

in cooperation with:



**US Army Corps
of Engineers**
Sacramento District



CALIFORNIA



NATURAL RESOURCES
CONSERVATION SERVICE

Common Wetland Plants of Central California



PEGGY L. FIEDLER, PH.D., AUTHOR

LARRY J. VINZANT, EDITOR

COVER PHOTOS

Freshwater Marsh (upper left): Deep marsh dominated by Tule (*Scirpus acutus*) with shallow marsh in the foreground supporting smartweed (*Polygonum* sp.) and rush (*Juncus* sp.). Photo taken in Suisun Marsh.

Vernal Pool (upper right): Typical flower ring of *Sidalcea calycosa* around the edge of the pool. The yellow flowers in the foreground are goldfields (*Lasthenia* sp.). Spikerush (*Eleocharis macrostachya*) and coyote thistle (*Eryngium vaseyi*) grow in the deeper central part of the pool. Photograph taken at Phoenix Field in Sacramento County.

Riparian Wetland (lower left): Forested wetland along Cosumnes River in Sacramento County dominated by cottonwood (*Populus* sp.) and willow (*Salix* sp.). Shallow marsh is in the foreground supporting Bur Marigold (*Bidens laevis*), Cocklebur (*Xanthium strumarium*) and hydric grasses.

Saltwater Marsh: Marsh along San Pablo Bay dominated by Pacific Cordgrass (*Spartina foliosa*) waterward and Saltmarsh Bulrush (*Scirpus maritimus*) landward.

ABOUT THE AUTHOR:

Peggy Lee Fiedler received her B.A. at Radcliffe College, Harvard University and her M.S and Ph.D. in plant evolution and ecology at the University of California. In 1989, Dr. Fiedler joined the faculty of the Biology Department at San Francisco State University and currently serves as Associate Professor and Director of the Graduate Program in Conservation Biology. In addition to teaching, she is involved in a variety of research projects and also does consulting work. Dr. Fiedler wrote the majority of text of this booklet under a Corps of Engineers contract as a professional affiliate of L. C. Lee and Associates, Inc.

ABOUT THE EDITOR:

Larry J. Vinzant received his B.A. from the University of Iowa, majoring in Zoology and General Science. He received an M.S. from Western Illinois University majoring in Zoology with an emphasis on Wildlife Biology and a minor in Botany. He has worked in wetlands for approximately 19 years, the last seven being with the U. S. Army Corps of Engineers', Sacramento District's Regulatory Branch.

REPORT DOCUMENTATION

Title: Common Wetland Plants of Central California

Author: Dr. Peggy Fiedler

Editor: Larry Vinzant

Prepared by: U.S. Army Corps of Engineers
Sacramento District

Final Report: October 1996

Keywords: Wetlands, Marsh, Vernal Pool, Riparian

Abstract: This booklet generally describes typical wetland communities in Central California and specifically describes 66 wetland plants with text and color photographs. Background information, a glossary, an index and selected references on wetlands are included.

ACKNOWLEDGEMENTS

I would like to thank Guy Romito of the U.S. Bureau of Reclamation for initiating this effort and securing much of the funding. Additional funding was obtained through the efforts of Jane Freeman of the U.S. Environmental Protection Agency, Ron Schultze of the Natural Resources Conservation Service and the U.S. Army Corps of Engineers' Sacramento District. Excellent review of the draft descriptions was provided by Peter Baye of the Corps' San Francisco District. Mary Butterwick of the U.S. Environmental Protection Agency also provided helpful review of the draft. Final review of the draft was also provided by Kathy Norton and Mike Finan of the Corps' Sacramento District, Regulatory Branch. Thanks go to Liz Carret of Prototype Typesetting for an excellent job in formatting this booklet. Finally I'd like to express appreciation to those people, particularly those of the Sacramento Regulatory Branch, that either provided slides of wetland plants or helped in other ways toward completion of this booklet.

Please note that the line drawings of a typical flower, composite flower, grass spikelet and perigynium are copyrighted material of Ms. Vera Wong and cannot be used without her permission. The other drawings were taken from "*Wetland Plants and Plant Communities of Minnesota & Wisconsin*" (Eggers and Reed, 1987).

PHOTOGRAPH CREDITS

Except as indicated below, all photographs were taken by Larry Vinzant.

Ken Brunner: *Jaumea carnosa*; *Oenanthe sarmentosa*.

Nancy Haley: Riparian wetland on cover; *Rumex crispus*.

Adrian Juncosa: *Carex nebrascensis*.

Kathy Norton: *Downingia bicornuta*; *Lasthenia fremontii*; *Limnanthes alba*;
Salix lasiolepis.

TABLE OF CONTENTS

REPORT DOCUMENTATION *i*

ACKNOWLEDGEMENTS *ii*

PHOTOGRAPH CREDITS *ii*

INTRODUCTION 1

COMMON WETLAND COMMUNITIES OF CENTRAL CALIFORNIA

Deep Freshwater Marsh 4
Shallow Freshwater Marsh 4
Wet Meadow 5
Seasonally Inundated/Saturated Freshwater Flat 5
Vegetated Shallows 5
Vernal Pool and Swale 6
Riparian Wetland 6
Inland Saline Marsh/Alkali Sink 6
Low Brackish/Salt Marsh 7
High Brackish/Salt Marsh 7

COMMON WETLAND PLANTS

Monocotyledoneae

Alismataceae-Water Plantain Family 9
Cyperaceae-Sedge Family 10
Juncaceae-Rush Family 18
Juncaginaceae-Arrow-weed Family 20
Poaceae-Grass Family 21
Typhaceae-Cattail Family 32

Dicotyledonae

Aceraceae-Maple Family 35
Apiaceae-Carrot Family 36
Asteraceae-Sunflower, Composite Family 39
Boraginaceae-Borage Family 47

Brassicaceae-Mustard Family	49
Campanulaceae-Bellflower Family	51
Caprifoliaceae-Honeysuckle Family	52
Caryophyllaceae-Pink Family	53
Chenopodiaceae-Goosefoot Family	54
Fabaceae-Legume Family	57
Fagaceae-Oak Family	59
Frankeniaceae-Frankenian Family	60
Lamiaceae-Mint Family	61
Limnanthaceae-Meadowfoam Family	63
Lythraceae-Loosestrife Family	64
Malvaceae-Mallow Family	65
Oleaceae-Olive Family	67
Onagraceae-Evening Primrose Family	68
Platanaceae-Sycamore Family	70
Polemoniaceae-Phlox Family	71
Polygonaceae-Buckwheat Family	72
Rubiaceae-Madder Family	73
Salicaceae-Willow Family	74
Scrophulariaceae-Figwort Family	76
Tamaricaceae-Tamarisk Family	77

SELECTED REFERENCES	78
----------------------------------	----

GLOSSARY	79
-----------------------	----

LINE DRAWINGS

Inflorescence Types	84
Leaf Shapes	85
Leaf Venation	86
Cross Section of a Typical Flower	87
Cross Section of a Typical Composite Flower	87
Cross Section of a Typical Grass Spikelet	88
Cross Section of a Perigynium (<i>Carex</i>)	88
Index	89

INTRODUCTION

Wetlands of California are floristically rich and ecologically varied. Floristically rich because they support a wealth of native, naturalized, and exotic plant species, and ecologically varied because of the large number of discrete geomorphic and hydrological features that combine to create conditions conducive to the development and support of wetlands.

The Corps of Engineers regulates activities in wetlands and other waters of the United States pursuant to the Clean Water Act and the Rivers and Harbors Act. As defined by the Corps of Engineers related to its regulatory activities, wetlands are:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3 (b)).

The general geographical coverage for this booklet is identified in Figure 1. While this booklet is not a complete listing of even the most common wetland plants in central California, it should provide the public and agency personnel a useful tool in quickly identifying some of our common wetland plants. This booklet should be of use over a large area of California including the San Joaquin Valley, Sacramento Valley, San Joaquin-Sacramento Rivers Delta and San Francisco Bay. The San Joaquin and Sacramento Valleys collectively form the Central (or Great) Valley.

To the north, the Sacramento Valley ends in the foothills at the confluence of the terminous of the Cascade Ranges and the Sierra Nevada. The foothills of the northern Sierra Nevada define the eastern boundary of this geographic subregion while the foothills of the Coast Ranges define the western limit. The southern limit is defined by the northern limit of the San Joaquin Valley, roughly congruent with the borders of Contra Costa and San Joaquin Counties. To the south of the Sacramento Valley, the San Joaquin Valley is defined on the east by the Sierra Nevada foothills, on the west by the foothills of the Coast Ranges and to the south by the foothills of the Transverse Ranges (Tehachapis). The Sacramento Valley is the smaller and historically wetter subregion of the Central Valley. The San Joaquin Valley, the larger of the two subregions, is hotter and drier than the Sacramento Valley.

The Central Valley now is mostly agricultural, but formerly was an expansive network of prairies, fresh and brackish marshes, valley oak savannahs, and riparian woodlands (Hickman 1993). At the confluence of the Sacramento River, which drains the northern area, and the San Joaquin River, which drains the south, is the area referred to as the Delta. This consists of a maze of waterways and islands with most of the islands diked off and currently in agriculture even though some are up to 20 feet below sea level due to subsidence, compaction and the oxidation of the peat soils.

CALIFORNIA'S CENTRAL VALLEY



Figure 1
California subregions addressed in this booklet

How To Use This Booklet

The purpose of this plant guide is to assist in the rapid photographic identification of some of the commonly occurring wetland plants in central California. The user cannot use this book as a taxonomic key or to discern among all possible species within a large, taxonomically complex genus. The sedges (*Carex*), for example, are difficult to identify even for the experienced wetland botanist. Thus, the species described herein represent only a very small subset of the wetland plants occurring within Central California. A more comprehensive flora, should be consulted to identify difficult taxa, and verify any identification.

