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FLORA OF THE MAYACMAS MOUNTAINS

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FLORA OF THE MAYACMAS MOUNTAINS

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ABSTRACT

This flora describes the plants that occur within the Mayacmas Mountain Range of Northern California. It is the result of ten years of environmental assessment by the author in the Geysers Geothermal Resource area, located in the center of the Mayacmas Range.

The flora includes notes on plant communities and ecology of the area, as well as habitat and collection data for most of the 679 species covered. Altogether 74 families, 299 genera and 679 species are included in the flora. The work is divided into eight subdivisions: trees; shrubs; ferns and fern allies; aquatic plants; tules, sedges, and rushes; lilies and related plants; dicot herbs; and grasses. Within each subdivision, family, genera and species are listed alphabetically. Keys are provided at the beginning of each subdivision.

A unique combination of physical, environmental and geologic factors have resulted in a rich and diverse flora in the Mayacmas. Maps have been provided indicating known locations for species of rare or limited occurrence.

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I. INTRODUCTION

This flora is a summary of the author's floristic interest compiled in connection with environmental assessment of geothermal development in the Mayacmas Mountains over the years 1972 to 1981. It is designed to serve as a guide to plants and plant communities of the Mayacmas Mountains. This area extends from Mt. St. Helena to the East Fork of the Russian River, Lake Mendocino, and the Blue Lakes, and generally lies between the foothills east of Highway 101 and west of the flat lands and ridges of the Lake County Volcanics. Total area covered is about 410 square miles, and altitudes range from 600 feet to 4670 feet. (See Figure 1.)

In an effort to reduce the number of decisions needed for identification, primary breakdown is by form and habitat. Detailed descriptions are omitted, but sufficient definitive or "key" information is included in the dichotomous keys to identify plants known by the author to be present in the Mayacmas. There may be omissions of some incidental or rare species, but common plants should be readily identifiable.

Technical terms were avoided where possible; technical definitions were based on the glossary of Munz. Also, determination often requires material at different stages of maturity; but an attempt has been made to use vegetative characters where possible. Location maps are provided for general locations of unusual, uncommon, or species of special importance. Nomenclature is largely restricted to that used in Munz' "A California Flora" for easy reference. Common names were taken from Abrams' "A Flora of the Pacific States" and McMinn's "Shrubs of California".

Plant assemblages have been described by the author over a period of years, especially those of the central and southern portion of the range exclusive of Mt. St. Helena. Principal plant communities are presented and arranged consistant with a system used by the author for geothermal assessment.

Voucher specimens of less common species have been collected from one to several locations and indicated on dot maps where appropriate. However, widespread species have not been collected much by the author. Herbaria at University of California Berkeley and Davis, Santa Rosa Junior College, and the California Academy of Science were used for reference and annotation of specimens.

The author is indebted to Ms. Teressa Sholars for help with specimen identification, Ms. Ivana Roland and Ms. Nancy Harrison for names and locations of their collections; and to Dr. Gil Muth for use of Pacific Union College's Herbaria computer system for plant list on file in Napa County.

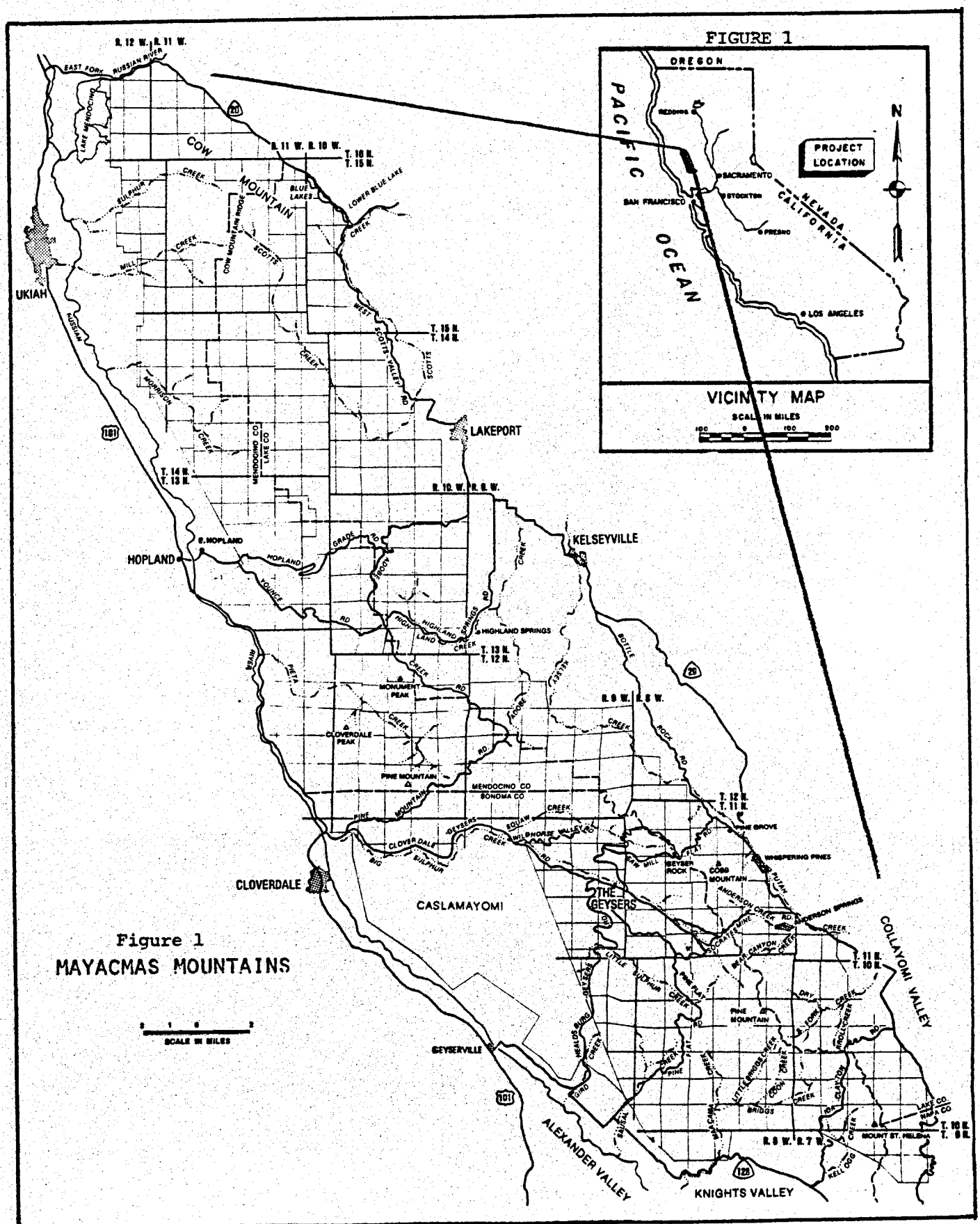


Figure 1
MAYACMAS MOUNTAINS

SCALE IN MILES

PLANT COMMUNITIES

The following discussion assigns plant communities into units of three types: zonal, transzonal, and azonal as defined by Langenheim (1962) and Neilson (1973). Vegetation is a dynamic entity; its pattern and process must be taken into account. However, most vegetation is measured at particular points in time and only extent features recorded. In the zonal concept, major features of vegetation dynamics are included, although their boundaries and expression may change over time. In general vegetation is a function of the influences of climate, soil, biota, fire, and altitude. These influences are taken into account in the limits of the terms zonal, transzonal, and azonal.

Zonal communities reflect the broad character of a landscape unit including climax, pre-, post-, and subclimax, as well as successional stages in each. In the Mayacmas Mountains representative landscape units or zones are: floodplain, foothill, ridge-canyon, and mountain. The first and last are quite limited in extent. The first by definition in this flora and the last because only 2 major sites, Mt. St. Helena and Cobb Mountain, occur.

The foothill zone is limited because of the relatively sharp rise of the range from bordering lowlands. In the foothill zone, grasslands and oak savannahs predominate. The ridge-canyon zone is the dominant zone in the Mayacmas. Chaparral covers much of this zone, though woodlands and grasslands do occur. Montane chaparral, woodlands, and forest dominate the mountain zone, but only the lower altitudinal expression of the possible vegetation types. White fir & pine, red fir, lodgepole, spruce and alpine types are entirely absent. Of those communities described here, altitude, exposure, and soils most influence modification of community expression into the intricate vegetation pattern found over the Mayacmas landscape. Serpentine and ryolite parent materials are the most distinctive edaphic variants of the area.

Azonal communities exhibit nearly uniform characteristics, regardless of the landscape unit in which they are found. When moving across several altitudinal levels, a continuum of community compostion is formed. Such communities are primarily ponds and anthropogenic areas, i.e. ruderal, disturbed, or manipulated areas.

Transzonal communities result from intense modifications of zonal factors; these modifications dramatically affect zonal characterisitcs and usually act across one or more landscape units. A riparian community series with its associated ecotonal community is such an example. Because both azonal and transzonal types are so strongly influenced by water stress or soil moisture conditions, they are often distinguished by radical departures in composition, form, and appearance from adjacent zonal communities.

Basic community types and their principal subdivisions (associations and facies) in the Mayacmas Mountains are as follows:

Zonal: Grasslands - Native prairie (perennial bunch grasses); predominantly native grasses and herbs; wet meadows; swales.

Savannahs

Chaparrals - "Hard" or xeric shrubland; "soft" or mesic shrubland.

Woodlands - Deciduous; evergreen broadleaf; conifer - broadleaf.

Forests - Conifer - broadleaf; conifer.

Azonal: Ponds and reservoirs

Seeps and vernal springs

Ruderal or weedy areas

Introduced annual grassland

Old field

Transzonal:

Stream courses - permanently flowing and intermittent

Rock cliff

Running springs

CALIFORNIA PRAIRIE

The California Prairie once formed the principal native grassland over much of central California. Now only relic stands occur, mostly in isolated, lightly grazed areas in the Coast Range (cf. Barry, 1972; Burcham, 1957). Stands of this community within the Mayacmas Range usually show intensive overgrazing and some agriculture practice has occurred throughout the range since its settlement in the 1870's. However, the present tendency to reduce or eliminate grazing of domestic livestock in developed geothermal areas has encouraged native bunch grasses to reassume dominance.

There is much variation in the expression of this community. The characteristic and dominant grass is Foothill Needle and Threadgrass (*Stipa lepida*), followed by Pine Bluegrass *(Poa scabrella)*, Creeping Wild Rye *(Elymus triticoides)*, and several other perennial grasses. The presence of Medusa Head *(Elymus caput-medusae)*, Ripgut *(Bromus rigidus)*, Western Cheatgrass *(B. tectorum)*, and the hairgrass *(Deschampsia danthonioides)* indicate an overgrazed state. Other species found are Lindley's Lupine *(Lupinus bicolor)*, Baby Blue-eyes *(Nemophilla menziesii)*, Sheep Sorrel *(Rumex angiocarpus)*, Cut-leaved Geranium *(Geranium dissectum)*, Loosestrife *(Lythrum hyssopifolia)*, poppy *(Eschscholzia caespitosa)*, Narrow-

leaved Owl's Clover *(Orthocarpus attenuata)*, Yarrow *(Achillea lanulosa)*, Popcorn Flower *(Plagiobothrys nothofulvus)*, and Harsh Allocarya *(Allocarya hispidula)*. Other elements of the Introduced Annual Grassland and Native Herb communities can also be found: Narrow-leafed Mule Ears *(Wyethia angustifolia)*, Western Buttercup *(Ranunculus occidentalis)*, Mountain Dandelion *(Agoseris heterophylla)*, Hill Morning Glory *(Convolvulus subacaulis)*. This type is well illustrated in the meadows along the upper portion of High Valley Creek, Lake County.

Total vegetative cover is about 60%, but stature is only 1 to 2 dm (3 to 6 in) high.

WET MEADOW

The Wet Meadow community occurs in isolated sites here and there throughout the Mayacmas Mountains. These meadows have good to abundant soil moisture until July. They are quite distinctive and vary in composition somewhat according to the degree of heat exposure.

The best indicator is the presence of Meadow Barley *(Hordeum brachyantherum)*, and Kellogg's Yampa *(Perideridia kelloggii)*. The following species have a constancy and fidelity to this community:

California Oat Grass	*Danthonia californica*
Sweet Vernal Grass	*Anthoxanthum odoratum*
June Grass	*Koeleria cristata*
Mountain Timothy	*Phleum alpinum*
Fowl Bluegrass	*Poa palustris*
Kentucky Bluegrass	*Poa pratensis*
Common Plaintain	*Plantago major*
Mariposa Lily	*Calochortus sp.*
Western Buttercup	*Ranunculus occidentalis*
Cream Sacs	*Orthocarpus lithospermoides*
Small-headed Clover	*Trifolium microcephlum*
White-tipped Clover	*Trifolium variegatum*
Cow Clover	*Trifolium wormskioldii*
White Brodiaea	*Brodiaea hyacinthina*

Depending upon the mositure and soil conditions, this community grades into a Swale community of even more water dependent plants, yet not actually a Riparian Spring community.

Vegetative cover varies between 30% in the wettest areas to 90% in better drained sites. Biomass standing crop is estimated at about 500 pounds per acre; but because the regeneration of California Oat Grass and Sweet Vernal Grass is good, its annual biomass is estimated to be about 1000 pounds per acre.

SWALE

The Swale community is often an expression of an incipient riparian type characteristic of low areas in a flood plain. It is very diverse and often invaded by both Seep, Wet Meadow, and Prairie species. It is distinguished by: rushes (*Juncus effusus* var. *pacificus* and *J. balticus*), Spike Rush (*Eleocharis acrostachya*), Dense Sedge (*Carex densa*), White Brodiaea (*Brodiaea hyacinthina*), Sticky Cinquafoil (*Potentilla glandulosa*), and Narrow-leafed Mule Ears (*Wyethia angustifolia*). Other herbs commonly found are a blue brodiaea (*Brodiaea laxa*), Blue-eyed Grass (*Sisyrinchium bellum*), Kellogg's Yampa (*Perideridia kelloggii*), Common Plantain (*Plantago major*), Dandelion (*Taraxacum officinialis*), and Large-flowered Star-Tulip (*Calochortus uniflora*). Several grasses occur prominently: California Oat Grass (*Danthonia californica*),Meadow Barley (*Hordeum brachantherium*), Sweet Vernalgrass (*Anthoxanthum odoratum*) and Pine Bluegrass (*Poa scabrella*). This communitiy is well represented in upper High Valley Creek meadows or in meadows near Socrates Mine Headquarters.

Ground cover is about 115% except in ponding areas, and stature is about 2 to 10 dm (6 to 10 in) high. Lush growth is produced into midsummer and its annual biomass is estimated at about 1 ton per acre.

NATIVE HERB

On low elevated rises or ridges above the general level of meadows or quite independent of them, two Native Herb communities are found. The first Native Herb usually has several species of introduced annual grasses in it, several clovers (*Trifolium dichotomum, T. bifidum, T. microdon),* filarees (*Erodium sp.*), Lindley's Lupine (*Lupinus bicolor*), Cream Cups (*Platystemon californica*), Few-flowered Collinsia (*Collinsia sparsiflora*), Fringe Pod (*Thysanocarpus curvipes*), Long-spurred Plectritis (*Plectritis ciliosa*), Annual Phlox (*Microsteris gracilis*), Hill Morning Glory (*Convolvulus subacaulis*), and Woolly-fruited Lomatium (*Lomatium dasycarpum*).

A second Native Herb type is found on steeper slopes where soils are mostly thinner having formed from a greywacke parent material. It almost always has one of the *Linanthus sp.* and *Orthocarpus pusillus O. faucibarbatus* present. Gambell's Dwarf Locoweed (*Astragalus gambellianus*), Red-stemmed Filaree (*Erodium cicutarium*), Western Cheatgrass and annual fescues, together with Yellow Evening Primrose (*Oenothera graciliflora*), a small crucifer (*Tropidocarpum gracile*), Mountain Violet (*Viola purpurea*), and the striking Purple Mouse Ears (*Mimulus douglasii*) distinguish it. Golden Fairy Lantern (*Calochortus amabilis*) and Fringe Pod also appear.

SAVANNAHS

Savannahs are grassland communities that contain scattered trees covering up to 15% of ground surface. While the grassland is dominant, the savannah's name is taken from the tree layer. Associated grassland communities are most often the Califonia Annual Grassland or the Native Herb communities described elsewhere. Several grasses appear in savannahs in association with the trees. These are California Melic (*Melica californica*), Torrey's Melic (*Melica torreyana*), Thread and Needlegrass (*Stipa cernua*).

Mixed Savannah has a preponderance of Blue Oak (*Quercus douglasii*) with occasional specimens of Garry Oak (*Q. garryana*) on east-facing slopes. Understory is largely California Annual Grassland or Native Herb communities. Big Manzanita (*Arctostaphylos manzanita*), Elderberry (*Sambucus mexicana*), and Poison Oak (*Rhus diversiloba*) are scattered occasionally under the oaks, especially near rock outcrops. At higher elevations the presence of both Garry Oak and Canyon Oak (*Q. chrysolepis*) cause this community to appear as a transitional type from the Blue Oak Savannah to Mixed Oak Woodlands.

Blue Oak Savannahs are found at lower elevations on dry, hot slopes. Understory is largely California Annual Grassland. Garry Oak Savannahs occur at higher elevations, normally on western and southern slopes. Black Oak Savannahs occur just below the ridge crests on north and west-facing slopes. It should be noted that savannahs and grasslands frequently occupy areas subject to extensive landsliding and mass wastage.

A few, small, open stands of Valley Oak (*Q. lobata*) have been mapped in the Geysers area. However, Valley Oak is not common above the floodplain zone. It prefers deep, rich, moist soils and becomes more abundant west of the Squaw Creek confluence.

In some area, Digger Pines (*Pinus sabiniana*) form a savannah. This type is related to the Digger Pine-Shrub community; but because of deeper soils, the shrub layer is limited to Big Manzanita and Poison Oak. Understory is mosly California Annual Grassland.

BRUSHLANDS

In previous environmental work in the Mayacmas, Neilson (1975 , 1974) has identified chaparral, montane chaparral, and scrub communities. These brush communities show significant differences in species composition even though they all belong to the broadleafed schlerophyllous woodlands (Cooper 1922). In this flora, the terms chaparral and scrub have been used to delineate brushland communities, leaving the term montane chaparral for higher elevation communities not found in the Mayacmas Mountains.

For the most part, chaparral and scrub are sharply divided at the ridge crest. Chaparrals are characteristic of south and west-facing slopes where high temperatures and severe water stress must be overcome. Leaves are small or leathery and many species crown sprout readily after fire. The

species assemblage of these communities are indicated as subxeric or xeric chaparrals in the flora. Figure 2 illustrates well defined community delimitations which usually reflect soil or rock discontinuities and exposure. Characteristically, chamise dominated communities occur on shallow, rocky soil -- chert, graywacke, or greenstone -- but not on serpentine.

Hard chaparral comunities commonly found are listed in order of decreasing xeric (dry) habitats:

-- chamise
-- chamise-mahogany-ceanothus-manzanita
-- chamise-mahogany-ceanothus-manzanita
-- Jepson's ceanothus-leather oak-Stanford's manzanita
-- shrubby live oak-silt tassel-manzanita
-- shrubby live oak-manzanita-ceanothus
-- manzanita

Chamise chaparral occurs on south and western exposures where radiation is most intense; i.e. on upper canyon slopes and ridge-tops. It often grades into the following community. It is subject to recurrent intense fire from 5 to 25 year periods. Soils are invariably very thin and poor, usually of graywacke parent material. In older stands, there is little infiltration of other species. Its composition is:

Chamise	*(Adenostema fasciculatum)*	90%
Buckbrush	*(Ceanothus cuneatus)*	5%
Yerba Santa	*(Eriodictyon californicum)*	1%

Because chamise produces a growth inhibitory toxin, few other plants exist in dense chamise stands. The few associates that do occur are:

Soap Plant	*(Chlorogalum pomeridianuum)*
Death Camas	*(Zigadenus venosum* or *Z. fremontii)*
Brome Grass	*(Bromus rubens* or *B. tectorum)*
Monkey Flower	*(Mimulus douglasii)*

Chamise-mahogany-ceanothus-manzanita occurs on south, west and east exposures of upper canyon slopes where soil is about 1 to 2 feet deep, usually developes graywacke parent material. It is also subject to intense, recurring fires 5 to 25 years apart depending upon density and fire load. Old, unburned stands begin to show senescence and a preponderance of dead wood with very little leaf cover and new growth in stands over 25 years old. It may reach a height of 12 feet. Stands often become infiltrated with Digger Pine. Composition is variable from place to place but dominant and subdominants include:

Chamise	*(Adenostema fasciculatum)*	10 to 30%
Buckbrush	*(Ceanothus cuneatus)*	5 to 25%
Manzanitas	*(Arctostaphylos glandulosa, A. stanfordiana, A. viscida)*	5 to 30%
Mountain Mahogany	*(Cercocarpus betuloides)*	3 to 10%
Oaks	*(Quercus wislizenii* ssp. *frutescens, Q. chrysolepis, Q. dumosa)*	5 to 15%

FIGURE 2

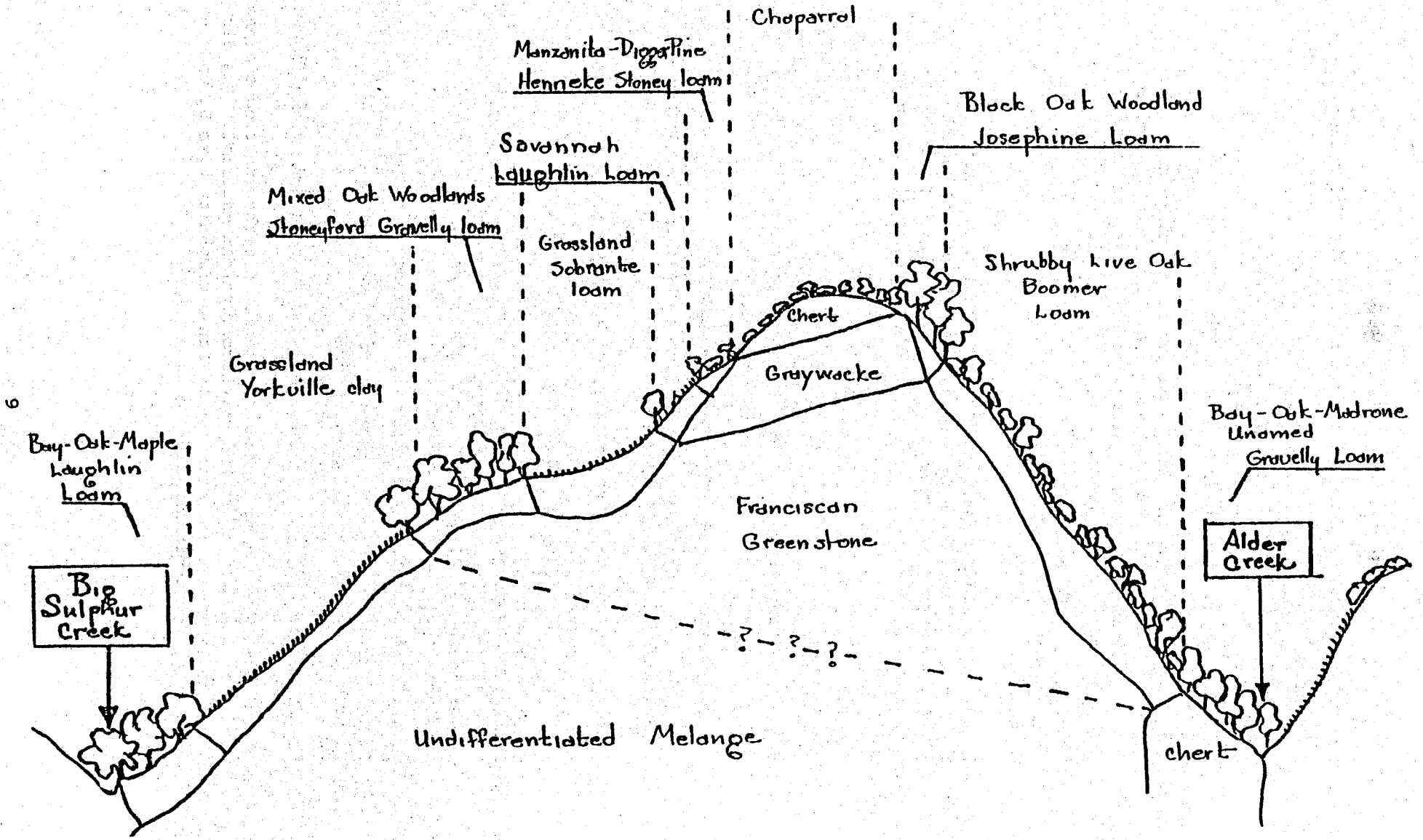


Figure 2. Schematic cross-section showing the relationship between bedrock, soils, and vegetative cover.

Herbs include those of the Chamise community and also the following:

California Fescue	*Festuca californica*
Squirrel-tail Grass	*Sitanion hystrix*
Gold Wire	*Hypericum concinnum*
Bull Thistle	*Cirsium vulgare*
California Windmill Flower	*Silene californica*

The chamise-shrubby live oak-manzanita community is probably only a common variation of the former, but represents a significant change in dominance. It occurs in dense stands with over 100% cover on deeper, wetter soils. The change in dominance is:

Chamise	10 to 15%
Shrubby oaks	50 to 75%
Manzanitas	20 to 50%

The Jepson's Ceanothus-Leather Oak-Stanford's Manzanita community is quite distinct being associated with serpentine soils of the Henneke and Huse series. Herbaceous associates are also distinct. Dominance varies between the two soil series, for the Henneke series the dominants and subdominants are:

Chamise	*Adenostema fasciculatum*	0 to 30%
Leather Oak	*Quercus durata*	10 to 30%
Jepson's Ceanothus	*Ceanothus jepsonii*	10 to 40%
Stanford's Manzanita	*Arctostaphylos stanfordiana*	5 to 50%
Cypress	*Cupressus sargentii* *C. macnabbiana*	0 to 20%
Knobcone Pine	*Pinus attenuata*	0 to 10%

On the Huse series, dominance most often shifts to Leather Oak, Jepson's Ceanothus, and Stanford's Manzanita.

On Henneke soils, the herbaceous understory may include:

Greene's Groundsel	*Senecio greenii*
Squirrel-tail grass	*Sitanion hystrix*
Mountain Bluegrass	*Poa scabrella*
Serpentine Reedgrass	*Agrostis ophitidus*
Wall Flower	*Erysimum capitatum*
Serpentine Jewel Flower	*Streptanthus morrisonii*
Narrow-leafed Jewel Flower	*S. barbiger*

On Huse soils, the following are sparsely represented:

Indian Warrior	*Pedicularia densiflora*
Slender-tubed Iris	*Iris macrosiphon*
Common Woodrush	*Luzula subsessilis*
Granite Gilia	*Leptodactylon pungeus* ssp. *pulchriflorum*

Shrubby Live Oak-Silk Tassel- manzanita is associated with wind ridges along the crest of the Mayacmas on chert and greenstone parent material. Its distribution is quite limited. It forms a very dense community with no understory. Dominants and subdominants are:

Shrubby oaks	*Quercus wislizenii* ssp. *frutescens* *Q. chrysolepis*	50%
Tassel	*Garrya elliptica*	30%
Manzanitas	*Arctostaphylos glandulosa, A. stanfordiana*	20%

The shrubby oaks-manzanitas-ceanothus community is widespread and may be generically related to several of the scrub communities. It tends to be found on east, north, and west exposures. Usually it forms very dense stands with cover values over 100%. Dominance values are:

Shrubby oaks	*Q. w.* ssp. *frutescens, Q. chrysolepis*	50 to 80%
Manzanitas	*A. glandulosa, A. canescens, A. stanfordiana,* occasionally *A. viscida*	30 to 50%
Ceanothus	*Ceanothus cuneatus, C. foliosus*	20 to 40%

The manzanita community is common at lower elevations of the foothill zone. Cover is quite variable (20 to 90%) and usually an understory is present. This community is often monotypic. However, the general composition is:

Big Manzanita	*Arctostaphylos manzanita*	20 to 100%
Buckbrush	*Ceanothus cuneatus*	5 to 15%
Toyon	*Heteromeles arbutifolia*	0 to 5%
Poison Oak	*Rhus diversiloba*	0 to 5%
Shrubby oaks	*Q. chrysolepis, Q. w.* ssp. *frutescens*	0 to 5%

Other shrubs are also found in varying abundance in many stands of hard chaparral. These include:

Chaparral Pea	*Pickeringia montana*
Deerbrush	*Lotus scoparius*
Bush Rock Spiraea	*Holodiscus boursieri*
Oak-leafed Gooseberry	*Ribes quercetorum*
Northen Monkey Flower	*Mimulus aurantiacus*
Chaparral Clematis	*Clematis lasiandra*
Chaparral Poppy	*Dendromecon rigida*
Purple Nightshade	*Solanum xanthii*
Western Redbud	*Cercis occidentalis*

Scrub species characteristically occur on north- and east-facing slopes or in areas of cool air drafts. Most do not crown sprout, and water stress is not as great because of reduced insolation. These communities form a species continuum, but also reflect adjacent woodlands. Dominants are Shrubby Live Oak (*Q. wislizenii* var. *frutescens*), Shrubby Canyon Oak (*Q. chrysolepis*), Mahogany (*Cercocarpus betuloides*), and Deerbrush (*Ceanothus integerrimus*). Madrone (*Arbutus menziesi*), Bay (*Umbellularia californica*), and sometimes Black Oak (*Q. kelloggii*), are common invaders, but frequent fires and high fire fuel loads keep them from acceding to dominance. It is plausible, however, that in the prolonged absence of fire, these would succeed to oak, oak-pine, or oak-pine-fir woodlands of forests.

Scrub communities are:

-- ceanothus-chamise-manzanita-madrone
-- shrubby oaks-mahogany-buckeye

-- coffeeberry-shrubby oaks-ceanothus
-- shrubby oaks-deerbrush-chamise
-- shrubby oaks-bay-ceanothus
-- shrubby canyon oak-deerbrush-bay
-- bay-mixed oak-madrone
-- toyon-mahogany-silk tassel

In the ceanothus-chamise-manzanita-madrone community, the introduction of Madrone and some Bay indicates its more mesic nature. Chamise, as always, occupies the thinnest soils and driest sites. Dominance ranges from:

Ceanothus	*C. cuneatus, C. foliosus*	20 to 30%
Chamise	*Adenostoma fasciculatum*	5 to 15%
Manzanitas	*A. glandulosa, A. stanfordiana A. canscens*	20 to 30%
Madrone	*Arbutus menziesii*	10 to 20%

The shrubby oaks-mahogany-buckeye community is somewhat open with a thin understory. It occurs on west, north, and east exposures. Its dominants are:

Shrubby oaks	*Q. chrysolepis* and/or *Q. dumosa*	30 to 70%
Mountain Mahogany	*Cercocarpus betuloides*	10 to 50%
Buckeye	*Aesculus californica*	5 to 20%

The coffeebery-shrubby oaks-ceanothus community is of limited distribution, often associated with open pine stands where it forms a weak understory. It is best developed on north- and east-facing slopes of the ridge-canyon zone where cover often exceeds 100%. Dominance values are:

Coffeeberry	*Rhamnus californica*	40 to 60%
Canyon Oak	*Q. chrysolepis*	30 to 50%
Ceanothus	*C. foliosus, C. integerrimus C. cuneatus*	5 to 30%

The shrubby oaks-deerbrush-chamise community occupies steep slopes on north, east, or west exposures. It is very dense and occurs on soils of uneven depth. Its dominants are:

Shrubby oaks	*Q. chrysolepis, Q. w.* ssp. *frutescens*	50 to 75%
Deerbrush	*C. integerrimus*	40 to 60%
Chamise	*Adenostoma fasciculatum*	5 to 15%
Manzanitas	*A. glandulosa, A. stanfordiana*	5 to 15%

The shrubby oaks-bay-ceanothus community is widespread on upper canyon slopes with northeast and west exposure or on canyon sides where soils are deep (± 2 feet). It is an indicator of mesic conditions with either cool air drainages or moist soils much of the summer. It is usually associated next to xeric communities and, hence, subject to repeated burning. Composition is:

Shrubby oaks	*Q. chrysolepis, Q. w.* ssp. *frutescens*	30 to 80%
Bay	*Umbellularia californica*	10 to 60%
Ceanothus	*C. integerrimus, C. foliosus*	5 to 15%
California Nutmeg	*Torreya californica*	3 to 8%
Madrone	*Arbutus menziesii*	5 to 8%

The shrub live oak-manzanita-ceanothus-bay community occupies upper north and east slopes. It is devoid of chamise and may be mid-successional to bay-fir-oak forest. It occurs on shallow to moderately deep soils and is relatively mesic. It appears to be disturbed by occasional intense fires, apparently after long, dry seasons. This community, in its oldest phases, may attain a height of 12 feet and is often extremely dense. Its general composition is:

Shrubby Live Oak	*Quercus chrysolepis, Q. wislizenii* ssp. *frutescens*	30 to 60%
Ceanothus	*Ceanothus integerrimus, C. foliosus, C. parryi*	5 to 15%
Big Manzanita	*Arctostaphylos manzanita*	5 to 8%
Bay	*Umbellaria californica*	10 to 20%
Scrub Oak	*Q. dumosa*	5 to 8%
Toyon	*Heteromeles arbutifolia*	5 to 10%
Poison Oak	*Rhus diversiloba*	2 to 5%
Digger Pine	*Pinus sabiniana*	1 to 3%
Elderberry	*Sambucus mexicana*	1%

Herbs are:

California fescue	*Festuca californica*	1%
Bed-straw	*Galium ruttallii*	1%
Chaparral Honeysuckle	*Lonicera interruptus*	1%

and when recent fire has created openings:

Slender Wild Oat	*Avena barbata*	20%
Ripgut	*Bromus diandrus*	20%
Red Brome	*B. rubens*	1 to 30%
White-stem Filaree	*Erodium moschatus*	1 to 20%
Bull Thistle	*Cirsium vulgare*	5 to 15%
Napa Star Thistle	*Cirsium melitensis*	5 to 15%
all other species		5 to 20%

The shrub live oak-bay-madrone community is highly variable in composition and aspect. It occurs on north, northwest, or northeast slopes. On occasion, it is predominantly live oak and elsewhere a mixture. Fires are fnfrequent. Soil is variable in depth but for the most part the community occurs on the Josephine series. It appears to be successional to the oak-maple-madrone-fir forest. Some stands may attain 20 feet in height, but the majority of stands are dense thickets of about 7 to 10 feet high. Dominant species are:

Shrubby Live Oak	*Q. w.* ssp. *frutescens*	30 to 90%
Canyon Oak	*Q. chrysolepis*	5 to 25%
Bay	*Umbellularia californica*	5 to 25%
Madone	*Arbutus menziesii*	10 to 25%
Black Oak	*Q. kelloggii*	0 to 5%
Big-leaf Maple	*Acer macrophyllum*	0 to 5%
Douglas Fir	*Pseudotsuga menziesii*	0 to 8%
California Nutmeg	*Torreyana californica*	0 to 1%

The toyon-garrya-mahogany community occupies very steep canyon sides (60% slope) at lower elevations or is confined to narrow steep draws along stream courses. Fires are rare, and it seems to be a closed association made up of:

Toyon	*Heteromeles arbutifolia*	25 to 75%
Garrya	*Garrya fremontii*	25 to 60%
Mountain Mahogany	*Cercocarpus betuloides*	10 to 50%

Canyon Oak	*Q. chrysolepis*	0 to 10%
Black Oak	*Q. kelloggii*	0 to 3%
California Coffee-berry	*Rhamnus californica*	0 to 3%

Scrub communities have a broad array of herbaceous species. The more common species include:

Broad-leaved Hosackia	*Lotus crassifolius*
California Fescue	*Festuca californica*
Chaparral Honeysuckle	*Lonicera interrupta*
California Toothwort	*Dentaria californica* var. *cardiophylla*
California Milkwort	*Polygala californica*
California Melic	*Melica californica*
Western Morning Glory	*Convolvulus occidentalis* var. *solanensis*
Purple Nightshade	*Solanum xanthii*
Shooting Star	*Dodecatheon hendersonii*
Lousewort, Indian Warrior	*Pedicularis densiflora*
Mountain Monardella	*Monardella odoratissima*
Chaparral Clematis	*Clematis lasiantha*
Star Flower	*Trientalis latifolia*
Pitcher Sage	*Lepechina calycina*

Other shrubs that occur in scrub communities include:

Squawbush	*Rhus trilobata* var. *quinata*
Bay Gooseberry	*Ribes menziesii*
Snowberry	*Symphoricarpos rivularis*
Coyote Bush	*Baccharis pilularis*
Bush Chinquapin	*Castanopsis sempervirens*

WOODLANDS

Woodlands constitute those communities whose dominant species are over 15 feet and under 75 feet high. They are for the most part associated with deep, rich soils and mesic habitats. Some woodland communities are associated with riparian in the transzonal habitat group of communities; these are noted by an asterisk in the list below. Several types of woodlands can be recognized:

Conifer Woodlands
- Cypress
- Knobcone Pine

Conifer-evergreen broadleaf
- Pine-cypress
- Digger Pine-shrub
- Digger Pine-Canyon Oak
- Canyon Oak-fir-pine
- Knobcone-manzanita

Evergreen-broadleaf
- Bay-Madrone-oak
- Mixed live oaks
- Tan Oak

Mixed broadleaf
- Mixed oaks
- Live oaks-Bay-maple*
- Bay-maple-alder-Madrone*

Deciduous broadleaf
- Black Oak
- Garry Oak
- Blue Oak
- Mixed oaks
- Scrub Oak

This array of woodlands is mostly dominated by oaks and pines. Fire plays an important part in the generation, maintenance, and regeneration of forest and woodlands. Fire dependent communities are the Knobcone Pine, Cypress, and Yellow-Sugar Pine communities. The first two depend upon fire for removal and seed germination, the third for maintenance of pure stands and development sequence.

Cypress woodlands are restricted to serpentine soils principally of the Huse series. They occur on all slopes and range from thin open stands to very dense stands. Their stature rarely exceeds 68 feet; but ranges from 5 to 100 feet -- the latter in canyon bottoms protected from fire. Dominance values are:

Cypress	*Cupressus sargentii* *C. macnabiana*	60 to 100%
Jepson's Ceanothus	*Ceanothus jepsonii*	0 to 40%
Scrub Oak	*Quercus durata*	0 to 15%
Stanford's Manzanita	*Arctostaphylos stanfordiana*	0 to 40%
Pines	*Pinus sabiniana, P. attenuata*	1 to 10%

Knobcone Pine woodlands are thick stands of *Pinus attenuata* with very little else. Their stature is from 30 to 50 feet and cover is complete.

Pine-cypress stands are often widespread on Huse soil series. They are apparently mixtures of the two foregoing communities. Their stature ranges from 30 to 50 feet and are very dense with usually a very high fire load. Dominance values are:

Knobcone Pine	*Pinus attenuata*	40 to 60%
Cypress	*C. sargentii, C. macnabiana*	40 yo 60%
Stanford's Manzanita	*Arctostaphylos stanfordiana*	10 to 30%
Jepson's Ceanothus	*Ceanothus jepsonii*	5 to 20%
Scrub Oak	*Quercus durata*	0 to 10%

Stands at Little Geyser on geothermally altered soil include Hoary Manzanita *(Arctostaphylos canescens)*.

Knobcone-manzanita woodlands are found scattered throughout the upper Big Sulphur Creek drainages, and are most widespread on east-facing slopes. A typical example is found just south of the Little Geysers. Associated trees are Knobcone Pine, Black Oak, Madrone, sometimes Canyon Oak, and rarely Western Yellow Pine *(Pinus ponderosa)*. Shrub understory consist's of Stanford's, Eastwood's, White-leaved, and Hoary Manzanitas, Wavy-leaved Ceanothus, occasionally Squaw Carpet *(Ceanothus prostratus* var. *occidentalis)*. Bush Chinquapin, California Coffeeberry. The herb layer consists of a sparse, intermittent cover of Bracken Fern *(Pteridium aquilinum)*, paintbrush *(Castilleja foliolosa)*, California Bedstraw *(Galium californicum)*, and Pine Violet *(Viola lobata)*. The endemic Cobb Mountain Lupine *(Lupinus sericatus)* appears occasionally.

Digger Pine stands are of two types, apparently depending upon exposure and soil type. The Digger Pine-shrub community on deep soil and southeast exposures consists of Digger Pine, Mountain Mahogany, Bush Lupine *(Lupinus albifrons)*, and an occasional shrubby Canyon Oak. California Fescue, Coyote

Mint (*Monardella villosa*), buckwheat, and a few annual grasses form a sparse, herbaceous element in the predominantly Bush Lupine understory. On very thin soils or exposed rocky ridges, the Digger Pine-oak community consists of Digger Pine, scattered shrubs of Shrubby Live Oak and Eastwood's or Big Manzanita, with scattered plants of Squirrel-tail Grass, Woolly Sunflower (*Eriophyllum lanatum*), Goldenback Fern (*Pityrogramma triangularis*), Red Brome (*Bromus rubens*), and Coyote Mint. Often the latter community will grade into the mixed shrub community, while the former grades into mesic forest or riparian communities.

The Canyon Oak-fir-pine community is transitional to the Douglas Fir climax forest and appears to be an advanced successional stage of the former. Stand surveys have nearly the same presence list, but a decided shift in dominance. Nuttall's Dogwood (*Cornus nuttallii*) is frequently common on north and eastern slopes. The only four specimens of Incense Cedar found on upper Big Sulphur Creek occur in this community.

Of the evergreen broadleaf woodlands, the bay-Canyon Oak-Madrone community is found on east-facing slopes, often ecotonal to riparian areas. The dominant is Bay. Canyon Oak and Madrone are constant associates and young Douglas Fir is common. Big-leaf Maple and Black Oak are occasional. Understory plants include: Western Hound's Tongue (*Cynoglossum occidentale*), Red Larkspur (*Delphinium nudicaule*), Common Lomatium (*Lomatium utriculatum*), and California Milkwort (*Polygala californica*).

Mixed live oak communities become common as one proceeds westward to lower elevations. They are variable in composition and cover values range from 75 to 125%. Dominants are Coast Live Oak (*Q. agrifolia*) and Canyon Oak, occasionally Bay and Madrone share a subdominant role. This community at it lowest elevations is usually associated with intermittant water courses that are dry most of the year. At higher elevations, it may form the principal zonal community.

Mixed broadleaf communities are mixtures between evergreen and deciduous broadleaf communities. Their occurence is often enough and their appearance distinct enough to be identified separately. Mixed oak-Madrone-maple is found in lower canyon draws and drier east-facing slopes. Canyon Oak, Garry Oak, and Black Oak grow in a variety of compositions. Madrone and Big-leaf Maple are present in most cases. Arboreal cover usually exceeds 60%. Understory is largely herbaceous and consists of Bur Chervil (*Anthriscus scandicina*), Miner's Lettuce (*Montia perfoliata*), Western Sword Fern (*Polystichum munitum*), California Polypody (*Polypodium californicum*), and Sweet Cicely (*Ozmorhiza chilensis*).

Canyon Oak-Bay-maple-Madrone communities are found on middle, north and east exposures, and lower slopes, west exposure, that are relatively undisturbed by fire. This community is best developed in draws or cold air drainages on north slopes. Overstory cover approaches 90% and only a few herbs grow under the trees. Black Oak and Douglas Fir are common components but at a variable density, depending upon stage of succession.

The deciduous broadleaf communities form distinctive woodlands on deep, well-drained soils. Garry Oak woodland is found on drier upland sites on

northwest-facing slopes. Associates are Digger Pine, Scrub Oak, and Big Manzanita at a combined cover totaling less than 20 percent. Trees rarely exceed 50 feet in height.

Black Oak woodland is found on upland sites on north-facing slopes, usually near pine stands, and often grading out into Black Oak savannahs. Cover values read 95% and trees are up to 75 feet in height.

Mixed oak woodland communities are variable in composition, but are predominantly Black Oak, Canyon Oak, Digger Pine, Madrone, Buckeye, and Western Yellow Pine. Garry Oak occurs on the driest, best drained sites; Bay occurs on the most mesic sites. The shrub understory is predominantly Big Manzanita and Poison Oak, but usually occurs in patches. California Fescue, California Melic, and perennial bromes attain their greatest abundance in this community. The degree of herbaceous understory development is dependent upon the percent overstory cover -- a high percent of tree or shrub cover and/or steep, cold, north slopes restrict herb composition and density. The community is found on northwest, north, and east-facing slopes.

Blue Oak woodlands are found on south and west exposures at lower elevations. They are indicators of intrusion of foothill zone vegetation into the ridge-canyon zone. Soils are thin and relatively poor. Occasionally Big Manzanita, Poison Oak, Elderberry, and Buckeye occur in low numbers. The herbaceous understory is either California Annual Grassland or Native Herb communities; however, these are usually poorly developed in the woodland as contrasted to the savannah.

Scrub Oak woodland occurs in small patches of 10 acres or less; those in the Squaw Creek drainage are a good example. It has a much different physiognomy from that in adjacent chaparral where this oak is a subdominant. In the woodland community, the trees are 12 to 16 feet high and 10 to 13 feet apart. Mountain Mahogany, Eastwood's Manzanita, and a few Big Manzanita are present in the shrub layer.

FORESTS

Forests are vegetation whose principal dominants exceed 75 feet in height. There are two types that occur in the central Mayacmas Range:

Coastal Ponderosa type, made up of Yellow Pine-manzanita; Yellow Pine-oak; and Yellow Pineparkland communities
Climax Douglas Fir, made up of fir-pine-oak-Madrone; and Douglas Fir-oak communities.

The Yellow Pine-manzanita community is a low sere stage and best developed on rhyolitic soils of Cobb Mountain. It consists of Yellow Pine (2 to 75%) and Big, Hoary, and/or Whiteleaf Manzanitas (20 to 60%). A few plants of Bush Chinquapin and, occasionally, Squaw Carpet may be present.

Pine-oak forests are not widespread, but isolated stands occur here and there in the range. Good examples are found in the vicinity of P.G.& E. Unit 13 and Socrates Mine headquarters. The Yellow Pine-oak community

is homologous to the Coastal Ponderosa Pine Forest of other classifications. Stand surveys indicate minor variability between stands but dominants are: Canyon Oak, Bay - at lower elevations and ecotonal to riparian - Sugar Pine (*Pinus lambertiana*), Nuttall's Dogwood, Squaw Carpet, Deerbrush, manzanitas, Bush Chinquapin. The herbaceous layer is highly variable but iris, Bracken Fern, California Fescue, and Drew's Silky Lupine (*Lupinus adsurgens*) are common. Cobb Mt. Lupine is also found in this community.

Yellow Pine Parkland is an uncommon community in the Mayacmas Range. Two of the best examples are Caldwell Pines and Cobb Mountain, though they differ significantly. At Caldwell Pines, canopy cover of the pines varies between 40 to 75%. Garry and Black oaks are present, but both have a low frequency. Eastwood's Manzanita and Big Manzanita are common tall shrubs. Squaw Carpet is common and there are several specimens of St. Helena Ceanothus (*C. divergens* ssp. *confusus*). Rock Spiraea (*Holodiscus boursieri*), Wild Blackberry (*Rubus leucodermis*), and *Rosa spithmea* occur occasionally. The more common herbs are Idahoe Fescue (*Festuca idahoensis*), Thread and Needlegrass, Narrow-leaved Penstemon (*Penstemon heterophylla*), Western Cheatgrass, Malpias Fescue(*Festuca megalura*), Drew's Silky Lupine, and Broad-leaved Lupine (*Lupinus latifolius*).

On Cobb Mountain two associations of Yellow Pine Parkland occur. The first is found on south and western slopes. Composed of Western Yellow Pine (10 to 100% cover) and scattered Sugar Pine (0 to 10% cover), the understory is its distinguishing characteristic. Bracken Fern, Drew's Silky Lupine, and iris are the herbaceous dominants. Also occurring are the beautiful Cyclademia (*Cyclademia humilis*), Forest Madder (*Kelloggia gallioides*), California Bedstraw, White-flowered Hawkweed (*Hieracium albiflorum*), Applegate's Paintbrush (*Castilleja applegateii*), and Cobb Mt. Lupine. Occasionally, a specimen of Squaw Carpet is found on the forest floor.

The second association occurs on east-facing slopes, and is best developed on moister sites. Tree cover is again Western Yellow Pine (95%) and Sugar Pine (5%), but the understory dominants change noticeably: the bunch grasses Mountain Brome (*Bromus marginatus*) and Idahoe Fescue are dominant, with Bracken Fern and Drew's Silky Lupine interspersed. In moister areas, the gentian *Frasera albicaulis spemitida* occurs. The composite, Silver Crown (*Cacaliopsis nardosmia*), is occasionally found on drier sites. In both these associations, the Pine Woods Lousewort (*Pedicularis semibarbata*) occurs.

On north-facing slopes, mostly below 4000 feet, Douglas Fir, Black Oak, and Madrone begin to infiltrate the pine forest. This forest is strikingly different from the Yellow Pine forest in composition, density, and aspect. At the 3200 to 3800 foot level, this forest is characterized by Douglas Fir (50 to 70%), Nuttall's Dogwood (2 to 10%), Western Yellow Pine (10 to 30%), Black Oak (5 to 30%. In draws and on steep northeast-facing slopes at higher elevations, Canyon Oak may form 30 to 50% of the stand. In lower draws, Big-leaf Maple and Bay are common, Occasionally, Giant Chinquapin (*Castanopsis chrysophylla*) is found. Probably the most common shrubs at higher elevations are Snowberry

(Symphoricarpos albus) and Deerbrush. At middle elevations, Coffeeberry, Shrubby Live Oak, and Gooseberry *(Ribes sp.)* are common understory plants. Manzanita is sparsely distributed at all elevations. Herbaceous understory is usually sparse but distinctive. Bracken Fern is as common as in the pine forest, but different lupines, Broad-leaved Lupine and Anderson's Lupine *(Lupinus andersonii)* are found scattered in small colonies. Other distinctive plants are the ericaceous leafless Wintergreen *(Pyrola aphylla)* and Sugarstick *(Allotropa virgata)*. California Butterweed *(Senecio aronicoides)* and White-flowered Hawkweed, both composites, occur occasionally at middle altitides.

PONDS

The almost total absence of natural lakes and ponds in the Mayacmas makes this range somewhat unique. The Blue Lakes on the extreme northern border are the notable exception, though they are hardly "in" the Mayacmas since they lie on the fault that divides the Mayacmas from the ranges to the north. Lake Mendocino, a large man-made reservoir, lies on the northwest corner of the range and technically is also out of the mountain range. However, the aquatic plants listed in the flora will probably apply to those waters as much as it does to the small ponds found throughout the Mayacmas.

The smaller ponds are all man-made reservoirs, mostly for stock watering or mining operations. The pond margin flora is much more predictable than the plants found within the waters. Becuase they are man=made and most spring fed, marginal flora often reflects the vegetation of the spring itself. Nevertheless, the Cattail *(Typha latifolia)* is the most common plant followed by the several species of *Juncus*. Any or all or none may be present. Very few *Carex* species are encountered, and while *Carex densa* or *C. dudleyi* may be present with some constancy, they are normally not important in the vegetation. *Epilobium adenocaulon* has a high constancy but is rarely found in great numbers. Mud flats formed where waters recede in the summer offer a tenuos habitat for *Ranunculus alismaefolius, Potamogeton natans,* or *Polygonum amphibium,* as well as Rabbit's Foot Grass *(Polypogon interruptus)*. The richness of the soil seems to be influential in governing the diversity of species. Graywacke sandstone and serpentine derivative substrates apparently limit the array of species. The relative age and configuration of ponds also contribute to low species diversity by immature substrate, depth of water, and introduction of seed.

While many ponds have not been thoroughly investigated, the species in the flora listed under aquatic weeds will serve as an indicator until a broader survey is accomplished.

SEEPS

The Seed community is often a part of the continuum of the Wet Meadow, changing gradually as the flow is concentrated toward the source. Seeps representing any portion of the continuum may be expressed as a result of ground configuration and soil water disposition. The source area is typically a mass of Chain Fern *(Woodwardia fimbriata)*, except at the lowest elevations toward

the western foot of the range. There the fern may be omitted and the Juncus-Mimulus-Carex association found, which typically forms the next level of the continuum. In order of their constancy and high fidelity, principal species are:

Juncus tenuis
J. effusus var. *pacificus*
Juncus balticus
Polypogon interruptus or
P. monospeliensis
Carex densa and other species
Mimulus guttatus or rarely
M. moschatus,
Nasturtium officinalis
Agrostis scabra
Rumex acetosella
Calamogrostis canadensis
Hordeum depressum

SPRINGS

Springs have a different character. The source is usually a dense growth of Chain Fern, with *Carex densa* lining the edge of the brook and *Mimulus guttatus* and *Juncus* species immediately adjacent. *Horkelia californica* or *Potentilla glandulosa* together with a wide variety of grasses are common. *Helenium pulerulum*, several of the *Rubus* species, especially *R. leucodermis* , and California grape (*Vitis californicus*) may be found.

ANTHROPOGENIC

Anthropogenic communities are those whose existence is dependent upon or the result of man's actions to replace natural vegetation. These may include yards, revegetation measures, agricultural fields, and managed pasture lands. Revegetation measures have introduced a number of weeds, grasses, and shrubs that appear to have gained a foothold. Among the more important of these species are Orchard Grass, Tall Fescue, wheat grasses, and especially the weedy shrubs French and Spanish Brooms *(Cytisus monspessulanus & Spartium junceum)*. French Broom is very widespread in mesic communities at low altitudes and is advancing into native communities. Spanish Broom appears to be largely restricted to the Mt. St. Helena area. Himalyan Blackberry *(Rubus procerus)* is aggressively occupying many spring, seep and riparian areas in the south and central Mayacamas. Periwinkle, iris, and daffodils usually persist for several decades following abandonment of habitations and may be their only remaining mark. Horehound *(Marrubium vulagre)* usually marks points where livestock have been concentrated and fed.

RUDERAL

These communities may be related to Old Field Communities especially at lower altitudes, but their characteristics are allied to primary succession of the locale in which some major earth disturbance has occurred. At high elevations,

the predominant species are Bull Thistle *(Cirsium vulgare)*, Red Brome, Cheatgrass, Dogtail Grass *(Cynosurus echinatus)*, and Woolly Sunflower *(Eriophyllum lanatum)*.

At lower altitudes, Ripgut, Soft Chess, lupine species, and Vinegar Weed often mark such places. Early invading shrubs are Coyote Bush *(Baccharis pilularis* ssp. *consanguinea)* especially where subsoil moisture is present. Shrubby Mimulus *(Mimulus auricatia)* occupies rocky sites, and Yerba Santa is almost predictable at all mid and higher sites.

INTRODUCED ANNUAL GRASSLAND

The Introduced Annual Grassland is a result of the livestock industry of the historical past in California. Spanish herds introduced a wide variety of hardy annual plants from North Africa and the Mediterranean region (Burcham, 1957; Crampton, 1974). At the same time, the tendency to overgraze reduced or eliminated many of the species that originally occupied California's perennial grasslands. Common introduced species found in this community are:

Soft Chess	*Bromus mollis*
Ripgut	*B. diandrus*
Red Brome	*B. rubens*
Western Cheatgrass	*B. tectorum*
Wild Oats	*Avena fatua*
Slender Wild Oats	*A. barbata*
Annual Hairgrass	*Aira caryophylla*
Foxtail Fescue	*Festuca megalura*
Little Quaking Grass	*Briza minor*
Dogtail	*Cynosurus echinatus*
Golden Top	*Lamarckia aurea*
Filarees	*Erodium botrys, E.cicutarium, E. moschatas*
Bur Clover	*Medicago polymorpha*
Bull Thistle	*Cirsium vulgare*
Napa Thistle	*Centaurea melitensis*
Vernal Whitlow Grass	*Draba verna*

A number of hardy natives also grow in these grasslands, they are also a part of the Native Herb community. The more common species are:

Popcorn Flower	*Plagiobothrys nothofulvus*
Tri-colored Gilia	*Gilia tricolor*
Blue-field Gilia	*G. capitata*
Valparaiso Clover	*Trifolium microdon*
Indian Clover	*T. dichotomum*
Sour Clover	*T. fucatum*
Common Linanthus	*Linanthus androsaceus*
Yellow Owl's Clover	*Orthocarpus attenuatus*
Napa Cryptantha	*Cryptantha hispidula*
Fringe Pod	*Thysanocarpus laciniatus*
Dwarf Athysanus	*Athysanus pusillus*
Clarkia	*Clarkia gracillis*

Summer annuals are Tarweed (*Hemizonia luzulafolia, H. fitchii*), Gumplant *(Grindelia hirsutula, G. camporum)*, and Vinegar Weed *(Trichostema lanceolatum)*.

OLD FIELD

Old field communities reflect the nature of the agricultural practice that preceded it. In most cases, Old Field communities in the Mayacmas Mountains stem from old orchards; however, some grain, oat-vetch hay and pasture are found in small flats, especially at lower altitudes. The other and perhaps more common communities are those developing around old barnyards.

The former group of communities are marked by tress, plow dead furrows or disc marks. Few are younger than 2 decades and most are much older. Their species composition is highly variable by are marked by very high percentages of Wild Oats, Ripgut, Soft Chess, and either of both Yellow Star Thistle and Bull Thistle. Old hay fields commonly have tarweeds *(Hemizonia* species) or *Lagophyllum* species along with the grass. On poorer soils, ephemeral annuals predominate and may include lupines and a variety of weedy composites.

RIPARIAN

The Spring community grades into the several modifications of the riparian vegetation. These vary considerably depending upon stream gradient, substrate, and altitude. Riparian communities are principally differentiated by the arboreal layer. Plants with the highest combined frequency, constancy, and fidelity are:

Torrent Sedge	*Carex nudata*
California Grape	*Vitus californicus*
Slender Rush	*Juncus tenuis*

Most remaining riparian species are associated with particular community types:

Bay-Oak-Maple -- higher and steeper elevations
Willow-Alder-Oak -- middle to low elevations
Cottonwood-Willow-Ash -- floodplain and low foothill
Rock Face -- shady canyons at all altitudes

The Bay-Oak-Maple community marks steep gradient, rock stream channels. They may be almost devoid of understory vegetation; but may have any of the following:

Polypodium californicum
Adiantum jordanii
Carex nudata
Juncus effusus
J. tenuis
Artemisia douglasiana

Open areas with deep soils and good vernal water supplies support the following in addition to wet meadow species:

Meadow Rue	*Thalictrum fendleri*
Fairy Bells	*Disporum hookeri*
Checker Lily	*Fritillaria lanceolata*

Shady areas support:

Spikenard	*Aralia californica*
California Sword Fern	*Polystichum californicum*
Coastal Wood Fern	*Dryopteris arguta*

The Willow-Oak-Alder community tends to be more heterogeneous and the dominants may change from place to place. The White Alder (*Alnus rhombifolia*), is more dominant at the higher altitudinal range, while willows dominate in the lower reaches. Oaks include typically Canyon Oak, some Coast Live Oak on the western slope and Black Oak in shady ravines. Common shrub associates are Spicebush (*Calycanthus occidentalis*), several blackberrys, Snowberry, and Squawbush (*Rhus trilobata*). Herbaceous plants with a high fidelity are Mugwort (*Artemisia douglasiana*), California Brickelia (*Brickelia californica*) and the three horsetails (*Equisetum sp.*).

The Cottonwood-Willow-Ash community is weakly represented in the Mayacmas, being limited ti the lowermost reaches of the major streams. The cottonwood (*Populus fremontii*) is not plentiful anywhere in the range, but is a reliable indicator of the community. Oregon Ash (*Fraxanus latifolia*) is more plentiful and may be found also in the Willow-Oak-Alder community. Willow, California Grape, and Poison Oak form a thicketlike border along streams. A wide varity of herbs are found. Most commonly noted are the Mugwort, Creeping Wild Rye (*Elymus triticoides* and *E. glauca*) and Cocklebur (*Xanthium strumarium*).

