.
- This is followed by the estimation of the coarse fragment information, again done collaboratively.

For egalitarian and familiarization purposes we suggest that the roles be switched regularly between the team members and that if multiple teams are being used in a larger project, that each team member switches frequently between teams, building all-important calibration, and camaraderie among the whole group.

Suggestions for Laying out Plots: If you are laying out a circular plot, work with two or more people. One person stands at the center of the plot and holds the tape case while the other walks the end of the tape out to the appointed distance (radium 5.6 for 100 m^2 circle, radius 11.3 m for a 400 m^2 circle, and radius 17.6 m for a 1000m^2 circle). The walker then fixes the tape end with a pin flag and walks back to the center where he/she instructs the center person to walk in the opposite direction of the already laid out tape radius, stretching the rest of the tape to an equal length (another 11.3 or 17.6 m) to the opposite edge of the plot, where he/she affixes it with another pin flag. This process is again repeated with another tape laid out perpendicular to the first so that an "+ " shape is created . The margins of the circle can be further delineated by measuring to the center of the circle with an optical tape measure (rangefinder) and marking mid points between the four ends of the crossed tapes.

When laying out square or rectangular plots work with two or more people per team. If doing a rectangle, determine the long axis of the plot first and have one person be stationed at the zero m end of the tape while the other person walks the unrolling tape case out to the appropriate length. The stationary end person can guide the walker, keeping them moving in a straight line. Once that tape is laid out and the far end staked, the team lays out another tape perpendicular to the first, either at one end, using the same type of process. This establishes the width of the rectangle (or square). Using an optical rangefinder and pin-flags, or colored flagging the team can further mark additional points along the other parallel long axis and short axis of the plot (every 5 m for shorter plots or every 10 m for longer plots is suggested) so that the entire plot boundary can be easily visualized.

References:

Barbour M.G., J.H. Burk, and W.D. Pitts 1987. Terrestrial Plant Ecology, Second Edition. Benjamin/Cummings Publishing Co. Menlo Park, CA. 634 pages.

Sawyer and Keeler-Wolf. 1995. Manual of California Vegetation. California Native Plant Society, Sacramento, CA. 471 pages

The Nature Conservancy and Environmental Systems Research Institute. 1994. Final Draft, Standardized National Vegetation Classification System. Prepared for United States Department of the Interior, National Biological Survey, and National Park Service. Arlington, VA. Complete document available at the following website: http||:biology.usgs.gov/npsveg/fieldmethods.html

Suggested Equipment:

Chaining pins, surveyor steel; Fiberglass tapes 2 - 165'/50 m; Logbook cover 8 ½ " x 12"; Perforated flagging; UTM Coordinate Grid; Rangefinder, 10-75m; Silva Compass w/ clinometer; Garmin GPS 12XL

CALIFORNIA NATIVE PLANT SOCIETY –
SIERRA NEVADA FOOTHILLS VEGETATION RAPID ASSESSMENT PROTOCOL
CNPS VEGETATION COMMITTEE
(Created November 5, 2001; Revised April 11, 2005 & March 14, 2006)

Introduction

The rapid assessment protocol is a reconnaissance-level method of vegetation and habitat sampling. It may be used to quickly assess and map the extent of all vegetation types in relatively large, ecologically defined regions. The California Native Plant Society (CNPS) has adopted this method to verify locations of known vegetation types, to gain information about new types, and to acquire general information about their composition, habitat, and site quality. Other agencies, such as California State Parks, the Department of Fish and Game, and the U.S. Forest Service, are also adopting this method for documenting vegetation patterns.

By using this method, biologists and resource managers can gain a broad ecological perspective, as the full range in ecological variation across broad landscapes can be reflected in the vegetation assessments. For example, changes in environmental elements (such as geology, aspect, topographic position) or physical processes (fire, flooding, erosion, and other natural or human-made disturbances) can influence the distribution of plants or patterning of vegetation, which are documented in the rapid assessments. In turn, these vegetation patterns can influence the distribution of animals across the landscape.

The quantitative vegetation data recorded in the rapid assessments can be described with standard classification techniques and descriptions, and they can be depicted in maps across any landscape. Additional information recorded in the assessments, such as disturbance history and anthropogenic impacts, can serve to define habitat quality and integrity for plant and animal distributions. Because this method provides an important means for representing the full array of biological diversity as well as habitat integrity in an area, it can also be an effective and efficient tool for conducting natural resource planning.

Purpose

The Vegetation Program has adopted the rapid assessment method to update the location, distribution, species composition, and disturbance information of vegetation types as identified in the first edition of *A Manual of California Vegetation* (MCV), a CNPS publication. The release of the MCV heralded a new statewide perspective on vegetation classification. The premise of the book – all vegetation can be quantified based on cover, constancy, and composition of plant species, yielding uniform defensible definitions of vegetation units – has proven to be very useful throughout California and the rest of the nation. The MCV has become the standard reference on California vegetation and has been adopted by many agencies such as California Department of Fish and Game, the National Park Service, California State Parks, and the U.S. Forest Service as the standard approach to classify vegetation statewide.

One of the most important purposes of rapid assessments is to verify the locations of each vegetation type because much about the geography of vegetation remains uncertain in this state. To obtain a more accurate understanding of the location and distribution of the vegetation types, nothing short of systematic inventory will suffice. Using the rapid assessment method, CNPS Chapters and other organizations can work together in selected ecological regions to gather vegetation data over a short time period in a broad area. This geographic inventory of vegetation types can greatly advance the current distribution understanding of vegetation.

In addition, California is working with a new vegetation classification, and its parameters are largely untested. The rapid assessment method will be used to gather additional information on species composition, distribution, disturbance effects, and environmental influences of vegetation. Thus, this method will provide modifications to the existing vegetation classifications and information on new types.

This protocol can also be used in tandem with other resource assessment protocols such as wildlife assessments or aquatic/stream assessments. For example, the California Wildlife Habitat Relationships (CWHR) protocols have been used in conjunction with the vegetation assessment protocol to obtain detailed records on habitat quality and suitability for vertebrate animals in terrestrial habitats. The CWHR protocols can also help test the relationships between the vegetation type and habitat of various animals and thereby refine the understanding and predictability of the distribution

of animals. A portion of the CWHR protocols is incorporated into the rapid assessment method to obtain suitability information for vertebrate species.

While people can quickly obtain information on the variety of vegetation types using this method, some of the vegetation types recorded in the rapid assessment process may be poorly defined in the current classification system. These poorly understood or unknown types will be identified and located and then will be prioritized for more detailed assessment using the CNPS relevé protocol. Thus, the rapid assessment method will be used in conjunction with the relevé method to provide large quantities of valuable data on the distribution and the definition of vegetation. These data will be entered into existing databases for summarizing and archiving, and they will be used to modify and improve statewide vegetation classification and conservation information.

Why do we need to know about the composition and distribution of vegetation?

- to have a more accurate understanding of the commonness and rarity of different forms of vegetation throughout the state
- to link the distribution of various rare and threatened plant species with the vegetation units
- to provide a clearer picture of relationships between vegetation types
- to help prioritize community-based land conservation goals based on the local representation of unique types, high diversity areas, etc.
- to do the same for regional vegetation throughout the state and the nation.
- to broaden the vegetation knowledge base for California
- to motivate people to do more to help identify, protect, and conserve vegetation in their area
- to link vegetation types with habitat for animals

Selecting stands to sample:

To start the rapid assessment method, stands of vegetation needs to be defined.
A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as alpine meadow or tundra types, and some may be several square kilometers in size, such as desert or forest types. A stand is defined by two main unifying characteristics:

1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
3) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous.

Stands to be sampled may be selected by evaluation prior to a site visit (*e.g.* delineated from aerial photos or satellite images), or they may be selected on site (during reconnaissance to determine extent and boundaries, location of other similar stands, etc.).

Depending on the project goals, you may want to select just one or a few representative stands of each homogeneous vegetation type for sampling (*e.g.* for developing a classification for a vegetation mapping project), or you may want to sample all of them (*e.g.* to define a rare vegetation type and/or compare site quality between the few remaining stands).

Definitions of fields in the protocol

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: A sample number recorded as a four-letter project code and unique four-digit survey number. This may be assigned in the field or in the office prior to sampling. It is usually denoted with an abbreviation of the sampling location and then a sequential number of that locale (*e.g.* DYCR0001 for Dye Creek rapid assessment number 1).

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photo interpreters have already done photo interpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for the first rapid assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS name: The name or number personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (e.g. NAD 83) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects is NAD 83. However, other agencies and organizations may prefer another datum. Please circle NAD 83, or write in the appropriate datum.

UTM zone: Universal Transverse Mercator zone as given by GPS with Zone 10S and 10T for California west of the 120^{th} longitude (zone 10T is north of the 40^{th} latitude and 10S is south of it); zone 11S for California east of 120^{th} longitude.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record using a GPS unit or USGS topographic map.

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location, because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

Is GPS within stand? Yes / No Circle "Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g*. binoculars, aerial photo).

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

Photograph #'s: Note the photo number and direction in which photo was taken. Also note the name of the person whose camera is being used or number of the camera. Take four photographs from due north, east, south, and west in that order. If photos are not taken in this sequence, retake them in the correct order. Keep camera at same orientation, zoom level, and distance from ground for all four photos., You may take photos close to the ground, if for instance, you are photographing a low herbaceous stand. If you omit a photo accidentally, erase all others and start over. Additional photographs of the stand may also be helpful to better represent the stand. (Also, if using a digital camera or scanning the image into a computer, positions relative to the polygon/stand number can be recorded digitally.)

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g*. igneous, metamorphic, sedimentary). *See code list for types*.

Soil: Record soil texture or series that is characteristic of the site (*e.g*. sand, silt, clay, coarse loamy sand, sandy clay loam, saline, et.). *See soil texture key and code list for types.*

Upland or Wetland/Riparian (circle one): Indicate if the stand is in an upland or a wetland; note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g*. seasonally wet meadow or riparian influenced vegetation).

Macrotopography and Microtopography: Check one or more of the provided features for macrotopography, characterizing the broad topographic position of the area; check only one of the provided features for microtopography, denoting the local relief.

First assess the broad topographic feature or general position of the area (*e.g*. stand is located at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top). Use the closest watershed or subwatershed as a lower boundary. Then assess the minor topographic features, or the lay of the area (*e.g*. surface is flat, concave, etc.).

%Surface cover: Estimation of mainly abiotic surface coarse fragments. The sum of all categories must total 100%. Note: These estimations are optional when surveys are conducted from a distance.

> **Rock: %Large**: Estimate the percent surface cover of large rocks (e.g. stones, boulders, bedrock) that are beyond 25 cm in size.
>
> **Rock: %Small**: Estimate the percent surface cover of small rocks (e.g. gravel, cobbles) that are greater than 2 mm and less than 25 cm in size.
>
> **%Bare/Fines**: Estimate the percent surface cover of bare ground and fine sediment (e.g. dirt) that is 2 mm or less in size.
>
> **%Litter**: Estimate the percent surface cover of litter, duff, or wood on the ground.
>
> **%Water**: Estimate the percent surface cover of running or standing water, ignoring the substrate below the water.
>
> **%BA Stems**: Estimate the percent surface cover of the plant basal area, i.e., the basal area of stems at the ground surface. (Note: This number is rarely greater than 5%).
>
> **Note:** Cover of terrestrial moss or vegetation cover is not to be recorded in this section (use species list). Look below moss or other vegetation to record its abiotic substrate.

General slope exposure (enter Actual º and circle one): Read degree aspect from a compass or clinometer (or estimate), and make sure to average the reading across entire stand. If "Flat" is selected, a "dash" should be recorded in the Actual º, because there should be no aspect. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

General slope steepness (enter Actual º and circle one): Read degree slope from compass (or estimate), using degrees from true north (adjusting for declination). Average the reading over entire stand.

Size of stand: Estimate the size of the entire stand in which the rapid assessment is taken. As a measure, one acre is about 0.4 hectares or about 4000 square meters.

Plot: Yes / No Denote if the rapid assessment was done by using a circumscribed plot (circle yes) or by surveying across the stand (circle no). **If Yes, circle size:** Denote which plot size was used for the sample.

Site history, stand age, and comments: Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, relatively high or low covers of natives or non-natives, or other stand dynamics.

Type / level of disturbance (use codes): List up to five codes for potential or existing human impacts on the stability of the plant community. Also, characterize level of disturbance for each impact each as L (=Light), M (=Moderate), or H =Heavy). *See code list for impacts*.

If competition by exotics (code "5") is designated, use L =<33%, M=33 - 66%, and H=>66% for relative cover of exotics compared to natives.

"Other": Describe the type of disturbance an impact code of "13" (other) is used. Or use this space for additional impacts (including type / level) if more than five disturbances occur in stand.

HABITAT AND VEGETATION DESCRIPTION

Habitat classification per California Wildlife-Habitat Relationships (CWHR)
For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree DBH: Record tree size classes when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average diameter of at breast height of each trunk (standard dbh is 4.5ft/137cm). You can record tree size class by marking and "X" in the main size class(es), or you can provide an estimate of counts per the size classes provided. If marking the main size class, make sure to estimate the mean diameter of all trees over the entire stand, and weight the mean if there are some larger tree dbh's. If there is a size class T5 of trees over a distinct layer of size class either T3 or T4 (*i.e.*, distinct height class separation between different tree species) and the total tree canopy exceeds 60%, then mark the two main size classes present. If doing an estimate of counts, use a Biltmore stick or other device to get quick counts of dbh per class.

If tree, list 1-3 dominant overstory species: If tree canopy cover exceeds 10 percent, please list the dominant species that occur in the overstory canopy.

Shrub (mark one)**:** Record shrub size classes when shrub canopy closure exceeds 10 percent. Record shrub class by marking the size class that is predominant in the survey. Size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herb (mark one)**:** Record herb height when herbaceous cover exceeds 2 percent. You can record herb class by marking the size class that is predominant in the survey, or you can provide an estimate of % cover within each size classes provided. This height class is based on the average plant height at maturity.

Note: Desert types may be encountered in the Southern Sierra Nevada foothills, so CWHR desert categories are shown below (in gray) as a reference.

% Cover of vegetation (per category)
Ocular estimate of cover for the following categories should be estimated (based on functional life forms). For each category below, record a specific number for the total aerial cover or "bird's-eye view" looking from above, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

% Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover. Disregard overlap of the various tree, shrub, and/or herbaceous layers.

% Cover - Overstory Conifer/Hardwood Tree: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Low Tree-Tall Shrub: The total aerial cover (canopy closure) of all live understory trees and arborescent shrub species, disregarding overlap of individual shrubs. This includes trees and shrubs in the sub-canopy tree layer.

Lo-Mid Shrub: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs. Arborescent shrubs that are in the tree sub-canopy should be included in the "Tall Shrub" category.

Herbaceous: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs (do not include bryophytes).

Modal height for conifer/hardwood tree, shrub, and herbaceous categories (optional)
If height values are important in your vegetation survey project, provide an ocular estimate of height for each category listed. Record an average height value per each category by estimating the mean height for each group. Please use the following height intervals to record a height class: 01=<1/2m, 02=1/2-1m, 03=1-2m, 04=2-5m, 05=5-10m, 06=10-15m, 07=15-20m, 08=20-35m, 09=35-50m, 10=>50m.

Species list and coverage
Species (List 12 to 20 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please) List the species that are dominant or that are characteristically consistent throughout the stand. These species may or may not be abundant, but they should be constant representatives in the survey.

Make sure that the main non-native species occurring in the stand also are listed in the space provided, usually after the major native species are recorded. Regardless of where the species are recorded on the form, all species are treated equally in the analysis.

When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant or characteristic species per stratum. Provide a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height. When species occur in more than one stratum, note each stratum and its cover. However, with grass species, do not separate the strata of a species; use the one stratum that best represents where the major biomass of the grasses lies (usu. Low).

Also, provide a numerical ocular estimate of aerial coverage for each species. When estimating, it is often helpful to think of coverage in terms of the cover intervals from the CNPS relevé form at first (*e.g*. <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%). Keeping these classes in mind, then refine your estimate to a specific percentage (*e.g*. the cover of species "x" is somewhere between 25 and 50 percent, but I think it is actually around 30%). Please note: All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Unusual species: List species that are either locally or regionally rare, endangered, or atypical (*e.g*. range extension or range limit) within the stand. This species list will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

INTERPRETATION OF STAND

Basic Alliance and stand description

Field-assessed vegetation alliance name: Name of alliance (series) or habitat following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g*. *Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Note: The field-assessed alliance name may not exist in present classification, in which you can provide a new alliance name in this field. If this is the case, also make sure to denote and explain this in the "**Confidence in Identification**" and/or "**Explain**" sections below.

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (*e.g*. *Quercus*

agrifolia/*Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (*e.g*. *Quercus agrifolia*-*Quercus kelloggii*).

Please note: The field-assessed association name may not exist in present classification, in which you can provide a new association name in this field.

Adjacent Alliances: Identify other vegetation types that are directly adjacent to the stand being assessed. Specifically, list up to three alliances (or associations or mapping units) by noting the dominant species; also note the distance away in meters from the GPS waypoint and the direction in degrees aspect that the adjacent alliance is found (e.g. Abies concolor-Pinus ponderosa 50m, 360°/N Arctostaphylos patula 100m, 110°).

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", denote whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Explain: Please elaborate if your "Confidence in Identification" is low or moderate. Similarly, if the field-assessed alliance name is not defined by CNPS's present Manual of California Vegetation (MCV) classification, note this in the space and describe why. In some instances for specific projects, there may be the benefit of more detailed classifications than what is presented in the first edition of the MCV. If this is the case, be sure to substitute the most appropriate and detailed classification.

Other identification problems (describe): Discuss any further problems with the identification of the assessment (*e.g*. stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

Polygon is more than one type (Yes, No) (Note: type with greatest coverage in polygon should be entered in above section) This is relevant to areas that have been delineated as polygons on aerial photographs for a vegetation-mapping project. In most cases the polygon delineated is intended to represent a single stand, however mapping conventions and the constraints and interpretability of remote images will alter the ability to map actual stands on the ground. "Yes" is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. "No" is noted when the polygon is primarily representative of the field-assessed alliance.

Other types: If "Yes" above, then list the other subordinate vegetation alliances that are included within the polygon. List them in order of their amount of the polygon covered.

Has the vegetation changed since air photo taken? (Yes, No) If an aerial photograph is being used for reference, evaluate if the stand of the field-assessed alliance has changed as a result of disturbance or other historic change since the photograph was taken.

If Yes, how? What has changed (write N/A if so)**?** If the photographic signature of the vegetation has changed (*e.g*. in structure, density, or extent), please detail here.

Simplified Key to Soil Texture

(Adapted from Brewer and McCann 1982)

Place about three teaspoons of soil in the palm of your hand. Take out any particles ≥ 3 mm in size.

A. Does soil remain in ball when squeezed in your hand palm?

Yes, soil does remain in a ball when squeezed..... **B**

No, soil does not remain in a ball when squeezed..... **sand**

SAND Sand (class unknown)
Very coarse texture……COSA Coarse sand
Moderately coarse texture……MESN Medium sand
Moderately fine texture…….. FISN Fine sand

B. Add a small amount of water until the soil feels like putty. Squeeze the ball between your thumb and forefinger, attempting to make a ribbon that you push up over your finger. Does soil make a ribbon?

Yes, soil makes a ribbon; though it may be very short.....**C**

No, soil does not make a ribbon.....**loamy sand**

Very gritty with coarse particles…..COLS Coarse, loamy sand
Moderately to slightly gritty with medium to fine particles.....MELS Medium to very fine, loamy sand

C. Does ribbon extend more than one inch?

Yes, soil extends > 1 inch.....**D**

No, soil does not extend > 1 inch.....Add excess water

Soil feels gritty……..……..…….....**loam or sandy loam**

LOAM Loam (class unknown)
Very gritty with coarse particles…..MCSL Moderately coarse, sandy loam
Moderately gritty with medium to fine particles.....MESA Medium to very fine, sandy loam
Slightly gritty .....MELO Medium loam

Soil feels smooth.....**silt loam**

MESIL medium silt loam

D. Does ribbon extend more than 2 inches?

Yes, ribbon extends more than 2 inches, and does not crack if bent into a ring.....**E**

No, soil breaks when 1–2 inches long; cracks if bent into a ring……...Add excess water

Soil feels gritty….....**sandy clay loam or clay loam**

Very gritty……..……...MFSA Moderately fine sandy clay loam
Slightly gritty……MFCL Moderately fine clay loam

Soil feels smooth.....…….**silty clay loam or silt**

Moderately fine texture……...MFSL Moderately fine silty clay loam
Very fine texture…….. MESI Medium silt

E. Soil makes a ribbon 2+ inches long; does not crack when bent into a ring.....Add excess water

Soil feels gritty.....**sandy clay or clay**

CLAY Clay (class unknown)
Very gritty…… FISA Fine sandy clay
Slightly gritty…….. FICL Fine clay

Soil feels smooth.....**silty clay**

FISC Fine silty clay

UNKN = UNKNOWN PEAT = PEAT MUCK = MUCK

CALIFORNIA NATIVE PLANT SOCIETY SURVEY FORM CODE LIST

(revised 4/5/05)

IMPACTS

01 Development
02 ORV activity
03 Agriculture
04 Grazing
05 Competition from exotics
06 Logging
07 Insufficient population/stand size
08 Altered flood/tidal regime
09 Mining
10 Hybridization
11 Groundwater pumping
12 Dam/inundation
13 Other
14 Surface water diversion
15 Road/trail construction/maint.
16 Biocides
17 Pollution
18 Unknown
19 Vandalism/dumping/litter
20 Foot traffic/trampling
21 Improper burning regime
22 Over collecting/poaching
23 Erosion/runoff
24 Altered thermal regime
25 Landfill
26 Degrading water quality
27 Wood cutting
28 Military operations
29 Recreational use (non ORV)
30 Nest parasitism
31 Non-native predators
32 Rip-rap, bank protection
33 Channelization (human caused)
34 Feral pigs
35 Burros
36 Rills
37 Phytogenic mounding
38 Sudden oak death syndrome (SODS)

MACRO TOPOGRAPHY

00 Bench
01 Ridge top (interfluve)
02 Upper 1/3 of slope
03 Middle 1/3 of slope
04 Lower 1/3 of slope (lowslope)
05 Toeslope (alluvial fan/bajada)
06 Bottom/plain
07 Basin/wetland
08 Draw
09 Other
10 Terrace (former shoreline or floodplain)
11 Entire slope
12 Wash (channel bed)
13 Badland (complex of draws & interfluves)
14 Mesa/plateau
15 Dune/sandfield
16 Pediment
17 Backslope (cliff)

MICRO TOPOGRAPHY

01 Convex or rounded
02 Linear or even
03 Concave or depression
04 Undulating pattern
05 Hummock or Swale pattern
06 Mounded
07 Other

PARENT MATERIAL

ANDE	Andesite
ASHT	Ash (of any origin)
GRAN	Granitic (generic)
GREE	Greenstone
DIOR	Diorite
BASA	Basalt
OBSI	Obsidian
PUMI	Pumice
IGTU	Igneous (type unknown)
MONZ	Monzonite
PYFL	Pyroclastic flow
QUDI	Quartz diorite
RHYO	Rhyolite
VOLC	General volcanic extrusives
VOFL	Volcanic flow
VOMU	Volcanic mud
BLUE	Blue schist
CHER	Chert
DOLO	Dolomite
FRME	Franciscan melange
INTR	General igneous intrusives
GNBG	Gneiss/biotite gneiss
HORN	Hornfels
MARB	Marble
METU	Metamorphic (type unknown)
PHYL	Phyllite
SCHI	Schist
SESC	Semi-schist
SLAT	Slate
BREC	Breccia (non-volcanic)
CACO	Calcareous conglomerate
CASA	Calcareous sandstone
CASH	Calcareous shale
CASI	Calcareous siltstone
CONG	Conglomerate
FANG	Fanglomerate
GLTI	Glacial till, mixed origin, moraine
LALA	Large landslide (unconsolidated)
LIME	Limestone
SAND	Sandstone
SETU	Sedimentary (type unknown)
SHAL	Shale
SILT	Siltstone
DIAB	Diabase
GABB	Gabbro
PERI	Peridotite
SERP	Serpentine
ULTU	Ultramafic (type unknown)
CALU	Calcareous (origin unknown)
DUNE	Sand dunes
LOSS	Loess
MIIG	Mixed igneous
MIME	Mixed metamorphic
MIRT	Mix of two or more rock types
MISE	Mixed sedimentary
CLAL	Clayey alluvium
GRAL	Gravelly alluvium
MIAL	Mixed alluvium
SAAL	Sandy alluvium (most alluvial fans and washes)
SIAL	Silty alluvium
OTHE	Other than on list

SOIL TEXTURE

COSA	Coarse sand
MESN	Medium sand
FISN	Fine sand
COLS	Coarse, loamy sand
MELS	Medium to very fine, loamy sand
MCSL	Moderately coarse, sandy loam
MESA	Medium to very fine, sandy loam
MELO	Medium loam
MESL	Medium silt loam
MESI	Medium silt
MFCL	Moderately fine clay loam
MFSA	Moderately fine sandy clay loam
MFSL	Moderately fine silty clay loam
FISA	Fine sandy clay
FISC	Fine silty clay
FICL	Fine clay
SAND	Sand (class unknown)
LOAM	Loam (class unknown)
CLAY	Clay (class unknown)
UNKN	Unknown
PEAT	Peat
MUCK	Muck

DOMINANT VEGETATION GROUP

Trees:

TBSE	Temperate broad-leaved seasonal evergreen forest
TNLE	Temperate or subpolar needle-leafed evergreen forest
CDF	Cold-deciduous forest
MNDF	Mixed needle-leafed evergreen-cold deciduous. forest
TBEW	Temperate broad-leaved evergreen woodland
TNEW	Temperate or subpolar needle-leaved evergreen woodland
EXEW	Extremely xeromorphic evergreen woodland
CDW	Cold-deciduous woodland
EXDW	Extremely xeromorphic deciduous woodland
MBED	Mixed broad-leaved evergreen-cold deciduous woodland
MNDW	Mixed needle-leafed evergreen-cold deciduous woodland

Shrubs:

TBES	Temperate broad-leaved evergreen shrubland
NLES	Needle-leafed evergreen shrubland
MIES	Microphyllus evergreen shrubland
EXDS	Extremely xeromorphic deciduous shrubland
CDS	Cold-deciduous shrubland
MEDS	Mixed evergreen-deciduous shrubland
XMED	Extremely xeromorphic mixed evergreen-deciduous shrubland

Dwarf Shrubland:

NMED	Needle-leafed or microphyllous evergreen dwarf shrubland
XEDS	Extremely xeromorphic evergreen dwarf shrubland
DDDS	Drought-deciduous dwarf shrubland
MEDD	Mixed evergreen cold-deciduous dwarf shrubland

Herbaceous:

TSPG	Temperate or subpolar grassland
TGST	Temperate or subpolar grassland with sparse tree
TGSS	Temperate or subpolar grassland with sparse shrublayer
TGSD	Temperate or subpolar grassland with sparse dwarf shrub layer
TFV	Temperate or subpolar forb vegetation
THRV	Temperate or subpolar hydromorphic rooted vegetation
TAGF	Temperate or subpolar annual grassland or forb vegetation

***Sparse Vegetation*:**

SVSD	Sparsely vegetated sand dunes
SVCS	Sparsely vegetated consolidated substrates

APPENDIX 1B. Relevé and Rapid Assessment forms used for the vegetation sampling.