Species characterizations are largely simplified and condensed adaptations from the detailed botanical descriptions found in *The Jepson Manual: Higher Plants of California* (Hickman 1993), but also from those found in *A California Flora* (Munz 1968) and *A Flora of the Marshes of California* (Mason 1957). Nomenclature follows Kartesz (1994). All descriptions were done by the author except *Scirpus maritimus*, *Deschampsia danthonioides*, *Sidalcea calycosa* and *Plantanus racemosa*, which were done by the editor.

It is important to remember that scientific plant names can vary, based upon current concepts of plant evolution, nomenclatural rules, and the acceptance of different plant names in regional floras. For example, names in Kartesz (1994) or Hickman (1993) may differ slightly from a few of those described in this booklet, but common synonymies are described in the notes for species whose currently accepted names, in either Kartesz (1994) or *The Jepson Manual*, might be confusing. Descriptions are arranged alphabetically by Family and Genus within the two major Classes of flowering plants. Each description is accompanied by a brief discussion of the species' habitat and geographic distribution, as well as by general comments that should aid in the identification process. Common plant species are provided for each.

Also included are brief discussions of eleven broad classes of wetland communities. These wetland communities are generalized, common wetland types found throughout the American West and, are easily recognizable.

COMMON WETLAND COMMUNITIES OF CENTRAL CALIFORNIA

DEEP FRESHWATER MARSHES (Cover Photograph)

Deep, freshwater marshes are characterized by an extended flooding regime of, often, permanent inundation, or nearly so, in the majority of the wetland. Water depths typically range from approximately 2 cm (approximately 1 in) to greater than 50 cm (>1.5 ft). These wetlands are found in a wide range of geomorphic settings, including lake and pond shores and margins, and basin features such as ponds and shallow depressions. Some ditches can also be characterized as deep marsh due to an extended hydroperiod. A wide variety of wetland plant species grow in deep, freshwater marshes. Their distribution within these wetland types is typically determined by the depth, duration, seasonality, and circumneutral chemistry of the water. Submerged aquatic plants often are represented by milfoil (*Myriophyllum* spp.); floating-leaved aquatic plants by water lilies (e.g., *Nuphar luteum*); floating aquatics by duckweed (*Lemna* spp.); rooted aquatic species by Watercress (*Rorippa nasturtium-aquaticum*); and, persistent and non-persistent emergent species by various bulrushes (*Scirpus acutus*, *S. californicus*) and cattails (*Typha* spp.).

SHALLOW FRESHWATER MARSHES (Cover Photograph)

Shallow, freshwater marshes also are characteristic of many geomorphic settings where surface water persists, but for a comparatively short period of time. Water depth in these wetlands is often less than 16 cm (6 in), with little or no standing water during the summer months, or during periods of drought. Shallow, freshwater marshes are often found adjacent to deeper marshes, as well as in palustrine basins and on the shores and margins of lakes, rivers, and streams. Many plant species are found in this wetland type, as the dynamic nature of the hydrologic regime allows for the persistence of many wetland plants. Species characteristic of this habitat include many rushes (*Juncus* spp.), sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), grasses (*Agrostis* spp., *Poa* spp., *Deschampsia* spp.), smartweeds (*Polygonum* spp.), horsetails (*Equisetum* spp.), and willow-herbs (*Epilobium* spp.).

WET MEADOWS

Wet meadows are wetlands that typically are infrequently inundated and then for only short periods of time. However, these areas typically remain saturated at or near the surface for extended periods in the growing season. As with all wetland communities described herein, wet meadows are found in a variety of geomorphic features, but are characteristic of palustrine basins, slopes, swales, bottomlands, terraces, and areas adjacent to seeps and springs. Water chemistry can be influenced by calcium or sodium-derived salts, but wet meadows are most commonly fresh in the Central Valley. Many plant species found in shallow, freshwater marshes are also found in wet meadows, including sedges, rushes, spikerushes, grasses, smartweeds, and willow-herbs. Additional species may include the Eurasian weeds Curly Dock (*Rumex crispus*), Poison Hemlock (*Conium maculatum*) and Broad-leaf Peppergrass (*Lepidium latifolium*).

SEASONALLY INUNDATED/SATURATED FRESHWATER FLATS

Flats are level landforms of unconsolidated sediments, mostly alluvial in origin and occupy significant portions of the Central Valley. They often remain shallowly inundated or saturated for a significant portion of the growing season, and support a variety of wetland plants, although many are exotic species. Native wetland plants that are found in these freshwater flats include Toad Rush (*Juncus bufonius*), Blowwives (*Achyraea mollis*), goldfields (*Lasthenia* spp.), and monkeyflowers (*Mimulus* spp.). Exotic species include a variety of barley species (*Hordeum* spp.), Rabbitfoot Grass (*Polypogon monspeliensis*), Prickly Lettuce (*Lactuca serriola*), and Curly Dock (*Rumex crispus*).

VEGETATED SHALLOWS

Vegetated shallows are typically permanently flooded basins, estuaries, or the shallow portions of lakes and slow-moving streams where vegetation is dominated by submerged or floating rooted plants. An important component of these habitats may include algae and floating non-rooted plants. Vegetated shallows are found in many types of wetlands and geomorphic settings. Characteristic freshwater aquatic species include water starworts (*Callitriche* spp.), Common Hornwort (*Ceratophyllum demersum*), water milfoil (*Myriophyllum* spp.), and White Water Buttercup (*Ranunculus aquatilis*). Widgeongrass (*Ruppia maritima*) and Ditchgrass (*Ruppia cirrhosa*) are more common in brackish or saline habitats.

VERNAL POOLS AND SWALES (Cover Photograph)

Vernal pools and swales are rather small, shallow depressions and drainages, respectively, typically embedded in a grassland matrix, in areas of California influenced by a Mediterranean climate. Impermeable substrates supporting vernal pools and swales in the Central Valley include hardpans, claypans, and basaltic flows. Vernal pools and swales fill with water during the winter rains, and remain inundated for a period of days to months. As the pools desiccate, a succession of vascular species uniquely adapted to these California wetlands bloom. Vernal pools are common in a number of regions within the Central Valley. Typical vernal pool wetland plants include species of coyote thistle (*Eryngium* spp.), downingia (*Downingia* spp.), meadowfoam (*Limnanthes* spp.), popcorn flower (*Plagiobothrys* spp.), woolymarbles (*Psilocarphus* spp.), as well as Tufted Hairgrass (*Deschampsia danthonioides*), and Pygmy Waterweed (*Crassula aquatica*).

RIPARIAN WETLANDS (Cover Photograph)

Riparian wetlands are those communities adjacent to and influenced by riverine or estuarine channels that continuously, intermittently, or periodically contain moving water. Although riparian refers to the proximity of the community to the watercourse, many of these areas do not meet Corps criteria for defining jurisdictional wetlands. In the Central Valley, riparian wetlands historically were dominated by a rich flora of trees and shrubs, but little natural riparian forested wetland remains. Natural riparian wetlands are characterized by a dominance of cottonwoods (*Populus fremontii*, *P. trichocarpa*), White Alder (*Alnus rhombifolia*), Box Elder (*Acer negundo*), Oregon Ash (*Fraxinus latifolia*) and willows (*Salix lasiolepis*, *S. exigua*, *S. gooddingii*). Commonly occurring shrubs and vines include Buttonbush (*Cephalanthus occidentalis*), American Dogwood (*Cornus sericea* ssp. *sericea*), elderberry (*Sambucus* spp.), and Mulefat (*Baccharis salicifolia* [= *Baccharis viminea*]).

INLAND SALINE MARSHES/ALKALI SINKS

Inland saline marshes are palustrine basins, typically shallow and seasonally or permanently inundated with water influenced by sodium salts (and other halides) not derived from ocean waters. Alkali sinks are very shallow basins with prolonged inundation whose typically sparse vegetation is influenced by calcium-derived salts. Because of the generally similar effects of the water chemistry on the wetland's species composition, these inland marshes and sinks share many species typical of coastal salt and brackish marshes. Species typical of these inland wetlands in the Central Valley include Iodinebush (*Allenrolfea occidentalis*), Bush Seepweed (*Suaeda moquinii*), Saltgrass (*Distichlis spicata*), and species of saltbush (*Atriplex* spp.) and arrowgrass (*Triglochin* spp.).

LOW BRACKISH/SALT MARSHES (Cover Photograph)

Low salt or brackish water marshes are found adjacent to marine and estuarine waters below mean higher high water (MHHW) where they are inundated by high tides, generally on a daily basis. Salinities may range from marine (approximately 35 ppt) to brackish (approximately 5 to 7 ppt). Brackish and salt marshes occur in the vicinity of coastal bays such as San Francisco, San Pablo, Suisun Bays and in portions of the Delta. In intertidal areas, Pickleweed (*Salicornia virginica*), Fleshy Jaumea (*Jaumea carnosa*), Pacific Cordgrass (*Spartina foliosa*) and Saltmarsh Bulrush (*Scirpus maritimus*) are most common with salt bush (*Atriplex* spp.) and arrowgrass (*Triglochin* spp.) occupying the peripheral halophyte zone. Under lower salinities, various bulrushes (*Scirpus acutus*, *S. californicus*, *S. americanus*), cattails (*Typha domingensis*, *T. angustifolia*), and sedges (*Carex* spp.) are more common.

HIGH BRACKISH/SALT MARSHES

High brackish or salt marshes are found within the estuarine system, typically above MHHW, receiving tidal inundation on an irregular (i.e., less than daily) basis. However, many of these areas, particularly in the San Francisco Bay area, have been diked off from tidal influence, often for salt production. High marshes are found at, and are contiguous with, the shoreward margins of the low brackish/salt marshes, although the boundaries are temporally and spatially dynamic. Typical dominant species include Saltgrass (*Distichlis spicata*), Pacific Silverweed (*Potentilla anserina*), Alkali Heath (*Frankenia salina* [= *Frankenia grandifolia*]), Sicklegrass (*Parapholis incurva*), Meadow Barley (*Hordeum brachyantherum*), Dwarf Barley (*Hordeum depressum*), Seaside Arrowgrass (*Triglochin maritima*), and many Eurasian weeds.