ROCK FACE

Rock Face communities are restricted to rock outcrops along the bottom of canyons usually with north or east exposures. They are invariably shaded, cool, and moist or at least low transpiration areas. The soil that supports them is highly organic and roots are either shallow or penetrate deeply into cracks of rocks. There is usually a moss cover next to the ground, mostly *Mnium sp.* with *Homalothecium nut.* present along with several foliose lichens. The higher plants present are mostly restricted to such sites; California Polypody (*Polypodium californicum*) is dominant, but Western Sword Fern (*Polystichum munitum*) and California Maidenhair (*Adiantum jordanii*) also occur. Pacific Stonecrop (*Sedum spathufolium*) is usually present. Alum Root (*Heuchera micrantha*) and Goldenback Fern are always present, but they may be there in small numbers. *Clarkia gracillis* is occasionally present on sunnier slopes.

III. KEYS AND COLLECTION DATA

KEY TO TREE FAMILIES

A. Leaves--needle-like

B. Seeds borne on scales formed into a cone . . . . . *Pinaceae*

BB. Seed borne on end of short stem and surrounded by a fleshy cap or aril . . . . . *Taxaceae*
Torreyana california

AA. Leaves--small scales closely appressed to stem . . . . . *Cupressaceae*

AAA. Leaves otherwise usually broad, flat, and with a well-defined petiole (leaf stem)

B. Leaves simple; i.e., a single blade on a single leaf stem shedding at the connection on the woody branch

C. Leaves pinnately veined

D. Plants with male parts (stamens) borne in flowers separate from female parts (pistils) and one or both flowers borne in catkins

E. Both male and female flowers borne in catkins

F. Female catkin 2-3 cm long, woody, cone-like, retained on stem for much of the year . . . . . *Betulaceae*

FF. Female catkins 3-10 cm long, soft, not woody nor conelike, usually not retained on the stem after maturity. . *Salicaceae*

EE. Male flowers borne on a catkin, female flower forming a nut (acorn) . . . . . *Fagaceae*

DD. Plants with male and female parts borne on the same flower.

E. Foliage strongly aromatic (the bay leaves of spices), leaves lanceolate 3-8 cm long; fruit a green or black drupe 2-2.5 cm long. Flowers borne in small umbels along a short stem 1-2 cm long . . . . . *Lauraceae*

EE. Foliage not aromatic (but see *Prunus*); leaves ovate or elliptic, fruit smaller, flowers not as above.

F. Flowers borne in umbels subtended by 4-6 large petal-like bracts, fruit a drupe 1-1.5 cm long, usually compressed into a fruit-like mass at maturity, leaves 6-12 cm long . . . . . *Cornaceae*

FF. Flowers borne in racemes or panicles, fruit smaller, borne in loose clusters

G. Leaves ovate 3-8 cm long, underside finely pubescent, margin finely serrulate; fruit a dark red drupe, 5-6 mm long, borne on a raceme . . . *Rosaceae*

GG. Leaves eliptic 6-12 cm long, glabrous margin entire; fruit a bright red berry borne on a panicle; bark and branches a dark red which peels off annually . . . . . *Ericaceae*

CC. Leaves palmately veined

D. Stems, inner bark and petioles exuding white latex when broken, fruit a "fig" . . . . . *Moraceae*

DD. Stems without latex; fruit of two-winged carpels united below (samara) . . . . . *Aceraceae*

BB. Leaves compound; i.e., several leaflets attached to a common stem (petiole) by short stems (petiolules) the petiole shedding from the branch at the connection at its base.

C. Leaves pinnately compound.

D. Leaflets 5 or less, Terminal leaflet larger than lateral leaflets.

E. Leaflets 5 to 7; terminal leaflet entire. . . *Oleaceae*

EE. Leaflets 3 or occasionally 5; terminal leaflet 3 to 5 lobed. . . . . *Aceraceae*

DD. Leaflets 15 to 19, mostly of equal size; fruit a nut . . . . . *Juglandaceae*

CC. Leaves palmately compound.

D. Flowers in a large raceme (12-30 cm across). Fruit a blue berry many per raceme. . . . . *Caprifoliaceae*

DD. Flowers in a large showy raceme, fruit one or at most 2 per raceme, a large leathery capsule 2 to 3 cm in diameter . . . . . *Hippocastanaceae*

ACERACEAE — MAPLES

KEY

Leaves simple palmately veined, about as long as broad; 10 to 25 cm across, deeply 3 to 5 lobed . . . . . *Acer macrophyllum*

Leaves pinnately compound; 3 leaflets terminal leaflet largest and 3 to 5 lobed, 5 to 12 cm long . . . . . *Acer negundo*

Acer macrophyllum Pursh — Big-leaf Maple

Habitat: riparian, along draws, east-facing slopes on deep soils; mesic areas.

Abundance: common within habitat, habitat somewhat restricted.

Major communities: bay - maple - madrone; Black oak - bay - maple

Remarks: Occurs mostly as a subdominant in zonal communities and sometimes as an understory member of preclimax Douglas fir forest.

Acer negundo L. ssp. californicum (T&G) Wesmael — Box Elder

Habitat: Riparian, mostly below 1500' in lower foothills; in water courses usually on deep alluvium soils.

Abundance: Occasional to locally common.

Major community: Riparian - willow - oak - alder.

Remarks: This is not an important species in the Mayacmas since it is limited to the lower reaches of the streams. It rarely reaches its full stature even where it is completely dominant such as in High Valley Creek in Lake County.

BETULACEAE — ALDERS, BIRCHES, HAZELNUTS

Alnus rhombifolia Nutt. — White Alder

Habitat: restricted to perennial watercourses, mostly below 3200'.

Abundance: Occasional to locally common. It varies from a dominant to present but with high fidelity.

Major communities: Riparian; willow - alder - oak.

Remarks: This species dominates or is a subdominant in cool canyons mostly between 3200' down to 2000', below that it becomes a subdominant. Its frequency becomes much lower in warmer exposures and at lower altitudes.

CORNACEAE — DOGWOODS

Cornus nuttallii Aud. — Mountain Dogwood

Habitat: cool forests and woodlands above the 3000' level, on deep soil, mostly on northern and eastern exposures.

Abundance: Common to occasional.

Major communities: Mixed conifer and evergreen woodlands. Douglas fir - Black oak - yellow pine forests; Black oak- madrone- riparian woodland.

Remarks: This lovely tree is characteristically an understory member of conifer-broadleaf forests.

CUPRESSACEAE — CYPRESS

KEY

A. Ovulate cones pendulous, oblong 2 to 2.5 cm long by 1 to 1.5 cm wide; 3 pair of oblong imbricated scales maturing the first year. Branches compressed vertically forming broad flat sprays. *Libocedrus decurrens*

AA. Ovulate cones globose 2 to 2.5 cm borne at right angles to the stem scales peltate.

B. Ovulate cone scales with a pronounced conical umbo 2 to 4 mm high, foliage gray green with a glandular pit. *Cupressus macnabiana*

BB. Ovulate cone scales mostly smooth with an inconspicuous umbo, foliage dull green without glands but often with deep pits. *Cupressus sargentii*

Calocedrus decurrens Torr — Incense Cedar

Habitat: cool, rocky canyons

Abundance: Rare* in the Mayacmas Mountains. Populations are restricted to 4 specimens on Hot Springs Creek (near PG&E Power Units 9 and 10) and to a small population along St. Helena Creek, also along High Valley Creek.

Major community: Mixed conifer woodlands. On St. Helena Creek it occurs in the ecotone between a Sargent's cypress woodland and a Black oak - pine woodland.

* Rare is used here in the floristic sense and does not refer to designations pursuant to California Native Plant Protection Act (Chapter 10, Fish and Game Code) or to Federal Endangered Species Act.

Cupressus macnabiana A. Murr — MacNab Cypress

Habitat: mostly on serpentine derived soils, ecotones bordering serpentine outcrops or on soils overlying serpentine.

Abundance: occasional to common within habitat but the habitat is only occasional.

Major communities: Cypress woodland and knobcone-manzanita.

Remarks: This species is occasionally found in pure stands but most commonly with Sargent's cypress. It is not nearly as abundant as Sargent's cypress.

Cupressus sargentii Jeps. — Sargent Cypress

Habitat: Mostly on serpentine derived rocky or stoney soils.

Abundance: Abundant to common within its habitat but its habitat is restricted.

Major communities: Cypress woodland, pine - cypress woodland.

Remarks: This species often grows in stands so thick that it forms a pigmy forest four to six feet high. In other areas, it attains a height of 75 feet, forming a very picturesque tree. It seems to be highly flammable and does not stump sprout. Fire encourages heavy seedling regrowth.

ERICACEAE — HEATHS

Arbutus menziesii Pursh — Madrone

Habitat: Hillsides of any exposure and many soil types. it does best on deeper soils in mesic or subxeric areas.

Abundance: Abundant to common.

Major communities: Shrubby live oak. Oak - bay - madrone; Douglas fir - black oak - madrone; bay - maple - madrone; and madrone woodlands.

Remarks: In chaparrals this tree rarely achieves arborescence because of periodic fires and the attacks of fungi. It readily crown sprouts and forms multi-stemmed clumps.

In woodlands is occasional to common as a codominant or dominant to bay and oaks. Occasionally it will

form monotypic stands where it is in exclusive control. It can attain a height of 60 to 70 feet in sheltered canyons having an abundance of water.

FAGACEAE — OAKS

KEY

A. Trees evergreen, leaves thick, tough and leathery.

B. Fruit a spiny burr with 1 to 3 nutlets.

C. Leaves entire, underside golden (young) to olive yellow (aged) tomentose, tapering at both ends. *Castanopsis chrysophylla*

CC. Leaves coarsely serrate, underside brown tomentose; rounded at the base and tapering at the distal end. *Castanea mollissima*

BB. Fruit an acorn; i.e., a single nut partially enclosed at the base by an involucre (cup) covered with tiny scales or tubercules.

C. Involucre (cup) tomentose on inner surface; outer surface covered with narrow pointed pliable spreading scales 5 to 7 mm long. *Lithocarpus densiflorus*

CC. Involucre not as above.

D. Leaves mostly less than 2 cm. long, involucre tuberculate at least toward the base and rusty tomentose, low tree. *Quercus dumosa*

DD. Leaves larger mostly longer than 2 cm. Involucre covered with thin scales 1 to 1.5 mm broad.

E. Involucre 8 to 12 mm across, purbulent especially toward the base; acorn narrow and pointed, maturing the first year. *Quercus agrifolia*

EE. Involucre 20 to 25 mm across, scales mostly hidden by a dense tomentum; acorn oblong, almost as broad as long, maturing the second year. *Quercus chrysolepis*

AA. Trees deciduous, leaves thinner.

B. Leaves usually 10 cm long, with deep sinuate lobes, each lobe with 3 or 4 bristle-tipped teeth; acorn oblong, 2.5-3 cm long by 1.5 - 1.8 cm wide. *Quercus kelloggii*

BB. Leaves mostly shorter, variously lobed but without bristle tips.

C. Leaves blue green entire or with a few undulate, shallow lobes; acorn 2 to 3 cm long and tapered at apex. *Quercus douglasii*

CC. Leaves green with 3 or 4 pairs of deep lobes; acorn longer and tapered or as long and rounded.

D. Acorn 3 to 5 cm long, conical; involucre enclosing up to 1/3 of the nut. Trees mostly on flood plains and low rolling hills. *Quercus lobata*

DD. Acorn 2 to 3 cm long ovoid and rounded at the apex; Involucre shallow. Trees mostly on uplands and sunny hillsides. *Quercus garryana*

Castanea mollissima Blume — Chinese Chestnut

Habitat: southwest facing slope at Happy Jack's cabin.

Abundance: one specimen

Major community: Anthropogenic.

Remarks: Introduced as a cultivar. Marks the site of old habitations often with walnuts and prunes.

Castanopsis chrysophylla (Dougl.) A.DC — Giant Chinquapin

Habitat: North- and east-facing slopes on deep ryolitic soils.

Abundance: rare to occasional

Major Communities: Douglas fir-forest, fir - oak - maple.

Remarks: Observed on Cobb Mountain.

Lithocarpus densiflora (H & A) Rehd. — Tanbark Oak

Habitat: Restricted to deep soils in heavy rainfall areas above 2800'.

Abundance: Abundant to common within its habitat, but the habitat is strongly manifested only near Mt. St. Helena and Pine Mountain.

Major Communities: Fir - pine - oak forest, tan oak woodland.

Remarks: Both of these stands were harvested in the late 1800's as a source of tannin for the hide processing industry of San Francisco.

Quercus agrifolia Nee — Coast Liveoak

Habitat: This species is the common evergreen oak in both tranzonal and zonal communities, mostly on deep soil, and mesic sites.

Abundance: Common to abundant on slopes and watercourses in the western portion of the range. It reaches to a point one mile above the county bridge on Big Sulfur Creek. For the next four miles it is gradually replaced by canyon oak and many hybrids can be found. Athigher altitudes it is replaced by Canyon oak west of Squaw Creek and at the head of Pieta Creek.

Major Communities: Riparian ecotones, oak - bay - maple.

Quercus chrysolepis Liebm. — Canyon Oak, Maul Oak

Habitat: Mesic sites which are well drained but with deep soil or loose fissured rocky soils--all exposures.

Abundance: common to abundant at all altitudes.

Major communities: Mixed oak woodland, canyon oak woodlands, riparian ecotones, oak - bay - maple, Douglas fir - oak forests.

Remarks: This species occurs as a large, spreading tree, or as a low to moderate-sized shrub. It hybridizes freely with several other species in the Mayacmas Mountains.

Quercus douglasii H. & A. — Blue Oak

Habitat: Sunny, well-drained hillsides with deep soils mostly on south and southwest exposures.

Abundance: Common below 1800', rare above 2500' and narrowly restricted to expressions of ideal habitat.

Major Communities: Blue oak savannah, blue oak woodland, mixed deciduous oak woodland.

Remarks: Clearly a foothill tree forming open grassy woodlands or savannahs. Occasionally found on deep soils with sunny south-facing exposures up to 2800', but only as small isolated patches of the community. It often hybridizes with canyon oak in such areas.

Quercus dumosa Nutt. Scrub Oak

Habitat: Mesic to sub-xeric sites with moderately deep, well-drained soils. Occurs mostly on south, west, and north-facing slopes.

Abundance: Locally abundant in ideal habitat but otherwise scattered groups in stands of other shrubby oaks. Many hybrid forms with *Q. chrysolepis* and *Q. wislenii* var. *frutescens*.

Major Communities: Shrubby live oak, scrub oak woodland,

Remarks: This species occurs as isolated low woodland or chaparral with scattered specimens of mountain mahogany and buck brush. It will have a dense canopy but small trunks, usually devoid of the tangle of low branches characteristic of other chaparral oaks. In the tree form it rarely attains a height over 9' (3 meters).

Quercus garryana Dougl. Garry Oak

Habitat: Deep soils on south and western exposures, middle altitudes.

Abundance: occasional to common.

Major Communities: Garry oak woodland, garry oak savannah.

Remarks: This oak is often mistaken for *Q. lobata*, but is clearly ecologically separated as well as morphologically except for a few hybrid swarms. Garry oak occupies warm sunny hillsides forming open woodlands or savannahs, mostly above 1000'. *Q. lobata* is strongly restricted to flood plains and riparian habitats that have deep well-drained fertile soils.

Quercus kelloggi Newl. California Black Oak

Habitat: Mesic sites on well-drained soils. Can be found on all exposures but most common on north and east exposures; mostly above 1600'.

Abundance: Occasional to common.

Major Communities: Black oak woodland, bay - oak - maple; Douglas fir - oak - maple. Oak - madrone - bay.

Remarks: Formerly a principal species harvested by Indians for its acorns.

Quercus lobata Nee — Valley Oak

Habitat: Strongly restricted to flood plains and low rolling foothills at low altitudes. Requires deep, rich, well-drained soil.

Abundance: Occasional to common

Major Communities: Valley oak woodland, valley oak savannahs, riparian ecotones in middle reaches of larger streams.

Remarks: This large graceful white oak appears to be sharply separated ecologically from Garry oak in the Mayacmas Mountains, although several hybrids have been observed. Valley oak occupies the flood plains while Garry oak the steep less fertile hillsides.

HIPPOCASTANACEAE — BUCKEYES

Aesculus californica (Spach) Nutt — California Buckeye

Habitat: Open or partially wooded hillsides up to 2500 feet, often associated with intermittent stream courses. More commonly found on east and northern exposures.

Abundance: rare to occasional.

Major communities: Riparian ecotones, oak - madrone - maple. Blue oak woodland.

Remarks: This tree is usually the first deciduous tree to leaf in late winter or early spring. On dry sites or when water stress occurs it will lose its leaves by early summer, leaving only the heavy single seeded pod attached to fruiting branches.

JUGLANDACEAE — WALNUTS

Juglans hindsii (Jeps.) Jeps. — California Black Walnut

Habitat: In its natural state this tree is most likely found adventitive along stream ecotones; however, it commonly is an abandoned cultivar, hence found in very unlikely spots.

Abundance: rare

Major communities: Stream ecotones, anthropogenic communities.

Remarks: The specimens in the Mayacmas Mountains are usually found around old habitations, especially at higher altitudes there may be specimens of *J. californica* present. Specimens that are close to *J. hindsii* are occasionally found along water courses at the lower altitudes but again whether they are escaped cultivars or true natives is difficult to determine.

LAURACEAE BAY

Umbellularia californica (H.&A.) Nutt California Bay

Habitat: Rich, deep to shallow soils, moderately well drained in mesic sites.

Abundance: common to abundant

Major communities: Stream ecotones, oak - bay - maple; bay - oak - madrone.

Remarks: This species is wide-spread, and occurs both as a spreading tree and large shrub. Recurrent fires prevent its arboreal expression in montane chaparral. There seems to be no genetic segregation between shrubby form and the arboreal specimens since the arboreal form will develop where fire suppression exceeds 15 years.

The intense aroma of its evergreen foliage makes selected specimens useful as the spice "bay leaves." Most California specimens taste somewhat sharper than the East Indian representatives.

MELIACEAE MAHOGANY

Melia azedarach L. Chinaberry

Habitat: cultivar. Sometimes used as an ornamental around old habitations and mines.

Abundance: rare

Major communities: anthropogenic.

MORACEAE — MULBERRY

Ficees caria L. — Common Fig

Habitat: A cultivar or adventative along major watercourses.

Abundance: occasional to rare.

Major communities: Anthropogenic or riparian.

Remarks: This species apparently was introduced as a cultivar. It is found adventive along several watercourses downstream from its original point of introduction.

OLEACEAE — OLIVES

Fraxanus latifolia Benth. — Oregon Ash

Habitat: Riparian below 1600'

Abundance: rare to occasional

Major communities: Riparian, willow - cottonwood - ash; willow - oak - alder.

Remarks: Occurs at the lowest levels of major watercourses near where they enter the flood plain.

PINACEAE — PINES

KEY

A. Needles single 2 to 3 cm long arranged along the stem, fruit a cone with a prominent three lobed bract subtending each scale. *Pseudotsuga menzesii*

AA. 3 to 5 needles bound at their base by small scaly sheaths into bundles. Fruit a cone.

B. 5 needles per bundle *Pinus lambertiana*

BB. 3 needles per bundle.

C. Trunk usually branched or forked in age, foliage appearing gray green, cone pendent, large 15 to 25 cm long, scales stout with large down-curved projections (umbos). *P. sabiniana*

CC. Trunk rarely forked, foliage green, cone smaller.

D. Tree 15 to 70 m high, bark fissured forming large flat plates, leaves 12-25 cm long, rows of stomates indistinct, cones 7-15 cm long, pendulous and deciduous after ripening, scales thin and slender, umbos small, tipped with outward projecting prickle. *P. ponderosa*

DD. Tree 2 to 15 m high, bark thin, rough, not fissured into plates, leaves 8-17 cm long, rows of stomates prominent, cones 7-12 cm long, remaining closed and adhering to branch many years. Scales broader and thicker, umbo larger with a pronounced knob, prickle small and incurved. *P. attenuata*

Pinus attenuata Lemmon — Knobcone Pine

Habitat: Subxeric to moderately mesic sites with deep to shallow relatively infertile rocky soils including some serpentine on most exposures above 1800 feet.

Abundance: common to locally abundant.

Major communities: Pine - cypress, pine - manzanita

Remarks: This is a short-lived, close cone pine that is fire dependent. Hot fire is usually required for germination and the breaking open of the cones. Often associated with strongly montmorillonite clay soils.

Pinus ponderosa Dougl. ex P&C — Western Yellow Pine, Ponderosa Pine

Habitat: subxeric sites on deep to moderately shallow fertile soils, above 2000 feet.

Abundance: occasional to locally abundant.

Major communities: Pine - oak - madrone, fir - pine - oak; pine parkland.

Pinus sabiniana Dougl. — Digger Pine

Habitat: Xeric or subxeric sites on rocky shallow soils, mostly below 3000 feet.

Abundance: occasional to locally common

Major communities: Digger pine shrub, pine - oak - manzanita.

Remarks: This tree is associated with many types of chaparral and in the absence of fire may become dominant or codominant with oaks.

Pinus lambertiana Dougl. Sugar Pine

Habitat: Deep soils relatively free of recurrent hot fires, mostly above 2800 feet. All exposures, but most commonly on north and east-facing slopes.

Abundance: rare to occasional

Major communities: Mixed pine - fir, adventative in montane chaparral.

Remarks: This pine was probably much more common and widespread. It was heavily and selectively logged for lumber and shingles during the late 1800's and early 1900's. Only a few large specimens remain, mostly on Cobb mountain and north of Mt. St. Helena.

Pseudotsuga menziesii (Mirb.) Franco Douglas Fir

Habitat: Deep rich soils on mesic sites, mostly on east, north and northwest slopes. Commonly associated with ravines and watercourses which do not burn readily.

Abundance: common to locally abundant

Major communities: Douglas fir forest, fir - pine - oak, fir - oak - maple, pine - fir - oak.

Remarks: This species forms the climax community type toward which most of the oak - maple, and mixed conifer communities develop in the Mayacmas Mountains.

ROSACEAE

Prunus persica Batsch Peach

Habitat: Cultivar relict of habitation.

Abundance: rare

Major community: anthropogenic

Prunus virginiana var. *demissa* (Nutt) Sarg. Western Chokecherry

Habitat: Riparian ecotones.

Abundance: rare

Major communities: Riparian, willow -oak - alder

SALICACEAE — WILLOWS

KEY

A. Leaves deltoid about as long as wide, 4 to 7 cm. *Populus fremontii*

AA. Leaves lanceolate or obovate, much longer than wide.

B. Foliage gray green on both sides, leaves linear lanceolate margins finely glandular serrulate peticles 6 to 10 mm, stipules often glandular, stamens 4-5. *Salix goodingii*

BB. Foliage dark or light green above, not grayish, leaves subentire to denticulate.

C. Foliage light green above paler and more glaucous beneath, leaves lanceolate to oblanceolate and acute at apex, acute to rounded at base, closely serrulate; stipules small glanular toothed, petioles .2 to 10 mm not glanular. Stamens 2 to 6. *Salix laveigata*

CC. Foliage dark green, shining or lustrous above, glaucous and light green beneath.

D. Leaves 6 to 10 cm by 1 to 2 cm oblanceolate, acute or obtuse at both ends, but narrowed toward the base, appearing broader above the middle, nearly entire, often sub-revolute, dark green above, pubescent to glabrate and glaucous, usually appearing gray beneath, petioles 3 to 12 mm; stipules none or small ovate; stamens 2 with glabrous filaments. *Salix lasiolepis*

DD. Leaves 6 to 10 cm long by 1.5 to 3.5 cm wide (much londer on young sprouts), acuminate at apex, acute to rounded at base; margins closely glandular, serrate, dark green and shining above, glaucous beneath; stipules small, rounded, acute, glandular on margins; petioles 5 to 15 mm, glandular at upper end; stamens 4 to 5 hairy below. *Salix lasiandra*

Populus fremontia Wats — Fremont's Cottonwood, Poplar

Habitat: Stream margins on alluvial soils below 1500' usually on warm sunny sites.

Abundance: occasional.

Major communities: Riparian; willow - cottonwood - ash, willow - oak - alder.

Salix goodingii Ball — Goodings Willow

Habitat: Stream margins and seeps mostly between 2000' and 2800' altitude.

Abundance: Locally abundant but occurs only at widespread sites--not common to all streams and seeps.

Major communities: willow break

Collections: Neilson 2733, Socrates Mine Hdqts., 3022, Old Mercuryville

Salix laevigata Bebb — Red or Polished Willow

Habitat: Stream margins below 1800' altitude.

Abundance: occasional between 1500' and 2500', common at lower elevations.

Major communities: Willow - cottonwood - ash, willow - oak - alder.

Remarks: There is apparently hybridization between the three common willows and some stands are difficult to assign (arroyo, yellow, and red).

Salix lasiandra — Red Willow

Habitat: Stream margins, low elevation.

Abundance. occasional to locally common.

Major communities: willow - cottonwood - ash.

Salix lasiolepis Benth — Arroyo Willow

Habitat: Margins of major streams, mostly below 1500' elevation and usually on warm sunny sites.

Abundance: occasional

Major communities: willow - cottonwood - ash, willow - oak - alder.

TAXACEAE — YEWS

Torreya ana californica Torr. — California Nutmeg

Habitat: Mesic sites on moderately shallow to deep, rich soils; mostly on north and east exposures.

Abundance: Occasional,

Major Communities: Oak-bay-madrone; Fir-oak-maple; Bay-madrone. For shrub form see shrub section.

Remarks: This species is more commonly encountered as a shrub in scrub communities, but when protected from severe fires it attains a height of 15 to 20 feet in the communities indicated.

KEY TO SHRUB AND VINE FAMILIES

A. Plants shrubby, not vines or lianas.

B. Leaves compound.

C. Leaves palmately compound (7 to 11 leaflets): flowers papilionaceous . . . . . *Leguminosae (Lupinus)*

CC. Leaves pinnately compound (3 to several leaflets).

D. Leaflets mostly more than 3.

E. Leaflets 11 to 27, oblong-elliptical, rounded or retuse and mucronate at apex; branches, foliage, and inflorescence pubescent with both sessile and prickle-like glands; flowers red-purple, papilionaceous in racemes, 5 to 20 cm long. . . . . *Leguminosae (Amorpha)*

EE. Leaflets 3 to 9.

F. Leaves opposite; deciduous; flowers white.

G. Flowers in flat-topped cymes; berries usually blue, sometimes white . . . *Caprifoliacea (Sambucus)*

GG. Flowers in many flowered panicles 3 to 12 cm long; fruit a samara 2 to 3 cm long, flattened, winged on both sides. . . . *Oleaceae (Fraxinus)*

FF. Leaves alternate; evergreen or tardily decidious; flowers colored.

G. Leaflets 5 to 9, 2.5 to 6 cm long, glossy green above lighter below, with 7 to 10 spinescent teeth on each margin; flowers yellow; berry blue-black. . . . . *Berberidaceae*

GG. Leaflets 3 to 7, 1 to 2 cm long, mostly glabrous, doubly serrate and gland tipped; stems armed with prickes or thorns; flowers pink; "rose hips" red . . . . . *Rosaceae (Rosa)*

DD. Leaves trifoliate.

E. Leaves large 8 to 15 cm; leaflets toothed or lobed; flowers small, regular, white; fruit a drupe *Anacardiaceae*

EE. Leaves mostly smaller; leaflets entire; flowers large, irregular, papilionaceous; fruit a legume *Leguminosae*

BB. Leaves simple.

C. Male and/or female flowers borne in catkins.

D. Both male and female flowers borne in catkins.

E. Leaves opposite, ovoid . . . . . *Garryaceae*

EE. Leaves alternate, linear, oblong. *Salicaceae*

DD. Males flowers only borne in catkins.

E. Plants of cool shady woods; leaves ovate, soft, pubescent on both sides, doubly serrate on margins; fruit a nut enclosed in leafy bracts. . . . *Betulaceae (Corifus)*

EE. Fruit 1 to 4 nuts enclosed or partly enclosed by thick, woody, and scaly or spinescent bracts.

F. Fruit a single nut (acorn), the basal portion (up to ½ its length) surrounded by receptacle bracts united into a "cup", bracts may be scaly or tuberculate . . . . . *Fagaceae (Quercus)*

FF. Fruit 1 to 4 nutlets enclosed in a spiny burr . . . . . *Fagaceae (Castanopsis)*

CC. Plants with male and female parts borne on the same flower.

D. Leaves alternate, round or reniform (kidney-shaped), 3 to 9 cm across (at least as broad as long); flowers magenta, appearing before the leaves; fruit a legume *Leguminosae (Cercis)*

DD. Leaves ovate to linear, mostly much longer than broad.

E. Leaves opposite.

F. Leaf margins entire (i.e. not lobed, toothed, or incised).

G. Leaves mostly more than 5 cm long.

H. Inflorescene cymose of many small flowers 3 to 6 cm across, each flower 4 to 7 mm across, color greenish-white . . . *Cornaceae*

HH. Inflorescence a single flower 4 to 12 cm across, color reddish-brown. . . . *Calycanthaceae*

GG. Leaves mostly less than 5 cm long.

H. Low, diffuse subshrub with trailing branches rooting at nodes; lateral shoots (10 to 20 cm) upright with racemes; flowers small (4 to 5 mm), white . . . . . *Saxifragaceae (Wipplea)*

HH. Plants upright shrubs.

I. Leaves 2.5 to 7 cm, glandular and glutinous with revolute margins; branches not stiff and rigid or subspinose; flowers large 3.5 to 4.5 cm, axillary tubular corolla with expanded limbs, yellow or salmon . . . *Scrophulariaceae*

II. Leaves 1 to 2.5 cm, very finely pubescent; branches stiff and rigid or subspinulose; flowers small less than 1 cm, in small axillary clusters, petals distinct cup-shaped in the expanded portion, white . . . . . *Rhamnaceae (Ceanothus cuneatus)*

FF. Leaf margins toothed or serrate.

G. Flowers large, more than 2.5 cm, tubular corollas.

H. Leaves glandular and glutinous with revolute margins thus appearing to be entire, 2.5 to 7 cm; flowers bright yellow to salmon. . . . . *Scrophulariaceae*

HH. Leaves not glandular and glutinous, upper leaves coarsely crenate, lower may be entire, 4 to 12 cm long; flowers white or pinkish with purple veins and blotches. . . . . *Labiatae (Lepechinia)*

GG. Flowers small about 1 cm across, petals distinct cup-shaped in the expanded portion; leaves 1 to 3 cm, thick and leathery, strongly toothed some with spinose teeth; shrubby, upright to prostrate. . . . . *Rhamnaceae*

EE. Leaves alternate.

F. Leaves entire or mostly so, but see *Papaveraceae* and *Solanaceae* below.

G. Leaves less than 2 cm long.

H. Leaves less than 1 cm long, in fascicles; flowers less than 1 cm, yellow, in dense racemes. . . . . *Rosaceae (Adenostoma)*

HH. Leaves 1 to 2 cm long, entire (sometimes very shallowly lobed), with stellate pubescence; flowers axillary, sepals petaloid, 2.5 to 3.5 cm across with a hairy gland at base, petals lacking . . . . . *Sterculiaceae (Fremontia)*

GG. Leaves longer.

H. Leaves 2 to 10 cm, mostly more than 6 cm.

I. Leaves linear, densley tomentose, gray-green; inflorescence a "head" with disc flowers only, bright yellow *Compositae (Chrysothamnus)*

II. Leaves elliptic, thin; inflorescence terminal of several funnelform flowers with separate petals 3.5 to 5 cm long, white, cream, or pinkish *Ericaceae (Rhododendron)*

HH. Leaves 2 to 5 cm, elliptic to ovate, glabrous to densely pubescent; bark deep mahogany red; flowers less than 1 cm long, petals united into an urn-shaped corolla, white or pinkish. . . . . *Ericaceae (Arctostaphylos)*

FF. Margins variously serrated, toothed, or incised.

G. Leaves with serrate or denticulate margins (sometimes finely so, appearing entire) but not also lobed or deeply incised.

H. Leaves resinous, coarsely denticulate above the middle; flowers in heads, disc flowers only pappus copius; heads numerous in small, axillary and terminal clusters *Compositae (Baccharis)*

I. Flowers mostly less than 1 cm across, in small umbels or cymes; petals separate and cup-shaped in the expanded portion, hooded, blue or white. . *Rhamnaceae*

II. Flowers mostly larger, petals not as above.

J. Leaves glandular, glutinous, 4 to 10 cm; corolla tubular with petals united and flared at end, inflorescence an open panicle, white *Hydrophyllaceae*

JJ. Corollas without a well-defined tube or petals separate.

K. Flowers white, petals ovate; fruit a pome, white when immature, dark purple when ripe . . *Rosaceae (Amelanchier)*

KK. Corolla rotate.

L. Leaves lance-linear, margins finely scabrous, denticulate under a lens; flowers yellow, solitary, terminal. . *Papaveraceae*

LL. Leaves ovate, basal ones sometimes lobed near base; flowers dark blue, petals united, inflorescence cymose; fruit a berry enclosed by enlarged reticulate sepals *Solanaceae*

GG. Leaves lobed or incised, segments entire, toothed or serrate.

H. Leaves deeply incised into linear filiform segments with entire margins, 1 to 5 cm, strigulose; inflorescence a head, many heads borne in a panicle; flowers yellow, ray flowers present *Compositae (Artemesia)*

HH. Leaves mostly with distinct lobes.

I. Leaves broadly lobed into 3 segments, margins very shallowly irregular but not serrated nor toothed, somewhat undulate, thick and leathery, densely stellate, pubescent; sepals petaloid, petals none . . . . . *Sterculiaceae*

II. Leaves broadly lobed into 3 to 5 segments, margins serrate.

J. Flowers white or pinkish, 1 cm across, numerous, borne in axillary corymbs 5 to 7 cm across; stems unarmed . . . . *Rosaceae (Physocarpus)*

JJ. Flowers greenish-white, purplish or pink, borne singly or several per leaf axile; fruit a berry armed with spines, prickles or glandular hairs; stems armed with nodal spines . . *Saxifragaceae (Ribes)*

AA. Plants trailing vines or lianas.

B. Leaves simple.

C. Leaves alternate.

D. Vines bearing tendrils opposite the leaves; flowers many small; fruit a berry borne in loose clusters. . . . . *Vitaceae*

DD. Vines without tendrils, flowers borne singly, petals lacking, 2.5 cm, sepals forming a long recurved tube. . *Aristolochiaceae*

CC. Leaves opposite, thick and leathery, 2 to 5 cm long. . *Caprifoliaceae*

BB. Leaves compound (see also Anacardiaceae).

C. Stems armed with thorns or prickles; fruit an aggregate of fleshy achenes, borne on an elongated receptacle. . *Rosaceae (Rubus)*

CC. Stems unarmed; fruit an achene with a much elongated plumose style. . . . . *Ranunculaceae*

ANACARDIACEAE — SUMACS

Key to *Anacardiacea*

A. Terminal leaflet 5 to 10 cm long with a distinct petiole; flowers in axillary panicles; fruit glaborous, white. . . . *Rhus diversiloba*

AA. Terminal leaflet 2 to 4 cm long without a distinct petiole; flowers in terminal spikes; fruit hairy, red . . . . . *Rhus trilobata*

Rhus diversiloba T.& G. — Poison oak

Habitat: Prefers rocky soils or margins of rock outcrops, but occurs on many other soils; tolerates shade as well as full sun; all exposures, mostly below 3000 feet.

Abundance: Common to occasional.

Major communities: Oak savannahs, Digger pine shrub, various chaparrals, and stream courses.

Remarks: This shrub contains a toxic oil to which many humans are allergic. May be transferred by contact or close proximity for highly sensitive persons. The oil may also be carried in smoke and be infective over a distance of 1 to 2 miles. The berries are a winter food source for small birds.

Rhus trilobata Nutt. ex T.& G. var. *quintata* Jeps. — Squaw bush

Habitat: Well drained but moist soils usually around seeps or alluvial sites along streams; occasionally stands are found on east-facing slopes.

Abundance: Occasional, but usually strongly dominant and abundant in its community.

Major Communities:

Remarks: Berries are grazed by birds and small mammals.

ARISTOLOCHIACEAE — BIRTHWORTS

Aristolochia californica Torr. — Dutchman's Pipe

Habitat: Shady canyons near streams; below 2000 feet.

Abundance: Rare.

Major Communities: Bay - oak - maple, Riparian.

BERBERIDACEAE — BARBERRYS

Berberis piperiana (abrams) McMinn. — Oregon Holly, Barberry

Habitat: Cool, well-drained slopes under pines; mostly on north and east exposures; below 2800 feet.

Abundance: Rare.

Major Communities: Pine - fir - oak woodland.

BETULACEAE — ALDERS, BIRCHES, HAZELNUTS

Corylus cornuta Marsh. var. *californica* (A. DC.) Sharp. — California Hazelnut

Habitat: Mesic, shady canyons, riparian ecotones, and forested alluvia on rich soil.

Abundance: Rare.

Major Communities: Douglas fir - oak - maple; Riparian: Maple - oak.

CALYCANTHACEAE — CALYCANTHUS

Calycanthus occidentalis H.& A. — Spicebush

Habitat: Mostly stream margins in shady canyons; north and east exposures; below 2500 feet.

Abundance: Occasional.

Major Communities: Fir - oak - madrone, Bay - oak - maple; Riparian: Bay - madrone.

CAPRIFOLIACEAE — HONEYSUCKLES

Key to *Caprifoliaceae*

A. Plants vinelike or low sprawling shrubs; leaves simple.

  B. Leaves mostly less than 2.5 cm, pubescent at least on undersurfaces, all leaves distinct; fruit white . . . . . *Symphoricarpos rivularis*

  BB. Leaves mostly larger, thick and leathery, glaucous or at most finely puberulent beneath, upper leaves joined at the base and surrounding the stem; fruit red.

    C. Leaves without stipules; inflorescence glabrous, corolla yellow or reddish; plants of chaparral . . . . . *Lonicera interrupta*

    CC. Leaves with ovate stipular appendages at least on the uppermost leaves; infloresence glandular pubescent, corolla pinkish or purplish; plants of riparian areas. . . . . *Lonicera hispidula*

AA. Plants erect; leaves compound, 1 to 2 cm long; fruit blue or purple in ± flat-topped cymes . . . . . *Sambucus mexicana*

Lonicera interrupta Benth. — Chaparral Honeysuckle

Habitat: Occurs on various soils and exposures, mostly mesic sites below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Shrubby live oak.

Lonicera hispidula Dougl. — California Honeysuckle

Habitat: Mesic sites along shady streams; rocky soils; mostly eastern exposures.

Abundance: Occasional to locally common.

Major Communities: Riparian: Bay - oak - alder.

Sambucus mexicana Presl. — Elderberry

Habitat: Deep, well-drained soils, usually near water courses or on east facing slopes below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Blue oak woodland; Garry oak woodland; Black oak - maple - elderberry (at higher elevations on east slopes).

Remarks: Berries were formerly used by Indians and are an important food source for small birds.

Symphoricarpos rivularis Suksd. Snowberry

Habitat: Understory plant in shady woods; most exposures below 3500 feet elevation.

Abundance: Occasional to common.

Major Communities: Yellow pine woodlands; Douglas fir - oak - madrone; Black oak woodland; Mixed oak woodlands.

COMPOSITAE — SUNFLOWERS

Key to *Compositae*

A. Lower leaves deeply cleft into linear, straplike segments; corola with both disc and ray flowers . . . . . *Artemisia californica*

AA. All leaf margins entire or merely toothed; corola with disc flowers only.

B. Leaves obovate or oblanceolate, 1.5 to 4 cm long, tapered at base, entire to coarsely toothed, dark green, and glabrous . . . . . *Baccharis pilularis var. consanguinea*

BB. Leaves linear, 2 to 7 cm long, entire, grey-green, and covered with fine hairs. . . . . *Chrysothamnus nauseosus*

Artemisia californica Less. — California Sagebrush

Habitat: Openings in pine woodlands on deep, well-drained soils.

Abundance: Rare.

Major Communities: Yellow pine - oak woodland.

Baccharis pilularis DC. ssp. *consanguinea* (DC.) C.B. Wolf. — Coyote Bush, Chaparral Broom

Habitat: Deep, moist but well-drained soils; mostly on south and western exposures; at lower elevations or on disturbed sites.

Abundance: Occasional

Major Communities: Anthropogenic communities, disturbed hillsides, or abandoned farms.

Remarks: This shrub is a pioneer plant at lower levels usually following tillage. It usually gives way to Manzanita - Digger pine or chaparral communities.

Chrysothamnus nauseosus (Pall.) Britton. — Rabbit Brush

Habitat: Dry open sites usually disturbed or on rock outcrops; mostly above 2800 feet; south and west exposures.

Abundance: Rare.

Major Communities: Adventitive, Yellow pine - oak - madrone.

ERICACEAE — HEATHS

Key to *Ericaceae*

A. Leaves elliptic to obovate, 2.5 to 10 cm x 1.5 to 2.5 cm; corolla large (3 to 4.5 cm across), trumpet-shaped, white, cream, or pinkish. . . . . *Rhododendron occidentalis*

AA. Leaves ovate to elliptic, 2.5 to 4 cm x 1.5 to 2.5 cm; corolla small (1 cm long), urn-shaped, white or pinkish

B. Plants with well developed basal burls often ½ to 1 meter across; crown sprouting after fire *Arctostaphylos glandulosa*

BB. Plants without basal burls.

C. Bracts of the inflorescence large and foliaceous; leaves pale green and gray-pubescent on both sides. . . . . *A. canescens*

CC. Bracts of the inflorescence small, subulate, not foliaceous; leaves glabrous (sometimes puberulent in *A. manzanita* when young).

D. Leaves gray or white glaucous; pedicels glandular . . . . . *A. viscida*

DD. Leaves dark or yellow-green; pedicels glabrous.

E. Ovary glandular; fruit stipitate glandular; bark usually bright orange-red . . . *A. elegans*

EE. Ovary and fruit glabrous; bark deep reddish-brown.

F. Branchlets glabrous, flowering stems very slender . . . . . *A. stanfordiana*

FF. Branchlets mostly puberulent or finely pubescent; flowering stems thick, especially near the flower . . . *A. manzanita*

Arctostaphylos canescens Eastw. — Hoary Manzanita

Habitat: Deep gravelly soils; all exposures below 3000 feet.

Abundance: Occasional to common and locally abundant, usually in small patches in xeric chaparral.

Major Communities: Digger pine shrub; Manzanita - ceanothus - shrub oak.

Arctostaphylos glandulosa Eastw. — Eastwood's Manzanita

Habitat: Dry, rocky hillsides; all exposures.

Abundance: Abundant.

Major Communities: Manzanita - chamise - buckbrush; Manzanita - cenaothus - mahogany; Knobcone pine - manzanita.

Remarks: This species stump sprouts from a basal bush after fire and is the only species in the Mayacmas to do so.

Arctostaphylos elegans Jepson. Mt. Konocti Manzanita

Habitat: Dry, rocky hillsides mostly on south, west, and east exposures.

Abundance: Occasional to locally abundant.

Major Communities: Chamise - buckbrush; Chamise - wavy-leafed ceanothus - manzanita.

Remarks: This species occurs occasionally along ridges mostly on the eastern side of the Mayacmas.

Arctostaphylos manzanita Parry. Big Manzanita, Parry's Manzanita

Habitat: Dry hillsides; deep rock soils; mostly on south and west exposures (east facing slopes if dry enough).

Abundance: Common to locally abundant.

Major Communities: Blue oak - manzanita; Big manzanita; Mixed pine - - manzanita.

Arctostaphylos stanfordiana Parry. Stanford's Manzanita

Habitat: Serpentine soils predominantly; however, it does occur off serpentine in montane chaparral on deep to shallow rocky, infertile soils; most exposures above 1800 feet.

Abundance: Common.

Major Communities: Jepson's ceanothus - Stanford's manzanita - leather oak; Manzanita - ceanothus - oak.

Arctostaphylos viscida Parry. Whiteleaf Manzanita

Habitat: Dry, open hillsides; all exposures; deep soils, mostly below 2500 feet.

Abundance: Common.

Major Communities: Digger pine shrub; Yellow pine - oak - manzanita; Manzanita - buckbrush - chamise.

Rhododendron occidentalis (T.& G.) Gray. Western Azalea

Habitat: Stream margins, in the Mayacmas mostly along streams draining serpentine, usually on rocky soil close to free water much of the year.

Abundance: Occasional to rare.

Major Communities: Riparian; Cypress - azalea - sedge.

FAGACEAE OAKS

Ket to *Fagaceae*

A. Fruit of 1 to 4 nutlets enclosed in a prickly dehiscent shell; prickles 7 to 12 mm long; leaves 2.5 to 8 cm long . . *Castanopsis sempervirens*

AA. Fruit a single nut.

B. Leaves dark dull green, pubescent above becoming glabrous, pale and tomentose beneath, entire to irregularly toothed, convex with margins rolled inward toward underside; acorns 2 cm long; cup tuberculate; 2 or 3 acrons per cluster maturing the first year. . . . . *Quercus durata*

BB. Leaves mostly plane or slightly undulate, dull green or dark green and shining above, glabrous above; acorns longer.

C. Leaves glabrous, light green beneath, dark green and shining above, entire to toothed; acorns 2 to 3 cm long, maturing the second summer; cup scales thin, long, and overlapping. . . . . *Q. wislizenii var. frutescens*

CC. Leaves pubescent and pale green or with yellow powder beneath, light green above.

D. Leaves with yellow or grey powder beneath, mostly entire except in the young stage of development when it is spiny toothed; acorn broadly oval, tapered gradually; cup shallow, thick and covered with a golden or rusty tomentum, maturing the second summer. . . . . *Q. chrysolepis var. nana*

DD. Leaves pubescent and pale green beneath, spinose or serrate margins; acorns 1.5 to 2.5 cm oval but abruptly pointed; cup deep, covering almost half the acorn; scales ovate or united and tuberculate; maturing the first year . . . . . *Q. dumosa*

Note: See also the key for arboreal oaks.

Castanopsis sempervirens Kell. Bush Chinquapin

Habitat: Deep sandy soils; north, east, and west exposures; above 2500 feet.

Abundance: Occasional to rare (mostly in vicinity of Cobb Mountain).

Major Communities: Pine - manzanita - ceanothus; Chinquapin - manzanita.

Quercus durata Jepson. Leather Oak

Habitat: Mostly on serpentine or soils overlying serpentine; all exposures above 1500 feet elevation.

Abundance: Common, locally abundant.

Major Communities: Jepson's ceanothus - Stanford's manzanita - leather oak; Chamise - leather oak - ceanothus, Digger pine shrub.

Quercus chrysolepis Leibm. var. *nana* Jepson. Dwarf Canyon Oak (shrubby form)

Habitat: Deep to shallow, rocky, fertile soils predominantly north and east slopes but occurs also on south and west slopes under favorable conditions; all elevations.

Abundance: Abundant.

Major Communities: More or less ubiquitous in many chaparrals or as an understory in Mixed oak woodlands; codominant in shrubby live oak and Oak - manzanita.

Remarks: The nomenclature of this taxon is not clear. The type locality is the summit of Mt. St. Helena and was named *Q. chrysolepis* var. *nana* by Jepson. It is thought to be a hybrid of *Q. vaccinifolia* Kell.; the huckleberry oak occurring mostly in the Sierra Nevada and on a few scattered high peaks in the Coast Range but not on Mt. St. Helena. Populations in the Lake Tahoe region known to the author are very likely hydrid swarms between *Q. chrysolepis* and *Q. vaccinifolia*, here parent stock is in close proximity. In the Mayacmas however, this relationship does not exist and so may be a distinct taxon as thought by Jepson.

Quercus wislizenii A. DC. var. *frutescens* Engelm. Shrubby Interior Live Oak

Habitat: Rocky or gravelly soils on steep hillsides; all exposures but most common on north and east facing slopes.

Abundance: Abundant.

Major Communities: Shrubby live oak; Bay - oak - madrone.

Quercus dumosa Nutt. Shrub Oak

Habitat: Mesic to sub-xeric sites with moderately deep, well-drained soils. Occurs mostly on south, west, and north-facing slopes.

Abundance: Locally adundant in ideal habitat but otherwise scattered groups in stands of other shrubby oaks. Many hybrid forms with *Q. chrysolepis* and *Q. wislensii* var. *frutescens*.

Major Communities: Shrubby live oak; Scrub oak woodlands.

Remarks: This species occurs as isolated low woodland or chaparral with scattered specimens of mountain mahogany and buckbrush. It will have dense canopy but small trunks, usually devoid of the tangle of low branches characteristic of other chaparral oaks.

GARRYACEAE SILK-TASSELS

Key to *Garryaceae*

A. Leaves glabrous beneath or with a few scattered hairs, plane; fruit glabrous or nearly so. . . . . *Garrya fremontii*

AA. Leaves densely pubescent or tomentose beneath.

B. Leaves 4 to 6.5 cm long; margins stongly undulate; tomentum of short curly or wavy hairs, more or less appressed. . *G. elliptica*

BB. Leaves 2.5 to 4.5 cm long; margins more or less undulate; tomentum of long wavy ascending hairs that tend to intertwine . . . . . *G. congdoni*

Garrya congdoni Eastwood. Silk-Tassel

Habitat: Chaparral stands near the crest of the Mayacmas, especially near wind ridges.

Abundance: Occasional to rare; occurs as a dominant in wind ridge communities.

Major Communities: Manzanita - garrya - ceanothus; Shrubby live oak.

Garrya elliptica Dougl. Coast Silk-Tassel

Habitat: Sunny slopes or in brushy ravines; rocky, shallow, infertile soils; mostly western exposures.

Abundance: Rare.

Major Communities: Shrubby live oak.

Garrya fremontii Torr. Fremont's Silk-Tassel

Habitat: Ravines in chaparral; mostly on southwest exposures.

Abundance: Rare.

Major Communities: Shrubby live oak; Manzanita - ceanothus - oak.

HYDROPHYLLACEAE WATERLEAFS

Eriodictyon californicum (H.& A.) Torr. Yerba Santa

Habitat: Dry, open, infertile soils or rock outcrops; any exposure; all elevations.

Abundance: Occasional to locally common.

Major Communities: Disturbed areas in all chaparrals and open woodlands.

Remarks: This is a pioneer plant occupying areas freshly scared by slumping or construction.

LABIATAE MINTS

Lepechinia calycina (Benth.) Epl. in Munz. Pitcher Sage

Habitat: Mesic sites on deep well-drained but moist soils on the lee side of wind ridges or along lower ridge lines.

Abundance: Locally abundant but mostly in scattered populations.

Major Communities: Shrubby live oak - pitcher sage; Black oak woodland - pitcher sage.

LEGUMINOSAE — PEAS

Key to *Leguminosae*

A. Leaves simple, round or reniform; flowers light magenta. *Cercis occidentalis*

AA. Leaves compound

B. Leaves palmately compound; flowers blue and white. *Lupinus albifrons var. collinus*

BB. Leaves pinnately compound or trifoliate.

C. Leaves pinnately compound with 5 or more leaflets.

D. Leaves small, 4 or 5 foliate; flowers yellow. . *Lotus scoparius*

DD. Leaves larger, 11 to 27 foliate; flowers reddish-purple. . . . . *Amorpha californica var. napensis*

CC. Leaves trifoliate.

D. Plant with short, stiff spinose branchlets; flowers deep rose or purple. . . . . *Pickeringia montana*

DD. Plants without spinose branchlets; flowers yellow.

E. Flowers yellow, borne on short lateral branches in terminal racemes or subcapitate . . *Cytisus monspessulanus*

EE. Flowers yellow in axillary whorls or singly. *Lotus scoparius*

Amorpha californica var. *napensis* Nutt. — California Indigobush

Habitat:

Abundance:

Major Communities:

Remarks: This species reported by others without community information.

Cercis occidentalis Torr. ex Gray. — Western Redbud

Habitat: Open sunny sites along water ways on south and west exposures and in open woods and savannah; on east and north facing slopes below 1800 feet elevation.

Abundance: Occasional.

Major Communities: Blue oak savannahs and woodland; Riparian: Cottonwood - willow - ash.

Cytisus monspessulanus (L.) Kuntze. — French Broom

Habitat: Deep soils on mesic or sub-xeric sites usually east or north exposures below 2800 feet. Disturbed places or old homesteads.

Abundance: Occasional but locally abundant.

Major Communities: Anthropogenic communities.

Lotus scoparius (Nutt. in T.& G.) Attley. Deer Brush, Deer Weed, California Broom

Habitat: Sub-xeric and xeric hillsides on various soils and exposures below 3000 feet elevation.

Abundance: Occasional but locally abundant.

Major Communities: Mixed oak - pine woodlands; Shrubby oak - ceanothus chaparral; open pine woodlands.

Remarks: An important deer forage plant.

Lupinus albifrons Benth. var. *collinus* Greene. Bentham's Bush Lupine

Habitat: Rocky soils on open sunny hillsides, mostly south and west exposures below 2800 feet elevation. Often on open road cuts.

Abundance: Occasional.

Major Communities: Blue oak savannah and woodland; Garry oak woodland; Mixed oak - pine woodlands.

Pickeringia montana Nutt. Chaparral Pea

Habitat: Rocky soils, any exposure but usually concentrated near the crests of ridges and hilltops.

Abundance: Common.

Major Communities: Chamise - buckbrush; Shrubby live oak - chamise - ceanothus. Often dominant in the ridgeline ecotone between chamise and shrubby live oak communities.

PAPAVERACEAE — POPPIES

Dendromecon rigida Benth. — Chaparral Poppy

Habitat: Gravelly infertile soils, sometimes on serpentine; mostly south and west exposures below 3000 feet elevation.

Abundnace: Occasional.

Major Communities: Digger pine shrub; Manzanita - cypress - knobcone pine; Chamise - buckbrush - manzanita.

RANUNCULACEAE — CROWFEET

Key to *Ranunculaceae*

A. Leaflets 3; flowers 1 to 3 in a cluster. . . . . *Clematis lasiantha*

AA. Leaflets 5 to 7; several flowers in a cluster. . . . *C. ligustifolia*

Clematis lasiantha Nutt. in T.& G. — Chaparral Clematis

Habitat: Sub-xeric to sub-mesic sites on chaparral hillsides, usually on west, north or east facing slopes below 3000 feet elevation.

Abundance: Occasional.

Major Communities: Shrubby live oak; Chamise - shrubby live oak - manzanita.

Clematis ligusticifolia Nutt. in T.& G. Virgin's Bower

Habitat: Steep hillsides in chappal; all exposures; below 3200 feet elevation.

Abundance: Occasional.

Major Communities: Shrubby live oak; Chamise - manzanita - shrubby live oak.

RHAMNACEAE BUCKTHORNS

Key to *Rhamnaceae*

A. Fruit a three celled capsule.

B. Leaves alternate.

C. Leaves with 3 distinct veins from the base.

D. Plants with spinose branchlets; leaves 2.5 to 6 cm long, gray-green and glaucous; flowers white . . *Ceanothus incanus*

DD. Plants not spinose nor gray-green above.

E. Leaves entire, thin, mostly less than 3 cm long; flowers white . . . . . *C. integerrimus*

EE. Leaves glandular-denticulate.

F. Leaves 3.5 to 8 cm long, glabrous and dark green appearing waxy above, flowers white. *C. velutinus*

FF. Leaves less than 3.5 cm long, dark green and glossy above; flowers blue. . . . . *C. sorediatus*

CC. Leaves with 1 main vein from the base; flowers blue.

D. Leaf margins revolute, obsuring the denticulate margin. . . . . *C. parryi*

DD. Leaf margins undulate and finely glandular serrate *C. foliosus*

BB. Leaves opposite; fruit with distinct dorsal or subdorsal horns.

C. Fruit without wrinkled intermediate ridges.

D. Leaves entire; flowers white . . . . . *C. cuneatus*

DD. Leaves spinose, toothed; flowers blue.

E. Plants erect and spreading, leaves convex above, margins with 5 to 8 teeth undulate; horns erect *C. divergens*

EE. Plants prostrate or decumbent; leaves plain, mostly with 3 to 5 teeth; horns divergent *C. divergens ssp. confusus*

CC. Fruit with large, wrinkled, dorsal horns and with wrinkled intermediate ridges; flowers blue.

D. Plants erect, spreading; leaves reflexed, undulate with 8 to 12 spinose teeth. . . . . *C. jepsonii*

DD. Plants prostrate; leaves plain with 5 to 7 spinose teeth toward the apex. . . . . *C. prostratus var. occidentalis*

AA. Fruit a berry-like drupe.

B. Leaves longer than 2.5 cm, never holly-like; fruit black.

C. Leaves 2.5 to 8 cm x 1.5 to 2.5 cm, thin, supple, serrulate or entire, bright green and glabrous (sometimes finely purbulent beneath). . . . . *Rhamnus californica*

CC. Leaves pubescent.

D. Leaves ovate, 3 to 7.5 cm x 2.5 to 5 cm, thick, leathery, gray-green, finely white tomentose on both surfaces *R. californica var. crassifolia*

DD. Leaves oblong, elliptical, much narrower, thinner, tough but not leathery, pubescent beneath, usually glabrous above . . . . . *R. californica var. tomentella*

BB. Leaves mostly shorter than 3 cm, holly-like with spinescent teeth; fruit red. . . . . *R. crocea*

Ceanothus cuneatus (Hook.) Nutt. Buckbrush

Habitat: Dry, gravelly soils; all exposure below 3200 feet elevation.

Abundance: Abundant.

Major Communities: Chamise - buckbrush; Chamise - buckbrush - shrubby live oak; Digger pine shrub.

Ceanothus divergens Parry. Mt. St. Helena Ceanothus

Habitat: Dry rocky slopes, mostly above 3000 feet elevation; south and west exposures.

Abundance: Common near the summit of Mt. St. Helena, but rare elsewhere along the ridge of the Mayacmas.

Major Communities: Ceanothus - manzanita - coffeeberry.

Remarks: Type location is "Calistoga, Calif.", Collected by Parry in 1881-88.

Ceanothus divergens Parry ssp. *confusus* (J.T.H.) Abrams. Rincon Ceanothus

Habitat: Dry rocky hillsides, mostly along ridgetops above 3000 feet elevation.

Abundance: Occasional although locally common.

Major Communities: Pine - cypress woodland; Yellow pine forest.

Remarks: The author has shown that those populations in Pine - cypress woodland stongly hybridize with *C. jepsonii*. Other populations may hybridize with *C. prostratus*. Synonym - *C. confusus* J.T.Howell

Ceanothus foliosus Parry Wavy-leaf Ceanothus

Habitat: Gravelly, infetile soils; mostly on south and west exposures above 1800 feet elevation.

Abundance: Common.

Major Communities: Shrubby live oak - ceanothus; Ceanothus - manzanita - mountain mahogany; Digger pine shrub.

Ceanothus incanus T.& G. Coastal Whitethorn

Habitat: Mesic sites on deep soils; mostly north and east, but occasionally on west exposures between 1600 and 2800 feet elevation; on the east side of the range only.

Abundance: Occasional to locally common.

Major Communities: Shrubby live oak.

Ceanothus integerrimus H.& A. (Lake Co. form) Deerbrush

Habitat: Mesic sites; all exposures, but mostly north and east; deep rich soils, usually with subsoil moisture.

Abundance: Occasional to locally common.

Major Communities: Black oak - bay woodland; Douglas fir - black oak; Shrubby live oak; Riaprian: Bay - oak - maple.

Remarks: This is the Lake County form of this species. Leaves usually are much smaller than its Sierran counterpart. This is an important deer browse.