CALIFORNIA NATIVE PLANT SOCIETY RELEVÉ FIELD FORM

(Revised 6/06/05)

Page_____ of Relevé # _____

See code list for italicized fields

	FOR OFFICE USE ONLY
Polygon #_____ or Relevé # _____	Permanent Number:
Date _____/_____/_____ BPU # _____ MM DD YYYY	Community Name: Community Number: Occurrence Number:
County	Source Code:
USGS Quad. 7.5' or 15' (Circle one)	Quad Code: Quad Name: Map Index Number:
CNPS Chapter	Update: Yes No (Circle one)
Landowner	
Contact Person	
Address	
City / Zip / Phone number	
Observers	

Relevé plot shape (square, rectangle, triangle, circle, entire stand) _____

Relevé plot size (length and width of rectangle, or circle-*diameter*) _____ _____ (m.)

NOTE: Forest/woodland plots should be 1000m² if upland or 400m² if riparian. All shrub plots should be 400m². Herb plots should be 100 or 10m². Please consult with CNPS Vegetation Ecologist on herb plots. For circle radiuses: 5.64m (100m²), 11.28m (400m²), 17.84m (1000m²)

Study Plot Revisit? Yes or No (Circle one)

Photo Interpreter Community Code for Polygon _____

Other polygons of same type? Yes or No Is plot representative of whole polygon? Yes or No (Circle one) If not, why not?_____

GPS File # _____ GPS name (or points in file) _____ Start Time ____:____(am or pm) GPS Datum (from GPS setup) (e.g. WGS 84, NAD 27)_____

File type: Point or Polygon (circle one) Releve: UTMN ___ ___ ___ ___ ___ ___ ___UTME ___ ___ ___ ___ ___ ___ Error ±_____ ft/m UTM Zone_____

Transect: Start UTME ___ ___ ___ ___ ___ ___UTMN ___ ___ ___ ___ ___ ___ ___End: UTME ___ ___ ___ ___ ___ ___UTMN___ ___ ___ ___ ___ ___ _

Elevation (ft.)_____ Slope (°) _____Aspect (°) _____ Topography: *Macro* _____ *Micro* _____

VEGETATION DESCRIPTION

Dominant Layer ___ 0-0.5 m, ___>0.5-5 m, ___>5 m Preliminary Alliance Name _____

Preliminary Association Name_____

Stand Size ____<1 acre, ____1-5 acres, ____>5 acres *Dominant Vegetation Group* _____ *(use codes from code list)*

Structure: Ground _____ Shrub _____ Tree _____ Phenology: Ground _____Shrub _____Tree _____
(1. Continuous 2. Intermittent 3. Open) (Early, Peak, Late)

Wetland Community Type _____ (Wetland or Upland)

If Community Type = Wetland (see Artificial Keys to Cowardin Systems and Names)

Cowardin System _____ Subsystem _____Class _____

Distance to water (m): Vertical _____ Horizontal _____ Channel form (if riverine) _____
(Straight, Meandering, Braided)

Adjacent Alliance Location (e.g., North, South, East, or West of stand)	Description (up to 4 species by layer)

Photographs – *Note position and direction of photo(s) relative to plot*

CALIFORNIA NATIVE PLANT SOCIETY RELEVÉ FIELD FORM

Page_____ of Relevé # _____

STAND AND ENVIRONMENTAL DESCRIPTION

Trend code _____
1. Increasing 2. Stable 3. Decreasing
4. Fluctuating 5. Unknown

Site Impact codes _____ _____ _____ _____ _____ _____ _____ _____
(List codes in order, with most significant first)

Site Intensity _____ _____ _____ _____ _____ _____ _____ _____
1. Light 2. Moderate 3. Heavy (List beneath each impact code)

Site Location and Plot Description

Site History – *including observations of fire scars, insect/disease damage, grazing/browsing, human disturbance*

Sensitive Species – *List species observed and GPS UTM's; Estimate size and extent of local populations*

Unknown Specimens – *List species name, identification notes (e.g. Genus, condition of specimen), etc of specific unknowns*

Additional Comments – *Including animal observations, anthropological observations, abiotic features*

Surface Coarse Fragments and Soils Information

Type:	Fines	Gravel	Cobble	Stone	Boulders	Bedrock	Litter	Water	Living stems	Other (Specify):
Descriptor:	Including sand, mud	2mm-7.5 cm diameter	7.5-25 cm diam	25-60cm diam.	>60cm diam.	Including outcrops	Organic matter covering ground	Standing or running water	At ground surface	
% cover*:										

*note all surface fragments, non-vegetation, living stems, etc., should add up to 100%

% Soil saturated _____ **% Soil moist** _____ **% Soil dry** _____ **Flowing Water Present?** __Y__/__N__
(all three % soil estimates should add up to 100%)

% Bioturbation in plot_____ (out of 100%) ***Soil Texture*** _____ ***Parent Material*** _____

Height Classes & Cover Estimates for Vegetation Strata

LICHEN / MOSS	Epiphytic Cover	Ground Cover	Rock Cover	blank	**TREE:**	Conifer cover	T1 <16' (<5m)	T2 16-<33' (5-10 m)	T3 33-<66' (10-20 m)	T4 66-99' (20-30 m)	T4 ≥99' (>30 m)
SHRUB cover per decadence class:	%SD1 <3yrs of growth	%SD2 <1% dead	%SD3 1-25% dead	%SD4 >25% dead		Hardwood cover	T1 <16' (<5m)	T2 16-<33' (5-10 m)	T3 33-<66' (10-20 m)	T4 66-99' (20-30 m)	T4 ≥99' (>30 m)
SHRUB:	Shrub Cover	S1 - <3' (<0.9m)	S2 - 3-6' (0.9-1.8m)	S3 - 6-8' (1.8-2.4m)	S4 - >8' (>2.4m)	**HERB:**	Herb Cover	H1 <4" (<10 cm)	H2 4-<8" (10-20cm)	H3 8-<12" (20-30cm)	H4 ≥12" (≥30cm)

CALIFORNIA PLANT COMMUNITIES RELEVÉ FIELD FORM (PART 2)

SPECIES SHEET (Revised 3/17/05)

Page_____ of Relevé # _____

Cover Class Intervals: 1 (<1%), 2 (1-5%), 3a (>5-15%), 3b (>15-25%), 4 (>25-50%), 5 (>50-75%), 6 (>75%)

L=Low herbs and subshrubs (<0.5 m.), M=Medium height (0.5 m.-5.0 m.), T=Tall height (>5.0 m.)

L	M	T	Vascular plant name, moss, lichen, or cryptogamic crust cover	Specimen	Final species determination or Tree dbh	Cover Class	%

Total Vegetation Cover (Class): _____ Total Tall_____ Total Medium _____ Total Low _____ Total Non-Native _____

percent cover of above: _____ _____ _____ _____ _____

CALIFORNIA NATIVE PLANT SOCIETY
SIERRA FOOTHILLS VEGETATION RAPID ASSESSMENT FIELD FORM
(Revised April 30, 2007)

For Office Use: **Final database #:**

LOCATION / ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** _____ **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: **UTME** ___ ___ ___ ___ ___ ___ **UTMN** ___ ___ ___ ___ ___ ___ ___ **GPS Error: ±**_____ **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(meters) and bearing** _____**(degrees)**

Elevation: _____ **ft / m Photograph #'s:**

Geology code: _____ **Soil Texture code:** _____ **Upland** or **Wetland/Riparian** (circle one)

Macro topography: top upper mid lower bottom | Micro topography: convex flat concave undulating

% Surface cover (sum to 100%)**: Lg rock:** _____ **Sm rock:** _____ **Bare/Fine:** _____ **Litter:** _____ **BA Stems:** _____ **Water:** _____

Slope exposure: Actual °:_____ **General: NE NW SE SW Flat Variable** (circle one)

Slope steepness: Actual °:_____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre / 1-5 acres / >5 acres | Plot: Yes / No If Yes, denote size: 100m² / 400 m² / 1000 m² / Other _____

Site history, stand age, and comments: _____

_____

_____

_____

Type/ Level of disturbance codes: _____/____ _____/____ _____/____ _____/____ _____/____ **"Other":**

HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (24-48" dbh), **T6** (>48" dbh) (circle one)

If Tree type, list 1-3 dominant overstory spp.: _____

Shrub: S1 (<3 yr old), **S2** (<1% dead), **S3** (1-25% dead), **S4** (>25% dead) **% Total Non-Vasc Cover** ____

Herb: H1 (<4" height), **H2** (4 -<8" ht), **H3** (8 -<12" ht), **H4** (≥12" ht.) **% Total Vasc Veg cover** ____

% Cover- Overstory Tree Conifer/Hardwood: _____/_____ **Low Tree-Tall Shrub:** _____ **Lo-Mid Shrub:** _____ **Herbaceous:** _____

Height Class - Overstory Conifer/Hardwood: _____/_____ **Low Tree-Tall Shrub:** _____ **Lo-Mid Shrub:** _____ **Herbaceous:** _____

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and % cover: (Jepson Manual nomenclature please)

Stratum categories: T (>5.0 m), M (0.5-5.0), L (<0.5m); *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover

Unusual species: _____

INTERPRETATION OF STAND

Field-assessed vegetation alliance name: _____

Field-assessed association name (optional): _____

Adj alliances: _____ _____ / _____ _____

Confidence in alliance identification: L M H Explain _____

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed? _____

APPENDIX 2. List of plants identified in the northern Sierra Nevada Foothills surveys. Scientific names and native status are by UCB (2007) and codes and common names by Sawyer and Keeler-Wolf (1995), UCB (2007), and USDA-NRCS (2007).

Code	Taxon	Common Name	Family	Native
ABCO	*Abies concolor*	white fir	Pinaceae	yes
ACCI	*Acer circinatum*	vine maple	Aceraceae	yes
ACMA3	*Acer macrophyllum*	big-leaf maple	Aceraceae	yes
ACNE2	*Acer negundo*	boxelder	Aceraceae	yes
ACMI2	*Achillea millefolium*	common yarrow	Asteraceae	yes
ACLE8	*Achnatherum lemmonii*	Lemmon's needlegrass	Poaceae	yes
ACMO2	*Achyrachaena mollis*	blow wives	Asteraceae	yes
ADFA	*Adenostoma fasciculatum*	chamise	Rosaceae	yes
ADIAN	*Adiantum*	maidenhair fern	Pteridaceae	yes
ADJO	*Adiantum jordanii*	California maiden-hair fern	Pteridaceae	yes
AETR	*Aegilops triuncialis*	barbed goatgrass	Poaceae	no
AECA	*Aesculus californica*	California buckeye	Hippocastanaceae	yes
AGOSE	*Agoseris*	agoseris	Asteraceae	yes
AGGR	*Agoseris grandiflora*	bigflower agoseris	Asteraceae	yes
AGHE2	*Agoseris heterophylla*	annual agoseris	Asteraceae	yes
AGRE	*Agoseris retrorsa*	spearleaf agoseris	Asteraceae	yes
AGROS2	*Agrostis*	bentgrass	Poaceae	unknown
AGAV	*Agrostis avenacea*	Pacific bentgrass	Poaceae	no
AGCA5	*Agrostis capillaris*	colonial bent	Poaceae	no
AGEL4	*Agrostis elliottiana*	Elliott's bentgrass	Poaceae	yes
AGEX	*Agrostis exarata*	spike bentgrass	Poaceae	yes
AGHE3	*Agrostis hendersonii*	Henderson's bent grass	Poaceae	yes
AGMI3	*Agrostis microphylla*	small-leaf bentgrass	Poaceae	yes
AGPA8	*Agrostis pallens*	seashore bentgrass	Poaceae	yes
AGVI11	*Agrostis viridis*	beardless rabbitsfoot grass	Poaceae	no
AIAL	*Ailanthus altissima*	tree of heaven	Simaroubaceae	no
AICA	*Aira caryophyllea*	silver European hairgrass	Poaceae	no
ALGAE	Algae	algae		unknown
ALPLA	*Alisma plantago-aquatica* var. *americanum*	northern water plantain	Alismataceae	yes
ALLIU	*Allium*	wild onion	Liliaceae	yes
ALAM2	*Allium amplectens*	narrowleaf onion	Liliaceae	yes
ALCR3	*Allium cratericola*	Cascade onion	Liliaceae	yes
ALOBC	*Allium obtusum* var. *conspicuum*	red Sierra onion	Liliaceae	yes
ALPEP2	*Allium peninsulare* var. *peninsulare*	penisula onion	Liliaceae	yes
ALSA	*Allium sanbornii*	Sanborn's onion	Liliaceae	yes
ALSAC	*Allium sanbornii* var. *congdonii*	Congdon's onion	Liliaceae	yes
ALSAS	*Allium sanbornii* var. *sanbornii*	Sanborn's onion	Liliaceae	yes
ALTU	*Allium tuolumnense*	Rawhide hill onion	Liliaceae	yes

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ALDI4	*Allophyllum divaricatum*	purple false gilyflower	Polemoniaceae	yes
ALRH2	*Alnus rhombifolia*	white alder	Betulaceae	yes
ALOPE	*Alopecurus*	foxtail	Poaceae	unknown
ALCA4	*Alopecurus carolinianus*	Carolina foxtail	Poaceae	yes
ALSA3	*Alopecurus saccatus*	Pacific foxtail	Poaceae	yes
AMBRO	*Ambrosia*	ragweed	Asteraceae	yes
AMAR2	*Ambrosia artemisiifolia*	common ragweed	Asteraceae	no
AMPS	*Ambrosia psilostachya*	western ragweed	Asteraceae	yes
AMUT	*Amelanchier utahensis*	Utah service-berry	Rosaceae	yes
AMCAC	*Amorpha californica* var. *californica*	California false indigo	Fabaceae	yes
AMSIN	*Amsinckia*	fiddleneck	Boraginaceae	yes
AMLY	*Amsinckia lycopsoides*	tarweed fiddleneck	Boraginaceae	yes
AMME	*Amsinckia menziesii*	rancher's fireweed	Boraginaceae	yes
AMMEI2	*Amsinckia menziesii* var. *intermedia*	common fiddleneck	Boraginaceae	yes
AMMEM2	*Amsinckia menziesii* var. *menziesii*	Menzies' fiddleneck	Boraginaceae	yes
ANAGA	*Anagallis*	anagallis	Primulaceae	unknown
ANAR	*Anagallis arvensis*	scarlet pimpernel	Primulaceae	no
ANMA	*Anaphalis margaritacea*	pearly everlasting	Asteraceae	yes
ANGLS	*Andropogon glomeratus* var. *scabriglumis*	southwestern bushy bluestem	Poaceae	yes
ANVI2	*Andropogon virginicus*	broomsedge bluestem	Poaceae	no
ANGEL	*Angelica*	angelica	Apiaceae	yes
ANCO2	*Anthemis cotula*	stinkweed	Asteraceae	no
ANOD	*Anthoxanthum odoratum*	sweet vernal grass	Poaceae	no
ANCA14	*Anthriscus caucalis*	bur-chervil	Apiaceae	no
APOC	*Aphanes occidentalis*	field parsley piert	Rosaceae	yes
APIAXX	*Apiaceae*	Apiaceae	Apiaceae	yes
APAN	*Apiastrum angustifolium*	wild parsley	Apiaceae	yes
APOCY	*Apocynum*	dogbane	Apocynaceae	yes
APAN2	*Apocynum androsaemifolium*	bitter dogbane	Apocynaceae	yes
APCA	*Apocynum cannabinum*	Indian hemp	Apocynaceae	yes
AQFO	*Aquilegia formosa*	Sitka columbine	Ranunculaceae	yes
ARABI2	*Arabis*	rockcress	Brassicaceae	yes
ARCA2	*Aralia californica*	elk clover	Araliaceae	yes
ARME	*Arbutus menziesii*	Pacific madrone	Ericaceae	yes
ARCEU	*Arceuthobium*	dwarf mistletoe	Viscaceae	yes
AROC	*Arceuthobium occidentale*	foothill-pine dwarf mistletoe	Viscaceae	yes
ARCTO3	*Arctostaphylos*	manzanita	Ericaceae	yes
ARMA	*Arctostaphylos manzanita*	common manzanita	Ericaceae	yes
ARMAM2	*Arctostaphylos manzanita* subsp. *manzanita*	common manzanita	Ericaceae	yes
ARMAW	*Arctostaphylos manzanita* subsp. *wieslanderi*	Wieslander's manzanita	Ericaceae	yes

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ARME3	*Arctostaphylos mewukka*	True's manzanita	Ericaceae	yes
ARMY	*Arctostaphylos myrtifolia*	Ione manzanita	Ericaceae	yes
ARPA6	*Arctostaphylos patula*	greenleaf manzanita	Ericaceae	yes
ARVI4	*Arctostaphylos viscida*	whiteleaf manzanita	Ericaceae	yes
ARVIM	*Arctostaphylos viscida* subsp. *mariposa*	Mariposa manzanita	Ericaceae	yes
ARCA10	*Aristolochia californica*	dutchman's pipe	Aristolochiaceae	
ARDO3	*Artemisia douglasiana*	mugwort	Asteraceae	yes
ASARU	*Asarum*	wildginger	Aristolochiaceae	yes
ASHA	*Asarum hartwegii*	Hartweg's wildginger	Aristolochiaceae	yes
ASCLE	*Asclepias*	milkweed	Asclepiadaceae	yes
ASCO	*Asclepias cordifolia*	purple milkweed	Asclepiadaceae	yes
ASER	*Asclepias eriocarpa*	Kotolo milkweed	Asclepiadaceae	yes
ASFA	*Asclepias fascicularis*	narrow-leaf milkweed	Asclepiadaceae	yes
ASSP	*Asclepias speciosa*	showy milkweed	Asclepiadaceae	yes
ASCA5	*Aspidotis californica*	California lacefern	Pteridaceae	yes
ASTER	*Aster*	aster		yes
ASEA	*Aster eatonii*	Eaton's aster	Asteraceae	yes
ASRA	*Aster radulinus*	roughleaf aster	Asteraceae	yes
ASTEXX	*Asteraceae*	Asteraceae	Asteraceae	no
ASTRA	*Astragalus*	locoweed	Fabaceae	yes
ASGA	*Astragalus gambelianus*	Gambel's dwarf milk-vetch	Fabaceae	yes
ASPA15	*Astragalus pauperculus*	depauperate milk-vetch	Fabaceae	yes
ATFI	*Athyrium filix-femina*	common ladyfern	Dryopteridaceae	yes
ATPU	*Athysanus pusillus*	common sandweed	Brassicaceae	yes
AVENA	*Avena*	oat	Poaceae	no
AVBA	*Avena barbata*	slender oat	Poaceae	no
AVFA	*Avena fatua*	wild oat	Poaceae	no
BAPI	*Baccharis pilularis*	coyote brush	Asteraceae	yes
BASA4	*Baccharis salicifolia*	mule fat	Asteraceae	yes
BALSA	*Balsamorhiza*	balsamroot	Asteraceae	yes
BADE2	*Balsamorhiza deltoidea*	deltoid balsamroot	Asteraceae	yes
BAMA3	*Balsamorhiza macrolepis*	California balsamroot	Asteraceae	yes
BAMAM	*Balsamorhiza macrolepis* var. *macrolepis*	big-scale balsamroot	Asteraceae	yes
BAOR	*Barbarea orthoceras*	erectpod wintercress	Brassicaceae	yes
BEAQ	*Berberis aquifolium*	hollyleaved barberry	Berberidaceae	yes
BEAQD	*Berberis aquifolium* var. *dictyota*	shining netvein barberry	Berberidaceae	yes
BIDEN	*Bidens*	beggarticks	Asteraceae	unknown
BLNAN	*Blennosperma nanum* var. *nanum*	common stickyseed	Asteraceae	yes
BOIN3	*Bowlesia incana*	hoary bowlesia	Apiaceae	yes
BRDI2	*Brachypodium distachyon*	purple false brome	Poaceae	no
BRASS2	*Brassica*	mustard	Brassicaceae	no

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BRNI	*Brassica nigra*	black mustard	Brassicaceae	no
BRRA	*Brassica rapa*	field mustard	Brassicaceae	no
BRASXX	*Brassicaceae*	Brassicaceae	Brassicaceae	unknown
BRCA3	*Brickellia californica*	California brickellbush	Asteraceae	yes
BRMA	*Briza maxima*	big quakinggrass	Poaceae	no
BRMI2	*Briza minor*	little quakinggrass	Poaceae	no
BRODI	*Brodiaea*	brodiaea	Liliaceae	yes
BRAP	*Brodiaea appendiculata*	appendage brodiaea	Liliaceae	yes
BRCA4	*Brodiaea californica*	California brodiaea	Liliaceae	yes
BRCO3	*Brodiaea coronaria*	crown brodiaea	Liliaceae	yes
BRELE	*Brodiaea elegans* subsp. *elegans*	harvest brodiaea	Liliaceae	yes
BRMI3	*Brodiaea minor*	dwarf brodiaea	Liliaceae	yes
BRPU16	*Brodiaea purdyi*	Sierra brodiaea	Liliaceae	yes
BROMU	*Bromus*	brome	Poaceae	no
BRAR3	*Bromus arenarius*	Australian brome	Poaceae	no
BRBR5	*Bromus briziformis*	rattlesnake brome	Poaceae	no
BRCA5	*Bromus carinatus*	California brome	Poaceae	yes
BRDI3	*Bromus diandrus*	ripgut brome	Poaceae	no
BRHO2	*Bromus hordeaceus*	soft chess	Poaceae	no
BRJA	*Bromus japonicus*	Japanese brome	Poaceae	no
BRLA3	*Bromus laevipes*	Chinook brome	Poaceae	yes
BRMA3	*Bromus madritensis*	foxtail chess	Poaceae	no
BRMAR	*Bromus madritensis* subsp. *rubens*	red brome	Poaceae	no
BROR2	*Bromus orcuttianus*	Orcutt's brome	Poaceae	yes
BRSE	*Bromus secalinus*	chess brome	Poaceae	no
BRST2	*Bromus sterilis*	poverty brome	Poaceae	no
BRTE	*Bromus tectorum*	cheat grass	Poaceae	no
CALAM	*Calamagrostis*	reedgrass	Poaceae	yes
CALAN	*Calandrinia*	calandrinia	Portulacaceae	yes
CACI2	*Calandrinia ciliata*	red maids	Portulacaceae	yes
CALLI6	*Callitriche*	water-starwort	Callitrichaceae	unknown
CAHE3	*Callitriche heterophylla*	larger waterstarwort	Callitrichaceae	yes
CAHEB2	*Callitriche heterophylla* var. *bolanderi*	Bolander's water-starwort	Callitrichaceae	yes
CAMA3	*Callitriche marginata*	waterstarwort	Callitrichaceae	yes
CADE27	*Calocedrus decurrens*	incense cedar	Cupressaceae	yes
CALOC	*Calochortus*	mariposa lily	Liliaceae	yes
CAAL2	*Calochortus albus*	white globe lily	Liliaceae	yes
CALU9	*Calochortus luteus*	yellow mariposa lily	Liliaceae	yes
CAMO3	*Calochortus monophyllus*	yellow star-tulip	Liliaceae	yes
CASU3	*Calochortus superbus*	yellow mariposa	Liliaceae	yes
CAVE3	*Calochortus venustus*	butterfly mariposa lily	Liliaceae	yes
CALYC	*Calycadenia*	rosinweed	Asteraceae	yes

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CACI4	*Calycadenia ciliosa*	Fremont's western rosinweed	Asteraceae	yes
CAFR	*Calycadenia fremontii*	Fremont's western rosinweed	Asteraceae	yes
CAMU3	*Calycadenia multiglandulosa*	sticky western rosinweed	Asteraceae	yes
CAOP	*Calycadenia oppositifolia*	Butte County calycadenia	Asteraceae	yes
CATR3	*Calycadenia truncata*	Oregon western rosinweed	Asteraceae	yes
CAOC5	*Calycanthus occidentalis*	spicebush	Calycanthaceae	yes
CALYS	*Calystegia*	morning-glory	Convolvulaceae	yes
CAOC6	*Calystegia occidentalis*	chaparral false bindweed	Convolvulaceae	yes
CAOCF	*Calystegia occidentalis* subsp. *fulcrata*	chaparral false bindweed	Convolvulaceae	yes
CAOCO	*Calystegia occidentalis* subsp. *occidentalis*	chaparral false bindweed	Convolvulaceae	yes
CAST21	*Calystegia stebbinsii*	Stebbins' morning-glory	Convolvulaceae	yes
CAMIS	*Camissonia*	suncup	Onagraceae	yes
CAMPA	*Campanula*	bellflower	Campanulaceae	yes
CARDA	*Cardamine*	bittercress	Brassicaceae	yes
CACA39	*Cardamine californica*	tooth wort	Brassicaceae	yes
CACAC3	*Cardamine californica* var. *californica*	milkmaids	Brassicaceae	yes
CAOL	*Cardamine oligosperma*	Idaho bittercress	Brassicaceae	yes
CAPY2	*Carduus pycnocephalus*	Italian thistle	Asteraceae	no
CAREX	*Carex*	carex	Cyperaceae	unknown
CAAM10	*Carex amplifolia*	bigleaf sedge	Cyperaceae	yes
CAAN15	*Carex angustata*	widefruit sedge	Cyperaceae	yes
CAAT3	*Carex athrostachya*	slenderbeak sedge	Cyperaceae	yes
CABA4	*Carex barbarae*	Santa Barbara sedge	Cyperaceae	yes
CABR7	*Carex brainerdii*	Brainerd's sedge	Cyperaceae	yes
CADE8	*Carex densa*	dense sedge	Cyperaceae	yes
CAFR2	*Carex fracta*	fragile sheath sedge	Cyperaceae	yes
CALE8	*Carex lenticularis*	lakeshore sedge	Cyperaceae	yes
CAMU5	*Carex multicaulis*	manystem sedge	Cyperaceae	yes
CANE2	*Carex nebrascensis*	Nebraska sedge	Cyperaceae	yes
CANU5	*Carex nudata*	naked sedge	Cyperaceae	yes
CAOB3	*Carex obnupta*	coast carex	Cyperaceae	yes
CAPR5	*Carex praegracilis*	clustered field sedge	Cyperaceae	yes
CARO5	*Carex rossii*	Ross' sedge	Cyperaceae	yes
CASE2	*Carex serratodens*	twotooth sedge	Cyperaceae	yes
CASU6	*Carex subfusca*	brown sedge	Cyperaceae	yes
CARYXX	*Caryophyllaceae*	Caryophyllaceae	Caryophyllaceae	unknown
CASTI2	*Castilleja*	Indian paintbrush	Scrophulariaceae	yes
CAAF	*Castilleja affinis*	Indian paintbrush	Scrophulariaceae	yes
CAAP4	*Castilleja applegatei*	pine Indian paintbrush	Scrophulariaceae	yes
CAAPP2	*Castilleja applegatei* var. *pinetorum*	wavyleaf Indian paintbrush	Scrophulariaceae	yes
CAAT25	*Castilleja attenuata*	valley tassels	Scrophulariaceae	yes