MONOCOTYLEDONEAE

Plant descriptions in this book are organized according to the two major Classes of flowering plants, the Monocotyledoneae and the Dicotyledoneae. Monocotyledoneae, or monocots, are distinguished from dicots by the number of seed leaves (one vs. two), and several other easily recognizable characteristics. For example, monocots typically have parallel veins in their leaves, without prominent midveins; their roots are generally fibrous; and their floral parts are arranged in multiples of three (e.g., 3 petals, 3 sepals, etc.). Many important and conspicuous wetland species are classified as monocots, including grasses, sedges, rushes, water plantains, pondweeds, and orchids.

ALISMATACEAE (Water Plantain Family)



Alisma plantago-aquatica L.

COMMON NAME: WATER PLANTAIN

Description: Perennial herb from a corm-like stem, often but not always emergent. Leaves are simple with broad, lance-shaped to ovate blades that are rounded or tapered at the base. Inflorescence is many-branched and much larger than the leaves, often up to 1 m (3.3 ft) in height. Flowers bear three showy, white (or slightly pink) petals, and appear June through July. Fruit is a cluster of very small, flattened nutlets borne in a single whorl. Each nutlet is about 3 mm (0.1 in) long.

Habitat & Distribution: Water Plantain is found typically at the margins of fresh-water ponds, in ditches and in saturated soils of marshes, swamps, lake and stream margins throughout California and the United States.

Notes: A synonym of *Alisma plantago-aquatica* is *Alisma triviale* Pursh.

ALISMATACEAE (Water Plantain Family)



Sagittaria latifolia Willd.

COMMON NAME: BROAD-LEAVED ARROWHEAD

Description: Erect, perennial herb, with simple naked stem 1-12 dm (0.3-4 ft) high. Leaf shape more or less arrowhead-shaped, but is quite variable in response to water depths. Submerged leaves are tapered at base; emergent leaf blades 6-30 cm (2.4-12 in) long and arrowhead-shaped. Flowers unisexual; female flower petals 3, showy white (rarely pink), borne in whorls of 2-15. Male flowers have many bright yellow stamens. Flowering occurs July through August. Fruit is a dense head of very small, flattened nutlets, ridged, beaked, 2-3.5 mm (+/- 0.1 in).

Habitat & Distribution: Broad-Leaved Arrowhead is a nonpersistent emergent found typically at the margins of shallow freshwater marshes and in saturated soils of marshes, swamps, lake and stream margins throughout California and the United States and northern South America.

Notes: Five species of *Sagittaria* are found in California, one of which is rare (*S. sanfordii*). Common species in the Central Valley, in addition to Broad-Leaved Arrowhead, include Northern Arrowhead (*Sagittaria cuneata*), Long-Lobed Arrowhead (*Sagittaria longiloba*), and *Sagittaria montevidensis* ssp. *calycina*. Broad-Leaved Arrowhead can be distinguished from *S. montevidensis* ssp. *calycina* by its perennial (not annual) habit; from Long-lobed Arrowhead by its much shorter lower lobes of the emergent leaves and its white or bluish tubers; and, from Northern Arrowhead by its larger, spreading (not erect or ascending) fruit beak. *Sagittaria latifolia* can also be distinguished from Northern Arrowhead by the more or less equal size of emergent leaf lobes. Tubers of *Sagittaria* ("duck potatoes") are important wildlife forage and were eaten by Native Americans and settlers for food.



Carex nebrascensis Dewey

COMMON NAME: NEBRASKA SEDGE

Description: Large, robust, tufted sedge with long, stout, horizontal rhizomes and stems up to 1 m (3.3 ft) tall. Stems triangular; covered with small bumps; either rough or smooth. Leaf blades thick, flat, 3-12 mm (0.1-0.5 in) wide, and covered with a bluish waxy film. Lower leaf sheaths often prominently septate and bumpy. Inflorescence simple, 55-165 mm (2-6 in) long, with 5 to 8 spikelets, lowest one usually widely separate from the others. Upper 1-3 spikelets staminate; lower spikelets pistillate or, upper 1-3 spikelets pistillate with staminate portion at the tip. Perigynium shiny, rounded, bearing approximately 5 distinct nerves on the front and 7 distinct nerves on the back. Nutlet is two-sided and less than 2 mm (<0.1 in) long.

Habitat & Distribution: Nebraska Sedge is found in permanently and seasonally saturated meadows and other open habitats below 2500 m (8300 ft) throughout California and the western United States. When Nebraska sedge grows in drier habitats, it is always in the wettest portion of the site.

Notes: *Carex nebrascensis* can be easily confused with *Carex angustata*, with which it sometimes grows. Typically the dead culms of the Nebraska Sedge persist and form a thick mat of leaf bases surrounding the plant. The dead leaves at the base of the culm disintegrate at the base of *C. angustata*. Another sedge with which *Carex nebrascensis* can be confused is *C. lenticularis* var. *impressa*. Generally, Nebraska Sedge has a short-toothed, hairy (or minutely hairy) beak on the perigynium and *C. lenticularis* var. *impressa* has a smooth, entire beak. Another common sedge species in the Central Valley is *C. praegracilis*, often occurring in alkaline areas.

**KEY TO COMMON SEDGES
(NOT LIMITED TO THE CENTRAL VALLEY)**

1. Stigmas 3; nutlets 3-sided
 2. Style deciduous, jointed with nutlet *Carex luzulina*
 - 2'. Style persistent as a stiff beak, continuous with nutlet
 3. Perigynia ascending when immature, widely spreading at maturity; stem erect *Carex rostrata*
 - 3'. Perigynia ascending; stems arising at an oblique angle to the ground *Carex vesicaria*
- 1'. Stigmas 2; nutlets 2-sided
 4. Spikelets elongate, well separated and not congested
 5. Nutlets constricted in the middle *Carex obnupta*
 - 5'. Nutlets not constricted in the middle
 6. Plants forming dense clumps, usually among rocks and gravel at the edges of streams and bars *Carex nudata*
 - 6'. Plants not forming dense clumps in streams, plants diffusely scattered
 7. Scales bearing short, obvious, scabrous awns; leaves generally not glaucous (white- or blue-waxy) in appearance; mostly < 900 m (3000 ft) elevation *Carex barbarae*
 - 7'. Awns typically on scales, but when present, are glabrous; leaves generally glaucous (white- or blue-waxy) in appearance
 8. Leaves conspicuously blue-glaucous; base of stems conspicuously shrouded in dead and dying leaf bases *Carex nebrascensis*
 - 8'. Leaves somewhat glaucous; base of stems not conspicuously shrouded in dead and dying leaf bases *Carex canescens*
 - 4'. Spikelets short, oblong or egg-shaped, contiguous or densely congested
 9. Stems arising singly or a few together from long creeping rhizomes
 10. Perigynia < 2.5 mm (>0.1 in), beak short; rhizomes slender, light brown *Carex simulata*
 - 10'. Perigynia > 2.5 mm (<0.1 in), beak longer than approximately 1/3 body length; rhizomes stout, brownish-black *Carex praegracilis*
 - 9'. Stems cespitose arising from short rhizomes
 11. Margin of perigynia narrowly to broadly winged
 12. Lowest 1-2 bracts longer than inflorescence; inflorescence dense, +/- triangular *Carex athrostachya*
 - 12'. Lowest bracts shorter than inflorescence; inflorescence dense but not +/- triangular *Carex microptera*
 - 11'. Margin of perigynia sharp or thick, not winged
 13. Leaf sheaths finely wrinkled on side facing stem; leaf blades 3-7 mm (0.1-0.3 in) wide; < 1500 m (< 5000 ft) elevation *Carex densa*
 - 13'. Leaf sheaths not finely wrinkled on side facing stem; leaf blades 1-3 mm (0.04-0.1 in) wide; 150-2400 m (500-8000 ft) elevation *Carex diandra*

CYPERACEAE (Sedge Family)



Cyperus spp.

COMMON NAME: **UMBRELLA SEDGE; NUTSEDGE**

Description: Erect annual or perennial herbs, typically with several 3-angled stems, 2-200 cm (1-80 in) in height. Basal leaves linear or absent. Inflorescence bracts 1 to 22, leafy. Inflorescence spreading; spikelets flat or somewhat cylindrical; spikelets few to many; arranged in either a dense or loose spike. Flowers bisexual; fruit an egg-shaped nutlet, 3-angled, brown, and without a beak or bristles.

Habitat & Distribution: *Cyperus* species are found in seasonally or temporarily saturated soil conditions, as at the edges of lakes, ponds, streams, or ditches. However, *Cyperus* species are found under a wide range of ecological conditions, in both wetland and upland habitats. Some species are weeds under agricultural conditions. For example, *Cyperus esculentus* is considered a worldwide weed. Approximately 16 species occur in California, and the great majority of these can be found in the Central Valley.

Notes: Mature fruits are important for identification. The genus is a distinctive taxon of the sedge family, and is rarely confused with other sedge genera.

KEY TO COMMON NUTSEDGES

- 1. Stems 1, stolons with tubers present *Cyperus esculentus*
- 1'. Stems > 1, sometimes clumped, tubers absent
 - 2. Tip of floral bract curved outward, +/- bristle-like *Cyperus acuminatus*
 - 2'. Tip of floral bract not curved outward, sometimes with a point but not bristle-like
 - 3. Floral bract < 1.1 mm (<0.04 in) wide; rhizomes absent
..... *Cyperus difformis*
 - 3'. Floral bract 1.3-4 mm (0.05-.2 in); rhizomes usually present
 - 4. Fruit as long as wide, stalked *Cyperus eragrostis*
 - 4'. Fruit 1.5-3x longer than wide, mostly sessile
 - 5. Floral bract 1.5 mm (0.06 in) wide; fruit < 1.0mm (0.04 in)
..... *Cyperus erythrorhizos*
 - 5'. Floral bract 2-4 mm (0.08-0.16 in) wide; fruit 1.5-2.4 mm (0.06-0.1 in)
 - 6. Annual; stem base not corm-like; spikelet falling apart
..... *Cyperus odoratus*
 - 6'. Perennial; stem base corm-like; spikelet falling as a unit
..... *Cyperus strigosus*



Eleocharis macrostachya Britton

COMMON NAME: CREEPING SPIKERUSH

Description: Rhizomatous perennial, 1-5 dm (4-20 in) tall, with round, typically solid stems. Leaves basal and sheathing, but without blades. Inflorescence is a solitary, erect, terminal spikelet, 5-25 mm (0.2-1 in), approximately equal in width to the stem, brown to purplish. Small flowers bear bristles, but no obvious calyx and corolla; bristles unequal, either larger or smaller than fruit. Fruit a nutlet, egg-shaped, 1.5-2.5 mm (0.06-0.1 in), yellowish brown, and strongly 2-sided.

