

SERPENTINE ENDEMISM IN THE CALIFORNIA FLORA:
A DATABASE OF SERPENTINE AFFINITY

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ABSTRACT

We present a summary of a database documenting levels of affinity to ultramafic (“serpentine”) substrates for taxa in the California flora, USA. We constructed our database through an extensive literature search, expert opinion, field observations, and intensive use of accession records at key herbaria. We developed a semi-quantitative methodology for determining levels of serpentine affinity (strictly endemic, broadly endemic, strong “indicator”, etc.) in the California flora. In this contribution, we provide a list of taxa having high affinity to ultramafic/serpentine substrates in California, and present information on rarity, geographic distribution, taxonomy, and lifeform. Of species endemic to California, 12.5% are restricted to ultramafic substrates. Most of these taxa come from a half-dozen plant families, and from only one or two genera within each family. The North Coast and Klamath Ranges support more serpentine endemics than the rest of the State combined. 15% of all plant taxa listed as threatened or endangered in California show some degree of association with ultramafic substrates. Information in our database should prove valuable to efforts in ecology, floristics, biosystematics, conservation, and land management.

Key Words: serpentine, ultramafic, California, endemism, diversity.

INTRODUCTION

Ultramafic rocks, often called “serpentine” by ecologists, botanists and pedologists, underlie more than 6000 km² of the land area of the State of California (Harrison et al. 2000). The edges of continental plates often include bands of these vestiges of oceanic mantle rock, accreted during the geologic process of subduction, and later uplifted and exposed during mountain building and subsequent erosion. Ultramafic rocks and the soils that develop on them are characterized by critically low levels of most principal plant nutrients (N, P, K, Ca), and exceptionally high levels of Mg and Fe and a suite of toxic trace elements including Cr, Ni, and Co. Outcrops of ultramafic rocks support high numbers of edaphic-endemic taxa throughout the world (Brooks 1987). The California serpentine flora is the richest in the temperate zone, and consists of hundreds of species and subspecies that are largely or entirely confined to ultramafic substrates.

Serpentine endemism is a key feature of the diversity of the California flora (Raven and Axelrod 1978; Kruckeberg 2002). Of about 1410 full species endemic to the State (Hickman 1993), Kruckeberg (1984) estimated that about 180 were endemic to serpentine. If these numbers are at least approximately correct, then about 13% of the plant species endemic to California are serpentine endemics. This is a remarkably high number when one considers that only 1.5% of the State is under-

lain by ultramafic rocks (6000 km²/406,280 km²). In addition, because they tend to have small geographic ranges and because many of them occur in the rapidly urbanizing San Francisco Bay Area, serpentine endemics are overrepresented among the state’s rare, sensitive, and listed plant taxa (Skinner and Pavlik 1994). The ecology of California’s serpentine plants has been extensively studied at the University of California’s Sedgwick Ranch Reserve (e.g., Seabloom et al. 2003; Gram et al. 2004) and McLaughlin Reserve (e.g., Harrison et al. 2003; Safford and Harrison 2004) and Stanford University’s Jasper Ridge Reserve (e.g., McNaughton 1968; Huenneke et al. 1990; Hobbs and Mooney 1991).

Botanists have relied for two decades on the monograph by Arthur Kruckeberg (1984) for most of their information on Californian serpentine-endemic plant taxa. Since then, publication of the Jepson Manual (Hickman 1993), and a proliferation of new botanical research and name changes have left this list in need of updating. Our initial aim was to modify Kruckeberg’s (1984) list, primarily using information from Hickman (1993), to use in our research on diversity patterns (Harrison et al. 2000, 2004). However, it soon became clear that we would have to expand and intensify our search for the best available information. Complicating this effort, plants show a continuum in degrees of serpentine restriction, and are sometimes more restrict-

ed in some parts of their geographic ranges than others, thus contributing to inconsistencies among reports from different sources. This led us to adopt a semi-quantitative procedure for scoring plant taxa on their reported degree of serpentine affinity.

In this contribution, we present a summary of our current database of serpentine affinity in the California flora. The database was constructed via an extensive literature search, expert opinion, field observations, web research, and intensive use of accession records at key herbaria. It provides data on levels of serpentine endemism, rarity, geographic distribution, taxonomy, and lifeform.

METHODOLOGY

We began by conducting a database search of the electronic Jepson Manual (Hickman 1993) maintained by the Jepson Herbarium at the University of California-Berkeley (UC-JEPS 2004a). The database was queried for all taxa with “serpentine”, “ultramafic”, or related (e.g., “asbestos soils”) references in the habitat description. Taxa containing “non-serpentine” in the description were removed afterward. We cross-checked the 391 serpentine-related taxa found in the Jepson Manual with Kruckeberg (1984), who listed those taxa he believed to be endemic to ultramafic substrates in California, and those that were either local or regional “serpentine indicators” (i.e., nonendemic taxa whose distributions are nonetheless skewed toward occurrences on ultramafics). Taxonomic updates in the Jepson Manual (Hickman 1993) were applied to the Kruckeberg list (which included 377 taxa after these revisions), and then those taxa not on the Jepson-derived list were added to our database. This resulted in a list of 529 taxa; of these, 287 were not shared between the two sources. We then added to the list a number of taxa that we considered to be likely endemics or indicators but which were not indicated as such by either Kruckeberg (1984) or the Jepson Manual (1993). Finally, published literature (e.g., Meinke and Zika 1992; Nelson and Nelson 2004; Baldwin 1999 and 2001; Barkley 1999; Porter and Johnson 2000; Zika et al. 1998) and the online Jepson Interchange Jepson Flora Project (UC-JEPS 2004b) were consulted for taxonomic revisions and taxa newly described since the publication of the Jepson Manual.

To score the affinity of taxa to ultramafic substrates, we adopted a modification of Kruckeberg’s measures of ultramafic “fidelity”. In his Appendix C, Kruckeberg (1984) used two or three “+”s to signify increasing levels of endemism: three “+”s were attached to taxa with 95–100% of their occurrences found on ultramafics, two “+”s signified taxa with 85–94% fidelity. In his Appendix D, Kruckeberg used one or two exclamation marks (“!”s) to signify increasing levels of fidelity to ultramafic substrates among supposed nonendemic “indicator” taxa. In both appendices, question

marks (“?”) were attached to those taxa for which more information was necessary to confidently assign their status. Some of the “tentative” endemics were included in the indicator appendix as well, thus these taxa occur twice in Kruckeberg’s lists. We combined Kruckeberg’s two scales, and added two levels to yield six levels of ultramafic affinity, where 6 represents a “strict endemic” ($\geq 95\%$ of occurrences on ultramafics), and successively lower values signify lower affinity to the substrate (5 = 85–94% of occurrences; 4 = 75–84%; 3 = 65–74%; 2 = 55–64%; 1 = 45–54%). By this definition, “1” thus represents a species found about half of the time on serpentine. We consider scores between 1 and 2 to indicate “weak indicators”, and a score of about 1 to mean an “indifferent” taxon. The Kruckeberg fidelity scale crosswalks to ours in the following fashion: “+++” = 6; “++” = 5; “!” = 3; one “!” = 2. Those taxa which occurred in both Kruckeberg’s endemic and indicator tables had their two scores averaged; these all fell between “3” and “4” on our scale. For example, *Citrus macnabiana* was rated “+++” in Kruckeberg’s Appendix C (i.e., “6” on our scale), and “!” [i.e., “2” in our scale] in Appendix D; these were averaged to “4” on our scale.

We attached our categorical levels of ultramafic affinity to all of the species in our hybrid Jepson-Kruckeberg database. In the case of the Kruckeberg taxa, we simply cross-walked the Kruckeberg fidelity codes to our scale as described above, making some adjustments based on more recent taxonomic revisions and combinations. In the case of the Jepson Manual taxa, we were forced to interpret the language used in habitat descriptions to determine levels of affinity. We used the following interpretations of description language to assign affinities: a “6” was assigned where the habitat description categorically stated “serpentine” or “ultramafic” (a “5” if there was some indication that this restriction was not absolute); a “4” was assigned where the modifiers “generally” or “usually serpentine” were used; “especially” or “often” equaled “3”; “sometimes” or “occasionally” equaled “1”. In a few cases, affinity levels were assigned based on ancillary information in the habitat and/or range description rather than on explicit statement of serpentine affinity.

We then conducted a broad survey of the literature, regional botanical experts, and herbaria records to obtain as many sources as possible for each taxon in our database, and to add to the database any taxa we might have overlooked. We manually consulted every species description in a variety of regional and local floras (Clifton 2001; Ertter and Bowerman 2004; Howell 1970; McMinn 1939; Oswald 2002; Smith and Wheeler 1992), and guidebooks to rare and sensitive taxa (Hanson 1999; Hoover et al. 1993; Jimerson et al. 1995; McCarten 1988; McCarten and Rogers 1991; Nakamura and Nelson 2001; Trinity SIPS 2001; USFWS 1998).

We also consulted the CalFlora Online Species Database (CalFlora 2004), and the California Native Plant Society Online Inventory of Rare and Endangered Plants (CNPS 2004). We added columns to our database for each source, and gave scores (1–6, as described above) to each taxon for which a habitat description suggested an ultramafic affinity. Information on serpentine affinity in the CalFlora database is limited to taxa from the Sierra Nevada and to rare taxa statewide, and does not include sufficient information to determine degree of affinity (A. Dennis, personal communication). CalFlora was therefore not treated as a typical “source”, and CalFlora serpentine taxa were simply given a score of 0.5 to be added later to the sum of scores when final ultramafic affinities were calculated (see below). The California Natural Diversity Database (CNDDDB) was not searched, as we consulted all of the primary resources originally used to build CNDDDB, and the CNPS Online Inventory (see above) is updated from the same contemporary sources as CNDDDB.

We calculated preliminary mean affinities for taxa in our database by summing the scores across source columns and adding the CalFlora score (if present), then dividing by the number of sources (not including CalFlora) for the taxon in question. We also calculated the number of sources, the median score, and the standard deviation and standard error of the scores for each taxon. We then sent the database to approximately 40 state and regional experts for their review and input, and asked them to score serpentine affinity using the 1–6 scale for taxa with which they were familiar. These individuals included botanists employed by federal and state land management agencies, universities, museums, non-governmental organizations, and private consulting firms. We received 17 substantive replies, and incorporated their input into an updated database.

The next step was to ensure that we had at least three sources of serpentine affinity for each taxon in our database; given the great differences between the Jepson Manual and Kruckeberg’s list, we felt a third opinion was important. We focused on those taxa for which we had less than three sources, as well as those with high variability in scores. We began by consulting the habitat descriptions in Munz and Keck (1968) for every taxon in our database with less than three sources. We then turned to Herbaria accession records. We searched the online “SMASCH” accession databases of the UC and Jepson Herbariums at UC-Berkeley at (UC-JEPS 2004c) for all taxa with one or two sources, and for all taxa with affinity-score standard deviations ≥ 1.0 (a total of 548 taxa). For any Northern California taxa remaining with less than three sources and/or high variability, we then searched the online accession database of the Biological Sciences Herbarium at Chico State University (CSU-BSH 2004; a total of 164 taxa were searched).

In our online accession database research, we followed the following protocol:

1. We began with the most recent accession records and worked backwards, as habitat descriptions before the mid 1970’s usually lack sufficiently detailed information on substrate and location.

2. We consulted the habitat description for each record. If the description included enough information to determine the substrate, we noted whether it was ultramafic or non-ultramafic. We did not count multiple accession records from the same collecting trip and location as different records.

3. On the average, about $\frac{1}{3}$ of the accession records consulted had sufficient information to determine if a collection had been made on ultramafics or not. Not all of these determinations were made simply based on the collector’s habitat description. For example, many California counties do not contain outcrops of ultramafic rocks (e.g., Los Angeles, San Diego, San Bernardino, Modoc). Collections from these counties were coded as “nonserpentine” even where habitat descriptions were missing. Also, collections from well-known collecting locations on ultramafics (e.g., Blue Banks in Glenn County, Red Butte in Siskiyou County, or the mouth of 18-Mile Creek on the Middle Fork Smith River, Del Norte County) were coded as “serpentine” even where habitat descriptions were missing. Finally, where we had trouble getting a sufficient number of records with habitat descriptions, or where it was otherwise critical to get more information, we used location information in the accession record (where it existed) to do further research. We used TOPO! Software (National Geographic Maps 2000) to locate coordinates or named locations and then consulted geological maps (ranging from 1:250,000 to 1:25,000) to determine if the location was on an ultramafic outcrop. Only those occurrences which could be confidently assigned to ultramafics were identified as such.

4. We continued until we had recorded habitat information from at least 10% of the total accession records for the species in question. Our minimum was 10 records, unless there were fewer than 10 records with habitat descriptions and reasonably locatable site information (286/548 taxa had fewer than 10). Our maximum was usually 20, although we went beyond 20 in some cases.

5. We summarized the accession record results for each taxon by dividing the total number of records with sufficient habitat or location information to determine substrate by the number of records recording serpentine/ultramafics, and then multiplied the result by 100 to get a percentage. We then cross-walked the percent value to our scale of ultramafic affinity: 95–100% of records on ultramafics = 6; 85–94% = 5; 75–84% = 4; 65–74% = 3; 55–64% = 2; 45–54% = 1; 35–44% = 0.75; 25–34% = 0.5; 15–24% = 0.25; >0–14% = 0.1; 0 = 0.

Finally, T. Nelson and S. Carothers also used the

Humboldt State University Herbarium to provide information to us on a number of under-documented taxa from Northwestern California.

In our accession records research, we necessarily assumed that: (1) the taxon itself was correctly identified on the accession record; (2) the substrate was correctly identified by the collector; and (3) ultramafic substrates were neither more nor less likely to be identified correctly (or at all) than other substrates. The last assumption is probably flawed, as serpentine and other “charismatic” substrates—given their close connection to plant endemic taxa and their relative ease of identification—are almost certainly more likely to be identified than “normal” substrates. This could theoretically lead to accession records “overstating” the degree of a taxon’s affinity to ultramafic substrates. In practice, however, we found that the accession records were generally somewhat more conservative than our literature sources vis-à-vis the serpentine affinities of the taxa in our database.

Our final database included 18 columns of information sources for serpentine affinity, plus a column for CalFlora. We summed these affinity values and took their mean (not including CalFlora in the denominator). We also calculated the mean without CalFlora, the median, the standard deviation, and the standard error. We identified each taxon by taxonomic category (pteridophyte, gymnosperm, dicot or monocot), and by lifeform (annual forb, perennial forb, annual graminoid, perennial graminoid, shrub, tree). For rare taxa, we added the rarity rating from the California Native Plant Society Online Database of Rare and Endangered Plants (version 6.04d, 11-12-2004). The following information was also added to the complete database: geographic distribution in California for each taxon (by Jepson Manual geographic subdivisions); elevational range (from Hickman 1993); the geographic distribution of, and number of species of the genus of each taxon (from Mabberly 1996); and the common name (from Hickman 1993, and the Natural Resource Conservation Service PLANTS online database [USDA-NRCS 2005]). Aside from a summary of the geographic distribution, this information is not presented in the current paper, but is available on request from the first author, as are the affinity values calculated for each source.

RESULTS

A summary table of the current database is presented in Appendix 1. Appendix 1 includes 669 taxa, ranging in affinity from 6.25 to 1.00 (some values exceed 6 because they were identified as serpentine taxa in the CalFlora Database). Our full database includes 698 taxa, 29 of which have mean serpentine affinities of < 1 ; we did not include these taxa in the current paper. The greatest number of sources we located for any single taxon was nine (four taxa). We found eight sources for eight taxa

and seven sources for 19 taxa; 587 taxa had between three and six sources. Eighty-one taxa had fewer than three sources (77 with two, three with one). Somewhat more than half of the taxa (387) in our original list had standard deviations for serpentine affinities > 1.0 .

Since our serpentine affinities are calculated as the means of multiple sources, our values fall on a continuous scale, rather than in categories. Given this, we recognized taxa with mean affinities > 5.5 as “strict endemics” (analogous to Kruckeberg’s “+++”, or taxa with $> 95\%$ of their occurrences on ultramafics), and taxa with mean affinities > 4.5 and < 5.5 as “broad endemics” (analogous to Kruckeberg’s “++”, taxa with about 85–94% of their occurrences on ultramafics). Using these definitions, 164 taxa are strict endemics, while 82 taxa are broad endemics, for a total of 246 endemic taxa; 176 of these are full species. Among the remaining taxa, 123 are “strong serpentine indicators” (Kruckeberg 1984), with scores ranging from 2.5 to 3.4 (about 65–74% of their occurrences on ultramafics); 150 are “weak indicators”, falling between 1.5 and 2.4 on our scale (± 55 –64% of their occurrences on ultramafics); and 79 fall in a gray area between weak indicators and indifferent taxa (between 1.0 and 1.4 on our scale, or about 50–54% of occurrences. Seventy-one taxa have affinity scores between 3.5 and 4.4 (about 75–84% of their occurrences on ultramafics), and thus represent the transition from strong indicators to broad endemics.

Six families account for more than half of all the endemics: Asteraceae, Liliaceae, Brassicaceae, Polygonaceae, Scrophulariaceae, and Apiaceae (Table 1). The 20 most important plant families among the serpentine endemics are shown in Fig. 1, with the percentage of the serpentine endemic flora that they contribute, as well as the percentage of the total California endemic flora that they contribute. Families that proportionally contribute more to the serpentine endemic flora than to the California endemic flora include Liliaceae, Brassicaceae, Polygonaceae, Linaceae and Caryophyllaceae. Families whose level of endemism is much lower on serpentine than it is statewide include Fabaceae, Poaceae, Boraginaceae, and Rosaceae (Fig. 1).

The most diverse genera in our list of serpentine endemics are *Streptanthus* (Brassicaceae) and *Eriogonum* (Polygonaceae), followed by *Hesperolimon* (Linaceae) and *Arctostaphylos* (Ericaceae) (Table 2). There are 21 genera with at least four taxa among the endemics. These represent 14 plant families, with Asteraceae (four genera among the endemics), Liliaceae (three genera), Scrophulariaceae (two genera) and Brassicaceae (two genera) the only families with multiple genera in the list. Figure 2 compares the contribution of these genera to the serpentine endemic flora with their contribution to the California endemic flora. All but five or six of these genera have a greater level of endemism to serpentine than they have within the State as a

TABLE 1. NUMBERS OF SERPENTINE ENDEMIC AND NEAR ENDEMIC TAXA, BY FAMILY. ¹ Strict endemics. ² Strict endemics plus broad endemics. ³ Strict and broad endemics plus "near endemic" taxa (taxa transitional from strong indicators to broad endemics).

| Family | Serpentine affinity score | | | Total taxa |
|------------------|---------------------------|-------------------|-------------------|------------|
| | ≥5.5 ¹ | ≥4.5 ² | ≥3.5 ³ | |
| Asteraceae | 26 | 37 | 45 | 106 |
| Liliaceae | 15 | 28 | 37 | 85 |
| Brassicaceae | 21 | 26 | 31 | 46 |
| Polygonaceae | 10 | 17 | 19 | 39 |
| Scrophulariaceae | 9 | 14 | 18 | 37 |
| Apiaceae | 7 | 10 | 13 | 32 |
| Linaceae | 8 | 9 | 9 | 14 |
| Ericaceae | 5 | 8 | 10 | 15 |
| Polemoniaceae | 6 | 7 | 8 | 18 |
| Caryophyllaceae | 5 | 7 | 8 | 18 |
| Fabaceae | 4 | 7 | 10 | 24 |
| Lamiaceae | 4 | 6 | 10 | 17 |
| Crassulaceae | 5 | 5 | 7 | 13 |
| Rhamnaceae | 4 | 5 | 6 | 14 |
| Campanulaceae | 3 | 5 | 8 | 12 |
| Onagraceae | 3 | 5 | 7 | 12 |
| Hydrophyllaceae | 4 | 4 | 8 | 15 |
| Rubiaceae | 3 | 4 | 4 | 8 |
| Convolvulaceae | 1 | 4 | 5 | 6 |
| Cyperaceae | 1 | 4 | 5 | 8 |
| Poaceae | 1 | 3 | 3 | 19 |
| Portulacaceae | 0 | 3 | 5 | 16 |
| Boraginaceae | 2 | 2 | 3 | 10 |
| Gentianaceae | 2 | 2 | 2 | 3 |
| Iridaceae | 2 | 2 | 2 | 4 |
| Malvaceae | 2 | 2 | 2 | 5 |
| Salicaceae | 2 | 2 | 2 | 3 |
| Garryaceae | 1 | 2 | 2 | 2 |
| Rosaceae | 1 | 2 | 5 | 10 |
| Cupressaceae | 0 | 2 | 3 | 6 |
| Violaceae | 0 | 2 | 3 | 7 |
| Asclepiadaceae | 1 | 1 | 1 | 1 |
| Berberidaceae | 1 | 1 | 1 | 4 |
| Dryopteridaceae | 1 | 1 | 1 | 2 |
| Fagaceae | 1 | 1 | 1 | 3 |
| Lentibulariaceae | 1 | 1 | 1 | 1 |
| Papaveraceae | 1 | 1 | 1 | 5 |
| Ranunculaceae | 1 | 1 | 3 | 6 |
| Orchidaceae | 0 | 1 | 1 | 3 |
| Pteridaceae | 0 | 1 | 1 | 4 |
| Verbenaceae | 0 | 1 | 1 | 1 |
| Cistaceae | 0 | 0 | 0 | 1 |
| Orobanchaceae | 0 | 0 | 0 | 1 |
| Pinaceae | 0 | 0 | 1 | 6 |
| Plantaginaceae | 0 | 0 | 0 | 1 |
| Polygalaceae | 0 | 0 | 0 | 1 |
| Primulaceae | 0 | 0 | 0 | 1 |
| Sarraceniaceae | 0 | 0 | 1 | 1 |
| Saxifragaceae | 0 | 0 | 1 | 2 |
| Sterculiaceae | 0 | 0 | 0 | 1 |
| Totals | 164 | 246 | 315 | 669 |

whole. These genera include *Streptanthus*, *Hesperolinon*, *Lomatium* and *Minuartia*. Only one genus (*Phacelia*) contributes less to the serpentine endemic flora than it does to the State as a whole; *Ar-*

tostaphylos contributes a similar percentage to both floras (Fig. 2).