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CACA79	*Castilleja campestris*	vernal pool Indian paintbrush	Scrophulariaceae	yes
CAEXE	*Castilleja exserta* subsp. *exserta*	exserted Indian paintbrush	Scrophulariaceae	yes
CAFO2	*Castilleja foliolosa*	woolly indian paintbrush	Scrophulariaceae	yes
CALA68	*Castilleja lacera*	cutleaf Indian paintbrush	Scrophulariaceae	yes
CALI20	*Castilleja lineariiloba*	sagebrush Indian paintbrush	Scrophulariaceae	yes
CAPA26	*Castilleja parviflora*	mountain Indian paintbrush	Scrophulariaceae	yes
CAPR14	*Castilleja pruinosa*	frosted Indian paintbrush	Scrophulariaceae	yes
CATE26	*Castilleja tenuis*	hairy Indian paintbrush	Scrophulariaceae	Yes
CABI8	*Catalpa bignonioides*	southern catalpa	Bignoniaceae	Yes no
CEANO	*Ceanothus*	ceanothus	Rhamnaceae	yes
CECU	*Ceanothus cuneatus*	wedgeleaf ceanothus	Rhamnaceae	yes
CEIN3	*Ceanothus integerrimus*	deerbrush	Rhamnaceae	yes
CELE	*Ceanothus lemmonii*	Lemmon's ceanothus	Rhamnaceae	yes
CEPR	*Ceanothus prostratus*	mahala mat	Rhamnaceae	yes
CERO4	*Ceanothus roderickii*	Pine Hill ceanothus	Rhamnaceae	yes
CETO	*Ceanothus tomentosus*	woolyleaf ceanothus	Rhamnaceae	yes
CENTA	*Centaurea*	knapweed	Asteraceae	no
CECY2	*Centaurea cyanus*	bachelor's button	Asteraceae	no
CEME2	*Centaurea melitensis*	tocalote	Asteraceae	no
CESO3	*Centaurea solstitialis*	yellow star-thistle	Asteraceae	no
CENTA2	*Centaurium*	centaury	Gentianaceae	yes
CEMU2	*Centaurium muehlenbergii*	Muhlenberg's centaury	Gentianaceae	yes
CEVE3	*Centaurium venustum*	canchalagua	Gentianaceae	yes
CEMI	*Centunculus minimus*	chaffweed	Primulaceae	yes
CEOCC2	*Cephalanthus occidentalis* var. *californicus*	California button-willow	Rubiaceae	yes
CERAS	*Cerastium*	mouse-ear chickweed	Caryophyllaceae	unknown
CEAR4	*Cerastium arvense*	field chickweed	Caryophyllaceae	yes
CEFOV2	*Cerastium fontanum* subsp. *vulgare*	big chickweed	Caryophyllaceae	no
CEGL2	*Cerastium glomeratum*	mouse-ear chickweed	Caryophyllaceae	no
CEOCO	*Cercis occidentalis*	California redbud	Fabaceae	yes
CEBE3	*Cercocarpus betuloides*	birchleaf Mountain-mahogany	Rosaceae	yes
CHAEN	*Chaenactis*	pincushion	Asteraceae	yes
CHGL	*Chaenactis glabriuscula*	yellow pincushion	Asteraceae	yes
CHGLH	*Chaenactis glabriuscula* var. *heterocarpha*	yellow pincushion	Asteraceae	yes
CHFO	*Chamaebatia foliolosa*	mountain misery	Rosaceae	yes
CHMA11	*Chamaesyce maculata*	spotted spurge	Euphorbiaceae	no
CHSE6	*Chamaesyce serpyllifolia*	thyme-leafed spurge	Euphorbiaceae	yes
CHENXX	*Chenopodiaceae*	Chenopodiaceae	Chenopodiaceae	unknown
CHENO	*Chenopodium*	goosefoot	Chenopodiaceae	no
CHLOR3	*Chlorogalum*	soapplant	Liliaceae	yes

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CHAN2	*Chlorogalum angustifolium*	narrowleaf soap plant	Liliaceae	yes
CHGR3	*Chlorogalum grandiflorum*	Red Hills soaproot	Liliaceae	yes
CHPO3	*Chlorogalum pomeridianum*	wavyleaf soap plant	Liliaceae	yes
CHJU	*Chondrilla juncea*	skeleton weed	Asteraceae	no
CHORI2	*Chorizanthe*	spineflower	Polygonaceae	yes
CHME2	*Chorizanthe membranacea*	pink spineflower	Polygonaceae	yes
CHPO4	*Chorizanthe polygonoides*	knotweed spineflower	Polygonaceae	yes
CHST5	*Chorizanthe stellulata*	starlet spineflower	Polygonaceae	yes
CHNAA3	*Chrysothamnus nauseosus* subsp. *albicaulis*	rubber rabbitbrush	Asteraceae	yes
CIQU3	*Cicendia quadrangularis*	Oregon timwort	Gentianaceae	yes
CIRSI	*Cirsium*	thistle	Asteraceae	unknown
CIAN	*Cirsium andersonii*	rose thistle	Asteraceae	yes
CIAR4	*Cirsium arvense*	canada thistle	Asteraceae	no
CIOC	*Cirsium occidentale*	cobwebby thistle	Asteraceae	yes
CIOCC4	*Cirsium occidentale* var. *californicum*	cobwebby thistle	Asteraceae	yes
CIVU	*Cirsium vulgare*	bull thistle	Asteraceae	no
CLARK	*Clarkia*	clarkia	Onagraceae	yes
CLAF	*Clarkia affinis*	chaparral clarkia	Onagraceae	yes
CLAR	*Clarkia arcuata*	glandular clarkia	Onagraceae	yes
CLBI	*Clarkia biloba*	twolobe clarkia	Onagraceae	yes
CLBIB	*Clarkia biloba* subsp. *brandegeeae*	Brandegee's clarkia	Onagraceae	yes
CLCO	*Clarkia concinna*	red ribbons	Onagraceae	yes
CLDU	*Clarkia dudleyana*	Dudley's clarkia	Onagraceae	yes
CLGR	*Clarkia gracilis*	slender clarkia	Onagraceae	yes
CLGRA	*Clarkia gracilis* subsp. *albicaulis*	white-stemmed clarkia	Onagraceae	yes
CLGRG2	*Clarkia gracilis* subsp. *gracilis*	slender clarkia	Onagraceae	yes
CLPU2	*Clarkia purpurea*	winecup clarkia	Onagraceae	yes
CLPUP	*Clarkia purpurea* subsp. *purpurea*	winecup clarkia	Onagraceae	yes
CLPUQ	*Clarkia purpurea* subsp. *quadrivulnera*	winecup clarkia	Onagraceae	yes
CLRH	*Clarkia rhomboidea*	diamond clarkia	Onagraceae	yes
CLUN	*Clarkia unguiculata*	elegant clarkia	Onagraceae	yes
CLAYT	*Claytonia*	springbeauty	Portulacaceae	yes
CLEXE2	*Claytonia exigua* subsp. *exigua*	serpentine spring beauty	Portulacaceae	yes
CLPA5	*Claytonia parviflora*	streambank spring beauty	Portulacaceae	yes
CLPAG4	*Claytonia parviflora* subsp. *grandiflora*	streambank spring beauty	Portulacaceae	yes
CLPAP	*Claytonia parviflora* subsp. *parviflora*	streambank spring beauty	Portulacaceae	yes
CLPE	*Claytonia perfoliata*	miner's lettuce	Portulacaceae	yes
CLLA3	*Clematis lasiantha*	pipestems	Ranunculaceae	yes
CLLI2	*Clematis ligusticifolia*	virgin's bower	Ranunculaceae	yes
COLLI	*Collinsia*	blue eyed Mary	Scrophulariaceae	yes

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COHE	*Collinsia heterophylla*	Chinese houses	Scrophulariaceae	yes
COPA3	*Collinsia parviflora*	blue-eyed mary	Scrophulariaceae	yes
COSP	*Collinsia sparsiflora*	spinster's blue eyed Mary	Scrophulariaceae	yes
COSPC	*Collinsia sparsiflora* var. *collina*	spinster's blue eyed Mary	Scrophulariaceae	yes
COTI	*Collinsia tinctoria*	sticky Chinese houses	Scrophulariaceae	yes
COGR4	*Collomia grandiflora*	grand collomia	Polemoniaceae	yes
COHE2	*Collomia heterophylla*	variableleaf collomia	Polemoniaceae	yes
COUM	*Comandra umbellata*	bastard toadflax	Santalaceae	yes
COMA2	*Conium maculatum*	poison hemlock	Apiaceae	no
CONVO	*Convolvulus*	bindweed	Convolvulaceae	unknown
COAR4	*Convolvulus arvensis*	bindweed	Convolvulaceae	no
COCA5	*Conyza canadensis*	horseweed	Asteraceae	yes
CORDY	*Cordylanthus*	bird's-beak	Scrophulariaceae	yes
COTE3	*Cordylanthus tenuis*	slender bird's beak	Scrophulariaceae	yes
COST3	*Coreopsis stillmanii*	Stillman's tickseed	Asteraceae	yes
CORNU	*Cornus*	dogwood	Cornaceae	yes
COGL3	*Cornus glabrata*	brown dogwood	Cornaceae	yes
CONU4	*Cornus nuttallii*	Pacific dogwood	Cornaceae	yes
COSE16	*Cornus sericea*	red-osier dogwood	Cornaceae	yes
COSE3	*Cornus sessilis*	blackfruit dogwood	Cornaceae	yes
COCOC	*Corylus cornuta* var. *californica*	California hazel	Betulaceae	yes
COTUL	*Cotula*	waterbuttons	Asteraceae	no
CRASS	*Crassula*	pygmyweed	Crassulaceae	yes
CRAQ	*Crassula aquatica*	water pygmyweed	Crassulaceae	yes
CRCO34	*Crassula connata*	pygmy-weed	Crassulaceae	yes
CRCOE	*Crassula connata* var. *erectoides*	sand pygmyweed	Crassulaceae	yes
CRTI	*Crassula tillaea*	moss pygmyweed	Crassulaceae	no
CRAN11	*Crucianella angustifolia*	narrowleaf crucianella	Rubiaceae	no
CRVA2	*Crypsis vaginiflora*	African pricklegrass	Poaceae	no
CRYPT	*Cryptantha*	cryptantha	Boraginaceae	yes
CRCR4	*Cryptantha crinita*	silky cryptantha	Boraginaceae	yes
CRFL4	*Cryptantha flaccida*	weakstem cryptantha	Boraginaceae	yes
CRIN8	*Cryptantha intermedia*	Clearwater cryptantha	Boraginaceae	yes
CUMA	*Cupressus macnabiana*	McNab cypress	Cupressaceae	yes
CUSCU	*Cuscuta*	dodder	Cuscutaceae	yes
CUCA	*Cuscuta californica*	chaparral dodder	Cuscutaceae	yes
CUHO	*Cuscuta howelliana*	Boggs Lake dodder	Cuscutaceae	yes
CUPE3	*Cuscuta pentagona*	fiveangled dodder	Cuscutaceae	yes
CYDA	*Cynodon dactylon*	Bermuda grass	Poaceae	no
CYGR	*Cynoglossum grande*	Pacific hound's tongue	Boraginaceae	yes
CYEC	*Cynosurus echinatus*	hedgehog dogtail	Poaceae	no
CYPEXX	*Cyperaceae*	Cyperaceae	Cyperaceae	unknown

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CYPER	*Cyperus*	flatsedge	Cyperaceae	yes
CYER	*Cyperus eragrostis*	tall flatsedge	Cyperaceae	yes
CYES	*Cyperus esculentus*	chufa flatsedge	Cyperaceae	yes
CYNI2	*Cyperus niger*	black flatsedge	Cyperaceae	yes
CYSQ	*Cyperus squarrosus*	bearded flatsedge	Cyperaceae	yes
CYFR2	*Cystopteris fragilis*	brittle bladderfern	Dryopteridaceae	yes
CYSC4	*Cytisus scoparius*	scotch broom	Fabaceae	no
DAGL	*Dactylis glomerata*	orchardgrass	Poaceae	no
DACA12	*Damasonium californicum*	California damsonium	Alismataceae	yes
DACA3	*Danthonia californica*	California oatgrass	Poaceae	yes
DAPE	*Darmera peltata*	Indian rhubarb	Saxifragaceae	yes
DAGL2	*Datisca glomerata*	Durango root	Datiscaceae	yes
DAUCU	*Daucus*	wild carrot	Apiaceae	unknown
DACA6	*Daucus carota*	queen anne's lace	Apiaceae	no
DAPU3	*Daucus pusillus*	wild carrot	Apiaceae	yes
DELPH	*Delphinium*	larkspur	Ranunculaceae	yes
DEGR	*Delphinium gracilentum*	pine forest larkspur	Ranunculaceae	yes
DEHA	*Delphinium hansenii*	Hansen's larkspur	Ranunculaceae	yes
DEHAH	*Delphinium hansenii* subsp. *hansenii*	Eldorado larkspur	Ranunculaceae	yes
DEVA	*Delphinium variegatum*	royal larkspur	Ranunculaceae	yes
DEVAV	*Delphinium variegatum* subsp. *variegatum*	royal larkspur	Ranunculaceae	yes
DERI	*Dendromecon rigida*	bush poppy	Papaveraceae	yes
DEDA	*Deschampsia danthonioides*	annual hairgrass	Poaceae	yes
DEEL	*Deschampsia elongata*	slender hairgrass	Poaceae	yes
DIFO	*Dicentra formosa*	bleeding heart	Fumariaceae	yes
DICHE2	*Dichelostemma*	snakelily	Liliaceae	yes
DICAC5	*Dichelostemma capitatum* subsp. *capitatum*	bluedicks	Liliaceae	yes
DIMU5	*Dichelostemma multiflorum*	wild hyacinth	Liliaceae	yes
DIVO	*Dichelostemma volubile*	snake lily	Liliaceae	yes
DISA	*Digitaria sanguinalis*	hairy crabgrass	Poaceae	no
DIFU2	*Dipsacus fullonum*	wild teasel	Dipsacaceae	no
DISP	*Distichlis spicata*	saltgrass	Poaceae	yes
DODEC	*Dodecatheon*	shootingstar	Primulaceae	yes
DOCLP	*Dodecatheon clevelandii* subsp. *patulum*	padre's shootingstar	Primulaceae	yes
DOHE	*Dodecatheon hendersonii*	mosquito bills	Primulaceae	yes
DOJE	*Dodecatheon jeffreyi*	Sierra shooting star	Primulaceae	yes
DOBI	*Downingia bicornuta*	doublehorn calicoflower	Campanulaceae	yes
DOBIB	*Downingia bicornuta* var. *bicornuta*	doublehorn calicoflower	Campanulaceae	yes
DOBIP	*Downingia bicornuta* var. *picta*	doublehorn calicoflower	Campanulaceae	yes
DOCU	*Downingia cuspidata*	toothed calicoflower	Campanulaceae	yes

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DOOR	*Downingia ornatissima*	folded calicoflower	Campanulaceae	yes
DOORO	*Downingia ornatissima* var. *ornatissima*	folded calicoflower	Campanulaceae	yes
DRVE2	*Draba verna*	spring draba	Brassicaceae	yes
DRAR3	*Dryopteris arguta*	wood fern	Dryopteridaceae	yes
DUCYC3	*Dudleya cymosa* subsp. *cymosa*	canyon liveforever	Crassulaceae	yes
ECCR	*Echinochloa crus-galli*	barnyardgrass	Poaceae	no
ELEOC	*Eleocharis*	spikerush	Cyperaceae	yes
ELAC	*Eleocharis acicularis*	needle spikerush	Cyperaceae	yes
ELACA	*Eleocharis acicularis* var. *acicularis*	needle spikerush	Cyperaceae	yes
ELMA5	*Eleocharis macrostachya*	pale spikerush	Cyperaceae	yes
ELMO2	*Eleocharis montevidensis*	sand spikerush	Cyperaceae	yes
ELOB2	*Eleocharis obtusa*	blunt spikerush	Cyperaceae	yes
ELPA	*Eleocharis pachycarpa*	black sand spikerush	Cyperaceae	no
ELPA4	*Eleocharis parishii*	Parish's spikerush	Cyperaceae	yes
ELPA6	*Eleocharis pauciflora*	fewflower spikerush	Cyperaceae	yes
ELTH	*Eleocharis thermalis*	yellow spikerush	Cyperaceae	yes
ELYMU	*Elymus*	wildrye	Poaceae	yes
ELEL5	*Elymus elymoides*	squirreltail	Poaceae	yes
ELGL	*Elymus glaucus*	blue wildrye	Poaceae	yes
ELGLG	*Elymus glaucus* subsp. *glaucus*	blue wildrye	Poaceae	yes
ELLAL	*Elymus lanceolatus* subsp. *lanceolatus*	streambank wheatgrass	Poaceae	yes
ELMU3	*Elymus multisetus*	big squirreltail	Poaceae	yes
EPILO	*Epilobium*	willowherb	Onagraceae	yes
EPBR3	*Epilobium brachycarpum*	tall annual willowherb	Onagraceae	yes
EPCA3	*Epilobium canum*	California fuchsia	Onagraceae	yes
EPCAL	*Epilobium canum* subsp. *latifolium*	hummingbird trumpet	Onagraceae	yes
EPCI	*Epilobium ciliatum*	fringed willowherb	Onagraceae	yes
EPCIC	*Epilobium ciliatum* subsp. *ciliatum*	fringed willowherb	Onagraceae	yes
EPDE4	*Epilobium densiflorum*	denseflower willowherb	Onagraceae	yes
EPMI	*Epilobium minutum*	chaparral willowherb	Onagraceae	yes
EPPA7	*Epilobium pallidum*	largeflower spike-primrose	Onagraceae	yes
EPPY4	*Epilobium pygmaeum*	smooth spike-primrose	Onagraceae	yes
EPTO4	*Epilobium torreyi*	Torrey's willowherb	Onagraceae	yes
EPGI	*Epipactis gigantea*	stream orchid	Orchidaceae	yes
EQUIS	*Equisetum*	horsetail	Equisetaceae	yes
EQAR	*Equisetum arvense*	common horsetail	Equisetaceae	yes
EQHYA2	*Equisetum hyemale* subsp. *affine*	scouringrush horsetail	Equisetaceae	yes
EQLA	*Equisetum laevigatum*	smooth scouring rush	Equisetaceae	yes
ERSE3	*Eremocarpus setigerus*	dove weed	Euphorbiaceae	yes
ERICA2	*Ericameria*	goldenbush	Asteraceae	yes
ERAR27	*Ericameria arborescens*	golden-fleece	Asteraceae	yes

Code	Taxon	Common Name	Family	Native
ERIGE2	*Erigeron*	fleabane	Asteraceae	yes
ERFOH	*Erigeron foliosus* var. *hartwegii*	Hartweg's fleabane	Asteraceae	yes
ERINI	*Erigeron inornatus* var. *inornatus*	California rayless fleabane	Asteraceae	yes
ERPES2	*Erigeron petrophilus* var. *sierrensis*	northern Sierra daisy	Asteraceae	yes
ERCA6	*Eriodictyon californicum*	California yerba santa	Hydrophyllaceae	yes
ERIOG	*Eriogonum*	buckwheat	Polygonaceae	yes
ERLU5	*Eriogonum luteolum*	goldencarpet buckwheat	Polygonaceae	yes
ERNU3	*Eriogonum nudum*	naked buckwheat	Polygonaceae	yes
ERNUO	*Eriogonum nudum* var. *oblongifolium*	naked buckwheat	Polygonaceae	yes
ERNUP4	*Eriogonum nudum* var. *pubiflorum*	naked buckwheat	Polygonaceae	yes
ERPR8	*Eriogonum prattenianum*	Nevada City buckwheat	Polygonaceae	yes
ERUM	*Eriogonum umbellatum*	sulfur flower	Polygonaceae	yes
ERVI5	*Eriogonum vimineum*	wicker buckwheat	Polygonaceae	yes
ERIOP2	*Eriophyllum*	woolly sunflower	Asteraceae	yes
ERCO25	*Eriophyllum confertiflorum*	golden-yarrow	Asteraceae	yes
ERLA6	*Eriophyllum lanatum*	common woolly sunflower	Asteraceae	yes
ERLAG	*Eriophyllum lanatum* var. *grandiflorum*	common woolly sunflower	Asteraceae	yes
ERODI	*Erodium*	stork's bill	Geraniaceae	no
ERBO	*Erodium botrys*	filaree	Geraniaceae	no
ERBR14	*Erodium brachycarpum*	shortfruit stork's bill	Geraniaceae	no
ERCI6	*Erodium cicutarium*	redstem stork's bill	Geraniaceae	no
ERMO7	*Erodium moschatum*	musky stork's bill	Geraniaceae	no
ERYNG	*Eryngium*	eryngo	Apiaceae	yes
ERCA33	*Eryngium castrense*	coyote-thistle	Apiaceae	yes
ERVA5	*Eryngium vaseyi*	coyote-thistle	Apiaceae	yes
ERCA14	*Erysimum capitatum*	western wallflower	Brassicaceae	yes
ERCAC	*Erysimum capitatum* var. *capitatum*	sanddune wallflower	Brassicaceae	yes
ERYTH3	*Erythronium*	fawnlily	Liliaceae	yes
ERMU7	*Erythronium multiscapoideum*	Sierra fawnlily	Liliaceae	yes
ERTU	*Erythronium tuolumnense*	Tuolumne fawn lily	Liliaceae	yes
ESCHS	*Eschscholzia*	California poppy	Papaveraceae	yes
ESCA	*Eschscholzia caespitosa*	tufted poppy	Papaveraceae	yes
ESCA2	*Eschscholzia californica*	California poppy	Papaveraceae	yes
ESLO	*Eschscholzia lobbii*	frying pans	Papaveraceae	yes
EUPHO	*Euphorbia*	spurge	Euphorbiaceae	unknown
EUCR2	*Euphorbia crenulata*	Chinese caps	Euphorbiaceae	yes
EUSP	*Euphorbia spathulata*	warty spurge	Euphorbiaceae	yes
EUOC4	*Euthamia occidentalis*	western goldenrod	Asteraceae	yes
FESTU	*Festuca*	fescue	Poaceae	unknown
FEAR3	*Festuca arundinacea*	tall fescue	Poaceae	no
FEOC	*Festuca occidentalis*	western fescue	Poaceae	yes

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FEPR	*Festuca pratensis*	meadow fescue	Poaceae	no
FICA	*Ficus carica*	edible fig	Moraceae	no
FILAG	*Filago*	cottonrose	Asteraceae	no
FICA2	*Filago californica*	California cottonrose	Asteraceae	yes
FIGA	*Filago gallica*	narrowleaf cottonrose	Asteraceae	no
FOVU	*Foeniculum vulgare*	fennel	Apiaceae	no
FRVE	*Fragaria vesca*	wood strawberry	Rosaceae	yes
FRDI2	*Fraxinus dipetala*	foothill ash	Oleaceae	yes
FRLA	*Fraxinus latifolia*	Oregon ash	Oleaceae	yes
FREMO2	*Fremontodendron*	flannelbush	Sterculiaceae	yes
FRCA6	*Fremontodendron californicum*	flannelbush	Sterculiaceae	yes
FRCAD	*Fremontodendron californicum* subsp. *decumbens*	Pine Hill flannelbush	Sterculiaceae	yes
FRITI	*Fritillaria*	fritillary	Liliaceae	yes
FRAFA2	*Fritillaria affinis* var. *affinis*	checker lily	Liliaceae	yes
FRMI	*Fritillaria micrantha*	brown bells	Liliaceae	yes
FRPL	*Fritillaria pluriflora*	adobe-lily	Liliaceae	yes
GALIU	*Galium*	bedstraw	Rubiaceae	yes
GAAN	*Galium andrewsii*	phlox-leaved bedstraw	Rubiaceae	yes
GAAP2	*Galium aparine*	goose grass	Rubiaceae	yes
GABO	*Galium bolanderi*	Bolander's bedstraw	Rubiaceae	yes
GACAS	*Galium californicum* subsp. *sierrae*	El Dorado bedstraw	Rubiaceae	yes
GADI	*Galium divaricatum*	Lamarck's bedstraw	Rubiaceae	no
GAMU4	*Galium murale*	tiny bedstraw	Rubiaceae	no
GAPA5	*Galium parisiense*	wall bedstraw	Rubiaceae	no
GAPO	*Galium porrigens*	climbing bedstraw	Rubiaceae	yes
GASPS	*Galium sparsiflorum* subsp. *sparsiflorum*	Sequoia bedstraw	Rubiaceae	yes
GATR3	*Galium triflorum*	sweet-scented bedstraw	Rubiaceae	yes
GACO9	*Garrya congdonii*	chaparral silktassel	Garryaceae	yes
GAEL	*Garrya elliptica*	wavyleaf silktassel	Garryaceae	yes
GAFL2	*Garrya flavescens*	ashy silktassel	Garryaceae	yes
GAFR	*Garrya fremontii*	bearbrush	Garryaceae	yes
GAVE3	*Gastridium ventricosum*	nit grass	Poaceae	no
GETET	*Gentianella tenella* subsp. *tenella*	Dane's dwarf gentian	Gentianaceae	yes
GERAN	*Geranium*	geranium	Geraniaceae	no
GECA5	*Geranium carolinianum*	Carolina geranium	Geraniaceae	yes
GEDI	*Geranium dissectum*	cutleaf geranium	Geraniaceae	no
GEMO	*Geranium molle*	dovefoot geranium	Geraniaceae	no
GILIA	*Gilia*	gilia	Polemoniaceae	yes
GICA5	*Gilia capitata*	bluehead gilia	Polemoniaceae	yes
GICAP2	*Gilia capitata* subsp. *pedemontana*	bluehead gilia	Polemoniaceae	yes
GITR2	*Gilia tricolor*	bird's eyes	Polemoniaceae	yes

Code	Taxon	Common Name	Family	Native
GITRT	*Gilia tricolor* subsp. *tricolor*	bird's-eye gilia	Polemoniaceae	yes
GITHO	*Githopsis*	bluecup	Campanulaceae	yes
GIPU2	*Githopsis pulchella*	Sierra bluecup	Campanulaceae	yes
GIPUC	*Githopsis pulchella* subsp. *campestris*	Sierra bluecup	Campanulaceae	yes
GIPUP	*Githopsis pulchella* subsp. *pulchella*	Sierra bluecup	Campanulaceae	yes
GIPUS	*Githopsis pulchella* subsp. *serpentinicola*	serpentine bluecup	Campanulaceae	yes
GISP3	*Githopsis specularioides*	common bluecup	Campanulaceae	yes
GITE9	*Githopsis tenella*	tubeflower bluecup	Campanulaceae	yes
GLBO	*Glyceria borealis*	mannagrass	Poaceae	yes
GLCE	*Glyceria declinata*	waxy mannagrass	Poaceae	yes
GLEL	*Glyceria elata*	fowl mannagrass	Poaceae	yes
GLOC	*Glyceria occidentalis*	northwestern mannagrass	Poaceae	yes
GNAPH	*Gnaphalium*	cudweed	Asteraceae	yes
GNCA	*Gnaphalium californicum*	ladies' tobacco	Asteraceae	yes
GNCA2	*Gnaphalium canescens*	Wright's cudweed	Asteraceae	yes
GNJA	*Gnaphalium japonicum*	father-and-child plant	Asteraceae	no
GNLU	*Gnaphalium luteoalbum*	Jersey cudweed	Asteraceae	no
GNPA	*Gnaphalium palustre*	western marsh cudweed	Asteraceae	yes
GNPU2	*Gnaphalium purpureum*	spoonleaf purple everlasting	Asteraceae	yes
GREB	*Gratiola ebracteata*	bractless hedgehyssop	Scrophulariaceae	yes
GRIND	*Grindelia*	gumweed	Asteraceae	yes
GRCA	*Grindelia camporum*	Great Valley gumweed	Asteraceae	yes
GRCAC	*Grindelia camporum* var. *camporum*	Great Valley gumweed	Asteraceae	yes
GRHID2	*Grindelia hirsutula* var. *davyi*	hairy gumweed	Asteraceae	yes
HEHE	*Hedera helix*	English ivy	Araliaceae	no
HECR2	*Hedypnois cretica*	Crete weed	Asteraceae	no
HEPU2	*Helenium puberulum*	rosilla	Asteraceae	yes
HECA	*Helianthella californica*	California helianthella	Asteraceae	yes
HELIA2	*Helianthemum*	frostweed	Cistaceae	yes
HESC2	*Helianthemum scoparium*	peak rush-rose	Cistaceae	yes
HESU2	*Helianthemum suffrutescens*	Bisbee Peak rush-rose	Cistaceae	yes
HELIA3	*Helianthus*	sunflower	Asteraceae	yes
HEAN3	*Helianthus annuus*	common sunflower	Asteraceae	yes
HEBO3	*Helianthus bolanderi*	serpentine sunflower	Asteraceae	yes
HEEU	*Heliotropium europaeum*	European heliotrope	Boraginaceae	no
HEMIZ	*Hemizonia*	tarweed	Asteraceae	yes
HEFI	*Hemizonia fitchii*	Fitch's tarweed	Asteraceae	yes
HESPE10	*Hesperevax*	dwarf-cudweed	Asteraceae	yes
HEAC8	*Hesperevax acaulis*	stemless dwarf-cudweed	Asteraceae	yes
HEACA	*Hesperevax acaulis* var. *acaulis*	stemless dwarf-cudweed	Asteraceae	yes
HEACR	*Hesperevax acaulis* var. *robustior*	stemless dwarf-cudweed	Asteraceae	yes