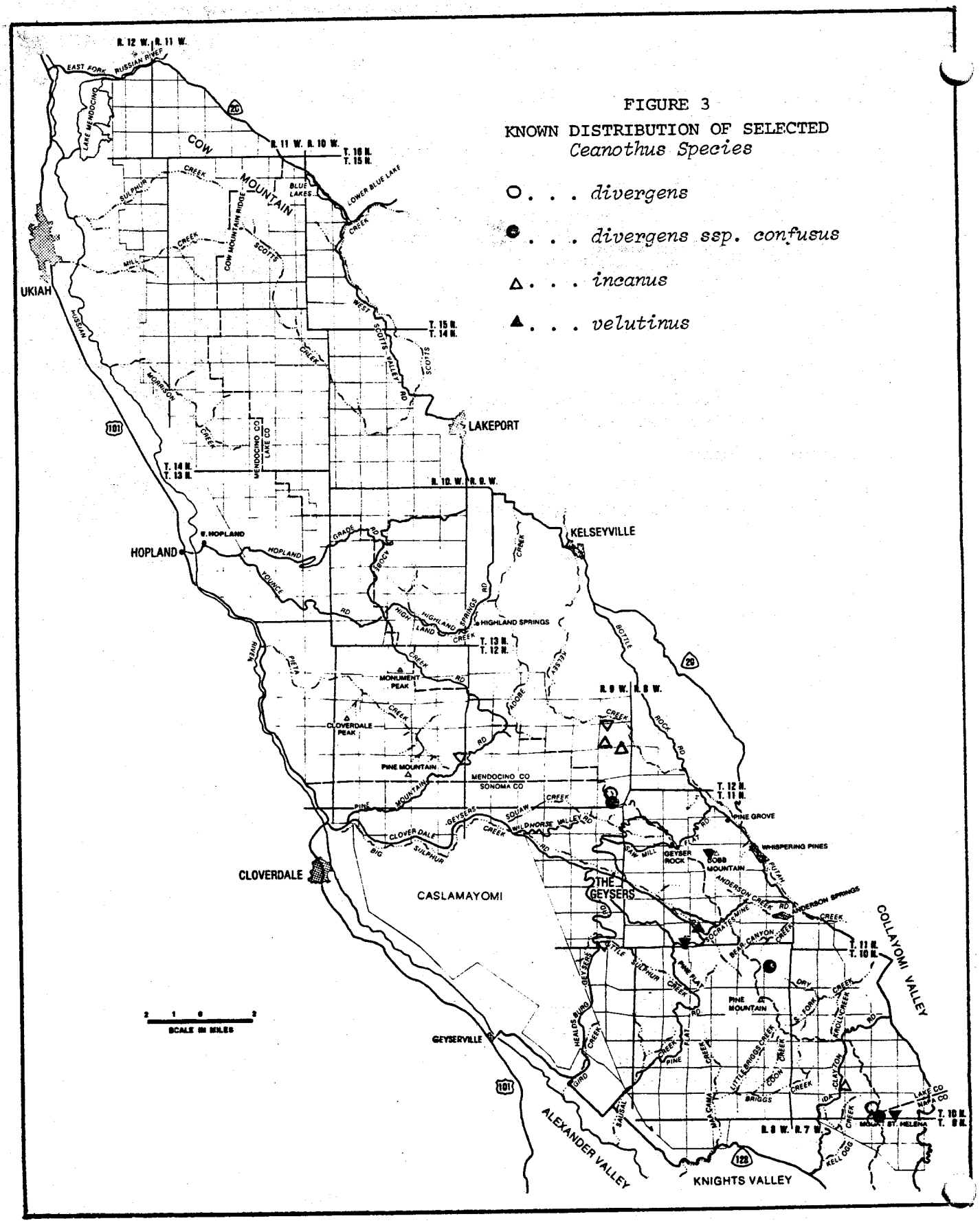


FIGURE 3
KNOWN DISTRIBUTION OF SELECTED
Ceanothus Species
○ . . . divergens
● . . . divergens ssp. confusus
△ . . . incanus
▲ . . . velutinus
UKIAH
HOPLAND
LAKEPORT
KELSEYVILLE
CLOVERDALE
CASLAMAYOMI
THE GEYSERS
GEYSERVILLE
COLLAYOMI VALLEY
ALEXANDER VALLEY
KNIGHTS VALLEY
COW MOUNTAIN
PINE MOUNTAIN
CLOVERDALE PEAK
MONUMENT PEAK
HIGHLAND SPRINGS
MENDOCINO CO
SONOMA CO
LAKE CO
R. 12 W.
R. 11 W.
R. 10 W.
R. 9 W.
R. 8 W.
R. 7 W.
T. 16 N.
T. 15 N.
T. 14 N.
T. 13 N.
T. 12 N.
T. 11 N.
T. 10 N.
T. 9 N.
SCALE IN MILES

Ceanothus jepsonii Greene. Jepson's Ceanothus

Habitat: Mostly on serpentine soils; all exposures.

Abundance: Common to abundant; codominant and a good indicator of serpentine.

Major Communities: Jepson's ceanothus - Stanford's manzanita - leather oak; Cypress - ceanothus; Pine - cypress woodland.

Ceanothus parryi Trel. Parry's Ceanothus

Habitat: Sunny hillsides; gravelly soils; south and west exposures.

Abundance: Rare to occasional.

Major Communities: Knobcone pine - manzanita; Manzanita - ceanothus.

Ceanothus prostratus Benth. var. *occidentalis* McMinn. Squaw Carpet, Mahala Mats

Habitat: Deep, well-drained, rich forest soils; west, south, and east exposures above 3000 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Yellow pine forest; Douglas fir - yellow pine - black oak forests.

Ceanothus sorediatus H.& A. Jim Brush

Habitat: Deep soils on north and west exposures.

Abundance: Occasional to common.

Major Communities: Shrubby live oak.

Remarks: This species seems to hybridize with *C. cuneatus* and many stands are difficult to assign a name. It is most common on the west side of the range.

Ceanothus velutinus Dougl. Tobacco Brush

Habitat: Mesic sites in higher valleys and canyons; mostly on north and east exposures above 2500 feet elevation.

Abundance: Rare to occasional.

Major Communities: Bay - oak - madrone; Pine - oak - bay.

Rhamnus californica Esch. California Coffeeberry

Habitat: Sub-xeric to mesic sites on deep well-drained soils; all exposures mostly above 2000 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Shrubby live oak - coffeeberry; Yellow pine - coffeeberry - fescue forest; Douglas fir - yellow pine - black oak forest and woodland.

Rhamnus californica Esch. ssp. *crassifolia* (Jepson) Wolf. Thick-leafed Coffeeberry

Habitat: Deep, well-drained soils; most exposures below 2000 feet elevation.

Abundance: Occasional.

Major Communities: Riparian ecotones between Blue oak savannah and woodland and Cottonwood - willow - ash communities.

Rhamnus californica Esch. var. *tomentella* Brew. & Wats. Chaparral Coffeeberry

Habitat: Open woodlands, often near water courses; mostly on deep alluvial soil; south and west exposures below 1500 feet.

Abundance: Occasional.

Major Communities: Blue oak woodland; ecotones along Cottonwood - willow - ash.

Rhamnus crocea Nutt. var. *ilicifolia* (Kell.) Greene. Holly-leaf Coffeeberry

Habitat: Mesic chaparral.

Abundance: Occasional to rare.

Major Communities: Shrubby live oak.

ROSACEAE — ROSES

A. Leaves compound.

B. Plants trailing vines armed with prickles or spines.

C. Aggregate fruit separating from dry receptacle when ripe; leaves white tomentose beneath, green and glaucous above, 5 to 7 foliate; stems glaucous. . . . *Rubus leucodermis*

CC. Aggregate fruit adhering to fleshy receptacle when ripe.

D. Leaves bright green, glabrous or thinly pubescent beneath; leaves of flowering shoots mostly 3-lobed but trifoliate near base, lobes long, pointed . . . . . *Rubus vitifolius*

DD. Leaves gray-green, tomentose beneath (at least when young); leaves of flowering shoots mostly trifoliate, lobes blunt to acute. . . . . *Rubus ursinus*

BB. Plants low, sprawling shrubs; stems armed with straight prickles; leaves 3 to 5 foliate, nearly glabrate and green above, paler and pruinose-glandular beneath, doubly serrate with teeth gland-tipped. . . . . *Rosa spithamea*

AA. Plants shrubby with simple leaves.

B. Leaves 1 cm long, linear, entire, fascicled; flowers in short racemes, greenish-yellow . . . . . *Adenostoma fasciculatum*

BB. Leaves longer.

C. Leaves 2.5 to 12 cm long.

D. Leaves entire near petiole, serrate at least above middle; branchlets not spinose.

E. Petals none; leaves evergreen; calyx extended into a tube expanded into 5 segments which are shed early; style becoming elongated (up to 7.5 cm) and plumose with long spreading hairs; leaves ovate but lower portion wedge-shaped and entire. . . . . *Cercocarpus betuloides*

EE. Petals present; leaves deciduous.

F. Fruit of 5 indehiscent dry pods; leaves with veins inset, leaf appearing rugose on the surface, ovate about as long as broad, 4 to 5 teeth on a side, pubescent to villous above; petals 2 mm long; inflorescence racemose with compound branches, densely flowered. . . . . *Holodiscus boursieri*

FF. Fruit a fleshy pome (apple-like); leaf surface smooth, leaves ovate to elliptical, toothed to just below middle or sometimes entire, tomentose or purbulent on both sides; petals about 1 cm long; inflorescence corymbose, few-flowered . . *Amelanchier pallida*

DD. Leaves serrate to petiole.

E. Leaves not lobed; petioles with 2 glands near base; short branchlets spinose or thorn-like; flowers in clusters of 2 to 4; fruit a drupe, bright red, 2 to 3 cm. . . . . *Prunus cordata*

EE. Leaves with 3 to 5 lobes; lobes doubly serrate; petioles without glands; short spinose branchlets lacking; fruit a single dry dehiscent pod; flowers numerous, borne in corymbs 5 to 8 cm across . . . . . *Physocarpus capitatus*

CC. Leaves larger.

D. Shrubs 2 to 10 m high, evergreen; leaves thick, leathery, plane, regularly toothed on margin; flowers many, white; inflorescence a corymb; fruit a bright red berry. . . . . *Heteromeles arbutifoli*

DD. Shrubs 1.6 to 6 m tall, deciduous; leaves with veins inset appearing rugose on the surface, entire near base, the rest doubly serrate; inflorescence a raceme; fruit of 5 indehiscent pods. . . . . *Holodiscus discolor*

Adenostoma fasciculatum H. & A. Chamise

Habitat: Xeric hillsides and ridge lines; thin, rocky soil; mostly south and west exposures; below 3200 feet.

Abundance: Abundant.

Major Communities: Chamise; Chamise-Buckbrush; Shrubby Live Oak-Chamise-Buckbrush.

Remarks: Crown sprouts after fire; good deer browse when shoots are young.

Amelanchier pallida Greene Serviceberry

Habitat: Shady sites; deep, rich soil in woodlands.

Abundance: Occasional.

Major Communities: Mixed Oak Woodland; Douglas Fir-Oak-Maple; Pine-Oak Woodland.

Cercocarpua betuloides Nutt ex T.& G. Mountain Mahogany

Habitat: Gravelly soils to rock outcrops; mostly south and east exposures, but found on all exposures.

Abundance: Occasional to locally common.

Major Communities: Shrubby Live Oak; Shrubby Live Oak-Mahogany-Ceanothus; Toyon-Mahogany.

Heteromeles arbutifolia M. Roem. Toyon, Christmas Berry

Habitat: Deep, rocky soils or along fractured rock outcrops; all exposures but mostly mesic sites; below 3200 feet.

Abundance: Occasional.

Major Communities: Shrubby Live Oak; Big Manzanita; Mixed Oak; Digger Pine-Shrub.

Holodiscus boursieri (Carr.) Rehd. in Bailey Bush Rock-Spiraea

Habitat: Rocky outcrops of non-serpentine material; mostly east and north exposures; below 3400 feet; subxeric sites.

Abundance: Rare.

Major Communities: Rock Outcrops in Mixed Oak, Oak-Pine, or Douglas Fir-Oak-Maple communities.

Collections : Neilson 2994 and 2996, Big Geysers

Holodiscus discolor (Pursh) Maxim Cream Bush, Ocean Spray

Habitat: Rocky outcrops; mostly north-facing slopes.

Abundance: Rare to occasional, habitat very limited.

Major Communities: Shrubby Live Oak chaparrals; Black Oak Woodland.

Collections: Neilson 3363 and 3115, Big Geysers

Physocarpus capitatus (Pursh) Kuntz Pacific Ninebark

Habitat: Mesic sites along shady stream banks; well-drained soil.

Abundance: Locally abundant, habitat rare in Mayacmas.

Major Communities: Douglas Fir-Oak-Maple-Madrone.

Collections: Neilson, La Cienaga Bog

Rosa spithamea Wats. Ground Rose

Habitat: Shady woods; deep soil; mostly north and east exposure.

Abundance: Occasional.

Major Communities: Fir-Pine-Oak; Fir-Oak-Madrone; Bay-Maple-Madrone.

Collections: Neilson 3265, Caldwell Pines; Neilson 3309 and 3349, High Valley Creek (L)

Rubus leucodermis Dougl. ex T.& G. Western Raspberry

Habitat: Mesic sites; moist soils; all exposures.

Abundance: Occasional to locally common.

Major Communities: Mixed Oak Woodland; Bay-Maple-Madrone; Douglas Fir-Pine-Oak; Riparian.

Rubus ursinus Cham & Schlecht California Blackberry

Habitat: Mesic sites along streams or around seeps; any exposure; below 2800 feet elevation.

Abundance: Occasional to rare.

Major Communities: Cottonwood-Willow-Ash.

Remarks: This may be partially an escape from cultivation especially at lower elevations.

Rubus procerus P.J. Muel Himalaya Blackberry

Habitat: Around pond margins, along stream courses, and in seeps; usually shady areas and mesic conditions.

Abundance: Occasional to locally common.

Major Communities: Riparian all types: most Seeps; nearly all Ponds.

Remarks: This is a vigorous plant naturalizing widely wherever suitable moisture can be found.

SAXIFRAGACEAE — SAXIFRAGES

Ribes menziesii var. *leptosmum* (Cov.) Jepson — Bay Gooseberry

Habitat: Mesic or sub-xeric sites; mostly northern and eastern exposures.

Abundance: Occasional to rare.

Major Communities: Shrubby live oak - madrone chaparral; Mixed oak woodland.

Ribes quercetorum Greene. — Oak Gooseberry

Habitat: Sub-xeric sites on deep rocky soils; most exposures.

Abundance: Occasional.

Major Communities: Mixed oak woodlands; Pine oak woodlands; Shrubby live oak.

Whipplea modesta Torr. — Western Whipplea

Habitat: Low understory shrub of shady woods in drier areas; rocky soils; usually north and east exposures.

Abundance: Occasional.

Major Communities: Pine - oak woodland; Douglas fir - black oak.

SCROPHULARIACEAE — FIGWORTS

Mimulus aurantiacus Curt. — Northern Monkey-flower

Habitat: Dry, rocky soils or rock outcrops; mostly on south and western exposures.

Abundance: Occasional.

Major Communities: Chamise - buckbrush - manzanita; Chamise -shrubby live oak.

Remarks: Synonym - *Diplacus aurantiacus*

SALICACEAE — WILLOWS

Salix breweri Bebb. — Brewer's Willow

Habitat: Stream courses that drain or pass through larger serpentine areas.

Abundance: Occasional, but may be locally common.

Major Communities: Riparian: Cypress - azalea - sedge.

SOLANACEAE — NIGHTSHADES

Solanum xantii Gray. — Purple Nightshade, Chaparral Nightshade

Habitat: Open places in chaparrals on rocky soils; usually southern and western exposures below 3200 feet.

Abundance: Occasional.

Major Communities: Chamise - buckbrush; Chamise - shrubby live oak - manzanita; Digger pine shrub.

STERCULIACEAE — CACAOS

Fremontia californica Torr. ssp. *napensis* (Eastw.) Munz. — Napa Flannel Bush

Habitat: Open chaparral on deep soils; southern and western exposures; below 3000 feet elevation.

Abundance: Rare.

Major Communities: Shrubby live oak; Chamise - buckbrush - manzanita.

Remarks: Type locality: north side of Mt. St. Helena.

VITACEAE — GRAPES

Vitus californica Benth. — California Grape

Habitat: Shady streamsides on well-drained soils; most exposures below 2800 feet elevation.

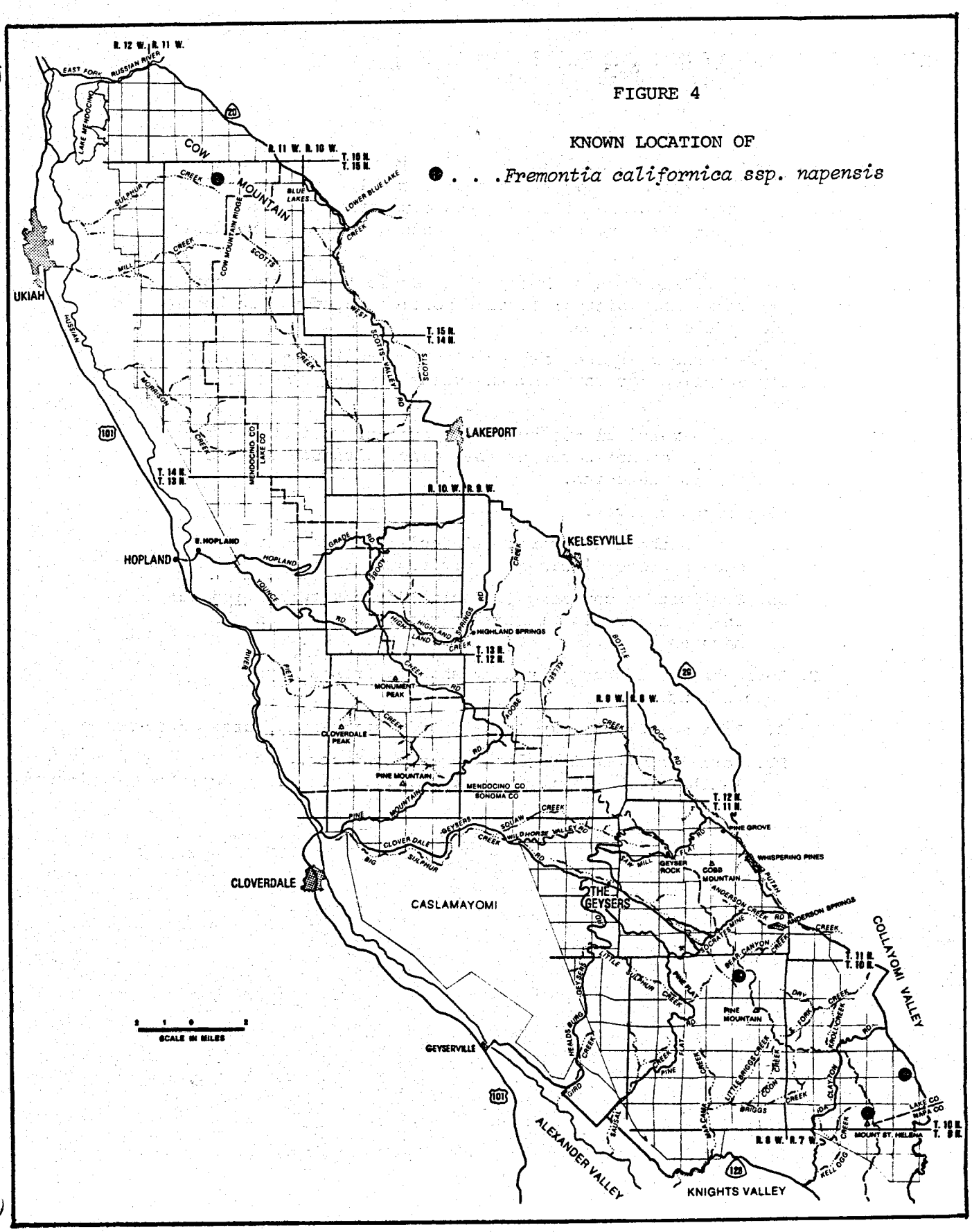
Abundance: Occasional.

Major Communities: Riparian: Cottonwood - willow - ash; Bay - maple - oak; Willow - alder - oak.

FIGURE 4

KNOWN LOCATION OF

● . . . *Fremontia californica ssp. napensis*



KEY TO FERN AND FERN-LIKE PLANT FAMILIES
(See also Key to Aquatic Plants)

A. Plants stem-like, cylindrical and fluted, "jointed" into nodal and internodal sections; leaves reduced to small pointed scales in whorls at the nodes, fertile portions concentrated into strobili or cone-like structures at the ends of stems or branches. *Equisetaceae*

AA. Plants with leaf-like fronds borne on a rachis from a horizontal scaly stem; stems not jointed; fertile portion in sporangia borne on the underside of the fronds.

B. Sporangia borne near the margins of the pinnules, margins usually enrolled, or covering the veins (*Pityrogramma triangularis*) *Pteridaceae*

BB. Sporangia not marginal but borne in separate sori away from the margin and/or not covering the veins, although they may be proximal to the veins.

C. Sori round or oval.

D. Sori without a covering (indusia lacking); fronds once pinnate, incised nearly to the rachis. . . *Polypodiaceae*

DD. Sori with a covering (indusia); fronds twice pinnate; the pinnae again pinnate or merely dentate on the margins . . . . . *Aspidiaceae*

CC. Sori oblong, linear or kidney-shaped; fronds ½ to 2 meters long.

D. Sori more than 2 mm long; fronds stiff and course *Blechnaceae*

DD. Sori less than 2 mm long; fronds thinner, not leathery and stiff. . . . . *Aspidiaceae (Athyrium)*

ASPIDIACEAE

Key to *Aspidiaceae*

A. Fronds 6 to 14 dm high, once pinnate, the pinnae with serrate margins and the base on the upper side enlarged into a distinct tooth usually lapping the next pinnule; sori round, in 2 median rows; indusium peltate, round, fringed. . . . *Polystichum munitum*

AA. Fronds twice pinnate, the pinnae variously serrate or incised.

B. Indusium round, peltate, irregularly toothed and ciliate; pinnae mostly deeply serrate, the upper basal segment often a distinct pinnule enlarged and overlapping onto the pinnule above. . . . . *Polystichum californicum*

BB. Indusium kidney-shaped or ± linear, attached on one side.

C. Sori usually less than 1 mm across, oblong, lunate, or horse shoe-shaped; indusia toothed or septate-ciliate; fronds up to 2 meters long . . . . . *Athyrium filix-femina*

CC. Sori mostly much larger, kidney-shaped; indusia entire, glandular on the margin; fronds up to 8 dm long . . *Dryopteris arguta*

Athyrium filix-femina (L.) Roth. var. *californicum* Butters. Lady Fern

Habitat: Moist canyons and draws on seepy ground or near springs.

Abundance: Rare to occasional.

Major Communities: Chain fern - juncus seeps; Douglas fir - oak - maple.

Dryopteris arguta (Kaulf.) Watt. Coastal Wood Fern

Habitat: Rocky ravines and shady slopes.

Abundance: Occasional to rare.

Major Communities: Douglas fir - oak - maple; Oak - bay - maple; Riparian: Bay - oak - madrone

Polystichum californicum (D.c Eat.) Underw. California Sword Fern

Habitat: Shady banks and along stream banks; shady woods.

Abundance: Common to occasional.

Major Communities: Douglas fir - oak - maple; Bay - oak - maple; Bay - oak - madrone.

Collections: Neilson 2966, ½ mi N. Big Geysers

Polystichum munitum (Kaulf.) Presl. Western Sword Fern

Habitat: Usually riparian, shady moist banks.

Abundance: Occasional.

Major Communities: Rock face associations; Bay - oak - maple.

Collections: Neilson 3147, High Valley Creek (L)

BLECHNACEAE

Woodwardia fimbriata Sm. in Rees. Giant Chain Fern

Habitat: Springs, seeps, amd stream margins with constant free water.

Abundance: Occasional but locally abundant.

Major Communities: Chain fern - juncus seeps; riparian communities.

Remarks: This plant is a certain indicator of springs flowing year around.

Collections: Neilson 3127, Alder Creek (S); Neilson 3026, upper Squaw Creek (S)

EQUISETACEAE HORSETAILS

Key to *Equisetaceae*

A. Stems much branched in whorls at the internodes, of two kinds: vegetative, large, green, and vigorous; fertile, short, yellowish or brown with a terminal strobilus appearing in early spring and disintergrating or ripening by late spring. . . *Equisetum arvense*

AA. Stems rarely branched; fertile portions terminal on most stems and persistant until winter. . . . . *E. laevigatum*

B. Sterile stems stout, mostly over 3 mm thick, 6 to 12 dm tall; sheaths with 20 to 30 teeth . . . . . *Equisetum telmateia*

BB. Sterile stems slender, less than 3 mm thick, less than 6 dm tall; sheaths with 8 to 12 teeth . . . . . *Equisetum arvense*

Equisetum arvense L. Common Horsetail

Habitat: Seeps usually on cool shady slopes with deep moist soils; occasionally on seeps in sunny locations.

Abundance: Occasional.

Major Communities: Springs and seeps.

Equisetum telmateia Elrh. var. *braunii* Milde — Giant Horsetail

Habitat: Shady to sunny areas; deep soil; most exposures.

Abundance: Occasional.

Major Communities: Springs; Seep.

Equisetum laevigatum A. Br. — Scouring Rush

Habitat; Usually on sandy moist soils along stream margins or at seeps and springs often in open sunny locations.

Abundance: Occasional, locally common.

Major Communities: Willow - cottonwood - ash; seeps and springs.

POLYPODIACEAE

Polypodium californicum Kaulf. — California Polypody

Habitat: Cool shady mossy banks which tend to be moist until late summer; most commonly on north and east exposures.

Abundance: Occasional to common; locally abundant.

Major Communities: Stream banks of most riparian communities; rock face stream associations.

Collections: Neilson 2915, ½ mi W. Old Mercuryville

PTERIDACEAE

Key to *Pteridaceae*

A. Underside of fronds with a golden powder; sporangia following the veins on the underside of the frond, indusium lacking. . *Pityrogramma triangularis*

AA. Underside of frond green without golden powder; sporangia along the margin of the leaf with or without a true indusium (leaf margin may be revolute covering the sporangia, hence a false indusium).

B. Fronds 3 to 15 dm tall; indusium double, the margin enrolled (false) and a thin indusium underneath. . . *Pteridium aquilinum*

BB. Fronds less than 3 dm tall; indusium single or lacking.

C. Indusium restricted to the sinuses of leaf serrations; fronds 1 to 3 dm long, 3 to 4 times pinnate, the segments fine, 2 to 3 mm long . . . . . *Aspidotis californicum*

CC. Indusium in the enrolled margin of the leaf.

D. Fertile portion on distal portion of pinnae.

E. Margins discontinuously enrolled over sori; pinnae 1 cm or more broad, often broder than long, ± fanlike, without scales or cilia.

F. Pinnae lobed into 3 or more segments. . *Adiantium capillus-veneris*

FF. Pinnae not lobed. . . . . *Adiantium jordanii*

EE. Pinnae appearing beadlike from the strongly recurved margin, with a few minute stellate scale above, scales beneath small, numerous, dark, imbricate, more or less ciliate . . . *Cheilanthes intertexta*

DD. Fertile portion extending along the sides of the oblong leaf margin; margin continuously enrolled nearly to the base; pinnae much longer than wide.

E. Pinnae linear or lance-linear, 3 or 4 times pinnate at least on lower divisions.

F. Ultimate pinnae 2 to 6 mm long . *Pellaea mucronata*

FF. Ultimate pinnae 5 to 11 mm long *Onychium densum*

EE. Pinnae oval or elliptical, short stalked, discrete, sterile pinnae flat, fertile pinnae enrolled. . . . . *Pellaea andromdaefolia*

Adiantum capillus-veneris L. Venus-hair Fern

Habitat: Damp shady banks, shady seeps.

Abundance: Occasional.

Major COmmunities: Douglas fir - oak - maple.

Adiantum jordanii K. Mull. California Maidenhair

Habitat: Cool shady banks; north and east exposures.

Abundance: Locally common.

Major Communities: Riparian rock face; Bay - oak - madrone; Douglas fir - oak - maple.

Collections: Neilson 3203, Truit Creek (S)

Aspidotis californica Nutt. ex Copel. California Lace Fern

Habitat: Dry slopes and rock outcrops.

Abundance: Occasional.

Major Communities: Dry rock outcrops.

Cheilanthes intertexta (Maxon) Maxon in Abrams

Habitat: Subxeric rock crevices.

Abundance: Occasional.

Major Communities: Rock Outcrop.

Collections: Neilson 3131, Alder Creek (S)

Onychium densum Brack. in Wilkes. Cliff Brake, Indian's Dream

Habitat: Dry, open slopes; gravelly rocky soils, and rock outcrops.

Abundance: Occasional, locally common.

MAjor Communities: Pine - cypress woodland; serpentine barrens; Jepson's ceanothus - leather oak - Stanford's manzanita.

Collections: Neilson 2914, Old Mercuryville area

Pellaeae andromedaefolia (Kaulf.) Fee. Coffee Fern

Habitat: Sunny rock outcrops; mostly south and west exposures.

Abundance: Occasional but habitats are rather restricted.

Major Communities: Dry rock outcrops.

Collections: Neilson 3130, Alder Creek (S)

Pellaeae mucronata (D.C. Eat.) D.C. Eat. Bird's-foot Fern

Habitat: Rock outcrops and dry rocky slopes.

Abundance: Locally common but habitats somewhat restricted.

Major Communities: Pine - cypress woodland; serpentine barrens.

Collections: Neilson 2913, Old Mercuryville area

Pityrogramma triangularis (Kaulf.) Maxon. Goldenback Fern

Habitat: Rock outcrops; south and west exposures; mostly in crevices and overhanging cracks.

Abundance: Occasional.

Major Communities: Rock outcrops.

Pteridium aquilinum (L.) Kuhn. var. *pubescens* Underwood. Bracken

Habitat: Cool moist sunny places usually on acid soils; or as an understory layer to pine forests.

Abundance: Ocassional but locally abundant.

Major Communities: Ecotones between streams and oak woodlands; Pine - oak woodlands; Douglas fir - pine - oak forest.

Collections: Neilson 3266, Caldwell Pines (S)

KEY TO AQUATIC PLANTS

(See also Tules, Sedges, and Rushes)

Note: Plants placed here are characteristically growing in standing water of ponds and reservoirs. Since there are no natural lakes within the Mayacmas, excepting the Blue Lakes on the extreme northern border, many species commonly found in open water of natural lakes and ponds do not occur. Nearly all bodies of water in the Mayacmas are small stock ponds and reservoirs of recent origin, most of which fluctuate widely in water level, often going dry. Thus, the normal complement of aquatic weeds is not present.

A. PLants free-floating; less than 3 cm across.

B. Plants without a discrete stem, vegetative portion a flat frond, 2 to 4 mm across, oblong-obovate with 2 or 3 roots from the underside of the central portion of the frond; 4 or 5 fronds often remaining attached by small stipes . . . *Spirodela oligorrhiza*

BB. Plants with a short stem 1 to 3 cm long, pinnately branched; leaves 2 lobed, imbricated over the upper surface, rooting at nodes on the underside. . . . . *Azolla filiculoides*

AA. Plants usually growing attached by roots or rhizoids (some may be free-floating with age); plants larger than ½ to 3 meters.

B. Leaves all basal, upright; petioles slender and long; blades ovate to linear-oblong, 3 to 5 veined, 2.5 to 8 cm long or lacking; flowering stem 1 to several, 2 to 4 dm high; peduncles 1 to several at a node (whorled) and unequal in length; flowers white with yellow basal spot, 3-merous *Machaerocarpus californicus*

BB. Leaves cauline, opposite, alternate or whorled.

C. Leaves opposite or whorled; plants always submerged; flowers or reproductive organs inconspicuous in the axils of the leaves or on a long filiform peduncle rising to the surface.

D. Leaves in whorls of 3 or lower ones opposite, oblong, flat, 6 to 12 mm x 2 mm wide, crowded; flowers inconspicuous. . . . . *Elodea canadensis*

DD. Leaves 9 or 10 in a whorl 15 to 25 mm long, filiform or slightly flattened, once or twice divided; margin with distinct teeth ending in a bristle-like cusp . . . . . *Ceratophyllum demersum*

CC. Leaves alternate, submerged, and/or floating and/or terrestrial.

D. Leaves simple, entire.

E. Leaves all submerged and similar, oblong, 4 to 8 x ½cm, thickened, sessile; margin serrulate and undulate; propagating by thick fleshy winter buds; veins parallel. . . . . *Potamogeton crispus*

EE. Leaves dimorphic, submerged and floating.

F. Leaves weakly dimorphic, floating or terrestrial, lance-oblong to oblong, obtuse at the apex, rounded at the base, 5 to 10 cm long with a petiole, pubescent when terrestrial; submerged leaves lanceolate to lance-oblong, 5 to 10 cm but narrower apex, more acute, glabrous; all leaves with stipular sheath. When terrestrial, stems upright and pubescent; when submerged, stems long trailing, mostly unbranched; inflorescence terminal in short-cylindric spikes, rose colored *Polygonum amphibium stipulaceum*

FF. Leaves strongly dimorphic; floating leaves ovate to oblong-ovate, 4 to 9 x 2.5 to 6 cm, rounded at the apex, subcordate at the base, coriaceous, many parallel veins; submerged leaves linear, 1 to 2 dm x 1 to 2 mm, coriaceous; stipules broad, clasping, whitish *Potamogeton natans*

DD. Plants with leaves simple divided or deeply lobed, submerged, floating, and aerial, strongly dimorphic.

E. Submerged leaves dissected into filiform, branched segments; floating and terrestrial leaves 3 lobed, the lobes shallowly dentate at the distal end; flowers with yellow petals . . . . . *Ranunculus aquatilis*

EE. Submerged leaves filiform, petiolate, unbranched and blades much reduced or lacking, glabrous; floating or terrestrial leaves deeply 4-parted on filiform petioles, pubescent when terrestrial *Marsilea vestita*

Azolla filiculoides Lam. Water Fern

Habitat: Quiet, warm water; full sun.

Abundance: Rare to occasional.

Major Communities: Deep pond.

Ceratophyllum demersum L. Hornwort

Habitat: Ponds and reservoirs; warm water.

Abundance: Occasional.

Major Communities: Deep ponds.

Elodea canadensis Michx. Waterweed

Habitat: Deep to shallow warm water.

Abundance: Common.

Major Communities: Deep Ponds.

Machaerocarpus californicus (Torr.) Small. Star Water-plantain

Habitat: Vernal pools, pond margins or seeps; shallow warm water or muddy banks; full sun.

Abundance: Rare.

Major Communities: Shallow pools; juncus - mimulus - carex seeps.

Marsilea vestita Hook & Grev. Hairy Pepperwort

Habitat: Shallow warm water, pond borders where water levels do not fluctuate.

Abundance: Rare, known only from one location.

Major Communities: Deep pond.

Polygonum amphibium L var. *stipulaceum* Coleman. Water Smartweed

Habitat: Deep, quiet, warm water; full sun; muddy flats that are constantly wet.

Abundance: Common.

Major Communities: Deep pond.

Potamogeton crispus

Habitat: Deep, quiet water; full sun.

Abundance: Rare.

Major Communities: Deep pond.

Potamogeton natans L. Pondweed

Habitat: Pond margins and mud flats to moderately, deep quiet water.

Abundance: Occasional.

Major Communities: Deep pond.

Ranunculus aquatilis L. var. *hispidulus* E. Drew. Aquatic Buttercup

Habitat: Pond margins and mud flats; seep areas; usually quiet, warm to cool waters.

Abundance: Occasional.

Major Communities: Deep pond; Chain fern - juncus.

Spirodela loigorrhiza (Kurz.) Hegelm. Duckweed

Habitat: Quiet, warm water any depth, sometimes roots on mud; full sun.

Abundance: Common.

Major Communities: Ponds and reservoirs.

KEY TO TULES, SEDGES, AND RUSHES

A. Flowers unisexual, without conspicuous bractlets, staminate and pistillate flowers separate but on same axis, in dense elongate spikes subtended by a leaflike bract. . . . . *Typha latifolia*

AA. Flowers perfect or unisexual, subtended by conspicuous bracts or bractlets.

B. Fruit a capsule; perianth conspicuous, of 6 scales in 2 series.

C. Capsule 3-seeded; leaves grasslike, shreddy-filamentose near base of blades especially when young; stems hollow.

D. Perianth 2.5 to 3.5 mm long, about as long as capsule. . . . . *Luzula multiflora*

DD. Perianth 3.5 to 6 mm long, much exceeding the capsule. . . . . *L. subsessilis*

CC. Capsule many seeded; leaves not shreddy, round-filamentose at base, rarely grasslike. . . . . *Juncus* *(See Species Key)*

BB. Fruit an achene; perianth none or inconspicuous and bristlelike.

C. Culms usually round and hollow; flowers subtended by 2 bractlets . . . . . *Graminae* *(See Generic Key)*

CC. Culms solid, often 3-angles; flowers subtended by one bract. . . . . *Cyperaceae* *(See Generic Key)*

Key to *Cyperaceae*

A. Flowers mostly perfect, if unisexual pistilate flowers not enclosed by saclike bract.

B. Spikelets flattened laterally; scales in 2 rows.

C. Annuals; plants low with celery-scented herbage; scales acuminate, awned, several-nerved . . . . . *Cyperus aristatus*

CC. Perennials; have short rhizomes; culms bluntly triangular; spikelets 2 to 4 mm wide; inflorescence subtended by 3 to 6 leaves. . . . . *C. eragrostis*

BB. Spikelets not laterally flattened; scales spirally arranged.

C. Spikelet solitary, terminating a smooth, apparently leafless round culm; involucral bract lacking; perennial with rhizomes; achenes brown or yellow, lenticular; style 2-parted . . . . . *Eleocharis palustris*

CC. Spikelet mostly more than 1, densely capitate, bract subtending inflorescence, not leaflike, appearing as a continuation of the round culm; perianth bristles reddish, brown or white, retorsely barbed; achenes 2 mm; scales 4 mm . . . . . *Scirpus acutus*

AA. Flowers unisexual, pistilate flowers enclosed in a small saclike organ (perigynium).

B. Spikelet 1 on each culm, androgynous; styles 3; perigyna glabrous, distended, completely filled by achenes; culms round or obtusely angled . . . . . *Carex multicaulis*

BB. Spikelets several to many per culm; styles 2; achenes lenticular.

C. Spikelets sessile, short, with relatively few perigyna, androgynous; plano-convex; inflorescence compound forming compact subglobose to oblongish heads.

D. Pistillate scales acute, not predominately awned, shorter than perigyna; perigyna 3.5 to 4.5 mm, ventral side nerved; ligule conspicuous. . . . . *C. densa*

DD. Pistillate scales awned; awn exceeding perigynium . *C. dudleyi*

CC. Spikelets on an elongated conspicuous stalk; lowest bract sheathless, not leaflike; perigyna short beaked; leaf sheaths breaking, becoming filamentous; plants of rocky stream beds. . . . . *C. nudata*

Carex densa (Bailey) Bailey — Dense Sedge

Habitat: Wet ground; usually open, full sun.

Abundance: Common.

Major Communities: Riparian predominantly, but also found in some wet meadows.

Carex Dudleyi MacKenzie — Dudley's Sedge

Habitat: Wet, spongy soils around seeps and ponds.

Abundance: Rare.

Major COmmunities: Seeps; Ponds.

Collections: Neilson 2767, seep ¼ mi S. Geyser Rock

Carex multicaulis Bailey — Many-stemmed Sedge

Habitat: Wet, sandy ground around seeps and ponds.

Abundance: Rare.

Major Communities: Seeps; Ponds.

Collections: Neilson 2766, pool and seep ¼ mi S. Geyser Rock

Carex nudata Boott — Torrent Sedge

Habitat: Rocky stream courses; full to partial sun.

Abundance: Abundant.

Major Communities: Riparian; Bay-oak-maple; Willow-alder-oak.

Cyperus eragrostis Lamarck — Tall Umbrella-sedge

Habitat: Seeps; usually full sun.

Abundance: Occasional.

Major Communities: Seeps.

Cyperus aristatus Rottboell — Awned Umbrella-sedge

Habitat: Wet ground around springs and seeps.

Abundance: Occasional.

Major Communities: Springs; Seeps.

Eleocharis palustris (L.) Roemer & Schultes — Creeping Spike-rush

Habitat: Wet ground around ponds; full sun.

Abundance: Rare.

Major Communities: Ponds; Springs.

Scirpus acutus Muhl — Common Tule

Habitat: Quiet water of pools and ponds.

Abundance: Rare.

Major Communities: Ponds.

Key to *Juncus* Species

A. Flowers not in heads, subtended by 2 scarious bracts, clusters loose or congested.

B. Inflorescene appearing lateral, subtended by an elongate subcylindric bract simulating a continuation of the stem.

C. Rhizomes little, if at all, prolonged; plant densely cespitose; anthers about as long as filaments or shorted.

D. Stamens 6 . . . . . *J. patens*

DD. Stamens 3; perianth straw colored, 2.5 to 3 mm, segments rigid. . . . . *J. effusus*

CC. Rhizomes long creeping; anthers much longer than filaments; basal sheaths not blade bearing; perianth about 5 mm long . . . . . *J. balticus*

BB. Inflorescence appearing terminal, subtended by a flattened or channeled leaflike bracts.

C. Perennials, generally 2 dm tall or more . . . . . *J. tenuis*

CC. Annuals, usually less than 2 dm tall; flowers about 5 mm; capsule mostly more than 3mm. . . . . *J. bufonius*

AA. Flowers in heads, subtended by a single bract; heads solitary or numerous, few to many flowered.

B. Perennials, more than 1 cm tall; leaves grasslike; blades flattened without transverse septa; capsule longer than perianth. . . . . *J. covellei*

BB. Leaves not grasslike; blades subcylindrical or laterally flattened with more or less conspicuous septa; stamens 3.

C. Basal sheaths bladeless; stem leaves 3 to 4, 1 to 2 dm long, 1 to 1.5 mm wide; auricles 3 to 5 mm; inflorescence 1 to a few globose heads. . . . . *J. bolanderi*

CC. Basal sheaths with blades; stems conpressed, 2-edged, 2 to 5 dm long; lowest blades of inflorescence sword shaped (as an iris) . . . . . *J. ensifolius*

Juncus balticus Willd. Baltic Rush

Habitat: Springs, seeps, and stream beds with water at least 9 months of the year; mostly full sun.

Abundance: Occasional.

Major Communities: Springs; Seeps; Riparian.

Juncus bolanderi Engelmann Bolander's Rush

Habitat: Wet ground around springs.

Abundance: Rare?

Major Communities: Springs.

Remarkes: Reported by Roland, BLM Geyser Peak EIR.

Juncus bufonius L. Toad Rush

Habitat: Wet ground of fields and seeps; low altitudes; full to partial sun.

Abundance: Occasional to rare, but locally common.

Major Communities: Ruderal; Springs; Seeps.

Juncus covellei Piper Covelle's Rush

Habitat: Wet ground around springs and seeps.

Abundance: Occasional?

Major Communities: Springs; Seeps.

Remarks: Reported by Roland, BLM.

Juncus ensifolius Wikstrom Three-stamened Rush

Habitat: Mostly stream beds or decayed vegetation along streams.

Abundance: Rare.

Major Communities: Riparian.

Juncus effusus L. var. *pacificus* Fernall & Wiegand — Soft Rush

Habitat: Beds of streams and in seeps.

Abundance: Occasional to common.

Major Communities: Riparian.

Collections: Neilson 3166, Alder Creek (S): Neilson 3436, Truit Creek; P.U.C., R.L. Stevenson State Park

Juncus patens Meyer — Spreading Rush

Habitat: Vernally wet areas; full to partial shade.

Abundance: Occasional.

Major Communities: Wet meadows; Springs; Brushland.

Collections: Neilson 3435, Truit Creek

Juncus tenuis Willd. var. *congestus* Engelman — Slender Rush

Habitat: Wet soils; full sun.

Abundance:

Major Communities: Pond margins; Seeps; water courses.

Luzula multiflora (Retz.) Lejeune — Common Wood Rush

Habitat: Grassland & woodland slopes on a variety of soils; full to partial sun.

Abundance: Occasional to common.

Major Communities: Chaparrals; oak savannahs & woodlands.

Luzula subsessilis (Watson) Buchenos — Wood Rush

Habitat: Wooded slopes, on and off serpentine; partial shade.

Abundance: Common.

Major Communities: Jepson's ceanothus-leather oak-Stanford's manzanita; chaparrals.

TYPHACEAE — CAT-TAILS

Typha latifolia L. — Cat Tail

Habitat: Deep, quiet water from 3 in to 3 ft.

Abundance: Rare but locally common.

Major Communities: Ponds.

KEY TO HERBACEOUS FAMILIES

A. Petals lacking or not evident. . . . . Group A

AA. Petals present, evident.

B. Corolla with petals separate from each other.

C. Stamens numerous, more than twice as many as the petals . . . . . Group B

CC. Stamens not more than twice as many as the petals Group C

BB. Corolla with petals united, sometimes united only at base but can be separated from receptacle more or less intact . . . . . Group D

Key to Group A

A. Ovary superior, free from caylx although sometimes surrounded by it.

B. Perianth lacking entirely; flowers imperfect, borne in clusters in a cuplike involucre resembling united sepals or petals (cyathium); capsule 3-lobed; sap milky. . . . . *Euphorbiaceae*

BB. Perianth present as a callus.

C. Pistils more than 1; stamens distinct, 10 to many . . *Ranunculaceae*

CC. Pistils 1, hypogynous.

D. Style and stigma 1; calyx not tubular, 4-parted; leaves ovate; blades 1 to 2 cm; stamens 4 . . . . *Urticaceae*

DD. Styles and stigmas more than 1.

E. Ovary 1-loculed; ovary and seed solitary; fruit an achene.

F. Flowers borne in a tubular to campanulate involucre. . . . . *Polygonaceae (Eriogonum)*

FF. Flowers not borne in an involucre.

G. Leaves with evident stipular sheath above each node . . . . . *Polygonaceae (See also Aquatic Plants)*

GG. Leaves lacking stipular sheaths.

H. Calyx mostly 6-cleft; stamens 3 to 6, or 9. . . . . *Polygonaceae (Chorizanthe)*

HH. Calyx lobes or sepals 1, 4 or 5; bracts subtending flowers, not scarious; plants mealy, scurfy. . *Chenopodiaceae*

EE. Ovary more than 1-loculed; fruit a capsule; leaves alternate. . . . . *Euphorbiaceae (Eremocarpus)*

AA. Ovary inferior.

B. Flowers perfect; plant parasitic on tree branches or shrubs and not connected to ground . . . . . *Loranthaceae*

BB. Flowers staminate and pistilate or a few perfect borne in axil of a leafy raceme; staminate caylx with 4 to 9 unequal lobes; pistilate calyx 3-toothed . . . . . *Datiscaceae*

Key to Group B

A. Ovary superior.

B. Sepals 2.

C. Plants fleshy; sepals persistant . . . . . *Portulacaceae*

CC. Plants nor fleshy; sepals deciduous by anthesis or earlier. . . . . *Papaveraceae*

BB. Sepals more than 2.

C. Stamens united into a tube around pistil; leaves rounded. . . . . *Malvaceae*

CC. Stamens not so united.

D. Mature ovary open at summit; flowers irregular . *Resedaceae*

DD. Mature ovary closed at summit; flowers regular.

E. Stamens hypogynous.

F. Leaves opposite, punctate with pellucid dots or glands; stamens usually in 3 or 5 bundles. . . . . *Hypericaceae*

FF. Leaves laternate; sepals decidous; anthers maturing centripetally . . . . . *Ranunculaceae*

EE. Stamens perigynous . . . . . *Rosaceae*

AA. Ovary at least partly inferior.

B. Ovary only partially inferior; fruit a dry capsule . . . *Saxifragaceae*

BB. Ovary wholly inferior; fruit a capsule . . . . . *Loasaceae*

Key to Group C

A. Pistils more than 1, nearly or quite separate.

B. Leaves fleshy, simple. . . . . *Crassulaceae*

BB. Plants not succulent; pistils mostly fewer than sepals . *Saxifragaceae*

AA. Pistils 1, more or less of 1 or more united carpels.

B. PLants climbing by means of tendrils; leaves palmately veined . . . . . *Cucurbitaceae*

BB. Plants not climbing by means of tendrils.

C. Styles 2 to 5, separate to near base.

D. Ovary superior; leaves simple.

E. Leaves largely basal; plants fleshy. . . . . *Portulacaceae*

EE. Leaves mostly cauline.

F. Sepals 2; plants fleshy; stamens 1 to 3 *Portulacaceae*

FF. Sepals 3 to several; plants not fleshy, stamens 3 to 8.

G. Flowers regular.

H. 5-merous; capsule closed until mature; overy 1-celled . . . . . *Caryophyllaceae*

HH. Flowers 4 or 5-merous; ovary 2 to 5-celled. . . . . *Linaceae*

GG. Flowers irregular, 2 to 7-merous; capsule open at top before maturity *Pesedaceae*

DD. Ovary inferior; flowers in umbels.

E. Fruit a berry; leaves 3 to 15 dm . . . . . *Araliaceae*

EE. Fruit dry, splitting into 2 carpels; leaves mostly smaller . . . . . *Umbelliferae*

CC. Style 1, sometimes more or less divided towards apex.

D. Ovary inferior; fruit dry; flowers 4-merous. . . *Onagraceae*

DD. Ovary superior.

E. Flowers irregular; base woody; petals 3 - 2 forming a pair, the third hooded; sepals 5, the lateral petaloid. . . . . *Polygalaceae*

EE. Petals not as above.

F. Sepals 2 or 3.

G. Plants fleshy; sepals 2, persistant *Portulacaeae*

GG. Plants not succulent.

H. Sepals 2, early dropping . . . . *Papaveraceae*

HH. Sepals not early dropping; leaves dissected; stamens in 2 sets of 3; petals 4 in 2 dissimilar sets *Fumariaceae*

FF. Sepals 4, 5 or more; leaves simple.

G. Flowers nearly or quite regular.

H. Ovary appearing inferior, actually superior and free in floral tube; flowers 4 to 6-merous — *Lythraceae*

HH. Ovary appearing superior.

I. Sepals 4; filaments 4 or 6, distinct. . . . . — *Cruciferae*

II. Sepals mostly 5; filaments 5, 8 or 10, often united at base.

J. Carpels in mature fruit separating as 1-seeded structures. . . . . — *Geraniaceae*

JJ. Mature carpels forming a many seeded capsule; anthers opening by horizontal slits or pores at base — *Pyrolaceae*

GG. Flowers definitely irregular; petals unlike.

H. Flowers papilionaceous; fruit a legume. . . . . — *Leguminosae*

HH. Flowers not papilionaceous; fruit 1-loculed; capsule 3-valved . . . . — *Violaceae*

Key to Group D

A. Ovary superior.

B. Stamens more than 5; petals united only near base.

C. Pistils 4 or 5; stamens 10; plants succulent . . . . . — *Crassulaceae*

CC. Pistil 1.

D. Corolla regular; stamens many, united in a tube about style; leaves simple, palmately veined or lobed. . . . . — *Malavaceae*

DD. Corolla irregular, petals not all alike.

E. Petals 4 in 2 unlike pairs; sepals 2; leaves dissected . . . . . — *Fumariaceae*

EE. Petals 3 appearing to be 5 because of 2 petaloid sepals; remaining 3 sepals foliaceous; leaves entire. . . . . — *Polygalaceae*

BB. Stamens not more than 5.

C. Plants parasitic, lacking chlorophyll.

D. Trailing vines without connection to ground when mature; feed on other plants through haustoria; flowers minute . . . . . — *Cuscutaceae*

DD. Root parasites; corolla 2-lipped; stamens 4 . . . — *Orobanchaceae*

CC. Plants not or only partially parasitic, all containing chlorophyll.

D. Corolla regular.

E. Pistils 2, ovaries distinct but styles or stigmas united; plants with milky juice.

F. Styles united; stamens united around stigma . . . . . *Apocynaceae*

FF. Style distinct below; stamens united, joined to stylar column. . . . . *Asclepiadaceae*

EE. Pistil 1.

F. Stamens as many as corolla-lobes, opposite them; petals strongly reflexed. . . *Primulaceae*

FF. Stamens as many as or fewer than corolla-lobes, alternate with them.

G. Corolla small, dry, scarious, veinless; capsule opening by lid; leaves usually basal; stamens 2 or 4 . *Plantaginaceae*

GG. Corolla not as above.

H. Ovary 1, 2, or 3-loculed.

I. Style 3-cleft; ovary 3-loculed; capsule 3-valved. . . . *Polemoniaceae*

II. Style not 3-cleft; ovary 1 or 2-loculed.

J. Calyx 4 or 5-toothed or cleft; style 1.

K. Ovary 1-loculed; stigmas 2; leaves opposite *Gentianaceae*

KK. Ovary 2-loculed; stigma usually 1; leaves alternate . . . . . *Solanaceae*

JJ. Calyx of 5 distinct sepals or united only at base; styles 2 or 1, usually partly divided.

L. Plants trailing, sometimes very short; flowers borne in leaf axils; corolla plaited in bud . . . . . *Convolvulaceae*

LL. Plants erect or diffuse; inflorescence terminal on branches, cymose, often coiled; corolla not plaited. . . . . *Hydrophyllaceae*

HH. Ovary 4-loculed, 4-lobed, each lobe forming a nutlet when mature; inflorescence a scorpioid cyme. . *Boraginaceae*

DD. Corolla irregular.

E. Fruit 2 to 4 nutlets; leaves opposite.

F. Ovary not lobed; style apical, entire. . . . *Verbenaceae*

FF. Ovary 4-lobed; style arising between ovary lobes, cleft at apex; stems square in cross section; usually strongly scented . . . . . *Labiatae*

EE. Fruit a capsule; seeds not winged; corolla strongly 2-lipped; stamens 4, 5, or rarely 2 . *Scrophulariaceae*

AA. Ovary inferior or partly so; stamens 5 or fewer.

B. Stamens distinct.

C. Leaves alternate; flowers regular (except in stamens 5. . . . . *Campanulaceae*

CC. Leaves opposite or whorled.

D. Stamens 1 to 3; flowers irregular with a pouch or saclike projection on basal portion of corolla; fruit 1-seeded . . . . . *Valerianaceae*

DD. Stamens 4 or 5; flowers regular or irregular.

E. Ovary 1-loculed; flowers in short spikes; fruit an achene. . . . . *Dipsacaceae*

EE. Ovary 2 to 5-loculed; flowers axillary; fruits paired carpels usually dry, often armed with bristles or tubercles, separating when ripe. . . . . *Rubiaceae*

BB. All or some stamens united by anthers.

C. Plants vining, bearing tendrils; leaves palmate; stamens 5 with 2 pairs united and appearing to be 3 . . . . . *Cucurbitaceae*

CC. Plants erect, not vinelike.

D. Flowers solitary or in panicles; stamens free from corolla . . . . . *Campanulaceae*

DD. Flowers congested into an involucrate head . . . . *Compositae*

APOCYNACEAE — DOGBANES

Key to *Apocynaceae*

A. Corolla 1.5 to 2 cm long, rose colored; style filiform with an annular appendage; plants 1 to 2 dm tall, spreading, diffuse perennials . . . . . *Cycladenia humilis*

AA. Corolla less than 1 cm long, white; style short without appendage; plants much taller, more compact patches.

B. Corolla 4 to 6 mm, cylindric; leaves drooping; plant less than 3 dm tall . . . . . *Apocynum pumilum*

BB. Corolla 3 to 4 mm, urn-shaped; leaves ascending, plant 4 to 7 dm tall . . . . . *A. sibiricum*

Apocynum pumilum (Gray) Greene var. *rhomboideum* (Greene) Big. & Bel. Mountain Dogbane

Habitat: Moist shady areas to dry slopes and flats.

Abundance: Rare.

Major Communities: Yellow pine forest; Riparian: Bay - oak - madrone.

Apocynum sibiricum Jaca. Var. *salignum* (Greene) Fern. Clasping-leaf Dogbane

Habitat: Stream margins, along wooded slopes.

Abundance: Rare.

Major Communities: Bay - oak - madrone; willow - oak - alder.

Cycladenia humilis Benth. Cycladenia

Habitat: Deep, acid to neutral soils in open pine forests above 3800 feet elevation.

Abundance: Common.

Major Communities: Yellow pine - Douglas fir forest.

Remarks: So far known only in the Mayacmas Mountains from Cobb Mountain.

ASCLEPIADACEAE — MILKWEEDS

Key to *Asclepiadaceae*

A. Plants prostrate; stems flattened; mostly on serpentine soils *Asclepias solanoana*

AA. Plants erect; stems round; non-serpentine soils.

B. Leaves opposite; corolla lobes and hoods deep rose-purple to deep purple.

C. Leaves sessile, cordate clasping, glabrous and glaucous, tinged with purple . . . . . *A. cordifolia*

CC. Leaves short pertioled, cordate but not clasping, soft tomentose to glabrate (ocassionally), greenish-gray . . . . . *A. speciosa*

BB. Leaves mostly in whorls of 3 to 6; foliage gray-green; flowers greenish-white, cream, and/or tinged with purple.

C. Follicles smooth, narrow, acuminate, 6 to 9 cm *A. fascicularis*

CC. Leaves elongate-oblong, hoary tomentose; follicles oblong, blunt, hairy, 6 to 9 cm. . . . . *A. eriocarpa*

Asclepias cordifolia (Benth.) Jepson — Glaucous Milkweed

Habitat: Rocky, gravelly soils; mostly on southern and western exposures; below 3200 feet elevation.

Abundance: Rare.

Major Communities: Manzanita - ceanothus - mahogany; chaparral - buckbrush - manzanita; shrubby live oak - manzanita chaparrals.

Asclepias eriocarpa Benth. — Kotolo

Habitat: Open woodland or savannahs; deep soil; full sun; all exposures; mostly below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Blus oak savannah; Mixed oak woodland; Ruderal.

Asclepias fascicularis Dcne. in A. DC. Narrow-leaved Milkweed

Habitat: Open, sunny slopes; gravelly, poor soils; most exposures; below 2800 feet elevation.

Abundance: Rare.

Major Communities: Mixed oak savannahs; Annual grasslands.

Asclepias solanoana Woodson. Ground Milkweed

Habitat: Open serpentine hillsides, usually rocky or thin soils; above 2800 feet elevation; all exposures.

Abundance: Occasional.

Major Communities: Serpentine barrens; Jepson ceanothus - leather oak - Stanford's manzanita.

Asclepias speciosa Torr.

Habitat: Dry, gravelly, and stony soils; often in stream meanders; partial shade to full sun; mostly below 2500 feet elevation.

Abundance: Rare.

Major Communities: Dry washes, alluvial benches; Mixed oak savannah and woodland.

ARALIACEAE GINSENGS

Aralia californica Watson California Spikenard

Habitat: Moist, mesic site on wet, rich alluvium soils with high humus; partial to full shade; any exposure.

Abundance: Occasional but locally abundant.

Major Communities: Riparian, deep cool canyons along streams or springs.

Collections: Neilson 2809, Alder Creek

Key to *Boraginaceae*

A. Flowers yellow or orange, in scorpioid spikes.

B. Flowers yellow, 5 to 7 mm long, tube included in the calyx, style 2.5 to 3 mm long; plant ashy colored. . *Amsinckia menziesii*

BB. Lowers orange, 8 to 10 mm long, tube exerted from calyx, style 5 to 18 mm long; plant greenish. . . . . *A. intermedia*

AA. Flowers blue or white.

B. Flowers blue; lower leaves 5 to 15 cm, broadly ovate with petioles as long.

C. Stems with spreading hairs; leaves oblanceolate to oblong-linear, gradually narrowed to winged petioles; above 3800 feet elevation . . . . . *Cynoglossum occidentale*

CC. Stems glabrous; leaves ovate, abruptly narrowed to petioles; middle and lower elevations. . . . . *C. grande*

BB. Flowers white.

C. Perennial from underground roots; stems lax and decumbent; leaves succulent, glaucous; flowers in one to several scorpioid cymes; corolla white with yellow spots, purplish in the center. . . . . *Heliotropium curassavicum*

CC. Annuals.

D. Calyx and pedicels persistant in fruit; inner face of nutlets with a fine longitudinal line or grooved at the base.

E. Nutlets grayish, verrucose or tuberculate; with one to several stems, 2 to 10 dm tall with several short floriferous branchlets forming a leafy panicle; 2 or 3 scorpioid cymes terminating the branchlets . . . . . *Cryptantha muricata*

EE. Nutlets brownish, smooth and shining; branches much longer, terminating in 1, 2, or sometimes 3 scorpioid cymes.