Of the taxa in our database, there are 532 dicots (of which 204 are endemic), 119 monocots (38 endemics), 12 gymnosperms (2 endemics) and six pteridophytes (2 endemics). 207 taxa are annual forbs (of which 71 are endemics, including 7 of 14 that can also be perennial/biennial), 383 are perennial forbs (150 endemics, including the 7 "annuals" and 6 taxa which can also be shrubs), 24 are perennial graminoids (7 endemics), 64 are shrubs (23 endemics, including 6 taxa shared with the perennial forbs and 1 which assumes both tree and shrub forms), and 12 are trees (2 endemics) (Appendix 1). Of the endemic perennial forbs, 24 are bulb plants (all Liliaceae), 17 are rhizomatous (from ten different Families), three are hemiparasites (Scrophulariaceae), and one is carnivorous (Lentibulariaceae) (Appendix 1).

Using Kruckeberg's (1984) physiographic provinces of California (which correspond more or less to major geographic subdivisions mapped in the Jepson Manual (Hickman 1993)), we found the following geographic distribution of serpentine endemic taxa (Fig. 3): The North Coast, considered *in toto* (i.e., the Jepson Manual's NCo and NCoR subregions (Hickman 1993)), supports approximately 118 serpentine endemics, with 49 of these restricted to that area. The Klamath Region (Jepson Manual subregion KR), supports 98 endemic taxa, with 54 restricted to that area (including taxa also found in neighboring SW Oregon). The San Francisco Bay Area (Jepson Manual subregion SnFrB plus the sections of NCo and CCo bordering it) supports about 51 endemics, with 24 found only there. The South Coast Ranges, including the Channel Islands and the Santa Ana Mountains (i.e., Jepson Manual subregions CCo, SCoR plus the few ultramafic outcrops that occur in the Jepson SW Region), support 43 total endemics with 24 restricted to that area. The Sierra Nevada (Jepson Manual region SN) support 38 total serpentine endemic taxa, with 21 taxa restricted to the Range (Fig. 3).

Of the 669 taxa in our database, 295 are listed as "rare" or "uncommon" by the California Native Plant Society (CNPS) (Appendix 1). These include 194 of the 246 taxa that we consider to be either strict or broad serpentine endemics. One serpentine endemic taxon, *Arctostaphylos hookeri* subsp. *franciscana*, is extinct in the wild and survives only in cultivation. Of the 295 rare or uncommon taxa, 154 are on CNPS List 1b, which lists plants considered threatened or endangered by either the State or Federal governments, as well as unlisted plants which CNPS considers rare enough to warrant listing; 111 of these List 1b plants are serpentine endemics by our definition. Nine taxa (seven endemics) from Appendix 1 are on CNPS list 2, which contains plant taxa that are rare in California but are not restricted completely to the State; all of these taxa are either State listed and threatened or endangered,

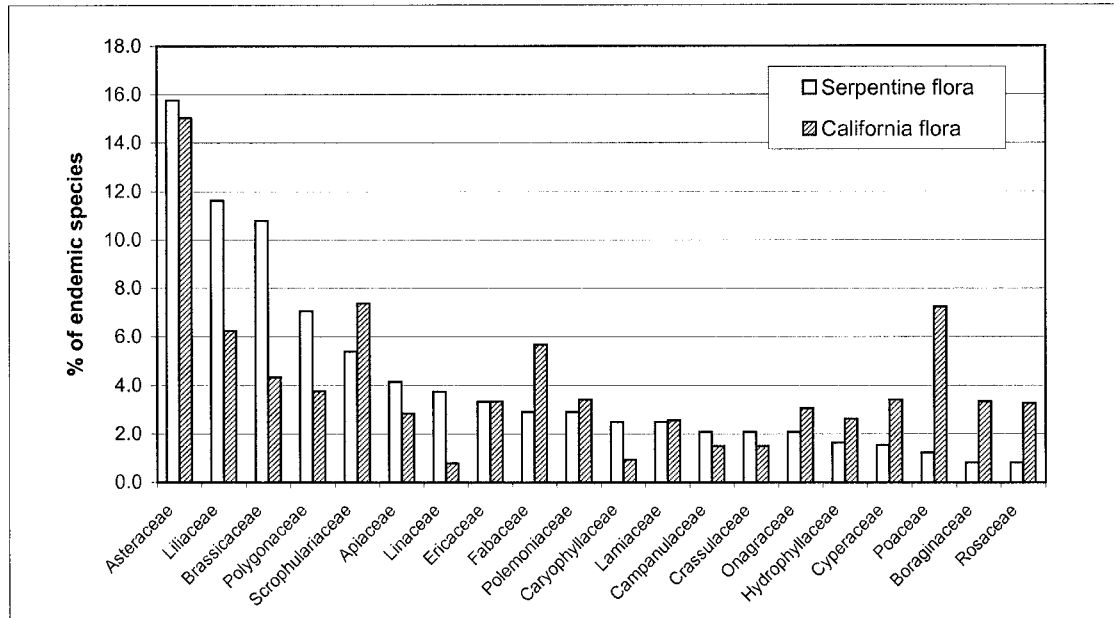


FIG. 1. The twenty most important plant families of serpentine endemic plants (i.e., including strict and broad serpentine endemics), with the percentage of endemic species they contribute to the serpentine endemic flora in California, and to the California endemic flora as a whole.

or are eligible for listing. Eight taxa (four endemics) in Appendix 1 are found on CNPS list 3, which lists uncommon taxa for which more information is required. Of taxa in Appendix 1, 123 (71 endemics) are on CNPS list 4, which contains taxa of "limited distribution or infrequent throughout a broader area in California".

TABLE 2. GENERA WITH MORE THAN THREE TAXA ENDEMIC TO SERPENTINE.

| Genus | Family | Endemic taxa |
|--------------------------|------------------|--------------|
| <i>Streptanthus</i> | Brassicaceae | 18 |
| <i>Eriogonum</i> | Polygonaceae | 14 |
| <i>Hesperolinon</i> | Linaceae | 9 |
| <i>Arctostaphylos</i> | Ericaceae | 8 |
| <i>Allium</i> | Liliaceae | 7 |
| <i>Lomatium</i> | Apiaceae | 7 |
| <i>Packera (Senecio)</i> | Asteraceae | 6 |
| <i>Calochortus</i> | Liliaceae | 5 |
| <i>Cordylanthus</i> | Scrophulariaceae | 5 |
| <i>Arabis</i> | Brassicaceae | 4 |
| <i>Calystegia</i> | Convolvulaceae | 4 |
| <i>Carex</i> | Cyperaceae | 4 |
| <i>Castilleja</i> | Scrophulariaceae | 4 |
| <i>Cirsium</i> | Asteraceae | 4 |
| <i>Erigeron</i> | Asteraceae | 4 |
| <i>Fritillaria</i> | Liliaceae | 4 |
| <i>Galium</i> | Rubiaceae | 4 |
| <i>Lessingia</i> | Asteraceae | 4 |
| <i>Minuartia</i> | Caryophyllaceae | 4 |
| <i>Monardella</i> | Lamiaceae | 4 |
| <i>Phacelia</i> | Hydrophyllaceae | 4 |

DISCUSSION

In 1984, Kruckeberg estimated that the serpentine endemic flora of California numbered approximately 220 taxa (about 180 full species), and that a further 230 taxa were sufficiently associated with ultramafics to be "indicators" of the substrate. Thus, Kruckeberg believed that about 450 taxa were associated with serpentine in California. Although our results suggest that the number of serpentine-associated taxa is closer to 670, they also suggest that Kruckeberg's (1984) estimate of the number of full-species endemics was remarkably accurate (180 vs. 176). As Kruckeberg's numbers also suggested, serpentine endemics therefore comprise approximately 12.5% (176/1410) of the plant species endemic to California. Based on numbers from the Jepson Manual (Hickman 1993; R. Moe personal communication), the percentage of serpentine endemics among California endemic species, subspecies and varieties is about 11.4% (246/2153).

Kruckeberg's (1984) estimates of endemics by California geographic region are somewhat less accurate than his statewide estimate (see Fig. 3), but Kruckeberg's data sources in the 1970's and early 1980's were extremely limited compared to ours. As did Kruckeberg, we found that the North Coast Ranges support more serpentine endemic plants than any other geographic region, but that the Klamath Ranges (and adjoining SW Oregon) support many more restricted endemics than Kruckeberg thought was the case (54 vs. 30). Kruckeberg's estimates for the numbers of restricted endemics in

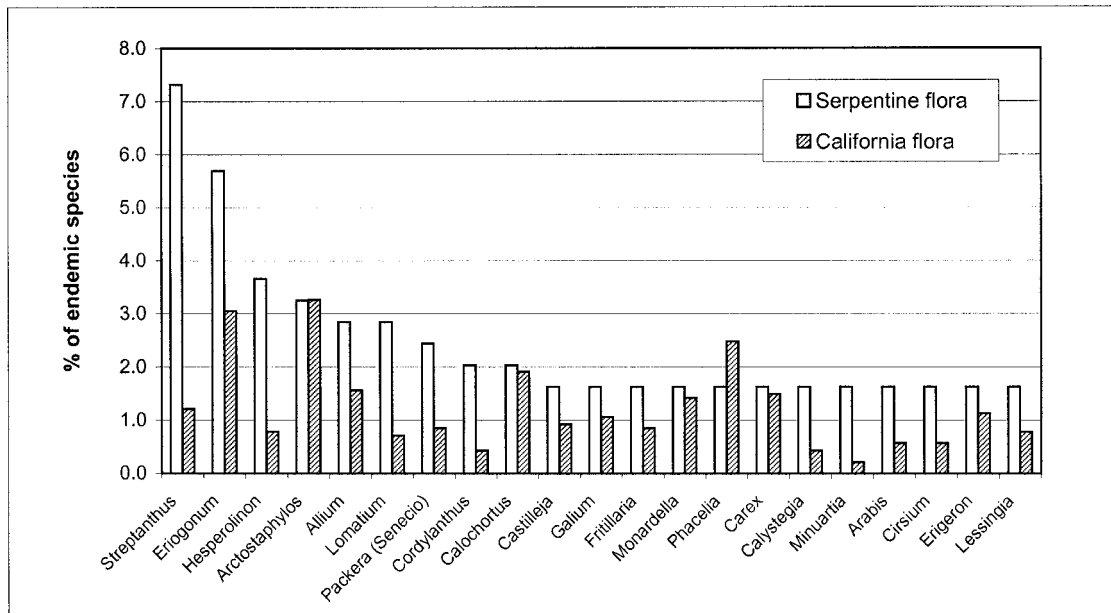


FIG. 2. The twenty-one most important genera of serpentine endemic plants (i.e., including strict and broad serpentine endemics), with the percentage of endemic species they contribute to the serpentine endemic flora in California, and to the California endemic flora as a whole.

the North Coast Ranges and the Bay Area are very similar to our numbers (Fig. 3), but he overestimated the number of endemics in the South Coast Ranges (36 vs. 24). Kruckeberg estimated that either 13 or 16 (depending on whether one goes by the text or the tables in Appendix E) endemic taxa were restricted to the Sierra Nevada; we found 21 taxa thus restricted.

Reasons for differences between our numbers and Kruckeberg's (1984) are many, but belong to two broad categories. The primary reason is quality and quantity of information. In many cases, Kruckeberg's information had to come through his own field experience, or through hard copy herbarium records, which—before the late 1970's—were no-

toriously uninformative when it came to habitat description. In contrast, many data sources we accessed were available electronically and could be queried and retrieved remotely.

The other principal reason for difference is the inevitable discoveries and taxonomic reorganizations that occur over a 20-year period. Kruckeberg's work came before publication of the Jepson Manual (Hickman 1993), which contained many significant changes in California plant taxonomy. A considerable number of serpentine endemic taxa in the Jepson Manual were wholly unknown to Kruckeberg in 1984. Examples include *Calochortus raichei* S. Farwig & V. Girard, *Minuartia stolonifera* T. W. Nelson & J. P. Nelson, *Perideridia bagalupii* Chuang & Constance, and *Monardella stebbinsii* Hardham & J. Bartel. Since the Manual's publication, there have been further changes (e.g., Barkley 1999; Baldwin 1999; Porter and Johnson 2000). Serpentine endemic taxa named since publication of the Jepson Manual include *Harmonia guggolziorum* B. G. Baldwin, *Carex serpentinicola* P. F. Zika, and *Silene serpentinicola* T. W. Nelson & J. P. Nelson.

As a null hypothesis, one might expect that the distribution of endemic plant taxa across plant families and genera on California serpentines would more or less mirror the distribution of endemics in the State as a whole. Our data demonstrate that this assumption is incorrect at both taxonomic levels, but the root of this difference seems to be largely at the level of genus. A number of families contribute a much higher proportion of the serpentine

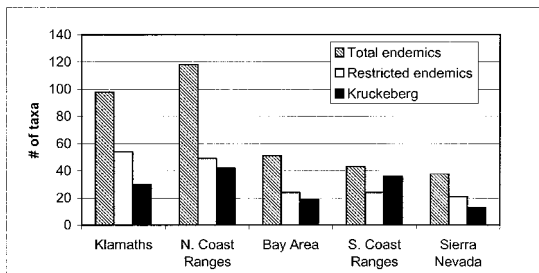


FIG. 3. Geographic distribution of serpentine endemic taxa in California. "Total endemics" includes all California serpentine endemic taxa present in a given region; "restricted endemics" includes only those taxa restricted to a given region; black bars represent Kruckeberg's (1984) estimates of restricted endemics.

TABLE 3. EXAMPLES OF "REGIONAL" SERPENTINE INDICATORS, *SENSU* KRUCKEBERG (1984). ¹ CA = California, KL = Klamath Ranges, NC = North Coast Ranges, BA = San Francisco Bay Area, SC = South Coast Ranges, SN = Sierra Nevada.

| Taxon | Distribution ¹ | Comments ¹ |
|---|---------------------------|---|
| <i>Allium amplexans</i> | CA | SC—broad endemic; Northern CA—weak indicator at best |
| <i>Aspidotis densa</i> | CA | Marin County—broad endemic; rest of NC—weak to strong indicator; KL—broad endemic to strong indicator, depending on locality; rest of CA—strong indicator |
| <i>Festuca californica</i> | CA | Northern SN and KL—strong indicator to broad endemic; NC—primarily weak indicator; rest of CA—indifferent |
| <i>Lupinus onustus</i> | KL, SN | KL—broad endemic; SN—indifferent (mostly non-ultramafic) |
| <i>Pinus attenuata</i> | CA | Mendocino County and neighboring NC—broad endemic; rest of NC and SC—strong indicator; KL—weak indicator; SN—weak indicator to indifferent |
| <i>Pinus jeffreyi</i> | KL, NC, SC, SN | KL and NC—± strict endemic; Westslope of northern SN—strong indicator; rest of CA—indifferent |
| <i>Quercus vaccinifolia</i> | KL, NC, SN | Mendocino County and neighboring NC—broad endemic; Northern NC and KL—weak indicator; SN—indifferent |
| <i>Sedum obtusatum</i> ssp. <i>obtusatum</i> | KL, SN | KL and NC—± broad endemic; SN—weak indicator or indifferent |
| <i>Stachys pycnantha</i> | CA | Marin County—broad endemic to strong indicator; Northern SN—very weak indicator; rest of CA—weak indicator or indifferent |
| <i>Viola douglasii</i> | CA | Plumas County—endemic; NC—strong indicator; rest of CA—indifferent |

endemic flora than they do of the California endemic flora (Fig. 1), but our database shows that most of these "anomalies" are due to one or two genera within those families (see Fig. 2). Examples include *Fritillaria* and *Allium* in Liliaceae, *Minuartia* in Caryophyllaceae, *Streptanthus* and *Arabis* in Brassicaceae, *Hesperolinon* in Linaceae, and *Eriogonum* in Polygonaceae. Many of these genera are well-known as foci of neoendemism (i.e., genera with groups of actively and rapidly speciating taxa) (Raven and Axelrod 1978). It is interesting that such prominent California plant families like Scrophulariaceae, Hydrophyllaceae, Boraginaceae, Onagraceae and Polemoniaceae are underrepresented on serpentine substrates. Certain highly diverse genera in California are also proportionally underrepresented as serpentine endemics (e.g., *Clarkia*, *Phacelia*, *Ceanothus*, *Gilia*, and *Mimulus*).

As we constructed our database, taxa with high variability in serpentine affinity scores were tagged for further research (e.g., through accession records; see Methodology) so that we might be able to discern taxa that truly varied geographically in their affinities from taxa that simply suffered from inadequate or faulty information. The former were called "regional indicators" by Kruckeberg (1984), i.e., taxa that are considered serpentine endemics or indicators in one part of their range but show less or no affinity for ultramafic substrates in other parts of their range. In his Appendix D, Kruckeberg (1984) tried to summarize where the different regional indicators he had identified occurred on ultramafics. We refer the reader to Kruckeberg (1984) for details on these taxa (most of which also occur in our database), but most regional indicators in our database can be recognized by searching for taxa with: (1) relatively wide geographic distributions,

(2) lower mean serpentine affinity scores, and (3) high standard deviations in their affinity scores. Table 3 lists ten examples of regional indicator taxa in our database.

Some of the variability in our serpentine affinity scores is thus due to geographic variation in affinities, but some is also due to inadequate, statistically biased, or even faulty information from our sources. We attempted to offset these sources of variability by including as many sources as possible in our database (and by using accession records), but were not successful in all cases. We consider any taxon with a standard deviation in affinity score > 1.5, or having fewer than three sources, as being in "need of further research"; this includes about a third of the taxa in our database. Examples of such taxa include: *Lupinus lapidicola*—called a strict serpentine endemic by Kruckeberg (1984) and a strong serpentine indicator by CNPS (2004), and with 2/2 accession records in SMASCH with ultramafic habitat descriptions, but stated as occurring only on granites by the Jepson Manual (Hickman 1993) and Munz and Keck (1973); *Phacelia phacelioides*—Kruckeberg (1984) and V. Yadon (personal communication) believe this is a strict endemic, but the Jepson Manual is mute on the subject, and only 1/3 accession records in SMASCH are on ultramafics (but the two nonserpentine locations may have misidentified geology given the location); and *Allium lacunosum* var. *lacunosum*—both the Jepson Manual and Kruckeberg rate this as a strict endemic, Munz and Keck score it a strong indicator, but SMASCH has only 1/6 records on ultramafics.