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HECA30	*Hesperevax caulescens*	hogwallow starfish	Asteraceae	yes
HETE5	*Hesperocnide tenella*	western stingingnettle	Urticaceae	yes
HESPE7	*Hesperolinon*	dwarf-flax	Linaceae	yes
HECA11	*Hesperolinon californicum*	California dwarf-flax	Linaceae	yes
HEMI9	*Hesperolinon micranthum*	smallflower dwarf-flax	Linaceae	yes
HERA3	*Heterocodon rariflorum*	rareflower heterocodon	Campanulaceae	yes
HEAR5	*Heteromeles arbutifolia*	toyon	Rosaceae	yes
HETER8	*Heterotheca*	false goldenaster	Asteraceae	yes
HEGR7	*Heterotheca grandiflora*	telegraph weed	Asteraceae	yes
HEORC	*Heterotheca oregona* var. *compacta*	Oregon false goldenaster	Asteraceae	yes
HEMI7	*Heuchera micrantha*	crevice alumroot	Saxifragaceae	yes
HIAL2	*Hieracium albiflorum*	white hawkweed	Asteraceae	yes
HIIN3	*Hirschfeldia incana*	shortpod mustard	Brassicaceae	no
HOMA4	*Hoita macrostachya*	large leather-root	Fabaceae	yes
HOOR	*Hoita orbicularis*	roundleaf leather-root	Fabaceae	yes
HOLA	*Holcus lanatus*	common velvet grass	Poaceae	no
HOVIV	*Holocarpha virgata* subsp. *virgata*	yellowflower tarweed	Asteraceae	yes
HODI	*Holodiscus discolor*	oceanspray	Rosaceae	yes
HOFI	*Holozonia filipes*	whitecrown	Asteraceae	yes
HORDE	*Hordeum*	barley	Poaceae	unknown
HOBR2	*Hordeum brachyantherum*	meadow barley	Poaceae	yes
HOBRB2	*Hordeum brachyantherum* subsp. *brachyantherum*	meadow barley	Poaceae	yes
HODE2	*Hordeum depressum*	low barley	Poaceae	yes
HOJU	*Hordeum jubatum*	foxtail barley	Poaceae	yes
HOMA2	*Hordeum marinum*	seaside barley	Poaceae	no
HOMAG	*Hordeum marinum* subsp. *gussonianum*	Mediterranean barley	Poaceae	no
HOMU	*Hordeum murinum*	mouse barley	Poaceae	no
HOMUG	*Hordeum murinum* subsp. *glaucum*	smooth barley	Poaceae	no
HOMUL	*Hordeum murinum* subsp. *leporinum*	leporinum barley	Poaceae	no
HOMUM	*Hordeum murinum* subsp. *murinum*	wall barley	Poaceae	no
HOCAD	*Horkelia californica* subsp. *dissita*	California horkelia	Rosaceae	yes
HOPA2	*Horkelia parryi*	Parry's horkelia	Rosaceae	yes
HYDRO2	*Hydrocotyle*	hydrocotyle	Apiaceae	unknown
HYPER	*Hypericum*	St. Johnswort	Clusiaceae	unknown
HYAN2	*Hypericum anagalloides*	tinker's penny	Clusiaceae	yes
HYCO3	*Hypericum concinnum*	gold-wire	Clusiaceae	yes
HYFOS	*Hypericum formosum* var. *scouleri*	Scouler's St. Johnswort	Clusiaceae	yes
HYPE	*Hypericum perforatum*	Klamathweed	Clusiaceae	no
HYPOC	*Hypochaeris*	catsear	Asteraceae	no
HYGL2	*Hypochaeris glabra*	smooth cat's-ear	Asteraceae	no
HYRA3	*Hypochaeris radicata*	rough cat's-ear	Asteraceae	no

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IRIS	*Iris*	iris	Iridaceae	unknown
IRHA	*Iris hartwegii*	rainbow iris	Iridaceae	yes
IRMA	*Iris macrosiphon*	bowltube iris	Iridaceae	yes
IRPS	*Iris pseudacorus*	paleyellow iris	Iridaceae	no
ISOET	*Isoetes*	quillwort	Isoetaceae	yes
ISHO	*Isoetes howellii*	Howell's quillwort	Isoetaceae	yes
ISNU	*Isoetes nuttallii*	Nuttall's quillwort	Isoetaceae	yes
ISOR	*Isoetes orcuttii*	Orcutt's quillwort	Isoetaceae	yes
ISOC3	*Isopyrum occidentale*	western false rue anemone	Ranunculaceae	yes
JUCA	*Juglans californica*	California black walnut	Juglandaceae	yes
JUHI	*Juglans hindsii*	Hind's walnut	Juglandaceae	no
JUNCU	*Juncus*	rush	Juncaceae	unknown
JUAC	*Juncus acuminatus*	tapertip rush	Juncaceae	yes
JUBA	*Juncus balticus*	Baltic rush	Juncaceae	yes
JUBU	*Juncus bufonius*	toad rush	Juncaceae	yes
JUBUB	*Juncus bufonius* var. *bufonius*	toad rush	Juncaceae	yes
JUCA5	*Juncus capitatus*	leafybract dwarf rush	Juncaceae	no
JUCO5	*Juncus covillei*	Coville's rush	Juncaceae	yes
JUDU	*Juncus dubius*	dubius rush	Juncaceae	yes
JUEF	*Juncus effusus*	common rush	Juncaceae	yes
JUEFG	*Juncus effusus* var. *gracilis*	lamp rush	Juncaceae	yes
JUME4	*Juncus mexicanus*	Mexican rush	Juncaceae	yes
JUNE	*Juncus nevadensis*	Sierra rush	Juncaceae	yes
JUOX	*Juncus oxymeris*	pointed rush	Juncaceae	yes
JUPA2	*Juncus patens*	spreading rush	Juncaceae	yes
JUTE	*Juncus tenuis*	poverty rush	Juncaceae	yes
JUXI	*Juncus xiphioides*	irisleaf rush	Juncaceae	yes
JUCA7	*Juniperus californica*	California juniper	Cupressaceae	yes
KECKI	*Keckiella*	keckiella	Scrophulariaceae	yes
KEBR	*Keckiella breviflora*	bush beardtongue	Scrophulariaceae	yes
KECO2	*Keckiella corymbosa*	redwood keckiella	Scrophulariaceae	yes
KIEL	*Kickxia elatine*	sharpleaf cancerwort	Scrophulariaceae	no
KOPH	*Koeleria phleoides*	Mediterranean hairgrass	Poaceae	no
LACTU	*Lactuca*	lettuce	Asteraceae	unknown
LASA	*Lactuca saligna*	willowleaf lettuce	Asteraceae	no
LASE	*Lactuca serriola*	prickly lettuce	Asteraceae	no
LAGOP	*Lagophylla*	hareleaf	Asteraceae	yes
LARAR	*Lagophylla ramosissima* subsp. *ramosissima*	branched lagophylla	Asteraceae	yes
LAMIXX	Lamiaceae	Lamiaceae	Lamiaceae	unknown
LAAM	*Lamium amplexicaule*	henbit deadnettle	Lamiaceae	no
LASTH	*Lasthenia*	goldfields	Asteraceae	yes

Code	Taxon	Common Name	Family	Native
LACA7	*Lasthenia californica*	California goldfields	Asteraceae	yes
LAFR4	*Lasthenia fremontii*	Fremont's goldfields	Asteraceae	yes
LAGL3	*Lasthenia glaberrima*	smooth goldfields	Asteraceae	yes
LAPL2	*Lasthenia platycarpha*	alkali goldfields	Asteraceae	yes
LATHY	*Lathyrus*	pea	Fabaceae	no
LAAN3	*Lathyrus angulatus*	angled pea	Fabaceae	no
LALA4	*Lathyrus latifolius*	perennial sweet pea	Fabaceae	no
LAOD	*Lathyrus odoratus*	sweet pea	Fabaceae	no
LASU	*Lathyrus sulphureus*	snub pea	Fabaceae	yes
LATI	*Lathyrus tingitanus*	Tangier pea	Fabaceae	no
LAFR2	*Layia fremontii*	Fremont's tidytips	Asteraceae	yes
LAPL	*Layia platyglossa*	tidy-tips	Asteraceae	yes
LEOR	*Leersia oryzoides*	rice cutgrass	Poaceae	yes
LEMNA	*Lemna*	duckweed	Lemnaceae	yes
LETA	*Leontodon taraxacoides*	lesser hawkbit	Asteraceae	no
LETAL	*Leontodon taraxacoides* subsp. *longirostris*	lesser hawkbit	Asteraceae	no
LECA3	*Lepechinia calycina*	woodbalm	Lamiaceae	yes
LEPID	*Lepidium*	pepperweed	Brassicaceae	yes
LENI	*Lepidium nitidum*	shining pepperweed	Brassicaceae	yes
LENIN	*Lepidium nitidum* var. *nitidum*	shining pepperweed	Brassicaceae	yes
LEST2	*Lepidium strictum*	upright pepperweed	Brassicaceae	yes
LESSI	*Lessingia*	lessingia	Asteraceae	yes
LEFI11	*Lessingia filaginifolia*	California-aster	Asteraceae	yes
LENE3	*Lessingia nemaclada*	slenderstem lessingia	Asteraceae	yes
LEVI8	*Lessingia virgata*	wand lessingia	Asteraceae	yes
LEVU	*Leucanthemum vulgare*	ox-eye daisy	Asteraceae	no
LEWIS	*Lewisia*	lewisia	Portulacaceae	yes
LERE7	*Lewisia rediviva*	bitter root	Portulacaceae	yes
LETR5	Leymus triticoides	beardless wildrye	Poaceae	yes
LICHEN	Lichen	lichen		yes
LISC4	*Lilaea scilloides*	flowering-quillwort	Juncaginaceae	yes
LILIXX	*Liliaceae*	Liliaceae	Liliaceae	unknown
LILIU	*Lilium*	lily	Liliaceae	unknown
LIHUH	*Lilium humboldtii* subsp. *humboldtii*	Humboldt lily	Liliaceae	yes
LIPA	*Lilium pardalinum*	leopard lily	Liliaceae	yes
LIMNA	*Limnanthes*	meadowfoam	Limnanthaceae	yes
LIAL3	*Limnanthes alba*	white meadowfoam	Limnanthaceae	yes
LIALA	*Limnanthes alba* subsp. *alba*	white meadowfoam	Limnanthaceae	yes
LIALV2	*Limnanthes alba* subsp. *versicolor*	white meadowfoam	Limnanthaceae	yes
LIDON2	*Limnanthes douglasii* subsp. *nivea*	Douglas' meadowfoam	Limnanthaceae	yes
LIDOR2	*Limnanthes douglasii* subsp. *rosea*	Douglas' meadowfoam	Limnanthaceae	yes

Code	Taxon	Common Name	Family	Native
LIFLC2	*Limnanthes floccosa* subsp. *californica*	Butte County meadowfoam	Limnanthaceae	yes
LIFLF	*Limnanthes floccosa* subsp. *floccosa*	woolly meadowfoam	Limnanthaceae	yes
LIST5	*Limnanthes striata*	foothill meadowfoam	Limnanthaceae	yes
LINAN2	*Linanthus*	linanthus	Polemoniaceae	yes
LIBI	*Linanthus bicolor*	true babystars	Polemoniaceae	yes
LIBO2	*Linanthus bolanderi*	Bolander's linanthus	Polemoniaceae	yes
LICI	*Linanthus ciliatus*	whisker brush	Polemoniaceae	yes
LIDI2	*Linanthus dichotomus*	evening snow	Polemoniaceae	yes
LIFI2	*Linanthus filipes*	thread linanthus	Polemoniaceae	yes
LIMO	*Linanthus montanus*	mustang clover	Polemoniaceae	yes
LIPA12	*Linanthus parviflorus*	variable linanthus	Polemoniaceae	yes
LIPY2	*Linanthus pygmaeus*	pygmy linanthus	Polemoniaceae	yes
LINUM	*Linum*	flax	Linaceae	unknown
LIBI5	*Linum bienne*	pale flax	Linaceae	no
LILE3	*Linum lewisii*	prairie flax	Linaceae	yes
LIUS	*Linum usitatissimum*	common flax	Linaceae	no
LITHO2	*Lithophragma*	woodland-star	Saxifragaceae	yes
LIAF	*Lithophragma affine*	San Francisco woodland-star	Saxifragaceae	yes
LIBO5	*Lithophragma bolanderi*	Bolander's woodland-star	Saxifragaceae	yes
LIPA5	*Lithophragma parviflorum*	smallflower woodland-star	Saxifragaceae	yes
LIPAT	*Lithophragma parviflorum* var. *trifoliatum*	prairie woodland-star	Saxifragaceae	yes
LIVER	Liverwort	liverwort		yes
LOLIU	*Lolium*	ryegrass	Poaceae	no
LOMU	*Lolium multiflorum*	Italian ryegrass	Poaceae	no
LOPE	*Lolium perenne*	perennial ryegrass	Poaceae	no
LOMAT	*Lomatium*	desertparsley	Apiaceae	yes
LOBI	*Lomatium bicolor*	Wasatch desertparsley	Apiaceae	yes
LOCA5	*Lomatium caruifolium*	alkali desertparsley	Apiaceae	yes
LOCAC	*Lomatium caruifolium* var. *caruifolium*	alkali desertparsley	Apiaceae	yes
LOCAD	*Lomatium caruifolium* var. *denticulatum*	alkali desertparsley	Apiaceae	yes
LOCO3	*Lomatium congdonii*	Congdon's lomatium	Apiaceae	yes
LODAT	*Lomatium dasycarpum* subsp. *tomentosum*	woollyfruit desertparsley	Apiaceae	yes
LODI	*Lomatium dissectum*	fernleaf biscuitroot	Apiaceae	yes
LOMA4	*Lomatium marginatum*	butte desertparsley	Apiaceae	yes
LOMAM	*Lomatium marginatum* var. *marginatum*	butte desertparsley	Apiaceae	yes
LOUT	*Lomatium utriculatum*	common lomatium	Apiaceae	yes
LONIC	*Lonicera*	honeysuckle	Caprifoliaceae	yes
LOHIV	*Lonicera hispidula* var. *vacillans*	pink honeysuckle	Caprifoliaceae	yes
LOIN4	*Lonicera interrupta*	chaparral honeysuckle	Caprifoliaceae	yes

Code	Taxon	Common Name	Family	Native
LOSU2	*Lonicera subspicata*	southern honeysuckle	Caprifoliaceae	yes
LOTUS	*Lotus*	trefoil	Fabaceae	unknown
LOCO6	*Lotus corniculatus*	birdfoot trefoil	Fabaceae	yes
LODE	*Lotus denticulatus*	riverbar bird's-foot trefoil	Fabaceae	yes
LOGRG3	*Lotus grandiflorus* var. *grandiflorus*	chaparral bird's-foot trefoil	Fabaceae	yes
LOHU2	*Lotus humistratus*	foothill deervetch	Fabaceae	yes
LOMI	*Lotus micranthus*	desert deervetch	Fabaceae	yes
LOOB2	*Lotus oblongifolius*	streambank bird's-foot trefoil	Fabaceae	yes
LOPU3	*Lotus purshianus*	American bird's-foot trefoil	Fabaceae	yes
LOSC2	*Lotus scoparius*	deer weed	Fabaceae	yes
LOST4	*Lotus strigosus*	strigose bird's-foot trefoil	Fabaceae	yes
LOWR2	*Lotus wrangelianus*	Chilean bird's-foot trefoil	Fabaceae	yes
LUPE5	*Ludwigia peploides*	floating primrose-willow	Onagraceae	unknown
LUPIN	*Lupinus*	lupine	Fabaceae	yes
LUAL4	*Lupinus albifrons*	silver lupine	Fabaceae	yes
LUBE	*Lupinus benthamii*	spider lupine	Fabaceae	yes
LUBI	*Lupinus bicolor*	miniature lupine	Fabaceae	yes
LUMI9	*Lupinus microcarpus*	chick lupine	Fabaceae	yes
LUMID3	*Lupinus microcarpus* var. *densiflorus*	whitewhorl lupine	Fabaceae	yes
LUNA3	*Lupinus nanus*	sky lupine	Fabaceae	yes
LUSP3	*Lupinus spectabilis*	shaggyhair lupine	Fabaceae	yes
LUST2	*Lupinus stiversii*	harlequin lupine	Fabaceae	yes
LUCO6	*Luzula comosa*	Pacific woodrush	Juncaceae	yes
LYCO	*Lychnis coronaria*	rose campion	Caryophyllaceae	no
LYTHR	*Lythrum*	loosestrife	Lythraceae	no
LYCA4	*Lythrum californicum*	California loose-strife	Lythraceae	yes
LYHY2	*Lythrum hyssopifolia*	hyssop loosestrife	Lythraceae	no
LYPO4	*Lythrum portula*	spatulaleaf loosestrife	Lythraceae	no
LYSA2	*Lythrum salicaria*	purple loosestrife	Lythraceae	no
MADIA	*Madia*	tarweed	Asteraceae	yes
MABO	*Madia bolanderi*	Bolander's madia	Asteraceae	yes
MACI2	*Madia citriodora*	lemon-scented tarweed	Asteraceae	yes
MAEL	*Madia elegans*	common madia	Asteraceae	yes
MAELE	*Madia elegans* subsp. *elegans*	common madia	Asteraceae	yes
MAELV	*Madia elegans* subsp. *vernalis*	spring madia	Asteraceae	yes
MAEX	*Madia exigua*	threadstem madia	Asteraceae	yes
MAGL2	*Madia glomerata*	mountain tarweed	Asteraceae	yes
MAGR3	*Madia gracilis*	slender tarweed	Asteraceae	yes
MARA2	*Madia rammii*	Ramm's madia	Asteraceae	yes
MASU	*Madia subspicata*	slender tarweed	Asteraceae	yes
MAFR2	*Malacothamnus fremontii*	Fremont's bushmallow	Malvaceae	yes
MASY3	*Malus sylvestris*	apple	Rosaceae	no

Code	Taxon	Common Name	Family	Native
MARAH	*Marah*	manroot	Cucurbitaceae	yes
MAFA3	*Marah fabaceus*	California man-root	Cucurbitaceae	yes
MAHO	*Marah horridus*	Sierra manroot	Cucurbitaceae	yes
MAWA2	*Marah watsonii*	taw manroot	Cucurbitaceae	yes
MAVU	*Marrubium vulgare*	horehound	Lamiaceae	no
MARSI	*Marsilea*	waterclover	Marsileaceae	yes
MAVEV	*Marsilea vestita* subsp. *vestita*	hairy waterclover	Marsileaceae	yes
MECA	*Meconella californica*	California fairypoppy	Papaveraceae	yes
MEDIC	*Medicago*	alfalfa	Fabaceae	unknown
MEPO3	*Medicago polymorpha*	California burclover	Fabaceae	no
MEPR	*Medicago praecox*	Mediterranean medick	Fabaceae	no
MESA	*Medicago sativa*	alfalfa	Fabaceae	no
MELIC	*Melica*	melicgrass	Poaceae	yes
MEAR3	*Melica aristata*	awned melic	Poaceae	yes
MECA2	*Melica californica*	California melic	Poaceae	yes
MEGE	*Melica geyeri*	Geyer's oniongrass	Poaceae	yes
MEHA2	*Melica harfordii*	Harford's oniongrass	Poaceae	yes
MEIM	*Melica imperfecta*	smallflower melicgrass	Poaceae	yes
MESU	*Melica subulata*	Alaska oniongrass	Poaceae	yes
METO	*Melica torreyana*	Torrey's melicgrass	Poaceae	yes
MELIL	*Melilotus*	sweetclover	Fabaceae	no
MEAL2	*Melilotus albus*	yellow sweetclover	Fabaceae	no
MEIN2	*Melilotus indicus*	annual yellow sweetclover	Fabaceae	no
MEOF2	*Melissa officinalis*	bee balm	Lamiaceae	no
MENTH	*Mentha*	mint	Lamiaceae	unknown
MEPI	*Mentha ×piperita*	peppermint	Lamiaceae	no
MEAR4	*Mentha arvensis*	wild mint	Lamiaceae	yes
MEPU	*Mentha pulegium*	pennyroyal	Lamiaceae	no
MESP3	*Mentha spicata*	spearmint	Lamiaceae	no
MICA	*Micropus californicus*	slender cottonweed	Asteraceae	yes
MICAC2	*Micropus californicus* var. *californicus*	q tips	Asteraceae	yes
MICRO6	*Microseris*	silverpuffs	Asteraceae	yes
MIAC	*Microseris acuminata*	Sierra foothill silverpuffs	Asteraceae	yes
MICA2	*Microseris campestris*	San Joaquin silverpuffs	Asteraceae	yes
MIDO	*Microseris douglasii*	Douglas' silverpuffs	Asteraceae	yes
MIDOD	*Microseris douglasii* subsp. *douglasii*	Douglas' silverpuffs	Asteraceae	yes
MIMUL	*Mimulus*	monkeyflower	Scrophulariaceae	yes
MIAU	*Mimulus aurantiacus*	orange bush monkeyflower	Scrophulariaceae	yes
MIBI4	*Mimulus bicolor*	yellow and white monkeyflower	Scrophulariaceae	yes
MICA3	*Mimulus cardinalis*	scarlet monkeyflower	Scrophulariaceae	yes

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MIDO2	*Mimulus douglasii*	brownies	Scrophulariaceae	yes
MIFL2	*Mimulus floribundus*	manyflowered monkeyflower	Scrophulariaceae	yes
MIGL2	*Mimulus glaucescens*	shield-bracted monkeyflower	Scrophulariaceae	yes
MIGU	*Mimulus guttatus*	seep monkeyflower	Scrophulariaceae	yes
MILA5	*Mimulus layneae*	Layne's monkeyflower	Scrophulariaceae	yes
MIMO3	*Mimulus moschatus*	musk monkeyflower	Scrophulariaceae	yes
MITO	*Mimulus torreyi*	Torrey's monkeyflower	Scrophulariaceae	yes
MITR3	*Mimulus tricolor*	tricolor monkeyflower	Scrophulariaceae	yes
MIVI2	*Mimulus viscidus*	sticky monkeyflower	Scrophulariaceae	yes
MINUA	*Minuartia*	stitchwort	Caryophyllaceae	yes
MICA7	*Minuartia californica*	California sandwort	Caryophyllaceae	yes
MIDO3	*Minuartia douglasii*	Douglas' stitchwort	Caryophyllaceae	yes
MOCA	*Modiola caroliniana*	Carolina bristlemallow	Malvaceae	no
MOVE	*Mollugo verticillata*	green carpetweed	Molluginaceae	no
MONAR2	*Monardella*	monardella	Lamiaceae	yes
MODOV2	*Monardella douglasii* subsp. *venosa*	veiny monardella	Lamiaceae	yes
MOOD	*Monardella odoratissima*	mountain monardella	Lamiaceae	yes
MOSH	*Monardella sheltonii*	Shelton's monardella	Lamiaceae	yes
MOVI2	*Monardella villosa*	coyote-mint	Lamiaceae	yes
MOVIV	*Monardella villosa* subsp. *villosa*	coyote mint	Lamiaceae	yes
MOFO	*Montia fontana*	water chickweed	Portulacaceae	yes
MOSS	Moss	moss		yes
MUHLE	*Muhlenbergia*	muhly	Poaceae	yes
MURI	*Muhlenbergia richardsonis*	mat muhly	Poaceae	yes
MURI2	*Muhlenbergia rigens*	deergrass	Poaceae	yes
MYOSO	*Myosotis*	forget-me-not	Boraginaceae	unknown
MYMI2	*Myosurus minimus*	tiny mousetail	Ranunculaceae	yes
NASSE	*Nassella*	tussockgrass	Poaceae	yes
NALE2	*Nassella lepida*	foothill needlegrass	Poaceae	yes
NAPU4	*Nassella pulchra*	purple needlegrass	Poaceae	yes
NAVAR	*Navarretia*	pincushionplant	Polemoniaceae	yes
NAFI	*Navarretia filicaulis*	threadstem pincushionplant	Polemoniaceae	yes
NAHE	*Navarretia heterandra*	Tehama navarretia	Polemoniaceae	yes
NAIN2	*Navarretia intertexta*	needleleaf navarretia	Polemoniaceae	yes
NAINI	*Navarretia intertexta* subsp. *intertexta*	needleleaf navarretia	Polemoniaceae	yes
NALE	*Navarretia leucocephala*	whitehead navarretia	Polemoniaceae	yes
NALEL	*Navarretia leucocephala* subsp. *leucocephala*	whitehead navarretia	Polemoniaceae	yes
NANI	*Navarretia nigelliformis*	adobe navarretia	Polemoniaceae	yes
NAPR	*Navarretia prolifera*	burr pincushionplant	Polemoniaceae	yes
NAPU2	*Navarretia pubescens*	downy pincushionplant	Polemoniaceae	yes
NATA3	*Navarretia tagetina*	marigold pincushionplant	Polemoniaceae	yes

Code	Taxon	Common Name	Family	Native
NAVI	*Navarretia viscidula*	sticky pincushionplant	Polemoniaceae	yes
NEMOP	*Nemophila*	baby blue eyes	Hydrophyllaceae	yes
NEHE	*Nemophila heterophylla*	small baby blue eyes	Hydrophyllaceae	yes
NEMA	*Nemophila maculata*	fivespot	Hydrophyllaceae	yes
NEME	*Nemophila menziesii*	baby blue-eyes	Hydrophyllaceae	yes
NEPA	*Nemophila parviflora*	smallflower nemophila	Hydrophyllaceae	yes
NEPE	*Nemophila pedunculata*	littlefoot nemophila	Hydrophyllaceae	yes
NEPU2	*Nemophila pulchella*	Eastwood's baby blue eyes	Hydrophyllaceae	yes
NEOL	*Nerium oleander*	oleander	Apocynaceae	no
ODHA	*Odontostomum hartwegii*	Hartweg's doll's-lily	Liliaceae	yes
OECE	*Oemleria cerasiformis*	Indian plum	Rosaceae	yes
OLEU	*Olea europaea*	olive	Oleaceae	no
ONAGXX	*Onagraceae*	Onagraceae	Onagraceae	unknown
ORTE	*Orcuttia tenuis*	slender Orcutt grass	Poaceae	Yes
OROBA	*Orobanche*	broomrape	Orobanchaceae	Yes yes
ORBU	*Orobanche bulbosa*	chaparral broomrape	Orobanchaceae	yes
ORCA2	*Orobanche californica*	California broomrape	Orobanchaceae	yes
ORFA	*Orobanche fasciculata*	clustered broom-rape	Orobanchaceae	yes
ORUN	*Orobanche uniflora*	naked broom-rape	Orobanchaceae	yes
OSCH	*Osmorhiza chilensis*	sweetcicely	Apiaceae	yes
OXALI	*Oxalis*	woodsorrel	Oxalidaceae	unknown
OXLA8	*Oxalis laxa*	dwarf woodsorrel	Oxalidaceae	no
PAAC5	*Panicum acuminatum*	tapered rosette grass	Poaceae	yes
PACA6	*Panicum capillare*	witchgrass	Poaceae	yes
PAVI3	*Parentucellia viscosa*	yellow glandweed	Scrophulariaceae	no
PAAH	*Paronychia ahartii*	Ahart's paronychia	Caryophyllaceae	yes
PASPA2	*Paspalum*	crowngrass	Poaceae	unknown
PADI3	*Paspalum dilatatum*	dallis grass	Poaceae	no
PADI6	*Paspalum distichum*	knotgrass	Poaceae	yes
PAUR2	*Paspalum urvillei*	Vasey's grass	Poaceae	no
PAPU10	*Parvisedum pumilum*	Sierra mock stonecrop	Crassulaceae	yes
PEPE26	*Pectocarya penicillata*	sleeping combseed	Boraginaceae	yes
PEPU	*Pectocarya pusilla*	little combseed	Boraginaceae	yes
PEDE	*Pedicularis densiflora*	Indian warrior	Scrophulariaceae	yes
PEAN2	*Pellaea andromedifolia*	coffee fern	Pteridaceae	yes
PEMU	*Pellaea mucronata*	bird's-foot fern	Pteridaceae	yes
PEMUC	*Pellaea mucronata* var. *californica*	California cliffbrake	Pteridaceae	yes
PENST	*Penstemon*	beardtongue	Scrophulariaceae	yes
PEAZ	*Penstemon azureus*	azure penstemon	Scrophulariaceae	yes
PEAZA	*Penstemon azureus* subsp. *angustissimus*	azure penstemon	Scrophulariaceae	yes
PEHE3	*Penstemon heterophyllus*	bunchleaf penstemon	Scrophulariaceae	yes