F. Leaves less than 2 mm long; nutlet 1; corolla 2 to 2.5 mm broad; stems branched above the middle . . . . . *C. hispidula*

FF. Leaves 2 to 6 mm long; nutlets mostly 4; corolla 1 mm broad; stems branched from near the base. . . . . *C. torreyana*

DD. Nutlets lacking a distinct ventral groove or slit in the pericarp, this replaced by an elevated keel and a conspicuous attachment scar.

E. Leaves opposite, strigose and pustulate; nutlets broadly ovoid, tubercled, with irregular ridges somewhat asymmetrical, attachment lateral; scar broad in a cavity broader than long; plant .5 to 2.5 dm tall; racemes solitary with bracts in the lower part; corolla 1 to 2 mm broad. . . . . *Plagiobothrys cognatus*

EE. Leaves alternate.

F. Nutlets cruciform, sharply ridged and tubercled dorsally and on edges; rosette leaves lance-oblong, cauline leaves ovate; plants 1 to 3 dm tall, stems soft-villous; calyx 3mm, short-villous, whitish or reddish; corolla 2 to 3 mm broad . . . . . *P. tenellus*

FF. Nutlets triangular, ovoid; all leaves linear or spatulate-oblong.

G. Stems 1 or more, mostly branched above, 2 to 5 dm tall, villous with short curly hairs; leaves mostly in basal rosette; calyx cirumsissile in fruit, 2 to 3 mm long; mature nutlets usually only 1 or 2; corolla 6 to 8 mm broad *P. nothofulvus*

GG. Stems 1 or more, 3 to 6 dm tall, villous-hirsute and sparsely tomentose, purplish; calyx not circumsissile in fruit, 5 mm long, rusty colored, hirsute; mature nutlets usually 4, 2.5 to 3 mm long; corolla 3 to 4 mm broad *P. fulvus*

Amsinckia intermedia F. & M. Fiddleneck-fireweed

Habitat: Rich to poor soils; open sunny places; any exposures; below 3200 feet elevation.

Abundance: Occasional to common locally.

Major Communities: Ruderal - old barnyards; Annual grasslands; Blue oak savannah.

Remarks: Found mostly around old habitations or stock yards. Introduced at higher elevations in weedy straw used for mulching.

Amsinckia menziesii (Lehm.) Nels. & Macbr. Harvest Fireweed

Habitat: Rich to poor soils; any exposure; full sun; below 2500 feet elevation.

Abundance: Occasional.

Major Communities; Ruderal - stockyards; Annual grasslands; old field communities.

Collections: Neilson 3461, High Valley Creek

Cryptantha hispidula Greene ex Brand. Napa Cryptantha

Habitat: Poor or overgrazed soils; full sun; any exposure; below 3000 feet elevation; often on serpentine outcrops.

Abundance: Common.

Major Communities: Annual Grasslands; Mixed oak and Blue oak savannahs; disturbed places.

Collections: Neilson 2868, Big Geysers

Cryptantha muricata (Hook & Arn.) Nels. & Macbr. var. *jonesii* (A. Gray) I.M. Johnston. Prickly Cryptantha

Habitat: Dry flats and slopes; poor, rocky soils.

Abundance: Occasional ?

Major Communities: Annual grassland; Native herb.

Cryptantha torreyana (Gray) Greene.

Habitat: Open, sunny slopes; poor soils; any exposure.

Abundance: Common.

Major Communities: Annual grassland; Native herb.

Collections: Neilson 3183, High Valley

Cynoglossum grande Dougl. ex Lehm. Grand Hound's Tongue

Habitat: Partial shade; mesic to sub-xeric sites; all exposures up to 3500 feet elevation.

Abundance: Occasional to common.

Major communities: Pine - oak woodland; Mixed oak woodland; Fir - pine - oak.

Collections: Neilson 2953

Cynoglossum occidentale Gray. Western Hound's Tongue

Habitat: Partial shade; rhyolitic soils; above 3500 feet elevation

Abundance: Occasional

Major Communities: Yellow pine parkland; fir - pine - oak.

Collections: Neilson 3137

Heliotropium curassavicum L. var. *oculatum* (Heller) Jtn.

Habitat: Alkaline and saline soils near seeps from serpentine.

Abundance: Rare; habitat very limited in the Mayacmas.

Major Communities: Juncus - saltgrass.

Plagiobothrys cognatus (Greene) Jtn.

Habitat: Open, sunny areas in meadow lands, usually damp areas.

Abundance: Occasional.

Major Communities: Annual grassland.

Plagiobothrys fulvus (H.& A.) Jtn. var. *campestris* (Greene) Jtn. Rusty Popcorn-flower

Habitat: Open, sunny hillsides; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland; Native herb.

Collections: Neilson 3015, near Unit 15

Plagiobothrys nothofulvus (Gray) Gray. Popcorn-flower

Habitat: Open, sunny slopes to partial shade; deep to shallow soils; usually overgrazed or infertile areas; south and west exposure.

Abundance: Common.

Major Communities: Annual grassland; Native herb; Blue oak savannah.

Plagiobothrys tenellus (Nutt.) Greene.

Habitat: Open, sunny slopes; poor soil.

Abundance: Occasional.

Major Communities: Annual grassland; Native herb.

Collections: Neilson 3469, High Valley Creek

CAMPANULACEAE — CAMPANULAS

Key to *Campanulaceae*

A. Corolla regular, anthers and filaments distinct.

  B. Capsule dehiscent at apex; leaves sessile, narrow, oblong, cauline, light green, glabrate to hirsute, shallowly toothed, 3 to 20 cm long; stems 3 to 15 cm long, branched from base; annual . . . . . *Githopsis specularioides*

  BB. Capsule dehiscent from the side by small lids; leaves broadly round; terminal flowers pedicelled; perennial *Campanula prenanthoides*

AA. Corolla irregular; stem zig-zaged, branched from base and above; leaves mostly oblanceolate, dentate, glabrous; corolla longer than sepals, white to purplish . . . . . *Nemacladus montanus*

Campanula prenanthoides Durand — California Harebell

Habitat: Subxeric sites in open pine woods; deep, sandy soils.

Abundance: Rare.

Major Communities: Pine-Oak Woodland.

Collections: Neilson 3389, Geyser Rock

Githopsis specularioides Nutt. — Common Blue-cup

Habitat: Open hillsides, often in burned chaparral; poor soil; full sun.

Abundance: Occasional to locally common.

Major Communities: Annual grassland; Native herb; various chaparral communities following burns.

Collections: Neilson 3578, Big Geysers (S)

Nemacladus montanus Greene. — Mountain Nemacladus

Habitat: Open places; serpentine soils.

Abundance: Occasional.

Major Communities: Jepson's ceanothus - leather oak - Stanford's manzanita.

CARYOPHYLLACEAE — PINKS

Key to *Caryophyllaceae*

A. Sepals distinct or nearly so; petals without claws.

B. Stipules lacking.

C. Capsules ovoid or ellipsoid; styles opposite the sepals usually 3.

D. Petals deeply notched or bifid; valves of capsule bifid; internodes with longitudinal line of hairs; leaves ovate; early spring annual. . . . . *Stellaria media*

DD. Petals entire or nearly so; leaves sessile, annuals.

E. Petals shorter than the sepals; plants purbulent, 5 to 20 cm tall; leaves ovate, acuminate, ciliate, scabrous, 3 to 5 veined, 3 to 7 mm . . . . *Arenaria serpyllifolia*

EE. Petals longer than sepals.

F. Plants glabrous; leaves petioled, lanceolate, obtuse, 25mm . . . . . *A. californica*

FF. Plants nearly glabrous to glandular pubescent, 5 to 25 cm tall, much branched; leaves filiform, 5 to 30 mm . . . . . *A. douglasii*

CC. Capsule cylindrical, often bent near the summit.

D. Erect, annual, viscid, freely branched, 10 to 30 cm tall; leaves elliptic to obovate, obtuse, pubescent, 1 to 2.5 cm long; inflorescence a glomerate cyme *Cerastium viscosum*

DD. Decumbent perennial with basal matted offshoots; flowering stems glandular, pubescent, ascending or decumbent, 10 to 40 cm; leaves oblong, 1 to 2.5 cm; flowers in loose cymes . . . . . *C. vulgatum*

BB. Stipules present, scarious; stlyes 3 to 5; petlas present.

C. Styles and capsule valves 5; leaves linear, 1 to 3 cm, appearing whorled because of crowding in the axils; petals white, protruding only slightly above the calyx *Spergula arvensis*

CC. Styles and capsule valves 3; leaves opposite.

D. Leaves densely fascicled, 6 to 12 mm long, filiform; stipules lance-acuminate . . . . . *Spergularia rubra*

DD. Leaves not or only slightly fascicled, 1 to 2 cm; stipules deltoid, 2 to 4 mm. . . . . *S. bocconii*

AA. Sepals united into a tube; petals with a claw, borne on a raised disc.

B. Styles 3; calyx lobes not leaf-like; petals 5 with a scale-like appendage at the base of the blade.

C. Plants annual, erect, densely pubescent, 10 to 40 cm tall; petals white to pinkish, slightly twisted; calyx constricted at the orifice . . . . . *Silene gallica*

CC. Plants perennial; stems several, usually decumbent, purbulent, somewhat glandular, 15 to 40 cm long; leaves ovate to oblanceolate, 3 to 8 cm; petals crimson . . *S. californica*

BB. Styles 2; calyx with 1 to 3 pairs of bracts at the base; leaves mostly near the base, 2 to 2.5 cm; petals red, scarcely protruding from the calyx, without an appendage *Tunica prolifera*

Arenaria californica (Gray) Brew. California Sandwort

Habitat: Dry, open, sunny slopes; sandy or gravelly soils.

Abundance: Occasional.

Major Communities: Ceanothus - manzanita; Chamise - buckbrush - manzanita.

Arenaria douglasii Fenzl. ex T.& G. Douglas' Sandwort

Habitat: Ruderal and disturbed areas; dry, open hillsides and pastures.

Abundance: Occasional to common.

Major Communities: Annual Grassland; Anthropogenic communities.

Collections: Neilson 2957, Big Geysers; Neilson 3224, Kelsey Creek near Glenbrook (L); Neilson 3221, Geysers Rock; Neilson 3887 (3)

Arenaria serpyllifolia L. Thyme-leaved Sandwort

Habitat: Moist sands or muddy areas.

Abundance: Occasional, habitat rare in the Mayacmas.

Major Communities: Juncus - mimulus seep

Collections: Neilson 3693, Lower Squaw Creek (S)

Cerastium viscosum L. Mouse-eared Chickweed

Habitat: Poor or overgrazed meadow lands, open hillsides.

Abundance: Common.

Major Communities: Anthropogenic communities; Annual grassland; Blue oak savannah.

Collections: Neilson 2956, Big Geysers (S)

Cerastium vulgatum L. Common Chickweed

Habitat: Open, sunny areas.

Abundance: Occasional.

Major Communities: Antropogenic; Annual grassland; Blue oak savannah.

Collections: Neilson 3013, Truit Creek (S)

Silene californica Durand. California Indian Pink

Habitat: Dry to sub-xeric slopes; poor rock soils; all exposures; often on serpentine soils.

Abundance: Occasional.

Major Communities: Shrubby live oak; Shrubby live oak - leather oak - Stanford's manzanita.

Collections: Neilson 2800, summit of Cobb Mountain (L); Neilson 2955, Big Geysers (S); Neilson 3008, Big Geysers (S)

Silene gallica L. Common Catchfly

Habitat: Disturbed places; open sunny hillsides; overgrazed grassland or poor soils.

Abundance: Occasional.

Major Communities: Annual grassland.

Spergula arvensis L. Spurry

Habitat: Open, sunny hillsides; overgrazed areas or poor soils, old fields.

Abundance: Occasional.

Major Communities: Annual grasslands; Anthropogenic.

Collections: Neilson 3054, Geyser Rock (S); Neilson 3059, Geyser Rock (S); Neilson 3113, Big Geysers (S)

Spergularia bocconii (Scheele) Foucaud. Boccone's Sand-Spurrey

Habitat: Disturbed areas, road sides, beaten paths; open and sunny sites.

Abundance: Rare.

Major Communities: Anthropogenic.

Collections: Neilson 2880, Geyser Rock (S)

Spergularia rubra (L.) J.& C. Presl. Purple Sand-Spurrey

Habitat: Muddy flats, pond margins, seeps.

Abundance: Occasional; few habitats in the Mayacmas.

Major Communities: Ponds and seeps.

Stellaria media (L.) Vill. Common Chickweed

Habitat: Deep, rich, humic soils; partial shade or mesic environment; all exposures.

Abundance: Occasional, may be locally abundant.

Major Communities: Mixed oak woodlands; Bay - oak - madrone.

Tunica prolifera (L.) Scop. Tunica

Habitat: Open, sunny hillsides.

Abundance: Rare.

Major Communities: Annual grassland; Anthropogenic.

CHENOPODIACEAE GOOSEFEET

Chenopodium californicum (Wats.) Wats. California Pigweed

Habitat: Open hillsides; alluvial flats.

Abundance: Rare to occasional.

Major Communities: Annual grassland.

Key to *Compositae*

A. Corollas all strap-shaped (ligulate), 5-toothed at apex, perfect; milky juice in stems and leaves . . . . . Group A

AA. Corollas of the head either of both tubular (disc) and marginal strap-shaped (ray) flowers or all tubular flowered; ray flowers pistilate or sterile.

B. Heads with ray and disc flowers (radiate).

C. Rays yellow or orange.

D. Pappus chaffy, or of firm awns, or none; receptacles chaffy, bristly, or naked . . . . . Group B

DD. Pappus mostly or wholly of capillary (sometimes plumose) bristles; receptacles naked . . . . . Group C

CC. Rays other than yellow or orange. . . . . Group D

BB. Heads discoid, without ray flowers.

C. Pappus partly or wholly of numerous capillary (sometimes plumose) bristles (wanting in outermost flowers of Filago). . . . . Group E

CC. Pappus of scales, or awns, or very short chaffy bristles, or a mere crown, or none, never plumose . . . . . Group F

Key to Group A

A. Pappus of soft, simple, capillary bristles only.

B. Achenes strongly flattened; leafy-stemmed herbs.

C. Involucre campanulate; achenes not beaked; without enlarged disc; bearing pappus at summit, some of outer pappus bristles evidently stouter than others . . . . *Sonchus asper*

CC. Involucre cylindrical; achenes with slender beak about twice as long as the body; disc enlarged at summit; pappus about equal in diameter. . . . . *Lactuca serriola*

BB. Achene round or prismatic, scarcely flattened.

C. Achenes smooth, not evidently tuberculate near summit.

D. Flowers white or tinged with pink or yellow; stems scapose.

E. Plants annual, mostly 1 to 4 dm tall; leaves with tufts of wool near margins or in leaf axils, dentate-pinnatifid with short teeth on lobes; achenes 5-ribbed . . . . . *Malacothrix floccifera*

EE. Plants biennial or perennial, mostly 4 to 8 dm tall; lower leaves at least densely hirsute with whitish or tawny hairs, entire, oblong-oblanceolate. . . . . *Hieracium albiflorum*

DD. Flowers yellow to orange-red, drying pink or purple in *Agoseris*; low acaulescent plants.

E. Achenes not beaked; pappus broad at base tapering into a bristle-like awn .

F. Plants perennial from thickened tap root; stems leafy, glabrous or nearly so, 2 to 8 dm tall; head solitary at branch ends; pappus bristles not plumose, about 10, white *Microseris lacinata*

FF. Plants annual, subacaulescent, glabrous to villous, 1 to 6 dm tall; heads terminal on scapose peduncles; pappus of 5 narrow scales 6 to 20 mm long, each 2-cleft at apex and slender-awned from between lobes. . . . . *Microseris lindleyi*

EE. Achenes beaked; pappus of white capillary bristles, never plumose.

F. Plants annual; achenes beak mostly 2 to 3 times as long as achene body; involucre 12 to 18 mm long . . . . . *Agoseris heterophylla*

FF. Plants perennial; involucre longer.

G. Achene body truncate at apex, abruptly beaked; leaf segments retorse; phyllaries in 2 unlike sets. . . . . *Agoseris retrorsa*

GG. Achene body tapering at apex gradually beaked; leaf segments not retorse; phyllaries mostly in 3 sets - outer short and broad, inner narrower and more elongate. . . . . *Agoseris grandiflora*

CC. Achenes tuberculate at summit; plant acaulescent with scapose stem bearing single head; flowers yellow . . . *Taraxacum officinale*

AA. Pappus of plumose bristles.

B. Flowers pink; achenes beakless.

C. Perennial; stems 1 to 3 dm tall; leaves mostly linear, 3 to 10 cm long, lower with a few divergent teeth; pappus about 20, white, plumose, thickened, more or less united at base. . . . . *Stephanomeria lactucina*

CC. Annual; 5 to 30 dm tall; slender, straight, erect stems or branches from about the middle; lower leaves oblong or spathulate, 10 to 20 dm long, often sinuate, drying early; upper leaves entire, small, linear; pappus bristles white, plumose, 4 to 5 mm long; flowers pinkish to white above, purplish below . . . . . *Stephanomeria virgata*

BB. Flowers purple or yellow; achenes beakless; perennials.

C. Flowers purple; phyllaries longer than corollas; peduncles strongly inflated toward apex; leaves linear-lanceolate, long acuminate, 1 to 3 dm long. . . . . *Tragopogon porrifolius*

CC. Flowers yellow; phyllaries shorter than corollas; peduncles not inflated; leaves hispid, pinnatifid, 6 to 14 cm long. . . . . *Hypochoeris radicata*

Agoseris grandiflora (Nutt.) Greene — Mountain Dandelion

Habitat: Mostly open, sunny sites; gravelly loam or sand; any exposure.

Abundance: Occasional.

Major Communities: Annual grassland, oak savannahs, open oak woodlands.

Collections: Neilson 2943, Big Geysers (serpentine); Neilson 3275 and 3298, Caldwell Pines; Neilson 3321 High Valley Creek; Neilson 3378, Big Geysers near Eagle Rock; Neilson 3444, ¼ mi S. Geysers Rock; Neilson 35581, 1 mi S. Geysers Rock

Agoseris heterophylla (Nutt.) Greene — Annual Agoseris

Habitat: Open, sunny hillsides; deep, gravelly loam.

Abundance: Occasional to locally common.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 2945, Big Geysers; Neilson 3227 and 3575, High Valley Creek (L)

Agoseris retrorsa (Benth.) Greene — Mountain Dandelion

Habitat: Open, sunny sites; subxeric conditions; usually on deep, gravelly laom.

Abundance: Common.

Major Communities: Annual grassland; savannahs; Native Herb; Pine parkland.

Collections: Neilson 2940, Big Geysers; Neilson 3341, High Valley Creek (L); Neilson 3710, Big Sulphur Creek above junction with Squaw Creek

Hieracium albiflorum Hook. Hawkweed

Habitat: Full to partial shade; deep, rich soils; any exposure.

Abundnace: Occasional to common.

Major Communities: Fir-pine-oak woodlands; oak woodlands; Douglas fir forest.

Collections: Neilson 2801, Cobb Mountain (L); Neilson 2945 and 3559, Big Geysers; Neilson 3294, Caldwell Pines; P.U.C., Troutdale Creek

Lactuca serriola L. Prickly Lettuce

Habitat: Open, sunny sites; deep, rich sandy or clay loams; full sun; below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Ruderal; Anthropogenic; Old field; wet grasslands.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Microseris lacinata (Hook.) Schultz. Cut-leafed Microseris

Habitat: Open, sunny sites; deep, gravelly soils, usually dry.

Abundance: Common.

Major Communities: Openings in chaparrals; oak savannahs.

Collections: Neilson 3372, near Eagle Rock; Neilson 3374, Headwaters Truit Creek ½ mi W.

Microseris lindleyi (D.C.) Gray Uropappus

Habitat: Dry, open, sunny slopes; deep, gravelly soils.

Abundance: Occasional.

Major Communities: Openings in chaparrals.

Collections: P.U.C., Troutdale Creek; Neilson 3191, High Valley Creek (L)

Malacothrix floccifera (D.C.) Blake Woolly Malacothrix

Habitat: Open, dry slopes; serpentine soils mostly.

Abundance: Occasional but locally common.

Major Communities: Shrubby live oak.

Collections: Neilson 2786, Great Western Mine (L); Neilson 2827, 2 mi. N. Cobb Creek; Neilson 3176, serpentine ridge SW. High Valley Creek (L)

Sonchus asper (L.) Hill — Prickly Sow Thistle

Habitat: Deep, moist, rich soils around springs and seeps; full sun; all exposures; mostly below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Springs; Seeps; Wet meadows.

Collections: Neilson 3134, Hillary Farms (S); P.U.C., Mt. St. Helena fire road

Stephanomeria lactucina Gray — Large-flowered Stephanomer

Habitat: Subxeric sites on deep forest soils, most common on disturbed sites with mineral soil; usually full to partial sun; all exposures.

Abundance: Occasional but locally common.

Major Communities: Pine-oak forest; Fir-pine-oak.

Collections; Neilson 2795, head of Alder Creek (L)

Stephanomeria virgata Benth. — Tall Stephanomeria

Habitat: Xeric and subxeric sites; deep, gravelly soils; mostly on south and west exposures, but also on others; full sun.

Abundance: Common.

Major Communities: Openings in chaparrals; Anthropogenic; disturbed sites; Pine-oak woodland; Shrubby live oak; chamise-buckbrush chaparral.

Collections: Neilson 3119, Geyser Rock; Neilson 3167, near Diana Rock; Neilson 3387, 1 mi E. Geyser Rock(L); P.U.C., Troutdale Creek; P.U.C., Mt. St. Helena fire road

Taraxacum officinale Wiggins — Dandelion

Habitat: Moist, well-drained soils; usually full to partial sun; all exposures.

Abundance: Common to occasional.

Major Communities: Wet meadows; Stream banks.

Collections: Neilson 3153, High Valley Creek (L); P.U.C., Troutdale Creek (L)

Key to Group B

A. Recertacle chaffy across whole receptacle; phyllaries of more than 1 series.

B. Cauline leaves all alternate; leaves entire or toothed; rays 2 to 6 cm long.

C. Outer phyllaries foliaceous, greatly exceeding disk flowers; heads large, solitary, terminal.

D. Plants shining, sparsely pilose to glabrous; achenes 10 to 12 mm long. . . . . *Wyethia glabra*

DD. Plants densely white tomemtose, becoming glabrate in age; achenes 12 to 15 mm long. . . . . *Wyethia helenioides*

CC. Outer phyllaries foliaceous, ciliate, shorter than disc flowers; heads 1 to 3. . . . . *Wyethia angustifolia*

BB. Cauline leaves or at least lower ones, opposite; ray flowers infertile.

C. Perennials; pappus persistant; disk achenes strongly compressed, thin-edged; lower 1 or 2 pairs of leaves opposite and 1 to 3 alternate leaves above; blades linear ro lanceolate; heads solitary. . . . . *Helianthella californica*

CC. Annuals; pappus of 2 paleaceous awns and rarely a few shorter scales readily deciduous; achenes only slightly or moderately compressed.

D. Plants vigrous, 3 to 25 dm tall, usually much branched, mostly of disturbed places. . . . . *Helianthus bolanderi*

DD. Plants mostly 3 to 5 dm tall, thin-stemmed, often on serpentine soils, mostly of undisturbed places *Helianthus exilis*

AA. Receptacle naked or receptacle bracts limited to a single row between ray and disc flowers.

B. Phyllaries in a single series each partly of completely enfolding a ray achene.

C. Receptacle bracts limited to a single row between ray and disc flowers; central portion of receptacle devoid of bracts.

D. Ray achenes obcompressed, each completely hidden and enclosed by an obcompressed phyllary, have abruptly infolded and overlapping lateral margins.

E. Disc flowers 6 or more.

F. Achenes 10, costate, tuberculate-scabrous; pappus oblong-obtuse. . . . . *Achyrachaena mollis*

FF. Achenes not costate nor scabrous; pappus, when present, attenuate to tip.

G. Disc-achenes sterile, undeveloped; heads closing during midday.

H. Heads not densely glomerate . . . *Lagophylla ramosissim*

HH. Heads densely glomerate . . . . . *Lagophylla congesta*

GG. Disc-achenes fertile; heads open continuously. . . . . *Layia septentrionalis*

EE. Disc-flower 1 . . . . . *Madia minima*

DD. Ray-achenes not compressed or not completely enclosed by enveloping margins or phyllaries.

E. Ligule bifid; upper leaves and phyllaries stiff-spinulose; lower leaves densely villous, with prominent stalked glands unpleasantly heavy-scented. . . . . *Hemizonia fitchii*

EE. Ligules trifid; herbage not stiff or spinulose, hispid to heavy stigulose or pubescent; Receptacle bracts more or less united into a ring or cup.

F. Leaves entire or remotely and shallowly dentate; herbage with or without glandular hairs but not tacked-shaped glands especially on leaf tips or phyllaries.

G. Perennial from usually simple rootstalk; leaves opposite well up stem; disc-achenes undeveloped, pubescent; pappus 5 to 8, lanceolate, unequal, fimbricate paleae, 1 mm or less; ray-achenes 8 to 15, smooth, semilunar, glabrous, without pappus. . . . . *Madia madioides*

GG. Plants annual; leaves alternate above first 1, 2, or 3 pairs.

H. Pappus on disc-achenes only; paleae lance-attenuate fimbricate; disc-achenes fertile. . . . . *Madia nutans*

HH. Pappus lacking on both ray- and disc-flowers.

I. Disc-achenes sterile; receptacle pubescent; ray-flowers conspicuous; ray-achenes compressed. . . . . *Madia elegans*

II. Disc-achenes fertile; receptacle glabrous; ray-flowers inconspicuous.

J. Ray-fls. 3 to 7; disk-fls. 3 to 6; achenes similar, obovoid, black, shiny *Madia anomala*

JJ. Ray-fls. 8 to 12; disc-fls. 15 to 35; achenes dissimilar, laterally compressed, dull, often mottled . . . . . *Madia gracilis*

FF. Leaves entire but with comblike cilia near base; inflorescence spicate; herbage glabrous, glaucescent, odorous, with tack-shaped glands at leaf tips and phyllaries . . . . . *Calycadenia truncata*

CC. Receptacle naked; leaves all alternate.

D. Perennial from woody base; rays showy; stems tomentose to floccose; leaves toothed or divided . . . . . *Eriophyllum lanatum*

DD. Annuals; rays inconspicuous; stems sparsely pubescent; leaves entire. . . . . *Rigiopappus leptocladus*

BB. Phyllaries multi-serrate, not enfloding a ray-achene.

C. Receptacle globose or conic; rays 3 to 10 mm.

D. Rays 3 to 8 mm long, reflexed, nearly concealed; plants 3 to 15 dm tall; receptacle 1 to 1.5 cm wide; found around springs . . . *Helenium puberulum*

DD. Rays 5 to 10 mm long, spreading but not reflexed at anthesis; plants .5 to 2.5 dm tall; receptacle narrowly conic, .5 cm wide; found on open hillsides and flats. . . . . *Lasthenia chrysostoma*

Achyrachaena mollis Schauer Blow-wives

Habitat: Open, sunny hillsides; various soils; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland.

Calycadenia truncata D.C. ssp. *microcephala* Hall ex Keck Small-headed Rosinweed

Habitat: Dry, sunny hillsides; rocky, poor soil; any exposure.

Abundance: Locally common.

Major Communities: Openings in xerix chaparrals.

Collections: K. Brandagee, Glenbrook (1884) (L); J.P. Tracy, Scotts Valley Hills (1902) (L); J.R. Sweeney 417, 1.2 mi SW. Highland Springs (1950); M.S. Baker, 5 mi W. Lakeport

Eriophyllum lanatum Pursh Forbes var. *achillaeoides* (D.C.) Jepson Woolly Sunflower

Habitat: Sunny hillsides; gravelly, poor soils; all exposures.

Abundance: Abundant.

Major Communities: Xeric chaparrals; Annual grassland; savannahs.

Collections: Neilson 3286, Caldwell Pines; P.U.C., Troutdale Creek; P.U.C., Mt. St. Helena fire road

Grindelia camporum Greene — Great Valley Gumplant

Habitat: Open, sunny hillsides; deep soil with some moisture retention; all exposures.

Abundance: Occasional.

Major Communities: Annual grassland; oak savannahs.

Collections: P.U.C., Mt. St. Helena fire road

Grindelia hirsutula Hooker and Arnold — Hirsute Gumplant

Habitat: Open, sunny hillsides; deep soil aometimes on serpentine; all exposures.

Abundance: Occasional.

Major Communities: Annual grassland; oak savannahs.

Helenium puberulum D.C. — Rosilla

Habitat: Springs and seeps, wet ground well into summer; full to partial sun; deep soil.

Abundance: Rare - habitat very limited.

Major Communities: Springs; Seeps.

Collections: Neilson 1139 & 2811, Geysers Rock area; Neilson 3171, ¼ mi S. Geyser Rock

Helianthella californica Gray — California Sunflower

Habitat: Deep, usually sandy or gravelly loam; full to partial sun.

Abundance: Occasional.

Major Communities: Pine-oak woodland.

Collections: Neilson 3339 & 3340, High Valley Creek (L); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Helianthus bolanderi Gray — Bolander's Sunflower

Habitat: Open, dry, usually disturbed sites; usually deep soils.

Abundance: Locally common but found rarely.

Major Communities: Ruderal, Anthropogenic.

Collections: Neilson 2942, Big Geysers

Helianthus exilis Gray — Contact Mine Sunflower

Habitat: Dry, open, gravelly serpentine soils.

Abundance: Locally common, but populations are very rare.

Major Communities: Open, gravelly soil.

Remarks: The population at Contact Mine is apparently obliterated through mining disturbance. A small population is also known at the Little Geysers, but *H. bolanderi* also grows there.

Collections: M.S. Baker, The Geysers

Hemizonia fitchii Gray

Habitat;

Abundance:

Major Communities:

Collections: J. McMurphy 698, Calistoga and bottom Mt. St. Helena (1909) (N); J.P. Tracy 2264, Scotts Valley (1905) (L)

Lagophylla congesta Greene — Rabbit's Foot

Habitat: Open, dry hillsides and flats; poor but deep soils; full sun.

Abundance: Occasional but locally common.

Major Communities: Annual grassland; Native herb; savannahs.

Collections: J.P. Tracy 2253, grassland on Cobb Mt. (1905)

Lagophylla ramosissima Nuttall — Common Hareleaf

Habitat: Open flats and low hillsides; deep, sandy, poor soils.

Abundance: Occasional but locally common.

Major Communities: Annual grassland; Native herb.

Collections: Harrison 2043, Pine Flat (L)

Lasthenia chrysostoma (F.& M.) Greene — Coast Goldfields

Habitat: Open, sunny areas with late moisture; shallow, poor soils; all exposures, mostly below 2500 feet.

Abundance: Locally common, found only occasionally.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 3704, Truit Creek (S)

Layia septentrionalis Keck — Colusa Layia

Habitat: Open, sunny hillsides; deep, gravelly, sandy loams.

Abundance: Rare.

Major Communities: Annual grassland.

Collections: Neilson 3222, Geysers Rock

Madia anomala Greene — Plump-seeded Tarweed

Habitat: Dry, hot, open hillside, usually in openings in chaparrals; shallow, sandy, gravelly loams; mostly below 3800 feet elevation.

Abundance: Occasional.

Major Communities: Chamis-buckbrush-manzanita.

Collections: Neilson 2952 & 3163, near Geyser Rock

Madia elegans D. Don ex Lindley — Common Madia

Habitat: Usually raw, disturbed soil; open, sunny sites, mostly below 3000 feet elevation.

Abundance: Occasional.

Major Communities: Old field; Anthropogenic; Ruderal.

Collections: Neilson 2789, Great Western Mine; Harrison 2046, Pine Flat (L); P.U.C. Troutdale Creek; P.U.C., R.L. Stevenson State Park; P.U.C., Mt. St. Helena fire road

Madia elegans D. Don ex Lindley ssp. *densiflora* (Greene) Keck

Habitat: Disturbed or overgrazed areas; below 2800 feet.

Abundance: Occasional.

Major Communities: Ruderal.

Collections: Neilson 2817, Geyser Rock

Madia gracilis (Smith) Keck — Slender Tarweed

Habitat: Open, sunny hillsides; poor gravelly soils.

Abundance; Occasional.

Major Communties: Annual grassland.

Collections: Neilson 3303, Caldwell Pines

Madia madioides (Nuttall) Greene — Woodland Madia

Habitat: "Moist conifer woods."

Abundance: Apparently rare.

Collections: Roland, Pine Flat area; Hoover 5020, foot of grade W. of Middletown (i.e. vic Anderson Springs) (L); Bright 13125, dry slopes at Hopland (1936)

Madia minima (Gray) Keck — Hemizonella

Habitat: Dry, open, pine woods; deep, gravelly soil; full sun.

Abundance: Occasional.

Major Communities: Pine parkland; Pine-oak woodland

Collections: Neilson 3419, Caldwell Pines

Madia nutans (Greene) Keck — Nodding Madia

Habitat: Open, rocky, snady soil in oak woodlands and grasslands.

Abundance: Rare.

Major Communities: Openings in chamise-buckbrush chaparral; Shrubby live oak; Mixed oak savannah.

Collections: Brandegee, toll house Mt St. Helena (1887) (N); Keck 1088, 3 mi SE. St. Helena crater; P.U.C., R.L. Stevenson State Park; A. Eastwoods 4064 & 6842, Mt. St. Helena (1916, 1918) (N)

Rigiopappus leptocladus Gray — Rigiopappus

Habitat: Dry, open, sunny sites; usually poor, gravelly, sandy loams.

Abundance: Common to occasional.

Major Communities: Native herb; Annual grassland.

Wyethia angustifolia (D.C.) Nuttall — Narrow-leaved Wyethia

Habitat: Moist to wet, well to poorly drained soil; full sun.

Abundance: Occasional to common.

Major Communities: Wet meadow; Stream side.

Collections: Neilson 2812, 1 mi S. Geyser Rock; Neilson 3173, High Valley Creek (L); Neilson 3353, ¼ mi S. Geyser

Rock; Neilson 3363, near Eagle Rock; Neilson 3364, wet seep 1 mi SW. Eagle Rock; Neilson 3410, Socrates Mine Headquarters pond; P.U.C., R.L. Stevenson State Park

Wyethia glabra Gray — Mule Ears

Habitat: Open hillsides; deep gravelly clay loam; full sun.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: Neilson 3713, Big Sulphur Creek ½ mi NW. junction of Squaw Creek

Wyethia helenioides (D.C) Nuttall — Gray Mule Ears

Habitat: Open, sunny hillsides; deep, gravelly soil; full sun.

Abundance: Occasional.

Major Communities: Oak savannahs; Rock barrens.

Collections: Neilson 3261, Caldwell Pines; Neilson 3250, High Valley Creek; Neilson 2849, Geyser Rock

Key to Group C

A. Inflorescence a many flowered, dense panicle, conic or rhombic in form; involucral bracts in few series; involucre 3.5 to 5 mm high . . . . . *Solidago canadensis*

AA. Inflorescence a flat-topped cluster; involucral bracts in a single series; involucre more than 8 mm high.

B. Rays bright orange; perennial from slender running root stalks; heads 1 to 3 on short, erect, naked peduncles; basal leaves roundish, dentate, 2 to 5 cm across *Senecio greenii*

BB. Rays yellow; perennial from short lived crown with many fibrous roots; heads several to many: leaves larger.

C. Stems mostly solitary; ray-flowers 0 to 3; lowest leaves deltoid or subcordate, coarsely and irregularly dentate, 7 to 25 cm long. . . . . *Senecio aronicoides*

CC. Stems several; rays many; leaves deeply dissected, lyrate to sharply toothed, 4 to 8 cm on petioles as long. . . . . *Senecio eurycephalus*

Senecio aronicoides D.C. California Butterweed

Habitat: Deep forest soils; full to partial shade; all exposures; mostly above 2800 feet elevation.

Abundance: Occasional.

Major Communities: Pine parkland; Pine-oak; Fir-pine-oak; oak woodlands.

Collections: Neilson 2726, Cobb Mountain

Senecio eurycephalus Torrey & Gray Cut-leaf Butterweed

Habitat: Deep forest soils; full to partial shade; all exposures.

Abundance: Rare to occasional.

Major Communities:

Collections: Neilson 2773, ½ mi S. Geyser Rock; Neilson 3192, Mt. St. Helena fire road; P.U.C., Mt. St. Helena fire road

Senecio greenii Gray Flame or Serpentine Butterweed

Habitat: Shallow, rocky soils usually on serpentine; full sun; all exposures.

Abundance: Common.

Major Communities: Jepson's ceanothus-leather oak-Stanford's manzanita; Cypress-manzanita; serpentine balds.

Collections: Neilson 3422, Caldwell Pines; Neilson 3433, headwaters of Truit Creek; Neilson 3574, High Valley Creek

Solidago canadensis L. ssp. *elongata* (Nuttall) Keck Goldenrod

Habitat: Subxeric sites; patial to full sun; deep, gravelly loams to rock crevices; mostly above 2500 feet.

Abundance: Occasional.

Major Communities: Pine-oak woodland.

Key to Group D

A. Leaves pinnatifid into fine linear segments.

  B. Perennial; herbage aromatic; leaves rarely wider than 1.5 cm; rays 2.5 to 3.5 mm; phyllaries with light brown margins in several series; heads in terminal corymbs . . *Achillea lanulosa*

  BB. Annual; leaves wider; rays 1.5 cm; phyllaries dark membraneous; heads solitary at branch tips; stems reddish *Anthemis fuscata*

AA. Leaves otherwise.

B. Ray-flowers several to many; stems erect, straight or branching from base.

C. Phyllaries in single series enclosing ray-achene; leaves linear-entire, 15 cm; herbage silvery . . . *Hemizonia luzulaefolia*

CC. Phyllaries 5 to 7, serrate graduated ciliate, not enclosing ray-achene; leaves oblanceolate, 4 to 10 x 2 to 5 cm, sessile, dentate or serrate, upper reduced, clasping. . . . . *Aster radulinus*

BB. Ray-flower 1 or 2, white; stems dichotomously forking, forming zigzag pattern. . . . . *Calycadenia pauciflora*

Calycadenia pauciflora Gray — Few-flowered Rosinweed

Habitat: Dry, sunny hillsides; poor rocky soils; any exposure but mostly south and west; mostly below 3000 feet.

Abundance: Common.

Major Communities: Annual grassland; xeric chaparral; oak woodland & savannah.

Collections: H.M. Hall 11936, Hopland Rd. 6 mi W. Lakeport; M.E. Jones 29125, The Geysers; D.E. Keck 4735, 5 mi NW. Middletown; D.E. Keck 5511, The Geysers; K. Brandegee, Cobb Mt.

Achillea lanulosa Nuttall — Yarrow

Habitat: Open, sunny sites; full to partial sun; any exposure.

Abundance: Abundant.

Major Communities: Open chaparrals; oak woodlands; Annual grassland; Native herb.

Collections: Neilson 3368, Geysers near junction of Cloverdale and Healdsburg Roads

Anthemis fuscata Brotero — Dusky Chamomile

Habitat: Muds and wet soils at seeps and vernal pools.

Abundance: Rare but populations with several hundred plants.

Major Communities: Pond margins.

Remarks: Apparently an introduced plant growing at the two ponds in the vicinity of the Culver Baer Mine operations and a vernal pool at Old Mercuryville.

Aster radulinus Gray

Habitat: Dry, wooded slopes; deep, rich soil; any exposure.

Abundance: Occasional.

Major Communities: Pine parkland; Fir-pine-oak.

Collections: Neilson 2850, Geyser Rock

Hemizonia lusulaefolia D.C. var. *rudis* (Benth.) Keck — Hayfield Tarweed

Habitat: Open, gravelly flats or low hillsides; poor soil often overgrazed; full sun.

Abundance: Common to locally abundant.

Major Communities: Native herb.

Collections: Neilson 2926, vicinity of Eagle Rock; McMurphy, 1 mi S. Old Mercuryville (1909)

Key to Group E

A. Plants not spinose leafed or stemmed.

B. Plants annuals or biennials.

C. Herbage greenish, sparsely strigulose to glabrous; leaves coarsely pinnatifid, then toothed or all toothed; phyllaries black-tipped; plants of wet places, often disturbed areas. . . . . *Senecio vulgaris*

CC. Herbage grayish, densely villous or woolly canescent.

D. Receptacle naked.

E. Pappus bristles united at base, falling away in a ring; lower leaf surface closely white pannose; appressed hairs tightly enmeshed; involucres brown to purple, 4 to 6 mm long. . . . . *Gnaphalium purpureum*

EE. Pappus bristles not united, deciduous separately; herbage white tomentose; involucres whitish . . . . . *Gnaphalium microcephalum*

DD. Receptacle chaffy at least near margin; phyllaries saclike enclosing female flowers, falling with achene; enclosed flowers without pappus; inner flowers with pappus but without bracts . . . . . *Filago californica*

BB. Plants perennial.

C. Phyllaries completely scarious or hyaline; herbage white woolly.

D. Plants tap rooted; heads all with outer female and central perfect or functionally male flowers; receptacle naked; inflorescence corymbose; leaves lanceolate to oblong, green, glandular, stongly scented. . . . . *Gnaphalium califonicum*

DD. Plants fibrous rooted, 3 to 9 dm tall; nearly dioecious with only a few male flowers in the center of each head; phyllaries pearly white . *Anaphalis margaritaceae*

CC. Phyllaries herbaceous or only partly scarious or hyaline and then herbage not woolly tomentose.

D. Principal phyllaries essentially equal and in 1 series, although some basal outer reduced bracts may be present.

E. Leaves opposite . . . . . *Arnica discoidea*

EE. Leaves alternate or basal; pappus bristles barbellate (but not plumose); leaves largely palmately cleft or parted; heads corymbose. *Cacaliopsis nardosmia*

DD. Principal phyllaries in 2 to several series.

E. Flowers yellow.

F. Style appendages very short, .5 mm or less; internodes numerous and short; leaves linear or narrowly oblong, uniform from base to top.

G. Stem and leaves spreading villous; leaves 2 to 4 cm long; outer pappus obscure or wanting. . . . . *Erigeron petrophilus*

GG. Middle and upper part of stem glabrous to glandular, sometimes appressed hairy; leaves not villous but sometimes short hairy . . . . . *Erigeron inornatus*

FF. Style appendages more than .7 mm; leaves lanceolate to elliptic-ovate, sessile, asscending, 2 to 5 cm long, reduced upward. . . . . *Chrysopsis oregona*

EE. Flowers white or purplish; achenes 10-ribbed; leaves alternate, deltoid-ovate, crenate-serrate, 1 to 4 cm long, truncate or subcordate at base; plants many stemmed, woody at base. . . . . *Brickellia californica*

AA. Plants with spinose leaves or stems.

B. Filaments united below; leaves white-mottled along veins; pappus of several series of minutely barbellate bristles united at base falling away together. . . . . *Silybum marianum*

BB. Filaments separate; leaves not white-mottled (except in some vigorous specimens of *Carduus*); receptacle densely bristly.

C. Pappus bristles barbellate; plants more or less aracnoid; heads 1 to 2 cm broad, 1 to 5 at ends of branches. . . . . *Carduus pycnocephalus*

CC. Pappus bristles plumose; style with thickened hairy ring below branches.

D. Stem spinose, winged by decurrent leaf bases nearly as long as internodes; leaves scabrose hispid above . . . . . *Cirsium vulgare*

DD. Not as above.

E. Middle or outer phillaries with a conspicuous glutinous dorsal ridge; heads many rather small; stems and leaves densely white tomentose; flowers dark red-purple . . . . . *Cirsium breweri*

EE. Phyllaries lacking glutinous ridge, densely arachnoid-tomentose on back, sometimes glabrate in age, middle ones ± squarrose, outer ones reflexed; head without leafy bract.

F. Plants from horizontal underground rootstocks, phyllaries slender, loosely imbricated; flowers sordid white to buff. . . . . *Cirsium cymosum*

FF. Plants from a tap root; phyllaries wider, densely white tomentose.

G. Outer phyllaries much shorter than inner, their base appressed, tips reflexed or spreading, glabrate; flowers conspicuously exceeding foliage. . . *Cirsium proteanum*

GG. Outer phyllaries about equaling inner, spreading to erect, permanently densely white tomentose with loose wool; herbage hoary tomentose. . . . . *Cirsium occidentale*

Anaphalis margaritaceae (L.) Benth. ex C.B. Clarke

Habitat: Dry, rocky outcrops, growing in rock crevices or shallow to deep soils.

Abundance: Rare.

Major Communities: ?

Collections: P.U.C., R.L. Stevenson State Park

Arnica discoidea Benth. var. *eradiata* (Gray) Cronquist Rayless Arnica

Habitat: Openings in woods; deep, rich soil; all exposures; partial shade.

Abundance: Occasional.

Major Communities: Pine parkland; Fir-pine-oak forest.

Collections: Neilson 2803, summit Cobb Mountain; Neilson 3386, 1 mi E. Geyser Rock (L); Harrison 2007, Pine Flat area

Brickellia californica (T.& G.) Gray — California Brickellia

Habitat: Rocky banks along major stream courses; usually full to partial sun; mostly north exposures.

Abundance: Occasional.

Major Communities: Alder-bay-willow.

Carduus pycnocephalus L. — Italian Thistle

Habitat: Mostly disturbed areas, open, sunny.

Abundance: Rare.

Major Communities: Ruderal; Anthropogenic.

Collections: P.U.C., Troutdale Creek; P.U.C., R.L. Stevenson State Park

Cacaliopsis nardosmia Gray — Silver Crown, Cut-leaf Luina

Habitat: Deep, loose , sandy soil; mostly east exposures.

Abundance: Rare.

Major Communities: Pine parkland; Pine-oak woodland.

Collections: M.S. Baker 2187G, E. slope Cobb Mountain 3000' (1927) (L): C.F. Baker 3201, divide between Hopland and Lakeport (1903) (L)

Chrysopsis oregona (Nutt.) Gray var. *rudis* (Greene) Jeps. — Golden Aster

Habitat: Water ways and rock outcrops; all exposures; often in cracks of rocks; above 3600 feet elevation.

Abundance: Occasional.

Major Communities: Pine parkland.

Remarks: Known so far in the Mayacmas only from Cobb Mt.

Cirsium breweri (Gray) Jepson

Habitat: Moist, well-drained, sandy loams; full to partial sun; usually near springs or areas moist much of the year, apparently only at low elevations in the Mayacmas.

Abundance: Rare.

Major Communities: Riparian.

Collections: R.F. Hoover 9914, Sausal Creek N. Alexander Valley (S)

Cirsium cymosum (Greene) J.T. Howell

Habitat:

Abundance: Occasional to rare.

Major Communties:

Collections: Neilson 3369, 1 mi SW. Eagle Rock (S); M.S. Baker, Whispering Pines

Cirsium proteanum J.T. Howell — Red Thistle

Habitat: Openings in chaparral or disturbed places; deep, gravelly soils; full sun.

Abundance: Occasional to locally common.

Major Communities: Ruderal, Anthropogenic.

Collections: Neilson 2848, Geyser Rock; Neilson 3417, 1 mi N. Little Geysers; P.U.C., Mt St. Helena fire road

Cirsium occidentale (Nutt.) Jepson — Cobweb Thistle

Habitat:

Abundance: Rare.

Major Communities: Anthropogenic in chaparral.

Collections: Neilson 3166

Cirsium vulgare (Savi) Tenore — Bull Thistle

Habitat: Open, sunny hillsides; poor to good gravelly soils; any exposure; below 3800 feet elevation.

Abundance: Abundant.

Major Communities: Ruderal; Anthropogenic; openings in chaparral and oak woodlands.

Collections: P.U.C., Mt St. Helena fire road; P.U.C., R.L. Stevenson State Park

Erigeron inornatus (Gray) Gray var. *angustatus* Gray — California Rayless Daisy

Habitat: Rock outcrops, usually in cracks.

Abundance: Rare.

Major Communities: Rock outcrops.

Collections: M.S. Baker, Whispering Pines

Erigeron petrophilus Greene — Rock Daisy

Habitat: Rock outcrops.

Abundance: Occasional but habitat limited.

Major Communities: Rock outcrops.

Collections: M.S. Baker, summit cobb Mountain; P.U.C., Mt. St. Helena fire road; P.U.C., R.L. Stevenson State Park

Filago californica Nuttall — California Filago

Habitat: Dry hillsides, poor gravelly soil; full sun.

Abundance: Occasional.

Major Communities: Openings in chaparral.

Collections: P.U.C., R.L. Stevenson State Park

Gnaphalium californicum D.C. — California Cudweed

Habitat: Open, dry sites; usually poor but deep soil; any exposure.

Abundance: Occasional.

Major Communities: Chaparrals.

Collections: Neilson 3282, Caldwell Pines

Gnaphalium microcephalum Nuttall — White Everlasting

Habitat: Open places in chaparral.

Abundance: Rare.

Major Communities: Chaparrals.

Collections: P.U.C., Troutdale Creek

Gnaphalium purpureum L. — Purple Cudweed

Habitat: ?

Abundance: Rare.

Major Communities: Ruderal; Anthropogenic.

Collections: P.U.C., Mt. St. Helena fire road

Senecio vulgaris L. Common Groundsel

Habitat: Mostly open sites; many soil types; tolerates some shade; subxeric to mesic sites.

Abundance: Common.

Major Communities: Ubiquitous.

Collections: Neilson 3182, High Valley Creek (L); P.U.C., R.L. Stevenson State Park

Silybum marianum (L.) Gaertn. Milk Thistle

Habitat: Disturbed places, usually with high nitrogen and rich soil.

Abundance: Rare.

Major Communities: Ruderal; Anthropogenic.

Key to Group F.

A. Involucres armed with short, hooked prickles or straight spines.

B. Involucres armed with short, hooked prickles; heads of 2 kinds. . . . . *Xanthium strumarium*

BB. Involucres with phyllaries terminating in a spine more than 5 mm; flowers yellow, stems winged with decurrent leaf bases; pappus whitish and with bristles; receptacle bristly.

C. Spines slender, purplish, 1 cm or less; plants branched above base; corolla glandular. . . . . *Centaurea melitensis*

CC. Spines stout, yellow, 1 to 2 cm; plants branched from base; corolla lacking glands. . . . . *Centaurea solstitialis*

AA. Involucres not armed with prickles or spines.

B. Receptacle chaffy; plants more or less white-woolly at least when young; slender annuals with inconspicuous flowers.

C. Phyllaries lacking; receptacle bracts of 2 types; central male flowers subtended by thin chaffy bracts, female flowers enclosed in woolly bracts (false involucre) . . . . . *Stylocline amphibola*

CC. Phyllaries open scarious, surrounding flower bearing woolly conduplicate bracts of receptacle; central flowers sterile and without pappus or subtending bract. . . . . *Micropus californicus*

BB. Receptacle naked.

C. Pappus none or a very short crown; leaves 7 to 15 cm long, coarsely toothed or deeply lobed near apex, glabrous, green or with a fine tomentum; heads many in panicles, discoid but tubular flowers of two types marginal and disc; involucral bracts in several series, erect . . . . . *Artemisia douglasiana*

CC. Pappus evident.

D. Pappus about 25 partly united bristles or of 5 bristly awns; leaves 3 to 4 cm long, eary deciduous, sharp toothed, with tomentum, upper ones reduced, scalelike, glandular; heads 3 to 5 flowered, solitary at end of branches; corolla purplish. . . . . *Lessingia nemaclada*

DD. Pappus of scalelike palea.

E. Pappus paleae 4 or 5 in one series with an incomplete whorl of much shorter palea; leaves bipinnatifid; involucre campanulate, 6 to 7 mm high; flowers yellow . . . . . *Chaenactis glabriuscula*

EE. Pappus of 10 linear-oblong palae alternating long and short; leaves pinnatifid with 4 to 8 pairs of pinnae; involucre broadly turbinate, densely glandular puberlent, 10 to 14 mm high; corolla white or pinkish. . . . . *Chaenactis douglasii*

Artemisia douglasiana Bessey in Hooker — Douglas' Mugwort

Habitat: Wet to moist, well-drained soil, sandy with considerable humus; all exposures; full to partial sun.

Abundance: Occasional.

Major Communities: Alder; Bay-oak-maple; willow-cottonwood-ash; seeps.

Collections: Neilson 2946, Big Geysers

Centaurea melitensis L. — Napa Thistle, Tocolate

Habitat: Open, sunny hillsides, usually on overgrazed or disturbed sites; deep soils.

Abundance: Locally common, but found only rarely.

Major Communities: Ruderal; Anthropogenic; Annual grassland.

Centaurea solstitialis L. Yellow Star Thistle

Habitat: Deep, light to heavy soils; full sun; mostly on south and west exposures; below 3200 feet elevation.

Abundance: Locally common, more common at lower elevations.

Major Communities: Ruderal; Old field; Anthropogenic.

Remarks: Introduced recently in several places at the Geysers in straw mulch.

Chaenactis douglasii (Hook.) H. & A. Douglas' Chaenactis

Habitat: Open, gravelly hillsides; all exposures.

Abundance: Occasional, but locally common.

Major Communities: Serpentine areas, xeric chaparrals.

Collections: Neilson 3262, Caldwell Pines

Chaenactis glabriuscula D.C. var. *gracilenta* (Greene) Keck

Habitat: Open, gravelly hillsides; full sun; xeric conditions.

Abundance: Occasional.

Major Communities: Serpentine soils; Serpentine barrens; openings in xeric chaparrals.

Collections: Neilson 2941, Big Geysers (S); Neilson 3223, Geyser Rock; Neilson 3434, Eagle Rock area

Lessingia nemaclada Greene Slender-stemmed Lessingia

Habitat: Dry, rocky, poor soils, mostly on serpentine; low altitudes.

Abundance: Rare.

Major Communities: Jepson's ceanothus-leather oak-cypress.

Remarks : This is more common on Lake County Volcanics than on Mayacmas graywackes.

Collections: Neilson 3951, Kelsey Creek meadow near Glenbrook

Micropus californicus Fischer & Meyer — Slender Cottonweed

Habitat: Open, sunny areas; dry to damp, poorly-drained spots in deep, gravelly, clay-loams.

Abundance: Occasional but locally common to abundant.

Major Communities: Native herb.

Collections: Neilson 3254, High Valley Creek (L): Roland, Geyser Rock

Stylocline amphibola (Gray) J.T. Howell

Habitat: Dry, open, sunny hillsides and flats; poor, gravelly loams; low altitudes.

Abundance: Rare.

Major Communities: Ruderal, openings in chaparral.

Collections: M.S. Baker, 6 mi NW. Lakeport

Xanthium strumarium L. var. *canadense* (Miller) Torrey & Gray — Cocklebur

Habitat: Disturbed sites.

Abundance: Rare.

Major Communities: Ruderal; Anthropogenic.

Collections: P.U.C., R.L. Stevenson State Park

CONVOLVULACEAE — MORNING-GLORIES

Key to *Convolvulaceae*

A. Plants perennial; calyx enclosed or closely subtended by a pair of large sepal-like bracts; corolla white or cream.

B. Plant almost stemless (less than 10 cm); herbage pubescent; corolla 4 to 5 cm . . . . . *Convolvulus subacaulis*

BB. Plant with stem 10 to 30 cm, ascending or trailing; leaves triangular-hastate, 2 to 4 cm, grayish tomentose; corolla 2.5 to 3.5 cm long . . . . . *C. malacophyllus*

AA. Plants perennial; calyx subtended by remote leaf-like bracts; leaves glabrous, sharp pointed, 1 to 4 cm; flowers with a brownish cast, about 3 cm long. . . . . *C. occidentalis*

Convolvulus malacophyllus Greene ssp. *collinus* (Greene) Abrams. Sierra Morning-Glory

Habitat: Rocky, gravelly ground on chaparral hillsides; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Chamise; Chamise - buckbrush - manzanita.

Convolvulus occidentalis Gray. var. *solanensis* (Jeps.) J.T.Howell Western Morning-Glory

Habitat: Dry, brushy slopes and flats; mostly south and west exposures.

Abundance: Common.

Major Communities: Most chaparral communities.

Convolvulus subacaulis (Hook. & Arn.) Greene Hill Morning-Glory

Habitat: Open areas, often between shrubs or trees; gravelly soils; most exposures.

Abundance: Occasional.

Major Communities: Mixed oak woodland; most chaparrals.

CRASSULACEAE — STONECROPS

Key to *Crassulaceae*

A. Plants annual, tufted, 2 to 8 cm tall; flowers one to several in the axils; petals 1 to 1.5 mm long . . . . . *Tillaea erecta*

AA. Plants perennial.

B. Flowering stems lateral from axils of basal rosette *Dudleya cymosa*

BB. Flowering stems terminal in central rosette; sterile shoot radiating horizontally, terminating in a rosette . . . . . *Sedum spathulifolium*

Dudleya cymosa (Lem.) Britt. & Rose. — Spreading Dudleya

Habitat: Thin soils and rock crevices on rock outcrops; most exposures but prefers a sub-mesic site.

Abundance: Occasional.

Major Communities: Rock outcrop.

Sedum spathulifolium Hook. — Pacific Stonecrop

Habitat: Mesic, shady rock faces; usually on north and east exposures or in deep, shady canyons.

Abundance: Occasional but locally common.

Major Communities: Rock Face.

Tillaea erecta H.& A. — Sand Pigmyweed

Habitat: Open, dry places; often abundant after fire.

Abundance: Occasional to locally abundant.

Major Communities: Chaparral.

CRUCIFERAE — MUSTARDS

Key to *Cruciferae*

A. Pods indehiscent, 1-celled, 1-seeded, thin and flat; pedicels recurved in fruit.

B. Siliques without wings, pubescent with hooked hairs; stems pubescent with branched hairs. . . . . *Athysanus pusillus*

BB. Siliques with a winged margin all around with well-defined rays, without hooked hairs; stems glabrous or with simple hairs.

C. Plants pubescent below, 2 to 5 dm tall; basal leaves in a rosette, lancelolate, sagittate, clasping; cauline leaves entire, auriculate. . . *Thysanocarpus curvipes*

CC. Plants 1 to 4 dm tall, glabrous and glaucous; basal leaves not forming a rosette, entire to pinnatifid; cauline leaves not auriculate. . . . *T. laciniatus*

AA. Pods opening by valves, containing 2 to many seeds.

B. Fruit a silique several times longer than wide or thick.

C. Siliques flattened contrary to the narrow partition; racemes leafy. . . . . *Tropidocarpum gracile*

CC. Siliques flattened parallel with the partition; racemes leafless.

D. Stigma lobes aligned over the valves; anthers sagittate at the base.

E. Calyx urn- or flask-shaped.

F. Plants annual.

G. Plants glabrous; upper pairs of stamens fused together.

H. Basal leaves linear to linear-lanceolate; flowers yellow; mostly on serpentine soil . . . . . *Streptanthus barbiger*

HH. Basal leaves ovate to obovate.

I. Plants 3 to 6 dm tall; leaves 3 to 12 cm long, thin, fleshy, entire to dentate; cauline leaves reduced upward, sessile, clasping . . . . . *S. breweri*

II. Plants 1 to 2 dm tall; leaves smaller; cauline leaves yellow-green; sepals and flowers yellow; on serpentine . . . . *S. breweri var. hesperidis*

GG. Plants 1 to 6 dm, pubescent to setose-hirsute; sepals and flowers purple. . *S. glandulosus*

FF. Plants biennial or weakly perennial; leaves of rosette stage fleshy and cabbage-like, spatulate-obovate to fan-like.

G. Plants 1 to 2 dm tall; upper leaves of the inflorescence ovate or oblong-ovate, deeply clasping to perfoliate. . *S. tortuosus var. orbiculatus*

GG. Plants 2 to 15 dm tall; upper leaves of the inflorescence auriculate, lanceolate, acute, sessile . . . . . *S. morrisonii complex* (cf. table for other members including *S. brachiatus*)

EE. Calyx open, not narrowed or constricted at the apex; silique terete or 4-sided at maturity *Thelypodium howellii*

DD. Stigma lobes aligned over the placenta, ie. between the valves.