Some species had surprising levels of ultramafic affinity. For example, our database includes a number of taxa that we personally have only rarely seen

on serpentine (e.g., *Lathyrus vestitus* var. *vestitus*, *Apiastrum angustifolium*, *Emmenanthe penduliflora* var. *penduliflora*). It also includes other taxa which we would have characterized as being clearly indifferent to ultramafic substrates, but which scored higher based on our sources (e.g., *Adenostoma fasciculatum*, *Pinus balfouriana* ssp. *balfouriana*). As noted above, some of these “discrepancies” may be due to inadequate or biased data—the ultramafic affinity of these types of taxa will drop as we collect more information. Many of these surprising affinities are probably real however, and they are simply a sign of our limited knowledge of the relationships between California plant life and ultramafic substrates.

In accession records, and in the literature, botanists and ecologists frequently misidentified basic rock types. For example, in accession records we found a number of examples of peridotite being called “volcanics” or even “sandstones”. We also found multiple examples, in accession records as well as in the literature, of gabbro and other basic intrusive rocks being misidentified as ultramafics. Gabbro and “basic” rocks are “mafic” in composition—that is to say, they usually contain visible feldspars and they are geochemically distinct from ultramafic rocks. For example, the average alkali-gabbro contains 4–5 times as much Na as peridotite, 5–10 times as much P, 3–4 times as much K and Ca, and about 1/3 as much Mg (Ehlers and Blatt 1982). The famous gabbro outcrops of Eldorado County (Pine Hill) or San Diego County are therefore *not* ultramafic, even though the effect of the substrate on plant physiognomy and community composition may appear similar. A number of species in our database appear to be primarily, if not exclusively gabbro endemics, but we lacked sufficient information to remove them from our list. These include *Acanthomintha ilicifolia*, *Fremontodendron californicum* ssp. *decumbens*, and *Calochortus weedii* var. *vestus*.

As has been frequently noted (Mason 1946a, b; Raven and Axelrod 1978; Kruckeberg 1984, 2002; Skinner and Pavlik 1994; McCarten 1997), California’s ultramafic soils support a very high proportion of the State’s rare plants. Based on our database, almost 11% (111/1021) of California’s rare plant taxa are either broadly or strictly restricted to ultramafic substrates; 15% of List 1b taxa (154/1021) show high affinity for ultramafic substrates (i.e., they are endemics or indicators). In northwestern California, 15% of plant taxa managed as “sensitive” by the Forest Service are serpentine endemics, and fully 30% are closely associated with ultramafics (J. K. Nelson and L. Hoover personal communication). In 2002, Kruckeberg wrote that “preservation of serpentine habitats in California is spotty, inadequate, and largely coincidental”. Given the great importance of ultramafic substrates to the richness and distinctiveness of the California flora, the conservation of these unique habitats

should be a high priority for land management agencies and private conservation organizations throughout the State.

Our database of serpentine affinity updates, and expands on the widely-used tables of serpentine endemic and “indicator” taxa published in 1984 by Art Kruckeberg in his classic monograph on California serpentine ecology. Our data are also a quantitative synthesis of the qualitative (and usually incomplete) allusions to serpentine affinity contained in habitat descriptions in California floras and flora databases, including Munz and Keck (1973), Hickman (1993), Oswald (2002), the online CalFlora Database (CalFlora 2004), and the California Native Plant Society Online Inventory of Rare and Endangered Plants (CNPS 2004). Our data on serpentine endemism should prove valuable to efforts in ecology, biosystematics (Baldwin 1995), conservation, and land management. In particular, we hope that our database will help us better understand the nature and degree of serpentine endemism in the California flora, and we hope it will spur the collection of additional, critical information necessary for conserving the rare plants and habitats of ultramafic substrates.