Code	Taxon	Common Name	Family	Native
PETR7	*Pentagramma triangularis*	goldenback fern	Pteridaceae	yes
PETRT	*Pentagramma triangularis* subsp. *triangularis*	goldback fern	Pteridaceae	yes
PERID	*Perideridia*	yampah	Apiaceae	yes
PEBA5	*Perideridia bacigalupii*	Bacigalupi's yampah	Apiaceae	yes
PEBO2	*Perideridia bolanderi*	Bolander's yampah	Apiaceae	yes
PEKE	*Perideridia kelloggii*	Kellogg's yampah	Apiaceae	yes
PEDU2	*Petrorhagia dubia*	hairypink	Caryophyllaceae	no
PHACE	*Phacelia*	phacelia	Hydrophyllaceae	yes
PHCI	*Phacelia cicutaria*	caterpillar phacelia	Hydrophyllaceae	yes
PHHEV	*Phacelia heterophylla* subsp. *virgata*	varileaf phacelia	Hydrophyllaceae	yes
PHIM	*Phacelia imbricata*	imbricate phacelia	Hydrophyllaceae	yes
PHPU2	*Phacelia purpusii*	Purpus' phacelia	Hydrophyllaceae	yes
PHRA2	*Phacelia ramosissima*	branching phacelia	Hydrophyllaceae	yes
PHALA2	*Phalaris*	canarygrass	Poaceae	unknown
PHAQ	*Phalaris aquatica*	harding grass	Poaceae	no
PHAR3	*Phalaris arundinacea*	reed canary grass	Poaceae	yes
PHPA5	*Phalaris paradoxa*	hood canarygrass	Poaceae	no
PHLE4	*Philadelphus lewisii*	wild mock orange	Hydrangeaceae	yes
PHLEU	*Phleum*	timothy	Poaceae	no
PHPR3	*Phleum pratense*	cultivated timothy	Poaceae	no
PHGR16	*Phlox gracilis*	slender phlox	Polemoniaceae	yes
PHAUA2	*Pholistoma auritum* var. *auritum*	blue fiestaflower	Hydrophyllaceae	yes
PHORA	*Phoradendron*	mistletoe	Viscaceae	yes
PHVI9	*Phoradendron villosum*	oak mistletoe	Viscaceae	yes
PHNO2	*Phyla nodiflora*	turkey tangle fogfruit	Verbenaceae	yes
PHCA11	*Physocarpus capitatus*	Pacific ninebark	Rosaceae	yes
PHAM4	*Phytolacca americana*	pokeweed	Phytolaccaceae	no
PIMO5	*Pickeringia montana*	Montana chaparral pea	Fabaceae	yes
PIAM	*Pilularia americana*	American pillwort	Marsileaceae	yes
PINUS	*Pinus*	pine	Pinaceae	unknown
PIAT	*Pinus attenuata*	knobcone pine	Pinaceae	yes
PILA	*Pinus lambertiana*	sugar pine	Pinaceae	yes
PIPO	*Pinus ponderosa*	ponderosa pine	Pinaceae	yes
PIRA2	*Pinus radiata*	Monterey pine	Pinaceae	yes
PISA2	*Pinus sabiniana*	foothill pine	Pinaceae	yes
PIPER2	*Piperia*	rein orchid	Orchidaceae	yes
PIEL4	*Piperia elongata*	denseflower rein orchid	Orchidaceae	yes
PIMI6	*Piperia michaelii*	Michael's rein orchid	Orchidaceae	yes
PITR3	*Piperia transversa*	royal rein orchid	Orchidaceae	yes
PIMI3	*Piptatherum miliaceum*	smilo grass	Poaceae	no
PLAGI	*Plagiobothrys*	popcornflower	Boraginaceae	yes

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PLAC	*Plagiobothrys acanthocarpus*	adobe allocarya	Boraginaceae	yes
PLAU	*Plagiobothrys austiniae*	Austin's popcornflower	Boraginaceae	yes
PLFU	*Plagiobothrys fulvus*	fulvous popcornflower	Boraginaceae	yes
PLGL2	*Plagiobothrys glyptocarpus*	sculptured popcornflower	Boraginaceae	yes
PLGLG	*Plagiobothrys glyptocarpus* var. *glyptocarpus*	sculptured popcornflower	Boraginaceae	yes
PLGR	*Plagiobothrys greenei*	Greene's popcornflower	Boraginaceae	yes
PLHU	*Plagiobothrys humistratus*	dwarf popcornflower	Boraginaceae	yes
PLNO	*Plagiobothrys nothofulvus*	rusty popcornflower	Boraginaceae	yes
PLSH	*Plagiobothrys shastensis*	Shasta popcornflower	Boraginaceae	yes
PLST	*Plagiobothrys stipitatus*	stalked popcornflower	Boraginaceae	yes
PLSTM	*Plagiobothrys stipitatus* var. *micranthus*	stalked popcornflower	Boraginaceae	yes
PLSTS	*Plagiobothrys stipitatus* var. *stipitatus*	stalked popcornflower	Boraginaceae	yes
PLANT	*Plantago*	plantain	Plantaginaceae	unknown
PLER3	*Plantago erecta*	dwarf plantain	Plantaginaceae	yes
PLLA	*Plantago lanceolata*	English plantain	Plantaginaceae	no
PLLE5	*Platanthera leucostachys*	white-flowered bog-orchid	Orchidaceae	yes
PLRA	*Platanus racemosa*	California sycamore	Platanaceae	yes
PLCA5	*Platystemon californicus*	cream cups	Papaveraceae	yes
PLECT	*Plectritis*	seablush	Valerianaceae	yes
PLBR6	*Plectritis brachystemon*	shortspur seablush	Valerianaceae	yes
PLCI	*Plectritis ciliosa*	longspur seablush	Valerianaceae	yes
PLCIC	*Plectritis ciliosa* subsp. *ciliosa*	longspur seablush	Valerianaceae	yes
PLMA4	*Plectritis macrocera*	longhorn plectritis	Valerianaceae	yes
PLFI2	*Pleuricospora fimbriolata*	fringed pinesap	Monotropaceae	yes
PLCA6	*Pleuropogon californicus*	annual semaphoregrass	Poaceae	yes
POA	*Poa*	bluegrass	Poaceae	unknown
POAN	*Poa annua*	annual bluegrass	Poaceae	no
POBU	*Poa bulbosa*	bulbous bluegrass	Poaceae	no
POHO6	*Poa howellii*	Howell's bluegrass	Poaceae	yes
POPRP2	*Poa pratensis* subsp. *pratensis*	Kentucky bluegrass	Poaceae	no
POSE	*Poa secunda*	Sandberg bluegrass	Poaceae	yes
POTE5	*Poa tenerrima*	delicate bluegrass	Poaceae	yes
POTR2	*Poa trivialis*	rough bluegrass	Poaceae	no
POACXX	*Poaceae*	unknown Poaceae	Poaceae	unknown
POGOG	*Pogogyne*	mesamint	Lamiaceae	yes
PODO2	*Pogogyne douglasii*	Douglas' mesamint	Lamiaceae	yes
POZI	*Pogogyne ziziphoroides*	Sacramento mesamint	Lamiaceae	yes
POLEXX	*Polemoniaceae*	Polemoniaceae	Polemoniaceae	unknown
POLYG	*Polygala*	polygala	Polygalaceae	unknown
POCA5	*Polygala californica*	California milkwort	Polygalaceae	yes
POCOC	*Polygala cornuta* var. *cornuta*	Sierra milkwort	Polygalaceae	yes

Code	Taxon	Common Name	Family	Native
POLYG4	*Polygonum*	knotweed	Polygonaceae	unknown
POBI4	*Polygonum bidwelliae*	Bidwell's knotweed	Polygonaceae	yes
POBO3	*Polygonum bolanderi*	Bolander's knotweed	Polygonaceae	yes
POCA7	*Polygonum californicum*	California knotweed	Polygonaceae	yes
PODO4	*Polygonum douglasii*	Douglas' knotweed	Polygonaceae	yes
POHY	*Polygonum hydropiper*	marshpepper	Polygonaceae	no
POHY2	*Polygonum hydropiperoides*	waterpepper	Polygonaceae	yes
POLA4	*Polygonum lapathifolium*	willow weed	Polygonaceae	yes
POPE3	*Polygonum persicaria*	lady's thumb	Polygonaceae	no
POPU5	*Polygonum punctatum*	dotted smartweed	Polygonaceae	yes
POLYP	*Polypodium*	polypody	Polypodiaceae	yes
POCA26	*Polypodium calirhiza*	nested polypody	Polypodiaceae	yes
POLYP2	*Polypogon*	rabbitsfoot grass	Poaceae	no
POAU3	*Polypogon australis*	Chilean beard grass	Poaceae	no
POIN7	*Polypogon interruptus*	ditch beard grass	Poaceae	no
POMA10	*Polypogon maritimus*	Mediterranean rabbitsfoot grass	Poaceae	no
POMO5	*Polypogon monspeliensis*	annual beard grass	Poaceae	no
POLYS	*Polystichum*	hollyfern	Dryopteridaceae	yes
POIMC	*Polystichum imbricans* subsp. *curtum*	narrowleaf swordfern	Dryopteridaceae	yes
POMU	*Polystichum munitum*	western sword fern	Dryopteridaceae	yes
POBAT	*Populus balsamifera* subsp. *trichocarpa*	black cottonwood	Salicaceae	yes
POFR2	*Populus fremontii*	Fremont cottonwood	Salicaceae	yes
PORTU	*Portulaca*	purslane	Portulacaceae	unknown
POOL	*Portulaca oleracea*	common purslane	Portulacaceae	no
POTAM	*Potamogeton*	pondweed	Potamogetonaceae	yes
PODI	*Potamogeton diversifolius*	diverse-leaved pondweed	Potamogetonaceae	yes
POTEN	*Potentilla*	cinquefoil	Rosaceae	yes
POGL9	*Potentilla glandulosa*	sticky cinquefoil	Rosaceae	yes
POGLG4	*Potentilla glandulosa* subsp. *glandulosa*	sticky cinquefoil	Rosaceae	yes
POGLR3	*Potentilla glandulosa* subsp. *reflexa*	sticky cinquefoil	Rosaceae	yes
PRVUL2	*Prunella vulgaris* subsp. *lanceolata*	lance selfheal	Lamiaceae	yes
PRUNU	*Prunus*	plum	Rosaceae	unknown
PRCE2	*Prunus cerasifera*	cherry plum	Rosaceae	no
PREM	*Prunus emarginata*	bitter cherry	Rosaceae	yes
PRSU2	*Prunus subcordata*	Klamath plum	Rosaceae	yes
PRVI	*Prunus virginiana*	chokecherry	Rosaceae	yes
PRVID	*Prunus virginiana* var. *demissa*	western chokecherry	Rosaceae	yes
PSHE	*Pseudobahia heermannii*	foothill sunburst	Asteraceae	yes
PSME	*Pseudotsuga menziesii*	Douglas-fir	Pinaceae	yes

Code	Taxon	Common Name	Family	Native
PSILO	*Psilocarphus*	woollyheads	Asteraceae	yes
PSBR	*Psilocarphus brevissimus*	short woollyheads	Asteraceae	yes
PSOR	*Psilocarphus oregonus*	Oregon woolly-heads	Asteraceae	yes
PSTEG	*Psilocarphus tenellus* var. *globiferus*	slender woollyheads	Asteraceae	yes
PTCR3	*Ptelea crenulata*	California hoptree	Rutaceae	yes
PTAQ	*Pteridium aquilinum*	brackenfern	Dennstaedtiaceae	yes
PTAN2	*Pterospora andromedea*	woodland pinedrops	Monotropaceae	yes
PTDR	*Pterostegia drymarioides*	woodland pterostegia	Polygonaceae	yes
PYCA	*Pycnanthemum californicum*	Sierra mint	Lamiaceae	yes
PYCO	*Pyrus communis*	common pear	Rosaceae	no
QUERC	*Quercus*	oak	Fagaceae	yes
QUMO2	*Quercus ×moreha*	oracle oak	Fagaceae	yes
QUBE5	*Quercus berberidifolia*	scrub oak	Fagaceae	yes
QUCH2	*Quercus chrysolepis*	canyon live oak	Fagaceae	yes
QUDO	*Quercus douglasii*	blue oak	Fagaceae	yes
QUDU4	*Quercus durata*	leather oak	Fagaceae	yes
QUGAB	*Quercus garryana* var. *breweri*	brewer oak	Fagaceae	yes
QUKE	*Quercus kelloggii*	black oak	Fagaceae	yes
QULO	*Quercus lobata*	valley oak	Fagaceae	yes
QUWI2	*Quercus wislizeni*	interior live oak	Fagaceae	yes
QUWIF	*Quercus wislizeni* var. *frutescens*	interior live oak	Fagaceae	yes
RANUN	*Ranunculus*	buttercup	Ranunculaceae	unknown
RAAQ	*Ranunculus aquatilis*	whitewater crowfoot	Ranunculaceae	yes
RAAQC2	*Ranunculus aquatilis* var. *capillaceus*	threadleaf crowfoot	Ranunculaceae	yes
RABO	*Ranunculus bonariensis*	Carter's buttercup	Ranunculaceae	yes
RACA2	*Ranunculus californicus*	California buttercup	Ranunculaceae	yes
RACA3	*Ranunculus canus*	Sacramento Valley buttercup	Ranunculaceae	yes
RAHE	*Ranunculus hebecarpus*	delicate buttercup	Ranunculaceae	yes
RAMU2	*Ranunculus muricatus*	spinyfruit buttercup	Ranunculaceae	no
RAOC	*Ranunculus occidentalis*	western buttercup	Ranunculaceae	yes
RAUN	*Ranunculus uncinatus*	woodland buttercup	Ranunculaceae	yes
RASA2	*Raphanus sativus*	radish	Brassicaceae	no
RHAMN	*Rhamnus*	buckthorn	Rhamnaceae	yes
RHCA	*Rhamnus californica*	California coffeeberry	Rhamnaceae	yes
RHIL	*Rhamnus ilicifolia*	holly-leaf redberry	Rhamnaceae	yes
RHRU	*Rhamnus rubra*	Sierra coffeeberry	Rhamnaceae	yes
RHTO6	*Rhamnus tomentella* (=*Frangula californica)*	hoary coffeeberry	Rhamnaceae	yes
RHOC	*Rhododendron occidentale*	western azalea	Ericaceae	yes
RHTR	*Rhus trilobata*	skunkbush	Anacardiaceae	yes
RIBES	*Ribes*	currant	Grossulariaceae	yes
RIMAM	*Ribes malvaceum* var. *malvaceum*	chaparral currant	Grossulariaceae	yes

Code	Taxon	Common Name	Family	Native
RINE	*Ribes nevadense*	mountain pink currant	Grossulariaceae	yes
RIRO	*Ribes roezlii*	Sierra gooseberry	Grossulariaceae	yes
RIROR	*Ribes roezlii* var. *roezlii*	Sierra gooseberry	Grossulariaceae	yes
RILE2	*Rigiopappus leptocladus*	wireweed	Asteraceae	yes
ROPS	*Robinia pseudoacacia*	black locust	Fabaceae	no
RORIP	*Rorippa*	yellowcress	Brassicaceae	unknown
ROCU2	*Rorippa curvipes*	bluntleaf yellowcress	Brassicaceae	yes
ROCU	*Rorippa curvisiliqua*	curvepod yellowcress	Brassicaceae	yes
ROCUO2	*Rorippa curvisiliqua* var. *orientalis*	oriental yellowcress	Brassicaceae	yes
RONA2	*Rorippa nasturtium-aquaticum*	water cress	Brassicaceae	yes
ROSA5	*Rosa*	rose	Rosaceae	unknown
ROCA2	*Rosa californica*	California rose	Rosaceae	yes
ROEG	*Rosa eglanteria*	sweet-brier	Rosaceae	no
RORA	*Rotala ramosior*	lowland rotala	Lythraceae	yes
RUBUS	*Rubus*	blackberry	Rosaceae	yes
RUDI2	*Rubus discolor*	Himalaya blackberry	Rosaceae	no
RUGL	*Rubus glaucifolius*	San Diego raspberry	Rosaceae	yes
RULE	*Rubus leucodermis*	blackcap raspberry	Rosaceae	yes
RUUR	*Rubus ursinus*	California blackberry	Rosaceae	yes
RUMEX	*Rumex*	dock	Polygonaceae	unknown
RUAC3	*Rumex acetosella*	sheep sorrel	Polygonaceae	no
RUCO2	*Rumex conglomeratus*	clustered dock	Polygonaceae	no
RUCR	*Rumex crispus*	curly dock	Polygonaceae	no
RUPU3	*Rumex pulcher*	fiddle dock	Polygonaceae	no
RUSA	*Rumex salicifolius*	willow dock	Polygonaceae	yes
RUSAD	*Rumex salicifolius* var. *denticulatus*	toothed willow dock	Polygonaceae	yes
RUSAT4	*Rumex salicifolius* var. *transitorius*	willow dock	Polygonaceae	yes
SAGIN	*Sagina*	pearlwort	Caryophyllaceae	yes
SAAP	*Sagina apetala*	dwarf pearlwort	Caryophyllaceae	yes
SADEO	*Sagina decumbens* subsp. *occidentalis*	western pearlwort	Caryophyllaceae	yes
SAMOC2	*Sagittaria montevidensis* subsp. *calycina*	hooded arrowhead	Alismataceae	yes
SALIX	*Salix*	willow	Salicaceae	yes
SAEX	*Salix exigua*	narrow-leaf willow	Salicaceae	yes
SAGO	*Salix gooddingii*	black willow	Salicaceae	yes
SALA3	*Salix laevigata*	red willow	Salicaceae	yes
SALA6	*Salix lasiolepis*	arroyo willow	Salicaceae	yes
SALUL	*Salix lucida* subsp. *lasiandra*	Pacific willow	Salicaceae	yes
SAME2	*Salix melanopsis*	dusky willow	Salicaceae	yes
SALVI	*Salvia*	sage	Lamiaceae	yes
SACO6	*Salvia columbariae*	chia	Lamiaceae	yes
SASO	*Salvia sonomensis*	creeping sage	Lamiaceae	yes

Code	Taxon	Common Name	Family	Native
SAMBU	*Sambucus*	elderberry	Caprifoliaceae	yes
SAME5	*Sambucus mexicana*	blue elderberry	Caprifoliaceae	yes
SAMIM	*Sanguisorba minor* subsp. *muricata*	garden burnet	Rosaceae	no
SAOC2	*Sanguisorba occidentalis*	western burnet	Rosaceae	yes
SANIC	*Sanicula*	sanicle	Apiaceae	yes
SABI2	*Sanicula bipinnata*	poison sanicle	Apiaceae	yes
SABI3	*Sanicula bipinnatifida*	purple sanicle	Apiaceae	yes
SACR2	*Sanicula crassicaulis*	Pacific blacksnakeroot	Apiaceae	yes
SAGR5	*Sanicula graveolens*	northern sanicle	Apiaceae	yes
SATU	*Sanicula tuberosa*	turkey pea	Apiaceae	yes
SAOF4	*Saponaria officinalis*	bouncingbet	Caryophyllaceae	no
SADO5	*Satureja douglasii*	yerba buena	Lamiaceae	yes
SACA18	*Saxifraga californica*	California saxifrage	Saxifragaceae	yes
SAIN4	*Saxifraga integrifolia*	wholeleaf saxifrage	Saxifragaceae	yes
SANIN	*Saxifraga nidifica* var. *nidifica*	peak saxifrage	Saxifragaceae	yes
SAXIXX	*Saxifragaceae*	Saxifragaceae	Saxifragaceae	unknown
SCPE	*Scandix pecten-veneris*	Venus' needle	Apiaceae	no
SCIRP	*Scirpus*	bulrush	Cyperaceae	yes
SCACO2	*Schoenoplectus* (=*Scirpus*) *acutus* var. *occidentalis*	common tule	Cyperaceae	yes
SCAM6	*Schoenoplectus* (=*Scirpus*) *americanus*	chairmaker's bulrush	Cyperaceae	yes
SCCE6	*Scirpus cernuus* (=*Isolepis cernua*)	low bulrush	Cyperaceae	yes
SCAN2	*Scleranthus annuus*	German knotgrass	Caryophyllaceae	no
SCBO	*Scribneria bolanderi*	Scribner's grass	Poaceae	yes
SCCA2	*Scrophularia californica*	California figwort	Scrophulariaceae	yes
SCROXX	*Scrophulariaceae*	Scrophulariaceae	Scrophulariaceae	unknown
SCUTE	*Scutellaria*	skullcap	Lamiaceae	yes
SCAN4	*Scutellaria antirrhinoides*	nose skullcap	Lamiaceae	yes
SCBO2	*Scutellaria bolanderi*	Sierra skullcap	Lamiaceae	yes
SCCA3	*Scutellaria californica*	California skullcap	Lamiaceae	yes
SCSI	*Scutellaria siphocamyploides*	grayleaf skullcap	Lamiaceae	yes
SCTU2	*Scutellaria tuberosa*	Danny's skullcap	Lamiaceae	yes
SEDUM	*Sedum*	stonecrop	Crassulaceae	unknown
SELAG	*Selaginella*	spikemoss	Selaginellaceae	yes
SEHA2	*Selaginella hansenii*	Hansen's spikemoss	Selaginellaceae	yes
SENEC	*Senecio*	ragwort	Asteraceae	yes
SEAR4	*Senecio aronicoides*	rayless ragwort	Asteraceae	yes
SECL2	*Senecio clevelandii*	Cleveland's ragwort	Asteraceae	yes
SECLH	*Senecio clevelandii* var. *heterophyllus*	Red Hills ragwort	Asteraceae	yes
SEEU	*Senecio eurycephalus*	widehead groundsel	Asteraceae	yes
SELA4	*Senecio layneae*	Layne's ragwort	Asteraceae	yes

Code	Taxon	Common Name	Family	Native
SETR	*Senecio triangularis*	arrowleaf ragwort	Asteraceae	yes
SEVU	*Senecio vulgaris*	old-man-in-the-Spring	Asteraceae	no
SESP5	*Setaria sphacelata*	African bristlegrass	Poaceae	no
SHAR2	*Sherardia arvensis*	field madder	Rubiaceae	no
SHRBAC	Shrub spp. - type unknown	n/a		unknown
SIDAL	*Sidalcea*	checkerbloom	Malvaceae	yes
SICAC3	*Sidalcea calycosa* subsp. *calycosa*	annual checkerbloom	Malvaceae	yes
SIDI	*Sidalcea diploscypha*	fringed checkerbloom	Malvaceae	yes
SIHA	*Sidalcea hartwegii*	valley checkerbloom	Malvaceae	yes
SIHI2	*Sidalcea hirsuta*	hairy checkerbloom	Malvaceae	yes
SIMA2	*Sidalcea malviflora*	checker mallow	Malvaceae	yes
SIMAA	*Sidalcea malviflora* subsp. *asprella*	dwarf checkerbloom	Malvaceae	yes
SIRO2	*Sidalcea robusta*	Butte County checkerbloom	Malvaceae	yes
SILEN	*Silene*	catchfly	Caryophyllaceae	unknown
SIBR	*Silene bridgesii*	Bridges' catchfly	Caryophyllaceae	yes
SICA4	*Silene californica*	Indian pink	Caryophyllaceae	yes
SIGA	*Silene gallica*	common catchfly	Caryophyllaceae	no
SIMA3	*Silybum marianum*	blessed milkthistle	Asteraceae	no
SISYM	*Sisymbrium*	hedgemustard	Brassicaceae	no
SIOF	*Sisymbrium officinale*	hedge mustard	Brassicaceae	no
SIBE	*Sisyrinchium bellum*	blue-eyed-grass	Iridaceae	yes
SMILA2	*Smilax*	greenbrier	Smilacaceae	yes
SMCA2	*Smilax californica*	California greenbrier	Smilacaceae	yes
SOLAN	*Solanum*	nightshade	Solanaceae	unknown
SOAM	*Solanum americanum*	American black nightshade	Solanaceae	yes
SOPA	*Solanum parishii*	Parish's nightshade	Solanaceae	yes
SOUM	*Solanum umbelliferum*	bluewitch nightshade	Solanaceae	yes
SOXA	*Solanum xanti*	chaparral nightshade	Solanaceae	yes
SOLID	*Solidago*	goldenrod	Asteraceae	yes
SOCA5	*Solidago californica*	California goldenrod	Asteraceae	yes
SOCA6	*Solidago canadensis*	Canada goldenrod	Asteraceae	yes
SOSE2	*Soliva sessilis*	field burrweed	Asteraceae	no
SONCH	*Sonchus*	sowthistle	Asteraceae	no
SOAS	*Sonchus asper*	spiny sowthistle	Asteraceae	no
SOOL	*Sonchus oleraceus*	common sow thistle	Asteraceae	no
SOHA	*Sorghum halepense*	Johnsongrass	Poaceae	no
SPJU2	*Spartium junceum*	Spanish broom	Fabaceae	no
SPAR	*Spergula arvensis*	corn spurry	Caryophyllaceae	no
SPERG2	*Spergularia*	sandspurry	Caryophyllaceae	yes
SPRU	*Spergularia rubra*	red sandspurry	Caryophyllaceae	no
SPIRA2	*Spiranthes*	ladies'-tresses	Orchidaceae	yes
SPPO7	*Spiranthes porrifolia*	creamy ladies'-tresses	Orchidaceae	yes