Habitat & Distribution: Creeping spikerush is common and widespread in many wetland communities, such as shallow marshes, pools, vernal pools, and along the margins of lakes, ponds, and ditches. It is widespread throughout California and the United States.

Notes: Creeping Spikerush is exceedingly variable and complex morphologically, and may not easily key to species. Mason (1969) provides a clear discussion of the great morphological variability of this spikerush. Other commonly occurring spikerushes in the Central Valley include Least Spikerush (*Eleocharis acicularis*), Purple Spikerush (*E. atropurpurea*), Parish's Spikerush (*E. parishii*), and Square-Stem Spikerush (*E. quadrangulata*). *Eleocharis palustris* is a synonym of *Eleocharis acicularis*.

CYPERACEAE (Sedge Family)



Scirpus acutus Bigelow var. *occidentalis* (S. Watson) Beetle

COMMON NAME: HARD-STEM BULRUSH

Description: Stout perennial herb from rhizomes, 1.5-4 m (6-16 ft). Stems cylindrical, dark olive to bluish green. Leaves basal, bearing prominent, leaf sheaths at the base. Stems 0.5-1.2 cm (0.2-0.5 in) thick and are small chambered so that they are not easily crushed. Spikelets 3-many, in clusters of 1-7 at branch tips. Inflorescence stalks 7-20 mm (0.3-0.8 in) long. Spikelets oval to cylindrical, and are exceeded by a specialized leaf, 1-11 cm (0.4-4.4 in) long, that appears as a continuation of the stem. Perianth bristles generally 6; scales bear marginal hairs and are red-dotted on the back. Flowers appear May through August. Fruit a 2 or 3-angled nutlet, 2-2.5 mm (+/- 0.1 in) long, smooth, gray-brown.

Habitat & Distribution: Hard-Stem Bulrush is a common persistent emergent found in deep or shallow freshwater or brackish marshes and ponds below 2500 m (8300 ft) throughout the Central Valley and elsewhere in California except the Sierra Nevada. It occurs eastward throughout the United States and in South America.

Notes: Hickman (1993) recognizes the *Scirpus acutus* in California as *S. acutus* var. *occidentalis* (S. Watson) Beetle. This bulrush species is distinguished from California Bulrush (*S. californicus*), with which it occasionally grows, by its completely round, typically bluish stems. Hard-stem Bulrush often hybridizes with *S. californicus* and *Scirpus tabernaemontani* [= *S. validus*]. It is readily distinguished from the latter species by its hard (not soft) stem. Two other bulrushes occurring in the Central Valley are Three-Square Bulrush (*S. pungens*) and Olney's Bulrush (*S. americanus*).



Scirpus maritimus L.

COMMON NAME: SALTMARSH BULRUSH

Description: Stout, perennial herb from long rhizomes with tubers less than 2 cm (<1 in) wide. Stems sharply 3-angled, 3-8 mm (0.1-0.3 in) wide, 8-15 dm (32-60 in) tall. Leaves evenly distributed along stem, 3-12 mm (0.1-0.5 in) wide. Spikelets 4-many, 10-30 mm (0.4-1.2 in) long, 7-8 mm (+/- 0.3 in) wide, often in one sessile dense cluster. Flower bracts 2 to 3, 5-7 mm (0.2-0.3 in), pale grayish to orange-brown, greatly exceeding inflorescence, leaf-like. Perianth generally with 6 bristles. Fruit is weakly angled, smooth, shiny, dark brown nutlet.

Habitat & Distribution: Saltmarsh Bulrush occurs in marshes throughout most of California below 2500 m (8400 ft) and is almost worldwide in distribution.

Notes: Saltmarsh Bulrush has typically been referred to in California and along the Atlantic Coast as *Scirpus robustus*, with which it hybridizes. It is recognized as an important waterfowl food.

JUNCACEAE (Rush Family)



Juncus balticus Willd.

COMMON NAME: BALTIC RUSH

Description: Perennial herb 3.5-11 dm (14-44 in), arising from creeping, unbranched rhizome, slender or stout. Stem 1-6 mm (0.04-0.2 in) wide, generally cylindrical, sometimes twisted. Leaves basal, without blades; 2-15 cm (1-6 in). Inflorescence appearing lateral, more or less open, with 5-50 flowers. Perianth segments 3-6 mm (0.1-0.2 in), often but not always equal in size; stamens 6, filaments much smaller than anthers. Flowers appear May through August. Fruit a capsule with a small, but not obvious beak.

Habitat & Distribution: Baltic Rush grows in both wetland and upland habitats, but typically can be found growing in the permanently or seasonally saturated soils of shallow marshes, wet meadows, and seasonally inundated or saturated flats in addition to some tidal brackish habitats. It is widely distributed throughout California, and occurs eastward to the eastern United States and northward to Alaska.

Notes: Baltic Rush is an extremely variable rush, and is easily confused with several other species. Salt Rush (*Juncus lesueurii*) is more consistently coastal in distribution, bears slightly larger flowers, and is generally more robust. Baltic Rush differs primarily from *Juncus textilis* by its acute, not obtuse capsule. Many other perennial rush species are common throughout the Central Valley, including Spreading Rush (*Juncus patens*), Soft Rush (*J. effusus*), Three-Stamen Rush (*J. ensifolius*), Pointed Rush (*J. oxymeris*), and Iris-Leaf Rush (*J. xiphioides*)

JUNCACEAE (Rush Family)



Juncus bufonius L.

COMMON NAME: TOAD RUSH

Description: Annual herb, typically branched from the base, 2-30 cm (1-12 in). One-3 leaves borne along stem; 0.5-1.5 mm (<0.1 in) wide. Inflorescence appearing terminal, bearing flowers 1-few in small clusters. Perianth segment 2-7 mm (0.1-0.3 in), with sepals generally larger than petals; stamens 6. Flowers appear April through September. Fruit an egg-shaped or oblong capsule.

Habitat & Distribution: Toad Rush occurs in many plant communities, but is particularly characteristic of seasonally saturated or inundated sites, such as wet meadows, vernal pool margins, and flats. It also occurs in saline or disturbed places, as well as in some upland settings.

Notes: Hickman (1993) recognizes three varieties of Toad Rush. *Juncus bufonius* var. *bufonius* bears relatively large, solitary flowers. *Juncus bufonius* var. *congestus* also has comparatively large flowers, but they are arranged in somewhat coiled, terminal clusters. *Juncus bufonius* var. *congestus* is a rather uncommon variety, typical of saline soils in the central portion of the Central Valley and in central western California. *Juncus bufonius* var. *occidentalis* is distinguished from the other varieties by its comparatively smaller habit and petal shape.

JUNCAGINACEAE (Arrow-Weed Family)



Triglochin maritima L.

COMMON NAME: SEASIDE ARROWGRASS

Description: Perennial herb with short, thick rhizomes. Stems erect, short, and generally obscure so that the basal, tufted leaves are more conspicuous. Flat, somewhat compressed leaves < 7 dm (28 in), 1.5-5 mm (0.06-0.2 in) wide. Unbranched inflorescences, generally 2 or more per individual, rise above leaves. Flowers bisexual, bearing 6, generally green, perianth parts. Flowers bloom April through August. Fruit consists of 6 dry, oblong or egg-shaped, sessile capsules per flower. Seeds 1 per fruit.

Habitat & Distribution: Seaside Arrowgrass is an occasional member of shallow saline, brackish, alkaline or freshwater marshes and wet meadows below 2800 m (9200 ft). It is distributed in the Coast Ranges, southeastern Sacramento-San Joaquin Delta, Sierra Nevada, and the Great Basin. Seaside Arrowgrass can be locally common in the western Sacramento-San Joaquin Delta high marsh community.

Notes: Fresh leaves and other plant parts of arrowgrass are toxic due to the presence of cyanogenic compounds.



Agrostis stolonifera L.

COMMON NAME: REDTOP; CREEPING BENTGRASS

Description: Perennial, stoloniferous grass, 8-60 cm (3-24 in) tall, reclining on the ground or erect, often forming mat-like stands. Lower leaf blades 2-10 mm (0.1-0.4 in) wide, flat; ligule 2-5 mm (0.1-0.2 in), membranous. Inflorescence many branched, dense, 3-15 cm (1-6 in). Spikelet bears one floret; glumes 1.5-3 mm (<0.1 in), unequal; tiny hairs borne along the veins. Lemma 1.5-2 mm (<0.1 in), awnless.

Habitat & Distribution: Redtop is a naturalized exotic grass of European origin, commonly found in shallow marshes, ditches, and seasonally ponded depressions, as well as along the margins of streams, rivers, lakes and in marshes below 1000 m (3300 ft). It is distributed throughout the western and northern portions of the state, and extends northward to southern Canada and eastward to the southern United States.