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APPENDIX 1. PLANT TAXA WITH HIGH AFFINITY TO ULTRAMAFIC SUBSTRATES IN CALIFORNIA. Ordered by family and taxon. ¹ Names as in Hickman (1993); names in parentheses are based on more recent revisions (see text for sources). ² Affinity: SE = strict endemic, BE = broad endemic, BE/SI = broad endemic/strong indicator, SI = strong indicator, WI = weak indicator, WI/IN = weak indicator/indifferent. ³ Mean affinity score, including information from CalFlora. ⁴ Sum of all affinity scores, including CalFlora. ⁵ Median of affinity scores. ⁶ Standard deviation of affinity scores. ⁷ Standard error of affinity scores. ⁸ California Native Plant Society rarity codes, from CNPS Inventory of Rare and Endangered Plants of California, 11-2004. ⁹ Geographic distribution: KL = Klamath Ranges, NC = North Coast Ranges, BA = San Francisco Bay Area, SC = South Coast Ranges, SN = Sierra Nevada. ¹⁰ Taxonomic category. ¹¹ carn = carnivorous, cesp = cespitose, hemipar = hemiparasitic, paras = parasitic, rhiz = rhizomatous. See text for more information.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|----------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Angelica tomentosa</i> | Apiaceae | SI | 2.7 | 8 | 3 | 3.0 | 1.5 | 0.9 | | 1 | 1 | | 1 | | Dicot | Perennial forb |
| <i>Apiastrum angustifolium</i> | Apiaceae | WI | 1.5 | 7.6 | 5 | 0.1 | 2.5 | 1.1 | | 1 | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Ligusticum californicum</i> | Apiaceae | WI/IN | 1.4 | 5.75 | 4 | 1.4 | 1.3 | 0.7 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Lomatium ciliolatum</i> | Apiaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Lomatium congdonii</i> | Apiaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Lomatium dasycarpum</i> ssp. <i>dasycarpum</i> | Apiaceae | BE/SI | 3.6 | 21.5 | 6 | 3.5 | 1.9 | 0.8 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Lomatium engelmannii</i> | Apiaceae | SE | 5.8 | 34.5 | 6 | 6.0 | 0.8 | 0.3 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Lomatium hooveri</i> | Apiaceae | SE | 5.9 | 29.5 | 5 | 6.0 | 0.4 | 0.2 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Lomatium howellii</i> | Apiaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Lomatium macrocarpum</i> | Apiaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Lomatium marginatum</i> | Apiaceae | BE | 5.0 | 25 | 5 | 6.0 | 1.4 | 0.6 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Lomatium observatorium</i> | Apiaceae | WI/IN | 1.4 | 2.75 | 2 | 1.4 | 0.9 | 0.6 | | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Lomatium parvifolium</i> | Apiaceae | SI | 3.3 | 13 | 4 | 3.0 | 2.3 | 1.1 | 4 | | | | 1 | | Dicot | Perennial forb |
| <i>Lomatium repostum</i> | Apiaceae | SI | 3.2 | 12.6 | 4 | 3.0 | 2.4 | 1.2 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Lomatium tracyi</i> | Apiaceae | SE | 6.1 | 42.5 | 7 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Lomatium tritermatum</i> var. <i>tritermatum</i> | Apiaceae | SI | 2.8 | 11 | 4 | 2.0 | 2.4 | 1.2 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Lomatium utriculatum</i> | Apiaceae | WI | 1.7 | 8.5 | 5 | 1.0 | 1.4 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Perideridia bacigalupii</i> | Apiaceae | BE | 4.6 | 23 | 5 | 6.0 | 2.4 | 1.1 | 4 | | | | | 1 | Dicot | Perennial forb |
| <i>Perideridia kelloggii</i> | Apiaceae | WI | 2.1 | 10.6 | 5 | 2.0 | 2.0 | 0.9 | | | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Perideridia leptocarpa</i> | Apiaceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Perideridia oregana</i> | Apiaceae | WI | 1.7 | 5 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Perideridia pringlei</i> | Apiaceae | BE/SI | 3.7 | 18.5 | 5 | 3.0 | 2.3 | 1.0 | 4 | | | | 1 | | Dicot | Perennial forb |
| <i>Sanicula bipinnatifida</i> | Apiaceae | WI | 1.8 | 7.1 | 4 | 2.0 | 1.5 | 0.7 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Sanicula hoffmannii</i> | Apiaceae | WI | 1.8 | 3.5 | 2 | 1.5 | 2.1 | 1.5 | 4 | | | | 1 | | Dicot | Perennial forb |
| <i>Sanicula maritima</i> | Apiaceae | WI | 2.3 | 4.5 | 2 | 2.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Sanicula peckiana</i> | Apiaceae | BE | 5.3 | 26.5 | 5 | 6.0 | 1.3 | 0.6 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Sanicula tracyi</i> | Apiaceae | WI | 2.1 | 8.5 | 4 | 1.0 | 2.6 | 1.3 | | | 1 | | | | Dicot | Perennial forb |
| <i>Sanicula tuberosa</i> | Apiaceae | WI/IN | 1.3 | 3.75 | 3 | 1.0 | 0.7 | 0.4 | | | 1 | | 1 | 1 | Dicot | Perennial forb |
| <i>Tauschia glauca</i> | Apiaceae | BE/SI | 3.5 | 10.5 | 3 | 3.0 | 0.6 | 0.3 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Tauschia hartwegii</i> | Apiaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | | | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Tauschia howellii</i> | Apiaceae | WI | 2.3 | 7 | 3 | 1.0 | 3.2 | 1.9 | | 1 | | | | | Dicot | Perennial forb |
| <i>Tauschia kelloggii</i> | Apiaceae | SI | 2.6 | 12.75 | 5 | 2.0 | 2.2 | 1.0 | | | 1 | | 1 | 1 | Dicot | Perennial forb |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|----------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|---------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Asclepias solanoana</i> | Asclepiadaceae | SE | 6.0 | 42 | 7 | 6.0 | 0.0 | 0.0 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Agoseris heterophylla</i> | Asteraceae | WI/IN | 1.4 | 4.1 | 3 | 1.0 | 1.5 | 0.9 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Ancistrocarphus filagineus</i> | Asteraceae | SI | 3.3 | 13 | 4 | 3.0 | 0.5 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Antennaria argentea</i> | Asteraceae | WI | 1.9 | 7.75 | 4 | 0.8 | 2.7 | 1.4 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Antennaria suffrutescens</i> | Asteraceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Arnica cernua</i> | Asteraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 4 | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Arnica spathulata</i> | Asteraceae | SE | 5.5 | 16.5 | 3 | 6.0 | 1.2 | 0.7 | 4 | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Aster oregonensis</i> | Asteraceae | WI/IN | 1.1 | 3.25 | 3 | 1.0 | 0.9 | 0.5 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i> | Asteraceae | SI | 2.5 | 15 | 6 | 2.0 | 1.1 | 0.5 | 1b | | | 1 | | 1 | Dicot | Perennial forb |
| <i>Balsamorhiza sericea</i> | Asteraceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Brickellia greenei</i> | Asteraceae | BE/SI | 3.7 | 11 | 3 | 4.0 | 0.6 | 0.3 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Cacaliopsis nardosmia</i> | Asteraceae | WI/IN | 1.3 | 4 | 3 | 2.0 | 1.2 | 0.7 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Calycadenia multiglandulosa</i> | Asteraceae | SI | 3.1 | 15.5 | 5 | 3.0 | 1.2 | 0.6 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Calycadenia oppositifolia</i> | Asteraceae | SI | 2.6 | 18 | 7 | 2.0 | 1.6 | 0.6 | 1b | | | | | 1 | Dicot | Annual forb |
| <i>Calycadenia pauciflora</i> | Asteraceae | BE | 5.3 | 21 | 4 | 5.5 | 1.0 | 0.5 | | | 1 | | | | Dicot | Annual forb |
| <i>Calycadenia truncata</i> | Asteraceae | WI | 2.1 | 12.5 | 6 | 2.5 | 1.1 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Chaenactis glabriuscula</i> var. <i>glabriuscula</i> | Asteraceae | WI | 1.7 | 5.1 | 3 | 2.0 | 1.5 | 0.9 | | | | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Chaenactis glabriuscula</i> var. <i>heterocarpha</i> | Asteraceae | SI | 2.5 | 10 | 4 | 2.5 | 0.6 | 0.3 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Chaenactis suffrutescens</i> | Asteraceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Chrysothamnus nauseosus</i> ssp. <i>consimilis</i> | Asteraceae | WI | 1.8 | 8.85 | 5 | 2.0 | 1.5 | 0.7 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Cirsium andrewsii</i> | Asteraceae | WI | 1.7 | 5 | 3 | 2.0 | 0.9 | 0.5 | 1b | | | 1 | | | Dicot | Perennial forb |
| <i>Cirsium cymosum</i> | Asteraceae | SI | 3.0 | 12 | 4 | 2.0 | 2.0 | 1.0 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Cirsium douglasii</i> var. <i>breweri</i> | Asteraceae | SI | 3.0 | 12 | 4 | 3.0 | 1.6 | 0.8 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Cirsium fontinale</i> var. <i>campylon</i> | Asteraceae | SE | 5.9 | 29.5 | 5 | 6.0 | 0.4 | 0.2 | 1b | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Cirsium fontinale</i> var. <i>fontinale</i> | Asteraceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Cirsium fontinale</i> var. <i>obispoense</i> | Asteraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | | 1 | Dicot | Perennial forb |
| <i>Cirsium hydrophilum</i> var. <i>vaseyi</i> | Asteraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Perennial forb |
| <i>Cirsium remotifolium</i> | Asteraceae | WI/IN | 1.0 | 3.1 | 3 | 1.0 | 1.0 | 0.5 | | 1 | 1 | 1 | | | Dicot | Perennial forb |
| <i>Coreopsis stillmanii</i> | Asteraceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | | 1 | | 1 | 1 | Dicot | Annual forb |
| <i>Crepis pleurocarpa</i> | Asteraceae | WI | 2.0 | 10 | 5 | 2.0 | 0.7 | 0.3 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Ericameria arborescens</i> | Asteraceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | 1 | 1 | | 1 | 1 | Dicot | Shrub |
| <i>Ericameria greenei</i> | Asteraceae | WI | 2.0 | 8.1 | 4 | 1.5 | 2.1 | 1.1 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Ericameria ophitidis</i> | Asteraceae | SE | 5.5 | 38.5 | 7 | 6.0 | 1.0 | 0.4 | 4 | 1 | 1 | | | | Dicot | Shrub |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Erigeron angustatus</i> | Asteraceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | 1b | | 1 | | | | Dicot | Perennial forb |
| <i>Erigeron bloomeri</i> var. <i>nudatus</i> | Asteraceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 2 | 1 | | | | | Dicot | Perennial forb |
| <i>Erigeron cervinus</i> | Asteraceae | SI | 3.3 | 10 | 3 | 4.0 | 3.1 | 1.8 | | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Erigeron decumbens</i> var. <i>robustior</i> | Asteraceae | WI | 1.5 | 4.5 | 3 | 2.0 | 1.2 | 0.7 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Erigeron foliosus</i> var. <i>confinis</i> | Asteraceae | BE/SI | 3.7 | 11 | 3 | 3.0 | 1.2 | 0.7 | | 1 | | | | | Dicot | Perennial forb |
| <i>Erigeron lassenianus</i> var. <i>deficiens</i> | Asteraceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | | | | | 1 | | Dicot | Perennial forb |
| <i>Erigeron petrophilus</i> var. <i>sierrensis</i> | Asteraceae | BE | 4.8 | 28.5 | 6 | 6.0 | 2.1 | 0.8 | 4 | | | | 1 | | Dicot | Perennial forb (rhiz.) |
| <i>Erigeron petrophilus</i> var. <i>viscidulus</i> | Asteraceae | WI | 2.4 | 9.5 | 4 | 2.0 | 0.5 | 0.3 | 4 | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Erigeron reductus</i> | Asteraceae | WI | 2.0 | 8 | 4 | 2.0 | 1.6 | 0.8 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Erigeron serpentinus</i> | Asteraceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Perennial forb |
| <i>Eriophyllum confertiflorum</i> var. <i>tanacetiflorum</i> | Asteraceae | WI | 1.9 | 3.75 | 2 | 1.9 | 1.6 | 1.1 | | | | | | 1 | Dicot | Shrub |
| <i>Eriophyllum jepsonii</i> | Asteraceae | BE/SI | 3.5 | 17.5 | 5 | 3.0 | 1.5 | 0.7 | 4 | | | 1 | 1 | | Dicot | Shrub |
| <i>Eriophyllum lanatum</i> var. <i>achillaeoides</i> | Asteraceae | WI | 2.3 | 7 | 3 | 2.0 | 0.6 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Eriophyllum lanatum</i> var. <i>lanceolatum</i> | Asteraceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | | 1 | 1 | | | | Dicot | Shrub |
| <i>Eriophyllum latilobum</i> | Asteraceae | SE | 5.5 | 16.5 | 3 | 6.0 | 1.2 | 0.7 | 1b | | | 1 | 1 | | Dicot | Shrub |
| <i>Grindelia hirsutula</i> var. <i>davyi</i> | Asteraceae | WI | 1.8 | 5.25 | 3 | 2.0 | 1.4 | 0.8 | | | 1 | | | 1 | Dicot | Perennial forb |
| <i>Grindelia hirsutula</i> var. <i>hirsutula</i> | Asteraceae | WI/IN | 1.2 | 3.6 | 3 | 1.0 | 1.0 | 0.5 | | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Grindelia hirsutula</i> var. <i>maritima</i> | Asteraceae | WI | 1.7 | 5 | 3 | 2.0 | 0.9 | 0.5 | 1b | | | 1 | | | Dicot | Perennial forb |
| <i>Gutierrezia californica</i> | Asteraceae | WI | 1.8 | 5.25 | 3 | 2.0 | 1.4 | 0.8 | | | 1 | 1 | 1 | | Dicot | Perennial forb, Shrub |
| <i>Harmonia guggolziorum</i> | Asteraceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Hazardia stenolepis</i> | Asteraceae | WI | 2.0 | 6.1 | 3 | 3.0 | 1.7 | 1.0 | | | | | 1 | | Dicot | Shrub (stem succulent) |
| <i>Hazardia whitneyi</i> var. <i>discoidea</i> | Asteraceae | WI | 1.9 | 5.75 | 3 | 2.0 | 1.1 | 0.7 | | | 1 | | | | Dicot | Perennial forb, Shrub |
| <i>Hazardia whitneyi</i> var. <i>whitneyi</i> | Asteraceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | | | | | | 1 | Dicot | Perennial forb, Shrub |
| <i>Helenium bigelovii</i> | Asteraceae | SI | 2.9 | 11.5 | 4 | 2.5 | 2.3 | 1.2 | | 1 | 1 | | 1 | 1 | Dicot | Perennial forb |
| <i>Helianthus exilis</i> | Asteraceae | SE | 5.7 | 45.5 | 8 | 6.0 | 1.1 | 0.4 | 4 | 1 | 1 | | 1 | 1 | Dicot | Annual, Perennial forb |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Hemizonia congesta</i> ssp. <i>calyculata</i> | Asteraceae | WI | 1.5 | 4.5 | 3 | 2.0 | 1.2 | 0.7 | 4 | | 1 | | | | Dicot | Annual forb |
| <i>Hemizonia congesta</i> ssp. <i>congesta</i> | Asteraceae | WI/IN | 1.3 | 4 | 3 | 2.0 | 1.2 | 0.7 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Hemizonia congesta</i> ssp. <i>tracyi</i> | Asteraceae | WI | 1.8 | 5.25 | 3 | 2.0 | 0.7 | 0.4 | 4 | | 1 | | | | Dicot | Annual forb |
| <i>Hemizonia halliana</i> | Asteraceae | SI | 3.0 | 12 | 4 | 3.0 | 2.4 | 1.2 | | | | | 1 | | Dicot | Annual forb |
| <i>Hesperivax sparsiflora</i> var. <i>sparsiflora</i> | Asteraceae | WI | 1.8 | 7.25 | 4 | 1.5 | 1.6 | 0.8 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Heterotheca oregona</i> var. <i>oregona</i> | Asteraceae | WI | 2.0 | 6 | 3 | 3.0 | 1.7 | 1.0 | | | 1 | 1 | | 1 | Dicot | Perennial forb |
| <i>Hieracium bolanderi</i> | Asteraceae | BE/SI | 3.8 | 15 | 4 | 4.5 | 2.6 | 1.3 | | | 1 | 1 | | | Dicot | Perennial forb |
| <i>Hieracium greenei</i> | Asteraceae | WI | 2.2 | 6.5 | 3 | 3.0 | 1.4 | 0.8 | | | 1 | 1 | | | Dicot | Perennial forb |
| <i>Lagophylla glandulosa</i> | Asteraceae | WI | 2.0 | 6.1 | 3 | 3.0 | 1.7 | 1.0 | | | 1 | | | 1 | Dicot | Annual forb |
| <i>Lagophylla minor</i> | Asteraceae | BE | 4.7 | 23.5 | 5 | 5.0 | 1.7 | 0.7 | | | 1 | | | 1 | Dicot | Annual forb |
| <i>Layia discoidea</i> | Asteraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Annual forb |
| <i>Layia jonesii</i> | Asteraceae | BE/SI | 3.5 | 10.5 | 3 | 3.0 | 0.6 | 0.3 | 1b | | | | 1 | | Dicot | Annual forb |
| <i>Layia septentrionalis</i> | Asteraceae | SI | 3.2 | 19 | 6 | 3.5 | 1.4 | 0.6 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Lessingia arachnoidea</i> | Asteraceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | | | Dicot | Annual forb |
| <i>Lessingia filaginifolia</i> var. <i>californica</i> | Asteraceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | | 1 | 1 | 1 | 1 | Dicot | Perennial forb, Shrub |
| <i>Lessingia hololeuca</i> | Asteraceae | SI | 2.5 | 7.5 | 3 | 3.0 | 1.2 | 0.7 | 3 | | 1 | 1 | | | Dicot | Annual forb |
| <i>Lessingia micradenia</i> var. <i>glabrata</i> | Asteraceae | BE | 5.1 | 30.5 | 6 | 5.5 | 1.3 | 0.5 | 1b | | | 1 | | | Dicot | Annual forb |
| <i>Lessingia micradenia</i> var. <i>micradenia</i> | Asteraceae | BE | 5.3 | 31.5 | 6 | 5.5 | 1.0 | 0.4 | 1b | | | 1 | | | Dicot | Annual forb |
| <i>Lessingia nemaclada</i> | Asteraceae | WI | 2.0 | 6 | 3 | 2.0 | 1.0 | 0.6 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Lessingia occidentalis</i> | Asteraceae | BE/SI | 4.1 | 16.5 | 4 | 4.0 | 1.8 | 0.9 | 4 | | | | 1 | | Dicot | Annual forb |
| <i>Lessingia ramulosa</i> | Asteraceae | BE | 5.4 | 27 | 5 | 6.0 | 1.3 | 0.6 | | | 1 | | | 1 | Dicot | Annual forb |
| <i>Luina hypoleuca</i> | Asteraceae | WI/IN | 1.4 | 4.25 | 3 | 2.0 | 1.0 | 0.6 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Madia doris-nilesiae</i> (= <i>Harmonia d.</i>) | Asteraceae | BE | 5.4 | 32.5 | 6 | 5.5 | 0.8 | 0.3 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Madia exigua</i> | Asteraceae | WI | 1.8 | 7.25 | 4 | 2.0 | 1.4 | 0.7 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Madia hallii</i> (= <i>Harmonia h.</i>) | Asteraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Madia stebbinsii</i> (= <i>Harmonia s.</i>) | Asteraceae | SE | 6.1 | 42.5 | 7 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Malacothrix clevelandii</i> | Asteraceae | SI | 3.0 | 9.1 | 3 | 3.0 | 3.0 | 1.7 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Malacothrix floccifera</i> | Asteraceae | WI | 2.1 | 6.25 | 3 | 3.0 | 1.6 | 0.9 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Micropus amphibolus</i> | Asteraceae | WI | 2.4 | 7.25 | 3 | 1.0 | 3.1 | 1.8 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Microseris douglasii</i> | Asteraceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 0.6 | 0.3 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Monolopia gracilens</i> | Asteraceae | WI | 2.4 | 4.75 | 2 | 2.4 | 2.3 | 1.6 | | | | 1 | 1 | | Dicot | Annual forb |
| <i>Pentachaeta bellidiflora</i> | Asteraceae | WI | 2.4 | 7.25 | 3 | 3.0 | 1.3 | 0.8 | 1b | | | 1 | | | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|---------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Pyrrocoma racemosa</i> var. <i>congesta</i> | Asteraceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 2 | 1 | | | | | Dicot | Perennial forb |
| <i>Pyrrocoma racemosa</i> var. <i>pinetorum</i> | Asteraceae | BE/SI | 4.0 | 16 | 4 | 4.5 | 2.4 | 1.2 | | 1 | | | | | Dicot | Perennial forb |
| <i>Pyrrocoma racemosa</i> var. <i>racemosa</i> | Asteraceae | WI | 1.7 | 5 | 3 | 1.0 | 2.1 | 1.2 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Raillardella pringlei</i> | Asteraceae | SE | 6.0 | 30 | 5 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Rigiopappus leptocladus</i> | Asteraceae | WI | 1.9 | 7.5 | 4 | 2.0 | 1.3 | 0.7 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Rudbeckia californica</i> var. <i>glauca</i> | Asteraceae | BE | 5.3 | 21 | 4 | 6.0 | 1.5 | 0.8 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Senecio clevelandii</i> var. <i>clevelandii</i> (= <i>Packera c. v. c.</i>) | Asteraceae | SE | 5.8 | 46.5 | 8 | 6.0 | 0.7 | 0.3 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Senecio clevelandii</i> var. <i>heterophyllus</i> (= <i>Packera c. v. h.</i>) | Asteraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Senecio eurycephalus</i> var. <i>eurycephalus</i> (= <i>Packera eurycephala</i> var. <i>eurycephala</i>) | Asteraceae | BE/SI | 3.8 | 15 | 4 | 3.0 | 1.5 | 0.8 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Senecio eurycephalus</i> var. <i>lewisrosei</i> (= <i>Packera eurycephala</i> var. <i>lewisrosei</i>) | Asteraceae | SE | 5.8 | 40.5 | 7 | 6.0 | 0.8 | 0.3 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Senecio greenii</i> (= <i>Packera g.</i>) | Asteraceae | BE | 5.3 | 32 | 6 | 6.0 | 1.6 | 0.7 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Senecio layneae</i> (= <i>Packera l.</i>) | Asteraceae | BE | 4.9 | 29.5 | 6 | 5.0 | 1.3 | 0.5 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Senecio macounii</i> (= <i>Packera m.</i>) | Asteraceae | BE | 5.1 | 20.5 | 4 | 6.0 | 2.0 | 1.0 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Solidago guiradonis</i> | Asteraceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 4 | | | | 1 | | Dicot | Perennial forb |
| <i>Solidago multiradiata</i> | Asteraceae | WI/IN | 1.1 | 2.1 | 2 | 1.1 | 1.3 | 1.0 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Stebbinsoseris decipiens</i> | Asteraceae | WI | 1.8 | 5.5 | 3 | 2.0 | 0.6 | 0.3 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Wyethia bolanderi</i> | Asteraceae | WI | 1.5 | 3 | 2 | 1.5 | 0.7 | 0.5 | | | | | | 1 | Dicot | Perennial forb |
| <i>Berberis aquifolium</i> var. <i>aquifolium</i> | Berberidaceae | WI | 1.6 | 4.75 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Berberis aquifolium</i> var. <i>repens</i> | Berberidaceae | WI | 1.7 | 5 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Vancouveria chrysantha</i> | Berberidaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | | Dicot | Perennial forb (rhiz.) |
| <i>Vancouveria planipetala</i> | Berberidaceae | WI | 1.7 | 5 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | 1 | 1 | | Dicot | Perennial forb (rhiz.) |
| <i>Cryptantha clevelandii</i> var. <i>dissita</i> | Boraginaceae | BE/SI | 4.4 | 17.5 | 4 | 4.5 | 2.1 | 1.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Cryptantha excavata</i> | Boraginaceae | WI | 1.5 | 3 | 2 | 1.5 | 2.1 | 1.5 | | | 1 | | | | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|--------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Cryptantha flaccida</i> | Boraginaceae | WI | 1.6 | 4.75 | 3 | 2.0 | 0.7 | 0.4 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Cryptantha hispidula</i> | Boraginaceae | SE | 6.0 | 24 | 4 | 6.0 | 0.0 | 0.0 | | 1 | 1 | | | | Dicot | Annual forb |
| <i>Cryptantha intermedia</i> | Boraginaceae | WI/IN | 1.4 | 4.1 | 3 | 1.0 | 1.5 | 0.9 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Cryptantha mariposae</i> | Boraginaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | | 1 | Dicot | Annual forb |
| <i>Cryptantha milobakeri</i> | Boraginaceae | SI | 3.3 | 9.75 | 3 | 3.0 | 2.6 | 1.5 | | 1 | 1 | | | 1 | Dicot | Annual forb |
| <i>Cryptantha sobolifera</i> | Boraginaceae | WI/IN | 1.4 | 4.1 | 3 | 1.0 | 1.5 | 0.9 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Hackelia bella</i> | Boraginaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Pectocarya pusilla</i> | Boraginaceae | WI/IN | 1.3 | 2.5 | 2 | 1.3 | 1.1 | 0.8 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Arabis aculeolata</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 2 | 1 | | | | | Dicot | Perennial forb |
| <i>Arabis constancei</i> | Brassicaceae | SE | 5.9 | 41.5 | 7 | 6.0 | 0.4 | 0.1 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Arabis koehleri</i> var. <i>stipitata</i> | Brassicaceae | SE | 5.5 | 16.5 | 3 | 6.0 | 1.2 | 0.7 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Arabis macdonaldiana</i> | Brassicaceae | BE | 5.4 | 32.5 | 6 | 6.0 | 1.0 | 0.4 | 1b | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Arabis oregana</i> | Brassicaceae | BE/SI | 3.8 | 11.5 | 3 | 3.0 | 2.1 | 1.2 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Arabis subpinnatifida</i> | Brassicaceae | SI | 3.2 | 16 | 5 | 3.0 | 1.6 | 0.7 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Arabis suffrutescens</i> var. <i>horizontalis</i> | Brassicaceae | BE/SI | 3.9 | 27 | 7 | 3.0 | 1.6 | 0.6 | | | 1 | | | 1 | Dicot | Perennial forb |
| <i>Arabis suffrutescens</i> var. <i>suffrutescens</i> | Brassicaceae | SI | 2.9 | 17.5 | 6 | 2.5 | 1.9 | 0.8 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Cardamine californica</i> var. <i>cuneata</i> | Brassicaceae | WI | 1.9 | 3.75 | 2 | 1.9 | 1.6 | 1.1 | | | | | 1 | | Dicot | Perennial forb (rhiz.) |
| <i>Cardamine nuttallii</i> var. <i>gemmata</i> | Brassicaceae | BE | 5.2 | 15.5 | 3 | 5.0 | 1.0 | 0.6 | 1b | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Cardamine pachystigma</i> var. <i>dissectifolia</i> | Brassicaceae | BE | 5.4 | 48.5 | 9 | 6.0 | 1.0 | 0.3 | 3 | | 1 | | | 1 | Dicot | Perennial forb (rhiz.) |
| <i>Cardamine pachystigma</i> var. <i>pachystigma</i> | Brassicaceae | WI | 2.0 | 6 | 3 | 2.0 | 1.0 | 0.6 | | | 1 | | | 1 | Dicot | Perennial forb (rhiz.) |
| <i>Caulanthus amplexicaulis</i> var. <i>barbarae</i> | Brassicaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Annual forb |
| <i>Draba aureola</i> | Brassicaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Draba carnosula</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Draba howellii</i> | Brassicaceae | WI/IN | 1.4 | 4.25 | 3 | 1.0 | 1.4 | 0.8 | | 1 | | | | | Dicot | Perennial forb |
| <i>Erysimum franciscanum</i> | Brassicaceae | SI | 3.0 | 9 | 3 | 3.0 | 0.0 | 0.0 | 4 | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Guillenia flavescens</i> | Brassicaceae | WI | 2.3 | 9.25 | 4 | 2.5 | 1.6 | 0.8 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Streptanthus albidus</i> ssp. <i>albidus</i> | Brassicaceae | BE | 5.3 | 31.5 | 6 | 6.0 | 1.3 | 0.5 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Streptanthus albidus</i> ssp. <i>peramoenus</i> | Brassicaceae | BE/SI | 4.3 | 34.5 | 8 | 4.5 | 1.9 | 0.7 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Streptanthus barbatus</i> | Brassicaceae | SE | 5.6 | 28 | 5 | 6.0 | 0.5 | 0.2 | | 1 | | | | | Dicot | Perennial forb |
| <i>Streptanthus barbiger</i> | Brassicaceae | SE | 6.0 | 24 | 4 | 6.0 | 0.0 | 0.0 | 4 | | 1 | | | | Dicot | Annual forb |
| <i>Streptanthus batrachopus</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|--------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Streptanthus brachiatus</i> var. <i>brachiatus</i> | Brassicaceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 1b | | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Streptanthus brachiatus</i> var. <i>hoffmanii</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Streptanthus breweri</i> var. <i>breweri</i> | Brassicaceae | SE | 5.7 | 40 | 7 | 6.0 | 0.8 | 0.3 | | 1 | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Streptanthus breweri</i> var. <i>hesperidus</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Streptanthus drepanoides</i> | Brassicaceae | SE | 6.1 | 36.5 | 6 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | 1 | Dicot | Annual forb |
| <i>Streptanthus glandulosus</i> ssp. <i>glandulosus</i> | Brassicaceae | WI | 1.9 | 5.75 | 3 | 2.0 | 1.1 | 0.7 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i> | Brassicaceae | BE | 4.9 | 24.5 | 5 | 6.0 | 1.8 | 0.8 | 1b | | 1 | 1 | | | Dicot | Annual forb |
| <i>Streptanthus glandulosus</i> ssp. <i>secundus</i> | Brassicaceae | SI | 3.3 | 20 | 6 | 3.0 | 1.5 | 0.6 | | | 1 | 1 | | | Dicot | Annual forb |
| <i>Streptanthus glandulosus</i> ssp. <i>secundus</i> var. <i>hoffmanii</i> | Brassicaceae | SI | 3.0 | 3 | 1 | 3.0 | — | — | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Streptanthus howellii</i> | Brassicaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Streptanthus insignis</i> ssp. <i>insignis</i> | Brassicaceae | BE/SI | 4.0 | 20 | 5 | 4.0 | 2.4 | 1.1 | | | | | 1 | | Dicot | Annual forb |
| <i>Streptanthus insignis</i> ssp. <i>lyonii</i> | Brassicaceae | SI | 3.3 | 16.5 | 5 | 2.0 | 2.7 | 1.2 | 1b | | | | 1 | | Dicot | Annual forb |
| <i>Streptanthus morrisonii</i> ssp. <i>elatus</i> | Brassicaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Streptanthus morrisonii</i> ssp. <i>hirtiflorus</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Streptanthus morrisonii</i> ssp. <i>kruckebergii</i> | Brassicaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Streptanthus morrisonii</i> ssp. <i>morrisonii</i> | Brassicaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Streptanthus niger</i> | Brassicaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Annual forb |
| <i>Streptanthus polygaloides</i> | Brassicaceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | | | | | 1 | | Dicot | Annual forb |
| <i>Streptanthus tortuosus</i> var. <i>suffrutescens</i> | Brassicaceae | WI | 1.6 | 8.2 | 5 | 2.0 | 1.6 | 0.7 | | | 1 | | 1 | 1 | Dicot | Annual, Perennial forb |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|-----------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Streptanthus tortuosus</i> var. <i>tortuosus</i> | Brassicaceae | WI/IN | 1.4 | 4.25 | 3 | 2.0 | 1.0 | 0.6 | | | 1 | 1 | | 1 | Dicot | Annual, Perennial forb |
| <i>Thelypodium brachycarpum</i> | Brassicaceae | SI | 3.3 | 10 | 3 | 3.0 | 0.6 | 0.3 | 4 | 1 | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Thlaspi californicum</i> | Brassicaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Perennial forb |
| <i>Thlaspi montanum</i> var. <i>montanum</i> | Brassicaceae | BE/SI | 4.4 | 22 | 5 | 4.0 | 1.5 | 0.7 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Campanula angustiflora</i> | Campanulaceae | BE/SI | 3.9 | 19.25 | 5 | 4.0 | 2.4 | 1.1 | | | 1 | 1 | | | Dicot | Annual forb |
| <i>Campanula exigua</i> | Campanulaceae | BE/SI | 3.9 | 19.5 | 5 | 4.0 | 1.5 | 0.7 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Campanula griffinii</i> | Campanulaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Campanula rotundifolia</i> | Campanulaceae | BE | 5.0 | 15 | 3 | 6.0 | 1.7 | 1.0 | | 1 | | | | | Dicot | Perennial forb |