E. Basal leaves in rosettes.

F. Flowers yellow; stems angled; plant 2 to 4 dm tall; lower leaves simple or with 2 to 4 small leaflets and 1 large terminal one; upper leaves lyrate-pinnatifid . . . *Barbarea orthoceras*

FF. Flowers white or purplish-rose; stems round in X-section.

G. Leaves simple.

H. Plants 4 to 12 dm tall, glabrous above hirsute below; stems 1 to few, rarely branched; sepals yellowish, oblong, 3 to 5 mm; petals narrow, yellowish-white; plants of stream margins. . *Arabis glabra*

HH. Plants .5 to 2 dm tall, coarse pubescent with branching hairs; stems 1 or few; sepals purplish, puescent, 6 to 8 mm; petals rose-purple, broadly spatulate; plants of rock outcrops. . . *A. breweri*

GG. Leaves pinnate . . . . . *Cardamine oligosperma*

EE. Basal leaves not in rosettes.

F. Siliques 1 to 2 cm long with a dehiscent beak, closely appressed to the stem; plant 5 to 25 dm tall; lower leaves 1 to 2 dm, deeply pinnatifid with a large terminal lobe; petals yellow *Brassica nigra*

FF. Silique not beaked, dehiscent to tip.

G. Pubescence simple or wanting.

H. Siliques strongly flattened.

I. Plants from fleshy rhizomes; some rhizomal leaves appearing remote from stem, simple, round cordate, 5 to 10 cm wide; cauline leaves 3 to 5 lobed; racemes many flowered; pedicels 1 to 2 cm; petals white to pinkish, 9 to 14 cm long.

J. Siliques 1 to 2 mm wide, rhizomal leaves sinuate along whole margin . . . *Dentaria californica*

JJ. Siliques 2 to 4 mm wide; rhizomal leaves coarsely toothed at apex. . . . . *D. pachystigma*

II. Plants from a tap root; leaves pinnate, 5 to 11 foliate, 2 to 9 cm long, in rosette, much reduced upward; petals white, 2 mm; silique erect, 1 to 2 cm . . *Cardamine oligosperma*

HH. Siliques round; plants ascending or more commonly prostrate, rooting at the nodes; leaves pinnate; flowers small, white; siliques 7 to 18 mm; plants aquatic in slow moving water *Nasturtium officinale*

GG. Pubescence of stellate hairs; basal leaves lanceolate, entire to dentate, 4 to 15 cm long, upper reduced, hairs 3-parted; flowers yellow to orange-brown; plants 2 to 8 dm tall . . . *Erysimum capitatum*

BB. Fruit a silicle, once or twice as broad.

C. Silique flattened.

D. Silicle an inverted triangle, broad at the summit, flattened; flowers 2 mm long. . . . . *Capsella bursa-pastoris*

DD. Silicle oval, strongly obcompressed, slightly notched at apex; leaves cauline, toothed below *Lepidium densiflorum*

CC. Silique turgid, plants small, ephemeral, annual *Draba verna*

Arabis breweri Watson — Brewer's Rockcress

Habitat: Rock outcrops; usually east and north exposures or in crevices; mostly along ridgecrests about 2800 to 3200 feet elevation.

Abundance: Occasional but habitat rare.

Major Communities: Rock outcrops.

Collections: Neilson 3978, 2 mi. N.W. Socrates Mine; Neilson 4007, crest ridge near base of Cobb Mt. N. Socrates Mine Rd.

Arabis glabra (L.) Bernh. Tower Mustard

Habitat: Deep, moist, well-drained, rich soil; open sites below 3000 feet elevation; usually associated with riparian alluviums.

Abundance: Rare.

Major Communities: Annual grassland ecotones to intermittant streams.

Athysanus pusillus (Hook.) Greene. Dwarf Athysanus

Habitat: Open hillsides; poor soils; all exposures; below 2800 feet elevation.

Abundance: Common.

Major Communities: Annual grassland; Blue oak savannah.

Collections: Neilson 3021, Old Mercuryville.

Barbarea orthoceras Ledeb. var. *dolichocarpa* Fern. American Wintercress

Habitat: Rocky or gravelly forest soils; most exposures; partial shade to full sun; above 2000 feet.

Abundance: Occasional.

Major Communities: Yellow pine forest; Pine - fir - oak; Bay - oak - maple.

Collections; Neilson 2894, ½ mi W. Socrates Mine hdqtrs.; Neilson 2948, ½ mi W. Socrates Mine hdqtrs.

Brassica nigra (L.) Koch. Black Mustard

Habitat: Open, heavy soils; disturbed places; most exposures but more common on south and west; below 3200 feet.

Abundance: Occasional.

Major Communities: Annual grassland; Ruderal; Anthropogenic, Old field.

Capsella bursa-pastoris (L.) Medic. Shepard's Purse

Habitat: Rich soils; open sites; most exposures.

Abundance: Occasional but locally common.

Major Communities: Annual grassland; Ruderal; Old field.

Cardamine oligosperma Nutt. Bittercress

Habitat: Gravelly, poor to rich soils; partial shade.

Abundance: Ocassional.

Major Communities: Garry oak woodland; Mixed oak woodland.

Collections: Neilson 3014, Old Mercuryville; Neilson 3155, High Valley Creek.

Dentaria californica Nutt. var. *cardiophylla* (Greene) Detl. California Toothwort

Habitat: Mesic sites; partial to full shade; below 3000 feet elevation; usually north and east exposures.

Abundance: Occasional.

Major Communities: Mixed oak and Oak - bay - madrone woodlands.

Dentaria pachystigma Wats. var. *dissectifolia* Detl. Stout-beaked Toothwort

Habitat: Deep, well-drained soil; partial shade; usually east and north exposures.

Abnudance: Ocassional.

Major Communities: Mixed oak woodlands.

Collections: Neilson 3848, Socrates Mine area (S)

Draba verna L. Witlow Grass

Habitat: Open, usually overgrazed hillsides; poor soils; most exposures.

Abundance: Occasional to locally common.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 3020, Old Mercuryville (S)

Erysimum capitatum (Dougl.) Greene. Wall Flower

Habitat: Rocky sites; usually open to partial sun; mostly between 1600 and 3000 feet elevation; all exposures.

Abundance: Ocassional.

Major Communities: Rock outcrops; serpentine barrens.

Collections: Neilson 2893 & 2949 ½ mi N. Geyser Rock; Neilson 3573, High Valley Creek

Lepidium densiflorum Schrad. *bourgeauanum* (Thell.) C.L. Hitchc. Common Peppergrass

Habitat: Disturbed soils.

Abundance: Rare.

Major communities: Ruderal.

Nasturtuim officinale R. Br. Watercress

Habitat: Quiet flowing year round water.

Abundnace: Rare but locally abundant.

Major Communities: Springs and seeps.

Collections: Neilson 3684, Ridge N. Big Sulphur Creek at pond.

Streptanthus barbiger Greene Narrow-leaved Jewel Flower

Habitat: Open, rocky, thin, serpentine soils or rock outcrops; most exposures; eueally xeric sites.

Abundance: Occasional.

Major Communities: Serpentine outcrops; disturbed rocky areas.

Collections: Neilson 2758, Geyser Rock; Neilson 2891, serpentine W. of Geyser Rock

*Streptanthus brachiatus** Hoffman ** Contact Mine Jewel Flower

Habitat: Serpentine soils and rock crevices; mostly north and east exposures.

Abundance: Rare limited to the crest of the ridge north and south of Socrates Mine.

Major Communities: Serpentine barrens.

Streptanthus breweri Gray. Brewer's Jewel Flower

Habitat: Rocky soils; usually sub-xeric and open; all exposures; often on serpentine.

Abundance: Occasional.

Major Communities: Serpentine barrens; serpentine tallus and derived soils; non-serpentine rocks and gravelly soils.

* See discussion for *S. morrisonii*

** cf. Hoffman, F., 1952. "Studies in Streptanthus: A New Streptanthus Complex", in California Madrono II:189-220.

Streptanthus breweri Gray var. *hesperidis* Jeps.

Habitat: Rocky, serpentine soils; full sun; any exposure; below 2800 feet elevation.

Abundance: Occasional, only on east side of range.

Major Communities: Jepson's ceanothus - leather oak - Stanford manzanita.

Streptanthus glandulosus Hook. Common Jewel Flower

Habitat: Rocky soils; rock outcrops; occasionally on serpentine; disturbed places; any exposure; below 3200 feet.

Abundance: Occasional.

Major Communities: Ubiquitous - chaparrals, woodlands, grasslands.

Collections: Neilson 3018, Big Geysers (S); Neilson 3256a, High Valley Creek; Neilson 3851, 3 mi S. Pine Flat (S)

Streptanthus glandulosus var. *secundus* (Greene) Munz. Yellow Annual Jewel Flower

Habitat: Rocky outcrops; serpentine soils; any exposure.

Abundance: Occasional.

Major Communities: Jepson's ceanothus - leather oak - Stanford's manzanita; Rock outcrops.

Streptanthus morrisonii Hoffman var. *elatus* Hoffman. Morrison's Jewel Flower

Habitat: Rocky serpentine, thin serpentine soils; south and east exposures.

Abundance: Very rare; limited to one site in the Mayacmas at the mine on Dry Creek, Lake County.

Major Communities: Serpentine barrens.

Remarks: This complex forms a polymorphic series in which there are several identifiable taxa. As currently understood, the author has proposed 3 morphologically distinct subspecies which have discrete distributions in and out of the Mayacmas Mountains. Two are very rare and one rather widespread. Taxa found in the Mayacmas Mountains (others are known from adjacent ranges), listed in order of size, color of sepals, and branching morphology, are:

Streptanthus morrisonii ssp. elatus
S. morrisonii ssp. stebbensii (ssp. novo)
S. morrisonii ssp. kruckebergii (ssp. novo)

*S. majorii (sp. novo)**
*S. majorii ssp. brachiatus (Comb. novo)**

The following table shows the key distinctions between these taxa and Figure 5 shows their distribution within the Mayacmas Mountains.

Taxa	Height	Stem Branching from Vert.	Color of Sepals	Filiment vascular trace coloration	Pubescence
S. morrisonii elatus	75-150	30 - 45	cream-lt. yellow	all white	glab.
S. morrisonii kruckebergii	25 - 60	45	yellow yel-gr	brn or lt. purple	glab.
S. morrisonii stebbensii	30 - 50	30 - 45	yel-gr w/ lilac	brown	pub.
S. majorii brachiatus	20 - 35	60 - 75	lilac & green	violet	glab.
S. majorii	15 - 20	80 - 90	lt. to dk. pur.	violet	pub.

Streptanthus tortuosus Kell. var. *orbiculatus* (Greene) Hall. Mountain Jewel Flower

Habitat: Non-serpentine rock outcrops above 4000 feet elevation.

Abundance: Rare, restricted habitat.

Major Communities: Rock outcrops.

Remarks : Only reported from the summit areas of Mt. St. Helena and Cobb Mountain.

Collections: Neilson 3966, Lookout tower Mt. St. Helena.

Thelypodium howellii Wats. Howell's Thelypodium

Habitat: Open, sunny sites; usually heavy soils.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: Neilson 3251, High Valley Creek (L)

Thysanocarpus curvipes Hook. Hairy Fringe Pod

Habitat: open, sunny sites; all exposures.

* Tentative.

FIGURE 5

KNOWN LOCATIONS OF TAXA OF THE
Streptanthus morrisonii COMPLEX

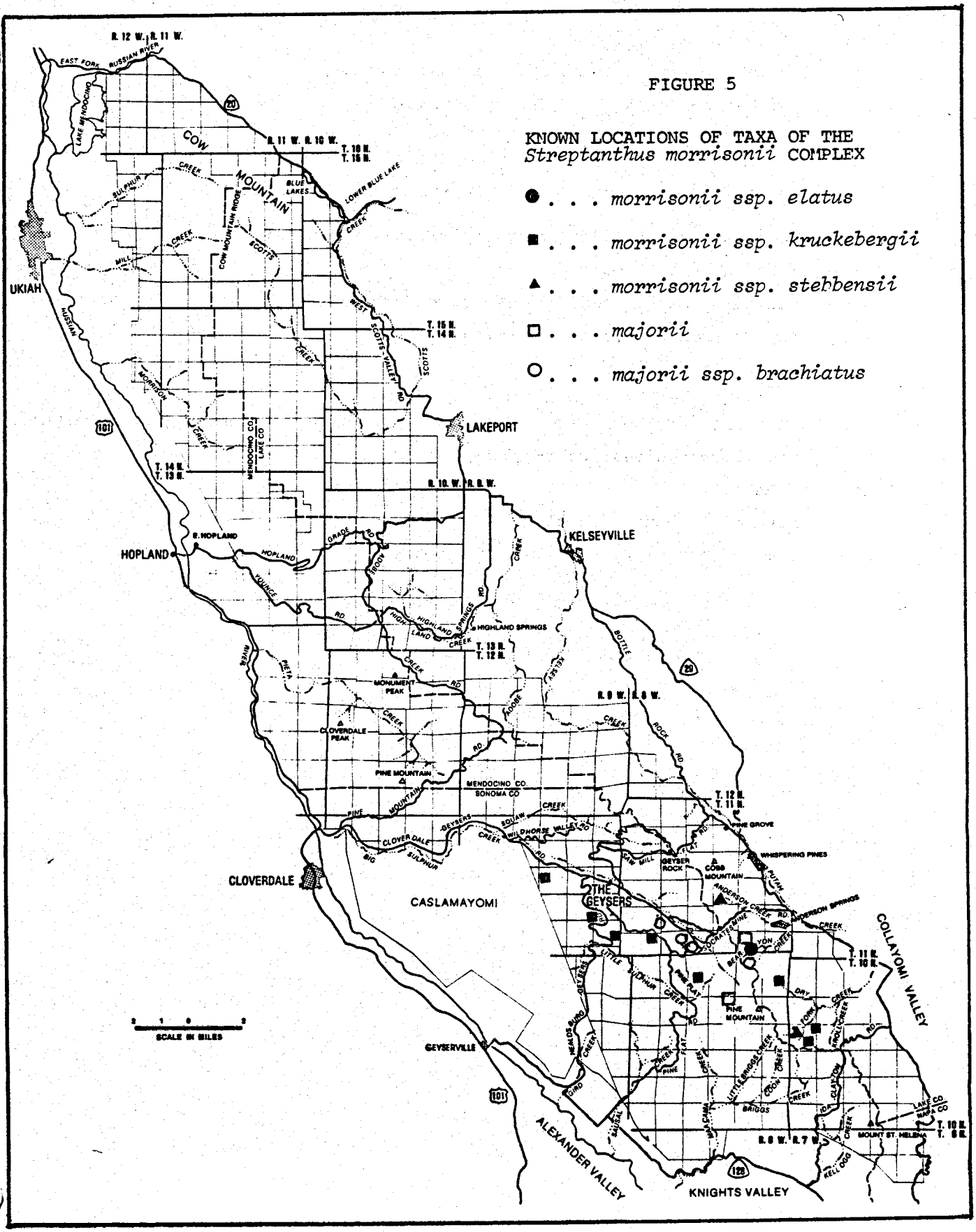
● . . . *morrisonii ssp. elatus*

■ . . . *morrisonii ssp. kruckebergii*

▲ . . . *morrisonii ssp. stebbensii*

□ . . . *majorii*

○ . . . *majorii ssp. brachiatus*



Abundance: Occasional to common.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 3141, High Valley Creek (L)

Thysanocarpus laciniatus Nutt. ex T.& G. var. *crenatus* (Nutt.) Brew. Fringe Pod

Habitat: Open, sunny hillsides; thin soils; any exposures.

Abundance: Occasional to common.

Major Communities: Annual grassland; Native herb; oak savannahs.

Collections: Neilson 2892, Big Geysers (S)

Tropidocarpum gracile Hook. Slender Tropidocarpum

Habitat: Open, sunny sites; well-drained soils.

Abundance: Rare:

Major Communities: Annual grassland.

Collections: Neilson 3154, High Valley Creek (L)

CUCURBITACEAE — GOURDS

Key to *Cucurbitaceae*

A. Mature corolla rotate, cream; fruit globose, light brown in age; spines prominent but soft. . . . . *Marah fabaceus*

AA. Mature corolla campanulate, white; fruit ovoid with alternate longitudinal dark and light bands; spines few to none, inconspicuous. . . . . *M. oreganus*

Marah fabaceus (Naud.) Greene var. *agrestis* (Greene) Stocking. California Man-Root

Habitat: Open, brushy hillsides and near streams; usually deep soils and partial shade.

Abundance: Rare.

Major Communities: Stream ecotones.

Marah oreganus (Torr. & Gray) Howell. Coastal Man-Root

Habitat: Deep soils; partial shade, usually moist areas; most exposures and elevations.

Abundance: Occasional to rare.

Major Communities: Riparian ecotones

CUSCUTACEAE — DODDERS

Key to *Cuscutaceae*

A. Capsule globose, about as long as broad; flowers 3 to 5 mm long; calyx slightly shorter than or longer than floral tube; corolla lobes pointed, reflexed; stamens on short filiments; usually on shrubs. . . . . *Cuscuta californica*

AA. Capsule ovoid, longer than broad; calyx about ½ or less of the corolla lobes; corolla lobes pointed but erect; stamens sessile on the corolla tube. . . . . *C. subinclusa*

Cuscuta californica H.& A. California Dodder

Habitat: Open grassland at low elevations.

Abundance: Rare but locally abundant.

Major Communities: Annual grassland; Old field.

Cuscuta subinclusa Dur. & Hilg. Canyon Dodder

Habitat: On shrubs, particularly ceanothus.

Abundance: Rare.

Major Communities: Chaparrals.

DATISCACEAE — DATISCAS

Datisca glomerata (Presl.) Baill. Durango Root

Habitat: Dry hillsides near streambeds; rocky soils; south and west exposures; below 3000 feet elevation.

Abundance: Occasional to rare.

Major Communities: Bay - madrone riparian.

Collections: Neilson 2828, Burned Mt. (Unit 9 & 10)

DIPSACACEAE — TEASELS

Dipsacus sylvestris Huds. Teasel

Habitat: Moist, rich, alluvial soils mostly near water courses, below 1600 feet elevation, usually waste places.

Abundance: Rare.

Major Communities: Riparian ecotones; Anthropogenic ruderal.

EUPHORBIACEAE — SPURGES

Key to *Euphorbiaceae*

A. Flowers with a calyx - not subtended or included in the involucre cup; herbage gray, stellate as well as stiff

stinging hairs. . . . . *Eremocarpus setigerus*

AA. Flowers lacking a calyx, but several male flowers and 1 female flower with a 3-lobed pistil included in an involcre cup which is sepal-like.

B. Cauline leaves obovate to spatulate, obtuse, entire; flora leaves opposite or whorls of 3, subcordate, deltoid to rhombic ovate . . . . . *Euphorbia crenulata*

BB. Lower cauline leaves alternate, obovate, spatulate, serrulate; floral leaves broadly ovate, subcordate to truncate . . . . . *E.spathulata*

Eremocarpus setigerus (Hook.) Benth. Turkey Mullein, Doveweed

Habitat: Dry, disturbed, open sites; usually clay or gravelly soils; mostly below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Ruderal; Anthropogenic - severly overgrazed.

Collections: Neilson 2921, Old Mercuryville.

Euphorbia crenulata Engelm. Chinese Caps

Habitat: Well-drained, moist soils in mesic environments; mostly riparian ecotones; partial shade.

Abundance: Rare.

Major Communities: Bay - oak - maple; Fir - oak - madrone.

Collections; Neilson 3210, Truit Creek

Euphorbia spathulata Lam. Reticulate-Seeded Spurge

Habitat: Open, sunny sites; rich gravelly soils; west, east, and south exposures; below 3000 feet elevation.

Abundance: Occasional.

Major Communities: Annual grassland; savannahs.

FUMARIACEAE — FUMITORIES

Key to *Fumariaceae*

A. Flowers yellow; plants 1 meter or more tall; dry rock hillsides . . . . . *Dicentra chrysantha*

AA. Flowers pink; plants 3 to 4 dm tall; of moist, shady sites . . . . . *D. formosa*

Dicentra chrysantha (H.& A.) Walp. — Golden Ear-Drops

Habitat: Dry, rocky soils; south and west exposures; below 3500 feet elevation.

Abundance: Occasional.

Major Communities: Chamise - buckbrush - manzanita.

Collections: Neilson 3421, 1 mi. N little Geysers

Dicentra formosa (Andr.) Walp. — Bleeding Heart

Habitat: Deep, rich, well-drained soils; partial to full shade; usually eastern exposure; mostly below 3000 feet elevation.

Abundance: Occasional to rare.

Major Communities: Pine - oak - madrone; Douglas fir - oak - maple.

GENTIANACEAE — GENTIANS

Key to *Gentianaceae*

A. Corolla rotate, conspicuous fringed glands on upper surface; leaves with white or cream border; stem leaves opposite; plant 2 to 5 dm tall . . . . . *Frasera albicaulis*

AA. Corolla funnelform without glands.

B. Flowers sessile and subsessile in crowded cymes; each flower subtended by a bract with a rudimentary flower in its axil; corolla tube 6 to 8 mm long . . . . . *Centaurium floribundum*

BB. Flowers pedicellate, 1 mm or more long; cymules loosely flowered.

C. Corolla lobes less than half the tube anthers, ovate, 5.5 x 3.3 mm; anthers 1.5 to 2.5 long, oblong *C. davyi*

CC. Corolla lobes more than half the tube anthers, 3.5 mm long, linear; style undivided; stigma lobes appressed against each other . . . . . *C. trichanthum*

Centaurium davyi (Jeps.) Abrams. Davy's Centaury

Habitat: Springs, seeps, and wet meadows.

Abundance: Rare.

Major Communities:

Centaurium floribundum (Benth.) Rob. June Centaury

Habitat: Springs, seeps, and wet meadows.

Abundance: Occasional but locally common.

Major Communities: Juncus - carex - nasturtium; Juncus - meadow barley - pteridia.

Centaurium trichanthum (Griseb.) Rob. Alkali Centaury

Habitat: Springs, seeps, and wet meadows; all exposures; mostly below 2800 feet elevation.

Abundance: Occasional; locally common but habitat restricted.

Major Communities: Juncus - meadow barley - pteridia; Juncus - carex - nasturtium.

Collections: Neilson 2838 Little Geysers (S); Harrison 2075, Crest Rd. ½ mi. S. Socrates Mine Rd.

Frasera albicaulis (Griseb. in Hook.) Kuntz ssp. *nitida* (Benth.) Post. Shining Frasera

Habitat: Deep, moist, but well-drained soils; mostly eastern exposures; mostly above 2000 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Yellow pine forest; Douglas fir - oak - pine.

Collections: Neilson 2799, Cobb Mountain.

GERANIACEAE — GERANIUMS

Key to *Geraniaceae*

A. Leaves palmately veined or divided; stamens all bearing anthers.

  B. Sepals awn-tipped; leaves 5-parted, then divided into linear segments . . . . . *Geranium dissectum*

  BB. Sepals awnless; leaves 2 to 6 cm broad, 5 to 7 cleft into broad cuneate segments, toothed or lobed. . . . . *G. molle*

AA. Leaves pinnately veined or divided; stamens with outer filiments without anthers.

  B. Leaves simple, dentate, lobed or divided; style columns 5 to 12 mm long.

    C. Style column 5 to 9 cm long, concavities at top of fruit subtended by a single fold; upper part of carpel body pubescent; sepals with a short green tip. . . . . *Erodium obtusiplicatum*

    CC. Style column 9 to 12 cm long, concavities subtended by 2 folds; upper style body glabrous; sepals with a prominent red tip. . . . . *E. botrys*

  BB. Leaves pinnate; style column 2.5 to 4 cm long.

    C. Leaflets broad, coarsely toothed or serrate; sepal tips not setose; petal claws glabrous. . *E. moschatum*

    CC. Leaflets pinnately lobed or divided; sepal tips setose; petal claws ciliate . . . . . *E. cicutarium*

Erodium botrys (Cav.) Bertol. — Long-Beaked Filaree

Habitat: Open sites; full sun; deep, usually rich soils; all exposures.

Abundance: Occasional to common.

Major Communities: Annual grassland; oak savannahs.

Erodium cicutarium (L.) L'Her. — Red-Stemmed Filaree

Habitat: Open to partial shade, deep to shallow, gravelly soils; all exposures; mostly below 3800 feet.

Abundance: Common.

Major Communities: Annual grassland; oak savannahs; chaparrals; pine - oak woodlands.

Erodium moschatum (L.) L'Her. White-Stemmed Filaree

Habitat: Open sites to partial shade; mostly well-drained, deep soils; below 3000 feet elevation.

Abundance: Occasioanl to common.

Major Communities: Annual grassland; oak savannahs.

Erodium obtusiplicatum (Maire, Weiller, & Wilcz.) J.T. Howell. Filaree

Habitat: Deep to shallow soils; open sites to partial shade; all exposures; below 2800 feet elevation.

Abundance: Occasional to common.

Major Communities: Annual grassland; oak savannahs.

Geranium dissectum L. Cut-Leaved Storksbill

Habitat: Deep to shallow, rich, well-drained soils; partial shade to full sun; mesic sites; all exposures.

Abundance: Common.

Major Communities: Mixed oak woodland; oak savannahs; Bay - oak - maple.

Geranium molle L. Dove's Foot Storksbill

Habitat: Poor to moderately rich, gravelly soils; sub-xeric to mesic sites; partial shade to full sun; below 3500 feet elevation.

Abundance: Occasional to common.

Major Communities: Annual grassland; oak savannahs; Bay - oak - madrone.

HYDROPHYLLACEAE — WATERLEAFS

Key to *Hydrophyllaceae*

A. Flowers solitary, or few in the axils, or in loose few-flowered cymes; plants annual.

B. Flowers yellow, ± nodding; stems erect; cauline leaves oblong, pinnatifid with oblong, dentate lobes; plants 1.5 to 5 dm tall . . . . . *Emmenanthe penduliflora*

BB. Flowers blue or white, solitary or few in axils; stems weak and flacid.

C. Corolla 1.5 to 4 cm broad, open, nearly rotate; calyx with auricles in the sinuses, reflexed 1/3 the length of the sepals.

D. Corolla bright blue with a white center, usually dark veined and/or with black spots in the center . . . . . *Nemophila menziesii*

DD. Corolla white with black dots radiating from the center . . . . . *N. menziesii var. atomaria*

CC. Corolla less than 1.3cm broad; flowers bluish or white; calyx with auricles more than 1/3 or less the length of the sepals.

D. Leaves all opposite, deeply pinnate, divided into 5 to 9 short, oblong to obovate divisions,appressed, hispid, entire to 1 or 2 toothed; corolla campanulate; calyx auricles 1/3 the length of sepals . . . . . *N. pedunculata*

DD. Leaves opposite below, alternate above; lower leaves 5 to 7 pinnate into widely separated divisions, these entire to 1 to 3 toothed; upper leaves entire to 3 to 5 lobed; corolla basin-shaped; calyx auricles less than 1/3 the length of the sepals . . . . . *N. heterophylla*

AA. Flowers in densely-flowered scorpoid cymes.

B. Plants perennial.

C. Basal leaves pinnate or pinnatifid into 5 to 9 leaflets.

D. Stems mostly solitary, simple, erect, coarse, 3 to 12 dm tall; leaves 5 to 10 cm long, 5 to 7 pinnate into prominently veined acuminate leaflets; calyx lobes linear, 4 to 7 mm long, not imbricated. . . . . *Phacelia heterophylla*

DD. Stems several from a woody caudex, 2 to 4 dm tall, unbranched; lower leaves 5 to 12 cm long, pinnate to pinnatifid into veined, acute to acuminate 5 to 9 leaflets; upper leaves reduced even simple; calyx lobes lanceolate to ovate, imbricated. . . . . *P. imbricata*

CC. Basal leaves pinnate into 3 to 5 leaflets or entire.

D. Plants caespitose from much branched caudices forming patches; stems 2 to 4 dm tall, glandular, pubescent as well as stiff hirsute; leaves entire with 1 to 2 pair of leaflets. . . . . *P. corymbosa*

DD. Plants erect from a crown; stems several, simple, 1 to 4.5 dm tall; lower leaves tufted, 2 to 8 cm long, mostly with 1 or 3 pairs of leaflets . . . . . *P. mutabilis*

BB. Plants annual.

C. Styles united; basal leaves once or twice pinnate, the oblong or lanceolate divisions toothed, incised, or pinnatifid; petiole shorted than blade; cauline leaves the same except sessile . . . . . *P. distans*

CC. Styles distinct; leaves basal rosette or clustered near tips of branches, alternate, entire . . . . . *Lemmonia californica*

Emmenanthe penduliflora Benth. Whispering Bells

Habitat: Ridges and hillsides; gravelly soil; all exposures; most common after hot chaparral fire.

Abundance: Rare to locally abundant.

Major Communities: Chamise - buckbrush; Shrubby live oak; the ecotone between the two.

Collections: Neilson , Ridge 2 mi E. Socrates Mine, Harrison 2031, Geyser Peak Rd.

Nemophila heterophylla F.& M. Variable-leaved Nemophila

Habitat: Moist, shady, canyon banks; deep soil.

Abundance: Common.

Major Communities: Mixed oak woodland; Bay - oak - maple.

Nemophila menziesii H.& A. Baby Blue Eyes

Habitat: Moist, cool hillsides; often in partial shade; deep gravelly soil; all exposures; below 2800 feet.

Abundance: Occasional to common.

Major Communities: Blue oak savannah; Annual grassland; ecotones between grassland and chaparral.

Collections: Neilson 3009, Old Mercuryville (S); Neilson 3121, High Valley Creek (L)

Nemophila menziesii H.& A. ssp. *atomaria* (F.& M.) Brand. White Baby Blue Eyes

Habitat: Open to shady hillsides; moist soils.

Abundance: Occasional, usually with the species.

Major Communities: Blue oak savannah; oak woodlands.

Collections: Neilson 3010, Old Mercuryville (S); Neilson 3126, Hilary Farm, Cascade Creek (S)

Nemophila pedunculata Dougl. ex Benth. Meadow Nemophila

Habitat: Moist, open seeps and wet meadows, deep soils.

Abundance: Occasional, restricted habitat.

Major Communities: Wet meadow and vernal spring.

Collections: Neilson 3140, High Valley Creek (L)

Phacelia corymbosa Jeps. Serpentine Phacelia

Habitat: Rock outcrops, serpentine barrens.

Abundance: Occasional.

Major Communities: Rock outcrops, serpentine barrens.

Collections: Neilson 2778, Geyser Peak (S); Neilson 2012 & 2017, Black Mountain fire trail

Phacelia heterophylla Pursh. ssp. *virgata* Greene. Virgate Phacelia

Habitat: Rock barrens; open areas in chaparral; thin, rocky soil; mostly south and west exposures.

Abundance: Common.

Major Communities: Rock outcrops; Chamise - buckbrush; Shrubby live oak - mahogany - ceanothus.

Collections: Neilson 2771, Geyser Rock (S); Neilson 2830, Burned Mountain (S)

Phacelia distans Benth.

Habitat: Open, sunny sites.

Abundance: Rare in the Mayacmas Mountains, reported only from Mt. St. Helena.

Major Communities:

Phacelia imbricata Greene.

Habitat: Rocky soils; south and west facing slopes.

Abundance: Occasional.

Major Communities: Annual grassland; Native herb.

Collections: Neilson 2972, Big Geysers; Neilson 3117, Big Geysers

Phacelia mutabilis Greene.

Habitat: Open forest soils; any exposure; above 3000 feet.

Abundance: Rare.

Major Communities: Yellow pine forest.

HYPERICACEAE — ST. JOHN'S WORTS

Key to *Hypericaceae*

A. Leaves linear to lanceolate, acute, mostly folded, often appearing from above closely decussate; sepals and petals black dotted at margin; plant a bushy perennial, 1.5 to 3 dm tall, growing mostly in dry chaparrals from a woody crown with stiff wiry stems. . . . . *Hypericum concinnum*

AA. Leaves oblong to ovate or somewhat linear, but flat.

B. Leaf margin revolute, black dotted; stems 3 to 10 dm tall, tough, erect, with sterile shoots from the leaf axils and from the base, stoloniferous; plants from a tough crown, usually with stolons; growing in open grassland, ruderal, or old field areas . . . . . *H. perforatum*

BB. Leaf margins flat, black dotted; leaves oblong-ovate, obtuse, 1 to 2.5 cm long; stems erect, without sterile shoots; plants from a rhizome; growing in wet meadows or seeps . . . . . *H. formosum*

Hypericum concinnum Benth. Goldwire

Habitat: Gravelly to rocky soils; dry hillsides; full sun to partial shade; all exposures.

Abundance: Common.

Major Communities: Nearly all chaparrals; Digger pine - shrub.

Hypericum formosum HBK. var. *scouleri* (Hook.) Coult. Scouler's St. John's Wort

Habitat: Wet, rich soil; usually open sites; usually south and west exposures.

Abundance: Occasional to rare.

Major Communities: Wet meadows; Seeps.

Collections: Neilson 3269a

Hypericum perforatum L. Klamath Weed

Habitat: Deep to shallow, sandy to gravelly loams; mostly full sun; below 3200 feet elevation.

Abundance: Rare.

Major Communities: Annual grassland; openings in Big manzanita - pine - oak.

Remarks: Poisonous to cattle with unpigmented skin.

Collections: Neilson 3355, 2 mi S. Truit Creek

LABIATAE — MINTS

Key to *Labiatae*

A. Ovary 4 united nutlets; style not basal; corolla almost equally 5-lobed; stigma and stamens 10 to 20 mm, long exerted, strongly recurved; corolla tube recurved, purple; plants annual with pale pubescence, distinctly aromatic.

  B. Lower petioles 5 to 15 mm; leaves remote from each other, attenuate . . . . . *Trichostema laxum*

  BB. Lower petioles sessile or nearly so; leaves crowded terminating abruptly with a little point . . . . . *T. lanceolatum*

AA. Ovary 4 distinct nutlets basaly attached; style basal.

  B. Calyx 2-lipped, lips entire with a helmet-like crest on the back; leaves oblong-ovate, 1 to 2 cm long, entire, sessile or nearly so.

    C. Corolla blue with white markings. . . . . *Scutellaria antirrhinoides*

    CC. Corolla yellowish-white . . . . . *S. californica*

  BB. Calyx regular or 2-lipped, the lips not entire.

    C. Corolla strongly 2-lipped.

      D. Stamens included in the corolla tube; calyx with 10 spinescent hooked teeth at tip. . . . . *Marrubium vulgare*

      DD. Stamens included or exerted; calyx without hooked teeth.

        E. Fertile stamens 4.

          F. Upper pair of stamens longer than lower pair. . . . . *Agastache urticifolia*

          FF. Upper pair of stamens shorter than or equal to lower pair.

            G. Calyx 2-lipped, closed over nutlets in fruit; flowers in dense spike, purplish. . . . . *Prunella vulgaris*

            GG. Calyx 5-toothed, not closed in fruit.

              H. Plants annual; flowers in axillary or terminal clusters, rose color; calyx not spine-tipped. . . . . *Lamium amplexicaule*

              HH. Calyx teeth spine-tipped; corolla tube with a hairy ring within; plants perennial.

                I. Pubescence soft slender hairs becoming matted and cobwebby; corolla white . . . . . *Stachys albens*

II. Pubescence straight stiff hairs; flower whorls forming an interrupted spike; corolla rose.

J. Petioles of lower leaves 2.5 to 4 cm long, crenate-serrate.

K. Stems 6 to 10 dm tall; leaves oblong to deltoid, oblong, rounded, or subcordate at base. . . . . *S. rigida*

KK. Stems less than 6 dm high; leaves ovate to cordate *S. rigida ssp quercetorum*

JJ. Petioles of lower leaves mostly less than 2.5 cm long; leaves oblong to oblong-ovate, both surfaces subglabrous and green *S. rigida ssp. rivularis*

EE. Fertile stamens 2; calyx 2-lipped, purplish, arcuate, middle spinose tooth of upper lip suppressed; corolla blue, 12 to 16 mm long, upper lip small; leaves mostly basal, 2 to 10 cm long, once or twice pinnatifid into tooth or incised divisions. . . . . *Salvia columbariae*

CC. Corolla regular or nearly so; lobes subequal; flowers in terminal heads; leaves plane, not crisped; plants perennial.

D. Outer bracts reflexed, leaf-like; leaves lanceolate, upper canescent; corolla 15 to 18 mm. . . *Monardella villosa*

DD. Outer bracts erect, sheathing not leaf-like.

E. Bracts firm not membranaceous of chaffy; corolla lobes blunt . . . . . *M. viridis*

EE. Bracts membranaceous; corolla lobes rounded to a point; calyses hirsute; leaves pubescent, longer and softer on underside *M. odoratissima ssp. pinetorum*

Agastache urticifolia (Benth.) Kuntze. Nettle-leaved Horsemint

Habitat: Moist to wet, rich soil.

Abundance: Occasional.

Major Communities: Springs, seeps, and pond margins.

Collections: Neilson 2829, Ridge near Cobb Creek.

Lamium amplexicaule L. Henbit, Giraffes Head

Habitat: Moist, rich soil; usually around habitations.

Abundance: Rare.

Major Communities: Ruderal; Old field; Anthropogenic.

Prunella vulgaris L. ssp. *lanceolata* (Barton.) Hulten. Self Heal

Habitat: Moist, rich soils; open sites; all elevations and exposures.

Abundance: rare.

Major Communities: Seeps, wet meadows, pond margins.

Collections: Neilson 2813, ¼ mi S. Geyser Rock

Marrubium vulgare L. Horehound

Habitat: Deep soils of various texture; below 3200 feet elevation; all exposures.

Abundance: Occasional.

Major Communities: Disturbed places; Old field; Anthropogenic - abandoned home sites and feed yards.

Monardella odoratissima Bentham ssp. *pinetorum* (Heller) Epling. Mountain Monardella

Habitat: Deep to shallow loams, may be rocky or gravelly; partial shade; above 3000 feet elevation.

Abundance: Occasional.

Major Communities: Fir - pine - oak; Yellow pine forest.

Collections: Neilson 3290, Caldwell Pines

Monardella villosa Bentham ssp. *subserrata* (Greene) Epling. Coyote Mint

Habitat: Rocky, gravelly soils; full sun to partial shade; mostly below 3600 feet; all exposures.

Abundance: Occasional.

Major Communities: Chaparrals.

Collections: Neilson 3170, Geyser Rock; Neilson 3362, Truit Creek area.

Monardella viridis Jeps. Green Monardella

Habitat: Many soils and rock outcrops; full sun to partial shade; mostly below 3600 feet; all exposures.

Abundance: Common.

Major Communities: Chaparrals and pine - oak woodlands; rock outcrops.

Collections: Neilson 2810, Geyser Rock

Salvia columbariae Benth. Chia

Habitat: Dry, open slopes; sandy to gravelly loams; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland; Ruderal, Anthropogenic.

Scutellaria antirrhinoides Bentham Snapdragon, Skullcap

Habitat: Moist soils; partial shade to full sun.

Abundance: Rare.

Major Communities: Riparian ecotones; Seeps.

Collections: Neilson 3312, High Valley Creek (L)

Scutellaria californica Gray. California Skullcap

Habitat: Dry, gravelly soils; full sun to partial shade.

Abundance: Rare.

Major Communities: Rock outcrops; montane chaparrals.

Collections: Neilson 3382, Little Geysers (S); Neilson 2846, Cobb Mountain; Harrison 2002, Pine Flat

Stachys albens Gray. White Hedge-Nettle

Habitat: Wet soils; full to partial sun.

Abundance: Rare.

Major Communities: Seeps; Pond margins; Chain fern - juncus - carex.

Stachys rigida Nutt. ex Benth. Rigid Hedge-Nettle

Habitat: Deep, well-drained, rich soils; full sun to partial shade.

Abundance: Occasional.

Major Communities: Stream ecotones.

Stachys rigida Nutt. ex Benth. ssp. *quercetorum* (Heller) Epling. Oak-leaved Hedge-Nettle

Habitat: Well-drained soils to gravelly areas; mostly full sun; below 3600 feet elevation.

Abundance: Common to occasional.

Major Communities: Montane chaparrals; pine parklands.

Collections: Neilson 3260 & 3279, Caldwell Pines; Neilson 3715, Big Sulphur Creek hillside ½ mi E junction Frazier Creek

Stachys rigida Nutt. ex Benth. ssp. *rivularis* (Heller) Epling. Rigid Hedge-Nettle

Habitat: Gravelly, poor soils; near seep and pond margins.

Abundance: Occasional.

Major Communities: Ecotones of streams; Seeps; Pond margins.

Collections: Neilson 2974, Big Geysers; Neilson 3048, Little Geysers; Neilson 3047. meadow ½ mi S. Little Geysers; Neilson 3342, High Valley Creek (L)

Trichostema lanceolatum Benth. Vinegar Weed

Habitat: Dry, barren soils; disturbed places; full sun.

Abundance: Common.

Major Communities: Annual grassland; Ruderal; Anthropogenic.

Trichostema laxum Gray. Turpentine Weed

Habitat: Dry, open soils; all exposures; usually disturbed or overgrazed areas.

Abundance: Common to occasional.

Major Communities: Ruderal; Anthropogenic; Serpentine derived soils.

Key to *Leguminosae*

A. Leaves palmately compound, 3 to many leaflets.

B. Leaves 3-foliate.

C. Stamens distinct to the base; flowers yellow, 17 to 19 mm long; stems 3 to 8 dm tall, branched above; plant silvery canescent . . . . . *Thermopsis macrophylla*

CC. Stamens all united or 9 united and 1 free; anthers nearly all the same length and shape; pods mostly indihescent.

D. Plants gland dotted (punctate).

E. Corolla whitish with purple-tipped keel, in racemes 1.5 to 2.5 cm long, black villous; calyx-teeth subequal, black and white hairy; calyx inflated in fruit, the lobes 1 to 2 mm; plants 3 to 7 dm tall, glabrous or black hairy, prominently grooved or striated. *Psoralea physodes*

EE. Corolla purple, in spikes 5 to 12 cm long, silky villous; lower calyx-lobe much longer than others; plants .5 to 3 meters tall, subglabrous; leaflets 2 to 8 cm on petioles 3 to 10 cm long . . . . . *Psoralea macrostachya*

DD. Plants not gland dotted.

E. Flowers solitary or in umbels in the leaf axils . . . . . *Lotus sp.* (See species key)

EE. Flowers otherwise.

F. Flowers in ovoid to oblong heads; corolla persistant after flowering; pod minute, 1 or 2-seeded . . . . . *Trifolium sp.* (See species key)

FF. Flowers in spikes or racemes, corolla decidious.

G. Pods curved or spirally coiled; style subulate.

H. Pods subreniform, 1-seeded; flowers many in dense, elongate, spike-like racemes. . . . *Medicago lupulina*

HH. Pods spirally coiled 2 or 3 times with well-developed usually hooked prickles; plants subglabrous, 1 to 4 dm long, procumbent *Medicago polymorpha*

GG. Pods ovoid, straight; style filiform.

H. Flower white. . . . . *Melilotus albus*

HH. Flowers yellow.

I. Flowers 2 to 3 mm on pedicels less than 1 mm . . . . . *M. indicus*

II. Flowers 5 to 7 mm on pedicels 1.5 to 2 mm long. . . . . *M. officinalis*

BB. Leaves with 5 to 7 leaflets; anthers of two types, some small and attached at the middle, others larger and basifixed; stamens 10, all united; pods dihescent. . . . . *Lupinus sp.* (See species key)

AA. Leaves pinnately compound; leaflets mostly more than 3 on the same plant or replaced by tendrils.

B. Rachis of leaf prolonged into a tendril.

C. Corolla wings free from keel; style bearded down the inner face.

D. Leaflets 2, perennial. . . . . *Lathyrus latifolius*

DD. Leaflets mostly 10, perennial. . . . . *L. vestitus & ssps.*

CC. Corolla wings adherent to the keel half or more of length; stlye bearded in a tuft or ring at the apex .

D. Flowers borne at the end of evident peduncles.

E. Plants perennial; leaflets 4 to 8 pairs; peduncles with 3 to 9 flowers mostly shorter than the leaves.

F. Stems subglabrous; pods glabrous; corolla 16 to 18 mm long. . . . . *Vicia americana*

FF. Stems villous-tomentose; pods pubescent; corolla 12 to 14 mm long . . . . . *V. californica*

EE. Plants annual; corolla 14 to 15 mm long; stems glabrous or somewhat stigose; leaflets 1 to 2 cm. . . . . *V. dasycarpa*

DD. Flowers 1 to 4 in leaf axils, sessile or subsessile; corolla violet, 1 to 1.8 cm long. . . *V. angustifolia*

BB. Rachis not prolonged into a tendril; plants not gland dotted; pods dehiscent.

C. Flowers in umbels or solitary . . . . . *Lotus sp.* (See species key)

CC. Flowers in racemes not more than 8 mm.; leaves odd pinnate; keel petals not prolonged into beak; annuals.

D. Pods less than 5 mm long, ovoid or suborbicular in outline, not divided into 2 sac-like lobes; flowers spreading or nodding at anthesis, at length racemose. . . . . *Astragalus gambelianus*

DD. Pod larger, grooved dorsally but not divided, fertile in lower portion only, the rest prolonged into a narrow, subulate-acuminate beak nearly as long . . . . . *A. breweri*

Astragalus breweri Gray — Brewer's Locoweed

Habitat: Open, sunny hillsides; mostly east, south, and west exposures; usually on poor soils.

Abundance: Occasional to locally common.

Major Communities: Annual grassland; Native herb.

Collections: Neilson 3225, Glenbrook

Astragalus gambelianus Sheld. — Gambel's Locoweed

Habitat: Open, sunny fields and hillsides; well-drained, gravelly soils; all exposures; below 2000 feet.

Abundance: Occasional.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 3455, Kelsey Creek

Lathyrus latifolius L. — Everlasting Pea

Habitat: Shady, moist slopes; rich soil; mostly south and east exposures; below 3000 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Fir-oak-madrone.

Remarks: A cultivar that is rapidly spreading in the oak woodlands.

Collections: Neilson 3226, S. base Mt. St. Helena, Neilson 3331 and 3347, High Valley Creek; P.U.C., Troutdale Creek

Lathyrus vestitus Nutt. ex T.& G. ssp. *puberulus* (Wht. & Greene) C.L. Hitch. — Common Pacific Pea

Habitat: Shady sites; deep, rich soil; below 3600 feet; mostly east and north exposures, but also on other exposures in mesic environments.

Abundance: Common.

Major Communities: Mixed oak woodland; Fir - oak - maple; Garry oak woodland.

Collections: Neilson 2722, Old Mercuryville; Neilson 3824, S. slope Mt. St. Helena; Neilson 3850, Pine Flat 1 mi S. Red Hill

Lathyrus vestitus Nutt. ex T.& G. Common Pacific Pea

Remarks: Distribution of the species and subspecies within the Mayacmas Mountains is not clear. Those of the central Mayacmas appear to be the subspecies *L. v. puberulus.*

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Lathyrus vestitus Nutt. ex T.& G. ssp. *bolanderi* (Watson) C.L. Hitch.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Key to *Lotus* species

A. Flowers 3 to 18 in umbels; perennials; stipules not gland-like.

B. Stipules large, green, leaf-like; stems not stout and coarse.

C. Flowers 3 to 6, bright yellow or with red tinge on banner, 8 to 12 mm long; peduncles short, .1 to 1.5 cm; leaflets 3, obovate, 5 to 15 mm long; plants 1 to 5 dm long, procumbent, growing in moist areas. . . . . *L. corniculatus**

CC. Flowers 4 to 10, banner and keel red-purple with white tips, wings white, 10 to 12 mm long; leaflets 9 to 19, oblong to elliptic, 6 to 20 mm long; stems several, 2 to 5 dm tall, growing on sub-xeric, wooded hillsides . . . . . *L. stipularis*

BB. Stipules membranaceous or hyaline, not leaf-like; stems stout and coarse.

C. Flowers 3 to 7, banner and keel yellow, wings white; stems erect, 2 to 4 dm tall; leaflets 5 to 9, oval to obovate, 1 to 2.5 cm long; peduncles exceeding the leaves; plants of moist environments. . . . . *L. pinnatus*

CC. Flowers 8 to 15, greenish-yellow with purplish tinge; stems erect, 4 to 12 dm tall; leaflets 7 to 15, oval to obovate, 1 to 3 cm long; peduncles shorter than leaves; plants of dry, brushy hillsides . . . . . *L. crassifolius*

* *L. uliginosus* appears similar and may also be present; flowers 8 to 12 on peduncles 5 to 15 cm long.

AA. Flowers mostly sessile or on a peduncle; annuals; stipules reduced to small dot-like glands.

B. Flowers yellow, often reddish after aging, solitary, subsessile.

C. Plant subglabrous to strigose; calyx-teeth about as long as the tube length; pods 10 to 15 mm . . . *L. subpinnatus*

CC. Plant densely villous-pubescent; calyx-teeth 2x the tube length: pods 5 to 10 mm long. . . . . *L. humistratus*

BB. Flowers cream white or pinkish, solitary on peduncles.

C. Calyx-teeth shorter than tube; corolla pinkish or pale salmon with reddish tinge; pods not deflexed; leaflets mostly 3 to 10 mm long. . . . . *L. micranthus*

CC. Calyx-teeth longer than tube; corolla white, tinged with rose; pods deflexed; leaflets mostly 10 to 15 mm long . . . . . *L. purshianus*

Lotus corniculatus L. Bird's Foot Trefoil

Habitat: Moist well-drained soil; full sun; below 2500 feet.

Abundance: Occasional.

Major Communities: Old field; Seeps; Wet meadows; Anthropogenic.

Lotus crassifolius (Benth.) Greene. Broad-leafed Hosackia

Habitat: Dry hillsides; full to partial shade; gravelly, poor soils; any exposure.

Abundance: Occasional.

Major Communities: Shrubby live oak; Oak - bay - madrone; Manzanita - ceanothus - mahogany.

Collections: Neilson 3273, Caldwell Pines (S); Neilson 3385, Alder Creek (L)

Lotus humistratus Greene. Short-podded Hosackia

Habitat: Dry, open, sunny slopes; usually poor soils, often disturbed places; below 4000 feet elevation.

Abundance: Common.

Major Communities: Annual grassland; savannahs; openings in chaparral; Anthropogenic.

Collections: Neilson 3714, lower Squaw Creek; P.U.C. Troutdale Creek; P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Lotus micranthus Benth. Small-flowered Hosackia

Habitat: Open, dry hillsides; mostly south and west exposures; full sun; any altitude.

Abundance: Common.

Major Communities: Annual grassland; disturbed places; Rock barrens; oak savannahs.

Collections: P.U.C., Troutdale Creek (Mt. St. Helena)

Lotus pinnatus Hook. Pinnate-leaved Hosackia

Habitat: Moist to wet soils; usually full sun; south, west, and east exposures.

Abundance: Occasional to rare.

Major Communities: Pond margins; Seeps in chaparral.

Lotus purshianus (Benth.) Clem. & Clem. Spanish Clover

Habitat: Dry hillsides; gravelly loams; full to partial sun; below 2800 feet; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Pine shrub; open chaparrals.

Collections: P.U.C., Mt. St. Helena fire road.

Lotus stipularis (Benth.) Greene. Stipulate Hosackia

Habitat: Moist, well-drained soils; partial shade; west or east exposures.

Abundance: Rare.

Major Communities: Pine - oak woodland.

Collections: Neilson 3391, ¼ mi S. Geyser Peak; P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Lotus subpinnatus Lag. Chile Hosackia

Habitat: Dry, sunny slopes; usually heavy soils; any exposure; mostly below 2300 feet elevation.

Abundance: Occasional to locally abundant.

Major Communities: Annual grassland; Old field; Ruderal.

Collections: Neilson 3328, High Valley Creek (L); Neilson 3447, High Valley Creek (L)

Key to *Lupinus* species

A. Plants annual; flowers in whorls.

B. Keel ciliate on upper margins near claws.

C. Keel ciliate on lower edges also near claws.

D. Flowers yellowish; pods 1 or 2-seeded, about 1.5 cm long; stems pithy . . . . . *L. luteolus*

DD. Flowers deep purple-blue, sometimes white or pink; pods 4 to 12-seeded, 4 to 5 cm long; stems hollow . . . . . *L. succulentus*

CC. Keel not ciliate on lower edges; banner 12 to 16 mm x 8 to 9 mm; stems secund after anthesis.

D. Flowers yellow or cream. . . . . *L. densiflorus var. aureus*

DD. Flowers rose . . . . . *L. d. var. densiflorus*

BB. Keel ciliate on upper margins toward apex or not at all.

C. Pedicels 4 to 10 mm long; flowers 10 to 15 mm long; keel entire.

D. Largest leaflets 5 to 7.5 mm wide; pods 3.5 to 5.5 mm wide. . . . . *L. nanus*

DD. Largest leaflets 5 to 15 mm wide; pod 6 to 8.5 mm wide. . . . . *L. nanus var. latifolius*

CC. Pedicels 1 to 3 mm long; flowers 4 to 8 mm long.

D. Keel ciliate on upper margins toward apex.

E. Banner oval, lemon-shaped when flattened, 3.6 to 6 mm long, mucronate; keel with short, blunt acumen. . . . . *L. b. ssp. microphyllus*

EE. Banner obovate to oblong, rounded to truncate or mucronate; keel with slender acumen.

F. Banner 3 to 7.5 mm; racemes many-flowered; whorls distant . . . . . *L. b. ssp. tridentatus*

FF. Banner 6 to 9 mm, racemes few-flowered; whorls indistinct. . . . . *L. bicolor*

DD. Keel glabrous; pods 3 to 5 mm; banner 5.2 to 6.5 mm long. . . . . *L. b. ssp. pipersmithii*

AA. Plants perennial.

B. Plants shrubby with woody stems, 2 to 6 dm above the crown; banner pubescent on back; plants appressed silky. . . . . *L. albifrons*

BB. Plants herbaceous above the root crown;

C. Banners glabrous on back.

D. Leaves well-distributed along stem; petioles 1 to 4 cm long; keel glabrous; banner ovate to obovate; flowers blue to yellowish.

E. Plants branched above, thinly strigose, greenish; racemes 6 to 18 cm long, lax; banner rounded; wings covering most of curved keel; leaves folded; ± flat leaflets spreading, leaf not cup-shaped. . . . . *L. andersonii*

EE. Plants branched near base, appressed pubescence ± silky; racemes 4 to 10 cm long, upright; banner obovate; keel strongly curved, not completely hidden by wings; leaves folded but midrib tending to curve upward then outward forming ● cup-shape leaf. . . . . *L. adsurgens*

DD. Leaves distributed along stem but largest in middle, basal leaves often dry at anthesis; petioles 5 to 20 cm long; keel ciliate on upper margin from middle to claws; banner suborbicular; wings truncate or incurved on lower edge exposing curved keel; flowers blue, usually with some pink fading to brown. . . . . *L. latifolius*

CC. Banner pubescent on back; plant with short,dense, silky canescence; stem 1.5 to 3 dm tall, unbranched, erect to decumbent; petioles 5 to 15 cm long; leaflets 6 to 7 spatulate-obovate, rounded or retuse at apex, 3 to 4 cm x 1 to 2 cm; petals purplish-blue, 14 to 16 mm long; keel curved, ciliate on upper margins and on lower free edges near claws. . . . . *L. sericatus*

Lupinus adsurgens E. Drew. Drew's Silky Lupine

Habitat: Mesic sites; rich, deep soils; mostly east, north, and west exposures; above 2000 feet elevation.

Abundance: Occasional.

Major Communities: Fir - oak - maple woodland; Mixed oak - maple - madrone.

Collections: Neilson 2763, ¼ mi S. Geysers Rock; Neilson 2796, Cobb Mountain; Neilson 3247, High Valley Creek (L)

Lupinus albifrons Benth. Silver Lupine

Habitat: Open, rocky or gravelly, often disturbed sites; mostly south and west exposures; mostly below 3000 feet.

Abundance: Occasional.

Major Communities: Blue oak woodland; Garry oak woodland; Mixed oak savannah.

Collections: Neilson 2727. Culver-Baer Mine. Neilson 3844. Socrates Mine Road above Anderson Springs: Neilson 3846. S. base Mt. St. Helena; P.U.C. Troutdale Creek, R.L. Stevenson State Park (Mt. St. Helena)

Lupinus andersonii Watson. Anderson's Lupine

Habitat: Open places in pine forest; deep sandy soil; any exposures; above 3600 feet elevation.

Abundance: Locally common.

Major Communities: Yellow pine parkland.

Remarks: Noted only from Cobb Mountain.

Lupinus bicolor Lindley. Lindley's Lupine

Habitat: Open, sunny hillsides and flats; poor gravelly soils; full sun; below 2800 feet elevation.

Abundance: Common.

Major Communities: Annual grassland; Ruderal; Anthropogenic.

Remarks: Several subspecies are present in the Mayacmas, mostly with the species. The subspecies that follow have been noted by the author.

Collections: Neilson 3255, High Valley Creek (L); P.U.C., Troutdale Creek, R.L. Stevenson State Park (Mt. St. Helena)

Lupinus bicolor Lindley. ssp. *microphyllus* (Watson) Dunn.

Collections: Neilson 3125, Alder Creek (S): Neilson 3255, High Valley Creek (L)

Lupinus bicolor Lindley. ssp. *pipersmithii* (Heller) Dunn.

Collections: Neilson 3852 and 3853, 3 mi S. Pine Flat

Lupinus bicolor Lindley. ssp. *tridentatus* (Eastw. ex C.P. Smith) Dunn.

Collections: Neilson 3065, The Geysers

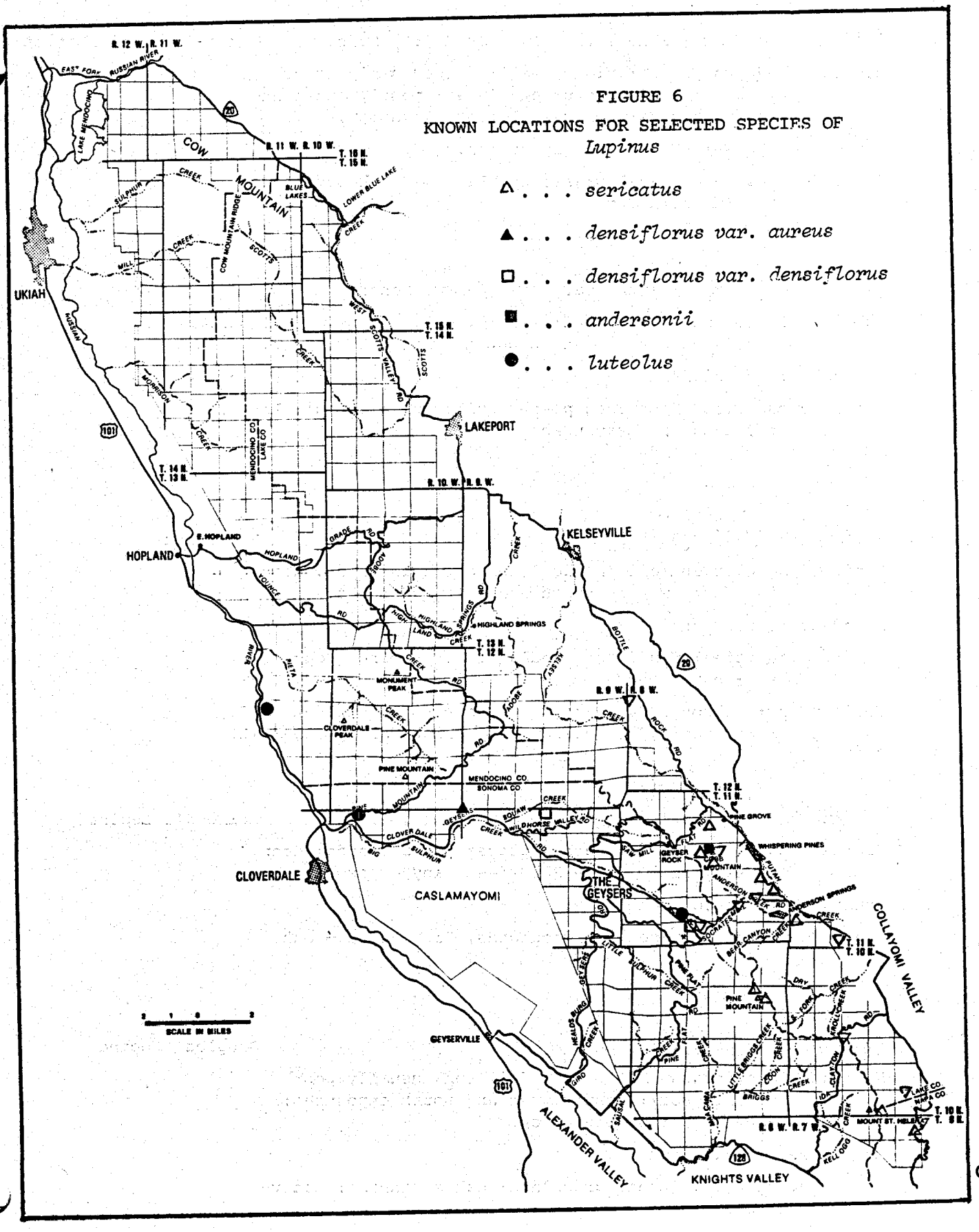


FIGURE 6
KNOWN LOCATIONS FOR SELECTED SPECIES OF
Lupinus
△ . . . sericatus
▲ . . . densiflorus var. aureus
□ . . . densiflorus var. densiflorus
■ . . . andersonii
● . . . luteolus
UKIAH
LAKEPORT
KELSEYVILLE
HOPLAND
CLOVERDALE
CASLAMAYOMI
THE GEYSERS
GEYSERVILLE
COLLAYOMI VALLEY
ALEXANDER VALLEY
KNIGHTS VALLEY
HIGHLAND SPRINGS
WHISPERING PINES
ANDERSON SPRINGS
MOUNT ST. HELENA
COW MOUNTAIN
PINE MOUNTAIN
CLOVERDALE PEAK
MONUMENT PEAK
GEYSER ROCK
SCALE IN MILES

Lupinus densiflorus Benth. var. *aureus* (Kell.) Munz. Dense-flowered Platycarpos

Habitat: Open, sunny hillsides; well-drained sandy or gravelly soils; often in disturbed places; mostly south and west exposures; below 2800 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Annual grassland; Rideral; oak savannahs; riparium alluvium.