Notes: *Agrostis* is a large genus with many taxa that are similar in appearance, and some that are exceedingly variable. The genus is readily identifiable by the single floret per spikelet, and the typically bent or twisted awn arising from the back of the lemma, characteristic of most species. Other commonly occurring *Agrostis* species in the Central Valley include Spike Bentgrass (*Agrostis exarata*), a common grass along the shores and margins of the Sacramento-San Joaquin Delta and Idaho Bentgrass (*Agrostis idahoensis*), a common grass of open wet meadows in the northern San Francisco Bay region, Cascade Ranges, Sierra Nevada, and portions of southern California. *The Jepson Manual* (Hickman 1993) subsumes *Agrostis alba* vars. *major* (Gaudin) Farw. and *palustris* (Hudson) Pers. under *Agrostis stolonifera*.

POACEAE (Grass Family)



Alopecurus saccatus Vasey

COMMON NAME: PACIFIC FOXTAIL

Description: Annual grass with stems either erect or reclining. Upper leaf sheath inflated; blade flat, either bearing short, stiff hairs or without. Ligule 1-6 mm (<0.2 in), membranous, tip squared. Inflorescence branched but dense; generally cylindrical; branches short. Spikelet somewhat compressed; floret 1, breaking from stem below the glumes. Glumes 3-5 mm (0.1-0.2 in); lemma membranous, keeled, 3-veined; awned. Awn borne on the back below the middle, larger than the lemma by 3-5 mm (0.1-0.2 in).

Habitat & Distribution: Pacific Foxtail is a characteristic grass of vernal pools, swales, and wet meadows below 700 m (2300 ft). It occurs throughout the Central Valley, as well as the central Sierra Nevada, central, west and southwest regions of California, and extends northward to Washington.

Notes: A synonym of *Alopecurus saccatus* is *Alopecurus howellii*, by which it is commonly known. It is a grass that is often overlooked in vernal pools, being somewhat nondescript in appearance.



Crypsis schoenoides (L.) Lam.

COMMON NAME: SWAMP TIMOTHY; SWAMP GRASS

Description: Annual grass with stems either prostrate, ascending or erect, litted branched. Ligule hairy; blades short, 2-10 cm (0.8-4 in), narrowly lance-shaped; leaf sheaths without hairs. Inflorescence dense; ovoid or cylindric, and enclosed by a subtending leaf sheath. Spikelets approximately 3 mm (0.1 in); floret 1, falling as a unit. Glumes +/- equal in size to floret, strongly 1-veined and keeled; lemma +/- larger than glumes, membranous, 1-veined; awned. Awn borne on the back below the middle, larger than the lemma by 3-5 mm (0.1-0.2 in).

Habitat & Distribution: Swamp Timothy is found as an exotic weed in many wet habitats throughout California, particularly seasonally inundated and saturated wetlands. It is a species often used for waterfowl and livestock forage, and thus is common around wetland managed primarily for wildlife.

Notes: Swamp Timothy is a distinctive grass easily distinguished by its pink or sometimes purple stems and leaves, and its mat-like habit.

POACEAE (Grass Family)



Deschampsia danthonioides (Trin.) Benth.

COMMON NAME: ANNUAL HAIRGRASS

Description: Annual grass with stems generally solitary to loosely clumped, 1.2-6 dm (5-24 in), open panicles 5-12 cm (2-5 in). Leaves are few, generally basal, glabrous, 1-9 cm (0.4-4 in) long, 1-2 mm (<0.1 in) wide. Ligule 2-4 mm (+/- 0.1 in) long, acute to acuminate, entire. Glumes 4-9 mm (0.2-0.4 in), equal, lanceolate, acute to acuminate, 3-veined. Florets generally 2, lemma 2-3 mm (+/- 0.1 in), toothed at tip, faintly 1 to 3-veined. Tips of lemma and glumes sometimes purplish. Lemma awn 4-9 mm (0.2-0.4 in) and slightly bent.

Habitat & Distribution: Annual hairgrass occurs in moist to drying open sites, meadows, streambanks and temporary ponds such as vernal pools below 2700 m (9000 ft). It is found throughout California except for the northeast, the east-central area of the east side of the Sierra Nevada and the southeastern desert areas. Annual hairgrass extends to Alaska south into Arizona and Baja California and also in South America.

Notes: Another species of hairgrass, which is perennial, is Tufted Hairgrass, (*D. cespitosa*). Tufted Hairgrass is a common and conspicuous member of wet meadows, saturated banks and margins of streams, rivers, lakes, and other depressions along the coast, and in forested and alpine habitats below 3900 m (13,000 ft). In California it is found in the greater San Francisco Bay region, western Sacramento-San Joaquin Delta, Sierra Nevada, the north and northwestern regions of California, Transverse Ranges, and on the eastern side of the Sierra Nevada. Tufted Hairgrass extends north to Alaska, east to the Atlantic Coast and also in Eurasia.



Distichlis spicata (L.) E. Greene

COMMON NAME: SALTGRASS

Description: Low, creeping perennial grass with scaly rhizomes and stolons. Stems more or less erect, bearing leaves in 2 ranks. Ligule membranous, fringed; leaf blade flat or rolled, deciduous at the stem region. Inflorescence 2-8 mm (0.1-0.3 in), narrow, dense; straw-colored or purplish; cylindrical or elliptic in outline. Spikelets unisexual; glumes unequal in size, awnless; lower 3, 5 veined, upper 5, 9 veined. Florets 3-20 per spikelet; lemma awnless, keel of palea and lemma minutely hairy.

Habitat & Distribution: Saltgrass is a very common member of salt marshes and many seasonally or regularly inundated saline or alkaline wetlands, such as flats, shallow depressions, and fringes. Saltgrass can occur bordering well-drained habitats and is also very tolerant of prolonged arid conditions.

Notes: Saltgrass is perhaps the most common and most easily recognizable grass in saline or alkaline habitats through the western United States.

POACEAE (Grass Family)



Echinochloa crus-galli (L.) P. Beauv.

COMMON NAME: BARNYARD GRASS

Description: Robust exotic, annual grass, with erect stem 2.5-15 dm (0.8-5 ft) tall. Leaves basal and borne along the stem; leaf blade flat, 6-20 mm (0.2-0.8 in); ligule absent. Inflorescence branched, dense, bearing many spikelets arranged 1 per node, appearing on 1 side of the axis. Spikelets egg-shaped or lance-shaped, more or less compressed. Lower glume smaller than upper glume, 3-5-veined. Florets 2 per spikelet, lower floret sterile; lemma 5-7-veined.

Habitat & Distribution: Barnyard Grass is a weed of disturbed, seasonally or temporarily ponded depressions, in and along many agricultural fields, roadsides, and abandoned pastures. It is widespread throughout California and worldwide.

Notes: Five species of *Echinochloa* are found in California, four of which are likely to be found in disturbed wet depressions and flats of the Central Valley. All species of *Echinochloa* are exotic to California.



Holcus lanatus L.

COMMON NAME: VELVET GRASS

Description: Perennial grass bearing generally erect, clumped stems, 6-20 cm (2.4-8 in); nodes and internodes usually distinctively soft-hairy. Leaves mostly basal; ligule membraneous; blade 5-18 cm (2-6.2 in) long. Inflorescence branched but more or less congested; spikelets laterally compressed, breaking below the glumes and falling as a single unit. Glumes 3-6 mm (+/- 0.1-0.2 in), purplish; keel long-hairy. Florets generally 2, the upper one male or sterile, the lower one bisexual. Lemma of upper floret awned near a 2-lobed tip; lemma of upper floret awnless.

Habitat & Distribution: Velvet Grass is a distinctive member of many seasonally saturated wetlands, particularly grasslands, cultivated fields, and meadows. It can also be found as a roadside weed and in other severely disturbed habitats throughout California except the deserts.

Notes: Two species of *Holcus* are found in California. Velvet Grass is distinguished from Creeping Velvet Grass (*Holcus mollis*) primarily by its tufted, not solitary stems and its hairy, not glabrous, internodes.

POACEAE (Grass Family)



Hordeum marinum ssp. *gussonianum* (Parl.) Thell.

COMMON NAME: MEDITERRANEAN BARLEY

Description: Tufted annual grass; stems 2-5 dm (8-20 in), characteristically bent at the base but sometimes erect. Basal leaf sheaths typically hairy; blade 1-6 mm (<0.2 in) wide. Inflorescence dense, spike-like, 1.5-7 cm (0.6-3 in), 5-20 cm (2-8 in) wide; green to purple; axis breaking apart at the nodes in fruit. Spikelets 2-ranked, of 2 kinds, and strongly overlapping; 3 per node. Glumes appearing as awns, exceeding the florets. Central spikelet bisexual, borne directly on the stem, with 1 stalked floret; glumes 5-8 mm (0.2-0.3 in). Lateral spikelets 2, sterile, with 1 short-stalked floret. Lateral floret < 5 mm (0.2 in); glumes 10-24 mm (0.4-0.9 in), straight or sometimes spreading with age; lemma awned.

Habitat & Distribution: Mediterranean Barley is a very common exotic in disturbed, temporarily or seasonally ponded, meadows, flats, and pastures. It also occurs as a weed in many upland habitats. Mediterranean Barley is widespread and common, often occurring in dense stands, throughout the Central Valley and elsewhere in California except the mountains. It extends northward to British Columbia, and eastward to Idaho and Arizona.

Notes: Mediterranean Barley is easily distinguished from other *Hordeum* species by its bent, reclining stems and hairy leaf sheaths. Two commonly accepted synonyms for *Hordeum marinum* ssp. *gussonianum* are *Hordeum hystrix* and *Hordeum geniculatum*. The *Jepson Manual* recognizes *H. m.* ssp. *gussoneanum* only, and includes *H. hystrix* and *H. geniculatum* under this name. Most of the older floras will list Foxtail Barley (*H. jubatum*) as one of these entities, and *H. hystrix* likely will be distinguished from *H. geniculatum*. Another common barley in the Central Valley is Meadow Barley (*H. brachyantherum*).