| <i>Campanula scabrella</i> | Campanulaceae | SI | 2.5 | 10 | 4 | 2.5 | 1.3 | 0.6 | 4 | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Campanula sharsmithiae</i> | Campanulaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Campanula wilkinsiana</i> | Campanulaceae | WI/IN | 1.0 | 5 | 5 | 0.0 | 1.7 | 0.8 | | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Githopsis diffusa</i> ssp. <i>candida</i> | Campanulaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | | | | | | 1 | Dicot | Annual forb |
| <i>Githopsis pulchella</i> ssp. <i>campestris</i> | Campanulaceae | WI | 1.6 | 3.25 | 2 | 1.6 | 1.9 | 1.4 | | | | | | 1 | Dicot | Annual forb |
| <i>Githopsis pulchella</i> ssp. <i>pulchella</i> var. <i>glabra</i> | Campanulaceae | BE/SI | 3.8 | 19 | 5 | 3.0 | 2.0 | 0.9 | | | | | | 1 | Dicot | Annual forb |
| <i>Githopsis pulchella</i> ssp. <i>serpentinicola</i> | Campanulaceae | BE | 5.3 | 21 | 4 | 5.5 | 1.0 | 0.5 | 4 | | | | | 1 | Dicot | Annual forb |
| <i>Nemacladus montanus</i> | Campanulaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Arenaria kingii</i> var. <i>glabrescens</i> | Caryophyllaceae | WI/IN | 1.4 | 4.1 | 3 | 2.0 | 1.1 | 0.6 | | | | | | 1 | Dicot | Perennial forb |
| <i>Cerastium arvense</i> | Caryophyllaceae | WI | 2.1 | 8.5 | 4 | 0.9 | 2.6 | 1.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Minuartia californica</i> | Caryophyllaceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Minuartia cismontana</i> (new taxon) | Caryophyllaceae | WI | 1.8 | 3.5 | 2 | 1.8 | 1.8 | 1.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual, Perennial forb |
| <i>Minuartia decumbens</i> | Caryophyllaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Minuartia douglasii</i> | Caryophyllaceae | SI | 3.0 | 15 | 5 | 3.0 | 0.7 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Minuartia howellii</i> | Caryophyllaceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Minuartia nuttallii</i> ssp. <i>gregaria</i> | Caryophyllaceae | SI | 3.2 | 16 | 5 | 3.0 | 1.9 | 0.9 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Minuartia rosei</i> | Caryophyllaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Minuartia stolonifera</i> | Caryophyllaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Moehringia macrophylla</i> | Caryophyllaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Silene antirrhina</i> | Caryophyllaceae | WI/IN | 1.1 | 3.25 | 3 | 1.0 | 0.9 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|-----------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Silene campanulata</i> ssp. <i>campanulata</i> | Caryophyllaceae | BE | 5.3 | 31.5 | 6 | 5.5 | 1.0 | 0.4 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Silene campanulata</i> ssp. <i>glandulosa</i> | Caryophyllaceae | BE/SI | 3.8 | 19 | 5 | 3.0 | 1.3 | 0.6 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Silene grayi</i> | Caryophyllaceae | WI | 1.8 | 5.5 | 3 | 2.0 | 1.3 | 0.7 | | 1 | | | | | Dicot | Perennial forb |
| <i>Silene hookeri</i> ssp. <i>bolanderi</i> | Caryophyllaceae | BE | 4.5 | 18 | 4 | 4.5 | 1.7 | 0.9 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Silene hookeri</i> ssp. <i>hookeri</i> | Caryophyllaceae | SI | 3.0 | 12 | 4 | 2.5 | 2.2 | 1.1 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Silene serpentinicola</i> (new taxon) | Caryophyllaceae | SE | 6.0 | 6 | 1 | 6.0 | — | — | | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Helianthemum suffrutescens</i> (in <i>H. scoparium</i> in Jepson) | Cistaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | 3 | | | | | 1 | Dicot | Shrub |
| <i>Calystegia collina</i> ssp. <i>collina</i> | Convolvulaceae | BE | 4.7 | 33 | 7 | 6.0 | 1.6 | 0.6 | | | 1 | 1 | | | Dicot | Perennial forb |
| <i>Calystegia collina</i> ssp. <i>oxyphylla</i> | Convolvulaceae | SE | 5.6 | 33.5 | 6 | 6.0 | 1.2 | 0.5 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Calystegia collina</i> ssp. <i>tridactylosa</i> | Convolvulaceae | BE | 4.5 | 18 | 4 | 4.5 | 1.7 | 0.9 | | | 1 | | | | Dicot | Perennial forb |
| <i>Calystegia collina</i> ssp. <i>venusta</i> | Convolvulaceae | BE | 4.9 | 24.5 | 5 | 5.0 | 1.3 | 0.6 | 4 | | | | 1 | | Dicot | Perennial forb |
| <i>Calystegia malacophylla</i> | Convolvulaceae | WI | 1.5 | 4.5 | 3 | 1.0 | 1.3 | 0.8 | | | | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Convolvulus simulans</i> | Convolvulaceae | BE/SI | 3.7 | 14.75 | 4 | 4.0 | 2.4 | 1.2 | 4 | | | 1 | 1 | | Dicot | Annual forb |
| <i>Dudleya abramsii</i> ssp. <i>bettinae</i> | Crassulaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Perennial forb |
| <i>Dudleya abramsii</i> ssp. <i>murina</i> | Crassulaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Perennial forb |
| <i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i> | Crassulaceae | SI | 3.2 | 9.5 | 3 | 3.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Perennial forb |
| <i>Dudleya setchellii</i> | Crassulaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Parvisedum pentandrum</i> | Crassulaceae | WI | 2.0 | 8.1 | 4 | 1.5 | 2.1 | 1.1 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Parvisedum pumilum</i> | Crassulaceae | WI | 1.7 | 5.1 | 3 | 2.0 | 1.5 | 0.9 | | | 1 | | | 1 | Dicot | Annual forb |
| <i>Sedum albomarginatum</i> | Crassulaceae | SE | 6.1 | 42.5 | 7 | 6.0 | 0.0 | 0.0 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Sedum eastwoodiae</i> | Crassulaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | | | Dicot | Perennial forb |
| <i>Sedum laxum</i> ssp. <i>flavidum</i> | Crassulaceae | SI | 3.1 | 18.5 | 6 | 3.0 | 0.6 | 0.3 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Sedum laxum</i> ssp. <i>heckneri</i> | Crassulaceae | BE/SI | 3.5 | 10.5 | 3 | 3.0 | 0.6 | 0.3 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Sedum laxum</i> ssp. <i>laxum</i> | Crassulaceae | BE/SI | 4.0 | 16 | 4 | 3.5 | 1.4 | 0.7 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Sedum obtusatum</i> ssp. <i>obtusatum</i> | Crassulaceae | SI | 3.2 | 16 | 5 | 3.0 | 2.2 | 1.0 | | 1 | | | | 1 | Dicot | Perennial forb (rhiz.) |
| <i>Sedum radiatum</i> | Crassulaceae | WI | 2.0 | 6 | 3 | 2.0 | 2.0 | 1.2 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Calocedrus decurrens</i> | Cupressaceae | SI | 3.0 | 9 | 3 | 3.0 | 0.0 | 0.0 | | 1 | 1 | 1 | 1 | 1 | Gymnosp. | Tree |
| <i>Cupressus bakeri</i> | Cupressaceae | SI | 2.6 | 13 | 5 | 3.0 | 0.5 | 0.2 | 4 | 1 | | | | 1 | Gymnosp. | Tree |
| <i>Cupressus lawsoniana</i> | Cupressaceae | SI | 3.0 | 15 | 5 | 3.0 | 0.7 | 0.3 | | 1 | 1 | | | | Gymnosp. | Tree |
| <i>Cupressus macnabiana</i> | Cupressaceae | BE | 4.7 | 28 | 6 | 4.5 | 1.2 | 0.5 | | | 1 | | | 1 | Gymnosp. | Tree |
| <i>Cupressus sargentii</i> | Cupressaceae | BE | 4.9 | 34 | 7 | 5.0 | 1.2 | 0.5 | | | 1 | 1 | 1 | | Gymnosp. | Tree |
| <i>Juniperus communis</i> var. <i>jackii</i> | Cupressaceae | BE/SI | 4.0 | 8 | 2 | 4.0 | 2.8 | 2.0 | | 1 | | | | | Gymnosp. | Shrub |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|-----------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|-------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Carex amplexans</i> | Cyperaceae | SI | 2.6 | 10.5 | 4 | 2.3 | 2.9 | 1.4 | | | | | | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Carex brainerdii</i> | Cyperaceae | WI/IN | 1.4 | 4.25 | 3 | 2.0 | 1.0 | 0.6 | | 1 | 1 | | 1 | 1 | Monocot | Perennial gram. (rhiz.) |
| <i>Carex gigas</i> | Cyperaceae | BE | 4.5 | 22.5 | 5 | 4.0 | 1.7 | 0.7 | 4 | 1 | | | | 1 | Monocot | Perennial gram. (rhiz.) |
| <i>Carex mendocinensis</i> | Cyperaceae | BE/SI | 3.8 | 23 | 6 | 3.5 | 1.2 | 0.5 | | 1 | 1 | | | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Carex obispoensis</i> | Cyperaceae | BE | 4.9 | 24.5 | 5 | 6.0 | 1.6 | 0.7 | 1b | | | | | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Carex serpentinicola</i> (new taxon) | Cyperaceae | SE | 5.5 | 11 | 2 | 5.5 | 0.7 | 0.5 | 2 | 1 | | | | | Monocot | Perennial gram. (rhiz.) |
| <i>Carex serratodens</i> | Cyperaceae | BE | 4.9 | 39 | 8 | 5.0 | 1.1 | 0.4 | | | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Carex spissa</i> | Cyperaceae | SI | 2.8 | 8.25 | 3 | 2.0 | 2.9 | 1.7 | | | | | | 1 | Monocot | Perennial gram. (rhiz.) |
| <i>Polystichum lemmonii</i> | Dryopteridaceae | SE | 6.0 | 24 | 4 | 6.0 | 0.0 | 0.0 | | 1 | 1 | | | 1 | Pteridoph. | Perennial forb (rhiz.) |
| <i>Polystichum scopulinum</i> | Dryopteridaceae | WI | 1.7 | 5.1 | 3 | 2.0 | 1.5 | 0.9 | | 1 | 1 | | | 1 | Pteridoph. | Perennial forb (rhiz.) |
| <i>Arctostaphylos bakeri</i> ssp. <i>bakeri</i> | Ericaceae | SE | 5.5 | 27.5 | 5 | 6.0 | 1.3 | 0.6 | 1b | | 1 | | | | Dicot | Shrub |
| <i>Arctostaphylos bakeri</i> ssp. <i>sublaevis</i> | Ericaceae | SE | 6.3 | 12.5 | 2 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Shrub |
| <i>Arctostaphylos canescens</i> ssp. <i>sonomensis</i> | Ericaceae | SI | 2.5 | 12.5 | 5 | 3.0 | 1.5 | 0.7 | 1b | 1 | 1 | | | | Dicot | Shrub |
| <i>Arctostaphylos hispidula</i> | Ericaceae | BE | 4.5 | 22.5 | 5 | 4.0 | 1.1 | 0.5 | 4 | 1 | 1 | | | | Dicot | Shrub |
| <i>Arctostaphylos hookeri</i> ssp. <i>franciscana</i> | Ericaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1a | | | 1 | 1 | | Dicot | Shrub |
| <i>Arctostaphylos hookeri</i> ssp. <i>montana</i> | Ericaceae | BE | 4.9 | 19.5 | 4 | 4.5 | 1.0 | 0.5 | 1b | | | 1 | 1 | | Dicot | Shrub |
| <i>Arctostaphylos hookeri</i> ssp. <i>ravenii</i> | Ericaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Shrub |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|-----------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|-------|---------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Arctostaphylos klamathensis</i> | Ericaceae | BE/SI | 3.9 | 19.5 | 5 | 4.0 | 1.8 | 0.8 | 1b | 1 | | | | | Dicot | Shrub |
| <i>Arctostaphylos nortensis</i> | Ericaceae | SI | 2.8 | 5.5 | 2 | 2.5 | 0.7 | 0.5 | 4 | 1 | | | | | Dicot | Shrub |
| <i>Arctostaphylos obispoensis</i> | Ericaceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | 4 | | | | 1 | Dicot | Shrub | |
| <i>Arctostaphylos stanfordiana</i> <i>ssp. raichei</i> | Ericaceae | SI | 2.6 | 10.5 | 4 | 3.0 | 1.7 | 0.9 | 1b | | 1 | | | Dicot | Shrub | |
| <i>Arctostaphylos viscida</i> ssp. <i>pulchella</i> | Ericaceae | BE | 5.0 | 25 | 5 | 5.0 | 1.0 | 0.4 | | 1 | 1 | | | Dicot | Shrub | |
| <i>Arctostaphylos viscida</i> ssp. <i>viscida</i> | Ericaceae | WI | 2.2 | 10.75 | 5 | 3.0 | 1.2 | 0.5 | | 1 | | | 1 | Dicot | Shrub | |
| <i>Pyrola picta</i> ssp. <i>dentata</i> | Ericaceae | WI | 2.0 | 6 | 3 | 3.0 | 1.7 | 1.0 | | 1 | 1 | | | Dicot | Perennial forb (rhiz.) | |
| <i>Vaccinium coccineum</i> | Ericaceae | BE/SI | 3.5 | 3.5 | 1 | 3.0 | — | — | 3 | 1 | | | | Dicot | Shrub | |
| <i>Astragalus breweri</i> | Fabaceae | SI | 3.2 | 15.75 | 5 | 3.0 | 2.0 | 0.9 | 4 | | 1 | 1 | | Dicot | Annual forb | |
| <i>Astragalus clarianus</i> (<i>claranus</i>) | Fabaceae | SI | 3.0 | 6 | 2 | 3.0 | 0.0 | 0.0 | 1b | | 1 | | | Dicot | Annual forb | |
| <i>Astragalus clevelandii</i> | Fabaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 4 | | 1 | | 1 | Dicot | Perennial forb | |
| <i>Astragalus curtipes</i> | Fabaceae | WI | 1.8 | 3.5 | 2 | 1.8 | 1.8 | 1.3 | | | | | 1 | Dicot | Perennial forb | |
| <i>Astragalus macrodon</i> | Fabaceae | WI/IN | 1.3 | 3.75 | 3 | 1.0 | 0.7 | 0.4 | 4 | | | | 1 | Dicot | Perennial forb | |
| <i>Astragalus rattanii</i> var. <i>jepsonianus</i> | Fabaceae | BE/SI | 4.3 | 25.5 | 6 | 4.0 | 1.2 | 0.5 | 1b | | 1 | | | Dicot | Annual forb | |
| <i>Astragalus whitneyi</i> var. <i>siskiyouensis</i> | Fabaceae | BE | 4.6 | 23 | 5 | 5.0 | 1.1 | 0.5 | | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Hoita strobilina</i> | Fabaceae | SI | 2.5 | 5 | 2 | 2.5 | 2.1 | 1.5 | 1b | | | 1 | | Dicot | Perennial forb | |
| <i>Lathyrus biflorus</i> | Fabaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | Dicot | Perennial forb | |
| <i>Lathyrus delnorticus</i> | Fabaceae | BE | 5.3 | 10.5 | 2 | 5.0 | 1.4 | 1.0 | 4 | 1 | | | | Dicot | Perennial forb | |
| <i>Lathyrus vestitus</i> var. <i>vestitus</i> | Fabaceae | WI | 1.8 | 7.2 | 4 | 0.6 | 2.8 | 1.4 | | | 1 | 1 | 1 | Dicot | Perennial forb | |
| <i>Lotus junceus</i> var. <i>junceus</i> | Fabaceae | WI | 1.5 | 3 | 2 | 1.5 | 0.7 | 0.5 | | | | | 1 | Dicot | Perennial forb | |
| <i>Lupinus constancei</i> | Fabaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | Dicot | Perennial forb | |
| <i>Lupinus lapidicola</i> | Fabaceae | SI | 3.0 | 15 | 5 | 3.0 | 3.0 | 1.3 | 4 | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Lupinus onustus</i> | Fabaceae | SI | 3.1 | 15.25 | 5 | 3.0 | 2.9 | 1.3 | | 1 | | | 1 | Dicot | Perennial forb | |
| <i>Lupinus spectabilis</i> | Fabaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | Dicot | Annual forb | |
| <i>Pediomelum californicum</i> | Fabaceae | BE/SI | 4.4 | 21.75 | 5 | 6.0 | 2.4 | 1.1 | | | 1 | 1 | 1 | Dicot | Perennial forb | |
| <i>Trifolium amoenum</i> | Fabaceae | WI/IN | 1.3 | 2.5 | 2 | 1.0 | 1.4 | 1.0 | 1b | | 1 | 1 | | Dicot | Annual forb | |
| <i>Trifolium fucatum</i> | Fabaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 0.6 | 0.3 | | | 1 | | 1 | Dicot | Annual forb | |
| <i>Trifolium gracilentum</i> var. <i>gracilentum</i> | Fabaceae | WI/IN | 1.0 | 3.1 | 3 | 1.0 | 1.0 | 0.5 | | 1 | 1 | 1 | 1 | Dicot | Annual forb | |
| <i>Trifolium longipes</i> var. <i>elmeri</i> | Fabaceae | BE | 5.3 | 21 | 4 | 6.0 | 1.5 | 0.8 | | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Trifolium longipes</i> var. <i>oreganum</i> | Fabaceae | BE/SI | 4.0 | 12 | 3 | 4.0 | 2.0 | 1.2 | | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Trifolium microcephalum</i> | Fabaceae | WI/IN | 1.4 | 7 | 5 | 1.0 | 1.1 | 0.5 | | 1 | 1 | | 1 | Dicot | Annual forb | |
| <i>Trifolium willdenovii</i> | Fabaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 0.6 | 0.3 | | 1 | 1 | 1 | 1 | Dicot | Annual forb | |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|-----------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Lithocarpus densiflorus</i> var. <i>echinoides</i> | Fagaceae | SI | 2.5 | 12.25 | 5 | 1.0 | 2.5 | 1.1 | | 1 | | | | 1 | Dicot | Shrub |
| <i>Quercus durata</i> var. <i>durata</i> | Fagaceae | SE | 5.8 | 40.5 | 7 | 6.0 | 0.8 | 0.3 | | | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Quercus vaccinifolia</i> | Fagaceae | SI | 2.5 | 12.25 | 5 | 2.0 | 2.2 | 1.0 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Garrya buxifolia</i> | Garryaceae | SE | 5.8 | 29 | 5 | 6.0 | 0.4 | 0.2 | | 1 | 1 | | | | Dicot | Shrub |
| <i>Garrya congdonii</i> | Garryaceae | BE | 5.0 | 30 | 6 | 5.5 | 1.3 | 0.5 | | 1 | 1 | 1 | | 1 | Dicot | Shrub |
| <i>Centaurium tricanthum</i> | Gentianaceae | SE | 5.5 | 11 | 2 | 5.5 | 0.7 | 0.5 | | | 1 | 1 | | | Dicot | Annual forb |
| <i>Gentiana setigera</i> | Gentianaceae | SE | 5.8 | 17.5 | 3 | 6.0 | 0.3 | 0.2 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Swertia fastigiata</i> | Gentianaceae | WI | 1.5 | 3 | 2 | 1.5 | 2.1 | 1.5 | | 1 | | | | | Dicot | Perennial forb |
| <i>Emmenanthe penduliflora</i> var. <i>penduliflora</i> | Hydrophyllaceae | WI | 1.8 | 7 | 4 | 2.0 | 0.5 | 0.3 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Emmenanthe penduliflora</i> var. <i>rosea</i> | Hydrophyllaceae | BE/SI | 4.3 | 17 | 4 | 4.5 | 1.7 | 0.9 | | | | 1 | 1 | | Dicot | Annual forb |
| <i>Phacelia breweri</i> | Hydrophyllaceae | SE | 5.5 | 11 | 2 | 5.5 | 0.7 | 0.5 | | | | 1 | 1 | | Dicot | Annual forb |
| <i>Phacelia californica</i> | Hydrophyllaceae | WI/IN | 1.4 | 4.25 | 3 | 1.0 | 1.4 | 0.8 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Phacelia corymbosa</i> | Hydrophyllaceae | SE | 5.5 | 33 | 6 | 6.0 | 0.8 | 0.3 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Phacelia dalesiana</i> | Hydrophyllaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Phacelia distans</i> | Hydrophyllaceae | WI/IN | 1.1 | 2.1 | 2 | 1.1 | 1.3 | 1.0 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Phacelia divaricata</i> | Hydrophyllaceae | WI | 2.3 | 7 | 3 | 3.0 | 1.2 | 0.7 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Phacelia egena</i> | Hydrophyllaceae | WI | 2.1 | 6.25 | 3 | 3.0 | 1.6 | 0.9 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Phacelia greenei</i> | Hydrophyllaceae | SE | 6.1 | 36.5 | 6 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Annual forb |
| <i>Phacelia imbricata</i> ssp. <i>imbricata</i> | Hydrophyllaceae | WI | 1.7 | 5 | 3 | 1.0 | 1.2 | 0.7 | | | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Phacelia leonis</i> | Hydrophyllaceae | BE/SI | 3.9 | 27.5 | 7 | 4.0 | 1.1 | 0.4 | 1b | 1 | | | | | Dicot | Annual forb |
| <i>Phacelia phacelioides</i> | Hydrophyllaceae | BE/SI | 4.2 | 12.5 | 3 | 6.0 | 3.2 | 1.8 | | | | 1 | 1 | | Dicot | Annual forb |
| <i>Phacelia pringlei</i> | Hydrophyllaceae | BE/SI | 4.0 | 12 | 3 | 4.0 | 1.0 | 0.6 | | 1 | | | | | Dicot | Annual forb |
| <i>Phacelia purpusii</i> | Hydrophyllaceae | WI/IN | 1.1 | 2.1 | 2 | 1.1 | 1.3 | 1.0 | | | | | | 1 | Dicot | Annual forb |
| <i>Iris bracteata</i> | Iridaceae | SE | 5.8 | 11.5 | 2 | 5.5 | 0.7 | 0.5 | 3 | 1 | | | | | Monocot | Perennial forb (rhiz.) |
| <i>Iris innominata</i> | Iridaceae | SE | 5.8 | 11.5 | 2 | 5.5 | 0.7 | 0.5 | 4 | 1 | 1 | | | | Monocot | Perennial forb (rhiz.) |
| <i>Iris macrosiphon</i> | Iridaceae | WI/IN | 1.1 | 3.25 | 3 | 1.0 | 0.9 | 0.5 | | | 1 | 1 | | 1 | Monocot | Perennial forb (rhiz.) |
| <i>Iris tenuissima</i> ssp. <i>purdyiformis</i> | Iridaceae | WI | 1.5 | 3 | 2 | 1.5 | 2.1 | 1.5 | | 1 | | | | 1 | Monocot | Perennial forb (rhiz.) |
| <i>Acanthomintha duttonii</i> | Lamiaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Acanthomintha ilicifolia</i> | Lamiaceae | WI/IN | 1.3 | 3 | 3 | 0.0 | 1.7 | 1.0 | | | | | 1 | | Dicot | Annual forb |
| <i>Acanthomintha lanceolata</i> | Lamiaceae | SI | 3.4 | 16.75 | 5 | 3.0 | 2.1 | 0.9 | 4 | | | 1 | 1 | | Dicot | Annual forb |
| <i>Acanthomintha obovata</i> ssp. <i>obovata</i> | Lamiaceae | BE/SI | 3.5 | 10.5 | 3 | 3.0 | 2.5 | 1.5 | 4 | | | | 1 | | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|------------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Monardella antonina</i> ssp. <i>benitensis</i> | Lamiaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 4 | | | | 1 | | Dicot | Perennial forb (rhiz.) |
| <i>Monardella douglasii</i> ssp. <i>douglasii</i> | Lamiaceae | SI | 3.0 | 6 | 2 | 3.0 | 1.4 | 1.0 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Monardella follettii</i> | Lamiaceae | SE | 5.8 | 34.5 | 6 | 6.0 | 0.8 | 0.3 | 1b | | | | | 1 | Dicot | Shrub |
| <i>Monardella palmeri</i> | Lamiaceae | BE | 4.8 | 28.5 | 6 | 6.0 | 2.2 | 0.9 | 1b | | | | 1 | | Dicot | Perennial forb (rhiz.) |
| <i>Monardella purpurea</i> | Lamiaceae | BE/SI | 4.4 | 22 | 5 | 6.0 | 2.3 | 1.0 | | 1 | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Monardella sheltonii</i> | Lamiaceae | SI | 3.0 | 18 | 6 | 3.0 | 1.7 | 0.7 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Monardella stebbinsii</i> | Lamiaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | | | | 1 | Dicot | Perennial forb (rhiz.) |
| <i>Monardella viridis</i> ssp. <i>viridis</i> | Lamiaceae | BE/SI | 4.3 | 17 | 4 | 4.5 | 2.1 | 1.0 | | | 1 | | | | Dicot | Perennial forb |
| <i>Salvia sonomensis</i> | Lamiaceae | WI | 1.6 | 9.5 | 6 | 1.5 | 1.3 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Scutellaria antirrhinoides</i> | Lamiaceae | WI | 2.3 | 11.5 | 5 | 3.0 | 1.5 | 0.7 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Stachys pycnantha</i> | Lamiaceae | WI | 2.2 | 11 | 5 | 1.0 | 2.4 | 1.1 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Trichostema laxum</i> | Lamiaceae | BE/SI | 4.0 | 16 | 4 | 4.5 | 2.4 | 1.2 | | 1 | 1 | | | | Dicot | Annual forb |
| <i>Trichostema rubisepalum</i> | Lamiaceae | BE | 5.4 | 21.5 | 4 | 6.0 | 1.5 | 0.8 | 4 | | 1 | | 1 | 1 | Dicot | Annual forb |
| <i>Pinguicula vulgaris</i> ssp. <i>macroceras</i> | Lentibulariaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 2 | | 1 | | | | Dicot | Perennial forb (carn.) |
| <i>Allium acuminatum</i> | Liliaceae | WI | 1.5 | 4.5 | 3 | 2.0 | 0.9 | 0.5 | | 1 | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Allium amplexens</i> | Liliaceae | WI | 2.3 | 11.25 | 5 | 2.0 | 2.2 | 1.0 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium bolanderi</i> var. <i>bolanderi</i> | Liliaceae | WI/IN | 1.1 | 4.5 | 4 | 1.0 | 0.6 | 0.3 | | 1 | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Allium bolanderi</i> var. <i>mirabile</i> | Liliaceae | WI | 2.0 | 4 | 2 | 2.0 | 0.0 | 0.0 | | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Allium cratericola</i> | Liliaceae | SI | 2.6 | 15.75 | 6 | 2.5 | 1.9 | 0.8 | | 1 | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium crispum</i> | Liliaceae | WI/IN | 1.3 | 3.75 | 3 | 1.0 | 0.7 | 0.4 | | | | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium diabloense</i> | Liliaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium falcifolium</i> | Liliaceae | BE/SI | 4.2 | 38 | 9 | 4.0 | 1.6 | 0.5 | | 1 | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Allium fimbriatum</i> var. <i>purdyi</i> | Liliaceae | BE | 5.4 | 21.5 | 4 | 6.0 | 1.5 | 0.8 | 4 | | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Allium hoffmanii</i> | Liliaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Allium howellii</i> var. <i>sanbenitense</i> | Liliaceae | BE/SI | 4.0 | 12 | 3 | 4.0 | 1.0 | 0.6 | | | | | 1 | | Monocot | Perennial forb (bulb) |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|-----------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Allium jepsonii</i> | Liliaceae | BE | 5.4 | 37.5 | 7 | 6.0 | 1.0 | 0.4 | 1b | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium lacunosum</i> var. <i>lacunosum</i> | Liliaceae | BE/SI | 3.8 | 15.25 | 4 | 4.5 | 2.8 | 1.4 | | | | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium lacunosum</i> var. <i>micranthum</i> | Liliaceae | BE/SI | 4.3 | 13 | 3 | 6.0 | 2.9 | 1.7 | | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium membranaceum</i> | Liliaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | 1 | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium obtusum</i> var. <i>conspicuum</i> | Liliaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium peninsulare</i> var. <i>franciscanum</i> | Liliaceae | WI | 1.8 | 3.5 | 2 | 1.8 | 1.8 | 1.3 | 1b | | | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium sanbornii</i> var. <i>congdonii</i> | Liliaceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 4 | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium sanbornii</i> var. <i>sanbornii</i> | Liliaceae | SI | 3.4 | 27 | 8 | 3.5 | 2.2 | 0.8 | 4 | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium serra</i> | Liliaceae | SI | 2.6 | 10.5 | 4 | 3.0 | 1.5 | 0.7 | | | 1 | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium sharsmithiae</i> | Liliaceae | BE | 5.1 | 20.5 | 4 | 6.0 | 2.0 | 1.0 | 1b | | | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Allium siskiyouense</i> | Liliaceae | SI | 2.8 | 14 | 5 | 2.0 | 1.8 | 0.8 | 4 | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Allium tuolumnense</i> | Liliaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Allium unifolium</i> | Liliaceae | WI/IN | 1.0 | 3 | 3 | 1.0 | 1.0 | 0.6 | | | 1 | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Brodiaea californica</i> var. <i>californica</i> | Liliaceae | WI/IN | 1.1 | 4.5 | 4 | 1.3 | 1.0 | 0.5 | | | 1 | | | 1 | Monocot | Perennial forb |
| <i>Brodiaea californica</i> var. <i>leptandra</i> | Liliaceae | WI | 2.0 | 4 | 2 | 2.0 | 1.4 | 1.0 | | | 1 | | | | Monocot | Perennial forb |
| <i>Brodiaea coronaria</i> ssp. <i>coronaria</i> | Liliaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | | 1 | 1 | | | 1 | Monocot | Perennial forb |
| <i>Brodiaea coronaria</i> ssp. <i>rosea</i> | Liliaceae | SE | 5.5 | 27.5 | 5 | 6.0 | 1.3 | 0.6 | 1b | | 1 | | | | Monocot | Perennial forb |
| <i>Brodiaea pallida</i> | Liliaceae | BE | 4.9 | 19.5 | 4 | 5.0 | 1.5 | 0.8 | 1b | | | | | 1 | Monocot | Perennial forb |
| <i>Brodiaea purdyi</i> | Liliaceae | WI | 2.2 | 11 | 5 | 2.0 | 0.8 | 0.4 | | | | | | 1 | Monocot | Perennial forb |
| <i>Brodiaea stellaris</i> | Liliaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | | | | Monocot | Perennial forb |
| <i>Calochortus clavatus</i> var. <i>clavatus</i> | Liliaceae | BE | 4.5 | 13.5 | 3 | 4.0 | 0.6 | 0.3 | 4 | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Calochortus coeruleus</i> var. <i>fimbriatus</i> | Liliaceae | WI | 1.5 | 4.5 | 3 | 1.0 | 1.3 | 0.8 | | 1 | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Calochortus elegans</i> var. <i>nanus</i> | Liliaceae | WI | 2.0 | 4 | 2 | 2.0 | 1.4 | 1.0 | | 1 | | | | | Monocot | Perennial forb (bulb) |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|-----------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Calochortus greenei</i> | Liliaceae | SE | 6.0 | 12 | 2 | 6.0 | 0.0 | 0.0 | | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Calochortus nudus</i> | Liliaceae | WI | 2.1 | 8.5 | 4 | 2.5 | 1.2 | 0.6 | | 1 | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Calochortus obispoensis</i> | Liliaceae | BE | 5.4 | 21.5 | 4 | 6.0 | 1.5 | 0.8 | 1b | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Calochortus raichei</i> | Liliaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Calochortus tiburonensis</i> | Liliaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Calochortus umbellatus</i> | Liliaceae | SI | 2.9 | 14.5 | 5 | 3.0 | 1.1 | 0.5 | 4 | | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Calochortus uniflorus</i> | Liliaceae | WI | 1.7 | 5 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Calochortus vestae</i> | Liliaceae | WI | 2.0 | 6 | 3 | 2.0 | 1.0 | 0.6 | | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Calochortus weedii</i> var. <i>vestus</i> | Liliaceae | WI/IN | 1.0 | 3 | 3 | 0.0 | 1.7 | 1.0 | 1b | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Chlorogalum angustifolium</i> | Liliaceae | WI | 2.4 | 9.5 | 4 | 1.8 | 2.8 | 1.4 | | | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Chlorogalum grandiflorum</i> | Liliaceae | BE | 5.2 | 26 | 5 | 6.0 | 1.1 | 0.5 | 1b | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Chlorogalum pomeridianum</i> var. <i>minus</i> | Liliaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Chlorogalum purpureum</i> var. <i>reductum</i> | Liliaceae | SE | 5.5 | 16.5 | 3 | 6.0 | 1.2 | 0.7 | 1b | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Erythronium californicum</i> | Liliaceae | SI | 2.7 | 8 | 3 | 2.0 | 2.1 | 1.2 | | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Erythronium citrinum</i> var. <i>citrinum</i> | Liliaceae | BE/SI | 4.3 | 21.5 | 5 | 4.0 | 0.4 | 0.2 | 4 | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Erythronium citrinum</i> var. <i>roderickii</i> | Liliaceae | BE | 4.7 | 37.5 | 8 | 4.5 | 1.4 | 0.5 | 1b | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Erythronium helenae</i> | Liliaceae | BE | 4.5 | 18 | 4 | 4.5 | 1.7 | 0.9 | 4 | | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Erythronium hendersonii</i> | Liliaceae | SI | 2.5 | 5 | 2 | 2.5 | 3.5 | 2.5 | | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Erythronium howellii</i> | Liliaceae | WI | 2.3 | 7 | 3 | 2.0 | 2.5 | 1.5 | 1b | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Erythronium multiscapoideum</i> | Liliaceae | SI | 3.0 | 15 | 5 | 2.0 | 1.7 | 0.8 | | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Erythronium purpurascens</i> | Liliaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | | | | | | 1 | Monocot | Perennial forb (bulb) |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|-----------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Erythronium tuolumnense</i> | Liliaceae | SI | 2.5 | 5 | 2 | 2.5 | 3.5 | 2.5 | | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Fritillaria affinis</i> var. <i>affinis</i> | Liliaceae | WI | 2.0 | 6 | 3 | 2.0 | 0.0 | 0.0 | | 1 | 1 | 1 | | 1 | Monocot | Perennial forb (bulb) |
| <i>Fritillaria agrestis</i> | Liliaceae | SI | 2.7 | 13.25 | 5 | 2.0 | 1.6 | 0.7 | 4 | | 1 | 1 | 1 | 1 | Monocot | Perennial forb (bulb) |
| <i>Fritillaria biflora</i> var. <i>biflora</i> | Liliaceae | WI | 2.3 | 9 | 4 | 2.5 | 1.7 | 0.9 | | | 1 | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria biflora</i> var. <i>ineziana</i> | Liliaceae | BE | 5.4 | 21.5 | 4 | 6.0 | 1.5 | 0.8 | 1b | | | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria eastwoodiae</i> | Liliaceae | WI | 2.3 | 13.5 | 6 | 2.0 | 0.4 | 0.2 | 3 | | | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Fritillaria falcata</i> | Liliaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria glauca</i> | Liliaceae | BE/SI | 4.3 | 17.25 | 4 | 5.5 | 2.7 | 1.4 | | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria liliacea</i> | Liliaceae | WI | 1.8 | 7 | 4 | 1.5 | 1.1 | 0.6 | 1b | | | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria pluriflora</i> | Liliaceae | WI | 2.4 | 9.5 | 4 | 2.5 | 1.5 | 0.7 | | | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Fritillaria purdyi</i> | Liliaceae | BE | 4.5 | 31.5 | 7 | 4.0 | 1.8 | 0.7 | 4 | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria recurva</i> var. <i>coccinea</i> | Liliaceae | SI | 2.7 | 8 | 3 | 2.0 | 3.1 | 1.8 | | | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Fritillaria recurva</i> var. <i>recurva</i> | Liliaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | 1 | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Fritillaria viridea</i> | Liliaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Monocot | Perennial forb (bulb) |