Code	Taxon	Common Name	Family	Native
STACH	*Stachys*	hedgenettle	Lamiaceae	unknown
STAJ	*Stachys ajugoides*	bugle hedgenettle	Lamiaceae	yes
STAJR	*Stachys ajugoides* var. *rigida*	rough hedgenettle	Lamiaceae	yes
STAL	*Stachys albens*	whitestem hedgenettle	Lamiaceae	yes
STRI	*Stachys rigida*	rough hedgenettle	Lamiaceae	yes
STST	*Stachys stricta*	Sonoma hedgenettle	Lamiaceae	yes
SNAG	*Standing snag*	unknown	unknown	yes
STHE10	*Stebbinsoseris heterocarpa*	grassland silverpuffs	Asteraceae	yes
STELL	*Stellaria*	starwort	Caryophyllaceae	unknown
STME2	*Stellaria media*	common chickweed	Caryophyllaceae	no
STEPH	*Stephanomeria*	wirelettuce	Asteraceae	yes
STVI2	*Stephanomeria virgata*	rod wirelettuce	Asteraceae	yes
STREP2	*Streptanthus*	twistflower	Brassicaceae	yes
STDI2	*Streptanthus diversifolius*	varied-leaved jewelflower	Brassicaceae	yes
STPO2	*Streptanthus polygaloides*	milkwort jewelflower	Brassicaceae	yes
STTO3	*Streptanthus tortuosus*	mountain jewelflower	Brassicaceae	yes
STTOT2	*Streptanthus tortuosus* var. *tortuosus*	shieldplant	Brassicaceae	yes
STOFR	*Styrax officinalis* var. *redivivus*	snowdrop bush	Styracaceae	yes
SWAL2	*Swertia albicaulis*	whitestem frasera	Gentianaceae	yes
SYMPH	*Symphoricarpos*	snowberry	Caprifoliaceae	yes
SYALL	*Symphoricarpos albus* var. *laevigatus*	common snowberry	Caprifoliaceae	yes
SYMO	*Symphoricarpos mollis*	creeping snowberry	Caprifoliaceae	yes
TACA8	*Taeniatherum caput-medusae*	medusahead	Poaceae	no
TAPA4	*Tamarix parviflora*	smallflower tamarisk	Tamaricaceae	no
TAOF	*Taraxacum officinale*	common dandelion	Asteraceae	no
TAUSC	*Tauschia*	umbrellawort	Apiaceae	yes
TAHA2	*Tauschia hartwegii*	Hartweg's umbrellawort	Apiaceae	yes
TAKE	*Tauschia kelloggii*	Kellogg's umbrellawort	Apiaceae	yes
THALI2	*Thalictrum*	meadow-rue	Ranunculaceae	yes
THOC	*Thalictrum occidentale*	western meadow-rue	Ranunculaceae	yes
THCU	*Thysanocarpus curvipes*	sand fringepod	Brassicaceae	yes
THLA3	*Thysanocarpus laciniatus*	mountain fringepod	Brassicaceae	yes
THRA	*Thysanocarpus radians*	ribbed fringepod	Brassicaceae	yes
TORIL	*Torilis*	hedgeparsley	Apiaceae	no
TOAR	*Torilis arvensis*	spreading hedgeparsley	Apiaceae	no
TONO	*Torilis nodosa*	knotted hedgeparsley	Apiaceae	no
TOCA	*Torreya californica*	California nutmeg	Taxaceae	yes
TODI	*Toxicodendron diversilobum*	poison-oak	Anacardiaceae	yes
TRAGO	*Tragopogon*	goatsbeard	Asteraceae	no
TRDU	*Tragopogon dubius*	yellow salsify	Asteraceae	no
TRPO	*Tragopogon porrifolius*	salsify	Asteraceae	no

Code	Taxon	Common Name	Family	Native
TRICH9	*Trichostema*	bluecurls	Lamiaceae	yes
TRLA4	*Trichostema lanceolatum*	vinegar weed	Lamiaceae	yes
TRRU	*Trichostema rubisepalum*	Hernandez bluecurls	Lamiaceae	yes
TRLA6	*Trientalis latifolia*	broadleaf starflower	Primulaceae	yes
TRIFO	*Trifolium*	clover	Fabaceae	unknown
TRAL5	*Trifolium albopurpureum*	rancheria clover	Fabaceae	yes
TRALD	*Trifolium albopurpureum* var. *dichotomum*	branched Indian clover	Fabaceae	yes
TRBA	*Trifolium barbigerum*	bearded clover	Fabaceae	yes
TRBI	*Trifolium bifidum*	notchleaf clover	Fabaceae	yes
TRBID	*Trifolium bifidum* var. *decipiens*	notchleaf clover	Fabaceae	yes
TRCA5	*Trifolium campestre*	hop clover	Fabaceae	no
TRCI	*Trifolium ciliolatum*	foothill clover	Fabaceae	yes
TRDE	*Trifolium depauperatum*	cowbag clover	Fabaceae	yes
TRDED	*Trifolium depauperatum* var. *depauperatum*	cowbag clover	Fabaceae	yes
TRDET	*Trifolium depauperatum* var. *truncatum*	balloon sack clover	Fabaceae	yes
TRDU2	*Trifolium dubium*	little hop clover	Fabaceae	no
TRFU	*Trifolium fucatum*	bull clover	Fabaceae	yes
TRGL4	*Trifolium glomeratum*	clustered clover	Fabaceae	no
TRGRG	*Trifolium gracilentum* var. *gracilentum*	pinpoint clover	Fabaceae	yes
TRHI4	*Trifolium hirtum*	rose clover	Fabaceae	no
TRHY	*Trifolium hybridum*	alsike clover	Fabaceae	no
TRJO	*Trifolium jokerstii*	Butte County golden clover	Fabaceae	yes
TRMI4	*Trifolium microcephalum*	smallhead clover	Fabaceae	yes
TRMI5	*Trifolium microdon*	thimble clover	Fabaceae	yes
TROB2	*Trifolium obtusiflorum*	clammy clover	Fabaceae	yes
TROL	*Trifolium oliganthum*	fewflower clover	Fabaceae	yes
TRPR2	*Trifolium pratense*	red clover	Fabaceae	no
TRRE3	*Trifolium repens*	white clover	Fabaceae	no
TRSU3	*Trifolium subterraneum*	subterranean clover	Fabaceae	no
TRVA	*Trifolium variegatum*	whitetip clover	Fabaceae	yes
TRWI3	*Trifolium willdenovii*	tomcat clover	Fabaceae	yes
TRWO	*Trifolium wormskioldii*	cows clover	Fabaceae	yes
TRIPH3	*Triphysaria*	owl's-clover	Scrophulariaceae	yes
TRERE2	*Triphysaria eriantha* subsp. *eriantha*	johnny-tuck	Scrophulariaceae	yes
TRPU16	*Triphysaria pusilla*	dwarf owl's-clover	Scrophulariaceae	yes
TRCA21	*Trisetum canescens*	tall trisetum	Poaceae	yes
TRITE	*Triteleia*	triteleia	Liliaceae	yes
TRBR7	*Triteleia bridgesii*	Bridges' brodiaea	Liliaceae	yes
TRHY3	*Triteleia hyacinthina*	white brodiaea	Liliaceae	yes
TRIX	*Triteleia ixioides*	prettyface	Liliaceae	yes

Code	Taxon	Common Name	Family	Native
TRIXS	*Triteleia ixioides* subsp. *scabra*	prettyface	Liliaceae	yes
TRLA16	*Triteleia laxa*	grass-nut	Liliaceae	yes
TRLI8	*Triteleia lilacinum*	foothill triteleia	Liliaceae	yes
TUGU	*Tuberaria guttata*	European frostweed	Cistaceae	no
TYPHA	*Typha*	cattail	Typhaceae	yes
TYAN	*Typha angustifolia*	narrow-leaved cattail	Typhaceae	yes
TYDO	*Typha domingensis*	southern cattail	Typhaceae	yes
TYLA	*Typha latifolia*	broadleaf cattail	Typhaceae	yes
UMCA	*Umbellularia californica*	California bay	Lauraceae	yes
HERBAC	unknown	n/a		unknown
URLI5	*Uropappus lindleyi*	Lindley's silverpuffs	Asteraceae	yes
URTIC	*Urtica*	nettle	Urticaceae	yes
URDI	*Urtica dioica*	stinging nettle	Urticaceae	yes
VERI	*Velezia rigida*	velezia	Caryophyllaceae	no
VERBA	*Verbascum*	mullein	Scrophulariaceae	no
VEBL	*Verbascum blattaria*	moth mullein	Scrophulariaceae	no
VETH	*Verbascum thapsus*	woolly mullein	Scrophulariaceae	no
VERBE	*Verbena*	vervain	Verbenaceae	unknown
VECA9	*Verbena californica*	California vervain	Verbenaceae	yes
VELI	*Verbena litoralis*	seashore vervain	Verbenaceae	no
VERON	*Veronica*	speedwell	Scrophulariaceae	unknown
VEAM2	*Veronica americana*	American brooklime	Scrophulariaceae	yes
VEAN2	*Veronica anagallis-aquatica*	water speedwell	Scrophulariaceae	no
VEAR	*Veronica arvensis*	corn speedwell	Scrophulariaceae	no
VEPEX2	*Veronica peregrina* subsp. *xalapensis*	hairy purslane speedwell	Scrophulariaceae	yes
VEPE3	*Veronica persica*	Persian speedwell	Scrophulariaceae	no
VICIA	*Vicia*	vetch	Fabaceae	yes
VIAMA3	*Vicia americana* subsp. *americana*	American vetch	Fabaceae	yes
VIBE	*Vicia benghalensis*	purple vetch	Fabaceae	no
VIHI	*Vicia hirsuta*	tiny vetch	Fabaceae	no
VISA	*Vicia sativa*	garden vetch	Fabaceae	no
VISAN2	*Vicia sativa* subsp. *nigra*	garden vetch	Fabaceae	no
VIVI	*Vicia villosa*	hairy vetch	Fabaceae	no
VIVIV8	*Vicia villosa* subsp. *varia*	winter vetch	Fabaceae	no
VIVIV	*Vicia villosa* subsp. *villosa*	winter vetch	Fabaceae	no
VIMA	*Vinca major*	greater periwinkle	Apocynaceae	no
VIOLA	*Viola*	violet	Violaceae	yes
VIDO	*Viola douglasii*	Douglas violet	Violaceae	yes
VILOL2	*Viola lobata* subsp. *lobata*	pine violet	Violaceae	yes
VIPUQ	*Viola purpurea* subsp. *quercetorum*	goosefoot violet	Violaceae	yes
VICA5	*Vitis californica*	California wild grape	Vitaceae	yes

Code	Taxon	Common Name	Family	Native
VULPI	*Vulpia*	fescue	Poaceae	unknown
VUBR	*Vulpia bromoides*	brome fescue	Poaceae	no
VUMI	*Vulpia microstachys*	small fescue	Poaceae	yes
VUMIC	*Vulpia microstachys* var. *ciliata*	Eastwood fescue	Poaceae	yes
VUMIC2	*Vulpia microstachys* var. *confusa*	confusing fescue	Poaceae	yes
VUMIM	*Vulpia microstachys* var. *microstachys*	desert fescue	Poaceae	yes
VUMIP	*Vulpia microstachys* var. *pauciflora*	Pacific fescue	Poaceae	yes
VUMY	*Vulpia myuros*	rat-tail fescue	Poaceae	no
WOFI	*Woodwardia fimbriata*	giant chain fern	Blechnaceae	yes
WYETH	*Wyethia*	mule-ears	Asteraceae	yes
WYAN	*Wyethia angustifolia*	California compassplant	Asteraceae	yes
WYBO	*Wyethia bolanderi*	Bolander's mule-ears	Asteraceae	yes
WYHE	*Wyethia helenioides*	whitehead mule-ears	Asteraceae	yes
WYRE	*Wyethia reticulata*	El Dorado County mule ears	Asteraceae	yes
XAST	*Xanthium strumarium*	cocklebur	Asteraceae	yes
YAMI	*Yabea microcarpa*	false carrot	Apiaceae	yes
ZIFR	*Zigadenus fremontii*	Fremont's deathcamas	Liliaceae	yes

APPENDIX 3. Noteworthy plant taxa identified in the northern Sierra Nevada Foothills vegetation surveys with their state and federal rarity status, general habitat, and known counties (CNPS 2007). Also provided are the counties and alliances where plants were recorded in vegetation surveys. Plants that need further plant identification to the species or subspecies level and that are potentially rare (but identified to the genus or species level) are denoted with an *.

Agrostis hendersonii

(Henderson's bent grass)

CNPS List: 3.2 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G1Q

Growth Form: Annual herb Elevation Range (ft): 225 - 3380

Habitat(s): Valley and foothill grassland (mesic), Vernal pools

Counties (states) known for plant: Butte?, Calaveras, Merced, Shasta, Tehama, Tuolumne; Oregon (OR)

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Shasta (3), Tuolumne (1)

Alliance(s) where surveys occurred: *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Agrostis

(**A. hendersonii* (Henderson's bent grass))

CNPS List: 3.2 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G1Q

Growth Form: Annual herb Elevation Range (ft): 225 - 3380

Habitat(s): Valley and foothill grassland (mesic), Vernal pools

Counties (states) known for plant: Butte?, Calaveras, Merced, Shasta, Tehama, Tuolumne; Oregon (OR)

Number of surveys from 2005-2006: 2

Counties where surveys occurred: Calaveras (1), Shasta (1)

Alliance(s) where surveys occurred: *Juncus* (*balticus*, *mexicanus*), *Lasthenia fremontii - Downingia* (*bicornuta*)

Allium sanbornii* var. *congdonii

(Congdon's onion)

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G3T3

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 980 - 2300

Habitat(s): Chaparral, Cismontane woodland/serpentinite or volcanic

Counties (states) known for plant: El Dorado, Mariposa, Nevada, Placer, Tuolumne

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Mariposa (1)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*

Allium sanbornii* var. *sanbornii

(Sanborn's onion)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G3T3

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 850 - 4955

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/usually serpentinite, gravelly

Counties (states) known for plant: Butte, Calaveras, El Dorado, Nevada, Placer, Plumas, Shasta, Tehama, Tuolumne, Yuba, Oregon (OR)

Number of surveys from 2005-2006: 5

Counties where surveys occurred: El Dorado (4), Placer (1)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Cercocarpus betuloides*

Allium tuolumnense

(Rawhide Hill onion)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 700 - 1650

Habitat(s): Cismontane woodland (serpentinite)

Counties (states) known for plant: Tuolumne

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Tuolumne (4)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Allium

(**A. jepsonii*, *A. sanbornii* var. *congdonii*, *A. s.* var. *sanbornii*, or *A. tuolumnense* (onion))

CNPS List: 1B.2, List 4.3, List 4.2, List State Rank: S1.2, S3.3, S3.2, S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G1, G3T3, G3T3, G2

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 700 - 4955

Habitat(s): Chaparral, Cismontane woodland (serpentinite or volcanic), Lower montane coniferous forest (usually serpentinite or volcanic), gravelly

Counties (states) known for plant: Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Plumas, Shasta, Tehama, Tuolumne, Yuba, Oregon (OR)

Number of surveys from 2005-2006: 37

Counties where surveys occurred: Butte (6), El Dorado (9), Mariposa (3), Nevada (2), Shasta (1), Tehama (10), Tuolumne (5), Yuba (1)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*, *Arctostaphylos viscida*, *Bromus* (*diandrus*, *hordeaceus*, *madritensis*), *Bromus hordeaceus* - (*Holocarpha virgata*), *Carex serratodens*, *Ceanothus cuneatus*, *Eriodictyon californicum*, *Lasthenia fremontii - Downingia* (*bicornuta*), *Layia fremontii*, *Lolium multiflorum*, *Pinus sabiniana*, *Quercus douglasii*, Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Arctostaphylos mewukka

(**A. m.* subsp. *truei* (True's manzanita))

CNPS List: List 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4?T3

Growth Form: Perennial evergreen shrub Elevation Range (ft): 130 - 400

Habitat(s): Chaparral, Lower montane coniferous forest/sometimes roadside

Counties (states) known for plant: Butte, El Dorado, Nevada, Placer, Plumas, Yuba

Number of surveys from 2005-2006: 1

Counties where surveys occurred: El Dorado (1)

Alliance(s) where surveys occurred: Unclassified stand

Arctostaphylos myrtifolia

(Ione manzanita)

CNPS List: 1B.2 State Rank: S2.1

Federal, State Listings: Fed: Threatened, Cal: None Global Rank: G2

Growth Form: Perennial evergreen shrub Elevation Range (ft): 300 - 1840

Habitat(s): Chaparral, Cismontane woodland/acidic, Ione soil, clay or sandy

Counties (states) known for plant: Amador, Calaveras

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Amador (1)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*

Astragalus pauperculus

(depauperate milk-vetch)

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 195 - 3675

Habitat(s): Chaparral, Cismontane woodland, Valley and foothill grassland/vernally mesic, volcanic

Counties (states) known for plant: Butte, Placer, Shasta, Tehama, Yuba

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Tehama (3)

Alliance(s) where surveys occurred: *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Balsamorhiza macrolepis* var. *macrolepis

(big-scale balsamroot)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G3G4T2

Growth Form: Perennial herb Elevation Range (ft): 125 - 4500

Habitat(s): Chaparral, Cismontane woodland, Valley and foothill grassland/sometimes serpentinite

Counties (states) known for plant: Alameda, Butte, Colusa, El Dorado, Lake, Mariposa, Napa, Placer, Santa Clara, Solano, Sonoma, Tehama

Number of surveys from 2005-2006: 2

Counties where surveys occurred: Mariposa (2)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*, *Juniperus californica*

Brodiaea

(**B. pallida* (Chinese Camp brodiaea))

CNPS List: 1B.1 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G1

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 1260 - 1260

Habitat(s): often serpentinite (Closed-cone coniferous forest, Chaparral, Cismontane woodland, Valley and foothill grassland/vernal streambeds)

Counties (states) known for plant: Calaveras, Tuolumne

Number of surveys from 2005-2006: 16

Counties where surveys occurred: Calaveras (6), Tuolumne (10)

Alliance(s) where surveys occurred: *Avena* (*barbata*, *fatua*), *Bromus hordeaceus* - (*Holocarpha virgata*), *Ceanothus cuneatus*, *Heteromeles arbutifolia*, *Pinus sabiniana*, *Quercus douglasii*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Calochortus superbus

(**C. syntrophus* (Callahan's mariposa lily))

CNPS List: 3.1 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G1

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 1720 - 2910

Habitat(s): Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland (vernally mesic)

Counties (states) known for plant: Shasta

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Shasta (3)

Alliance(s) where surveys occurred: *Quercus douglasii*

Calycadenia oppositifolia

(Butte County calycadenia)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 215 - 3100

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland/openings; volcanic, granitic or serpentinite

Counties (states) known for plant: Butte

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Butte (3)

Alliance(s) where surveys occurred: *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Calycadenia

(**C.oppositifolia* or *C. hooveri* (Butte County or Hoover's calycadenia))

CNPS List: 4.2, List 1B.3 State Rank: S3.2, S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G3, G2

Growth Form: Annual herb Elevation Range (ft): 225 - 3100

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland/openings; volcanic, granitic or serpentinite

Counties (states) known for plant: Butte; Calaveras, Madera, Merced, Mariposa, Stanislaus

Number of surveys from 2005-2006: 11

Counties where surveys occurred: Butte (2), Calaveras (2), Mariposa (1), Tuolumne (6)

Alliance(s) where surveys occurred: *Bromus* (*diandrus*, *hordeaceus*, *madritensis*), *Ceanothus cuneatus*, *Pinus sabiniana*, Unclassified stand

Calystegia stebbinsii

(Stebbins' morning-glory)

CNPS List: 1B.1 State Rank: S1.1

Federal, State Listings: Fed: Endangered, Cal: Endangered Global Rank: G1

Growth Form: Perennial rhizomatous herb Elevation Range (ft): 600 - 2380

Habitat(s): Chaparral (openings), Cismontane woodland/gabbroic

Counties (states) known for plant: El Dorado, Nevada

Number of surveys from 2005-2006: 31

Counties where surveys occurred: El Dorado (31)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*

Calystegia

(**Calystegia atriplicifolia* subsp. *buttensis* (Butte County morning-glory))

CNPS List: 1B.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T3

Growth Form: Perennial rhizomatous herb Elevation Range (ft): 350 - 4960

Habitat(s): Chaparral, Lower montane coniferous forest/rocky, sometimes roadside

Counties (states) known for plant: Butte, Contra Costa?, Del Norte, Mendocino, Shasta, Tehama

Number of surveys from 2005-2006: 5

Counties where surveys occurred: Butte (1), Tehama (4)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*, *Ceanothus integerrimus*, *Fraxinus latifolia*, *Pinus ponderosa*, *Quercus wislizeni*

Castilleja

(**Castilleja campestris* subsp. *succulenta* (succulent owl's-clover))

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: Threatened, Cal: Endangered Global Rank: G4?T2

Growth Form: Annual herb hemiparasitic Elevation Range (ft): 160 - 2460

Habitat(s): Vernal pools (often acidic)

Counties (states) known for plant: Fresno, Madera, Mariposa, Merced, San Joaquin, Stanislaus

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Mariposa (1)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*

Ceanothus roderickii

(Pine Hill ceanothus)

CNPS List: 1B.2 State Rank: S2.1

Federal, State Listings: Fed: Endangered, Cal: Rare Global Rank: G2

Growth Form: Perennial evergreen shrub Elevation Range (ft): 860 - 2059

Habitat(s): Chaparral, Cismontane woodland/serpentinite or gabbroic

Counties (states) known for plant: El Dorado

Number of surveys from 2005-2006: 64

Counties where surveys occurred: El Dorado (64)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Pinus sabiniana*, *Quercus durata*

Chlorogalum grandiflorum

(Red Hills soaproot)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 800 - 3800

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/serpentinite or gabbroic

Counties (states) known for plant: Amador, Calaveras, El Dorado, Placer, Tuolumne

Number of surveys from 2005-2006: 55

Counties where surveys occurred: El Dorado (40), Tuolumne (15)

Alliance(s) where surveys occurred: *Aesculus californica*, *Arctostaphylos viscida*, *Bromus hordeaceus* - (*Plagiobothrys nothofulvus*), *Ceanothus cuneatus*, *Pinus sabiniana*, *Quercus douglasii*, *Quercus durata*, *Quercus kelloggii*, *Quercus wislizeni*, *Toxicodendron diversilobum*, *Vulpia*

Chlorogalum

(**C. grandiflorum* (Red Hills soaproot))

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 800 - 3800

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/serpentinite or gabbroic

Counties (states) known for plant: Amador, Calaveras, El Dorado, Placer, Tuolumne

Number of surveys from 2005-2006: 61

Counties where surveys occurred: Calaveras (2), El Dorado (12), Nevada (1), Placer (1), Tuolumne (45)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*, *Aesculus californica*, *Arctostaphylos viscida*, *Bromus* (*diandrus*, *hordeaceus*, *madritensis*), *Ceanothus cuneatus*, *Eriodictyon californicum*, *Mimulus guttatus*, *Pinus sabiniana*, *Quercus douglasii*, *Quercus lobata*, *Quercus wislizeni*, *Toxicodendron diversilobum*, Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Clarkia biloba* subsp. *brandegeeae

(Brandegee's clarkia)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4G5T2

Growth Form: Annual herb Elevation Range (ft): 350 - 2900

Habitat(s): Chaparral, Cismontane woodland/often roadcuts

Counties (states) known for plant: Butte, El Dorado, Nevada, Placer, Sierra, Yuba

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Placer (3)

Alliance(s) where surveys occurred: *Quercus wislizeni*

Clarkia biloba

(**C*. *b*. subsp. *brandegeeae* or *C*. *b*. subsp. *australis* (Brandegee's or Mariposa clarkia))

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4G5T2

Growth Form: Annual herb Elevation Range (ft): 350 - 3100

Habitat(s): Chaparral, Cismontane woodland/often roadcuts

Counties (states) known for plant: Butte, El Dorado, Nevada, Placer, Sierra, Yuba; Mariposa, Tuolumne

Number of surveys from 2005-2006: 31

Counties where surveys occurred: El Dorado (4), Mariposa (3), Nevada (5), Placer (1), Tuolumne (13), Yuba (5)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*, *Bromus* (*diandrus*, *hordeaceus*, *madritensis*), *Ceanothus cuneatus*, *Quercus berberidifolia*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus kelloggii*, *Quercus wislizeni*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Clarkia gracilis* subsp. *albicaulis

(white-stemmed clarkia)

CNPS List: 1B.2 State Rank: S2.2?

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T2

Growth Form: Annual herb Elevation Range (ft): 700 - 3600

Habitat(s): Chaparral, Cismontane woodland/sometimes serpentinite

Counties (states) known for plant: Butte, Lake, Tehama

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Butte (3)

Alliance(s) where surveys occurred: *Quercus douglasii*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Clarkia gracilis

(**C*. *g*. subsp. *albicaulis* (white-stemmed clarkia))

CNPS List: 1B.2 State Rank: S2.2?

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T2

Growth Form: Annual herb Elevation Range (ft): 700 - 3600

Habitat(s): Chaparral, Cismontane woodland/sometimes serpentinite

Counties (states) known for plant: Butte, Lake, Tehama

Number of surveys from 2005-2006: 2

Counties where surveys occurred: Butte (2)

Alliance(s) where surveys occurred: *Avena* (*barbata*, *fatua*), *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Claytonia parviflora* subsp. *grandiflora

(streambank spring beauty)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T3

Growth Form: Annual herb Elevation Range (ft): 250 - 1200

Habitat(s): Cismontane woodland/rocky

Counties (states) known for plant: Amador, Butte, Calaveras, El Dorado, Fresno, Kern, Placer, Tulare, Tuolumne

Number of surveys from 2005-2006: 1

Counties where surveys occurred: El Dorado (1)

Alliance(s) where surveys occurred: *Quercus wislizeni*

Claytonia parviflora

(**C*. *p*. subsp. *grandiflora* (streambank spring beauty))

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T3

Growth Form: Annual herb Elevation Range (ft): 250 - 1200

Habitat(s): Cismontane woodland/rocky

Counties (states) known for plant: Amador, Butte, Calaveras, El Dorado, Fresno, Kern, Placer, Tulare, Tuolumne

Number of surveys from 2005-2006: 44

Counties where surveys occurred: Amador (5), Butte (9), Calaveras (4), El Dorado (16), Placer (5), Tuolumne (5)

Alliance(s) where surveys occurred: *Acer macrophyllum*, *Adenostoma fasciculatum*, *Alnus rhombifolia*, *Bromus hordeaceus* - (*Plagiobothrys nothofulvus*), *Ceanothus cuneatus*, *Cercocarpus betuloides*, *Heteromeles arbutifolia*, *Pinus ponderosa*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus kelloggii*, *Quercus lobata*, *Quercus wislizeni*, *Trifolium* var*iegatum*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Cryptantha crinita

(silky cryptantha)

CNPS List: 1B.2 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G1

Growth Form: Annual herb Elevation Range (ft): 275 - 3680

Habitat(s): Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland, Valley and foothill grassland/gravelly streambeds

Counties (states) known for plant: Shasta, Tehama

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Tehama (1)

Alliance(s) where surveys occurred: *Cercocarpus betuloides*

Cupressus macnabiana

(McNab cypress)

CNPS List: Locally rare State Rank: None

Federal, State Listings: Fed: None, Cal: None Global Rank: None

Growth Form: Perennial evergreen tree or shrub Elevation Range (ft): 980 - 2790

Habitat(s): Dry slopes, flats, chaparral, pine/oak woodlands, often on serpentine

Counties (states) known for plant: Amador, Butte, Colusa, El Dorado, Lake, Los Angeles, Mendocino, Napa, Nevada, Santa Barbara, Shasta, Siskiyou, Sonoma, Tehama, Yuba (Inner North Coast Ranges, High Cascade Range, n Sierra Nevada Foothills)

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Yuba (4)

Alliance(s) where surveys occurred: *Cupressus macnabiana*, *Quercus kelloggii*

Erigeron petrophilus* var. *sierrensis

(northern Sierra daisy)

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T3

Growth Form: Perennial rhizomatous herb Elevation Range (ft): 980 - 6800

Habitat(s): Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest/sometimes serpentinite

Counties (states) known for plant: Butte, El Dorado, Nevada, Plumas, Sierra, Yuba

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Nevada (1)

Alliance(s) where surveys occurred: *Quercus chrysolepis*

Eriogonum prattenianum* var. *prattenianum

(Nevada City buckwheat)

CNPS List: None State Rank: None

Federal, State Listings: Fed: None, Cal: None Global Rank: None

Growth Form: Perennial herb | Elevation Range (ft): 2620 - 8530

Habitat(s): Volcanics

Counties (states) known for plant:

Number of surveys from 2005-2006: 2

Counties where surveys occurred: Nevada (1), Placer (1)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Cercocarpus betuloides*

Erythronium tuolumnense

(Tuolumne fawn lily)

CNPS List: 1B.2 | State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None | Global Rank: G3

Growth Form: Perennial bulbiferous herb | Elevation Range (ft): 1670 - 4800

Habitat(s): Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest

Counties (states) known for plant: Tuolumne

Number of surveys from 2005-2006: 2

Counties where surveys occurred: Tuolumne (2)

Alliance(s) where surveys occurred: Unclassified stand

Fremontodendron californicum* subsp. *decumbens

(Pine Hill flannelbush)

CNPS List: 1B.2 | State Rank: S1.2

Federal, State Listings: Fed: Endangered, Cal: Rare | Global Rank: G1

Growth Form: Perennial evergreen shrub | Elevation Range (ft): 1400 - 2520

Habitat(s): Chaparral, Cismontane woodland/gabbroic or serpentinite, rocky

Counties (states) known for plant: El Dorado, Nevada?, Yuba?