Lupinus densiflorus Benth. var. *densiflorus* Benth.

Habitat: Open, sandy or gravelly soils, well-drained; full sun; mostly south and west exposures below 2800 feet.

Abundance: Occasional.

Major Communities: Disturbed places, riparium alluvium; Annual grassland; oak savannahs.

Lupinus latifolius Agardh. Broad-leaved Lupine

Habitat: Deep, rich soil; mesic sites often in shade; above 1500 feet; mostly north and east exposures.

Abundance: Occasional.

Major Communities: Mixed oak woodland; Fir - pine - oak; Oak - bay - maple.

Collections:Neilson 2764, 1 mi S. Geysers Rock; Neilson 3200, Truit Creek (S); Neilson 3347, High Valley Creek (L)

Lupinus luteolus Kell. Kellogg's Lupine

Habitat: Open, usually disturbed places in woodlands; deep, gravelly soil; above 2000 feet; any exposure.

Abundance: Occasional to rare.

Major Communities: Mixed oak woodlands, Fir - pine - oak.

Lupinus nanus Dougl. in Benth. Douglas' Lupine

Habitat: Open, grassy hillsides; full sun; usually poor gravelly soil; mostly west and south exposures; below 3000 feet elevation.

Abundance: Locally common.

Major Communities: Annual grassland; oak savannahs; Native herb.

Collections: Neilson 3854, 3 mi S. Pine Flat (S)

Lupinus nanus Dougl. in Benth. ssp. *latifolius* (Benth.) Dunn.

Collections: Neilson 3064 and 3113, The Geysers

Lupinus sericatus Kell. Cobb Mt. or St. Helen's Lupine

Habitat: Mesic sites on deep, well-drained sandy or loam soils; partial shade; mostly on east or north exposures; above 2000 feet elevation.

Abundance: Occasional.

Major Communities: Disturbed places; Black oak savannah; Fir - pine - oak.

Remarks: This species appears on the rare species list, but is much more common and widespread than once thought.

Collections: P.U.C., Troutdale Creek, R.L. Stevenson State Park (Mt. St. Helena)

Lupinus succulentus Dougl. ex Koch. Succulent Annual Lupine

Habitat: Deep, well-drained sandy or gravelly loams; full sun; disturbed places on open hillsides; below 3000 feet; mostly south and west exposures.

Abundance: Rare.

Major Communities: Annual grassland; Ruderal; Old field.

Collections: Neilson 3346, High Valley Creek (L)

Medicago lupulina L. Black Medic

Habitat: Moist soils; mostly in pond margins or seeps; full sun.

Abundance: Rare.

Major Communities: Pond margins; Carex - juncus seeps.

Collections: P.U.C., Troutdale Creek, R.L. Stevenson State Park (Mt. St. Helena)

Medicago polymorpha L. Bur Clover

Habitat: Open hillsides; full to partial shade; good to poor soils; all exposures; below 3600 feet.

Abundance: Common.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 3443, Big Geysers; P.U.C. Troutdale Creek

Melilotus albus Desr. White Sour Clover

Habitat: Sub-xeric aites on disturbed soils and road margins; most exposures.

Abundance: Occasional to rare.

Major Communites: Ruderal; Anthropogenic

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Melilotus indicus (L.) Allioni. Yellow Clover

Habitat: Disturbed places; deep, moist soil; full sun.

Abundance: Rare.
Major Communities: Ruderal; Anthropogenic.

Melilotus officinalis (L) Lamark. Sour Clover

Habitat: Disturbed soils; full sun.

Abundance: Rare.

Major Communities: Road sides; Ruderal.

Psoralea macrostachya De Candole. Leather Root

Habitat: Moist to wet soils around ponds or along streams; below 2500 feet elevation.

Abundance: Rare to occasional.

Major Communities: Riparian; Blackberry - grape - ash.

Collections: Neilson 2788, Great Western Mine (L); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Psoralea physodes Dougl. California Tea

Habitat: Mesic sites in open woods; deep soils.

Abundance: Rare.

Major Communities: Mixed oak woodlands.

Thermopsis macrophylla Hook. & Arnott. False Lupine

Habitat: Deep, moist, well-drained loam or clay soils; full sun; below 3600 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Carex - juncus seeps; Wet meadows.

Collections: P.U.C., Western Mine Road

Key to *Trifolium* species

A. Heads without an involucre at the flower base.

B. Annuals.

C. Flowers pedicellate, reflexed in age, purple or pinkish; calyx 10-nerved.

D. Plants villous on peduncles and calyx.

E. Leaflets linear-cuneate, deeply bifid at apex; stems slender, 1.5 to 4 dm, erect. . . *T. bifidum*

EE. Leaves oblanceolate to obcordate, rounded to retuse at apex. . . . . *T. b. var. decipiens*

DD. Plants glabrous except calyx; calyx ciliate on lobes, with short flat appendages; stems 2 to 5 dm tall, erect, hollow . . . . . *T. ciliolatum*

CC. Flowers sessile, not reflexed in age; calyx densely villous; heads globose, peduncled, solitary, purple; calyx 10-nerved.

D. Corolla exceeding or equaling the calyx.

E. Corolla purple-tipped with white, well exserted from the calyx, 8 to 10 mm long; calyx 5 to 7 mm long, the subulate-filiform teeth plumose, longer than tube; stems erect to ascending, pubescent. . . . . *T. dichotomum*

EE. Corolla about equal to calyx, 6 to 7 mm long; calyx with subulate teeth plumose, villous, longer than tube; stems decumbent to ascending, villous pubescent . . . . . *T. albopurpureum*

DD. Corolla much shorter than olive-green calyx, 8 to 10 mm long; calyx with subulate teeth villous plumose, longer than tube; stems erect or ascending, 2 to 3 dm tall, villous pubescent . . . . . *T. olivaceum*

BB. Perennials; peduncles axillary; flowers on pedicels, 4 to 5 mm long, recurved in fruit; plant subglabrous; stems erect or ascending, 2 to 6 dm long, stout, succulent; corolla pink. . . . . *T. hybridum*

AA. Heads with an involucre at flower base.

B. Corolla not inflated in age; involucral bracts united.

C. Involucre campanulate to bowl-shape.

D. Involucre lobes 7 to 10, entire; heads pubescent, small; involucre 5 to 8 mm across, deeply campanulate; slender annual; stems procumbent to ascending, 2 to 4 dm long . . . . . *T. microcephalum*

DD. Involucre lobes toothed.

E. Calyx-teeth 1 to 3 times trichotomously forked; glabrous annual with erect or decumbent stems, 1 to 3 dm long; involucre 8 to 10 mm across, bowl-shaped, membraneous, unequally toothed. . . . . *T. cyathiferum*

EE. Calyx-teeth simple, all ciliate; corolla 5 to 6 mm long, white to pink; slender, branched annual, subglabrous, 1 to 5 dm tall; involucre 5 to 10 mm across, deep campanulate, scarious and subglabrous below, pubescent on green-toothed lobes. . . . . *T. microdon*

CC. Involucre flat, rotate.

D. Plant perennial, from creeping rootstocks; branched, decumbent stems, 1 to 3 dm long; banner white to light purple, wings and keel dark; involucre 12 to 15 mm broad, flattish, mostly lobed then toothed . . . . . *T. wormskioldii*

DD. Plants annual.

E. Plants vicid, pubescent, clammy; stems hollow, 3 to 5 dm tall, erect to decumbent; corolla 12 to 14 mm long, pale with dark central spot. . . . . *T. obtusiflorum*

EE. Plants glabrous.

F. Corolla 12 to 15 mm long, red-purple; calyx-teeth dilated below, shorter than tube; stems erect to decumbent, 1 to 4 dm long . . . . . *T. tridentatum*

FF. Corolla 5 to 8 mm, purple with white tip; petals much longer than the 5 to 20-nerved calyx; involucre with 4 to 12 lobes, these 3 to 7 toothed; several stems from base, ascending or decumbent, 1 to 6 dm long . . . . . *T. variegatum*

BB. Corolla much inflated in age; involucre bracts separate divisions, 6 to 18 mm long; flowers 12 to 25 mm long, cream becoming pink; glabrous annuals; stems short, hollow, 1 to 8 dm long . . . . . *T. fucatum*

Trifolium albopurpureum Torr. & Gray. Rancheria Clover

Habitat: Open hillsides; poor to good gravelly soils; full sun; below 3800 feet elevation.

Abundance: Common.

Major Communities: Annual grassland; Native herb; oak savannahs.

Collections: Neilson 3445, High Valley Creek (L)

Trifolium bifidum Gray. Pinole Clover

Habitat: Sub-mesic sites; full sun; deep, moist soil.

Abundance: Occasional.

Major Communities: Annual grassland, oak savannahs.

Collections: Neilson 3458, High Valley Creek (L)

Trifolium bifidum Gray var. *decipiens* Greene.

Remarks: With species.

Collections: Neilson 2989

Trifolium ciliolatum Benth. Tree Clover

Habitat: "Open, grassy hillsides."

Abundance:
Major Communities: Annual grassland, oak savannahs.

Collections: P.U.C., Troutdale Creek, R.L. Stevenson State Park (Mt. St. Helena)

Trifolium cyathiferum Lindley Bowl Clover

Habitat: Open, sunny hillsides; deep well-drained soils; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland; oak savannahs.

Trifolium dichotomum Hook. & Arn. Branched Indian Clover

Habitat: Open, sunny hillsides; poor to rich soils; full sun.

Abundance: Occasional.

Major Communities: Annual grassland; oak savannahs.

Collections : Neilson 2843, The Geysers; Neilson 3446, High Valley Creek (L)

Trifolium fucatum Lindley. Sour Clover

Habitat: Deep, moist, rich soils; full sun.

Abundance: Occasional.

Major Communities: Annual grassland; Wet meadows.

Collections: Neilson 2844, The Geysers

Trifolium hybridum L. Alsike Clover

Habitat: Moist, well-drained soils; sunny slopes; any exposure; below 3000 feet elevation.

Abundance: Occasional.

Major Communities: Annual grassland; oak savannahs.

Trifolium microcephalum Pursh. Small-headed Clover

Habitat: Moist to wet, rich, sandy or gravelly loams; full sun; most exposures.

Abundance: Occasional.

Major Communities: Wet meadows; Annual grassland.

Collections: Neilson 3696, lower Squaw Creek (S); P.U.C., Troutdale Creek

Trifolium microdon Hook. & Arn. Valparaiso Clover

Habitat: Rich, deep soils; full sun; all exposures.

Abundance: Common.

Major Communities: Annual grassland; oak savannahs.

Collections: Neilson 2843 The Geysers (S); Neilson 3459, High Valley Creek (L); Neilson 3689, lower Squaw Creek (S)

Trifolium obtusiflorum Hook. Creek or Clammy Clover

Habitat: Moist to wet soils; mesic habitats; partial shade to full sun; any exposure.

Abundance: Occasional.

Major Communities: Riparian; Pond margins; Seeps.

Collections: Neilson 3202, 1 mi W. Truit Creek; Neilson 2791, Great Western Mine (L)

Trifolium olivaceum Greene. Olive Clover

Habitat: Open, sunny hillsides.

Abundance: ?

Major Communities: Annual grassland; oak savannahs.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Trifolium tridentatum Lindley. Tomcat Clover

Habitat: Open, grassy slopes; poor to goo soil; full sun.

Abundance: Common.

Major Communities: Annual grassland.

Collections: Neilson 2990, The Geysers (S); Neilson 2049, Pine Flat (S); Neilson 3209, Truit Creek (S), P.U.C., Troutdale creek, R.L. Stevenson State Park (Mt. St. Helena)

Trifolium variegatum Nutt. var. *major* Loja White-tipped Clover

Habitat: Wet to moist, well-drained soil; full sun.

Abundance: Rare.

Major Communities: Seep; Wet meadow.

Collections: Neilson 3717, lower Squaw Creek (S)

Trifolium wormskioldii Lelmann. Cow Clover

Habitat: Wet soils of seeps or meadows; sandy loams or clays; full sun.

Abundance: Occasional.

Major Communities: Wet meadow; Seep.

Collections: Neilson 2038, Little Sulphur Creek (S)

Vicia americana Muhl. ssp. *oregana* (Nutt.) Abrams. American Vetch

Habitat: Mesic sites; deep gravelly loams; partial to full shade; mostly north and east exposures.

Abundance: Common.

Major Communities: Oak savannahs and woodlands.

Collections: Neilson 2969 and 2999, The Geysers; Neilson 3332 and 3453, High Valley Creek (L)

Vicia angustifolia Richard. Common Vetch

Habitat: Open, sunny hillsides and flats; deep, sandy or gravelly soils; full sun.

Abundance: Occasional to locally common.

Major Communities: Annual grassland; oak savannahs.

Collections: P.U.C.

Vicia californica Greene. California Vetch

Habitat: Deep, sandy or gravelly, rich soils; full to partial shade.

Abundance: Common.

Major Communities: Mixed oak woodland; Pine - oak woodlands

Collections: Neilson 3452, High Valley Creek (L)

Vicia dasycarpa Ten. Winter Vetch

Habitat: Deep soils; sunny hillsides and plains; full sun; mostly below 2800 feet elevation.

Abundance: Rare to occasional.

Major Communities: Annual grassland; Old field; Anthropogenic.

Remarks: Introduced as a companion to oats in hay fields.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

LINACEAE — FLAXES

Key to *Linaceae*

A. Flowers yellow, 3 to 5 mm long; plants 1 to 3 dm tall.

  B. Styles 2; petals 3 to 4 mm long; appendages hairy, the lateral thickish; stamens cup at filiments base, 10-toothed; stems branched from near middle, branches mostly opposite; leaves entire. . . . . *Hesperolinon bicarpellatum*

  BB. Styles 3.

    C. Leaves 5 to 10 mm long, lanceolate to rounded, somewhat clasping at base, margined with stipulate glands, mostly alternate a few in whorls; petals 4 to 6 mm long, central scale oblong, lateral appendages pubescent. . . . . *H. adenophyllum*

    CC. Leaves linear to narrow-oblong with narrow non-clasping base, not prominently glandular on margin; stamens forming a 5-toothed cup at base; petals 3 to 4 mm long, central scale erect, lateral tooth-like; on serpentine . . . . . *H. clevelandii*

AA. Flowers white or pinkish; plants 1 to 5 dm tall; styles 3, leaves and bracts entire.

  B. Plants paniculately branched above; branches angled, striate; sepals glabrous; petals 4 to 6 mm long; pedicels mostly 1 to 6 mm long; stipule gland prominent. . *H. californicum*

  BB. Plants dichotomously branched above; ultimate branches filiform, pubescent in forks; sepals with a few glandular teeth; petals 6 to 7 mm long, middle appendage large, erect, hairly within, lateral tooth-like and hairy; pedicels capillary, 6 to 20 mm long. . . . . *H. spergulinum*

Hesperolinon adenophyllum Gray. — Glandular Dwarf Flax

Habitat: Dry, rocky or gravelly soils; sometimes on serpentine; full sun or partial shade; most exposures.

Abundance: Occasional to rare, but locally common.

Major Communities:

Remarks: More plentiful on Lake County volcanic soils in the Boggs Mountain area than the Mayacmas Mountains.

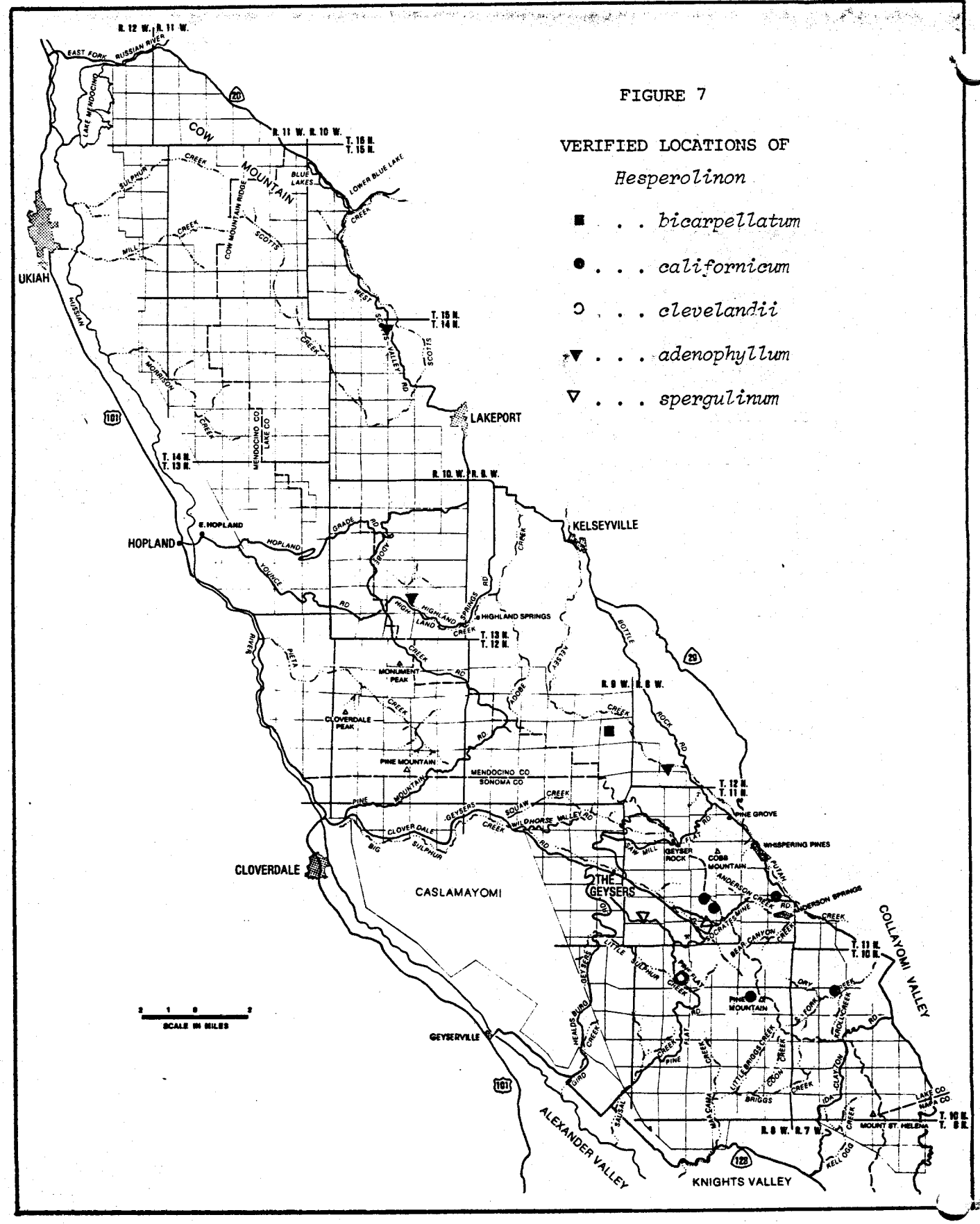


FIGURE 7
VERIFIED LOCATIONS OF
Hesperolinon
■ . . . bicarpellatum
● . . . californicum
○ . . . clevelandii
▼ . . . adenophyllum
▽ . . . spergulinum
UKIAH
LAKEPORT
HOPLAND
KELSEYVILLE
CLOVERDALE
CASLAMAYOMI
THE GEYSERS
COLLAYOMI VALLEY
ALEXANDER VALLEY
KNIGHTS VALLEY
GEYSERVILLE
COW MOUNTAIN
MENDOCINO CO
LAKE CO
SONOMA CO
HIGHLAND SPRINGS
MONUMENT PEAK
CLOVERDALE PEAK
PINE MOUNTAIN
COBB MOUNTAIN
PINE GROVE
WHISPERING PINES
MOUNT ST. HELENA
SCALE IN MILES

Hesperolinon bicarpellatum Sharsm. Twin-carpeled Dwarf Flax

Habitat: ?

Abundance: Very rare.

Major Communities:

Hesperolinon californicum Benth. California Dwarf Flax

Habitat: Dry, rocky soils, often on ridge tops.

Abundance: Common.

Major Communities: Chamise; Chamise - buckbrush - manzanita.

Collections: Neilson 3980, 1 mi N.W. Socrates Mine

Hesperolinon clevelandii Cleveland's Dwarf Flax

Habitat: Mostly on serpentine gravelly soils or rock outcrops; full sun to partial shade.

Abundance: Apparently rare in the Mayacmas.

Major Communities: Jepson's ceanothus - leather oak - cypress.

Collections: Harrington 2005, N. Pine Flat (S)

Hesperolinon spergulinum Gray. Slender Dwarf Flax

Habitat: Dry, rocky soils in openings in chaparral; full sun; all exposures.

Abundance: Common.

Major Communities: Chamise - buckbrush - manzanita.

Collections: Neilson 2967, ½ mi S. Little Geysers; Harrington 2025, Little Sulphur Creek near Black Mountain

LOASACEAE LOASAS

Key to *Loasaceae*

A. Floral bracts green, round-ovate to lance-ovate to partly hiding the crowded flowers; leaves 2 to 8 cm long, rough hispid, sinuately toothed or serrate; upper ones subcordate at base, lanceolate to ovate. . . . . *Mentzelia micrantha*

AA. Floral bracts lance-linear or wider, not concealing flowers; leaves mostly entire, lower ones lanceolate, upper ones ovate, entire to sinuately toothed, all sessile . . . . . *M. dispersa*

Mentzelia dispersa Wat. Nada Stick-leaf or Blazing Star

Habitat: Dry, gravelly soils; full sun; usually south and west exposures.

Abundance: Occasional.

Major Communities: Chaparrals, open alluvial flats.

Collections: Neilson 3314, High Valley Creek (L); Harrison 2010, Little Sulphur Creek near Black Mountain

Mentzelia micrantha (Hook. & Arn.) Torr. & Gray. Small-flowered Stick-leaf or Blazing Star

Habitat:

Abundance:

Major Communities: Ruderal; Anthropogenic; Chamise: Chamise - buckbrush - manzanita.

Collections Neilson 2888, ½ mi N. Little Geysers (S)

LORANTHACEAE MISTLETOES

Key to *Loranthaceae*

A. Berry on a recurved pedicel; female sepals 2; anther 1-celled; parasitic on pines . . . . . *Arceuthobium campylopodum*

AA. Berry sessile, globose; female sepals 3; anthers 2-celled; parasitic on oaks and poplars. . . . . *Phoradendron flavescens*

Arceuthobium campylopodum Engl. in Gray. Mistletoe

Habitat: Parasite on pines.

Abundance: Occasional.

Major Communities: Pine communities.

Collections: P.U.C., Mt. St. Helena fire road; Neilson 4044, Old Mercuryville

Phoradendron flavescens (Pursh) Nutt. var. *villosum* (Nutt.) Engl. in Rothr. — Mistletoe

Habitat: Parasite on oaks, occasionally on bay and cottonwood.

Abundance: Common.

Major Communities: All oak communities.

Collections: Neilson 3988, Caldwell Ranch; P.U.C., Mt. St. Helena lookout

LYTHRACEAE — LOOSESTRIFES

Lythrum hyssopifolia L. — Hyssop Loosestrife

Habitat: Wet, somtime saline soils around seeps and hot springs.

Abundance: Occasional to locally common.

Major Communities: Hot spring; Seep.

Collections: Neilson 2815, ¼ mi S. Geyser Rock; Neilson 3057, Little Geysers; Neilson 3156, High Valley Creek (L); Neilson 3370, Geysers near Eagle Rock

MALVACEAE — MALLOWS

Key to *Malavaceae*

A. Plants annual, mostly less than 5 dm tall. . . . . *Sidalcea diploscypha*

AA. Plants perennial, mostly more than 5 dm tall . . . . . *S. oregana*

Sidalcea diploscypha (Torr. & Gray) Gray. — Fringed Sidalcea

Habitat: Open, sunny hillsides; loamy clays to gravelly loams; mostly south and west exposures.

Abundance: Occasional.

Major Communities; Annual grassland.

Collections: Neilson 3326, High Valley Creek (L)

Sidalcea oregana (Nutt.) Gray ssp. *hydrophila* (Heller) Hitch. — Heller's Sidalcea

Habitat: Deep, rich soil; partial shade; east, south and north exposures; below 3000 feet elevation.

Abundance: Very rare.

Major Communities: Open Pine - oak woodland; oak savannahs.

Remarks: Included here from collections of P.U.C. on Mt. St. Helena and CNPS rare species list.

Key to *Onagraceae*

A. Seeds with a tuft of hair at one end.

B. Flower-tube 2 to 3 cm long, funnelform with row of 8 scales within about ½ its length; flowers scarlet . . . . . *Zauschneria californica*

BB. Flower-tube less than 1 cm or lacking, without internal scales; flowers not scarlet. . . . . *Epilobium species (See species key)*

AA. Seed without hairs.

B. Ovary 2-loculed; flower-tube not prolonged beyond ovary; flowers very small; stem branches capillary. . . . . *Gayophytum humile*

BB. Ovary 4-loculed; flower-tube prolonged beyond the ovary.

C. Anthers attached near base, erect; petals pink, lavender or rose, sometimes whitish.

D. Sepals erect; petals small or wanting; pollen in tetrads.

E. Capsule breaking between locules; septa adherent to central axis appearing 4-winged on ripening *Boisduvalia densiflora*

EE. Capsule breaking between locules; septa adherent to valves at dehiscence.

F. Flower-tube .5 to 1 mm long; petals 2 to 4 mm long; floral bracts ovate to oblong, broader than foliage leaves; capsule straight 6 to 8 mm long . . . . . *B. glabella*

FF. Flower-tube 2 to 3 mm long; petals 7 to 10 mm long; capsule straight. . . . . *B. macrantha*

DD. Sepals reflexed or tips remaining united and turned to one side at anthesis; pollen not in tetrads; flowers mostly showy . . . . . *Clarkia species (See species key)*

CC. Anthers attached at middle; petals yellow or white, often reddish in age . . . . . *Oenothera species (See species key)*

Boisuvalia densiflora (Lind.) Wats. Dense-flowered Boisduvalia

Habitat: Wet, poorly drained, usually heavy soils; any exposure; full to partial sun.

Abundance: Occasional.

Major Communities: Seeps; Springs; Wet meadows.

Collections: Neilson 3413, Socrates Mine Headquarters spring; Neilson 3437, 1 mi S. Truit Creek; Harrison no #, Pine Flat

Boisduvalia glabella (Nutt.) Walpers. Smooth Boisduvalia

Habitat: Pond margins, stream banks, wet meadows.

Abundance: Rare.

Major Communities: Pond margins; Wet meadows.

Boisduvalia macrantha Heller. Large-flowered Boisduvalia

Habitat: Seeps.

Abundance: Rare.

Major Communities: Juncus-carex-mimulus.

Collections: Harrison 2051, Pine Flat area in seep (S)

Key to *Clarkia* species

A. Petals twice as long as broad, conspicuously lobed; stamens 4; floral-tube 1.5 to 3 cm long, slender. . . . . *C. concinna*

AA. Petals entire to irregularly dentate or emarginate - not lobed.

B. Petals constructed into a definite claw which expands into a pair of lateral lobes near base, purplish or red; axis of inflorescence becoming erect as flowers open . . . . . *C. rhomboidea*

BB. Petals not constricted into a claw or if so claws entire.

C. Buds pendulous or deflexed.

D. Petal claw slender, equal to or longer than limb; plants glabrous; capsule nearly round or quadrangular, 8-ribbed . . . . . *C. unguiculata*

DD. Claw lacking; flower-tube with ring of hairs near summit; capsule 4-grooved, puberulent. . . . . *C. gracilis*

CC. Buds erect.

D. Immature capsule stout, not more than 8 times as long as broad, 8-ribbed, tapering to summit or with a beak 2 mm long; sepals mostly deflexed individually in pairs . . . . . *C. purpurea*

DD. Immature capsule slender, usually at least 10 times as long as broad, shallowly 8-grooved, 4-sided or nearly round; sepals usually united and deflexed to one side . . . . . *C. affinis*

Clarkia affinis Lewis & Lewis.

Habitat: Rocky or gravelly soils; full sun; any exposure.

Abundance: Occasional.

Major Communities; Openings in chaparral; Rock barrens; Annual grassland.

Collections: Neilson 3705, Big Sulphur Creek near junction with Squaw Creek.

Clarkia concinna (Fish. & May.) Greene. Lovely Clarkia

Habitat: Dry, rocky or gravelly soils or rocky outcrops; usually south and west exposures; mostly full sun.

Abundance: Occasional but locally common.

Major Communities: Chamise-buckbrush-manzanita.

Collections: Neilson 2776, Geyser Rock (S); Neilson 2987, Big Geysers (S); Neilson 3348, High Valley Creek (L); Neilson 3359, 1 mi S. Truit Creek

Clarkia gracilis (Piper) Nelson & MacBride. Farewell-to-Spring

Habitat: Open, sunny hillsides; deep, gravelly loams; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Openings in chaparral; Annual grassland; oak savannahs.

Collections: Neilson 2772, 1 mi. S. Geyser Rock; Neilson 2876, Geyser Rock; Neilson 2970, Big Geysers; P.U.C., Mt. St. Helena fire road

Clarkia purpurea (Curt.) Nel. & MacB. ssp. *quadrivulnera* (Doug.) Lew. & Lew. Four-Spotted Clarkia

Habitat: Shallow rock soils; full to partial sun; south and west exposures.

Abundance: Occasional.

Major Communities: Openings in chaparrals.

Collections: Neilson 3252, High Valley Creek (L); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Clarkia rhomboidea Dougl. Rhomboid Clarkia

Habitat: Dry, open slopes; poor soils; mostly south and west exposures; often on serpentine.

Abundance: Occasional.

Major Communities: Chaparrals.

Collections: Harrison 2015, serpentine near Contact Mine; Harrison 2040, road near Black Mountain on serpentine; P.U.C., Troutdale Creek; P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Clarkia unguiculata Lind. Elegant Clarkia

Habitat: Open, sunny slopes; heavy soils.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: Neilson 2971, Big Geysers

Key to *Epilobium* species

A. Plants annual, dry areas; stems with exfoliating epidermis, .5 to 3 dm tall, purberulent throughout; leaves mostly opposite, without axillary fascicles; flower-tube 1 mm long. . . . . *E. minutum*

AA. Plants perennial, of wet areas; epidermis not exfoliating.

B. Root stocks bearing globose winter buds with fleshy overlapping scales; stems simple, 2 to 6 dm tall, glabrous below, crisped pubescent or glandular on inflorescence *E. brevistylum*

BB. Root stocks without winter buds.

C. Petals 3 to 4 mm long, pale pink to whitish; leaves alternate; stems 3 to 10 dm tall, glabrous below except for some hair on decurrent lines below nodes; inflorescence appressed canescent. . . . . *E. adenocaulon var. parishii*

CC. Petals 6 to 10 mm, red-purple; stems reddish, canescent above; leaves mosly opposite . . . . . *E. watsonii*

Epilobium adenocaulon Hauss. var. *parishii* (Trel.) Munz.

Habitat: Wet to moist soils; full to partial sun.

Abundance: Occasional.

Major Communities: Wet meadows; Seeps; Pond margins.

Epilobium brevistylum Barb. — Slender Willow-Herb

Habitat: Wet to moist clay-loams; full sun.

Abundance: Occasional.

Major Communities: Wet meadows.

Collections: Neilson 3234, High Valley Creek (L)

Epilobium minutum Lind. ex Hook. — Minute Willow-Herb

Habitat: Serpentine soils; open, sunny sites.

Abundance: Common.

Major Communities: Serpentine barrens; Jepson's ceanothus-leather oak-Stanford's manzanita; Cypress.

Collections: P.U.C. Troutdale Creek; Neilson 3034, Geyser Rock

Epilobium watsonii Barb. — Watson's Willow-Herb

Habitat: Moist to wet soils.

Abundance: Occasional.

Major Communities: Pond margins; Juncus-carex-mimulus.

Collections: Neilson 2814, ¼ mi S. Geyser Rock

Gayophytum humile Jussien — Nuttal's Gayophytum

Habitat: Dry, gravelly to sandy loams; full to partial sun; all exposures.

Abundance: Abundant.

Major Communities: Ubiquitous.

Collections: Neilson 3477, High Valley Creek

Key to *Oenothera* species

A. Plants acaulescent; ovary fertile in lower portion only, upper portion sterile, tubular, elongate, subfiliform and simulating a flower-tube; flowers yellow.

  B. Capsule broadly and truncately 4-winged, not over 1 cm; sterile portion of ovary 12 to 35 mm long; petals 8 to 12 mm long. . . . . *O. graciliflora*

  BB. Capsule cylindrical, not winged, 1 to 2 cm long, gradually attenuate; sterile portion 5 to 12 cm; petals 2 to 20 mm *O. ovata*

AA. Plants caulescent; ovary fertile to near summit, not prolonged into a sterile portion though sometimes with a beak; capsule curved or contorted.

B. Capsule not quadrangular; leaves narrow, 1 to 2 mm wide, usually linear-oblong; plants less than 15 cm tall, glabrous or finely pubescent.

C. Sepals 1.5 to 2 mm long; petals 1.5 to 2.5 mm long — *O. contorta*

CC. Sepals 2 to 3 mm long; petals 3.5 to 5 mm long . . . — *O. cruciata*

BB. Capsule quadrangular; leaves 5 to 20 mm wide, oblong-ovate to ovate with subcordate clasping base; plants 5 to 50 cm tall, hairy; epidermis readily exfoliating. . — *O. micrantha*

Oenothera contorta Dougl. ex Hook. var. *strigulosa* (F&M) Munz — Contorted Primrose

Habitat: Open, often burned areas in chaparral; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Chamise-buckbrush-manzanita; Chamise.

Collections: M.S. Baker, grade west of Lakeport (L)

Oenothera cruciata (Wats.) Munz. — Field Primrose

Habitat: Dry, open, usually disturbed soils that are barren.

Abundance: Rare.

Major Communities: Openings in chapparal.

Collections: Neilson 3313, High Valley Creek (L)

Oenothera graciliflora Hook. & Arnold. — Slender-flowered Primrose

Habitat: Sandy clay-loam around meadow borders.

Abundance: Rare.

Major Communities: Ecotones between Chamise chaparral and meadows.

Collections: M.S. Baker, Woodcrest Cobb Valley (L)

Oenothera micrantha Horne. ex Spreng var. *jonesii* (Lev.) Munz — Small Primrose

Habitat: Moist soils usually heavy clay-loam; full sun.

Abundance: Rare.

Major Communities: Seeps.

Collections: Harrison 2011, seep near Pine Flat (S)

Oenothera ovata Nutt. in Torr. & Gray. Sun-cup

Habitat: Deep clay-loam soils; full sun; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: Neilson 3884, foothills above Alexander Valley.

Zauschneria californica Presley. California Fushia

Habitat: Dry, rocky outcrops; growing in cracks or basal scree.

Abundance: Occasional.

Major Communities: Rock outcrops.

Collections: Neilson 2825, 2 mi N. Cobb Mountain

OROBANCHACEAE — BROOM-RAPES

Key to *Orobanchaceae*

AA. Flower on elongate, scape-like pedicel, numerous and not exceeding length of stem; without bractlets; plant yellowish brown or purple. . . . . *Orobanche fasiculata var. franciscana*

AA. Flowers on short pedicels subtended by bracklets; stems on thickened, tuber-like bases; plant dark purplish-brown . . . *O. bulbosa*

Orobanche bulbosa (Gray) Beck. — Broom-rape

Habitat: Parasitic on chamise.

Abundance: Rare.

Major Communities: Chaparrals.

Collections: Neilson 3979; 3/4 mi N.W. Socrates Mine (S)

Orobanche fasiculata Nutt. var. *franciscana* Achey. — Broom-rape

Habitat: Parasitic on ceanothus.

Abundance: Rare.

Major Communities: Chaparrals.

Collections: Neilson 2759, Geyser Rock (S)

PAPAVERACEAE — POPPIES

Key to *Papaveraceae*

A. Leaves opposite, entire; plant villous, 1 to 3 dm tall; flowers cream. . . . . *Platystemon californicus*

AA. Leaves alternate, ternately dissected; plant glabrous, 1 to 4 dm tall; flowers yellow or orange; torus single. . . . *Eschscholzia caespitosa*

Eschscholzia caespitosa Benth. var. *hypecoides* (Benth.) Gray — Tufted Poppy

Habitat: Open, sunny sites on rocky clay loams to gravelly loams often on disturbed sites or in grasslands.

Abundance: Common.

Major Communities: Annual grassland; Ruderal; oak savannahs.

Collections: Neilson 2882, Geyser Rock (S)

Platystemon californicus Benth. Cream Cups

Habitat: Open, sunny sites; deep loamy or gravelly soils; south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland; Native herb; Old field.

Collections: Neilson 2834, Little Geysers; Neilson 3143, High Valley Creek (L)

PLANTAGINACEAE PLANTAINS

Key to *Plantaginaceae*

A. Plants perennial, acaulescent; leaves 5 to 15 cm, broadly elliptic . . . . . *Plantago major*

AA. Plants annual; stems erect, 5 to 15 dm tall; leaves filiform *P. hookeriana*

Plantago hookeriana Fish. & Mey. var. *californica* (Greene) Poe. California Plantain

Habitat: Open, sunny sites; poor, thin soil; mostly south and east exposures.

Abundance: Locally common.

Major Communities: Annual grassland; savannahs; Native herb.

Collections: Neilson 3169, Big Geysers; Neilson 3289, Caldwell Pines; Neilson 3568, Big Geysers.

Plantago major L. Common Plantain

Habitat: Moist soils; open to partial shade; any exposure; below 3600 feet elevation.

Abundance: Occasional to locally common.

Major Communities: Wet meadows, Seeps.

POLEMONIACEAE — PHLOXES

Key to *Polemoniaceae*

A. Calyx growing with the capsule and not ruptured by it, becoming chartaceous with age, ± scarious between lobes, sinus distended or replicate; annuals.

B. Flowers pink; mature calyx 7.8 mm long; leaves usually marked, lobed to incised. . . . . *Collomia heterophylla*

BB. Flowers blue to purple; mature calyx 10 to 12 mm long; leaves 3-toothed at the summit to entire. . . . . *C. diversifolia*

AA. Calyx at length ruptured by maturing capsule, usually tubular by the coalescence of the marginal membranes of the sepals; leaves cauline, basal, or both, sometimes also bracteate.

B. Leaves opposite at least near base of the plant; annuals in the Mayacmas.

C. Stamens arising at two levels in corolla tube; leaves entire; flowers inconspicuous . . . . . *Microsteris gracilis*

CC. Stamens arising at one level; leaves mostly palmately cleft.

D. Calyx with a conspicuous hyaline membrane in the sinuses forming a short pseudotube; flowers sessile with subtending leaves or bracts.

E. Corolla tube proper (below throat), included in calyx. . . . . *Linanthus dichotomus*

EE. Corolla tube proper, well-exerted above the calyx, 2 to 4 x length of calyx.

F. Corolla pink. . . . . *L. androsaceus*

FF. Corolla white . . . . . *L. a. ssp. luteus*

DD. Calyx not membraneous in sinuses or on the margins of lobes.

E. Corolla lobes 5 to 8 mm long, corolla 20 to 35 mm long . . . . . .

EE. Corolla lobes 3 to 5 mm.

F. Flowers pink to white; throat and tube yellow; middle lobe of leaf usually broadened upward; stigma lobes .5 to 1.5 mm. . *L. bicolor*

FF. Flowers yellow; middle leaf-lobe linear, acicular; stigma lobes 2 to 4 mm long . . *L. acicularis*

BB. Leaves mostly alternate, entire to pinnately dissect.

C. Calyx lobes subequal; flowers solitary, cymose, or in heads.

D. Upper cauline leaves usually much reduced, not conspicuously mucronate; bracts subtending groups of flowers.

E. Inflorescence with loose to head-like glomerules of 3 to many flowers subtended by a single leaf; upper leaves pinnately dissected.

F. Inflorescence in dense spherical heads; calyx composed of narrow herbaceous bands and narrow to broad hyaline sinuses; stamens as long as or longer than corolla tube . . . . . *Gilia capitata*

FF. Flowers solitary, cymes, or glomerate to loosely capitate with 12 to 15 flowers in a head.

G. Corolla campanulate, 5 to 14 mm long; throat with 5 pairs of purple spots; lobe blue-violet and tube bright yellow or orange . . . . . *G. tricolor*

GG. Flowers solitary on pedicels, 1 to 4 cm long, smaller than the species . . . . . *G. t. ssp. diffusa*

EE. Inflorescence a loose cyme; flowers in pairs on pedicels 3 to 40 mm, subtended by a single leaf; rosette absent; stems leafy; leaves linear to linear-oblong, glandular; calyx glabrous; flowers 8 to 18 mm long; some stamens inserted in middle of corolla throat; style exerted . . . . . *G. leptalea*

DD. Upper cauline leaves well developed, entire to pinnately lobed with 1 to 6 lobes; lower stems not densely leafy, villous and viscid with strong skunklike odor . . . . . *Allophyllum divaricatum*

CC. Caylx lobes unequal; flowers in dense bracteate heads; plants lacking feltlike mat of interlaced hairs in inflorescence; leaves and bracts with rigid spinose lobes.

D. Main stems finely retorse-pubescent with crisped white hairs; mature capsule thin, membraneous; lobes of foliaceous bracts at base of head rigidly acerose.

E. Stigma deeply 2-cleft.

F. Corolla lobes with 1 main vein each; corolla exceeding calyx, bracts 7 to 20 mm long, coarsely shaggy white-pilose . . . . . *Navarretia intertexta*

FF. Corolla lobes with 3 main veins; corolla blue to white, 5 to 7 mm long, usually 4-lobed; capsule circumscissle at base. . . . . *N. heterandra*

EE. Stigma deeply 3-cleft; stamens included; corolla 5 to 6 mm long . . . . . *N. subuligera*

DD. Main stems with spreading hairs to almost glabrous or if retorse not crispid and appressed against stem; capsule with a thick wall.

E. Seeds 1 to 2; corolla 4-lobed, blue or white, 5 to 7 mm long; stamens included with white-retorse, short hairs. . . . . *N. heteranda*

EE. Seeds few to many; capsule leathery; terminal lobe not greatly elongated; branches stout and leafy; plants heavily glandular.

F. Bracts with a broad ovate base; terminal segment of bract palmately lacerate into single lobes . . . . . *N. heterodoxa*

FF. Bracts with linear to lanceolate base.

G. Corolla 9 to 12 mm long; lobes 2 to 3 mm long; skunk-like odor. . . . . *N. squarrosa*

GG. Corolla 6 to 7 mm long; lobes 1.5 mm long; pleasant odor . . . . . *N. mellita*

Allophyllum divaricatum (Nutt.) A.& V. Grant. Straggling Allophyllum

Habitat: Openings in chaparral; dry, sunny slopes.

Abundance: Apparently rare in Mayacmas Mountains.

Major Communities: Chaparrals.

Collomia diversifolia Greene. Serpentine Collomia

Habitat: Open, sunny sites; poor rocky soils; south and west exposures.

Abundance: Occasional.

Major Communities: Jepson's ceanothus-leather oak-Stanford's manzanita.

Collections: Neilson 2760, Geyser Rock area.

Collomia heterophylla Doug. ex Hook. Varied-leafed Collomia

Habitat: Open, sunny sites in chaparral; poor, rocky soils; south and west exposures.

Abundance: Occasional.

Major Communities: Shrubby live oak chaparral.

Collections: Neilson 2878, Geyser Rock

Gilia capitata Sims. Blue-field Gilia

Habitat: Open grasslands; usually on poor soil; mostly south and west exposures; below 3600 feet elevation.

Abundance: Locally abundant.

Major Communities: Annual grassland; savannahs; Native herb; openings in chaparrals.

Collections: Neilson 2872 and 3045, Big Geysers (S); Neilson 2867, Geysers Rock (S)

Gilia leptalea (Gray) Greene ssp. *pinnatisecta* Mason & A. Grant. Bridge's Gilia

Habitat: Open places in chaparrals; full sun to partial shade; poor soil.

Abundance: Occasional to locally common.

Major Communities: Chaparrals.

Collections: Neilson 2864, 1 mi S. Little Geysers (S); Neilson 3565, Geysers Rock (S)

Gilia tricolor Benth. Tricolored Gilia

Habitat: Open, sunny hillsides; south and west exposures; below 3000 feet elevation.

Abundance: Common to abundant.

Major Communities: Annual grassland; savannahs,

Collections: Neilson 2871, Big Geysers

Gilia tricolor Benth. ssp. *diffusa* (Congd.) Mason & A. Grant

Remarks: This is quite out of range; the specimens may be an ecotype of the species.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Linanthus aciculare Greene. Bristly Linanthus

Habitat: Open, sunny hillsides; poorly drained soils.

Abundance: Locally common.

Major Communities: Native herb.

Collections: Neilson 3457, High Valley Creek (L); Neilson 3708, Big Sulphur Creek near junction with Squaw Creek (S)

Linanthus androsaceus (Benth.) Greene — Common Linanthus

Habitat: Open, sunny hillsides; gravelly loams or clays; all exposures; below 3600 feet elevation.

Abundance: Common.

Major Communities: Annual grassland; savannahs; Native herb.

Collections: Neilson 2869, Big Geysers (serpentine)

Linanthus androsaceus ssp. *luteus* (Benth.) Mason

Habitat: With the species.

Abundance: Occasional.

Collections: Neilson 2870, Big Geysers (serpentine)

Linanthus bicolor (Nutt.) Greene. — Bicolored Linanthus

Habitat: Open, sunny hillsides; poor soils, sometimes poorly drained.

Abundance: Locally common.

Major Communities: Annual grassland; savannahs.

Collections: Neilson 3456, High Valley Creek (L)

Linanthus dichotomus Benth. ssp. *meridianus* (East.) Mason — Evening Snow

Habitat:

Abundance:

Major Communities:

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Microsteris gracilis (Doug. ex Hook.) Greene. — Slender Microsteris

Habitat: Dry, gravelly soils, often in disturbed places; full sun to partial shade; all exposures but more common on north and east.

Abundance: Common to abundant.

Major Communities: Chaparrals; savannahs.

Collections: Neilson 3448, High Valley Creek (L); Harrison, 3 mi. N. Geyser Peak (serpentine) (S)

Navarretia heterandra Mason. Tehama Navarretia

Habitat: Open, sunny slopes in openings in chaparral; full sun; south and west exposures.

Abundance: Occasional.

Major Communities: Chaparrals; disturbed places.

Collections: Neilson 3778, ridge ½ mi. S. Socrates Mine Rd.

Navarretia heterodoxa (Greene) Greene. Calistoga Navarretia

Habitat:

Abundance:

Major Communities:

Collections: P.U.C., Mt. St. Helena fire road

Remarks: Recorded by others without community data.

Navarretia intertexta (Benth.) Hook. Needle-leaved Navarretia

Habitat: Open, sunny sites without much competition; south and

Abundance: Occasional.

Major Communities: Chaparrals; disturbed places.

Collections: Neilson 3294, Caldwell Pines; M.S. Baker, Whispering Pines

Navarretia mellita Greene. Honey-scented Navarretia

Habitat: Burned over chaparral; dry, rocky or gravelly soils; full sun.

Abundance: Locally common.

Major Communities: Chaparrals.

Collections: Harrison 2021, meadow, Little Sulphur Creek; Harrison 2027, Pine Flat

Navvaretia squarrosa Eschsc. Skunkweed

Habitat:

Abundance:

Major Communities;

Remarks: Recorded by others without community data.

Navarretia subuligera Greene. Awl-leaved Navarretia

Habitat:

Abundance:

Major Communities:

Collections: Mt. St. Helena (in manuals)

Remarks: Recorded by others without community data.

POLYGALACEAE — MILKWORTS

Key to *Polygalaceae*

A. Flower of two kinds: raceme from base without petals; others with petals; sepals glabrous except for ciliate margins. . . . *Polygala californica*

AA. Flowers all with petals; sepals usually pubescent. . . . . *P. cornuta*

Polygala californica Nutt. — California Milkwort

Habitat: Deep, well-drained, gravelly loams; north and east exposures; partial shade.

Abundance: Occasional.

Major Communities: Pine - oak - madrone; Mixed oak woodland; chaparrals.

Polygala cornuta Kell. — Milkwort

Habitat: Well-drained, gravelly loams to shallow thin soils; any exposure; partial to full shade.

Abundance: Occasional.

Major Communities: pine - oak - madrone; oak savannahs and woodlands.

Collections: Neilson 2993, Big Geysers

POLYGONACEAE — BUCKWHEATS

Key to *Polygonaceae*

A. Leaves without stipules; flowers enclosed in a tubular to campanulate involucre.

B. Flowers subtended by whorled bracts, hooked at the tip,; leaves linear.

C. Involucres 6-toothed and 6-ribbed.

D. Involucre teeth unequal with 3 outer lobes ovate, erose, and 3 inner lobes shorter and conspicuously erose; without a marginal, scarious membrane; 3 stamens . . . . . *Chorizanthe clevelandii*

DD. Involucre teeth with a white, marginal, scarious membrane continuous through the sinuses, woolly; stamens 9 . . . . . *C. membranacea*

CC. Involucres with 3 outer large and hooked teeth alternating with 3 inner inconspicuouse teeth, but 3-angled - not ribbed; stamens 9 . . . . . *C. polygonoides*

BB. Involucres with 3 to 8 teeth or lobes, without bristle or spine tips.

C. Calyx stipe-like at the attenuated base; bracts 2 to several, leafy.

D. Involucres with lobes at least half as long as tube and usually reflexed or spreading; calyx glabrous *Eriogonum compositum*

DD. Involucres with lobes much shorter than tube, tooth-like and suberect . . . . . *E. nervulosum*

CC. Calyx not stipe-like at base; bracts 3, not leafy.

D. Plants annual; leaves in basal rosettes; flowering branches elongate, virgate, bearing involucres at the nodes.

E. Calyx and bracts glabrous, white, rose, or yellowish . . . . . *E. vimineum*

EE. Calyx pubescent externally, white or rose; involucres 5-ribbed, toothed, tomentose between branches. . . . . *E. dasyanthemum*

DD. Plants perennial, from a woody caudex involucres in heads; involucre and flowering stem glabrous; leaves mostly basal . . . . . *E. nudum*

AA. Leaves with evident stipular sheaths.

B. Calyx 6-parted, not spine-tipped; sepals 6; stigmas 3.

C. Plants dioecious, low, slender, acid to the taste; leaves hastate; valves not attached to nutlet. . . . *Rumex acetosella*

CC. Plants monoecious, tall, weedy, not acid to the taste.

D. Stems ascending with axillary shoots or tufts, without basal leaves even when young; one valve with a callosity . . . . . *R. salicifolius*

DD. Stems erect without axillary shoots or tufts, with basal leaves when young; leaves large, narrow, undulate, broadest at the middle; gradually narrowed at base . . . . . *R. crispus*

BB. Calyx 5-parted; akenes enclosed by the somewhat enlarged fruiting calyx.

C. Leaves jointed with the ocrea, 1-nerved; flowers mostly 2, in axillary fasicles, short petioled; plants annual, prostrate; stems round; calyx with pinkish margins. . . . . *Polygonum aviculare*

CC. Leaves not jointed with the ocrea, 3-nerved; flowers solitary in axils, sessile; plants perennial, 2 to 6 dm tall. . . . . *P. bolanderi*

Chorizanthe clevelandii Parry. Cleveland's Spineflower

Habitat:

Abundance: Rare?

Major Communities:

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Chorizanthe membranaceae Benth. Pink Chorizanthe

Habitat:

Abundance: Occasional.

Major Communities:

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena): M.S. Baker, Mt. St. Helena Inn

Chorizanthe polygonoides Torr. & Gray. Knotweed Chorizanthe

Habitat: Dry or gravelly soils.

Abundance: Rare.

Major Communities:

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Eriogonum compositum Dougl. ex Benth. Composite Buckwheat

Habitat: Dry, rocky outcrops; mostly south and west exposures; full sun.

Abundance: Occasional.

Major Communities: Rock barrens.

Collections: Neilson 2775, Geyser Rock (S); Neilson 3311, High Valley Creek (L)

Eriogonum dasyanthemum Torr. & Gray. Many-flowered Buckwheat

Habitat: Xeric site; poor, rocky soils; mostly west exposure.

Abundance: Occasional.

Major Communities: Rock out crops; openings in chaparrals.

Collections: Neilson 3483, 1 mi W. Truit Creek (S)

Eriogonum nervulosum (Stokes) Reveal. Snow Mountain Buckwheat

Habitat: Open, sunny sites; rocky scree or gravelly soil; mostly on serpentine; above 3000 feet elevation.

Abundance: Rare.

Major Communties: Serpentine balds.

Remarks: On CNPS rare and endangered species list.

Collections: Neilson 3915, Headwaters of Bear Canyon.

Eriogonum nudum Dougl. ex Benth. Naked-stemmed Buckwheat

Habitat: Xeric sites; poor, rocky soils; any exposure.

Abundance: Common.

Major Communities: Most chaparrals; Rock barrens; Grassland.

Eriogonum vimineum Dougl. ex Benth. Wicker Buckwheat

Habitat: Xeric sites, openings in chaparrals or rock barrens; mostly on gravelly to rocky soils; full sun.

Abundance: Common.

Major Communities: Rock barrens; chaparrals.

Collections: Neilson 2757 and 3055, Geyser Rock; Neilson 3315, High Valley Creek

Polygonum aviculare L. Knotweed, Wireweed

Habitat: Open, disturbed areas, good, deep, usually moist soils; often along paths.

Abundance: Rare.

Major Communities: Anthropogenic.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Polygonum bolanderi Brew. & Gray. Bolander's Knotweed

Habitat: Xeric sites; gravelly or rocky soils; usually in full sun; all exposures.

Abundance: Rare.

Major Communities: Rock balds; openings in chaparrals.

Collecions: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Rumex acetosella L. Sheep Sorrel

Habitat: Mesic sites; poorly drained soils, usually clays; full sun; all altitudes.

Abundance: Occasional.

Major Communities: Seeps; Pond margins: Wet meadows.

Collections: Neilson 3468, High Valley Creek (L); P.U.C., Mt. St. Helena fire road

Rumex crispus L. Curly Dock

Habitat: Wet to moist soils, gravelly clay of loam; full sun; all elevations and exposures.

Abundance: Occasional.

Major Communities: Wet meadows; Pond Margins.

Collections; Neilson 2897, Old Mercuryville; Neilson 3061, Big Geysers; P.U.C., Troutdale Creek

Rumex salicifolius Wein. Willow Dock

Habitat: Wet soils; full sun.

Abundance: Rare.

Major Communities: Pond margins; Seeps.

Collections: Neilson 2832, Little Geysers (S)

PORTULACACEAE — PURSLANES

Key to *Portulacaceae*

A. Capsule circumscissile, sepals several, petaloid becoming scarious; stamens 5 to many; fleshy perennial from a fleshy root and short caudex. . . . . *Lewisia rediviva*

AA. Capsule opening by 2 or 3 valves; sepals 2.

B. Style branches 3; capsule 3-valved; inflorescence secund or slightly so.

C. Flowers in leafy racemes; petals red; stamens 5 to many.

D. Capsule scarcely exceeding calyx; leaves well distributed; pedicels ascending to erect . . . . . *Calandrinia ciliata*

DD. Capsule twice as long as calyx; leaves mostly basal; pedicels often reflexed in fruit. . . . . *C. breweri*

CC. Flowers in naked or bracteate racemes; petals white to pink; stamens 1 to 5; stems from fibrous roots.

D. Stem leaves 1 pair, opposite, united on both sides forming a rounded flat disk, basal leaves ovoid to deltoid.

E. Stems suberect, 1 to 3 dm tall; racemes elongate often peduncled; sepals 3 to 5 mm long. . *Montia perfoliata*

EE. Stems spreading, mostly less than 1 dm tall; racemes short, compact, sessile; sepals about 2 mm long . . . . . *M. p. var. depressa*

DD. Stem leaves 1 pair, partly united only one side, not forming a flat disk.

E. Petals 2.5 to 4 mm long; inflorescence mostly with 3 to 6 flowers.

F. Petals 2.5 to 3 mm long; basal leaves 3 to 9 cm long, mostly surpassing stems. . . . *M. spathulata*

FF. Petals 4 mm long; basal leaves shorter than stem. . . . . *M. s. var. exigua*

EE. Petals 5 to 7 mm long; inflorescence mostly 8 to 15 flowered. . . . . *M. gypsophiloides*

BB. Style 1, capsule 2-valved; inflorescence secund.

C. Style short; petals in age folding over capsule; capsule broadly to narrowly ovoid; lowest flowers distinctly pedicelled; flowers shedding early; sepals round, reniform, scarious throughout; petals 4. . . . *Calyptridium quadripetalum*

CC. Style long, filiform; petals in age twisitng about style; caspule round or nearly so; sepals 5 to 8 mm; inflorescence umbellate-cymose, rather lax to subcapitate, consisting of scorpioid spikes; flowers imbricate, crowded; sepals pink or white . . . . . *C. umbellatum*

*Calandrinia breweri*i Wats. Brewer's Calandrinia

Habitat: Open, sunny hillsides; gravelly clay-loams; south and west exposures.

Abundance: Occasional.

Major Communities: Annual grassland; savannahs.

Collections: Neilson 3487, Big Geysers

Calandrinia ciliata (Ruiz & Pavon) DE var. *menzesii* (Hook.) McBride Red Maids

Habitat: Open, flat or low rolling hills; usually deep, rich soils, well-drained but mosit; south and west exposures; below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Annual grassland.

Calyptridium quadripetalum Wats. Four-petaled Calyptridium

Habitat: Open sites in chaparral; usually poor, gravelly soils.

Abundance: Occasional.

Major Communities: Shrubby live oak; oak savannahs.

Calyptridium umbellatum (Torrey) Greene. Pussy Paws

Habitat: Open, sandy sites; sometimes on serpentine; east exposures; above 3200 feet elevation.