| <i>Hastingsia alba</i> | Liliaceae | SI | 3.4 | 17 | 5 | 3.0 | 1.5 | 0.7 | | 1 | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Hastingsia serpentinicola</i> | Liliaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Lilium bolanderi</i> | Liliaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 4 | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Lilium kelloggii</i> | Liliaceae | SI | 2.5 | 10 | 4 | 2.0 | 1.9 | 1.0 | | 1 | 1 | | | | Monocot | Perennial forb (bulb) |
| <i>Lilium rubescens</i> | Liliaceae | WI | 2.0 | 9.75 | 5 | 2.0 | 1.4 | 0.6 | 4 | 1 | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Lilium washingtonianum</i> ssp. <i>purpurascens</i> | Liliaceae | BE/SI | 3.5 | 10.5 | 3 | 3.0 | 2.5 | 1.5 | 4 | 1 | | | | | Monocot | Perennial forb (bulb) |
| <i>Muilla maritima</i> | Liliaceae | WI | 2.0 | 6 | 3 | 2.0 | 1.0 | 0.6 | | | 1 | 1 | 1 | 1 | Monocot | Perennial forb (bulb) |
| <i>Odontostomum hartwegii</i> | Liliaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Triteleia bridgesii</i> | Liliaceae | SI | 3.3 | 13 | 4 | 3.5 | 1.7 | 0.9 | | 1 | 1 | | | 1 | Monocot | Perennial forb (bulb) |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|---------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Triteleia crocea</i> var. <i>crocea</i> | Liliaceae | SI | 3.3 | 10 | 3 | 3.0 | 2.5 | 1.5 | 4 | 1 | | | | | Monocot | Perennial forb |
| <i>Triteleia crocea</i> var. <i>modesta</i> | Liliaceae | BE | 4.5 | 22.5 | 5 | 4.0 | 1.5 | 0.7 | 4 | 1 | | | | | Monocot | Perennial forb |
| <i>Triteleia ixioides</i> ssp. <i>cookii</i> | Liliaceae | BE | 4.5 | 13.5 | 3 | 6.0 | 2.9 | 1.7 | 1b | | | | 1 | | Monocot | Perennial forb |
| <i>Triteleia peduncularis</i> | Liliaceae | BE/SI | 3.8 | 19 | 5 | 3.0 | 2.2 | 1.0 | | 1 | 1 | 1 | 1 | | Monocot | Perennial forb |
| <i>Xerophyllum tenax</i> | Liliaceae | WI | 1.6 | 8 | 5 | 1.0 | 0.9 | 0.4 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial forb (rhiz.) |
| <i>Zigadenus micranthus</i> var. <i>fontanus</i> | Liliaceae | BE/SI | 3.8 | 23 | 6 | 4.0 | 0.8 | 0.3 | 4 | | 1 | 1 | 1 | | Monocot | Perennial forb (bulb) |
| <i>Zigadenus paniculatus</i> | Liliaceae | WI | 1.6 | 4.75 | 3 | 2.0 | 0.7 | 0.4 | | 1 | 1 | | | 1 | Monocot | Perennial forb (bulb) |
| <i>Hesperolinon adenophyllum</i> | Linaceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Hesperolinon bicarpellatum</i> | Linaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Hesperolinon breweri</i> | Linaceae | SI | 2.5 | 10 | 4 | 2.5 | 1.5 | 0.7 | 1b | | 1 | 1 | | | Dicot | Annual forb |
| <i>Hesperolinon californicum</i> | Linaceae | SI | 2.8 | 8.5 | 3 | 3.0 | 0.6 | 0.3 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Hesperolinon clevelandii</i> | Linaceae | WI | 2.0 | 8 | 4 | 2.0 | 1.8 | 0.9 | | | 1 | 1 | | | Dicot | Annual forb |
| <i>Hesperolinon congestum</i> | Linaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Annual forb |
| <i>Hesperolinon didymocarpum</i> | Linaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Hesperolinon disjunctum</i> | Linaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Hesperolinon drymarioides</i> | Linaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Hesperolinon micranthum</i> | Linaceae | WI | 2.4 | 11.75 | 5 | 3.0 | 1.0 | 0.4 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Hesperolinon serpentinum</i> | Linaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Hesperolinon spergulinum</i> | Linaceae | BE | 4.7 | 14 | 3 | 6.0 | 2.3 | 1.3 | | | 1 | 1 | | | Dicot | Annual forb |
| <i>Hesperolinon tehamense</i> | Linaceae | SE | 5.8 | 34.5 | 6 | 6.0 | 0.8 | 0.3 | 1b | | 1 | | | | Dicot | Annual forb |
| <i>Linum lewisii</i> | Linaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Sidalcea diploscypha</i> | Malvaceae | SI | 2.6 | 13 | 5 | 3.0 | 2.3 | 1.0 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Sidalcea hartwegii</i> | Malvaceae | WI | 1.6 | 4.75 | 3 | 2.0 | 0.7 | 0.4 | | | 1 | | | 1 | Dicot | Annual forb |
| <i>Sidalcea hickmanii</i> ssp. <i>anomala</i> | Malvaceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 1b | | | | 1 | | Dicot | Perennial forb |
| <i>Sidalcea hickmanii</i> ssp. <i>viridis</i> | Malvaceae | SE | 6.3 | 12.5 | 2 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Perennial forb |
| <i>Sidalcea keckii</i> | Malvaceae | SI | 3.0 | 6 | 2 | 3.0 | 2.8 | 2.0 | 1b | | | | | 1 | Dicot | Annual forb |
| <i>Camissonia benitensis</i> | Onagraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Annual forb |
| <i>Camissonia lacustris</i> | Onagraceae | SI | 3.0 | 9 | 3 | 3.0 | 3.0 | 1.7 | | | 1 | | | 1 | Dicot | Annual forb |
| <i>Clarkia arcuata</i> | Onagraceae | WI | 2.3 | 7 | 3 | 2.0 | 0.6 | 0.3 | | | | | | 1 | Dicot | Annual forb |
| <i>Clarkia biloba</i> ssp. <i>biloba</i> | Onagraceae | WI/IN | 1.4 | 2.75 | 2 | 1.4 | 0.9 | 0.6 | | | | | 1 | | Dicot | Annual forb |
| <i>Clarkia breweri</i> | Onagraceae | BE/SI | 3.8 | 11.5 | 3 | 3.0 | 2.1 | 1.2 | 4 | | | 1 | 1 | | Dicot | Annual forb |
| <i>Clarkia franciscana</i> | Onagraceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Annual forb |
| <i>Clarkia gracilis</i> ssp. <i>albicaulis</i> | Onagraceae | WI | 2.2 | 6.5 | 3 | 2.0 | 1.0 | 0.6 | 1b | | | | | 1 | Dicot | Annual forb |
| <i>Clarkia gracilis</i> ssp. <i>tracyi</i> | Onagraceae | BE | 5.0 | 25 | 5 | 5.0 | 1.0 | 0.4 | 4 | | | 1 | | | Dicot | Annual forb |
| <i>Epilobium minutum</i> | Onagraceae | WI | 2.0 | 6 | 3 | 2.0 | 1.0 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Epilobium oregonum</i> | Onagraceae | BE/SI | 3.8 | 23 | 6 | 4.0 | 2.2 | 0.9 | | 1 | 1 | | | | Dicot | Perennial forb |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|----------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|-------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Epilobium rigidum</i> | Onagraceae | BE | 5.1 | 20.5 | 4 | 6.0 | 2.0 | 1.0 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Epilobium siskiyouense</i> | Onagraceae | SE | 5.5 | 38.5 | 7 | 6.0 | 1.0 | 0.4 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Cypripedium californicum</i> | Orchidaceae | BE | 4.5 | 40.5 | 9 | 4.0 | 1.3 | 0.4 | 4 | 1 | 1 | 1 | | 1 | Monocot | Perennial forb (bulb) |
| <i>Cypripedium fasciculatum</i> | Orchidaceae | SI | 2.5 | 12.25 | 5 | 2.0 | 1.6 | 0.7 | 4 | 1 | 1 | 1 | | 1 | Monocot | Perennial forb (bulb) |
| <i>Piperia candida</i> | Orchidaceae | WI/IN | 1.2 | 3.5 | 3 | 1.0 | 1.0 | 0.6 | 4 | 1 | 1 | 1 | | | Monocot | Perennial forb (bulb) |
| <i>Orobanche valida</i> ssp. <i>howellii</i> | Orobanchaceae | SI | 3.4 | 13.5 | 4 | 3.0 | 1.3 | 0.6 | 4 | | 1 | | | | Dicot | Perennial forb (paras.) |
| <i>Dicentra chrysantha</i> | Papaveraceae | WI/IN | 1.1 | 3.25 | 3 | 1.0 | 0.9 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Dicentra formosa</i> ssp. <i>oregana</i> | Papaveraceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Dicentra pauciflora</i> | Papaveraceae | WI | 2.2 | 6.5 | 3 | 3.0 | 1.4 | 0.8 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Eschscholzia hypocoides</i> | Papaveraceae | SI | 2.6 | 7.75 | 3 | 1.0 | 3.1 | 1.8 | 4 | | | | 1 | | Dicot | Annual forb |
| <i>Platystemon californicus</i> | Papaveraceae | WI | 1.7 | 5 | 3 | 2.0 | 0.6 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Picea breweriana</i> | Pinaceae | WI | 2.2 | 6.5 | 3 | 3.0 | 1.4 | 0.8 | | 1 | | | | | Gymnosp. | Tree |
| <i>Pinus attenuata</i> | Pinaceae | SI | 2.5 | 12.6 | 5 | 3.0 | 2.4 | 1.1 | | 1 | 1 | 1 | 1 | 1 | Gymnosp. | Tree |
| <i>Pinus balfouriana</i> ssp. <i>balfouriana</i> | Pinaceae | BE/SI | 4.3 | 26 | 6 | 4.0 | 1.5 | 0.6 | | 1 | | | | | Gymnosp. | Tree |
| <i>Pinus coulteri</i> | Pinaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | | | 1 | 1 | | Gymnosp. | Tree |
| <i>Pinus jeffreyi</i> | Pinaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | 1 | 1 | | 1 | 1 | Gymnosp. | Tree |
| <i>Pinus sabiniana</i> | Pinaceae | WI/IN | 1.4 | 4.25 | 3 | 1.0 | 1.4 | 0.8 | | 1 | 1 | 1 | 1 | 1 | Gymnosp. | Tree |
| <i>Plantago erecta</i> | Plantaginaceae | WI/IN | 1.0 | 3 | 3 | 1.0 | 1.0 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Achnatherum lemmonii</i> var. <i>pubescens</i> | Poaceae | BE | 4.8 | 14.5 | 3 | 6.0 | 2.3 | 1.3 | 3 | 1 | 1 | | | | Monocot | Perennial gram. (cesp.) |
| <i>Achnatherum nelsonii</i> var. <i>dorei</i> | Poaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | | | | | | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Achnatherum stillmanii</i> | Poaceae | WI/IN | 1.1 | 2.1 | 2 | 1.1 | 1.3 | 1.0 | | | | | | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Agrostis microphylla</i> | Poaceae | WI/IN | 1.1 | 4.25 | 4 | 1.1 | 1.1 | 0.5 | | | 1 | 1 | 1 | | Monocot | Annual gram. |
| <i>Bromus laevipes</i> | Poaceae | WI | 1.7 | 65 | 3 | 2.0 | 0.6 | 0.3 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Calamagrostis foliosa</i> | Poaceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | | | 1 | | | | Monocot | Perennial gram. (rhiz.) |
| <i>Calamagrostis ophitidis</i> | Poaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 4 | | 1 | 1 | | | Monocot | Perennial gram. (rhiz.) |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|---------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|-------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Calamagrostis stricta</i> ssp. <i>inexpansa</i> | Poaceae | WI | 1.5 | 3 | 2 | 1.5 | 2.1 | 1.5 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Danthonia californica</i> var. <i>californica</i> | Poaceae | SI | 3.3 | 13 | 4 | 3.0 | 2.2 | 1.1 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i> | Poaceae | WI | 1.6 | 3.1 | 2 | 1.6 | 2.1 | 1.5 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Festuca californica</i> | Poaceae | WI | 2.4 | 11.75 | 5 | 2.0 | 1.6 | 0.7 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Festuca idahoensis</i> | Poaceae | WI/IN | 1.3 | 5.25 | 4 | 1.0 | 1.2 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Hordeum brachyantherum</i> ssp. <i>californicum</i> | Poaceae | SI | 3.1 | 9.25 | 3 | 3.0 | 2.9 | 1.7 | | 1 | 1 | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Melica geyeri</i> | Poaceae | WI/IN | 1.2 | 6 | 5 | 1.0 | 0.4 | 0.2 | | 1 | 1 | | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Poa piperi</i> | Poaceae | BE | 5.4 | 21.5 | 4 | 5.5 | 1.0 | 0.5 | 4 | 1 | | | | | Monocot | Perennial gram. (rhiz.) |
| <i>Poa rhizomata</i> | Poaceae | WI | 1.8 | 3.5 | 2 | 1.5 | 2.1 | 1.5 | 4 | 1 | | | | | Monocot | Perennial gram. (rhiz.) |
| <i>Poa tenerrima</i> | Poaceae | SI | 3.3 | 13 | 4 | 3.0 | 1.3 | 0.6 | | | | 1 | 1 | 1 | Monocot | Perennial gram. (cesp.) |
| <i>Scribneria bolanderi</i> | Poaceae | WI | 1.7 | 5.1 | 3 | 1.0 | 2.0 | 1.2 | | 1 | 1 | 1 | 1 | 1 | Monocot | Annual gram. |
| <i>Vulpia microstachys</i> var. <i>microstachys</i> | Poaceae | WI | 2.3 | 9.1 | 4 | 2.0 | 2.0 | 1.0 | | 1 | 1 | 1 | 1 | 1 | Monocot | Annual gram. |
| <i>Collomia diversifolia</i> | Polemoniaceae | SE | 5.6 | 33.5 | 6 | 6.0 | 1.2 | 0.5 | 4 | | 1 | 1 | | | Dicot | Annual forb |
| <i>Collomia tinctoria</i> | Polemoniaceae | WI | 1.8 | 7.1 | 4 | 2.0 | 1.5 | 0.7 | | 1 | 1 | | 1 | | Dicot | Annual forb |
| <i>Gilia capitata</i> ssp. <i>capitata</i> | Polemoniaceae | WI | 1.6 | 4.75 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | | | | Dicot | Annual, Perennial forb |
| <i>Gilia sinistra</i> ssp. <i>pinnatisecta</i> | Polemoniaceae | BE/SI | 3.8 | 19 | 5 | 3.0 | 2.2 | 1.0 | 4 | | 1 | | | | Dicot | Annual, Perennial forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|---------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Gilia sinistra</i> ssp. <i>sinistra</i> | Polemoniaceae | SI | 2.5 | 7.5 | 3 | 3.0 | 1.8 | 1.0 | | 1 | 1 | | | 1 | Dicot | Annual forb |
| <i>Linanthus ambiguus</i> | Polemoniaceae | SE | 5.8 | 17.5 | 3 | 6.0 | 0.6 | 0.3 | 4 | | | 1 | 1 | | Dicot | Annual forb |
| <i>Linanthus bolanderi</i> | Polemoniaceae | WI/IN | 1.3 | 2.5 | 2 | 1.3 | 1.1 | 0.8 | | | 1 | 1 | | 1 | Dicot | Annual forb |
| <i>Linanthus dichotomus</i> | Polemoniaceae | SI | 2.5 | 12.35 | 5 | 3.0 | 2.4 | 1.1 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Linanthus latisectus</i> (= <i>Leptosiphon</i> la.) | Polemoniaceae | WI | 2.0 | 6 | 3 | 2.0 | 0.0 | 0.0 | | | 1 | | | | Dicot | Annual forb |
| <i>Linanthus liniflorus</i> (= <i>Leptosiphon</i> li.) | Polemoniaceae | WI | 1.6 | 6.25 | 4 | 1.5 | 1.2 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Linanthus nuttallii</i> ssp. <i>howellii</i> (= <i>Leptosiphon</i> n. s. h.) | Polemoniaceae | BE | 5.3 | 31.5 | 6 | 6.0 | 1.3 | 0.5 | 1b | | 1 | | | | Dicot | Perennial forb |
| <i>Navarretia heterodoxa</i> | Polemoniaceae | SI | 2.8 | 14 | 5 | 3.0 | 2.4 | 1.1 | | | | 1 | | | Dicot | Annual forb |
| <i>Navarretia jaredii</i> | Polemoniaceae | SE | 5.9 | 23.5 | 4 | 6.0 | 0.5 | 0.3 | 4 | | | | 1 | | Dicot | Annual forb |
| <i>Navarretia jepsonii</i> | Polemoniaceae | SE | 5.6 | 22.5 | 4 | 5.5 | 0.6 | 0.3 | 4 | | 1 | | | | Dicot | Annual forb |
| <i>Navarretia pubescens</i> | Polemoniaceae | WI | 2.0 | 6 | 3 | 2.0 | 1.0 | 0.6 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Navarretia rosulata</i> | Polemoniaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Annual forb |
| <i>Phlox hirsuta</i> | Polemoniaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Polemonium chartaceum</i> | Polemoniaceae | WI | 1.6 | 8.1 | 5 | 2.0 | 1.5 | 0.7 | 1b | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Polygala cornuta</i> var. <i>cornuta</i> | Polygalaceae | WI | 2.3 | 9 | 4 | 2.0 | 1.3 | 0.6 | | 1 | | | | 1 | Dicot | Perennial forb, Shrub |
| <i>Chorizanthe breweri</i> | Polygonaceae | BE | 5.4 | 21.5 | 4 | 5.5 | 1.0 | 0.5 | 1b | | | | 1 | | Dicot | Annual forb |
| <i>Chorizanthe palmeri</i> | Polygonaceae | BE | 4.9 | 24.5 | 5 | 6.0 | 1.6 | 0.7 | 4 | | | | 1 | | Dicot | Annual forb |
| <i>Chorizanthe uniaristata</i> | Polygonaceae | SI | 2.7 | 10.75 | 4 | 2.5 | 2.0 | 1.0 | | | | | 1 | 1 | Dicot | Annual, Perennial forb |
| <i>Chorizanthe ventricosa</i> | Polygonaceae | BE | 5.3 | 16 | 3 | 6.0 | 1.2 | 0.7 | 4 | | | | 1 | | Dicot | Annual forb |
| <i>Eriogonum alpinum</i> | Polygonaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Eriogonum argillosum</i> | Polygonaceae | SI | 3.1 | 12.5 | 4 | 3.0 | 2.6 | 1.3 | 4 | | | 1 | 1 | | Dicot | Annual forb |
| <i>Eriogonum compositum</i> var. <i>compositum</i> | Polygonaceae | WI | 1.7 | 5.1 | 3 | 2.0 | 1.5 | 0.9 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Eriogonum congdonii</i> | Polygonaceae | BE | 5.1 | 35.5 | 7 | 6.0 | 1.7 | 0.7 | 4 | 1 | | | | | Dicot | Shrub |
| <i>Eriogonum covilleanum</i> | Polygonaceae | SI | 3.0 | 12 | 4 | 3.0 | 1.6 | 0.8 | | | | | 1 | | Dicot | Annual forb |
| <i>Eriogonum dasyanthemum</i> | Polygonaceae | SI | 3.0 | 6 | 2 | 3.0 | 1.4 | 1.0 | | | 1 | | | | Dicot | Annual forb |
| <i>Eriogonum diclinum</i> | Polygonaceae | SI | 3.2 | 9.5 | 3 | 3.0 | 3.0 | 1.7 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Eriogonum elatum</i> var. <i>villosum</i> | Polygonaceae | SI | 3.3 | 13 | 4 | 3.5 | 3.2 | 1.6 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Eriogonum hirtellum</i> | Polygonaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Eriogonum hirtiflorum</i> | Polygonaceae | SI | 3.3 | 13 | 4 | 3.5 | 3.2 | 1.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Eriogonum kelloggii</i> | Polygonaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Perennial forb |
| <i>Eriogonum libertini</i> | Polygonaceae | SE | 6.1 | 36.5 | 6 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Eriogonum luteolum</i> var. <i>caninum</i> | Polygonaceae | SE | 5.5 | 27.5 | 5 | 6.0 | 0.9 | 0.4 | 3 | | 1 | 1 | 1 | | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|---------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|-------|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Eriogonum luteolum</i> var. <i>luteolum</i> | Polygonaceae | BE/SI | 3.8 | 15 | 4 | 3.0 | 1.5 | 0.8 | | 1 | 1 | 1 | 1 | Dicot | Annual forb | |
| <i>Eriogonum nervulosum</i> | Polygonaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | Dicot | Perennial forb (rhiz.) | |
| <i>Eriogonum nudum</i> var. <i>indictum</i> | Polygonaceae | WI | 1.5 | 4.5 | 3 | 1.0 | 0.6 | 0.3 | 4 | | | 1 | | Dicot | Perennial forb | |
| <i>Eriogonum nudum</i> var. <i>oblongifolium</i> | Polygonaceae | WI | 2.0 | 6 | 3 | 2.0 | 0.0 | 0.0 | | 1 | 1 | | 1 | Dicot | Perennial forb | |
| <i>Eriogonum pendulum</i> | Polygonaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 2 | 1 | | | | Dicot | Perennial forb | |
| <i>Eriogonum pyrolifolium</i> | Polygonaceae | WI/IN | 1.0 | 3 | 3 | 0.0 | 1.7 | 1.0 | | 1 | | | 1 | Dicot | Perennial forb | |
| <i>Eriogonum siskiyouense</i> | Polygonaceae | BE | 5.4 | 32.5 | 6 | 6.0 | 1.2 | 0.5 | 4 | 1 | | | | Dicot | Perennial forb | |
| <i>Eriogonum strictum</i> var. <i>greenii</i> | Polygonaceae | SE | 5.9 | 29.5 | 5 | 6.0 | 0.4 | 0.2 | 4 | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Eriogonum strictum</i> var. <i>proliferum</i> | Polygonaceae | SE | 6.0 | 24 | 4 | 6.0 | 0.0 | 0.0 | | 1 | 1 | | 1 | Dicot | Perennial forb | |
| <i>Eriogonum ternatum</i> | Polygonaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 4 | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Eriogonum trichopes</i> var. <i>hooveri</i> | Polygonaceae | SI | 3.3 | 10 | 3 | 3.0 | 2.5 | 1.5 | | | | 1 | | Dicot | Annual forb | |
| <i>Eriogonum tripodum</i> | Polygonaceae | BE | 5.3 | 26.5 | 5 | 6.0 | 1.3 | 0.6 | 4 | | 1 | | 1 | Dicot | Shrub | |
| <i>Eriogonum umbellatum</i> var. <i>argus</i> | Polygonaceae | SI | 3.0 | 12 | 4 | 3.5 | 1.4 | 0.7 | | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Eriogonum umbellatum</i> var. <i>bahiiforme</i> | Polygonaceae | BE/SI | 3.5 | 21 | 6 | 3.0 | 1.2 | 0.5 | 4 | | 1 | 1 | 1 | Dicot | Perennial forb | |
| <i>Eriogonum umbellatum</i> var. <i>goodmanii</i> | Polygonaceae | SI | 3.3 | 10 | 3 | 3.0 | 2.5 | 1.5 | | 1 | | | | Dicot | Perennial forb | |
| <i>Eriogonum umbellatum</i> var. <i>humistratum</i> | Polygonaceae | BE | 4.5 | 27.25 | 6 | 5.0 | 2.1 | 0.8 | 4 | 1 | 1 | | | Dicot | Perennial forb | |
| <i>Eriogonum umbellatum</i> var. <i>speciosum</i> | Polygonaceae | BE/SI | 4.2 | 21 | 5 | 4.0 | 1.3 | 0.6 | | 1 | | | 1 | Dicot | Perennial forb | |
| <i>Eriogonum ursinum</i> | Polygonaceae | WI/IN | 1.1 | 2.25 | 2 | 1.1 | 1.2 | 0.9 | | 1 | | | 1 | Dicot | Perennial forb | |
| <i>Eriogonum vimineum</i> | Polygonaceae | WI/IN | 1.0 | 3 | 3 | 1.0 | 0.0 | 0.0 | | 1 | | | 1 | Dicot | Annual forb | |
| <i>Polygonum douglasii</i> ssp. <i>majus</i> | Polygonaceae | WI | 1.5 | 4.5 | 3 | 2.0 | 0.9 | 0.5 | | 1 | | | 1 | Dicot | Annual forb | |
| <i>Polygonum douglasii</i> ssp. <i>spergulariiforme</i> | Polygonaceae | SI | 3.0 | 18.25 | 6 | 2.5 | 2.1 | 0.9 | | 1 | 1 | 1 | 1 | Dicot | Annual forb | |
| <i>Systemotheca vortriedei</i> | Polygonaceae | SI | 3.1 | 12.25 | 4 | 2.5 | 2.2 | 1.1 | 4 | | | 1 | | Dicot | Annual forb | |
| <i>Calyptridium quadripetalum</i> | Portulacaceae | BE | 4.6 | 27.5 | 6 | 4.0 | 1.2 | 0.5 | 4 | | 1 | | | Dicot | Annual forb | |
| <i>Calyptridium umbellatum</i> | Portulacaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | 1 | 1 | 1 | 1 | Dicot | Perennial forb | |
| <i>Claytonia exigua</i> ssp. <i>exigua</i> | Portulacaceae | SI | 3.4 | 24 | 7 | 3.0 | 1.1 | 0.4 | | 1 | 1 | 1 | 1 | Dicot | Annual forb | |
| <i>Claytonia exigua</i> ssp. <i>glauca</i> | Portulacaceae | BE/SI | 3.6 | 18 | 5 | 3.0 | 1.3 | 0.6 | | 1 | 1 | 1 | 1 | Dicot | Annual forb | |
| <i>Claytonia gypsophiloides</i> | Portulacaceae | SI | 3.1 | 15.5 | 5 | 3.0 | 0.2 | 0.1 | | | 1 | 1 | 1 | Dicot | Annual forb | |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|---------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Claytonia saxosa</i> | Portulacaceae | BE/SI | 4.4 | 21.75 | 5 | 5.0 | 2.2 | 1.0 | | 1 | 1 | | | | Dicot | Annual forb |
| <i>Lewisia cantelovii</i> | Portulacaceae | WI/IN | 1.0 | 6 | 6 | 1.0 | 1.1 | 0.4 | 1b | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Lewisia cotyledon</i> var. <i>cotyledon</i> | Portulacaceae | WI | 2.0 | 6 | 3 | 3.0 | 1.7 | 1.0 | | 1 | | | | | Dicot | Perennial forb |
| <i>Lewisia cotyledon</i> var. <i>heckneri</i> | Portulacaceae | WI/IN | 1.0 | 4 | 4 | 0.5 | 1.4 | 0.7 | | 1 | | | | | Dicot | Perennial forb |
| <i>Lewisia cotyledon</i> var. <i>howellii</i> | Portulacaceae | WI/IN | 1.3 | 4 | 3 | 1.0 | 1.5 | 0.9 | | 1 | | | | | Dicot | Perennial forb |
| <i>Lewisia leana</i> | Portulacaceae | SI | 3.0 | 6 | 2 | 3.0 | 0.0 | 0.0 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Lewisia nevadensis</i> | Portulacaceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Lewisia oppositifolia</i> | Portulacaceae | BE | 5.3 | 21 | 4 | 6.0 | 1.5 | 0.8 | | 1 | | | | | Dicot | Perennial forb |
| <i>Lewisia rediviva</i> | Portulacaceae | WI/IN | 1.4 | 7 | 5 | 1.0 | 1.1 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Lewisia stebbinsii</i> | Portulacaceae | BE | 4.7 | 14 | 3 | 6.0 | 2.3 | 1.3 | 1b | | 1 | | | | Dicot | Perennial forb |
| <i>Lewisia triphylla</i> | Portulacaceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Dodecatheon clevelandii</i> ssp. <i>patulum</i> | Primulaceae | SI | 3.0 | 9 | 3 | 3.0 | 0.0 | 0.0 | | | | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Adiantum aleuticum</i> | Pteridaceae | WI | 2.4 | 11.75 | 5 | 2.0 | 1.2 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Pteridoph. | Perennial forb |
| <i>Aspidotis carlotta-halliae</i> | Pteridaceae | BE | 5.3 | 26.5 | 5 | 6.0 | 1.1 | 0.5 | 4 | | | 1 | 1 | | Pteridoph. | Perennial forb (rhiz.) |
| <i>Aspidotis densa</i> | Pteridaceae | SI | 3.4 | 31 | 9 | 3.0 | 1.2 | 0.4 | | 1 | 1 | 1 | 1 | 1 | Pteridoph. | Perennial forb |
| <i>Pellaea brachyptera</i> | Pteridaceae | WI | 1.5 | 4.5 | 3 | 2.0 | 0.9 | 0.5 | | 1 | 1 | | | 1 | Pteridoph. | Perennial forb |
| <i>Anemone drummondii</i> | Ranunculaceae | WI | 2.3 | 6.75 | 3 | 2.0 | 1.6 | 0.9 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Aquilegia eximia</i> | Ranunculaceae | BE/SI | 4.2 | 25 | 6 | 3.5 | 1.5 | 0.6 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Delphinium hesperium</i> ssp. <i>hesperium</i> | Ranunculaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | 1 | 1 | 1 | | | Dicot | Perennial forb |
| <i>Delphinium nuttallianum</i> | Ranunculaceae | WI/IN | 1.4 | 4.1 | 3 | 1.0 | 1.5 | 0.9 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Delphinium parryi</i> ssp. <i>eastwoodiae</i> | Ranunculaceae | BE/SI | 3.7 | 11 | 3 | 4.0 | 2.5 | 1.5 | | | | | 1 | | Dicot | Perennial forb |
| <i>Delphinium uliginosum</i> | Ranunculaceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Ceanothus confusus</i> | Rhamnaceae | WI/IN | 1.3 | 2.5 | 2 | 1.3 | 1.1 | 0.8 | 1b | | 1 | | | | Dicot | Shrub |
| <i>Ceanothus cuneatus</i> var. <i>cuneatus</i> | Rhamnaceae | WI | 1.5 | 6.1 | 4 | 1.5 | 1.3 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Ceanothus divergens</i> | Rhamnaceae | WI | 2.0 | 4 | 2 | 2.0 | 1.4 | 1.0 | 1b | | 1 | | | | Dicot | Shrub |
| <i>Ceanothus ferrisae</i> | Rhamnaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | | | Dicot | Shrub |
| <i>Ceanothus foliosus</i> var. <i>medius</i> | Rhamnaceae | BE/SI | 4.0 | 12 | 3 | 3.0 | 1.7 | 1.0 | | | | 1 | 1 | | Dicot | Shrub |
| <i>Ceanothus jepsonii</i> | Rhamnaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | 1 | | | Dicot | Shrub |
| <i>Ceanothus masonii</i> | Rhamnaceae | SI | 3.3 | 6.5 | 2 | 3.0 | 4.2 | 3.0 | 1b | | | 1 | | | Dicot | Shrub |
| <i>Ceanothus papillosus</i> var. <i>roweanus</i> | Rhamnaceae | WI | 1.5 | 3 | 2 | 1.5 | 2.1 | 1.5 | | | | | 1 | | Dicot | Shrub |
| <i>Ceanothus pumilus</i> | Rhamnaceae | SE | 5.7 | 28.5 | 5 | 6.0 | 0.9 | 0.4 | | 1 | 1 | | | | Dicot | Shrub |
| <i>Ceanothus roderickii</i> | Rhamnaceae | WI | 1.7 | 5 | 3 | 2.0 | 1.5 | 0.9 | 1b | | | | | 1 | Dicot | Shrub |
| <i>Ceanothus sonomensis</i> | Rhamnaceae | WI/IN | 1.3 | 4 | 3 | 2.0 | 1.2 | 0.7 | 1b | | | 1 | | | Dicot | Shrub |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|------------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|---------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Rhamnus californica</i> ssp. <i>occidentalis</i> | Rhamnaceae | SE | 6.0 | 24 | 4 | 6.0 | 0.0 | 0.0 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Rhamnus tomentella</i> ssp. <i>crassifolia</i> | Rhamnaceae | BE | 4.8 | 19 | 4 | 6.0 | 2.5 | 1.3 | | 1 | 1 | | | | Dicot | Shrub |
| <i>Rhamnus tomentella</i> ssp. <i>tomentella</i> | Rhamnaceae | WI | 1.5 | 6 | 4 | 0.8 | 1.7 | 0.8 | | 1 | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Adenostoma fasciculatum</i> | Rosaceae | WI/IN | 1.3 | 5.2 | 4 | 1.1 | 1.4 | 0.7 | | | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Holodiscus discolor</i> | Rosaceae | WI/IN | 1.0 | 3 | 3 | 1.0 | 1.0 | 0.6 | | 1 | 1 | 1 | 1 | 1 | Dicot | Shrub |
| <i>Horkelia congesta</i> ssp. <i>nemorosa</i> | Rosaceae | BE/SI | 3.8 | 7.5 | 2 | 3.5 | 0.7 | 0.5 | 2 | 1 | | | | | Dicot | Perennial forb |
| <i>Horkelia daucifolia</i> | Rosaceae | BE/SI | 3.8 | 15 | 4 | 3.0 | 1.5 | 0.8 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Horkelia sericata</i> | Rosaceae | SE | 5.6 | 22.5 | 4 | 6.0 | 1.0 | 0.5 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Horkelia tridentata</i> ssp. <i>flavescens</i> | Rosaceae | SI | 3.0 | 9 | 3 | 2.0 | 1.7 | 1.0 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Ivesia gordonii</i> | Rosaceae | WI | 1.6 | 3.25 | 2 | 1.6 | 1.9 | 1.4 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Ivesia pickeringii</i> | Rosaceae | BE | 5.4 | 32.5 | 6 | 6.0 | 1.0 | 0.4 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Potentilla cristae</i> | Rosaceae | SI | 3.1 | 12.5 | 4 | 3.0 | 0.0 | 0.0 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Sanguisorba officinalis</i> | Rosaceae | BE/SI | 4.2 | 12.5 | 3 | 3.0 | 1.7 | 1.0 | 2 | 1 | 1 | | | | Dicot | Perennial forb (rhiz.) |
| <i>Galium ambiguum</i> var. <i>ambiguum</i> | Rubiaceae | SI | 3.3 | 10 | 3 | 3.0 | 2.5 | 1.5 | | | 1 | | | 1 | Dicot | Perennial forb |
| <i>Galium ambiguum</i> var. <i>siskiyouense</i> | Rubiaceae | SE | 5.5 | 27.5 | 5 | 6.0 | 0.9 | 0.4 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Galium andrewsii</i> ssp. <i>andrewsii</i> | Rubiaceae | SI | 3.2 | 16 | 5 | 3.0 | 1.9 | 0.9 | | | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Galium andrewsii</i> ssp. <i>gatense</i> | Rubiaceae | BE | 5.1 | 20.5 | 4 | 5.0 | 0.8 | 0.4 | 4 | | | 1 | 1 | | Dicot | Perennial forb |
| <i>Galium andrewsii</i> ssp. <i>intermedium</i> | Rubiaceae | WI/IN | 1.4 | 2.75 | 2 | 1.4 | 0.9 | 0.6 | | | | | 1 | | Dicot | Perennial forb |
| <i>Galium clementis</i> | Rubiaceae | WI/IN | 1.0 | 2 | 2 | 1.0 | 1.4 | 1.0 | 1b | | | | 1 | | Dicot | Perennial forb |
| <i>Galium hardhamiae</i> | Rubiaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | | | 1 | | Dicot | Perennial forb |
| <i>Galium serpenticum</i> ssp. <i>scotticum</i> | Rubiaceae | SE | 5.9 | 29.5 | 5 | 6.0 | 0.4 | 0.2 | 1b | 1 | | | | | Dicot | Perennial forb |
| <i>Salix breweri</i> | Salicaceae | SE | 6.0 | 30 | 5 | 6.0 | 0.0 | 0.0 | | | 1 | 1 | 1 | | Dicot | Shrub |
| <i>Salix delnortensis</i> | Salicaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 4 | 1 | | | | | Dicot | Shrub |
| <i>Salix sitchensis</i> | Salicaceae | WI | 1.6 | 4.75 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | 1 | 1 | | Dicot | Tree, shrub |
| <i>Darlingtonia californica</i> | Sarraceniaceae | BE/SI | 4.1 | 32.5 | 8 | 4.0 | 1.4 | 0.5 | 4 | 1 | | | | 1 | Dicot | Perennial forb (carn.) |
| <i>Parnassia californica</i> | Saxifragaceae | WI | 2.0 | 6 | 3 | 2.0 | 0.0 | 0.0 | | 1 | 1 | | 1 | 1 | Dicot | Perennial forb |
| <i>Saxifraga howellii</i> | Saxifragaceae | BE/SI | 3.8 | 7.5 | 2 | 3.5 | 2.1 | 1.5 | 4 | 1 | | | | | Dicot | Perennial forb |
| <i>Antirrhinum cornutum</i> | Scrophulariaceae | WI | 2.2 | 11 | 5 | 2.0 | 0.8 | 0.4 | | | 1 | | | | Dicot | Annual forb |
| <i>Antirrhinum leptaleum</i> | Scrophulariaceae | WI | 1.6 | 3.1 | 2 | 1.6 | 2.1 | 1.5 | | | | | | 1 | Dicot | Annual forb |