Lolium perenne L. (=Italian Ryegrass (*L. multiflorum*))

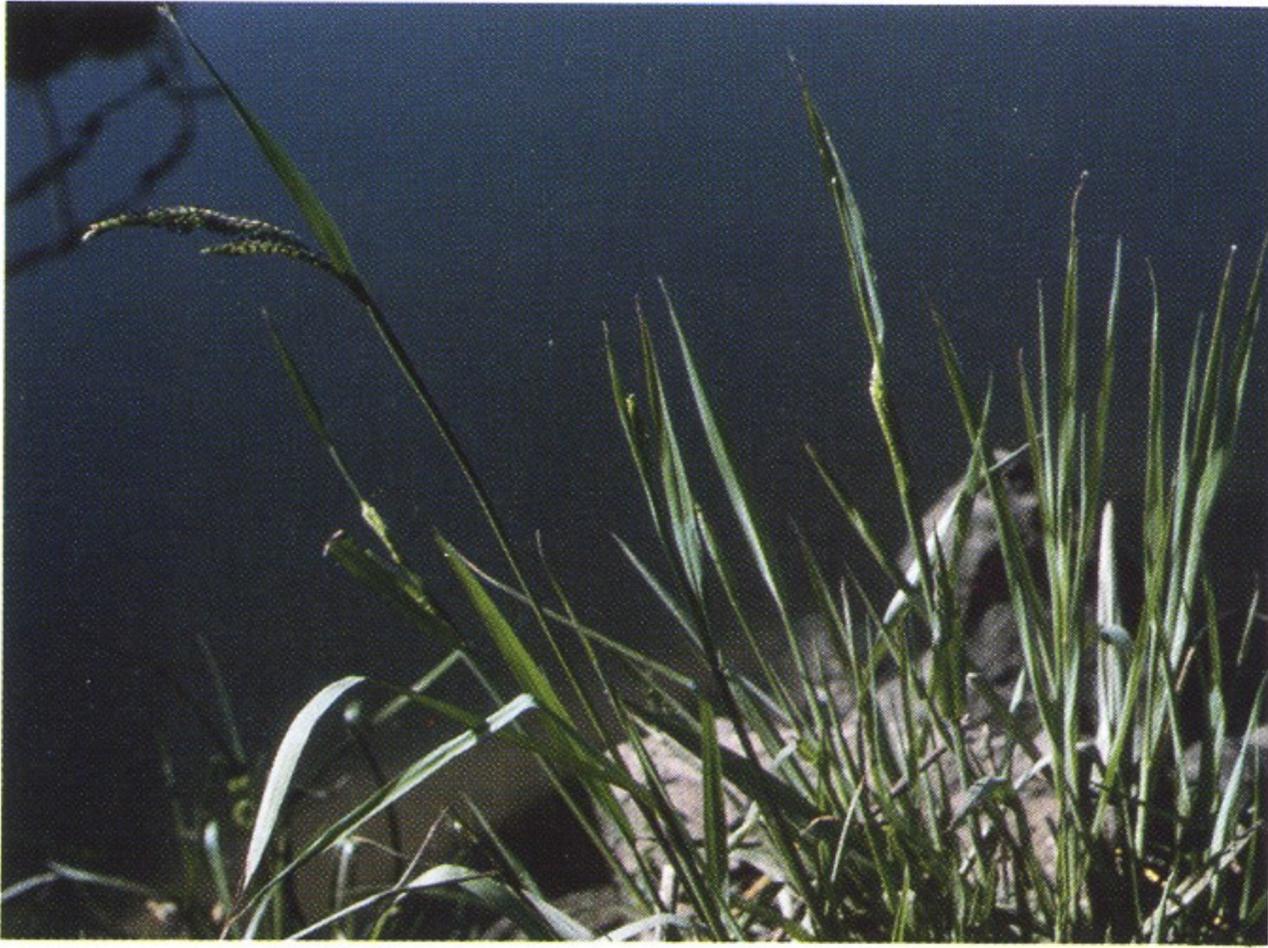
COMMON NAME: PERENNIAL RYEGRASS

Description: Perennial grass, with stems typically erect, 3-8 dm (1-2.6 ft) in height; generally without hairs. Leaves basal and borne along the stem; ligules membranous, 1-3 mm (+/- 0.1 in). Leaf blades 2-5 mm (0.1-0.2 in) wide, rolled in the bud. Inflorescence spike-like, sometimes spreading, 8-30 cm (3-12 in); spikelets 2-ranked and mostly laterally compressed; 1 per node. Glumes 1, borne on outside of spikelet; axis breaking above the glumes and between florets. Florets 5-20; lemma membranous, rounded on the back, 5-7 mm (+/- 0.3 in), awnless.

Habitat & Distribution: Italian Ryegrass and Perennial Ryegrass are found in many wetland geomorphic settings, most commonly in disturbed, seasonally saturated or inundated meadows, flats, slopes, and pond and lake margins. Both varieties can withstand short periods of inundation and grow commonly in upland sites as well.

Notes: Italian Ryegrass has been considered indistinct from Perennial Ryegrass and some authors recognize only the latter species. The main distinguishing features are that Perennial Ryegrass is awnless and bears sterile shoots from the base of the plant.

POACEAE (Grass Family)



Paspalum distichum L.

COMMON NAME: JOINTGRASS, JOINT PASPALUM

Description: Rhizomatous or stoloniferous perennial grass with reclining or erect stems, 0.8-6 dm (3-24 in) in height. Leaves basal and borne along the stem; leaf sheath glabrous; blade 2-7 mm (0.1-0.3 in) wide; ligule < 1.5 mm (<0.1 in), membranous. Inflorescence branched, with widely spaced, spike-like primary branches. Spikelets many, compressed, 1-2 per node, green, 2.5-3.5 mm (0.1 in), borne on one side of the axis, and falling as a unit. Glumes 1-2, lower glume minute. Florets 2, awnless.

Habitat & Distribution: Jointgrass is a native grass of seasonally and permanently saturated, temporarily flooded, frequently disturbed sites such as river and stream banks and bars. It is also found along the fringes of shallow or deep freshwater marshes. Jointgrass extends throughout the Central Valley and California except the mountains, and eastward to the eastern United States and northward to Washington.

Notes: Dallisgrass (*Paspalum dilatatum*) is an exotic grass similar in appearance and habit to Jointgrass. They are most easily differentiated by the number of branches in the inflorescence. Dallisgrass typically has 3 to 6 branches while Joint Paspalum bears 2 to 3.

POACEAE (Grass Family)



Polypogon monspeliensis (L.) Desf.

COMMON NAME: RABBITFOOT GRASS; ANNUAL BEARD GRASS

Description: Annual grass; stems either erect or reclining, unbranched, 2-10 dm (8-40 in). Leaf sheaths open, barely enclosing the stem; ligule 5-6 mm (+/- 0.2 in), membranous, irregularly toothed and minutely hairy. Leaf blades borne along the stem, flat, rough to the touch, 4-6 mm wide (+/- 0.2 in). Inflorescence branched but dense and appearing plume-like; spikelets 1 per node, breaking below the glumes and part of the stalk; glumes 2, 1-veined, minutely bristly. Floret 1; lemma minute; awn 0.5-4.5 mm (<0.2 in).

Habitat & Distribution: Rabbitfoot Grass is one of the most common grasses found in wetlands throughout California below 2100 m (7000 ft). It is characteristic of seasonally or permanently inundated or saturated wetlands, including wet meadows, flats, pond and lake margins, stream banks and bars, and vernal pools. Rabbitfoot Grass tolerates brackish and sometimes saline and alkaline conditions, and severe disturbance.

Notes: Another exotic *Polypogon* species, Ditch Beard Grass (*Polypogon interruptus*), can be confused with Rabbitfoot Grass. Both are common in disturbed wetlands throughout the western United States.

TYPHACEAE (Cattail Family)



Typha spp.

COMMON NAME: CATTAIL

Description: Erect, rhizomatous, perennial herb, 1.5 to 4 m (6-16 ft) in height. Leaves sheathing at base, 4-18 mm (0.2-0.7 in) wide, long and linear. Terminal male and female, spike-like inflorescences borne on a single stalk; staminate above pistillate, some species with a naked axis between male and female inflorescences. Flowers minute and without perianth. Fruit a minute nutlet, fusiform, and detaching from the inflorescence axis with pedicel and hairs.

Habitat & Distribution: Cattails are very common in shallow and some deep freshwater or brackish marshes and at the margins of lakes and ponds throughout the world.

Notes: Cattails can grow under a wide range of hydrological conditions, from saturated mud to inundation at greater than 6 dm (2 ft) of water. Individuals spread extensively from rhizomes, so that a large stand may consist of one or two individuals. Cattails also provide important food and cover for a wide range of wildlife, including many species of waterfowl, muskrats, and song birds. Narrow-Leaved Cattail (*Typha angustifolia*) can withstand more saline conditions than Broad-Leaved Cattail (*Typha latifolia*) (pictured above), and is found more commonly further west in the Sacramento-San Joaquin Delta.

KEY TO COMMON CATTAILS

1. Male and female inflorescences separated, axis naked 1-8 cm (0.4-3 in) between; female inflorescences green when young, turning brown, 2.5-3.5 cm (1-1.5 in) wide in fruit *Typha latifolia*
- 1'. Male and female inflorescences not separated but adjacent; female inflorescences bright yellow-brown to dark brown throughout flower and fruit; 0.5-2.5 cm (0.2-1 in) wide
 2. Female spikes bright yellow- to orange-brown, base of leaf blade dotted with glands on side toward stem *Typha domingensis*
 - 2'. Female spikes medium to dark brown, leaf blade glands absent *Typha angustifolia*

DICOTYLEDONEAE

Dicotyledoneae, or dicots, are distinguished from monocots by the number of seed leaves (two vs. one), and several other easily recognizable characteristics. For example, in addition to two embryonic leaves, dicots generally have netted veins in their leaves, usually with a prominent midvein; their roots are variable, but often a taproot is present; and their floral parts are in multiples of fours or fives (e.g., 5 petals, 5 sepals, etc.). Many important or conspicuous wetland species are classified as dicots, including willows (*Salix* spp.), alders (*Alnus* spp.), cottonwoods (*Populus* spp.), and many members of the carrot (Apiaceae), mustard (Brassicaceae), and sunflower (Asteraceae) plant families.