Abundance: Rare but locally common.

Major Communities: Shrubby live oak; Jepson's ceanothus-leather oak-Stanford's manzanita; Cypress woodland.

Collections: Neilson 3376, crest ridge between Cobb and Pine Mountains.

Lewisia rediviva Pursh. Bitter Root

Habitat: Open places in serpentine chaparrals; shallow, thin soil; full sun; above 2800 feet elevation.

Abundance: Occasional; habitat very limited.

Major Communities: Serpentine barrens; Cypress woodland; Jepson's ceanothus-leather oak-Stanford's manzanita.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Montia gypsophiloides (Fish. & Mey.) Howell. Coast Range Montia

Habitat: Moist banks and open slopes without much competition; full to partial shade; mostly on north and east exposures; above 1600 feet elevation.

Abundance: Common.

Major Communities: Anthropogenic; Shrubby live oak; oak woodlands.

Collections: Neilson 3011, Old Mercuryville; P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Montia perfoliata (Donn) Howell. Miner's Lettuce

Habitat: Moist or mesic sites; usually full to partial shade; rich soils; all exposures.

Abundance: Common to occasional.

Major Communities: Oak woodlands; savannahs; stream banks and springs.

Collections: P.U.C., Troutdale Creek (L); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Montia perfoliata (Donn) Howell var. *depressa* (Gray) Jep. Miner's Lettuce

Habitat: Moist or mesic sites; partial shade; rich to poor soils; all exposures.

Abundance: Common.

Major Communities: Oak woodlands; savannahs.

Collections: Neilson 3129 and 3479, High Valley Creek (L): Neilson 3168, Big Geysers (S)

Montia spathulata (Doug.) Howell. Common Montia

Habitat: Open hillsides; poor soils; partial shade to full sun.

Abundance: Occasional to common.

Major Communities: Annual grassland; savannahs.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Montia spathulata (Doug.) Howell var. *exigua* (Tor. & Gray) Robin.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

PRIMULACEAE — PRIMROSES

Key to *Primulaceae*

A. Leaves all basal; corolla-lobes strongly reflexed; flowers light purple with dark base and throat . . . . . *Dodecatheon hendersonii*

AA. Leaves cauline; corolla-lobes erect or spreading.

B. Leaves in a single whorl at top of stem; corolla pinkish; perennial, understory herb of chaparral and woodland . . . . . *Trientalis latifolia*

BB. Leaves distributed along stem; corolla salmon or bluish; small, spreading annual. . . . . *Anagallis arvensis*

Anagallis arvensis L. — Scarlet Pimpernel

Habitat: Wet to moist soil; partial shade.

Abundance: Rare.

Major Communities: Ruderal; Anthropogenic; Pond margin; Seep.

Collections: Neilson 3471, 1 mi W. Truit Creek (S); P.U.C., R.L. Steveson State Park (Mt. St. Helena)

Dodecatheon hendersonii Gray. — Shooting Star

Habitat: Moist, cool sites; fair to poor soils usually well-drained; full to partial shade; mostly north and east exposures.

Abundance: Common.

Major Communities: Oak savannahs; Native herb.

Collections: Neilson 3017, Old Mercuryville (S): Neilson 3158, Upper Squaw Creek (S); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Dodecatheon hendersonii Gray ssp. *parvefolium* (Knuth) Thompson.

Collections: P.U.C., Highland Creek (L)

Trientalis latifolia Hook. — Star-Flower

Habitat: Shady, usually moist sites; any exposure but mostly north and east.

Abundance: Occasional to common.

Major Communities: Oak woodlands; Shrubby live oak; Fir-pine-oak; chaparrals.

Collections: P.U.C., Troutdale Creek (L): P.U.C., Mt. St. Helena Fire Road (N)

PYROLACEAE — WINTERGREENS

Key to *Pyrolaceae*

A. Plants with slender underground rootstocks.

  B. Flowers in racemes; petals greenish or pink with white margins; calyx red-purple; leaves of flowering stalk scale-like, often purplish, rarely green; filaments glabrous . . . . . *Pyrola picta* forma *aphylla*

  BB. Flowers in corymbs; petals whitish, pinkish with age; leaves 1.5 to 3.5 cm long, ovate, serrate, sometimes mottled dark green above, paler beneath; filaments hairy. . . . . *Chimaphila menziesii*

AA. Plants fleshy-stemmed from a thickened base, lacking green leaves; stems longitudinally stripped red and white with elongate scale-like leaves, especially toward base . . . . *Allotropa virgata*

Allotropa virgata Torr. & Gray ex Gray. — Sugar Stick

Habitat: Deep litter in shady woods; mostly east exposure.

Abundance: Rare.

Major Communities: Tan oak forest; Douglas fir-pine-oak.

Collections: Neilson 2787, summit Ida Clayton Road; P.U.C., Mt. St. Helena fire Road (N), R.L. Stevenson State Park (Mt. St. Helena)

Chimaphila menziesii (R. Br.) Spreng. — Pipsisswea or Little Prince's Pine

Habitat: Shady woods.

Abundance: Rare.

Major Communities: Douglas fir-pine-oak.

Collections: P.U.C., Mt. St. Helena lookout; M.S. Baker, E. side Cobb Mountain

Pyrola picta Smith forma *aphylla* (Smith) Camp. — Leafless Wintergreen

Habitat: Deep litter and duff of conifer forest.

Abundance: Rare to occasional.

Major Communities: Yellow pine forest; Douflas fir-pine-oak.

Collections: P.U.C., Troutdale Creek (L): P.U.C., Mt. St. Helena fire road (N); M.S. Baker, Mt. St. Helena near highway summit

RANUNCULACEAE — CROWFEET

Key to *Ranunculaceae*

A. Pistils with more than one seed, becoming follicles when ripe.

B. Flowers irregular; petals 4, upper pair spurred and included in sepal spur.

C. Flowers orange or dull red . . . . . *Delphinium nudicaule*

CC. Flowers blue or purplish.

D. Plants scapose; leaves trifid, fleshy and basal, divisions entire to toothed. . . . . *Delphinium uliginosum*

DD. Plants not both scapose and with simple trifid leaves, usually 2 to 6 dm tall; rootstock stout, elongate or with a cluster of fibrous root stems, puberulent throughout; leaves withering at anthesis; midveins of leaves rusty-browinsh . . . . . *Delphinium hesperium*

BB. Flowers regular; petals with long saccate spurs projected backwards.

C. Basal leaves biternate; central upward projection of petal (laminae) 1 to 6 mm long . . . . . *Aquilegia formosa*

CC. Basal leaves triternate; lamina lacking. . . . . *Aquilegia eximia*

AA. Pistils with one ovule, becoming an achene when ripe.

B. Petals absent; leaves more than once divided; flowers greenish; unisexed. . . . . *Thalictrum polycarpum*

BB. Petals present; flowers yellow.

C. Leaves entire or serrulate, lanceolate, 1 to 3 cm long; stems erect, 3 to 8 dm tall; achene beak straight, .6 to.9 mm long; plant glabrous . . . . . *Ranunculus alismaefolius*

CC. Leaves 3-parted or lobed; segments lobed or dissected; stems 1.5 to 9 dm tall; achene beaks curved.

D. Achene body 5 to 6 mm long, covered with stout curved spines, margin smooth; beak curved but not hooked, 2 to 2.5 mm long. . . . . *Ranunculus muriatus*

DD. Achene body 2 to 3.5 mm long, not spiny; receptacle glabrous.

E. Petals 6 to 15 mm long.

F. Mostly 5 or 6 petals. . . . . *Ranunculus occidentalis*

FF. Mostly 7 to 16 petals . . . . . *Ranunculus californicus*

EE. Petals 2.5 to 4 mm long; achenes smooth, 2 to 2.5 mm long; beak 1 to 1.5 mm long with hooked tip. . . . . *Ranunculus uncinatus*

Aquilegia eximia Van Houtte. Van Houtte's Columbine

Habitat: Moist banks; deep, rich well-drained soil; partial to full shade; mostly north and east exposures.

Abundance: Occasional.

Major Communities: Riparian; Chain fern-juncus seeps.

Aquilegia formosa Fisch. in D.C. var. *truncata* Fisch. & Meyer. Northwestern Columbine

Habitat: Moist banks; deep, rich, well-drained soil; partial shade; mostly north and east exposures.

Abundance: Occasional.
Major Communities: Riparian; Chain fern-juncus seeps.

Collections: P.U.C., Troutdale Creek; P.U.C., Highland Creek

Delphinium hesperium Gray. Western Larkspur

Habitat: Open, sunny areas; gravelly loams; all exposures.

Abundance: Occasional.

Major Communities: Oak savannahs, grassy openings in chaparral.

Collections: Neilson 3256, High Valley Creek

Delphinium nudicaule Torr. & Gray Red Larkspur

Habitat: Open woods and grassy hillsides; cool mesic slopes; partial to full sun, mostly deep, gravelly loam soils; all exposures, but mostly north and east.

Abundance: Common.

Major Communities: Oak woodlands.

Collections: Neilson 2721, Old Mercuryville; Neilson 2734, Geyser Rock; Neilson 2889, 1 mi N. Little Geysers

Delphinium uliginosum Curran. Swamp Larkspur

Habitat: Moist to wet soils, often on serpentine; mostly west and north exposures.

Abundance: Rare.

Major Communities: Seeps.

Ranunculus alismaefolius Geyer ex Benth. Water Plaintain Buttercup

Habitat:

Abundance: Occasional to rare.

Major Communities: Pond margins; Seeps.

Ranunculus californicus Benth. California Buttercup

Habitat: Moist hillsides; deep, rich, well-drained, gravelly loams; all exposures but most common on north and east slopes.

Abundance: Common.

Major Communities: Oak savannahs; oak woodlands.

Ranunculus muriatus L. Prickle-fruited Buttercup

Habitat: Moist to wet soils, usually clay-loams; full sun.

Abundance: Occasional to rare, limited habitat.

Major Communities: Wet meadows, Seeps.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Ranunculus occidentalis Nutt. var. *eisenii* (Kell.) Gray. Western Buttercup

Habitat: Open to wooded hillsides; deep, gravelly, usually rich loam; all exposures.

Abundance: Abundant.

Major Communities: Annual grassland; oak savannahs; Native herb; oak woodlands.

Collections: Neilson 2890, Big Geysers; Neilson 3012, Old Mercuryville

Ranunculus uncinatus D. Don in G. Don.

Habitat: Moist shady places; sandy soils rich in organic matter.

Abundance: Rare.

Major Communities: Mixed oak forest; Bay-oak-maple.

Collections: Neilson 3233, High Valley Creek (L)

Thalictrum polycarpum (Torr.) Wats. Meadow Rue

Habitat: Moist banks; deep, rich soils with high organic matter; any exposures; partial shade.

Abundance: Occasional.

Major Communities: Fir-oak-maple; Riparian; Bay-oak-maple.

Collections: High Valley Creek (L)

RESEDACEAE — MIGNONETTES

Reseda luteola L. Dyer's Rocket

Habitat: ?

Abundance: Rare.

Major Communities: Ruderal.

Collections: Neilson 2792, Great Western Mine (L); M.S. Baker, west side Mt. St. Helena

ROSACEAE — ROSES

Key to *Rosaceae*

A. Inflorescence in narrow, spicate racemes 2 to 4 dm tall; pistils 2; stigmas 2; styles persist in fruit; achenes 1 or 2; fruiting hypanthium 4 to 5mm long and broad, 10-grooved, constricted at throat, dilated margin bearing a ring of hooked bristles. . . . . *Agrimonia gryposepala*

AA. Inflorescence cymose; hypanthium campanulate not constricted; styles deciduous.

B. Petals white; stamens 10, inserted on hypanthium some distance above recetacle.

C. Hypanthium glabrous inside; sepals green on inner surface; leaflets 5 to 10 pairs, deeply incised. . . *Horkelia elata*

CC. Hypanthium pubescent inside; sepals purple, flecked within . . . . . *Horkelia californica*

BB. Petals yellow; stamens 20, inserted near base of receptacle; stems leafy, glandular, villous . . . . . *Potentilla glandulosa*

Agrimonia gryposepala Wallr. Tall Hairy Agrimony

Habitat: Mesic sites; deep, rich soil; full to partial shade.

Abundance: Rare.

Major Communities: Fir-oak-maple.

Collections: M.S. Baker, Whispering PInes (L)

Horkelia californica Chamisso & Schechtendal California Horkelia

Habitat: Moist to wet site; partial shade; heavy clay soils.

Abundance: Occasional.

Major Communities: Springs; Seeps; wettest portions of meadows.

Collections: Neilson 3379, Little Geysers.

Horkelia elata (Greene) Rydberg. Tall Horkelia

Habitat: Mesic areas near seeps or streams.

Abundance: Rare.

Major Communities:

Collections: M.S. Baker, Whispering Pines resort area (L)

Potentilla glandulosa Lind. ssp. *reflexa* (Greene) Keck Sticky Cinquefoil

Habitat: Moist to wet, usually heavy soils; full to partial sun.

Abundance: Occasional.

Major Communities: Wet meadows, Seeps, Springs.

Collections: Neilson 3244, High Valley Creek (L)

RUBIACEAE — MADDERS

Key to *Rubiaceae*

A. Leaves opposite; flowers in cymes . . . . . *Kelloggia galioides*

AA. Leaves whorled; flowers soiltary or in cymes.

B. Leaves 5 to 8 per whorl.

C. Ovary and fruit glabrous; stems retorsely scabrous.

D. Leaves blunt or rounded at tip without a terminal bristle . . . . . *Galium trifidum*

DD. Leaves sharply acute, ending in a bristle; plant annual; fruits not more than 1 mm in diameter; leaf margins upwardly spinose-edged . . . . . *Galium divaricatum*

CC. Ovary and fruit bristly hairy; flowers mostly 2 to 3 in axillary cymules.

D. Plants perennial; stems not readily clinging to other vegetation; leaves ovate-oblong to broadly obovate . . . . . *Galium triflorum*

DD. Plants annual; stems clinging to other vegetation; leaves linear to linear-oblong or oblanceolate; fruit 4 to 5 mm long; corolla 2 mm across . . . . *Galium aparine*

BB. Leaves 4 per whorl, occasionally 2 or 5.

C. Plants without a woody base, perennial; fruit glabrous *Galium trifidum*

CC. Plants with a woody base.

D. Leaves linear-subulate, glabrous, prickly-tipped; mat forming . . . . . *Galium andrewsii*

DD. Leaves lance-linear to ovate.

E. Stems mostly retrorse-scabrous on the angles, woody; leaves 2 to 6, sometimes 10 mm long, oval to linear-oblong . . . . . *Galium nuttallii*

EE. Stems not retrorse-scabrous; leaves mostly longer - 5 to 15 mm.

F. Leaves glabrous on surfaces, ciliate on margins, oblong to lance-oblong, 5 to 10 mm long . . . . . *Galium holanderi*

FF. Leaves stiff-pubescent on surfaces; plants tufted, erect, 6 to 18 cm tall; fruit glabrous; leaves dull, 5 to 15 mm *Galium californicum*

Galium andrewsii Gray. — Phlox-leaved Bedstraw

Habitat: Shallow, serpentine soils; partial to full sun.

Abundance: Occasional.

Major Communities: Jepson's ceanothus-leather oak-Stanford's manzanita; Serpentine balds.

Collections: Neilson 3170, ¼ mi S. Geyser Rock; Neilson 3572, serpentine W. Geyser Rock; Harrison 2024, Little Sulphur Creek E. of bridge crossing; M.S. Baker, serpentine off Highway 29 near Napa-Lake County line

Galium aparine L. Cleavers

Habitat: Shady slopes; gravelly loams; all exposures.

Abundance: Common.

Major Communities: Oak woodlands; Shrubby live oak; chaparrals.

Collections: Neilson 2998, Big Geysers

Galium bolanderi Gray. Bolander's Bedstraw

Habitat: Mesic site; full to partial shade; gravelly loams; all exposures.

Abundance: Common.

Major Communities: Oak woodlands; Pine-shrub; mesic, open chaparrals.

Collections: Neilson 2768, ¼ mi S. Geyser Rock; M.S. Baker, Cobb Mountain

Galium californicum California Bedstraw

Habitat: Mesic sites on forest and woodland floors; rich soil; full to partial shade.

Abundance: Common.

Major Communities: Oak woodlands; Mixed conifer forest; Yellow pine forest.

Collections: Neilson 2761, Geyser Rock; Neilson 2802, Cobb Mt. near summit; Neilson 2879, ¼ mi S.W. Geyser Rock; Neilson 3037, Cobb Mt. W. approach; Neilson 3214, Truit Creek (S); Neilson 3440 1 mi N. Geyser Rock on E. slope

Galium divaricatum Lamarck Lamarck's Bedstraw

Habitat: Rocky slopes.

Abundance: Rare.

Major Communities: Talus; Rock outcrops; Native herb.

Collections: Neilson 3701, talus above pond 1 mi N.W. junction of Big Sulphur and Squaw Creeks

Galium nuttallii Gray. Climbing Bedstraw

Habitat: Mesic areas; partial to full shade; deep, rich soils; all exposures.

Abundance: Occasional.

Major Communities: Oak woodlands; Shrubby live oak; chaparrals.

Collections: Neilson 2999 and 3563, Big Geysers; Neilson 3277, Caldwell Pines; P.U.C., Troutdale Creek (L); P.U.C., Mt. St. Helena fire road (N); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)(N)

Galium trifidum L. Trifid Bedstraw

Habitat: Mesic sites; usually shady; deep, rich soils; all exposures.

Abundance: Occasional.

Major Communities: Oak woodlands; Shrubby live oak; chaparrals.

Collections: Neilson 2997, Big Geysers

Galium triflorum Michx. Fragrant Bedstraw

Habitat: Mesic sites; usually deep soil; any exposure.

Abundance: Occasional.

Major Communities: Oak woodlands; Douglas fir-oak-pine.

Collections: P.U.C., Troutdale Creek; P.U.C., Mt. St. Helena fire road; P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Kelloggia galioides Torrey Kelloggia

Habitat: Mesic sites on forest floor; well-drained, sandy soils; all exposures; above 3800 feet elevation.

Abundance: Common.

Major Communities: Pine parkland; Douglas fir-oak-pine.

Remarks: So far found only on the rhyolitic sands at the summit of Cobb Mt and Caldwell Pines.

SAXIFRAGACEAE — SAXIFRAGES

Key to *Saxifragaceae*

A. Fertile stamens 10.

  B. Styles 3; petals clawed, usually laciniate or toothed; rootstocks slender, tuberous.

    C. Pedicels 1 to 3 mm long; petals 4 to 7 mm long; flower-tube almost truncate at base . . . . . *Lithophragma heterophyll*

    CC. Pedicels 2 to 8 mm long; petals 6 to 10 mm long; flower-tube obconic at base. . . . . *Lithophragma affinis*

  BB. Styles 2; petals clawed or sessile, entire or toothed; rootstocks various.

    C. Leaf blades roundish to broader than long, doubly toothed; leaves with stipular dilations; petals 3 to 5 mm long. . . . . *Saxifraga mertensiana*

    CC. Leaf blades twice as long as broad, hairy or pilose on upper surface; petals 3.5 to 5 mm long exceeding sepals; sepals reflexed after anthesis. . . . . *Saxifraga californica*

AA. Fertile stamens 5; plants from scaly rhizomes; petals entire.

  B. Hypanthium campanulate, becoming urn-shaped with age, glandular pubescent below; ovary 2-celles with axile placentae . . . . . *Boykinia elata*

  BB. Hypanthium short campanulate in age, appressed pilose; ovary 1-celled with partial placentae . . . . . *Heuchera micrantha*

Boykinia elata (Nuttall) Greene. — Brook Foam

Habitat: Cool, wet seeps over rocks; thin soil; mostly north exposures; partial to full shade.

Abundance: Locally common but habitat rare.

Major Communities: Riparian, Springs.

Collections: Neilson 3388, 1 mi E. Geyser Rock (S)

Heuchera micrantha Doug. ex Lind. var. *pacifica* Rosen. — Alum Root

Habitat: Cool, moist to submesic banks and rock faces; usually north and east exposures; full to partial shade.

Abundance: Occasional.

Major Communities: Rock face.

Collections: P.U.C., Troutdale Creek (L)

Lithophragma affinis Gray. Woodland Star

Habitat: Deep, rich soil; usually north and east exposures; mesic sites often under a heavy canopy of oaks.

Abundance: Occasional.

Major Communities: Oak woodlands.

Collections: P.U.C., Troutdale Creek; P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Lithophragma heterophylla (Hook. & Arn.) Torr. & Gray. Hill Star

Habitat: Mesic or submesic sites; usually deep, moist, rich soil; full to partial shade; mostly north and east exposures.

Abundance: Common to occasional.

Major Communities: Oak woodlands; Bay-oak-maple.

Collections: Neilson 3467, High Valley Creek (L); P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Saxifraga californica Greene California Saxifrage

Habitat: Steep, moist banks; full to partial shade; usually east and north exposures.

Abundance: Occasional but habitat is not plentiful.

Major Communities: Rock face; Riparian.

Collections: P.U.C., R.L. Stevenson State Park (Mt. St. Helena)

Saxifraga mertensiana Bongard. Wood Saxifrage

Habitat: Steep, moist rocky banks; partial shade; any exposure.

Abundance: Rare.

Major Communities: Rock face.

Collections: Neilson 3886, junction Big Sulphur and Squaw Creeks

Key to *Scrophulariaceae*

A. Fertile stamens 5; leaves alternate; corolla nearly regular rotate.

B. Herbage green, glabrous; stems with simple gland-tipped hairs; leaves sinuately dentate. . . . . *Verbascum blattaria*

BB. Herbage woolly with stellately branched glandless hairs; leaves entire with decurrent bases . . . . . *Verbascum thapsus*

AA. Fertile stamens 4 (some with 5 filaments) or 2; corolla more or less bilabiate.

B. Stigmas 2, distinct and lamelliform (platelike) or adhering to form a funnel-like structure; stamens 4, paired *Mimulus species (See species key)*

BB. Stigmas wholly united, capitate, or punctiform.

C. Corolla spurred or saccate on lower side of base.

D. Corolla 15 to 18 mm including a narrow basal spur; purple with yellow palate and purple veins . . . . *Linaria pinifolia*

DD. Corolla 2-lipped, gibbous or saccate at base; palate usually closing throat.

E. Stems erect, self supporting, lacking filiform tortile branchlets; flowers reddish; plant glabrous on vegetative parts . . . . . *Antirrhinum virga*

EE. Mature stems supported by or possessing tortile branches; flowers light purple, 12 to 15 mm; plant glabrate or stiff hairy below, glandular pubescent above . . . . . *A. vexillo-calyculatu*

CC. Corolla not spurred or saccate at base.

D. Corolla upper lip flattened or widely arched, not forming a galea.

E. Plants annual; corolla gibbous on upper side of base.

F. Corolla lower lip appearing 2-lobed, middle lobe keel-shaped, concealed between lateral lobes; stamens included in keel. . . . . *Collinsia species (See species key)*

FF. Corolla lower lip 3-lobed; filaments exerted. . . . . *Tonella tenella*

EE. Plant perennial; corolla not gibbous on upper side.

F. Filaments all pubescent at base and bearded above.

G. Corolla whitish or brownish-yellow, not distinctly tubular.

H. Staminode glabrous; corolla white with pink tinge, long, hairy externally *Keckellia brevi[illegible]ra*

HH. Staminode densely bearded; corolla brownish-yellow with yellow lower lip, short, pubescent externally; stems glaucous; leaves denticulate *Keckellia lemmonii*

GG. Corolla red, distinctly tubular; stems not glaucous; staminode densely bearded; leaves tapering to base. . . . . *Keckellia corymbosus*

FF. Filaments glabrous or at most only 2 pubescent at base.

G. Corolla red-brown or maroon, 1 cm, inflated, with 4 erect lobes and 1 reflexed; sterile uppermost filament brown or purplish, club-shaped . . . . . *Scrophularia californica*

GG. Corolla mostly other than brown, 1 to 4 cm, tubular, bilabiate; sterile stamen as long as fertile ones.

H. Anthers glabrous; corolla rose-violet with blue or lilac lobes, 25 to 35 mm. . . . . *Penstemon heterophyllus*

HH. Anthers densely comose; corolla rose-red to rose-purple. . . . . *Penstemon newberryi*

DD. Corolla upper lip narrowly arched, forming a galea inclosing anthers.

E. Anther cells equal and together.

F. Leaves opposite; corolla yellow; capsule symetrical; annual or biennial . . . . . *Parentucellia viscosa*

FF. Leaves alternate or basal; capsule asymetrical, usually decurved; perennial.

G. Plants green; flowers yellow; above 3800 feet elevation. . . . . *Pedicularis semibarbata*

GG. Plants reddish-green or deep red; flowers red; below 3500 feet . . . . . *Pedicularis densiflora*

EE. Anther cells unequal and separated.

F. Calyx tubular-campanulate, 4 or 2-lobed.

G. Lower corolla lip as long or longer than galea; annuals . . . . . *Orthocarpus species (See species key)*

GG. Lower corolla lip shorter and smaller than galea; perennials . . . . . *Castilleja species (See species key)*

FF. Calyx 1-lobed, minutely lobed at apex, spahtelike on upper side.

G. Inflorescence hirsute; bracts long ciliate; leaves flat, linear.

H. Stem glandular-pubescent, hirsute; leaves 1 to 2 mm wide. . . . . *Cordylanthus pilosus*

HH. Stem canescent-pubescent with fine mostly glandless hairs, but glandu-

lar toward inflorescence; cauline leaves mostly less than 1 mm wide. . *C. p. ssp. diffu*

GG. Inflorescence pubescent without glands; bracts finely ciliate; leaves mostly involute subfiliform; stem glabrous. . . *C. tenuis ssp. brunneus*

Antirrhinum vexillo-calyculatum Kellogg — Wiry Snapdragon

Habitat: Rocky, gravells; partial shade.

Abundance: Rare.

Major Communities: Intermittant stream beds.

Collections: Neilson 2835, Little Geysers.

Antirrhinum virga Gray — Tall Snapdragon

Habitat: Deep, gravelly loams; partial shade.

Abundance: Rare.

Major Communities: Knobcone pine woodland disturbed places.

Collections: Neilson 2833, 1 mi S. Little Geysers; P.U.C., Mt. St. Helena fire road

Key to *Castilleja* species

A. Lower corolla lip nearly as long as galea, with thin whitish lobes; herbage with distinct spreading hairs; galea 6 to 8 mm; corolla 13 to 16 mm long . . . . . *C. nana*

AA. Lower corolla lip less than half as long as galea, usually green or dark, with minute incurved lobes.

B. Herbage with simple unbranched hairs, green to gray-green.

C. Plant evidently glandular-pubescent below inflorescence.

D. Calyx-lobes usually rounded; galea 15 to 24 mm, stout, conspicuously exerted . . . . . *C. roseana*

DD. Calyx-lobes sharp pointed; galea 10 to 17 mm, less conspicuously exerted, slender; lower corolla lip not exerted; leaves lanceolate . . . . . *C. applegatei*

CC. Plant not glandular-pubescent below infloresence; calyx-lobes 3 to 6 mm, pointed; galea 16 to 23 mm long;

lower lip dark green to brownish, 1.5 to 2 mm long; main cauline leaves entire or with 1 to 2 pairs of lobes. . . . . *C. affinis*

BB. Herbage with branched hairs, grayish to white, woolly, densely tomentose; galea grenish dorsally with pale thin reddish margins; calyx equally cleft dorsally and ventrically. . . . . *C. foliolosa*

Castilleja affinis Hooker & Arnold — Lay and Collie's Indian Paint Brush

Habitat: Poor, rocky, gravelly laoms; full sun; mostly south, east, and west exposures.

Abundance: Occasional.

Major Communities: Shrubby live oak-chamise chaparral; Knobcone pine woodland.

Collections: Neilson 2805, Cobb Mountain; Neilson 3481, Truit Creek

Castilleja applegatei Fernalf — Wavy-leaved Indian Paint Brush

Habitat: Deep, sandy soils; mostly south and east exposures.

Abundance: Occasional.

Major Communities: Pine parkland; Manzanita-chinquapin chaparral.

Collections: Neilson 2804, Cobb Mountain

Castilleja gyroloba Pennell — Round-lobed Indian Paint Brush

Habitat:

Abundance:

Major Communities:

Collections: M.S. Baker, Mt. St. Helena "above Hanley's"

Castilleja foliolosa Hooker & Arnold — Woolly Indian Paint Brush

Habitat: Rocky, gravelly soils; full sun; mostly south, east, and west exposures.

Abundance: Occasional to common.

Major Communities: Chamise-buckbrush; Shrubby live oak-manzanita; Pine shrub.

Collections: Neilson 2865, Little Geysers; Neilson 3285, Caldwell Ranch; M.S. Baker, Highway 29 above Hanley's; P.U.C., Mt. St. Helena fire road

Castilleja nana Eastwood — Dwarf Alpine Indian Paint Brush

Habitat: Deep, sandy soils; full sun; above 3600 feet.

Abundance: Rare to occasional.

Major Communities: Pine parkland; rock outcrops.

Remarks: Cobb Mountain near summit.

Castilleja roseana Eastwood

Habitat: Deep, well-drained, sandy or gravelly loams; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Pine parkland; Pine-oak forest.

Collections: Neilson 3301, Caldwell Pines; P.U.C., Mt. St. Helena fire road; P.U.C., R.L. Stevenson State Park

Key to *Collinsia* Species

A. Flowers congested in whorls; pedicels shorter than calyces in the lower whorls (except in *C. greenei*).

  B. Lateral lobes of lower corolla-lip bearded; leaves pubescent beneath; plants strongly glandular. . . . . *C. tinctoria*

  BB. Lateral lower corolla-lobes glabrous; leaves mostly glabrous; plants not strongly glandular.

    C. Upper filament pair with distinct basal appendages, 1 to 2 mm; upper corolla-lip distinctly paler than lower. . . . . *C. heterophylla*

    CC. Upper filament pair lacking or with rudimentary basal appendages.

      D. Filaments glabrous, upper pair bearded at base; upper corolla-lip with distinct lateral and transverse callous-crests projecting into throat. . . . *C. greenei*

      DD. Filaments bearded; upper corolla-lip with transverse but not conspicuous lateral callous-crests at throat; pedicels shorted than calyces; keel glabrous; corolla-lobes strongly veined; stems canescent-puberlent below. . . . . *C. bartsiaefolia*

AA. Flowers pedicelled, solitary, or in whorls with the lower pedicels as long as or longer than the calyces.

  B. Plants minutely pubescent or glabrous; 1 or 2 flowers per node . . . . . *C. sparsiflora*

  BB. Plants finely canescent, pilose, with gland-tipped hairs in inflorescence; 4 to 5 flowers per whorl . . . . . *C. greenei*

Collinsia bartsiaefolia Bentham in D.C. White Chinese Houses

Habitat: Rich, sandy loams; north exposure; full sun.

Abundance: Rare.

Major Communities: Shrubby live oak-ceanothus chaparrals.

Collections: P.U.C., Mt. St. Helena lookout

Collinsia greenii Gray Green's Blue-eyed Mary

Habitat:

Abundance:

Major Communities:

Collections: P.U.C., Mt. St. Helena fire road

Collinsia heterophylla Bruist ex Graham Chinese Houses

Habitat: Deep, rich, organic loams; partial shade; north and east exposures.

Abundance: Occasional but locally abundant.

Major Communities: Mixed oak woodlands.

Collinsia sparsiflora F. & M. var. *arvensis* (Greene) Jeps. Blue-eyed Mary

Habitat: Usually poor, gravelly loams; full sun; mostly south and west exposures.

Abundance: Occasional to common.

Major Communities: Openings in chaparrals; Native herb; Annual grassland.

Collinsia tinctoria Hartweg ex Bentham Sticky Chinese Houses

Habitat:

Abundance:

Major Communities:

Collections: P.U.C., Troutdale Creek

Cordylanthus pilosus Gray — Hairy Bird's Beak

Habitat:

Abundance:

Major Communities:

Remarks: Recorder by others without community data.

Cordylanthus tenuis Gray ssp. *brunneus* (Jepson) Munz — Slender Bird's Beak

Habitat:

Abundance: Common.

Major Communities: Open places in chaparrals; oak savannahs; Knobcone pine woodland.

Collections: Neilson 2863, Little Geysers; P.U.C., Mt. St. Helena fire road; M.S. Baker, serpentine on Cobb Mountain, west of Glenbrook

Linaria pinifolia (Poiret) Thell — Toad Flax

Habitat:

Abundance: Rare.

Major Communities: Anthropogenic.

Remarks: Garden escape.

Collections: P.U.C., Troutdale Creek

Key to *Mimulus* Species

A. Plants perennial.
  B. Corolla scarlet; plants to 1 m tall . . . . . *M. cardinalis*
  BB. Corolla yellow.
    C. Mature calyx not or little inflated; corolla-throat open; plants slimy to touch . . . . . *M. moschatus*
    CC. Mature calyx strongly inflated, lower lobes curved against others; corolla-lip closed; plants not slimy *M. guttatus*

AA. Plants annual.
  B. Pedicels conspicuous, longer than calyx; corolla deciduous; flowers yellow.
    C. Mature calyx stongly inflated, lower lobes curved against upper . . . . . *M. guttatus*
    CC. Mature calyx not inflated, lobes straight . . . . . *M. pilosus*

BB. Pedicels shorted than calyces; corolla persistant; flowers purple, rose, or magenta.

C. Capsule symetrical, soon dehiscent; corolla tubular-campanulate, throat wider than tube below.

D. Corolla-lobes and stigma nearly equal, 13-20 mm *M. layneae*

DD. Corolla-lobes and stigma-lobes unequal, 10-13 mm *M. brachiatus*

CC. Capsule asymetrical, cartilaginous, tardily or not dehiscent, gibbous or oblique at base; corolla 3-4½ cm.

D. Lower corolla-lip less than 1/3 as long as upper lip; calyx densely ciliate with glandless hairs *M. douglasii*

DD. Lower corolla-lip more than 1/3 as long as upper; calyx glandular pubescent. . . . . *M. kelloggii*

Mimulus brachiatus Pennell — Serpentine Monkey Flower

Habitat:

Abundance: Occasional.

Major Communities: Intermittant streams in chaparral on serpentine.

Collections: Neilson 3317, High Valley Creek (L): Neilson 3376, Ridge Crest Road ½ mi S. Socrates Mine Road

Mimulus cardinalis Douglas ex Bentham — Scarlet Monkey Flower

Habitat: Moist, rich soils at springs or along water courses; mostly partial shade; any exposure.

Abundance: Occasional.

Major Communities: Riparian; seeps; springs.

Collections: Neilson 2821, 1 mi S. Geyser Rock

Mimulus douglasii (Bentham in D.C.) Gray — Purple Mouse Ears

Habitat: Open, sunny hillsides; poor, shallow, gravelly soils.

Abundance: Occasional but locally common.

Collections: Neilson 3123, High Valley Creek (L)

Mimulus guttatus Fischer ex D.C. — Common Large Monkey Flower

Habitat: Moist, shallow soils along margins of vernal streams, springs or seeps.

Abundance: Common.

Major Communities: Springs; Seeps; stream banks.

Collections: Neilson 2874, Hot Springs Big Geysers; Neilson 3296, Caldwell Pines; P.U.C., Mt. St. Helena lookout

Mimulus guttatus Fischer ex D.C. ssp. *micranthus* (Heller) Munz

Habitat: Wet soils at springs or meadows.

Abundance: Occasional to rare.

Major Communities: Springs; Wet meadows.

Collections: Neilson 3234, High Valley Creek (L)

Mimulus layneae (Greene) Jepson — Layne's Monkey Flower

Habitat: Deep, sandy soils; partial shade.

Abundance: Occasional to locally common.

Major Communities: Disturbed places in Douglas fir-pine-oak forest.

Collections: Neilson 2732, Little Geysers; P.U.C. Mt. St. Helena lookout; P.U.C., R.L. Stevenson State Park

Mimulus moschatus Douglas ex Lindley — Musk Flower

Habitat: Shallow, wet soils; full sun; mostly south exposure.

Abundance: Rare.

Major Communities: Springs; Seeps.

Collections: P.U.C., Troutdale Creek

Mimulus pilosus (Bentham) Watson — Downy Mimetanthe

Habitat: Gravelly alluviums along streams.

Abundance: Rare.

Major Communities: Riparian.

Collections: Harrison 2006, Pine Flat seep

Key to *Orthocarpus* Species

A. Anthers 2-celled; lower lip 3-saccate.

B. Bracts green throughout; lower lip deeply 3-saccate; galea equaling or barely exceeding lower lip. . . . . *O. lithospermoides*

BB. Bracts tipped with purple or yellow; galea exceeding lower lip.

C. Corolla widened upward, lower lip 2 mm or more deep; spike usually broad and conspicuous; galea hooked

at tip, densely bearded; stems purple, ... *O. purpurascens*

CC. Corolla linear, lower lip 2mm or less deep; spike narrow, pale, and rather inconspicuous . . . . . *O. attenuatus*

AA. Anthers 1-celled; stamens shorted than galea.

B. Branches divergent from central, erect axis; flowers showy; bracts pinnatifid .

C. Galea purple; herbage pubescent . . . . . *O. erianthus*

CC. Galea yellowish; herbage glabrous or puberulent in inflorescence. . . . . *O. faucibarbatus*

BB. Branches many, weak, ascending from base; central stem indistinct; flowers minute, inconspicuous; galea sharply curved; bracts often bipinnatifid. . . . . *O. pusillus*

Orthocarpus attenuatus Gray — Narrow-leaved Owl's Clover

Habitat: Open, sunny sites on flats or low hills; deep soils.

Abundance: Common.

Major Communities: Annual grassland; oak savannahs; Native Herb.

Collections: Neilson 2843, Big Geysers; P.U.C., R.L. Stevenson State Park

Orthocarpus erianthus Bentham — Butter and Eggs

Habitat: Open, poor shallow soils; full sun.

Abundance: Occasional to locally abundant.

Major Communities: Annual grassland; Native herb.

Orthocarpus faucibarbatus Gray — Smooth Owl's Clover

Habitat: Open, sunny sites; mostly south exposure; deep, gravelly soils.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: Neilson 3462, High Valley Creek (L); Neilson 3706, hills at junction of Big Sulphur and Squaw Creeks

Orthocarpus lithospermoides Bentham — Cream Sacs

Habitat: Moist, rich soild of open flats; low altitudes.

Abundance: Occasional to locally common.

Major Communities: Wet meadows.

Collections: Neilson 3249, High Valley Creek (L)

Orthocarpus purpurascens Bentham — Escobita; Purple Owl's Clover

Habitat: Open, sunny hillsides and flats; mostly below 2800 feet elevation; south exposure.

Abundance: Occasional but locally abundant.

Major Communities: Annual grassland; oak savannahs.

Orthocarpus pusillus Bentham — Dwarf Owl's Clover

Habitat: Open, shallow soils; full sun; mostly south and west exposure; below 2800 feet elevation.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: Neilson 3462, High Valley Creek (L)

Pedicularis densiflora Bentham — Indian Warrior

Habitat: Deep, gravelly soils; full to partial shade; all exposures.

Abundance: Abundant.

Major Communities: Chaparrals and woodlands.

Collections: Neilson 3442, Big Geysers; P.U.C., Mt. St. Helena fire road; P.U.C., R.L. Stevenson State Park

Pedicularis semibarbata Gray — Pinewood's Lousewort

Habitat: Deep, sandy soils; partial shade; above 3600 feet.

Abundance: Locally common.

Major Communities: Pine parkland.

Remarks: So far limited to rhyolitic soils of Cobb Mountain.

Collections: M.S. Baker, Cobb Mountain

Keckellia breviflorus Lindley — Gaping Penstemon

Habitat: Rock outcrop crevices; all exposures; above 2800 feet.

Abundance: Occasional.

Major Communties: Chaparrals.

Keckellia corymbosus Bentham — Redwood Penstemon

Habitat: Rocky banks along stream courses in dense chaparrals; any exposure.

Abundance: Occasional.

Major Communities: Shrubby live oak; Bay-madrone-shrubby live oak.

Collections: Neilson 2824, Cobb Creek Canyon; P.U.C., Troutdale Creek; P.U.C., Mt. St. Helena fire road

Penstemon heterophyllus Lindley — Foothill Penstemon

Habitat: Dry, open sites in woods or brushland; full sun; any exposure; gravelly loams.

Abundance: Common.

Major Communities: Chaparrals; woodlands.

Collections: Neilson 2823, Cobb Mountain summit; Neilson 2847, 1 mi S. Geyser Rock; Neilson 2856, W. side Cobb Mt., Neilson 3242, High Valley Creek (L); Neilson 3292, Caldwell Pines; M.S. Baker, Whispering Pines; P.U.C., Mt. St. Helena fire road; Harrison 1999, Pine Flat

Penstemon heterophyllus Lindley ssp. *purdyi* Keck

Habitat: Deep, well-drained, gravelly sandy-loams; full to partial sun; any exposure; above 2800 feet elevation.

Abundance: Occasional.

Major Communities: Fir-pine-oak; Pine parkland; mesic chaparrals.

Keckellia lemmonii Gray — Bush Beard-tongue

Habitat: Dry, gravelly soils or rock outcrops; full sun; any exposure.

Abundance: Occasional.

Major Communities: Chaparrals; Rock outcrops.

Collections: Neilson 2790, Great Western Mine (L): Neilson 2822, Cobb Mt. N. approach to summit; M.S. Baker, Whispering Pines; Harrison 2000, Pine Flat

Penstemon newberryi Gray var. *sonomensis* (Greene) Keck — Mountain Pride

Habitat: Rock outcrops; above 3600 feet elevation.

Abundance: Rare but locally common.

Major Communities: Rock outcrops.

Collections: M.S., Baker, Cobb Mountain; M.S. Baker, Mt. St. Helena; P.U.C., Mt. St. Helena lookout; P.U.C., Red Hill

Penstemon speciosus Douglas ex Lindley — Showy Penstemon

Habitat: Deep, well-drained sandy-loams; full sun; mostly north and west exposures; above 3600 feet elevation.

Abundance: Occasional.

Major Communities: Douglas fir-pine-oak woodland; mesic chaparrals.

Scrophularia californica Chamisso & Schechtendal — Coast Figwort

Habitat: Stream ecotones; deep, rich soil; full to partial shade.

Abundance: Rare.

Major Communities: Open woods usually in vicinity of streams.

Collections: Neilson 3208, Truit Creek; P.U.C., Red Hill

Scrophularia californica C. & S. var. *floribunda* Greene — California Figwort

Habitat: Subxeric sites in chaparrals; full to partial shade; usually in draws.

Abundance: Occasional to rare.

Major Communities: Chaparrals.

Collections: Neilson 3694, 1 mi NW. junction Big Sulphur & Squaw Creeks

SOLANACEAE — NIGHTSHADES

Solanum furcatum Dunal — Nightshade

Habitat: Mesic sites, mostly around springs and seeps.

Abundance:

Major Communities:

Collections: Neilson 3711, junction Big Sulphur and Squaw Creeks.

Solanum parishii Heller

Habitat: Open, subxeric sites; deep, gravelly loams; mostly west and south exposures.

Abundance: Rare.

Major Communities: Annual grassland; Native herb.

Collections: Neilson 3438, High Valley Creek (L); P.U.C., Highland Creek near Highland Springs (L)

Key to *Umbelliferae*

A. Ovary and fruit armed with prickles, bristles, tubercles, or scales.

B. Ovary and fruit armed with spines, hooked bristles, or tubercles.

C. Plants biennial or perennial; flowers perfect or staminate.

D. Basal leaves round-cordate in outline, ternately or palmately divided, primary divisions lobed or merely serrate not deeply pinnatifid; plants usually branched well above base . . . . . *Sanicula crassicaulis*

DD. Basal leaves pinnately divided to pinnately or ternately-pinnately decompound; plants mostly branched from base . . . . . *Sanicula bipinnatifida*

CC. Plants annual; flowers all perfect.

D. Fruit with prolonged beaks with short, hooked bristles . . . . . *Anthriscus scandicina*

DD. Fruit without prolonged beaks with longer, straight bristles with small hook at end .

E. Umbels sessile or short pedunculate, capitate, opposite the leaves. . . . . *Torilis nodosa*

EE. Umbels with long peduncles, spreading terminally and laterally; involucre wanting bristles spreading at right angles . . . . . *Torilis arvensis*

BB. Ovary and fruit armed with bristles without hooks.

C. Fruit linear, several times longer than broad.

D. Plants annual; fruit with an elongated beak, several times longer than body . . . . . *Scandix pecten-veneris*

DD. Plants perennial; fruit 12 to 20 mm with a beak much shorter than body, bristly-hispid with a caudate base with a conspicuous tail . . . . . *Osmorhiza chilensis*

CC. Fruit oblong-ovoid, 2 times as long as broad; leaves pubescent; fruit armed with barbed bristles. . . . . *Daucus pusillus*

AA. Ovary and fruit not armed, sometimes pubescent.

B. Fruit ribs not prominently winged; plants perennial or biennial, mostly more than 70 cm, caulescent; involucre usually present; leaves pinnately or ternate-pinnately divided or uppermost once pinnate.

C. Leaf divisions few, mostly entire; ribs filiform; perennial from tuberous or fusiform roots. . . . . *Perideridia kelloggii*

CC. Leaf division many, incised; ribs prominent or somewhat winged. . . . . *Ligusticum apiifolium*

BB. Some or all fruit ribs winged, dorsally compressed.

C. Lateral ribs winged, dorsal ribs filiform.

D. Marginal flower petals about equal in size; plants less than 6 dm tall . . . . . *Lomatium species (See species key)*

DD. Marginal flower petals radiately enlarged; plants mostly more than 1 m tall; herbage tomentose. . . . . *Heracleum lanatum*

CC. All ribs winged or prominent.

D. Umbellets not capitate; plants coarse; leaf divisions large, lanceolate, serrate . . . . . *Angelica tomentosa*

DD. Umbelletes capitate; stems glabrate up to tomentose heads. . . . . *Sphenosciadium capitellatum*

Angelica tomentosa Watson — California Angelica

Habitat: Stream banks; below 2500 feet elevation.

Abundance: Occasional but locally common.

Major Communities: Riparian.

Collections: Neilson 3923, Kelsey Creek

Anthriscus scandicina (Weber) Mansf. — Bur Chervil

Habitat: Deep, usually rich loams; partial to full sun; rather submesic sites; any exposure.

Abundance: Abundant.

Major Communities: Annual grassland; oak savannahs; oak woodlands.

Collections: Neilson 3212, Truit Creek; Neilson 3700, lower Squaw Creek

Daucus pusillus L. — Wild Carrot

Habitat: Open, sunny sites to partial shade; usually poor, gravelly loams; any exposure.

Abundance: Common.

Major Communities: Annual grassland; oak savannahs & woodlands.

Heracleum lanatum Michux — Cow Parsnip

Habitat: Deep, moist soils around shady springs or stream courses.

Abundance: Rare.

Major Communities: Riparian.

Ligusticum apiifolium (Nuttall) Gray — Lovage

Habitat: Mesic sites in open meadows; deep, moist soils; mostly north and east exposures.

Abundance: Occasional.

Major Communities: Oak woodlands; Wet meadows.

Collections: Neilson 340C, ½ mi E. Geyser Rock

Key to *Lomatium* Species

A. Fruits broadly oval, emarginate at both ends; lateral wings distinct, thin; leaves 1 or 2 times ternate-pinnate, glabrous — *L. repostum*

AA. Fruit not emarginate; wings joined at top or bottom; leaves decompound, disected; leaflets narrow.

B. Ovaries and young fruit pubescent.

C. Involucre bractlets oblanceolate to obovate; umbels 5 to 13 rayed; fruit wings broader than body, puberulent — *L. utriculatum*

CC. Involucre bractlets linear, sonetimes reduced; plants 3 to 5 dm tall; petals tomentose; pedicels longer than mature fruit; fruit densely pubescent . . . . . — *L. dasycarpum*

BB. Ovaries and fruit glabrous; bractlets present.

C. Involucre bractlets obovate, sometimes connate.

D. Stems mostly with several cauline leaves; fruit wings wider than body; dorsal ribs obcolete . . . . — *L. utriculatum*

DD. Stems with only 1 cauline leaf; fruit wings narrower than body; flowers yellow . . . . . — *L. caruifolium*

CC. Involucre bractlets filiform or lance-linear; plants glabrous, acaulescent or short caulescent; flowers yellow or purple. . . . . — *L. marginatum*

Lomatium caruifolium (H.& A.) Coulter & Rose — Caraway-leaved Lomatium

Habitat: Moist, grassy hillsides; deep soils; partial shade.

Abundance: Rare.

Major Communities: Oak savannahs.

Collections: Neilson 3201, Truit Creek

Lomatium dasycarpum (Torrey & Gray) Coulter & Rose — Woolly-fruited Lomatium

Habitat: Xeric hillsides; gravelly or rocky soil; any exposure.

Abundance: Common.

Major Communities: Chaparrals; Rock outcrops.

Collections: Neilson 3322, High Valley Creek (L)

Lomatium marginatum (Bentham) Coutler & Rose — Hartweg's Lomatium

Habitat: Dry, open hillsides to submesic sites; mostly deep, rocky soils but also on rock outcrops.

Abundance: Common.

Major Communities: Chaparrals; grasslands; Native herb; Rock outcrop.

Collections: Neilson 2774, Geyser Rock; Neilson 2784, Great Western Mine (L): Neilson 3206, Truit Creek

Lomatium repostum (Jepson) Mathias — Napa Lomatium

Habitat: Dry openings in chaparral; mostly on north slopes; usually in lower portions of canyons.

Abundance: Rare.

Major Communities: Chaparrals.

Collections: Neilson 3180, High Valley Creek (L); Neilson 3193, Mt. St. Helena fire road; P.U.C., Mt. St. Helena fire road; P.U.C., R.L. Stevenson State Park; Harrison 2023, Little Sulphur Creek

Lomatium utriculatum (Nuttall) Coulter & Rose — Common Lomatium

Habitat: Openings in chaparral; dry, gravelly soils; south and west exposures.

Abundance: Occasional to rare.

Major Communities: Chaparral openings; Native herb.

Collections: Neilson 2885, ¼ mi S. Geyser Rock; P.U.C., R.L. Stevenson State Park

Osmorhiza chilensis H. & A. — Mountain Sweet-cicely

Habitat: Mesic, shady hillsides; deep, rich soils; mostly north and east exposures.

Abundance: Common.

Major Communities: Oak woodlands; Douglas fir-pine-oak woodlands; Douglas fir forest.

Collections: Neilson 3307, High Valley Creek (L); P.U.C., Troutdale Creek

Perideridia kelloggii Gray — Kellogg's Yampa

Habitat: Wet, poorly-drained soils; full sun; any exposure.

Abundance: Occasional but locally common.

Major Communities: Wet meadows; occasionally riparian.

Collections: Neilson 2886, ½ mi S. Little Geysers; Neilson 3472, High Valley Creek (L); P.U.C., R.L. Stevenson State Park

Sanicula bipinnatifida Douglas ex Hooker — Purple Sanicle

Habitat: Open, sunny hillsides; deep, poor soils; mostly on south and west exposures; low elevations.

Abundance: Locally common.

Major Communities: Annual grassland.

Sanicula crassicaulis Poeppig ex D.C. — Pacific Sanicle

Habitat: Deep, rich soils; mostly north and east exposures; below 3000 feet elevation.

Abundance: Common to abundant.

Major Communities: Oak savannahs and woodlands.

Collections: Neilson 3003, Big Geysers; Neilson 3199, Old Mercuryville; P.U.C., Troutdale Creek; P.U.C., R.L. Stevenson State Park

Scandix pecten-veneris L. — Shepard's Needle

Habitat: Open, sunny sites; gravelly loams or clays; any exposure.

Abundance: Occasional.

Major Communities: Annual grassland.

Collections: P.U.C., Troutdale Creek

Sphenosciadium capitellatum Gray — Ranger's Buttons

Habitat: Shady, mesic sites; deep, rich, moist to wet soils; north facing slopes.

Abundance: Rare.

Major Communities: Riparian; Bay-oak-maple.

Collections: Neilson 3390, ¼ N.E. Geyser Rock

Torilis arvensis (Hudson) Link — Hedge Parsley

Habitat: Mostly open, subxeric sites; poor, shallow soils; full to partial sun; any exposure.

Abundance: Abundant.

Major Communities: Annual grassland.

Collections: Neilson 3002 & 3037, Big Geysers; Neilson 3352, Truit Creek; Neilson 3414, Birdsong Meadow on Socrates Mine Road; Neilson 3571, Big Geysers; P.U.C., Troutdale Creek; P.U.C., R.L. Stevenson State Park

Torilis nodosa (L) Gaertner — Knotted Hedge Parsley

Habitat: Open, subxeric sites; poor, shallow soils; full sun; any exposure.

Abundance: Common.

Major Communities: Annual grassland; Native herb; oak savannahs and woodlands.

Collections: Neilson 3300, Caldwell Pines

URTICACEAE — NETTLES

Parietaria pensylvanica Muhl. — Pennsylvania Pelletory

Habitat: Moist soils; partial shade.

Abundance: Rare to occasional.

Major Communities: Riparian; Seeps; Pond margins.

VALERIANACEAE — VALERIANS

Plectritis ciliosa (Greene) Jepson — Long-spurred Plectritis

Habitat: Open, sunny sites; poor shallow soils; full sun; any exposure.

Abundance: Common.

Major Communities: Annual grassland; oak savannahs; Native herb.

Collections: Neilson 3142, High Valley Creek (L)

VERBENACEAE — VERVAINS

Verbena lasiostachys Link — Western Verbena

Habitat: Wet, heavy soils; usually full sun.

Abundance:

Major Communities: Seeps and water courses.

Collections: Neilson 2780, Great Western Mine (L): Neilson 3415, Birdsong Meadow on Socrates Mine Road; P.U.C., Troutdale Creek; P.U.C., R.L Stevenson State Park

VIOLACEAE — VIOLETS

Viola lobata Bentham — Pine Violet

Habitat: Mesic sites; full to partial shade; deep, rich, humic soils.

Abundance:

Major Communities:

Collections: Neilson 2730; Neilson 3451, High Valley Creek (L): P.U.C., Mt. St. Helena fire road

Viola purpurea Kellogg — Mountain Violet

Habitat: Subxeric sites; deep, shady soils; full to partial sun.

Abundance: Occasional.

Major Communities: Openings in chaparral; Pine-oak forest; oak woodlands.

Collections: Neilson 3449 & 3450, High Valley Creek (L)

Viola quercetorum Baker & Clausen — Oak-leaved Violet

Habitat: Deep, rich, sandy soils; partial shade.

Abundance: Occasional.

Major Communities: Chaparrals at higher elevations.

Collections: Neilson 3122, High Valley Creek (L); P.U.C., R.L. Stevenson State Park

KEY TO LILIES AND RELATED PLANT FAMILIES

A. Ovary superior; perianth well developed; petals and sepals same color or if unlike flowers not in umbels.

  B. Flowers in umbels, subtended by ± numerous spathlike bracts.

    C. Perianth segments distinct, anthers versatile. . . *Amaryllidaceae (Allium)*

    CC. Perianth segments united into a basal tube; anthers often basifixed; filaments separate. . . . . *Amaryllidaceae (Brodiaea)*

  BB. Flowers not in a scapose umbel with spathlike bracts . *Liliaceae*

AA. Ovary inferior.

  B. Flowers regular; ovary 3-loculed; stamens 3; leaves equitant (folded and the folds inserted within each other) . . . . . *Iridaceae*

  BB. Flowers irregular; ovary 1-loculed; stamens 1 or 2; leaves not equitant. . . . . *Orchidaceae*

Key to *Allium*

A. Leaves terete or appearing so.

B. Leaf one, anatomically terete.

C. Scape 3 to 16 cm long; slender leaves twice scape. . *Allium fimbriatum*

CC. Scape 10 to 30 cm long; stout leaves little longer than scape . . . . . *Allium f.* var. *purdyi*

BB. Leaves two, appearing terete but flat, narrow, convolute, filifrom in age; scape 28 to 50 cm long; bulb coats with broadly V-shaped regular vertical rows . . . . . *Allium amplectens*

AA. Leaves flat.

B. Leaves falcate (Sickle-shape).

C. Leaf one; scape 20 to 70 cm long . . . . . *Allium cratericola*

CC. Leaves two; scape 3 to 12 cm, half underground . . . *Allium falcifolium*

BB. Leaves not falcate.

C. Ovary strongly 6-crested; bulb coats with strong verticle lines, tranverse lines faint . . . . . *Allium campanulatum*

CC. Ovary crestless or weakly 3-central crested.

D. Perianth segments saccate at base, inner segments serrulate. . . . . *Allium bolanderi*

DD. Perianth segments plain and entire.

E. Bulb 12 to 15mm, from lateral bublets produced on stout rhizomes; bracts 2 to 3 cm long; flowers in loose umbells; pedicels 2 to 3.5 cm long . . . . . *Allium unifolium*

EE. Bulb less than 12 mm without lateral bublets or rhizomes; bracts 1 to 1.5 cm long; flowers in dense umbels; pedicels 1 to 1.5 cm. . *Allium serratum*

Allium amplectens Torrey Narrow-leaved Onion

Habitat: Subxeric habitats in open pine-oak woodlands; deep, rich soil.

Abundance: Occasional.

Major Communities: Pine-Oak Woodlands.

Collections: Neilson 3310, High Valley Creek (L): P.U.C., R.L. Stevenson State Park

Allium cratericola Eastwood — Dwarf Onion

Habitat: Loose sandy or gravelly soils, usually shallow.

Abundance: Occasional to rare.

Major Communities: Rock Balds.

Collections: M.S. Baker, Mt. St. Helena

Allium falcifolium Hooker & Arnott — Cicle-leaved Onion

Habitat: Open sites; full sun; mostly shallow, poor, gravelly loams.

Abundance: Common to abundant.

Major Communities: Rock Balds; serpentine barrens.

Collections: Neilson 3861, serpentine 1 mi W. bridge on Dry Creek Road (L); M.S. Baker, Mt. St. Helena

Allium fimbriatum Watson — Fringed Onion

Habitat: Open, rocky, snady loams; full sun.

Abundance: Rare.

Major Communities: Rock balds.

Collections: P.U.C., St Helena Creek (L)

Allium unifolium Kellogg — One-leaved Onion

Habitat: Deep, moist loams; full sun.

Abundance: Rare to occasional.

Major Communities: Wet Meadow; Seep.

Collections: Neilson 3207, Truit Creek

Key to *Brodiaea* Species

A. Anthers versitile, 6; corm coats straw colored; stigma not evidently lobed.

  B. Stamens alternately attached at 2 different levels; perianth-tube attenuate at base; pedicels less than 2 times perianth; flowers blue. . . . . *B. laxa*

  BB. Stamens attached at same level: perianth-tube open, campanulate, 2 to 4 mm; flowers white . . . . . *B. hyacinthina*

AA. Anthers erect, appressed to style, attached near base, 3 (6 in *B. pulchella*): corm coats brown; stigma 3-lobed.

B. Leaves narrow, rounded, not keeled on lower side; filaments without appendage.

C. Perianth-segments 3 times as long as tube, latter splitting in fruit. . . . . *B. californica*

CC. Perianth-segments 1 to 2 times tube, latter funnelform, not splitting in fruit, not constricted above ovary; earliest flowers with the longest pedicels; staminodia plain, acute, not recurved at apex. . . . . *B. elegans*

BB. Leaves flat, keeled on lower surface; stigmas 3-lobed; lobes run into wings on upper style.

C. Anthers 6 . . . . . *B. pulchella*

CC. Anthers 3; pedicels ascending in fruit, joined near base *B. congesta*

Brodiaea californica Lindley — California Brodiaea

Habitat: Open, sunny hillsides; deep, gravelly loams or clay-loams; lower elevations.

Abundance: Occasional.

Major Communities: Annual Grassland; oak savannahs.

Brodiaea congesta Smith — Ookow

Habitat: Open to brushy areas; various soils.

Abundance: Occasional.

Major communities: Brushlands; oak savannahs; open oak woodlands.