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|---|------------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|---------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Antirrhinum subcordatum</i> | Scrophulariaceae | BE/SI | 4.3 | 21.5 | 5 | 4.0 | 1.8 | 0.8 | 4 | | 1 | | | | Dicot | Annual forb |
| <i>Antirrhinum vexillo-calyculatum</i> | Scrophulariaceae | SI | 2.5 | 20 | 8 | 2.5 | 1.3 | 0.5 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Antirrhinum virga</i> | Scrophulariaceae | SI | 2.8 | 8.5 | 3 | 3.0 | 0.6 | 0.3 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Castilleja affinis</i> ssp. <i>neglecta</i> | Scrophulariaceae | SE | 6.1 | 30.5 | 5 | 6.0 | 0.0 | 0.0 | 1b | | 1 | 1 | | | Dicot | Perennial forb (hemipar.) |
| <i>Castilleja foliolosa</i> | Scrophulariaceae | WI | 2.3 | 9 | 4 | 2.5 | 1.0 | 0.5 | | | 1 | 1 | 1 | 1 | Dicot | Perennial forb, Shrub |
| <i>Castilleja hispida</i> ssp. <i>brevilobata</i> | Scrophulariaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 4 | 1 | | | | | Dicot | Perennial forb (hemipar.) |
| <i>Castilleja miniata</i> ssp. <i>elata</i> | Scrophulariaceae | BE | 4.6 | 27.5 | 6 | 4.5 | 1.4 | 0.6 | 2 | 1 | | | | | Dicot | Perennial forb (hemipar.) |
| <i>Castilleja minor</i> ssp. <i>spiralis</i> | Scrophulariaceae | SI | 3.3 | 16.5 | 5 | 3.0 | 2.6 | 1.2 | | | 1 | 1 | 1 | 1 | Dicot | Annual forb (hemipar.) |
| <i>Castilleja pruinosa</i> | Scrophulariaceae | SI | 3.2 | 15.75 | 5 | 3.0 | 1.9 | 0.8 | | 1 | 1 | | | 1 | Dicot | Perennial forb (hemipar.) |
| <i>Castilleja rubicundula</i> ssp. <i>lithospermoides</i> | Scrophulariaceae | WI | 2.4 | 9.75 | 4 | 2.0 | 1.8 | 0.9 | | | 1 | | | | Dicot | Annual forb (hemipar.) |
| <i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> | Scrophulariaceae | SE | 5.6 | 28 | 5 | 6.0 | 0.9 | 0.4 | 1b | | 1 | | | | Dicot | Annual forb (hemipar.) |
| <i>Collinsia greenii</i> | Scrophulariaceae | BE | 5.2 | 31 | 6 | 6.0 | 1.3 | 0.5 | | 1 | 1 | | | | Dicot | Annual forb |
| <i>Collinsia multicolor</i> | Scrophulariaceae | WI/IN | 1.1 | 2.25 | 2 | 1.1 | 1.2 | 0.9 | 1b | | 1 | 1 | | | Dicot | Annual forb |
| <i>Collinsia sparsiflora</i> | Scrophulariaceae | WI | 1.7 | 5 | 3 | 1.0 | 1.2 | 0.7 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Cordylanthus nidularius</i> | Scrophulariaceae | SE | 6.2 | 18.5 | 3 | 6.0 | 0.0 | 0.0 | 1b | | | 1 | 1 | | Dicot | Annual forb (hemipar.) |
| <i>Cordylanthus pilosus</i> var. <i>pilosus</i> | Scrophulariaceae | SI | 2.5 | 10 | 4 | 2.5 | 0.6 | 0.3 | | | 1 | 1 | | | Dicot | Annual forb (hemipar.) |
| <i>Cordylanthus pringlei</i> | Scrophulariaceae | SE | 5.6 | 28 | 5 | 6.0 | 0.9 | 0.4 | | | 1 | | | | Dicot | Annual forb (hemipar.) |
| <i>Cordylanthus tenuis</i> ssp. <i>brunneus</i> | Scrophulariaceae | BE | 5.1 | 25.5 | 5 | 5.0 | 1.0 | 0.4 | 4 | | 1 | | | | Dicot | Annual forb (hemipar.) |
| <i>Cordylanthus tenuis</i> ssp. <i>capillaris</i> | Scrophulariaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 1b | | 1 | | | | Dicot | Annual forb (hemipar.) |
| <i>Cordylanthus tenuis</i> ssp. <i>tenuis</i> | Scrophulariaceae | WI | 2.3 | 9 | 4 | 2.0 | 0.5 | 0.3 | | | | | | 1 | Dicot | Annual forb (hemipar.) |
| <i>Cordylanthus tenuis</i> ssp. <i>viscidus</i> | Scrophulariaceae | BE | 4.5 | 27 | 6 | 4.5 | 1.4 | 0.6 | | 1 | 1 | | | 1 | Dicot | Annual forb (hemipar.) |
| <i>Keckiella lemmonii</i> | Scrophulariaceae | WI/IN | 1.1 | 3.25 | 3 | 1.0 | 0.9 | 0.5 | | 1 | 1 | | | 1 | Dicot | Shrub |
| <i>Mimulus douglasii</i> | Scrophulariaceae | SI | 2.7 | 13.5 | 5 | 3.0 | 0.5 | 0.2 | | 1 | 1 | 1 | 1 | 1 | Dicot | Annual forb |
| <i>Mimulus glaucescens</i> | Scrophulariaceae | BE/SI | 3.8 | 18.75 | 5 | 4.0 | 2.1 | 0.9 | 4 | | | | | 1 | Dicot | Annual forb |
| <i>Mimulus layneae</i> (including <i>M. brachiatus</i>) | Scrophulariaceae | SI | 2.9 | 14.25 | 5 | 3.0 | 1.2 | 0.5 | | 1 | 1 | | | 1 | Dicot | Annual forb |