Acer negundo L. var. *californica* (Torrey & A. Gray) Sarg.

COMMON NAME: BOX ELDER

Description: Deciduous tree with separate male and female individuals, sometimes growing to 20 m (65 ft) in height. Leaves opposite, pinnately compound with 3-5 leaflets, terminal leaflet the largest. Leaflets are 5-12 cm (2-5 in) long, 3-5 lobed, and toothed. Flowers generally appear March through April, before the leaves; pistillate flowers are long, drooping, and without petals. Fruit is a pair of one-seed fruits. Fruit body is red with widely spreading, straw-colored wings at maturity.

Habitat & Distribution: Box Elder is widely distributed along streamsides and bottomlands throughout the Central Valley and California. It is a conspicuous and distinctive member of the riparian forest community. The species is common and widespread in the eastern and central United States and portions of southern Canada.

Notes: Box Elder is commonly planted as an ornamental in the Central Valley and throughout California.

APIACEAE (Carrot Family)



Conium maculatum L.

COMMON NAME: POISON HEMLOCK

Description: Tall, biennial herb, often musty smelling, with an unbranched stem 5-30 dm (1.6-10 ft) tall. Stem and petioles are spotted and striped red to purple. Leaf blades oblong to ovate in outline, highly dissected into tiny leaflets. White to rosy-petalled flowers are borne in compound umbels, and flower April through July. Fruit, small, slightly compressed, and bearing small ribs.

Habitat & Distribution: Poison Hemlock is a very common weed of moist, seasonally saturated, disturbed places such as stream and river banks and bars, abandoned agricultural fields and pastures, depressions and upland slopes throughout California. It is a native of Europe.

Notes: Poison Hemlock is easily recognizable by its highly dissected leaves and red to purple stripes and spotting along the tall, unbranched stem. Like Water Hemlock (*Cicuta douglasii*), Poison Hemlock is highly poisonous, and many livestock and human deaths have been attributed to ingestion of its highly alkaloidal tissues.



Eryngium vaseyi J. Coulter & Rose

COMMON NAME: VASEY'S COYOTE THISTLE

Description: Spiny perennial or biennial herb, 1.5-5 dm (6-20 in) tall, often decumbent or ascending; stem branching 1-5 cm (0.4-2 in) above the basal rosette. Juvenile leaves linear, segmented, and appear while plant is submerged. Adult leaves are both basal and borne along the stem. Leaf petiole 1-4 cm (0.4-1.6 in), shorter than the deeply pinnate and sharply lobed leaf blade. White or cream colored flowers are borne in simple, nearly spherical heads, and bloom in June through August. Leaves and stems supporting inflorescence are generally spiny on the margins. Egg-shaped fruits are less than 3 mm (0.1 in) long.

Habitat & Distribution: *Eryngium vaseyi* is found in beds of vernal pools, often alkaline, in the Central Valley, and in pools in the interior of the South Coast Ranges and the mountains of southern California, at elevations below 600 m (2000 ft).

Notes: Vasey's Coyote Thistle may have hybridized historically with other coyote thistles including *Eryngium castrense* and *E. spinosepalum*.

APIACEAE (Carrot Family)



Oenanthe sarmentosa J.S. Presl.

COMMON NAME: WATER PARSLEY

Description: Robust perennial herb, 5-15 dm (1.6-5 ft), arising from rhizomes. Stems generally recline on the ground, but tips ascend. Leaf petiole 1-3.5 dm (4-14 in), supporting a generally bipinnate leaf blade 1-3 dm (4-12 in) long and 6-25 cm (2-10 in) wide. Leaflets 1-5 cm (0.4-2 in) and more or less egg-shaped. Inflorescence is compound, and composed of flowers with minute calyx lobes and white to reddish petals, blooming June through October. Fruit 2-4 mm (<0.2 in) long, oblong, and more or less cylindrical.

Habitat & Distribution: Water Parsley grows under a wide range of hydrologic conditions, from seasonally saturated soils to aquatic conditions, particularly within riparian wetlands. It is widely distributed throughout the Sierra Nevada foothills and coastal California below 1250 m (4000 ft).

Notes: *Oenanthe sarmentosa* is a common member of the fresh and brackish marshes and slow-moving waters of central California.

ASTERACEAE (Sunflower, Composite Family)



Bidens laevis (L.) Britton, Sterns & Pogg.

COMMON NAME: BUR MARIGOLD, BEGGER'S TICKS

Description: Annual or perennial herb with erect or reclining, cylindrical stems, 2-25 dm (0.7-8 ft). Leaves are simple, alternate, borne without petioles; leaf bases often fused around the stem. Leaf blades lance-shaped and finely toothed. Flowering heads erect, nodding in fruit. Ray flowers 7-8, yellow; disk flowers yellow; blooming August through November. Fruit flat or angled; pappus awns 2-5 mm (<0.2 in).

Habitat & Distribution: Bur Marigold is found in many freshwater wetlands below 300 m (1000 ft), including wet meadows, lake and pond shores, and openings along the terraces, bars, and floodplains of rivers and streams. It is common in the Central Valley and also occurs in the South Coast Ranges, southwestern California, and the Mojave Desert.

Notes: *Bidens* bears a distinctive fruit in which the awned pappus aids in dispersal, often sticking in socks and other clothing. The bright yellow flowers and fruit aid in the easy identification of members of this genus. Bur Marigold can be confused with Nodding Bur Marigold (*Bidens cernua* var. *cernua*), but the fruit does not have thick margins or prominent ribs, as in the latter species.

ASTERACEAE (Sunflower, Composite Family)



Cotula coronopifolia L.

COMMON NAME: BRASS BUTTONS

Description: Perennial herb with low, creeping, branched stems. Stems are typically fleshy and root from the nodes. Leaves alternate, linear to lanceolate or oblong, often irregularly toothed or lobed. Inflorescence is a solitary head without ray flowers. Disk flowers many, small, bright yellow; heads 6-15 mm (0.2-0.6 in) in diameter. Bloom March through December.

Habitat & Distribution: Brass Buttons is a commonly occurring exotic herb in saline, brackish, or freshwater wetlands along the coast and in the western portion of the Sacramento-San Joaquin Delta. It can grow under eusaline conditions and appears to tolerate moderate disturbance.

Notes: Brass Buttons is an exotic species naturalized from South Africa. When in flower, it is very conspicuous where it grows and is not easily confused with other salt or brackish marsh species. The closest comparison would be Fleshy Jaumea (*Jaumea cornosa*), another yellow-flowered creeping composite. *C. australis*, a short erect annual brass buttons, has more finely dissected leaves and occurs in disturbed soils and mud (especially brackish) along the coast.

ASTERACEAE (Sunflower, Composite Family)



Grindelia integrifolia DC

COMMON NAME: MARSH GUMPLANT

Description: Shrubby perennial, 2-15 dm (0.7-5 ft), with stems both reclining and erect. Basal leaves tapered and larger than stem leaves. Inflorescence generally gummy-sticky; heads 1-many, somewhat hemispheric in shape. Ray flowers 30-60, yellow; disk flowers many, yellow, blooming May through September.

Habitat & Distribution: Marsh Gumplant is found in shallow saltwater and brackish marshes within the peripheral halophyte zone, below 500 m (1700 ft). It occurs in these wetlands throughout the North Coast Ranges, extending to Alaska.

Notes: A synonym of *Grindelia integrifolia* is *Grindelia stricta* DC. var. *stricta* by which it is currently recognized (Hickman 1993). Another variety of *Grindelia stricta*, *Grindelia humilis* Hook. & Arn. misapplied [= *Grindelia stricta* DC. var. *angustifolia* (A. Gray) M.A. Lane], is a local endemic in the San Francisco Bay Estuary and western portions of the Sacramento-San Joaquin Delta.

ASTERACEAE (Sunflower, Composite Family)



Jaumea carnosa (Less.) A. Gray

COMMON NAME: FLESHY JAUMEA

Description: Rhizomatous perennial herb; stems glabrous, more or less succulent, and typically recline on the ground or sometimes ascend and root below. Leaves simple, opposite, borne on the stem, linear to narrow oblong. Flowering heads yellow, approximately 2 cm (0.8 in), and appear May through October; phyllaries often purple-tipped. Fruit 2-3 mm (0.1 in), cylindric, occasionally bearing 1-5 bristles.

Habitat & Distribution: Fleshy Jaumea is widespread throughout the low marsh habitat of salt marshes along the California coast and northward in the Pacific Northwest.

Notes: *Jaumea carnosa* is a common and conspicuous member of the salt marsh community, and is not easily confused with others. It can be found in nearly monotypic stands, or growing intermixed with Pickleweed (*Salicornia virginica*).

ASTERACEAE (Sunflower, Composite Family)



Lasthenia spp.

COMMON NAME: GOLDFIELDS

Description: Annual and perennial herbs, sometimes bearing hairs. Stem typically branched, < 60 cm (2.4 ft). Leaves opposite, entire or pinnately lobed. Flowering heads solitary or in clusters; phyllaries free or partly fused. Ray flowers 4-21, yellow; disk flowers many, yellow. Fruit < 5 mm (0.2 in), cylindrical or egg-shaped; pappus composed of scales, awns, or sometimes absent.

Habitat & Distribution: Goldfields are common members of vernal pools, swales, and seasonally inundated or saturated flats, slopes and wet meadows throughout California and North America.

Notes: Sixteen species are found in California, the most common in the Central Valley include *Lasthenia californica*, *L. chrysantha*, *L. fremontii* (pictured above, left), *L. glabrata* (pictured above, right), and *L. minor*. Several of these goldfield species are characteristic of saline or alkaline habitats, including *L. chrysantha* and *L. glabrata*. Goldfields form expansive fields of bright, yellow-gold flowers in the early spring, hence the name. Another yellow composite common in vernal pools is Common Blennosperma (*Blennosperma nanum*). It can be distinguished from goldfields by its paler yellow flowers and orange tinging under the petals. Common Blennosperma is one of the first flowers to bloom in the spring.