Number of surveys from 2005-2006: 1

Counties where surveys occurred: El Dorado (1)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*

Fritillaria pluriflora

(adobe-lily)

CNPS List: 1B.2 | State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None | Global Rank: G2

Growth Form: Perennial bulbiferous herb | Elevation Range (ft): 155 - 2700

Habitat(s): Chaparral, Cismontane woodland, Valley and foothill grassland/often adobe

Counties (states) known for plant: Butte, Colusa, Glenn, Lake, Napa, Solano, Tehama, Yolo

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Butte (1), Tehama (2)

Alliance(s) where surveys occurred: *Lolium multiflorum* (*Zigadenus fremontii*)

Fritillaria

(**F. agrestis*, *F. eastwoodiae*, or *F. pluriflora* (fritillary))

CNPS List: 4.2, List 3.2, List 1B.2 — State Rank: S3.2, S3.2, S2.2

Federal, State Listings: Fed: None, Cal: None — Global Rank: G3, G3Q, G2

Growth Form: Perennial bulbiferous herb — Elevation Range (ft): 30 - 5100

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest (openings), Pinyon and juniper woodland, Valley and foothill grassland/clay, sometimes serpentinite or

Counties (states) known for plant: Butte, El Dorado, Nevada, Placer, Plumas, Shasta, Tehama, Tuolumne, Yuba; Mariposa, Merced, Sacramento; etc.

Number of surveys from 2005-2006: 9

Counties where surveys occurred: Butte (1), Placer (3), Shasta (1), Tehama (3), Yuba (1)

Alliance(s) where surveys occurred: *Cupressus macnabiana*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Quercus kelloggii*, *Quercus wislizeni*, *Umbellularia californica*

Galium californicum* subsp. *sierrae

(El Dorado bedstraw)

CNPS List: 1B.2 — State Rank: S1.2

Federal, State Listings: Fed: Endangered, Cal: Rare — Global Rank: G5T1

Growth Form: Perennial herb — Elevation Range (ft): 440 - 1920

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/gabbroic

Counties (states) known for plant: El Dorado

Number of surveys from 2005-2006: 5

Counties where surveys occurred: El Dorado (5)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Quercus kelloggii*, *Quercus wislizeni*

Galium

(**G. californicum* subsp. *sierrae* (El Dorado bedstraw))

CNPS List: 1B.2 — State Rank: S1.2

Federal, State Listings: Fed: Endangered, Cal: Rare — Global Rank: G5T1

Growth Form: Perennial herb — Elevation Range (ft): 440 - 1920

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/gabbroic

Counties (states) known for plant: El Dorado, Placer, Sacramento

Number of surveys from 2005-2006: 20

Counties where surveys occurred: El Dorado (14), Placer (2), Sacramento (4)

Alliance(s) where surveys occurred: *Bromus* (*diandrus*, *hordeaceus*, *madritensis*), *Quercus douglasii*, *Quercus wislizeni*, *Trifolium* var*iegatum*

Githopsis pulchella* subsp. *serpentinicola

(serpentine bluecup)

CNPS List: 4.3 — State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None — Global Rank: G4T3

Growth Form: Annual herb — Elevation Range (ft): 1050 - 2000

Habitat(s): Cismontane woodland (serpentinite or Ione)

Counties (states) known for plant: Amador, El Dorado, Mariposa, Stanislaus, Tuolumne

Number of surveys from 2005-2006: 11

Counties where surveys occurred: Butte (1), Mariposa (1), Tuolumne (9)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*, *Heteromeles arbutifolia*, *Pinus sabiniana*, *Quercus berberidifolia*, *Toxicodendron diversilobum*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Githopsis pulchella

(**G*. *pulchella* subsp. *serpentinicola* (serpentine bluecup))

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T3

Growth Form: Annual herb Elevation Range (ft): 1050 - 2000

Habitat(s): Cismontane woodland (serpentinite or Ione)

Counties (states) known for plant: Amador, El Dorado, Mariposa, Stanislaus, Tuolumne

Number of surveys from 2005-2006: 3

Counties where surveys occurred: El Dorado (1), Mariposa (2)

Alliance(s) where surveys occurred: *Bromus* (*diandrus*, *hordeaceus*, *madritensis*), *Ceanothus cuneatus*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Githopsis

(**G*. *pulchella* subsp. *serpentinicola* (serpentine bluecup))

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T3

Growth Form: Annual herb Elevation Range (ft): 1050 - 2000

Habitat(s): Cismontane woodland (serpentinite or Ione)

Counties (states) known for plant: Amador, El Dorado, Mariposa, Stanislaus, Tuolumne

Number of surveys from 2005-2006: 2

Counties where surveys occurred: El Dorado (1), Mariposa (1)

Alliance(s) where surveys occurred: *Juniperus californica*, *Mimulus guttatus*

Helianthemum suffrutescens

(Bisbee Peak rush-rose)

CNPS List: 3.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2Q

Growth Form: Perennial evergreen shrub Elevation Range (ft): 250 - 1840

Habitat(s): Chaparral (often serpentinite, gabbroic, or Ione soil)

Counties (states) known for plant: Amador, Calaveras, El Dorado, Mariposa, Sacramento, Tuolumne

Number of surveys from 2005-2006: 1

Counties where surveys occurred: El Dorado (1)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*

Helianthemum

(**H. suffrutescens* (Bisbee Peak rush-rose))

CNPS List: 3.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2Q

Growth Form: Perennial evergreen shrub Elevation Range (ft): 250 - 1840

Habitat(s): Chaparral (often serpentinite, gabbroic, or Ione soil)

Counties (states) known for plant: Amador, Calaveras, El Dorado, Mariposa, Sacramento, Tuolumne

Number of surveys from 2005-2006: 13

Counties where surveys occurred: El Dorado (13)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*

Hesperevax caulescens

(hogwallow starfish)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 0 - 1660

Habitat(s): Valley and foothill grassland (mesic, clay), Vernal pools (shallow)

Counties (states) known for plant: Alameda, Amador, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Monterey, Napa*, Sacramento, San Diego*, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama, Yolo

Number of surveys from 2005-2006: 5

Counties where surveys occurred: Butte (4), Tehama (1)

Alliance(s) where surveys occurred: *Layia fremontii*, *Lolium multiflorum*, *Lolium multiflorum* (*Zigadenus fremontii*), Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Horkelia parryi

(Parry's horkelia)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial herb Elevation Range (ft): 280 - 3400

Habitat(s): Chaparral, Cismontane woodland/especially Ione formation

Counties (states) known for plant: Amador, Calaveras, El Dorado, Mariposa

Number of surveys from 2005-2006: 7

Counties where surveys occurred: Amador (2), Calaveras (3), Mariposa (2)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Quercus wislizeni*, Unclassified stand

Iris hartwegii

(**I. h.* subsp. *columbiana* (Tuolumne iris))

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T2

Growth Form: Perennial rhizomatous herb Elevation Range (ft): 2000 - 5200

Habitat(s): Cismontane woodland, Lower montane coniferous forest

Counties (states) known for plant: Calaveras, Tuolumne

Number of surveys from 2005-2006: 9

Counties where surveys occurred: Amador (9)

Alliance(s) where surveys occurred: *Pinus ponderosa*, *Quercus chrysolepis*, *Quercus kelloggii*, *Quercus wislizeni*

Lathyrus sulphureus

(**L. s.* var. *argillaceus* (dubious pea))

CNPS List: 3 State Rank: S1S2

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T1T2

Growth Form: Perennial herb Elevation Range (ft): 490 - 1000

Habitat(s): Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest

Counties (states) known for plant: Nevada?, Placer, Shasta, Tehama

Number of surveys from 2005-2006: 23

Counties where surveys occurred: El Dorado (10), Placer (4), Nevada? (2), Shasta (3), Tehama (4)

Alliance(s) where surveys occurred: *Pinus ponderosa*, *Quercus chrysolepis*, *Quercus kelloggii*, *Quercus lobata*, *Quercus wislizeni*

Linanthus

(**Leptosiphon serrulatus* (Madera leptosiphon))

CNPS List: 1B.2 State Rank: S1?

Federal, State Listings: Fed: None, Cal: None Global Rank: G1?

Growth Form: Annual herb Elevation Range (ft): 270 - 5400

Habitat(s): Cismontane woodland, Lower montane coniferous forest

Counties (states) known for plant: Fresno, Kern, Madera, Mariposa, Tulare

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Mariposa (1)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*

Lilium humboldtii* subsp. *humboldtii

(Humboldt lily)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T3

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 295 - 3920

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/openings

Counties (states) known for plant: Amador, Butte, Calaveras, El Dorado, Fresno, Madera, Mariposa, Nevada, Placer, Tehama, Tuolumne, Yuba

Number of surveys from 2005-2006: 1

Counties where surveys occurred: El Dorado (1)

Alliance(s) where surveys occurred: *Quercus kelloggii*

Lilium

(**L*. *humboldtii* subsp. *humboldtii* (Humboldt lily))

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T3

Growth Form: Perennial bulbiferous herb Elevation Range (ft): 295 - 3920

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/openings

Counties (states) known for plant: Amador, Butte, Calaveras, El Dorado, Fresno, Madera, Mariposa, Nevada, Placer, Tehama, Tuolumne, Yuba

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Butte (1), Placer (2), Tehama (1)

Alliance(s) where surveys occurred: *Alnus rhombifolia*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Quercus wislizeni*

Limnanthes floccosa* subsp. *californica

(Butte County meadowfoam)

CNPS List: 1B.1 State Rank: S1.1

Federal, State Listings: Fed: Endangered, Cal: Endangered Global Rank: G4T1

Growth Form: Annual herb Elevation Range (ft): 120 - 1167

Habitat(s): Valley and foothill grassland (mesic), Vernal pools

Counties (states) known for plant: Butte

Number of surveys from 2005-2006: 6

Counties where surveys occurred: Butte (6)

Alliance(s) where surveys occurred: *Layia fremontii*

Limnanthes floccosa* subsp. *floccosa

(woolly meadowfoam)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T4

Growth Form: Annual herb Elevation Range (ft): 195 - 5000

Habitat(s): Chaparral, Cismontane woodland, Valley and foothill grassland, Vernal pools/vernally mesic

Counties (states) known for plant: Butte, Lake, Napa, Shasta, Siskiyou, Tehama, Trinity, Oregon (OR)

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Shasta (2), Tehama (2)

Alliance(s) where surveys occurred: *Trifolium* var*iegatum*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Limnanthes

(**L*. *floccosa* subsp. *californica* or *L*. *f*. subsp. *floccosa* (Butte County or woolly meadowfoam))

CNPS List: 1B.1 / List 4.2 State Rank: S1.1, S3.2

Federal, State Listings: Fed: Endangered / None, Cal: Global Rank: G4T1, G4T4

Growth Form: Annual herb Elevation Range (ft): 120 - 5000

Habitat(s): Valley and foothill grassland (mesic), Vernal pools; Chaparral, Cismontane woodland
Counties (states) known for plant: Butte, Lake, Napa, Shasta, Siskiyou, Tehama, Trinity, Oregon (OR)

Number of surveys from 2005-2006: 1
Counties where surveys occurred: Butte (1)

Alliance(s) where surveys occurred: *Layia fremontii*

Lomatium congdonii
(Congdon's lomatium)

CNPS List: 1B.2 State Rank: S2.2
Federal, State Listings: Fed: None, Cal: None Global Rank: G2
Growth Form: Perennial herb Elevation Range (ft): 1100 - 2050
Habitat(s): Chaparral, Cismontane woodland/serpentinite
Counties (states) known for plant: Calaveras, Mariposa*, Tuolumne

Number of surveys from 2005-2006: 10
Counties where surveys occurred: Tuolumne (10)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*, *Pinus sabiniana*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Lomatium
(**L. congdonii* (Congdon's lomatium))

CNPS List: 1B.2 State Rank: S2.2
Federal, State Listings: Fed: None, Cal: None Global Rank: G2
Growth Form: Perennial herb Elevation Range (ft): 1100 - 2050
Habitat(s): Chaparral, Cismontane woodland/serpentinite
Counties (states) known for plant: Calaveras, Mariposa*, Tuolumne

Number of surveys from 2005-2006: 6
Counties where surveys occurred: Tuolumne (6)

Alliance(s) where surveys occurred: *Pinus sabiniana*, *Quercus douglasii*, *Toxicodendron diversilobum*, Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Lotus
(**L. rubriflorus* (red-flowered lotus))
CNPS List: 1B.1 State Rank: S1.1
Federal, State Listings: Fed: None, Cal: None Global Rank: G1
Growth Form: Annual herb Elevation Range (ft): 650 - 1400
Habitat(s): Cismontane woodland, Valley and foothill grassland
Counties (states) known for plant: Colusa, Stanislaus, Tehama

Number of surveys from 2005-2006: 2
Counties where surveys occurred: Tehama (2)

Alliance(s) where surveys occurred: *Trifolium* var*iegatum*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Lupinus spectabilis

(shaggyhair lupine)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Annual herb Elevation Range (ft): 1000 - 2500

Habitat(s): Chaparral, Cismontane woodland/serpentinite

Counties (states) known for plant: Mariposa, Tuolumne

Number of surveys from 2005-2006: 10

Counties where surveys occurred: Mariposa (9), Tuolumne (2)

Alliance(s) where surveys occurred: *Eriodictyon californicum*, *Pinus sabiniana*, *Quercus douglasii*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Mimulus glaucescens

(shield-bracted monkeyflower)

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 195 - 4070

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland/serpentinite seeps

Counties (states) known for plant: Butte, Colusa, Lake, Nevada, Shasta, Tehama

Number of surveys from 2005-2006: 18

Counties where surveys occurred: Butte (4), Tehama (14)

Alliance(s) where surveys occurred: *Alnus rhombifolia*, *Eleocharis macrostachya*, *Juniperus californica*, *Populus fremontii*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus wislizeni*, *Trifolium* var*iegatum*, *Umbellularia californica*, Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Mimulus

(**M*. *glaucescens* or *M*. *inconspicuous* (shield-bracted or small-flowered monkeyflower))

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 0 - 4070

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland/serpentinite seeps

Counties (states) known for plant: Butte, Colusa, Lake, Nevada, Shasta, Tehama

Number of surveys from 2005-2006: 8

Counties where surveys occurred: Butte (2), Tehama (1); Calaveras (1), Mariposa (2), Tuolumne (2)

Alliance(s) where surveys occurred: *Aesculus californica*, *Ceanothus cuneatus*, *Heteromeles arbutifolia*, *Lasthenia fremontii - Downingia* (*bicornuta*), *Quercus garryana* var. *breweri*, *Toxicodendron diversilobum*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Monardella douglasii* subsp. *venosa

(veiny monardella)

CNPS List: 1B.1 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T1

Growth Form: Annual herb Elevation Range (ft): 100 - 1325

Habitat(s): Cismontane woodland, Valley and foothill grassland/heavy clay

Counties (states) known for plant: Butte, Sutter*, Tuolumne, Yuba

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Butte (1)

Alliance(s) where surveys occurred: *Lolium multiflorum*

Monardella

(**M*. *douglasii* subsp. *venosa* (veiny monardella))

CNPS List: 1B.1 State Rank: S1.1

Federal, State Listings: Fed: None, Cal: None Global Rank: G5T1

Growth Form: Annual herb Elevation Range (ft): 100 - 1325

Habitat(s): Cismontane woodland, Valley and foothill grassland/heavy clay

Counties (states) known for plant: Butte, Sutter*, Tuolumne, Yuba

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Butte (1), Calaveras (2)

Alliance(s) where surveys occurred: *Pinus sabiniana*, *Quercus wislizeni*

Navarretia heterandra

(Tehama navarretia)

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 98 - 360

Habitat(s): Valley and foothill grassland (mesic), Vernal pools

Counties (states) known for plant: Butte, Colusa, Lake, Napa, Shasta, Tehama, Trinity, Yuba, Oregon (OR)

Number of surveys from 2005-2006: 7

Counties where surveys occurred: Butte (1), Shasta (2), Tehama (4)

Alliance(s) where surveys occurred: *Lolium multiflorum*, Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Navarretia nigelliformis

(**N*. *n*. subsp. *nigelliformis or N*. *n*. subsp. *radians* (adobe navarretia))

CNPS List: 4.2 / List 1B.2 State Rank: S3.2, S2S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G4T3, G4T2T3

Growth Form: Annual herb Elevation Range (ft): 210 - 3200

Habitat(s): Valley and foothill grassland vernally mesic, Vernal pools sometimes/clay, sometimes serpentinite

Counties (states) known for plant: Alameda, Butte, Contra Costa, Colusa, Fresno, Kern, Merced, Monterey, Placer, San Benito, San Luis Obispo, Sutter, Tulare

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Butte (1)

Alliance(s) where surveys occurred: *Lolium multiflorum*

Navarretia

(**N*. *heterandra*, *N*. *nigelliformis* subsp. *nigelliformis*, or *N*. *n*. subsp. *radians* (navarretia))

CNPS List: 4.3, List 4.2, List 1B.2, List — State Rank: S3.3, S3.2, S2S3.2, S3.3

Federal, State Listings: Fed: None, Cal: None — Global Rank: G3, G4T3, G4T2T3, G4T3

Growth Form: Annual herb — Elevation Range (ft): 100 - 4600

Habitat(s): Valley and foothill grassland (mesic), Vernal pools, Wetland, Cismontane woodland, Chaparral

Counties (states) known for plant: Alameda, Butte, Contra Costa, Colusa, Fresno, El Dorado, Kern, Lake, Merced, Monterey, Napa, Placer, Shasta, Sutter, San Benito, San Luis Obispo, Tehama, Trinity, Tulare, Yuba, Oregon (OR)

Number of surveys from 2005-2006: 27

Counties where surveys occurred: Butte (5), Mariposa (2), Tehama (19), Yuba (1)

Alliance(s) where surveys occurred: *Ceanothus cuneatus*, *Cercocarpus betuloides*, *Eleocharis macrostachya*, *Layia fremontii*, *Quercus douglasii*, *Trifolium* var*iegatum*, Unclassified stand, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Orcuttia tenuis

(slender Orcutt grass)

CNPS List: 1B.1 — State Rank: S3.1

Federal, State Listings: Fed: Threatened, Cal: Endangered — Global Rank: G3

Growth Form: Annual herb — Elevation Range (ft): 85 - 5760

Habitat(s): Vernal pools

Counties (states) known for plant: Butte, Lake, Lassen, Modoc, Plumas, Sacramento, Shasta, Siskiyou, Tehama

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Tehama (1)

Alliance(s) where surveys occurred: *Eleocharis macrostachya*

Paronychia ahartii

(Ahart's paronychia)

CNPS List: 1B.1 — State Rank: S2.1

Federal, State Listings: Fed: None, Cal: None — Global Rank: G2

Growth Form: Annual herb — Elevation Range (ft): 150 - 1680

Habitat(s): Cismontane woodland, Valley and foothill grassland, Vernal pools

Counties (states) known for plant: Butte, Shasta, Tehama

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Tehama (4)

Alliance(s) where surveys occurred: *Layia fremontii*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Perideridia bacigalupii

(Bacigalupi's yampah)

CNPS List: 4.2 State Rank: S3.2?

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Perennial herb Elevation Range (ft): 1475 - 3280

Habitat(s): Chaparral, Lower montane coniferous forest/serpentinite

Counties (states) known for plant: Amador, Butte, Calaveras, Kern, Madera*, Mariposa, Nevada, Tuolumne, Yuba

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Amador (1), Calaveras (1), Yuba (1)

Alliance(s) where surveys occurred: *Quercus kelloggii*, *Quercus lobata*, *Quercus wislizeni*

Phacelia

(**P. stebbinsii* or *P. vallicola* (Stebbin's or Mariposa phacelia))

CNPS List: 1B.2, Locally rare State Rank: S3.2, None

Federal, State Listings: Fed: None, Cal: None Global Rank: G3, None

Growth Form: Annual herb Elevation Range (ft): 1965 - 7875

Habitat(s): Cismontane woodland, Lower montane coniferous forest, Meadows and seeps; Open, gravelly to rocky soils, Chaparral, Oak/pine woodland, Coniferous forest

Counties (states) known for plant: s Cascade Range, n&c Sierra Nevada especially El Dorado Co.

Number of surveys from 2005-2006: 2

Counties where surveys occurred: El Dorado (2)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*, *Toxicodendron diversilobum*

Piperia michaelii

(Michael's rein orchid)

CNPS List: 4.2 State Rank: S3.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Perennial herb Elevation Range (ft): 10 - 3000

Habitat(s): Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest

Counties (states) known for plant: Alameda, Amador, Butte, Contra Costa, Fresno, Humboldt, Los Angeles*, Monterey, Marin, Santa Barbara, San Benito, Santa Clara, Santa Cruz, Santa Cruz Isl., San Francisco, San Luis Obispo San Mateo, Stanislaus, Tulare, Tuolumne, Ventura(*?), Yuba

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Tuolumne (1)

Alliance(s) where surveys occurred: *Toxicodendron diversilobum*

Piperia

(**P. michaelii* or *P. leptopetala* (rein orchid))

CNPS List: 4 — State Rank: S3.2, S3.3

Federal, State Listings: Fed: None, Cal: None — Global Rank: G3

Growth Form: Perennial herb — Elevation Range (ft): 10 - 7300

Habitat(s): Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Upper montane coniferous forest

Counties (states) known for plant: Alameda, Amador, Butte, Contra Costa, Fresno, Humboldt, Los Angeles*, Monterey, Marin, Santa Barbara, San Benito, Santa Clara, Santa Cruz, Santa Cruz Isl., San Francisco, San Luis Obispo San Mateo, Stanislaus, Tulare, Tuolumne, Ventura(*?), Yuba ; El Dora

Number of surveys from 2005-2006: 4

Counties where surveys occurred: Butte (3), El Dorado (1)

Alliance(s) where surveys occurred: *Quercus douglasii*

Polygonum bidwelliae

(Bidwell's knotweed)

CNPS List: 4.3 — State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None — Global Rank: G3

Growth Form: Annual herb — Elevation Range (ft): 195 - 3935

Habitat(s): Chaparral, Cismontane woodland, Valley and foothill grassland/volcanic

Counties (states) known for plant: Butte, Shasta, Tehama

Number of surveys from 2005-2006: 18

Counties where surveys occurred: Butte (4), Shasta (1), Tehama (13)

Alliance(s) where surveys occurred: *Quercus douglasii*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Polygonum

(**P. bidwelliae* (Bidwell's knotweed))

CNPS List: 4.3 — State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None — Global Rank: G3

Growth Form: Annual herb — Elevation Range (ft): 195 - 3935

Habitat(s): Chaparral, Cismontane woodland, Valley and foothill grassland/volcanic

Counties (states) known for plant: Butte, Shasta, Tehama

Number of surveys from 2005-2006: 6

Counties where surveys occurred: Butte (2), Shasta (1), Tehama (3)

Alliance(s) where surveys occurred: *Alnus rhombifolia*, *Quercus douglasii*, *Salix laevigata*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Psilocarphus

(**Psilocarphus brevissimus* var. *multiflorus* (Delta woolly-marbles))

CNPS List: 4.2 — State Rank: S3.2?

Federal, State Listings: Fed: None, Cal: None — Global Rank: G4T3

Growth Form: Annual herb
Elevation Range (ft): 30 - 1640
Habitat(s): Vernal pools
Counties (states) known for plant: Alameda, Napa, Santa Clara, San Diego, San Joaquin, Solano, Stanislaus, Yolo

Number of surveys from 2005-2006: 1
Counties where surveys occurred: Tuolumne (1)

Alliance(s) where surveys occurred: *Lasthenia fremontii* - *Downingia* (*bicornuta*)

Senecio clevelandii* var. *heterophyllus
(Red Hills ragwort)
CNPS List: 1B.2
State Rank: S2.2
Federal, State Listings: Fed: None, Cal: None
Global Rank: G4?T2Q
Growth Form: Perennial herb
Elevation Range (ft): 850 - 1250
Habitat(s): Cismontane woodland (serpentinite seeps)
Counties (states) known for plant: Tuolumne

Number of surveys from 2005-2006: 1
Counties where surveys occurred: Tuolumne (1)

Alliance(s) where surveys occurred: *Carex nudata*

Senecio layneae
(Layne's ragwort)
CNPS List: 1B.2
State Rank: S2.1
Federal, State Listings: Fed: Threatened, Cal: Rare
Global Rank: G2
Growth Form: Perennial herb
Elevation Range (ft): 680 - 3100
Habitat(s): Chaparral, Cismontane woodland/serpentinite or gabbroic, rocky
Counties (states) known for plant: Butte, El Dorado, Tuolumne, Yuba

Number of surveys from 2005-2006: 31
Counties where surveys occurred: El Dorado (28), Tuolumne (3)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Ceanothus cuneatus*, *Quercus durata*

Sidalcea robusta
(Butte County checkerbloom)
CNPS List: 1B.2
State Rank: S2.2
Federal, State Listings: Fed: None, Cal: None
Global Rank: G2
Growth Form: Perennial rhizomatous herb
Elevation Range (ft): 155 - 2357
Habitat(s): Chaparral, Cismontane woodland
Counties (states) known for plant: Butte

Number of surveys from 2005-2006: 4
Counties where surveys occurred: Butte (4)

Alliance(s) where surveys occurred: *Quercus douglasii*, Unclassified stand

Sidalcea

(**S. robusta* (Butte County checkerbloom))

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial rhizomatous herb Elevation Range (ft): 155 - 2357

Habitat(s): Chaparral, Cismontane woodland

Counties (states) known for plant: Butte, Tehama

Number of surveys from 2005-2006: 5

Counties where surveys occurred: Butte (4), Tehama (1)

Alliance(s) where surveys occurred: *Quercus douglasii*, *Quercus kelloggii*, *Vulpia microstachys-Lasthenia californica-Plantago erecta*

Trichostema rubisepalum

(Hernandez bluecurls)

CNPS List: 4.3 State Rank: S3.3

Federal, State Listings: Fed: None, Cal: None Global Rank: G3

Growth Form: Annual herb Elevation Range (ft): 980 - 3280

Habitat(s): Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Vernal pools/volcanic or serpentinite, gravelly

Counties (states) known for plant: Mariposa, Napa, San Benito, Tuolumne

Number of surveys from 2005-2006: 5

Counties where surveys occurred: El Dorado (2), Tuolumne (3)

Alliance(s) where surveys occurred: *Carex nudata*, *Juncus* (*oxymeris*, *xiphioides*), *Mimulus guttatus*, Unclassified stand

Trifolium jokerstii

(Butte County golden clover)

CNPS List: 1B.2 State Rank: S1.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G1

Growth Form: Annual herb Elevation Range (ft): 150 - 1300

Habitat(s): Valley and foothill grassland (mesic), Vernal pools

Counties (states) known for plant: Butte

Number of surveys from 2005-2006: 3

Counties where surveys occurred: Butte (3)

Alliance(s) where surveys occurred: *Trifolium* var*iegatum*

Trifolium

(**T. jokerstii* (Butte County golden clover))

CNPS List: 1B.2 State Rank: S1.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G1

Growth Form: Annual herb Elevation Range (ft): 150 - 1300

Habitat(s): Valley and foothill grassland (mesic), Vernal pools

Counties (states) known for plant: Butte

Number of surveys from 2005-2006: 6

Counties where surveys occurred: Butte (6)

Alliance(s) where surveys occurred: *Lolium multiflorum* (*Zigadenus fremontii*), *Quercus douglasii*, *Quercus wislizeni*, *Trifolium* var*iegatum*

Verbena californica

(California vervain)

CNPS List: 1B.1 State Rank: S2.1

Federal, State Listings: Fed: Threatened, Cal: Threatened Global Rank: G2

Growth Form: Perennial herb Elevation Range (ft): 850 - 1150

Habitat(s): Cismontane woodland, Valley and foothill grassland/mesic, usually serpentinite seeps or creeks

Counties (states) known for plant: Tuolumne

Number of surveys from 2005-2006: 2

Counties where surveys occurred: Tuolumne (2)

Alliance(s) where surveys occurred: *Carex nudata*, Unclassified stand

Verbena

(**V*. *californica* (California vervain))

CNPS List: 1B.1 State Rank: S2.1

Federal, State Listings: Fed: Threatened, Cal: Threatened Global Rank: G2

Growth Form: Perennial herb Elevation Range (ft): 850 - 1150

Habitat(s): Cismontane woodland, Valley and foothill grassland/mesic, usually serpentinite seeps or creeks

Counties (states) known for plant: Tuolumne

Number of surveys from 2005-2006: 1

Counties where surveys occurred: Calaveras (1)

Alliance(s) where surveys occurred: *Eleocharis macrostachya*

Wyethia reticulata

(El Dorado County mule ears)

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial herb Elevation Range (ft): 600 - 2059

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/clay or gabbroic

Counties (states) known for plant: El Dorado

Number of surveys from 2005-2006: 42

Counties where surveys occurred: El Dorado (42)

Alliance(s) where surveys occurred: *Arctostaphylos viscida*, *Pinus sabiniana*, *Quercus durata*, *Quercus kelloggii*, *Quercus wislizeni*

Wyethia

(**W*. *reticulata* (El Dorado County mule ears))

CNPS List: 1B.2 State Rank: S2.2

Federal, State Listings: Fed: None, Cal: None Global Rank: G2

Growth Form: Perennial herb Elevation Range (ft): 600 - 2059

Habitat(s): Chaparral, Cismontane woodland, Lower montane coniferous forest/clay or gabbroic

Counties (states) known for plant: El Dorado; Placer, Sacramento

Number of surveys from 2005-2006: 6

Counties where surveys occurred: El Dorado (5), Placer (1)

Alliance(s) where surveys occurred: *Adenostoma fasciculatum*, *Quercus chrysolepis*, *Quercus kelloggii*, *Quercus wislizeni*

APPENDIX 4. Crosswalk for the northern Sierra Nevada Foothills between the vegetation classification systems of Alliances and Associations in the Floristic U.S. National Vegetation Classification (NVC; Jennings et al. 2006) and Wildlife Habitat Relationships (WHR; Mayer and Laudenslayer 1988) types.