Collections: Neilson 3335, High Valley Creek (L)

Brodiaea elegans Hoover — Harvest Brodiaea

Habitat: Open fields and hillsides; usually deep clay-loams; full sun; below 2500 feet elevation.

Abundance: Occasional.

Major Communities: Annual Grassland; oak savannahs.

Collections: Neilson 3032, ½ mi S. Little Geysers (S); Neilson 3354, Old Mercuryville (S): P.U.C., Troutdale Creek (L)

Brodiaea hyacinthina (Lindley) Baker — Wild Hyacinth

Habitat: Deep, moist soils.

Abundance: Occasional but locally common.

Major Communities: Wet Meadow.

Collections: Neilson 3241, High Valley Creek (L)

Brodiaea laxa (Bentham) Watson — Ithuriel's Spear

Habitat: Open, sunny hillsides and flats; mostly heavy clay-loams.

Abundance: Occasional to rare.

Major Communities: Annual Grassland.

Collections: Neilson 3337, High Valley Creek; P.U.C., Highland Creek

Brodiaea pulchella (Salisb.) Greene — Blue Dicks

Habitat:

Abundance: Common.

Major Communities: Brushlands; oak savannahs; Digger Pine-Scrub.

Collections: P.U.C., Troutdale Creek

IRIDACEAE — IRIS

Key to *Iridaceae* Species

A. Inflorescence umbellate; perianth-segments all alike: perianth less than 2 cm long. . . . . *Sisyrinchium bellum*

AA. Inflorescence not umbellate; perianth-segments unlike, 3 erect, 3 drooping; tube over 5 cm long; spath bracts opposite.

B. Stigmas truncately flattened to bilobed; stem covered with short overlapping leaves; flowers yellow to whitish with a lavender flush on sepals . . . . . *Iris purdyi*

BB. Stigmas triangular, tongue shaped or rounded; stem leaves 1 or 2, 5 to 10 cm, tightly clasping for ½ to 1/3 their length; perianth tube over 3 cm, slender.

C. Spath bracts 4 to 9 mm wide, linear-lanceolate; perianth-tube never with a distinct throat; flower stem up to 2.5 dm tall; leaves 5 mm wide; flower color deep purple to golden yellow. . . . . *Iris macrosiphon*

CC. Spath bracts 6 to 11 mm, broadly lanceolate; perianth-tube often with a distinc throat; flower stems 2 to 4 dm tall; leaves 7 or 8 mm wide, drying a peculiar gray-green color; entire plant colored with red; flowers creamy-yellow, veined darker . . . . . *Iris fernaldii*

Iris fernaldii Foster — Fernald's Iris

Habitat: Mostly wooded areas; deep, rich soils; full to partial shade.

Abundance: Occasional.

Major Communities: Oak woodlands.

Collections: Neilson 3211, Truit Creek

Iris macrosiphon Torrey — Slender-tubed Iris

Habitat: Subxeric sites; full shade to full sun; many soil types; up to 4000 feet elevation.

Abundance: Common.

Major Communities: Brushlands; oak woodlands; Pine-Oak Woodlands.

Collections: Neilson 3053, Geyser Rock; Neilson 3345, High Valley Creek; Neilson 3566, 1 mi W. Geyser Rock; P.U.C., Mt. St. Helena fire road; P.U.C., Troutdale Creek; Neilson 4006, Great Western Mine area (L)

Iris purdyi Eastwood — Purdy's Iris

Habitat: Moist, shady woods; deep, rich soils; full to partial shade; low altitudes.

Abundance: Rare.

Major Communities: Fir-Oak-Maple Woodland.

Collections: P.U.C., Alder Glen Springs (M)

Sisyrinchium bellum Watson — Blue-eyed Grass

Habitat: Mesic, open sites; deep, vernally wet clay-loams or gravelly loams; full sun.

Abundance; Occasional to locally common.

Major Communities: Annual Grassland; Wet Meadow.

LILIACEAE — LILY

Key to *Liliaceae*

A. Plants from rootstocks or thickened tuberous ± branched underground parts.

B. Leaves all basal, ovate, mottled, not grasslike; flowers nodding . . . . . *Erythronium*

BB. Leaves basal and cauline.

C. Cauline leaves in whorl of 3.

D. Flower distinctly pedicelled, white. . . . . *Trillium ovatum*

DD. Flower sessile, purple; leaves sessile . . . . . *Trillium chloropetalum*

CC. Cauline leaves alternate; stems not vinelike nor tendril-bearing.

D. Flowers in terminal panicle. . . . . *Smilacina racemosa*

DD. Flowers terminal, but solitary or umbellate . . *Disporum hookeri*

AA. Plants with tunicated or scaly bulb or corm.

B. Stems leafy, sometimes branched above.

C. Styles 3, distinct to base; flowers erect; perianth with glands. . . . . .*Zigadenus fremontii*

CC. Style 1, ± lobed at summit.

D. Perianth segments unlike outer, sepal like, inner petaloid . . . . . *Calochortus species (See key)*

DD. Perianth segments alike, petaloid.

E. Anthers versatile, attached at middle of back.

F. Flowers nodding, yellow with red spots . . *Lilium pardalinum*

FF. Flowers white with purple spots, turning wine-colored . . . . . *Lilium rubescens*

EE. Anthers basifixed.

F. Leaves several to many, scaly bulbs. . . .*Fritillary species (See key)*

FF. Leaves 2, from tunicated corms.

E. Anthers white; corm 3.5 to 5 cm; leaves 2.5 to 5 cm wide. . . . . .*Erythronium californicu*

EE. Anthers golden; corm 6 to 8 cm; leaves 0.7 to 2.2 cm wide . . . . . .*Erythronium helenae*

BB. Stems scapelike; leaves mostly basal, more than 2; inflorescence widely branching panicle . . . . . .*Chlorogalum pomeridianu*

Key to *Calochortus species*

A. Flowers yellow.

B. Flowers closed, campanulate. . . . . *Calochortus amabilis*

BB. Flowers broad, campanulate . . . . . *Calochortus luteus*

AA. Flowers white, yellow, or lilac.

B. Surface of gland naked.

C. Petals ciliate, densely bearded. . . . . *Calochortus tolmiei*

CC. Petals glabrous or nearly so; stems leafy, usually unbranched, bulbiferous near base; internodes very short. . . . . *Calochortus uniflorus*

BB. Surface of gland densely hairy; inflorescence sub-umbellate; petal blotch surrounded by yellow zone.

C. Glands an inverted V . . . . . *Calochortus superbus*

CC. Glands doubly lunate . . . . . *Calochortus vestae*

Calochortus amabilis Purdy — Golden Fairy Lanterns

Habitat: Open, subxeric sites; gravelly loams; full to partial sun sun; below 3600 feet elevation; any exposure.

Abundance: Common.

Major Communities: Open brushlands; Pine-Oak Woodland.

Collections: Neilson 3297, Caldwell Ranch; Neilson 3360, Old Mercuryville; P.U.C., Troutdale Creek; P.U.C., R.L. Steveson State Park

Calochortus coeruleus (Kellogg) Watson var. *fimbricatus* Owenby — Beavertail Grass

Habitat: Subxeric sites; part shade; deep, rich soils.

Abundance: Rare.

Major Communities: Oak woodlands.

Collections: Neilson 3466, High Valley Creek; M.S. Baker, Cobb Mountain

Calochortus luteus Douglas — Yellow Mariposa Lily

Habitat: Open, subxeric sites; gravelly loams or clay-loams; full sun; below 2500 feet.

Abundance; Occasional.

Major Communities: Annual Grassland; oak savannahs.

Collections: P.U.C., The Geysers

Calochortus superbus Purdy ex Howell — Superb Mariposa Lily

Habitat: Open, sunny hillsides; deep, gravelly soils; mostly west exposures.

Abundance: Occasional to rare.

Major Communities: Annual Grassland; Native Herb.

Collections: Neilson 3367, ½ mi W. Old Mercuryville

Calochortus tolmiei Hooker & Arnott — Tolmie's Star Tulip

Habitat: Submesic sites; shallow, often poor soils, sometimes on serpentine; mostly north and east exposures.

Abundance: Occasional.

Major Communities: Seep; Wet Meadow; openings in chaparrals.

Collections: Neilson 3186, High Valley Creek; Neilson 3480, hills S. High Valley Creek; P.U.C., Mt. St. Helena fire road

Calochortus uniflorus Hooker & Arnott — Large-flowered Star Tulip

Habitat:

Abundance: Occasional.

Major Communities: Wet Meadow; Seep.

Calochortus vestae Purdy — Butterfly Mariposa Lily

Habitat: Open hillsides, deep clay and clay-loam soils; mostly south and west exposures; full sun.

Abundance: Occasional.

Major Communities: Annual Grassland; oak savannahs.

Collections: Neilson 3918

Chlorogalum pomeridianum (DC) Kunth — Soap Plant

Habitat: Xeric sites; rocky, gravelly loams or gravelly clays; full or part sun; all exposures.

Abundance: Abundant.

Major Communities: Brushlands; Rock Outcrop; oak woodlands.

Collections: P.U.C., R.L. Stevenson State Park

Diasporum hookeri (Torrey) Nichols var. *trachyandrura* (Tor.) Jones Hooker's Fairy Bell

Habitat: Mesic sites; mosit, well-drained, rich soils; full to partial shade.

Abundance: Occasional.

Major Communities: Pine-Oak Woodland; Fir-Oak Forest; Riparian ecotones.

Collections: P.U.C., Mt. St. Helena fire road

Erythronium californicum Purdy California Fawn Lily

Habitat: Open to shaded sites; humic gravelly loams; any exposure.

Abundance: Common to occasional.

Major Communities: Brushlands; Oak-Pine Woodlands.

Collections: P.U.C., Cloverdale

Erythronium helenae Applegate Mt. St. Helena Fawn Lily

Habitat: Mostly shaded sites; humic, gravelly loams.

Abundance: Occasional to common.

Major Communities: Pine-Oak Woodlands; brushlands.

Collections: Neilson 3475, High Valley Creek

Key to *Fritillaria*

A. Flowers scarlet, mottled yellow; petals recurved. . . . . *Fritillaria recurva*

AA. Flowers white/greenish-white, brown, or purplish.

B. Leaves on upper part of stem; flowers brown-purple, mottled yellow or pale green, mottled purple. . . . . *Fritillaria lanceolata*

BB. Leaves on lower part of stem just above ground; flowers white, mottled purple. . . . . *Fritillaria purdyi*

Fritillaria lanceolata Pursh. Checker Lily

Habitat: Mesic sites; full to part shade; deep, rich loams; all exposures.

Abundance: Occasional to common.

Major Communities: Oak woodlands; Oak-Pine Woodlands; scrub; Riparian; Bay-Oak-Maple.

Collections: Neilson 3992, Hummingbird Creek; P.U.C., Troutdale Creek; P.U.C. Highland Creek

Fritillaria purdyi Eastwood — Purdy's Fritillary

Habitat: Shallow, sandy soils and rock crevices on rock outcrops; any exposure; full sun.

Abundance: Rare.

Major Communities: Rock Outcrop

Fritillaria recurva Bentham — Scarlet Fritillary

Habitat: Open, subxeric sites; shallow serpentine soils; any exposure; full sun.

Abundance: Occasional.

Major Communities: Jepson's Ceanothus-Leather Oak-Stanford's Manzanita.

Collections: Neilson 3185, serpentine ridge S. headwaters of High Valley Creek; Neilson 3476, rocky ridge High Valley Creek

Lilium pardalinum Kellogg — Panther Lily

Habitat: Mesic sites; deep, rich, sandy soils near running water; full or part shade.

Abundance: Rare.

Major Communities: Riparian; Willow-Oak-Alder; Seep.

Collections: P.U.C., R.L. Steveson State Park; Roland, Pine Flat seep

Lilium rubescens Watson — Chamise Lily

Habitat: Submesic sites in chaparral; deep, gravelly loams; part shade; any exposure.

Abundance: Rare.

Major Communities: Brushlands.

Collections: P.U.C., R.L. Stevenson State Park

Smilacina racemose (L.) Desfon. var. *amplexicaulis* (Nutt.) Wat. False Solomon Seal

Habitat: Mesic hillsides; deep, rich, humic soils to gravelly loams and rock crevices; full to part shade.

Abundance: Occasional.

Major Communities: Fir-Oak Woodland; oak woodlands; Rock Outcrop.

Trillium chloropetalum (Torr.) How. var. *gigantum* (H & A) Munz Giant Wake-Robin

Habitat: Mesic sites, deep, humic, sandy soils; full or part shade; mostly north and east exposures.

Abundance: Occasional.

Major Communities: Riparian; Bay-Oak-Maple; Willoe-Oak-Alder.

Collections: Neilson 4005, Great Western Mine (L)

Trillium ovatum Western Wake-Robin

Habitat: Mesic sites; deep, humic, sandy soils; full or part shade: mostly north and east exposures.

Abundance: Occasional.

Major Communities: Riparian; Bay-Oak-Maple; Willow-Oak-Alder.

Zigadenus fremontii Torrey Star Lily

Habitat: Xeric to submesic sites; deep, gravelly loams and clays; full to part sun; all exposures.

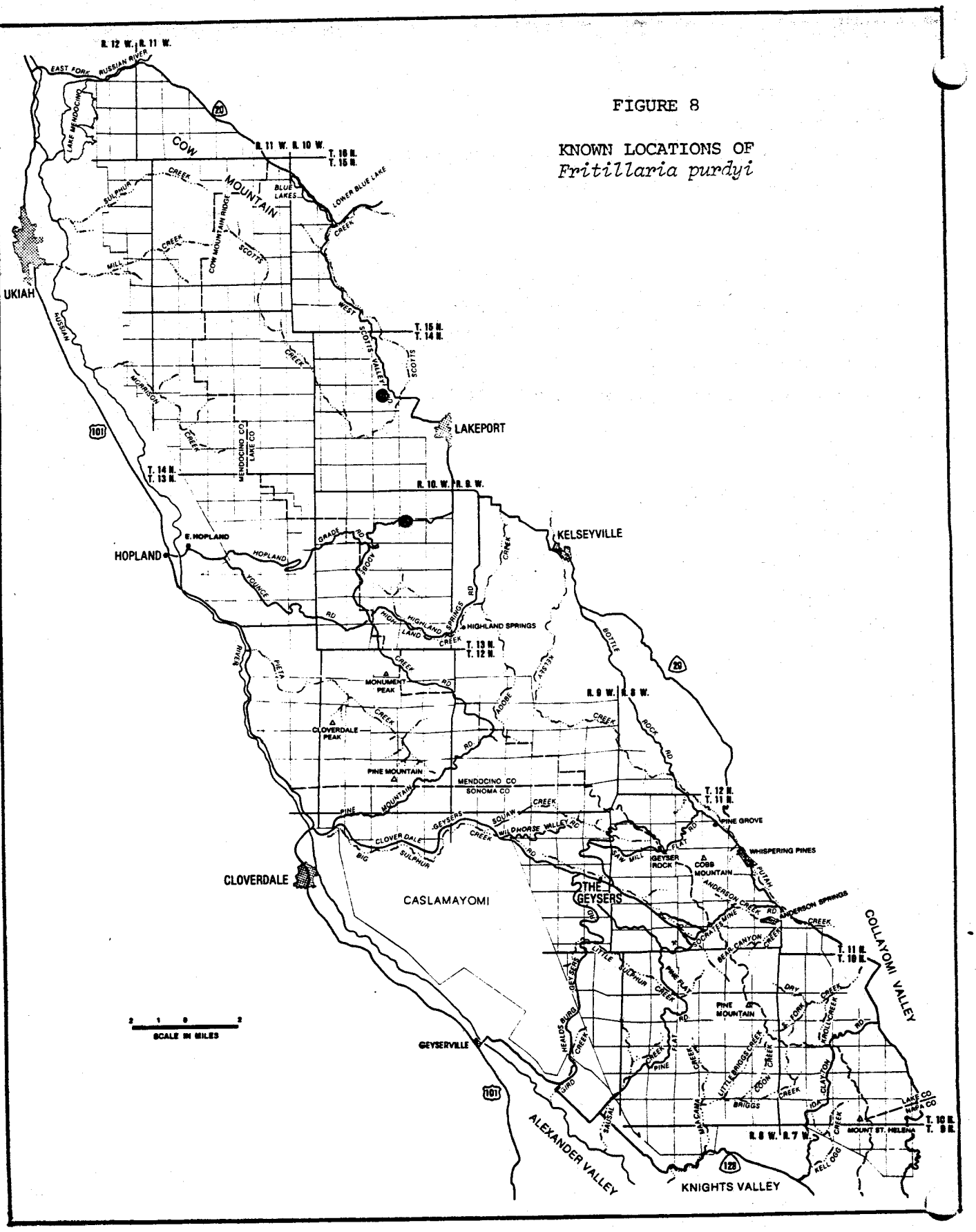
Abundance: Common.

Major Communities: Brushlands.

Collections: P.U.C., Mt. St. Helena fire road

FIGURE 8

KNOWN LOCATIONS OF
Fritillaria purdyi



ORCHIDACEAE — ORCHIDS

Key to *Orchidaceae*

A. Leaves reduced to small scales; plants saprophytic, brownish or brown-purple. . . . . *Corallorhiza maculata*

AA. Leaves foliacious, green.

B. Flowers less than 15, mostly fewer with leafy bracts; leaves several; anther 1 . . . . . *Epipactis gigantea*

BB. Flowers mostly more than 15, spicate to racemose, bracts not foliacious; lip spurred. . . . . *Habenaria elegans*

Corallorhiza maculata Rafinesque

Habitat: Deep, shady, conifer woods; mesic environments.

Abundance: Rare.

Major Communities: Douglas Fir forest, Fir-Pine-Oak

Collections: P.U.C., R.L. Stevenson State Park

Epipactis gigantea Douglas ex Hooker — Stream Orchis

Habitat: Wet, shady sites in stream beds; rich, organic, alluvial sands.

Abundance: Rare.

Major Communities: Riparian; Oak-Bay-Maple.

Habenaria elegans (Lindley) Bolander — Rein Orchis

Habitat: Mesic and submesic sites near streams or in open woods; full shade to full sun; all exposures.

Abundance: Occasional.

Major Communities: Wet Meadows; Pine-Oak woodland.

GRAMINEAE — GRASSES

Key to *Gramineae*

A. Spikelets sessile or sometimes very short pedicelled, placed along opposite sides or along one side of the spike or raceme axis . . . . . Group A

AA. Spikelets borne on long or short pedicels, on the branches of a loose to dense panicle, occasionally in a loose raceme, or if in a cylindrical spikelike panicle then the spiklets crowded all around the axis. . . . Group B

Key to Group A

A. Spike or raceme one. terminal on the culm; spikelets alternating on opposite sides of rachis.

B. Spikelets placed edgeways to rachis; inner glume absent except in terminal spikelet, glume shorter than spikelet; lemmas mostly awned. . . . . *Lolium multiflorum*

BB. Spikelets placed flatwise to rachis; both glumes present in all spikelets.

C. Spikelets in 3's, placed side-by-side at each rachis node, lateral spikelets neuter or staminate, middle spikelets producing grain; rachis disjointing at nodes with the 3 spikelets and rachis falling away together. . . . . *Hordeum species (See species key)*

CC. Spikelets solitary or in pairs at each rachis node.

D. Spikelets solitary at each rachis node.

E. Plants with creeping rhizomes . . . . . *Agropyron trichophorum*

EE. Plants without rhizomes . . . . . *A. parishii*

DD. Spikelets paired at each rachis node, sometimes 1 in *Elymus triticoides*.

E. Rachis continuous, disarticulating only tardily or not at all; glumes with short awns.

F. Lemmas awned.

G. Lemmas 1 to 2 cm, straight; perennial without creeping rhizomes. . . . . *Elymus glaucus*

GG. Lemmas 30 to 80 cm, annual. . . . . *E. caput-medusae*

FF. Lemmas awnless or less than .5 cm; with creeping rhizomes . . . . . *E. triticoides*

EE. Spikes bristly from greatly elongated, setaceous glumes; rachis articulating into joints at maturity.

F. Glumes long, slender, entire or divided near base into 2 long, slender awns, 2 to 7 cm; spike 2 to 8 cm, rather sparse *Sitanion hystrix*

FF. Glumes long, slender, divided near base into 3 or 4 long, slender awns; spike 3 to 10 cm, very dense. . . . . *S. jubatum*

AA. Spikes or racemes several to many on culm, with long retaining hairs, enclosed at base by a fertile leaflike bract; spikelets in pairs, placed along one side of each raceme axis, one spikelet sterile or staminate the other fertile and grain producing . . . . . *Andropogon virginicus*

Key to Group B

A. Spikelets with 1 or 2 dissimilar sterile florets below a terminal grain producing floret; sterile floret as long or longer than fertile one.

B. Sterile florets 2, awned from back, unlike enclosing thin glumes; panicle dense, spike-like . . . . . *Anthoxanthum odoratum*

BB. Sterile floret 1, resembling upper glume in color, size, texture; panicle open.

C. Perennials, velvety pubescent; spikelets less than 4 mm. . . . . *Panicum thermale*

CC. Annuals, papillos-hispid; spikelets 4.5 to 5 mm; panicles drooping. . . . . *P. miliaceum*

AA. Spikelets with similar (mostly smaller) or with dissimilar sterile florets above fertile floret or sterile florets lacking.

B. Spikelets with a single fertile floret, in some species with a dissimilar sterile rudimentary floret on a stipe or rachilla or the rudiment absent leaving only the rachilla or stipe.

C. Sterile floret produced on a stipe or rachilla; spikelets with persistant glumes on the pedicel; florets separating at maturity; foliage finely scabrous; lemmas with papery or hyaline margins.

D. Culms bulbous at bases.

E. Lemmas tapering-acuminate, mostly ciliate-pubescent on nerves. . . . . *Melica subulata*

EE. Lemmas obtuse, glabrous; panicle narrow; culm bulb attached directly to nonwoody rhizome; rudimentary floret (terminal) blunt, not exerted . . . . . *Melica californica*

DD. Culms not bulbous at base; fertile florets 1 or 2; rudiment 1 mm on a stipe; lemma pubescent near tip . . . . . *Melica torreyana*

CC. Sterile floret absent, sometimes rachilla remains.

D. Panicle dense, spikelike, cylindrical; lemmas thin.

E. Spikelets falling entire from pedicels; glumes awned from back; panicles soft and bristly.

F. Perennials; glume-awns 3 to 5 mm, lemma-awns conspicuous, usually exerted beyond glumes . . . . . *Polypogon interrup*

FF. Annuals; glume-awns 6 to 10 mm, ciliate about the apex . . . . . *P. monspeliensis*

EE. Spikelets with glumes persistant on pedicels.

F. Glumes truncate; midrib prolonged into a stout, stiff awn, 2mm; perennials. . . *Phleum alpinum*

FF. Glumes long, tapering, somewhat swollen at base; annuals . . . . . *Gastridium ventricosum*

DD. Panicle open to narrowly contracted, not dense and cylindrical; lemmas thin to tough.

E. Glumes shorter than lemma, abruptly narrowed at apex; lemma minutely pubescent, lanceolate, acute. . . . . *Muhlenbergia filiformis*

EE. Glumes as long or longer than lemma.

F. Lemmas awnless or awned from back, hairlike; florets not tough nor hardened at maturity.

G. Lemma-callus with conspicuous tufts of long hairs; palea well developed; rachilla a hairy bristle.

H. Awn longer than glumes, geniculate; glumes 6 to 8 mm; panicle straw colored, lax; on serpentine *Calamagrostis ophitidis*

HH. Awn about equal to glumes, straight, included; panicles loose, open; callus hairs copius about as long as lemma. . . . . *C. canadensis*

GG. Lemma-callus hairs reduced; palea reduced to a scale at lemma base. . . *Agrostis species (See Species Key)*

FF. Lemma awned from tip, awn stiff, twisted, bent; lemma tough, leathery, hardened at maturity.

G. Panicle loose to open, lower branches long, drooping in fruit.

H. Lemma over 7 mm; awn stoutish, over 5 cm, terminal segment slender and flexous . . . . . *Stipa cernua*

HH. Lemma 4 to 6 mm; awn slender, less than 5 cm. . . . . *S. lepida*

GG. Panicle narrow-contracted, branches always appressed; awn hairy on 2 lower segments; leaves glabrous; glumes broad at base, abruptly tapered, lower glume 5-nerved; callous blunt. . . *S. lemmonii*

BB. Spikelets with 2 or more fertile florets.

C. Plants low, mat forming perennial with scaly, yellowish rhizomes; leaves with stiff distichous blades, closely overlapping sheathes; grows on alkaline or saline soils *Distichlis spicata*

CC. Plants upright, tufted, bunched or solitary; not as above.

D. Glumes well developed, at least as long or longer than lowermost floret, often as long or longer than all florets; lemma awned from back or awnless.

E. Spikelets 5 or more flowered: ligule a fringe of hairs; collar with a tuft of long hairs on either side; lemmas awned; awn flat, twisted below, bent sharply above; points on either side of awn attenuate as short awns. . . . . *Danthonia californica*

EE. Spikelets 2 or 3-flowered; collar without a tuft of long hairs on either side.

F. Glumes 2 cm or more; lemmas 1.5 cm with long awns; awns stout, twisted in lower part.

G. Lemma-teeth acute; spikelets mostly 3-flowered . . . . . *Avena fatua*

GG. Lemma-teeth attenuate as bristles; spikelets mostly 2-flowered . . . . . *A. barbata*

FF. Glumes and lemmas not as above.

G. Lemmas keeled on back, V-shaped in cross section, awnless or with a very short straight awn; rachilla glabrous or minutely hairy. . . . . *Koeleria cristata*

GG. Lemmas rounded on back; awned from below middle; awn slender and hairlike.

H. Lemma blunt, irregularly notched at apex.

I. Annuals. . . . . *Aira caryophyllea*

II. Perennials.

J. Basal leaves firm; panicles open to dense and thick. . . . *Deschampsia danthonoides*

JJ. Basal leaves filiform, soft; panicle narrow, elongate . . . *D. caespitosa*

HH. Lemma acute with 2 slender, bristle-like teeth at apex . . . . . *D. elongata*

DD. Glumes shorter than lowermost floret; lemmas awned from tip or awnless.

E. Spikelet of two different kinds, sterile and fertile, intermixed in a dense panicle.

F. Panicle oblong, one sided, yellowish or purplish tinged; fertile spikelets surrounded by a cluster of sterile spikelets, the whole group falling away as a unit. . . . . *Lamarckia aurea*

FF. Panicles ovoid, greenish to whithish, densely bristly; only florets of fertile spikelet falling away. . . . . *Cynosurus echinatus*

EE. Spikelets all alike in an open or contracted panicle, sometimes a simple raceme.

F. Spikelets more than 1.5 cm; lower glumes 1 to 3-nerved, upper 3 to 5-nerved; palea shorter than lemma body, ciliate. . . . . *Bromus species (See Species Key)*

FF. Spikelets commonly less than 1.5 cm.

G. Spikelets densely crowded, nearly sessile in one sided clusters at ends of stiff panicle branches. . . . . *Dactylis glomerata*

GG. Spikelets not as above.

H. Lemmas about as long as braod, horizontally disposed on spikelet.

I. Spikelets numerous, about 3mm . . . *Briza minor*

II. Spikelets relatviely few, 10 to 20 mm long . . . . . *B. maxima*

HH. Lemmas not as above, 5 to 9-nerved; glumes persistant on pedicel; rachis disjointing and florets falling away at maturity.

I. Lemmas normally awned; florets somewhat divergent from each other exposing rachilla at maturity; blades tightly rolled. . . *Festuca species (See Species Key)*

II. Lemmas usually awnless; florets closely overlapping and not exposing rachilla; blades flat.

J. Lemmas 5-nerved, lateral nearves somewhat indistinct. . *Poa species (See Species Key)*

JJ. Lemmas 7 to 9-nerved, all nerves prominent. . . . . *Melica species (See key above)*

Agropyron parishii Scrib. & Smith var. *laeve* Scrib. & Sm. Parish's Wheatgrass

Habitat: Disturbed places; roadsides.

Abundance: Occasional.

Major Communities: Anthropogenic.

Remarks: Introduced as a revegetation measure. It is not very successful in most Mayacmas soils, but does persist for several years.

Agropyron trichophorum (Link) Richt. Pubescent Wheatgrass

Habitat: Disturbed places; roadsides.

Abundance: Rare.

Major Communities: Anthropogenic.

Remarks: Introduced as a revegetation measure. It is not very successful in most Mayacmas soils.

Key to *Agrostis* Species

A. Palea evident, 2-nerved, at least half as long as lemma; rachilla not prolonged beyond palea; glumes scabrous on keel only; lemma rarely awned; panicle open, purplish, branches or some of them floriferous from base; plants stoloniferous, 5 to 12 dm tall, turf forming . . . . . *A. alba*

AA. Palea obsolete or a minute nerveless scale up to 0.5 mm.

B. Plants with creeping rhizomes; hairs at base of lemma 1 to 2 mm; culms 6 to 9 dm tall; ligule 2 to 7 mm; lemmas awnless . . . . . *A. hallii*

BB. Plants without rhizomes.

C. Panicle narrow, contracted, lower branches bearing spikelets from base; lemmas awnless or awn acute; paleae minute; ligule 4 to 6 mm; plants tufted, 2 to 12 dm tall . . . . . *A. exarata*

CC. Panicle open, sometimes diffuse, branches slender, scabrous, branches not flowered near base; lemmas awnless or awned from middle or above.

D. Panicle very diffuse; branches scabrous, capillary, not flexuous; spikelets terminal; lemma awnless or with a straight awn; ligule 2 to 5 mm; plants tufted, 3 to 9 dm tall . . . . . *A. scabra*

DD. Panicle open, not diffuse; branches arising at or below middle; lemmas awnless; ligule 1 to 2 mm.

E. Spikelets about 2mm; plants 1 to 3 dm tall. . . . *A. idahoensis*

EE. Spikelets 2.5 mm; plants 6 to 9 dm tall . . . . . *A. oregonensis*

Agrostis alba L. Red Top

Habitat: Wet, deep soils; full to partial sun; any exposure.

Abundance: Rare.

Major Communities: Seep.

Remarks: This is probably an exotic.

Collections: Neilson 2851, ½ mi S. Geyser Rock.

Agrostis exarata Trinius — Western Bentgrass

Habitat: Open woods; rich, deep soils; partial to full sun.

Abundance: Rare.

Major Communities: Mixed oak woodlands; Pine-oak woodlands.

Collections: Neilson 3393, Geyser Rock

Agrostis hallii Vasey — Hall's Bentgrass

Habitat: Deep, sandy-loam soils; full to part shade; mostly north and east exposures.

Abundance: Rare to occasional.

Major Communities: Pine parkland; Pine-oak woodland.

Collections: Neilson 2783, Great Western Mine (L); Neilson 3060, ½ mi S. Little Geysers

Agrostis idahoensis Nash — Idaho Bentgrass

Habitat: Disturbed places, usually construction zones.

Abundance: Occasional.

Major Communities: Anthropogenic.

Remarks: Introduced as a revegetation measure.

Agrostis oregonensis Nash — Oregon Bentgrass

Habitat: Subxeric sites in chaparral; gravelly loams; full sun.

Abundance: Occasional.

Major Communities: Chaparrals; scrubs.

Agrostis scabra Willd. — Rough Hairgrass

Habitat: Wet to moist soils; full to partial sun.

Abundance: Occasional.

Major Communities: Seep; Pond margins.

Aira caryophyllea L. — Annual Hairgrass

Habitat: Poor soils; sunny, open hillsides.

Abundance: Common.

Major Communities: Annual grassland; savannahs.

Remarks: Usually an indicator of heavy and prolonged overgrazing.

Collections: Neilson 2985

Andropogon virginicus L. — Broom Sedge, Yellowsedge Bluestem

Habitat: Wet, open sites mostly near hot springs, rarely on open wet meadows near running water.

Abundance: Occasional.

Major Communities: Riparian - hot springs; Wet Meadow.

Anthoxanthum odoratum L. — Sweet Vernal Grass

Habitat: Vernally moist, rich soils; full sun; mostly on flats.

Abundance: Occasional but locally abundant.

Major Communities: Wet meadows; Seep.

Collections: Neilson 2819, ¼ mi S. Geyser Rock; Neilson 3246, 3485, and 3562, High Valley Creek meadows (L)

Avena barbata Bratero — Slender Wild Oat

Habitat: Open hillsides and flats; gravelly loams and clays; full sun; all exposures.

Abundance: Abundant.

Major Communities: Annual grassland; oak savannahs; openings in chaparral.

Avena fatua L. — Wild Oat

Habitat: Open hillsides and flats; rich to poor gravelly loams and clays; all exposures; full sun.

Abundance: Common to abundant.

Major Communities: Grasslands, savannahs; Ruderal; Anthropogenic.

Briza maxima L. — Large Quaking Grass

Habitat: Open mesic sites; rich gravelly loams; full sun; low elevations.

Abundance: Locally common.

Major Communities: Annual grassland; oak savannahs.

Remarks: Restricted to the foothills and canyons of the westerly third of the range.

Collections: Neilson 2939, Old Mercuryville

Briza minor L. Small Quaking Grass

Habitat: Open hillsides or vernally wet areas; poor or overgrazed soils; full to partial sun; below 3200 feet elevation.

Abundance: Occasional but locally common.

Major Communities: Annual grassland; oak savannahs; Seep.

Key to *Bromus* Species

A. Plants annual.

B. Spikelets strongly flattened; lemmas compressed-keeled with terminal teeth not more than 0.5 mm, awns 7 to 15 mm. . . . *B. carinatus*

BB. Spikelets round or somewhat flattened; lemmas not compressed-keeled, their teeth mostly 0.6-5 mm long; awns straight or spreading.

C. Lemmas broad, rounded at top, pubescent, teeth less than 1mm; first glume 3 to 5-nerved; culms 3 to 8 dm tall; panicle 5 to 10 cm; spikelets turgid; awn straight, 6 to 9 mm . . . . . *B. mollis*

CC. Lemmas narrow, elongate, tapering at tip, teeth 2 to 5 mm; first glume 1-nerved.

D. Panicle erect, contracted, reddish; awn 1 to 2 cm long; culms pubescent below the dense panicle; sheaths pubescent . . . . . *B. rubens*

DD. Panicle open with spreading or drooping branches

E. Awns 12 to 14 mm long; lemmas 1 cm long, 5-nerved, villous; spikelets 1 to 2 cm long, nodding; culms slender; sheaths and blades pubescent; panicle broad, drooping. . . . . *B. tectorum*

EE. Awns 3.5 to 5 cm long; lemmas 25 to 30 mm long; spikelets 2.5 to 4 cm long. . . . . *B. diandrus (rigidus)*

AA. Plants perennial.

B. First glume 3 to 5-nerved.

C. Spikelets strongly flattened; lemmas compressed-keeled.

D. Blades canescent, densely short pilose, 2 to 5 mm wide, often involute; panicle narrow . . . . . *B. breviaristatus*

DD. Blades glabrous to puberulent or sparsely pilose, mostly 4 to 12 mm wide; awns 4 to 15 mm long.

E. Biennial; awns 7 to 15 mm long; spikelets 2 to 3 cm long, 6 to 10 flowered; panicle spreading with drooping branches; lemma 1.6 to 2 mm wide; sheaths scabrose to sparsely pilose. . . . . *B. carinatus*

EE. Perennial; awns 4 to 7 mm long; spikelets 2.5 to 3.5 cm long, 7 to 8 flowered; panicles narrow with ascending branches; sheaths pilose; lemmas pubescent. . . . . *B. marginatus*

CC. Spikelets terete before anthesis or somewhat flattened but the lemmas not compressed-keeled; sheaths pilose; blades and glumes glabrous; second glume 5-nerved; ligule 2 to 4 cm long . . . . . *B. laevipes*

BB. First glume 1-nerved.

C. Short, creeping rhizomes present; lemmas smooth to puberulent, awnless or awned to 3 mm; blades usually glabrous. . . . . *B. inermis*

CC. Creeping rhizomes absent; lemmas awned.

D. Panicles less than 2 cm broad at anthesis; nodes 2 to 3; awns 5 to 7 mm long . . . . . *B. erectus*

DD. Panicles more than 2 cm broad; nodes mostly more, 7 to 11 mm apart; ligule 3 to 5 mm long. . . . . *B. vulgaris*

Bromus breviaristatus Buckley — Short-awned Brome

Habitat: Crevices and sandy niches in rock outcrops.

Abundance: Rare.

Major Communities: Rock outcrops; Balds.

Collections: Neilson 3035, Geyser Rock

Bromus carinatus Hook. & Arnott — California Brome

Habitat: Open hillsides; gravelly clay or loam soils; usually east and north exposures.

Abundace: Occasional.

Major Communities: Oak savannahs.

Bromus diandrus Rothman — Ripgut

Habitat: Open hillsides; deep to shallow, usually rich soils; full sun; mostly below 2800 feet elevation.

Abundance: Common.

Major Communities: Annual Grassland; Blue Oak Savannah; Ruderal.

Remarks: *B. rigidus* of California authors.

Bromus erectus Hudson

Habitat: Open, sunny hillsides.

Abundance: Rare.

Major communities: Oak savannahs.

Collections: Neilson 2964, 1 mi above Big Geysers; Neilson 2965, ½ mi N. Big Geysers

Bromus inermis Leysser — Smooth Brome

Habitat: Mostly open hillsides; rich, gravelly loams; mesic sites.

Abundance: Occasional.

Major Communities: Live Oak and Garry Oak Savannahs.

Bromus laevipes Shear — Woodland Brome

Habitat: Crevices and soil basins in rock outcrops.

Abundance: Rare.

Major Communities: Rock outcrops; Balds.

Collections: Neilson 3007, ¼ mi S. Geyser Rock

Bromus marginatus Neus — Mountain Brome

Habitat: Subxeric sites; deep woodland soils; any exposure; mostly partial shade.

Abundance: Occasional.

Major Communities: Pine Parkland; Pine-Oak Woodland; Digger Pine-Scrub.

Collections: Neilson 2853, Caldwell Pines

Bromus mollis L. — Soft Chess

Habitat: Open, sunny sites; many soil types and conditions.

Abundance: Abundant.

Major Communities: Ubiquitous in many plant communities.

Bromus rubens L. — Red Brome or Foxtail Chess

Habitat: Open sites; gravelly loams; full sun; more common above 2500 feet elevation.

Abundance: Abundant.

Major Communities: Ruderal; disturbed places; openings in chaparral; grasslands; savannahs.

Collections: Neilson 3564, ridge above Big Geysers

Bromus tectorum L. — Western Cheatgrass

Habitat: Open sites, often protected by overtopping shrubs; mostly above 3000 feet; many soil types.

Abundance: Abundant.

Major Communities: Ruderal; openings in chaparrals.

Bromus vulgaris (Hooker) Shear — Common Brome

Habitat: Mesic sites; moist, rich soils; full to partial sun.

Abundance: Rare.

Major Communities: Wet meadows; Seep.

Collections: 3023, ¼ mi S. Geyser Rock

Calamagrostis canadensis Micheaux — Blue Jointgrass

Habitat: Mesic sites; wet to moist soils; mostly partial shade.

Abundance: Occasional.

Major Communities: Seep; Mixed Oak Woodland; Bay-Oak-Madrone.

Calamagrostis ophitidis (Howell) Nygren — Leafy Red Grass

Habitat: Mesic sites in serpentine chaparrals, mostly along water ways.

Abundance: Rare.

Major Communities: Jepson's Ceanothus-Leather Oak- Stanford's Manzanita; Cypress Woodlands.

Cynosurus echinatus L. — Dog Tail Grass

Habitat: Poor, gravelly loams, often disturbed; full to partial sun; below 3800 feet elevation.

Abundance: Abundant.

Major Communities: Rather ubiquitous, but mostly in open woodlands, poor or overgrazed grasslands and savannahs.

Collections: Neilson 3263, High Valley Creek (L): Neilson 3582, ½ mi W. Old Mercuryville

Dactylis glomerata L. — Orchard Grass

Habitat: Open, sunny hillsides; deep soils; full sun.

Abundance: Occasional to locally common.

Major Communities: Grasslands.

Remarks: Introduced in range improvement programs.

Danthonia californica Bolander — California Oatgrass

Habitat: Vernally moist sites; mostly rich soils; full sun.

Abundance: Occasionally to locally common.

Major Communities: Annual Grassland; Wet Meadow; Seep.

Collections: Neilson 3050 & 3051, meadow ½ mi S. Little Geysers; Neilson 3237, High Valley Creek (L)

Deschampsia caespitosa (L.) Beau. Annual Hairgrass

Habitat: Vernal, moist to subxeric sites; full sun; usually deep meadow soils.

Abundance: Occasional to locally common.

Major Communities: Oak woodlands; savannahs; disturbed places.

Deschampsia danthonoides (Trin.) Munro. es Bentham Annual Hairgrass

Habitat: Subxeric sites; mostly poor soils or depleted pasture land; full sun.

Abundance: Occasional but locally common.

Major Communities: Annual Grassland; oak savannahs; openings in chaparral and scrub brushlands.

Collections: Neilson 3239, High Valley Creek

Deschampsia elongata (Hook.) Munro ex Bentham Slender Hairgrass

Habitat: Mesic habitats; mostly deep, moist, rich soils; full sun.

Abundance: Occasional to locally common.

Major Communities: Wet Meadow; Springs; Seep.

Collections: Neilson 2820, ¼ mi S. Geyser Rock

Elymus caput-medusae L. Medusahead

Habitat: Open, sunny hillsides and flats; poor or overgrazed loams and clays, often vernally moist.

Abundance: Occasional to locally common.

Major Communities: Annual Grassland; oak savannahs; openings in chaparrals; oak woodlands, Anthropogenic.

Remarks: Synonym = *Taeniatherum asperum*

Collections: Neilson 2781 and 3044, Great Western Mine area (L)

Elymus glaucus Buckley Perennial Wild Rye

Habitat: Usually rich, loamy soils; full or partial shade; all exposures.

Abundance: Occasional.

Major Communities: Riparian; oak woodlands.

Collections: Neilson 2902 and 2925, Old Mercuryville area; Neilson 3583, Truit Creek

Elymus triticoides Buckley — Creeping Wild Rye

Habitat: Usually on sandy loams; full or partial shade; all exposure.

Abundance: Occasional.

Major Communities: Riparian; oak woodlands.

Key to *Festuca* Species

A. Plants annuals.

B. Spikelets densely 5 to 12-flowered; lemmas without scarious margins . . . . . *F. octoflora*

BB. Spikelets loosely 1 to 5-flowered; lemmas with a narrow, scarious margin.

C. Inflorescence narrow, branches ascending or appressed-ascending.

D. Lemmas long, ciliate toward apex. . . . . *F. megalure*

DD. Lemmas not ciliate; lower glume 2/3 to 3/4 as long as the second. . . . . *F. dertonensis*

CC. Inflorescence broader, the principal branches spreading.

D. Spikelets glabrous or scabrous.

E. Spikelets mostly 3 to 5-flowered, only main branches divergent . . . . . *F. pacifica*

EE. Spikelets mostly 1 to 2-flowered, all branches of inflorescence divergent or reflexed. . . . . *F. reflexa*

DD. Spikelets, glumes, and lemmas pubescent; pedicels and panicle branches all spreading or reflexed at maturity . . . . . *F. eastwoodae*

AA. Plants perennials.

B. Awns less than 2 mm long or mucronate or awnless; leaf blades flat or loosely rolled, smooth and shiny on lower surface when fresh, 4 to 8 mm wide; lemmas 7 to 10 mm long . . . . . *F. arundinaceae*

BB. Awns well developed, more than 2 mm long; leaf blades narrow or tightly rolled, if flat not smooth and shiny below.

C. Collar and mouth of sheath villous; plants forming coarse clumps . . . . . *F. californica*

CC. Collar and mouth of sheath glabrous.

D. Awn of lemma shorter than the body; ovary glabrous at summit; blades scabrous and commonly glaucous. . . . . *F. idahoensis*

DD. Awn of lemmas longer than the body; ovary pubescent at the summit; blades smooth, green or glaucous. . . . . *F. occidentalis*

Festuca arundinacea Schreber — Tall Fescue

Habitat: Open, sunny hillsides and meadows; deep, rich, vernally moist soils; full sun.

Abundance: Occasional.

Major Communities: Wet Meadow; grasslands at higher elevations.

Remarks: Introduced in range improvement programs or as a revegetation measure - successful only where adequate soil moisture in summer is available.

Festuca californica Vasey — California Fescue

Habitat: Open to wooded slopes; gravelly loams and clays, including some serpentine; full to partial shade; mostly north and east exposures.

Abundance: Common.

Major Communities: Digger Pine-Shrub; Douglas Fir-Oak-Pine; Jepson's Ceanothus-Leather Oak-Stanford's Manzanita.

Collections: Neilson 2917, near Old Mercuryville; Neilson 2961 Big Geysers; Neilson 3581, High Valley Creek (L)

Festuca dertonensis (Allioni) Ascherson & Graebner — Six-weeks Fescue

Habitat: Open, sunny slopes; gravelly, poor soils; all exposures.

Abundance: Common.

Major Communities: Annual Grassland; oak savannahs; openings in chaparrals.

Collections: Neilson 2979, ½ mi S. Geyser Rock

Festuca eastwoodae Piper — Eastwood's Fescue

Habitat: Subxeric sites, mostly with little competition, gravelly loam, usually thin and poor; full sun.

Abundance: Occasional to locally common.

Major Communities: Mostly openings in brushlands and woodlands.

Collections: Neilson 3486, Big Geysers

Festuca idahoensis — Idaho Fescue

Habitat: Open places in woods or forests; deep soils.

Abundance: Occasional.

Major Communities: Pine-Oak Woodland; Pine Parkland; disturbed places.

Remarks: Used as a revegetation species occasionally.

Collections: Neilson 2976, Big Geysers; Neilson 3236, High Valley Creek (L)

Festuca megalura Nuttall — Foxtail or Malpias Fescue

Habitat: Open, sunny sites; good to poor, gravelly soils; full sun; all exposures.

Abundance: Abundant.

Major Communities: Native Herb; Annual Grassland; California Prairie; oak savannahs; openings in chaparral.

Collections: Neilson 3687, 1 mi NW. junction Big Sulphur and Squaw Creeks

Festuca occidentalis Hooker — Western Fescue

Habitat: Dry, rocky slopes; gravelly loams; mostly full sun.

Abundance: Rare to occasional.

Major Communities: Oak savannahs.

Collections: Neilson 2960, Big Geysers area

Festuca octoflora Walter — Six-week Fescue

Habitat: Dry, open sites; poor, gravelly soils; full sun.

Abundance: Occasional.

Major Communities: Annual Grassland.

Festuca pacifica Piper — Pacific Fescue

Habitat: Open, sparsely vegetated sites, often on serpentine; full sun.

Abundance: Occasional to locally common.

Major Communities: Serpentine chaparrals; Rock Barrens.

Festuca reflexa Buckley — Reflexed-flower Fescue

Habitat: Open, sunny sites; usually poor soils; full sun.

Abundance: Occasional to locally common.

Major Communities: Native Herb; openings in chaparrals and scrub; oak savannahs.

Gastridium ventricosum (Gouan) Schinz & Thellung — Nitgrass

Habitat: Open, sunny sites; poor or overgrazed soils; full sun; mostly south and west exposures.

Abundance: Occasional.

Major Communities: Annual Grassland; oak savannahs.

Key to *Hordeum* Species

A. Perennials.

B. Spikelets about as long as broad, bristly with awns, 2-5 cm . . . *H. jubatum*

BB. Spike much longer than broad; awns less than 1 cm.

C. Blades pubescent, 1.5 to 5 mm wide; anthers 1.5 to 3 mm; glumes of central spikelet much longer than palea. . . . . *H. californicum*

CC. Blades mostly glabrous, 3 to 9 mm wide; anthers 1 to 1.5 mm long; glumes about as long as palea . . . . . *H. brachyantherum*

AA. Annuals.

B. Auricles well developed; rachis disjointing at nodes; all spikelets pediceled; glumes ciliate . . . . . *H. leporinum*

BB. Auricles absent; floret of lateral spikelets awned; spike 3 to 6 cm long. . . . . *H. depressum*

Hordeum brachyantherum Nevskii — Meadow Barley

Habitat: Wet to moist sites; deep, rich soil; full sun.

Abundance: Occasional to locally common.

Major Communities: Wet Meadow.

Collections: Neilson 3327, High Valley Creek

Hordeum californicum Covas and Stebbins — Meadow Barley

Habitat: Subxeric sites; gravelly sandy loams; full to partial shade; all exposures.

Abundance: Occasional.

Major Communities: Pine Parklend; Native Herb; openings in scrub brushlands.

Collections: Neilson 3190 and 3306, High Valley Creek (L)

Hordeum depressum (Scribn. & Smith) Rydberg. — Low Barley

Habitat: Mostly open sites with excessive vernal moisture; heavy clay or clay-loams, often tending to be saline or alkali; full sun; all exposures.

Abundance: Occasional to locally common.

Major Communities: Seeps, especially at the low end.

Hordeum jubatum L. — Foxtail Barley

Habitat: Usually subxeric site; poor, gravelly soils; full sun.

Abundance: Rare to occasional.

Major Communities: Seep; Riparian.

Hordeum leporinum Link — Wild or Foxtail Barley

Habitat: Open, sunny sites; good to poor soils, but more abundant where soils are rich; full sun.

Abundance: Common.

Major Communities: Annual Grassland; oak savannahs; Ruderal; Anthropogenic.

Koeleria cristata (L.) Persoon — June Grass

Habitat: Vernally wet areas; deep, rich soil; full sun.

Abundance: Common.

Major Communities: Wet Meadow.

Lamarckia aurea (L.) Moench — Golden Top

Habitat: Open, sunny hillsides; poor or depleted soils; full sun.

Abundance: Occasional to locally common.

Major Communities: Ruderal; Annual Grassland; openings in Chaparral.

Lolium multiflorum Lammark — Italian Rye Grass

Habitat: Open, sunny hillsides; good to poor soils.

Abundance: Occasional to locally common.

Major Communities: Annual Grassland; Anthropogenic.

Remarks: Commonly used as a revegetation species.

Melica californica Scribner — California Melic

Habitat: Openings in woodlands or brushlands; deep to shallow soil; full or part sun.

Abundance: Common.

Major Communities: California Prairie; oak woodlands; oak savannahs; chaparrals.

Collections: Neilson 2977, ½ mi S. Geyser Rock; Neilson 3350, Caldwell Pines

Melica subulata (Grisebach) Scribner — Alaskan Onion Grass

Habitat: ?

Abundance: Occasional.

Major Communities: Annual Grassland.

Collections: Neilson 2962, hillside 1 mi. above Big Geysers; Neilson 2984, Big Geysers: Neilson 3484, Old Mercuryville

Melica torreyana Scribner — Torrey's Melic

Habitat: Open, sunny hillsides; gravelly, rock soils; full sun.

Abundance: Occasional.

Major Communities: Annual Grassland; oak savannahs.

Collections: Neilson 2785, Great Western Mine on serpentine (L): Neilson 3006, Big Geysers

Muhlenbergia filiformis (Thurber) Rydberg — Slender Mully

Habitat: Moist to wet soils; full sun; any exposure.

Abundance: Occasional to locally common.

Major Communities: Seep; Wet Meadow.

Panicum miliaceum L. Broom Corn Millet

Habitat: Disturbed places, mostly on roadsides.

Abundance: Rare.

Major Communities: Ruderal.

Remarks: Introduced in revegetation seed mixtures.

Panicum thermale Bolander Hot Springs Panic Grass

Habitat: Geothermally altered soils in the immediate vicinity of hot springs.

Abundance: Rare to locally common.

Major Communities: Restricted to hot springs at the Geysers.

Remarks: CNPS Rare Species List, synonyms-*Dicanthelium langinosum* (Ell.) Gould var. *thermale* (Bol.) Spellenberg, *D. acuminatum* (Sw.) Gould & Clark var. *acuminatum*

Collections: Neilson 2837, Little Geysers

Phleum alpinum L. Mountain Timothy

Habitat: Vernally wet soils; full sun.

Abundance: Occasional.

Major Communities: Wet Meadow; Seep borders.

Key to *Poa* Species

A. Plants annual; lemmas pubescent, but not webbed at base. . . . . *P. annua*

AA. Plants perennial.

B. Creeping rhizomes present; panicle open, its elongated lower branches lax and only floriferous in outer half.

C. Lemmas glabrous or puberulent, but not webbed at base; florets all female . . . . . *P. nervosa*

CC. Lemmas cobwebby at the base, pilose on keel and marginal nerves; florets perfect . . . . . *P. pratensis*

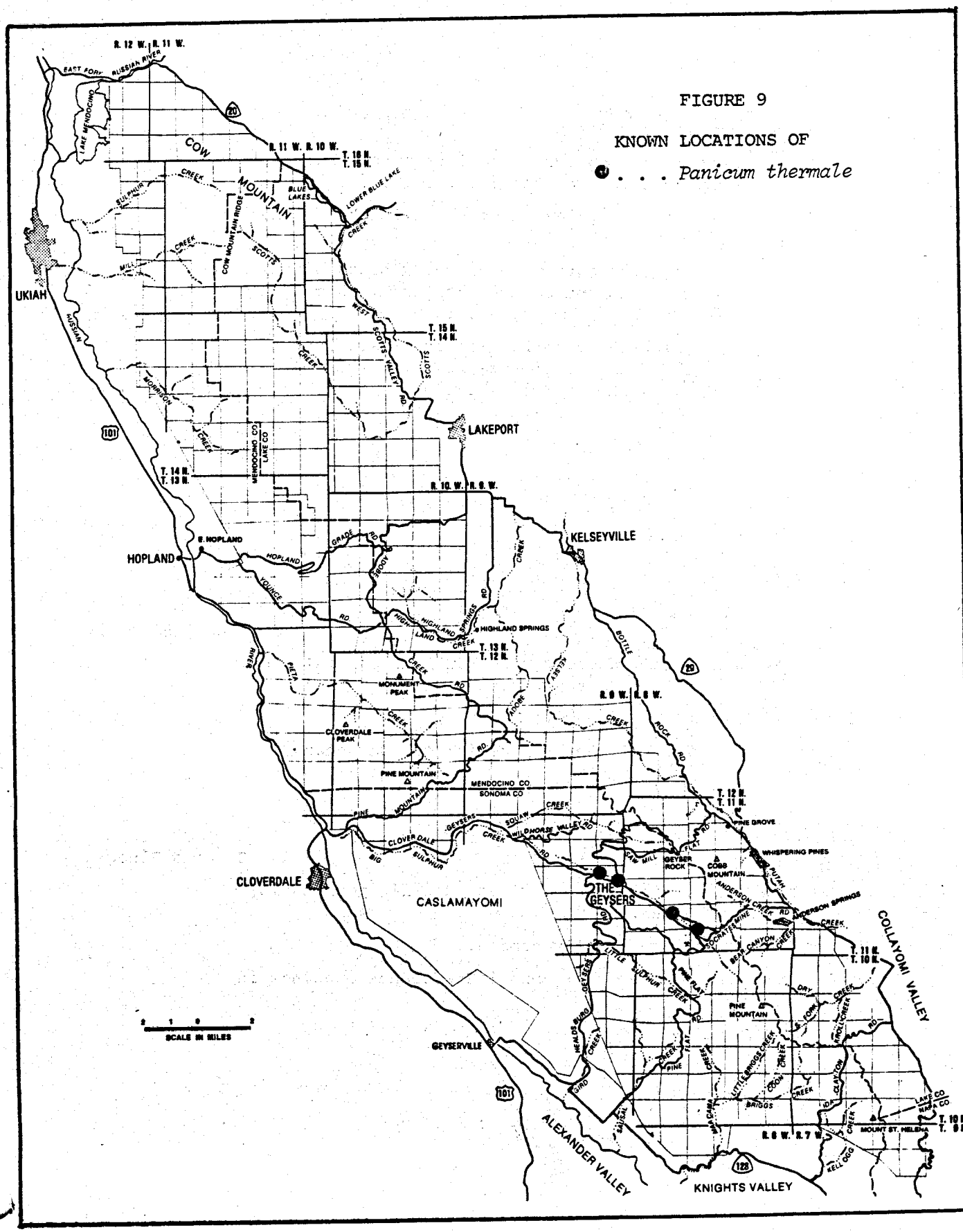


FIGURE 9

KNOWN LOCATIONS OF

● . . . *Panicum thermale*

BB. Creeping rhizomes absent.

C. Florets mostly converted to dark purple bulblets; culms with bulblike base . . . . . *P. bulbosa*

CC. Florets normal; green culms not bulblike at the base.

D. Lemmas with a tuft of cobwebby hairs at the base, pubescent on the keel and with marginal nerves. . . . . *P. palustris*

DD. Lemmas without webbing at the base, rounded on the back, crisp-puberulent toward the base; the keel obscure . . . . . *P. scabrella*

Poa annua L. Annual Bluegrass

Habitat: Disturbed soils, usually rich; full to partial sun; mostly north and east exposures.

Abundance: Occasional.

Major Communities: Ruderal, Anthropogenic; oak savannahs.

Poa bulbosa L. Bulbous Bluegrass

Habitat: Open sites, often vernally wet; usually poor soils; mostly full sun.

Abundance: Occasional to locally common.

Major Communities: Native Herb; Annual Grassland; openings in chaparrals.

Poa nervosa (Hooker) Vasey — Hooker's Bluegrass

Habitat: Crevice's in rocks.

Abundance: Occasional.

Major Communities: Rock outcrops.

Poa palustris — Fowl Bluegrass

Habitat: Deep, rich, vernally wet soils.

Abundance: Occasional.

Major Communities: Wet Meadow; Seep; Pond margins.

Poa pratensis L. — Kentucky Bluegrass

Habitat: Mesic sites, usually vernally wet soils; full to part sun.

Abundance: Occasional.

Major Communities: Oak woodlands; Anthropogenic.

Collections: Neilson 2986, Big Geysers; Neilson 3228 and 3324, High Valley Creek (L)

Poa scabrella (Thurber) Bentham ex Vasey — Pine Bluegrass

Habitat: Open woods or subxeric sites; mostly deep soils; full to part sun.

Abundance: Occasional to rare.

Major Communities: California Prairie; Pine Parkland.

Collections: Neilson 3580; serpentine ridge 1 mi SE headwaters High Valley Creek (L)

Polypogon interruptus HBK — Beard Grass

Habitat: Wet soils, usually rich and deep.

Abundance: Occasional to rare.

Major Communities: Seep; Pond margins.

Polypogon monspeliensis (L.) Decf. Rabbit's Foot Grass

Habitat: Wet, soggy ground, mostly perennial wet; full sun.

Abundance: Occasional but locally common.

Major Communities: Seep; Spring; Pond Margins; Riparian.

Sitanion hystrix Nuttall Squirreltail Grass

Habitat: Xeric to subxeric sites; open, gravelly, usually poor, rocky soils; full sun.

Abundance: Abundant.

Major Communities: Ubiquitous in many communities.

Collections: Neilson 2982

Sitanion jubatum J.G. Sm. Big Squirreltail Grass

Habitat: Open, gravelly soils, usually disturbed sites that have vernal moisture; full sun; any exposure.

Abundance: Rare to occasional.

Major Communities: Ruderal; a few riparian sites.

Collections: Neilson 2782, Great Western Mine area (L)

Stipa cernua Stebbins & Love Nodding Stipa

Habitat: Openings in chaparral or grassy hillsides; gravelly loams and clays; mostly full sun.

Abundance: Occasional.

Major Communities: Openings in brushland; occasionally below seeps; oak savannahs.

Stipa lemmonii (Vasey) Scribn. Lemmon's Needle & Threadgras

Habitat: Xeric sites; rocky, gravelly soils; full to partial sun.

Abundance: Occasional.

Major Communities: Chaparral openings; Rock outcrop; savannahs.

Collections: Neilson 2818, ½ mi S. Geyser Rock

Stipa lepida Hitchcock Foothill Stipa

Habitat: Subxeric sites; deep gravelly soils; full sun.
Abundance: Occasional to locally common.
Major Communities: California Prairie.
Collections: Neilson 3330, High Valley Creek meadows

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