APPENDIX 1. CONTINUED.

| Taxon ¹ | Family | Aff ² | Mean ³ | Sum ⁴ | Sources | Med. ⁵ | SD ⁶ | SE ⁷ | Rarity ⁸ | Geog. Dist. ⁹ | | | | | Tax. Cat. ¹⁰ | Lifeform ¹¹ |
|--|------------------|------------------|-------------------|------------------|---------|-------------------|-----------------|-----------------|---------------------|--------------------------|----|----|----|----|-------------------------|------------------------------|
| | | | | | | | | | | KL | NC | BA | SC | SN | | |
| <i>Mimulus nudatus</i> | Scrophulariaceae | SE | 5.6 | 33.5 | 6 | 6.0 | 1.2 | 0.5 | 4 | | 1 | | | | Dicot | Annual forb |
| <i>Mimulus primuloides</i> ssp. <i>linearifolius</i> | Scrophulariaceae | BE/SI | 4.0 | 16 | 4 | 4.5 | 2.4 | 1.2 | | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Orthocarpus pachystachyus</i> | Scrophulariaceae | SE | 6.0 | 18 | 3 | 6.0 | 0.0 | 0.0 | | | 1 | | | | Dicot | Annual forb (hemipar.) |
| <i>Pedicularis howellii</i> | Scrophulariaceae | SI | 2.5 | 7.5 | 3 | 3.0 | 1.2 | 0.7 | 4 | | 1 | | | | Dicot | Perennial forb (hemipar.) |
| <i>Penstemon azureus</i> var. <i>azureus</i> | Scrophulariaceae | SI | 2.7 | 8 | 3 | 3.0 | 0.6 | 0.3 | | 1 | 1 | | | 1 | Dicot | Perennial forb |
| <i>Penstemon filiformis</i> | Scrophulariaceae | BE | 5.0 | 30 | 6 | 5.5 | 1.3 | 0.5 | | 1 | | | | | Dicot | Perennial forb |
| <i>Penstemon parvulus</i> | Scrophulariaceae | BE/SI | 3.7 | 11 | 3 | 4.0 | 0.6 | 0.3 | | 1 | | | | 1 | Dicot | Perennial forb |
| <i>Penstemon purpusii</i> | Scrophulariaceae | SI | 2.8 | 11 | 4 | 2.0 | 2.4 | 1.2 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Triphysaria floribunda</i> | Scrophulariaceae | WI | 2.3 | 6.75 | 3 | 2.0 | 1.9 | 1.1 | 1b | | 1 | 1 | 1 | | Dicot | Annual forb |
| <i>Veronica copelandii</i> | Scrophulariaceae | SE | 6.1 | 24.5 | 4 | 6.0 | 0.0 | 0.0 | 4 | | 1 | | | | Dicot | Perennial forb |
| <i>Fremontodendron californicum</i> ssp. <i>decumbens</i> | Sterculiaceae | BE/SI | 2.0 | 8 | 4 | 1.5 | 2.4 | 1.2 | 1b | | | | | 1 | Dicot | Shrub |
| <i>Verbena californica</i> | Verbenaceae | BE | 4.8 | 14.5 | 3 | 4.0 | 1.2 | 0.7 | 1b | | | | | 1 | Dicot | Perennial forb |
| <i>Viola cuneata</i> | Violaceae | BE | 5.2 | 31 | 6 | 6.0 | 1.3 | 0.5 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Viola douglasii</i> | Violaceae | SI | 2.8 | 13.75 | 5 | 2.0 | 2.0 | 0.9 | | 1 | 1 | 1 | 1 | 1 | Dicot | Perennial forb |
| <i>Viola hallii</i> | Violaceae | BE/SI | 4.0 | 16 | 4 | 4.0 | 2.3 | 1.2 | | 1 | 1 | | | | Dicot | Perennial forb |
| <i>Viola lobata</i> ssp. <i>lobata</i> | Violaceae | WI | 2.3 | 11.35 | 5 | 2.0 | 2.4 | 1.1 | | 1 | 1 | | | 1 | Dicot | Perennial forb (rhiz.) |
| <i>Viola ocellata</i> | Violaceae | SI | 2.5 | 12.5 | 5 | 3.0 | 0.9 | 0.4 | | 1 | 1 | 1 | 1 | | Dicot | Perennial forb |
| <i>Viola primulifolia</i> ssp. <i>occidentalis</i> | Violaceae | BE | 5.1 | 25.5 | 5 | 6.0 | 1.4 | 0.6 | 1b | 1 | | | | | Dicot | Perennial forb (rhiz.) |
| <i>Viola purpurea</i> ssp. <i>integrifolia</i> | Violaceae | WI/IN | 1.3 | 4 | 3 | 2.0 | 1.2 | 0.7 | | 1 | 1 | | | 1 | Dicot | Perennial forb |