Woodland/Forest Vegetation Types

Alliance / Association	WHR Code	WHR Name	N-surveys
Acer macrophyllum (Big-leaf Maple) Woodland/Forest Alliance			
Acer macrophyllum	MRI, VRI	Montane Riparian, Valley Foothill Riparian	4
Acer macrophyllum - *Pseudotsuga menziesii* / *Dryopteris arguta*	MRI, VRI	Montane Riparian, Valley Foothill Riparian	2
Aesculus californica (California Buckeye) Woodland/Forest Alliance			
(Alliance level only)	BOW, VRI	Blue Oak Woodland, Valley Foothill Riparian	1
Aesculus californica / *Toxicodendron diversilobum* / Moss	BOW	Blue Oak Woodland	14
Aesculus californica Riparian	VRI, BOW	Valley Foothill Riparian, Blue Oak Woodland	6
Alnus rhombifolia (White Alder) Woodland/Forest Alliance			
(Alliance level only)	MRI, VRI	Montane Riparian, Valley Foothill Riparian	5
Alnus rhombifolia - *Quercus chrysolepis*	MRI	Montane Riparian	15
Alnus rhombifolia - *Salix laevigata*	MRI, VRI	Montane Riparian, Valley Foothill Riparian	15
Alnus rhombifolia - *Salix laevigata* - *Platanus racemosa*	VRI	Valley Foothill Riparian	8
Alnus rhombifolia / *Carex*	MRI, VRI	Montane Riparian, Valley Foothill Riparian	23
Alnus rhombifolia / *Darmera peltata*	MRI, VRI	Montane Riparian, Valley Foothill Riparian	2
Alnus rhombifolia / *Salix exigua*	MRI, VRI	Montane Riparian, Valley Foothill Riparian	15
Arbutus menziesii (Pacific Madrone) Woodland/Forest Alliance			
(Alliance level only)	MHW	Montane Hardwood	1
Calocedrus decurrens (Incense-cedar) Woodland/Forest Alliance			
(Alliance level only)	MRI	Montane Riparian	1
Calocedrus decurrens - *Alnus rhombifolia*	MRI	Montane Riparian	2
Cupressus macnabiana (McNab Cypress) Woodland/Forest Alliance			
Cupressus macnabiana / *Arctostaphylos viscida*	CPC	Closed-cone Pine - Cypress	3

Woodland/Forest Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Fraxinus latifolia (Oregon Ash) Woodland/Forest Alliance			
(Alliance level only)	VRI	Valley Foothill Riparian	6
Fraxinus latifolia - Alnus rhombifolia	VRI	Valley Foothill Riparian	14
Juglans hindsii (Hind's Walnut) Woodland/Forest Alliance			
Juglans hindsii Semi-Natural Stands	VRI	Valley Foothill Riparian	1
Pinus ponderosa (Ponderosa Pine) Woodland/Forest Alliance			
Pinus ponderosa / *Arctostaphylos viscida*	PPN	Ponderosa Pine Forest	5
Pinus ponderosa Stream Terrace	PPN	Ponderosa Pine Forest	5
Pinus sabiniana (Foothill Pine) Woodland/Forest Alliance			
(Alliance level only)	BOP	Blue Oak - Foothill Pine	4
Pinus sabiniana / *Adenostoma fasciculatum*	BOP	Blue Oak - Foothill Pine	10
Pinus sabiniana / *Arctostaphylos viscida*	BOP	Blue Oak - Foothill Pine	8
Pinus sabiniana / *Ceanothus cuneatus*	BOP	Blue Oak - Foothill Pine	10
Pinus sabiniana / *Ceanothus cuneatus* / *Plantago erecta* Serpentine	BOP	Blue Oak - Foothill Pine	7
Pinus sabiniana / *Rhamnus tomentella*	BOP	Blue Oak - Foothill Pine	6
Platanus racemosa (California Sycamore) Woodland/Forest Alliance			
(Alliance level only)	VRI	Valley Foothill Riparian	3
Populus fremontii (Fremont Cottonwood) Woodland/Forest Alliance			
(Alliance level only)	VRI	Valley Foothill Riparian	2
Populus fremontii - Salix laevigata	VRI	Valley Foothill Riparian	25
Populus fremontii / *Vitis californica*	VRI	Valley Foothill Riparian	2
Pseudotsuga menziesii (Douglas-fir) Woodland/Forest Alliance			
Pseudotsuga menziesii	DFR	Douglas Fir	4
Pseudotsuga menziesii - Quercus chrysolepis	DFR, MHC	Montane Hardwood - Conifer	5
Quercus chrysolepis (Canyon Live Oak) Woodland/Forest Alliance			
(Alliance level only)	MHW, MHC, MRI	Montane Hardwood, Hardwood - Conifer, or Riparian	4
Quercus chrysolepis	MHW	Montane Hardwood	8
Quercus chrysolepis - Pinus ponderosa	MHC	Montane Hardwood - Conifer	7
Quercus chrysolepis - Quercus kelloggii	MHW	Montane Hardwood	14
Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum	MHW	Montane Hardwood	7
Quercus chrysolepis - Quercus lobata / *Vitis californica*	MRI	Montane Riparian	15
Quercus chrysolepis - Quercus wislizeni	MHW	Montane Hardwood	10

Woodland/Forest Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Quercus chrysolepis (Canyon Live Oak) Woodland/Forest Alliance (continued)			
Quercus chrysolepis - *Umbellularia californica*	MHW	Montane Hardwood	9
Quercus chrysolepis - *Umbellularia californica* / *Vitis californica* Riparian	MRI	Montane Riparian	22
Quercus chrysolepis / *Arctostaphylos viscida*	MHW	Montane Hardwood	12
Quercus douglasii (Blue Oak) Woodland/Forest Alliance			
(Alliance level only)	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	4
Quercus douglasii - *Aesculus californica* / Herbaceous	BOW	Blue Oak Woodland	11
Quercus douglasii - *Pinus sabiniana* / *Arctostaphylos viscida* / Herbaceous	BOP	Blue Oak - Foothill Pine	9
Quercus douglasii - *Pinus sabiniana* / Herbaceous	BOP	Blue Oak - Foothill Pine	43
Quercus douglasii - *Quercus lobata* / Herbaceous	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	3
Quercus douglasii - *Quercus wislizeni* / Herbaceous	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	43
Quercus douglasii / Annual Grass-Forb	BOW	Blue Oak Woodland	180
Quercus douglasii / *Arctostaphylos manzanita* / Herbaceous	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	12
Quercus douglasii / *Ceanothus cuneatus* / Herbaceous	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	8
Quercus douglasii / *Juniperus californica* - *Ceanothus cuneatus*	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	4
Quercus douglasii / Perennial Grass-Forb	BOW	Blue Oak Woodland	13
Quercus douglasii / *Selaginella hansenii* - *Navarretia pubescens*	BOW	Blue Oak Woodland	9
Quercus kelloggii (Black Oak) Woodland/Forest Alliance			
(Alliance level only)	MHW, MHC	Montane Hardwood or Hardwood - Conifer	8
Quercus kelloggii - *Pinus ponderosa*	MHC	Montane Hardwood - Conifer	10
Quercus kelloggii - *Pinus ponderosa* / *Arctostaphylos viscida*	MHC	Montane Hardwood - Conifer	24
Quercus kelloggii - *Pinus ponderosa* / *Ceanothus integerrimus*	MHC	Montane Hardwood - Conifer	13
Quercus kelloggii - *Pseudotsuga menziesii* - *Umbellularia californica*	MHC	Montane Hardwood - Conifer	6

Woodland/Forest Vegetation Types (continued)

Alliance

Association	WHR Code	WHR Name	N-surveys
Quercus kelloggii (Black Oak) Woodland/Forest Alliance (continued)			
Quercus kelloggii - Quercus chrysolepis / Toxicodendron diversilobum	MHW, MHC	Montane Hardwood or Hardwood - Conifer	3
Quercus kelloggii / Arctostaphylos Viscida	MHW, MHC	Montane Hardwood or Hardwood - Conifer	9
Quercus kelloggii / Ceanothus integerrimus	MHW, MHC	Montane Hardwood or Hardwood - Conifer	2
Quercus kelloggii / Toxicodendron diversilobum - Styrax officinalis / Triteleia laxa	MHW	Montane Hardwood	3
Quercus kelloggii / Toxicodendron diversilobum / Grass	MHW	Montane Hardwood	29
Quercus lobata (Valley Oak) Woodland/Forest Alliance			
(Alliance level only)	VOW, VRI	Valley Oak Forest, Valley Foothill Riparian	3
Quercus lobata - Alnus rhombifolia	VRI	Valley Foothill Riparian	15
Quercus lobata - Quercus wislizeni	VRI	Valley Foothill Riparian	18
Quercus lobata / Herbaceous Semi-Riparian	VOW	Valley Oak Forest	16
Quercus lobata / Rhus trilobata	VOW	Valley Oak Forest	7
Quercus lobata / Rubus discolor	VRI	Valley Foothill Riparian	16
Quercus wislizeni (Interior Live Oak) Woodland/Forest Alliance			
(Alliance level only)	BOP, BOW, MHC, MCH	Blue Oak - Foothill Pine, Blue Oak Woodland, Montane Hardwood, Mixed Chaparral	7
Quercus wislizeni - Salix laevigata / Rhamnus tomentella	VRI	Valley Foothill Riparian	18
Quercus wislizeni - Aesculus californica	BOW	Blue Oak Woodland	46
Quercus wislizeni - Pinus ponderosa	BOP	Blue Oak - Foothill Pine	10
Quercus wislizeni - Pinus sabiniana	BOP	Blue Oak - Foothill Pine	35
Quercus wislizeni - Pinus sabiniana / Arctostaphylos manzanita	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	11
Quercus wislizeni - Quercus douglasii - Aesculus californica	BOW	Blue Oak Woodland	15
Quercus wislizeni - Quercus douglasii - Pinus sabiniana	BOP	Blue Oak - Foothill Pine	35
Quercus wislizeni - Quercus douglasii / Herbaceous	BOW	Blue Oak Woodland	38
Quercus wislizeni - Quercus kelloggii	MHC	Montane Hardwood	23
Quercus wislizeni / Arctostaphylos viscida	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	16

Woodland/Forest Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Quercus wislizeni (Interior Live Oak) Woodland/Forest Alliance			
Quercus wislizeni / *Heteromeles arbutifolia*	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	55
Quercus wislizeni / *Toxicodendron diversilobum*	BOW, BOP	Blue Oak Woodland, Blue Oak - Foothill Pine	43
Quercus wislizeni Mixed Shrub	MCH, BOP	Mixed Chaparral, Blue Oak - Foothill Pine	6
Salix gooddingii (Black Willow) Woodland/Forest Alliance			
(Alliance level only)	VRI	Valley Foothill Riparian	1
Salix gooddingii	VRI	Valley Foothill Riparian	2
Salix laevigata (Red Willow) Woodland/Forest Alliance			
(Alliance level only)	MRI, VRI	Montane Riparian, Valley Foothill Riparian	2
Salix laevigata	MRI, VRI	Montane Riparian, Valley Foothill Riparian	16
Salix laevigata / *Salix lasiolepis*	VRI	Valley Foothill Riparian	6
Umbellularia californica (California Bay) Woodland/Forest Alliance			
(Alliance level only)	MHW, VRI	Montane Hardwood, Valley Foothill Riparian	2
Umbellularia californica - *Alnus rhombifolia*	MHW, VRI	Montane Hardwood, Valley Foothill Riparian	2
Umbellularia californica - *Quercus wislizeni*	MHW	Montane Hardwood	10

Shrubland Vegetation Types

Alliance / Association	WHR Code	WHR Name	N-surveys
Adenostoma fasciculatum (Chamise) Shrubland Alliance			
(Alliance level only)	CRC, MCH	Chamise-Red Shank Chaparral, Mixed Chaparral	1
Adenostoma fasciculatum	CRC	Chamise-Red Shank Chaparral	29
Adenostoma fasciculatum - *Arctostaphylos manzanita*	MCH	Mixed Chaparral	6
Adenostoma fasciculatum - *Arctostaphylos viscida*	MCH	Mixed Chaparral	34
Adenostoma fasciculatum - *Eriodictyon californicum* - *Lotus scoparius*	MCH	Mixed Chaparral	20
Adenostoma fasciculatum / Herbaceous	CRC	Chamise-Red Shank Chaparral	4

Shrubland Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Arctostaphylos viscida (Whiteleaf Manzanita) Shrubland Alliance			
(Alliance level only)	MCH, MCP	Mixed Chaparral, Montane Chaparral	3
(*Arctostaphylos viscida* - *Adenostoma fasciculatum*) / *Salvia sonomensis*	MCH	Mixed Chaparral	101
Arctostaphylos viscida	MCH, MCP	Mixed Chaparral, Montane Chaparral	7
Arctostaphylos viscida - *Quercus wislizeni*	MCH	Mixed Chaparral	14
Arctostaphylos viscida / *Salvia sonomensis*	MCH	Mixed Chaparral	7
Ceanothus cuneatus (Wedgeleaf Ceanothus) Shrubland Alliance			
(Alliance level only)	MCH	Mixed Chaparral	6
Adenostoma fasciculatum - *Ceanothus cuneatus*	MCH, CRC	Mixed Chaparral, Chamise-Red Shank Chaparral	4
Ceanothus cuneatus - *Eriodictyon californicum* - (*Fremontodendron californicum*)	MCH, MCP	Mixed Chaparral, Montane Chaparral	9
Ceanothus cuneatus / Herbaceous	MCH	Mixed Chaparral	24
Ceanothus cuneatus / *Plantago erecta*	MCH	Mixed Chaparral	28
Ceanothus integerrimus (Deerbrush) Shrubland Alliance			
Ceanothus integerrimus	MCH, MCP	Mixed Chaparral, Montane Chaparral	3
Ceanothus integerrimus - *Quercus garryana var*. *breweri*	MCH, MCP	Mixed Chaparral, Montane Chaparral	9
Cephalanthus occidentalis (Button-willow) Shrubland Alliance			
Cephalanthus occidentalis	VRI	Valley Foothill Riparian	8
Cercocarpus betuloides (Birchleaf Mountain-mahogany) Shrubland Alliance			
Cercocarpus betuloides	MCH, MCP	Mixed Chaparral, Montane Chaparral	4
Cercocarpus betuloides - *Ceanothus cuneatus*	MCH, MCP	Mixed Chaparral, Montane Chaparral	8
Cornus sericea (Red-osier dogwood) Shrubland Alliance			
(Alliance level only)	MCH	Mixed Chaparral	1
Eriodictyon californicum (California Yerba Santa) Shrubland Alliance			
Eriodictyon californicum / Herbaceous	MCH	Mixed Chaparral	14
Heteromeles arbutifolia (Toyon) Shrubland Alliance			
(Alliance level only)	MCH	Mixed Chaparral	1
Heteromeles arbutifolia Serpentine	MCH	Mixed Chaparral	5

Shrubland Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Juniperus californica (California Juniper) Shrubland Alliance			
Juniperus californica / Herbaceous	JUN	Juniper	7
Quercus berberidifolia (Scrub Oak) Shrubland Alliance			
(Alliance level only)	MCH, MCP	Mixed Chaparral, Montane Chaparral	2
Quercus berberidifolia - *Ceanothus cuneatus*	MCH, MCP	Mixed Chaparral, Montane Chaparral	13
Quercus berberidifolia - *Fraxinus dipetala* - *Heteromeles arbutifolia*	MCH	Mixed Chaparral	2
Quercus durata (Leather Oak) Shrubland Alliance			
Quercus durata	MCH	Mixed Chaparral	2
Quercus durata - *Adenostoma fasciculatum* / *Salvia sonomensis*	MCH	Mixed Chaparral	7
Quercus garryana var. *breweri* (Brewer Oak) Shrubland Alliance			
(Alliance level only)	MCH, MCP	Mixed Chaparral, Montane Chaparral	1
Quercus garryana var. *breweri*	MCH, MCP	Mixed Chaparral, Montane Chaparral	5
Frangula californica (=*Rhamnus tomentella*) (Hoary Coffeeberry) Shrubland Alliance			
Rhamnus tomentella - *Hoita macrostachya*	MCH	Mixed Chaparral	4
Rubus discolor (Himalaya Blackberry) Shrubland Semi-Natural Stands			
Rubus discolor	CSC, VRI	Coastal scrub, Valley Foothill Riparian	8
Salix exigua (Narrow-leaf Willow) Shrubland Alliance			
(Alliance level only)	VRI	Valley Foothill Riparian	1
Salix exigua	VRI	Valley Foothill Riparian	14
Salix exigua - *Brickellia californica*	VRI	Valley Foothill Riparian	5
Salix lasiolepis (Arroyo Willow) Shrubland Alliance			
(Alliance level only)	VRI	Valley Foothill Riparian	1
Salix lasiolepis / *Rubus* spp.	VRI	Valley Foothill Riparian	3
Tamarix spp. (Tamarisk) Shrubland Semi-Natural Stands			
Tamarix spp.	VRI	Valley Foothill Riparian	1
Toxicodendron diversilobum (Poison-Oak) Shrubland Alliance			
Toxicodendron diversilobum / Herbaceous	MCH	Mixed Chaparral	31

Herbaceous Vegetation Types

Alliance

Association	WHR Code	WHR Name	N-surveys
Avena (*barbata*, *fatua*) (Slender Oat, Wild Oat) Herbaceous Semi-Natural Stands			
Avena barbata - Bromus hordeaceus	AGS	Annual Grassland	4
Bromus hordeaceus - (*Holocarpha virgata*) (Soft Chess - (Yellowflower Tarweed)) Herbaceous Alliance			
Holocarpha virgata - Bromus hordeaceus - Taeniatherum caput-medusae	AGS	Annual Grassland	25
Bromus hordeaceus - (*Plagiobothrys nothofulvus*) (Soft Chess - (Rusty Popcornflower)) Herbaceous Alliance			
(Alliance level only)	AGS	Annual Grassland	5
Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus	AGS	Annual Grassland	22
Bromus (*diandrus*, *hordeaceus*, *madritensis*) (Ripgut Brome, Soft Chess, Foxtail Chess) Herbaceous Semi-Natural Stands			
Brachypodium distachyon - Bromus diandrus / (*Quercus douglasii*) Sub-Alliance	AGS	Annual Grassland	38
Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus	AGS	Annual Grassland	11
Bromus hordeaceus - Leontodon taraxacoides	AGS	Annual Grassland	23
Bromus hordeaceus - Lupinus nanus - Trifolium spp.	AGS	Annual Grassland	9
Trifolium hirtum - Bromus hordeaceus	AGS	Annual Grassland	8
Carex barbarae (Santa Barbara Sedge) Herbaceous Alliance			
Carex barbarae	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	2
Carex nudata (Naked Sedge) Herbaceous Alliance			
Carex nudata	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	3
Carex serratodens (Twotooth Sedge) Herbaceous Alliance			
Carex serratodens	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	1
Centaurea (*melitensis*, *solstitialis*) ((Maltese, Yellow) Star Thistle) Herbaceous Alliance			
Centaurea solstitialis	AGS	Annual Grassland	8
Eleocharis acicularis (Needle Spikerush) Herbaceous Alliance			
Eleocharis acicularis - Eryngium castrense	FEW	Fresh Emergent Wetland	3
Eleocharis macrostachya (Pale Spikerush) Herbaceous Alliance			
(Alliance level only)	FEW	Fresh Emergent Wetland	4
Eleocharis macrostachya	FEW	Fresh Emergent Wetland	13

Herbaceous Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Eleocharis macrostachya (Pale Spikerush) Herbaceous Alliance cont.			
Eleocharis macrostachya - (*Pleuropogon californicus*)	FEW	Fresh Emergent Wetland	6
Eleocharis macrostachya-Marsilea vestita	FEW	Fresh Emergent Wetland	5
Juncus (*balticus*, *mexicanus*) (Rush (Baltic, Mexican)) Herbaceous Alliance			
Juncus balticus	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	10
Juncus balticus - Carex praegracilis	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	3
Juncus (*oxymeris*, *xiphioides*) (Rush (Pointed, Irisleaf)) Herbaceous Alliance			
Juncus oxymeris	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	5
Juncus xiphioides	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	1
Juncus effusus (Common Rush) Herbaceous Alliance			
Juncus effusus	FEW, WTM	Fresh Emergent Wetland, Wet Meadow	2
Lasthenia fremontii - Downingia (*bicornuta*) (Fremont's Goldfields - Calicoflower) Herbaceous Alliance			
(Alliance level only)	AGS, WTM	Annual Grassland, Wet Meadow	3
Downingia (*cuspidata*, *bicornuta*)	AGS, WTM	Annual Grassland, Wet Meadow	5
Downingia bicornuta -Lasthenia fremontii	AGS, WTM	Annual Grassland, Wet Meadow	1
Downingia ornatissima -Lasthenia fremontii	AGS, WTM	Annual Grassland, Wet Meadow	9
Eryngium (*vaseyi*, *castrense*)	AGS, WTM	Annual Grassland, Wet Meadow	11
Lasthenia fremontii	AGS, WTM	Annual Grassland, Wet Meadow	5
Layia fremontii (Fremont's Tidytips) Herbaceous Alliance			
(Alliance level only)	AGS	Annual Grassland	1
Layia fremontii - Lasthenia californica - Achyrachaena mollis	AGS	Annual Grassland	20
Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei	AGS	Annual Grassland	11
Plagiobothrys austiniae - Achyrachaena mollis	AGS	Annual Grassland	11
Lolium multiflorum (Italian Ryegrass) Herbaceous Semi-Natural Stands			
(Alliance level only)	AGS	Annual Grassland	2
Lolium multiflorum - Centaurium muehlenbergii	AGS	Annual Grassland	13

Herbaceous Vegetation Types (continued)

Alliance / Association	WHR Code	WHR Name	N-surveys
Lolium multiflorum (*Zigadenus fremontii*) (Italian Ryegrass (Fremont's Deathcamas) Herbaceous Alliance			
Zigadenus fremontii	AGS	Annual Grassland	6
Mimulus guttatus (Seep Monkeyflower) Herbaceous Alliance			
(Alliance level only)	AGS, WTM	Annual Grassland, Wet Meadow	1
Mimulus guttatus - Vulpia microstachys Serpentine	AGS	Annual Grassland	3
Muhlenbergia rigens (Deergrass) Herbaceous Alliance			
Muhlenbergia rigens	PGS	Perennial Grass	8
Nassella pulchra (Purple Needlegrass) Herbaceous Alliance			
(Alliance level only)	PGS	Perennial Grass	1
Nassella pulchra	PGS	Perennial Grass	11
Nassella pulchra - Leontodon taraxacoides	PGS	Perennial Grass	12
Phalaris aquatica (Harding Grass) Herbaceous Semi-Natural Stands			
Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis	PGS	Perennial Grassland	3
Schoenoplectus (=*Scirpus*) *acutus* (Common Tule) Herbaceous Alliance			
Schoenoplectus acutus var. occidentalis	FEW	Fresh Emergent Wetland	3
Schoenoplectus acutus - Typha domingensis	FEW	Fresh Emergent Wetland	1
Trifolium variegatum (Whitetip Clover) Herbaceous Alliance			
(Alliance level only)	AGS	Annual Grassland	1
(*Trifolium variegatum - Vulpia bromoides*) - *Hypochaeris glabra - Leontodon taraxacoides*	AGS	Annual Grassland	15
Trifolium variegatum	AGS	Annual Grassland	22
Trifolium variegatum - Lolium multiflorum - Leontodon taraxacoides	AGS	Annual Grassland	18
Trifolium variegatum - Vulpia bromoides - (*Hypochaeris glabra - Leontodon taraxacoides*)	AGS	Annual Grassland	33
Typha (*angustifolia*, *domingensis*, *latifolia*) (Cattail (Narrowleaf, Broad, Southern)) Herbaceous Alliance			
Typha latifolia	FEW	Fresh Emergent Wetland	2

Herbaceous Vegetation Types (continued)

Alliance

Association	WHR Code	WHR Name	N-surveys
Vulpia microstachys-Lasthenia californica-Plantago erecta (Small Fescue - California Goldfields - Dwarf Plantain) Herbaceous Alliance			
(Alliance level only)	AGS	Annual Grassland	20
Selaginella hansenii - *Vulpia microstachys*	AGS	Annual Grassland	34
Selaginella hansenii - *Vulpia microstachys* - *Lupinus nanus*	AGS	Annual Grassland	7
Selaginella hansenii - *Vulpia microstachys* - *Lupinus spectabilis*	AGS	Annual Grassland	9
Vulpia microstachys - *Elymus elymoides* - *Achnatherum lemmonii*	AGS, PGS	Annual Grassland, Perennial Grass	6
Vulpia microstachys - *Lasthenia californica* - *Agrostis elliottiana*	AGS	Annual Grassland	17
Vulpia microstachys - *Lasthenia californica* - *Parvisedum pumilum*	AGS	Annual Grassland	30
Vulpia microstachys - *Navarretia tagetina*	AGS	Annual Grassland	20
Vulpia microstachys - *Plantago erecta* - *Calycadenia* (*truncata*, *multiglandulosa*)	AGS	Annual Grassland	14