KEY TO THE COMMON GOLDFIELDS

- 1. Phyllaries partly fused
 - 2. Fruit strongly flattened, margin fringed with hairs ... *Lasthenia chrysantha*
 - 2'. Fruit not flattened, club- or egg-shaped, glabrous *Lasthenia glabrata*
- 1'. Phyllaries free
 - 3. All leaves entire *Lasthenia californica*
 - 3'. Mid-stem leaves generally pinnately divided
 - 4. Fruit > 2 mm (0.08 in) *Lasthenia minor*
 - 4'. Fruit < 1.5 mm (0.06 in) *Lasthenia fremontii*

ASTERACEAE (Sunflower, Composite Family)



Psilocarphus brevissimus Nutt. var. *brevissimus*

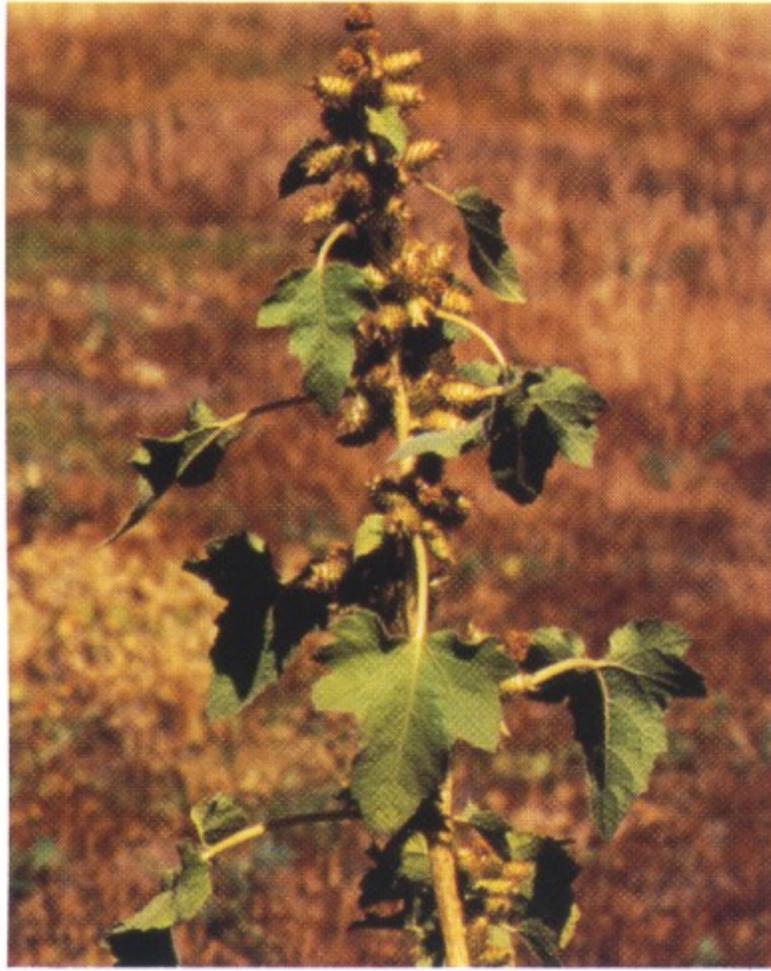
COMMON NAME: DWARF WOOLYMARBLES

Description: Small, prostrate, annual herb; gray-green and densely long-hairy. Stems several, arising from the base or branched above. Leaves simple, opposite; uppermost leaves more or less lance- or egg-shaped. Flowering heads small, 6-9 mm (0.2-0.4 in), spheric; blooming April through June. Ray flowers absent; disk flowers 2-10, staminate; pistillate flowers enclosed in chafey scale, wooly, and falling with fruit.

Habitat & Distribution: Dwarf Woollymarbles is found in vernal pools, flats and swales, and other seasonally ponded or saturated depressional wetlands below 2500 m (8300 ft). It is distributed throughout California, including the Modoc Plateau, and extends northward to Washington and Montana, eastward to Utah, and southward to northwestern Baja California.

Notes: The genus *Psilocarphus* is distinctive within the vernal pool flora, and is not easily confused with other taxa. Four species are found in California, and they are rather similar in appearance.

ASTERACEAE (Sunflower, Composite Family)



Xanthium strumarium L.

COMMON NAME: COCKLEBUR

Description: Erect, annual herb; thick, fleshy stems < 15 dm (5 ft) tall. Stem often red- or black-spotted. Leaves alternate, borne on long petioles, 3-lobed, coarsely toothed and hairy. Leaf blades triangular in shape; glandular, green on upper and lower surfaces. Staminate flowering heads in clusters; pistillate flowering heads 2-flowered, 2-beaked, spiny, blooming July through October. Fruits 2, enclosed in a cylindrical or barrel-shaped bur; spines stout and glandular.

Habitat & Distribution: Cocklebur is a common weed of disturbed places, especially seasonally saturated or inundated stream and river banks, bars, and terraces. It is also found in many depressional wetlands below 500 m (1700 ft). The genus is widespread in California and worldwide.

Notes: Cocklebur is easily recognized by its spiny, burred fruit. A second species of *Xanthium*, Spiny Cocklebur (*Xanthium spinosum*) is distinguished from Cocklebur by its spiny stems and white hairs borne on the lower leaf surface. Cocklebur is typically distributed by floating fruits during flood events.



Heliotropium curassavicum L.

COMMON NAME: SEASIDE HELIOTROPE

Description: Low-growing perennial, often arising from a rhizome-like root. Stems are fleshy, smooth, without hairs, 1-6 dm (4-24 in) in length. Fleshy and glaucous leaf blades are borne on very short stalks, and are generally entire, broadest above the center of the leaf, 1-6 cm (0.4-2 in) long. Small, bell-shaped, white to bluish flowers, sometimes bearing yellow to purple spots near the base are arranged on 2-4 terminal, coiled spikes. Flowers bloom from March to October. Four smooth, roundish nutlets are borne as the fruit.

Habitat & Distribution: Seaside Heliotrope is found in the moist soils of vernal flats, pastures, and agricultural fields, often saline or alkaline, drying by the end of the summer, and in the drier soils of brackish and saline marshes. It is widely distributed below 2100 m (7000 ft) throughout California, as well as Nevada and Arizona.

Notes: Seaside Heliotrope is a common member of many wetland communities, and often persists even after severe site disturbance. It is easily recognizable by its coiled inflorescences of white to bluish flowers.

BORAGINACEAE (Borage Family)



Plagiobothrys stipitatus (E. Greene) I.M. Johnston

COMMON NAME: SLENDER POPCORN FLOWER

Description: Annual herb with a more or less straight, often fleshy, hollow stem, 1-5 dm (4-20 in). Short, straight, stiff hairs are pressed along the stem. Leaves simple, with lower stem leaves opposite and upper stem leaves smaller, alternate, 2-11 cm (0.8-4 in). Inflorescence unbranched, coiled, particularly in bud, bearing white flowers 2-12 mm (0.1-0.5 in) wide. Flowering extends from March through July. Fruit is a small nutlet, 1.5-2.5 mm (<0.1 in), bearing a basal scar.

Habitat & Distribution: Slender Popcorn Flower is a common element of vernal pools, often alkaline, as well as other seasonally saturated or inundated sites throughout California, the Great Basin, and southern Oregon. It is a particularly common member of the Central Valley's vernal pool wetlands.

Notes: Two varieties of *Plagiobothrys stipitatus* are recognized by Hickman (1993). *Plagiobothrys stipitatus* var. *stipitatus* is distinguished from *Plagiobothrys stipitatus* var. *micranthus* by its larger flower size and blooming time. *Plagiobothrys stipitatus* var. *stipitatus* bears flowers 5-12 mm (0.2-0.5 in.) wide from March through May, while *Plagiobothrys stipitatus* var. *micranthus* bears flowers only 2-3 mm (+/- 0.1 in.) wide from April through July. Both are common in Central Valley vernal pools.

BRASSICACEAE (Mustard Family)



Lepidium latifolium L.

COMMON NAME: BROADLEAF PEPPERGRASS

Description: Robust perennial herb, often in dense colonies, ranging from 4-10 dm (1.3-3.3 ft) tall. Stems rising from rhizomes, are without hairs and grayish. Basal obdurate leaves are less than 3 dm (1 ft) long, single, toothed, and are distinguished by long petioles. Stem lance-elliptic leaves are smaller, 1-4 cm (0.4-1.6 in) wide, lower ones with short petioles and upper stem leaves borne directly on the stem. Inflorescence many branched, terminal, and bearing many small flowers, blooming May through August. Both the sepals and petals are white; stamens 6. Fruit is round, 2 mm (0.1 in), and is borne on a stalk much longer than the fruit.

Habitat & Distribution: Broadleaf Peppergrass is a widespread, pernicious weed in many wetlands throughout the Central Valley, and can be found along beaches, tidal shores, brackish tidal marshes, saline flats, slopes, and roadsides below 1900 m (6300 ft). It is a particularly conspicuous weed in the western Sacramento-San Joaquin Delta region and in Suisun Marsh, where it forms large colonies in both disturbed and undisturbed wetland habitats.

Notes: The fruit of *Lepidium latifolium* does not bear the distinctive terminal notch of most *Lepidium* species, resembling superficially the exotic Heart-Podded Hoary Cress (*Cardaria draba*). Broadleaf Peppergrass often grows in large, densely monotypic and conspicuous colonies. It is an aggressive, noxious weed in California, spreading rapidly into wetland communities as well as some dryland habitats.

BRASSICACEAE (Mustard Family)



Rorippa nasturtium-aquaticum (L.) Hayek

COMMON NAME: WATERCRESS

Description: Aquatic perennial herb, often growing with its stem submersed, sometimes floating, or prostrate on mud. Stems range from 1-6 dm (0.3-2 ft) long and root at the nodes. Leaves are many, 1-pinnate, and bear 1-7 entire leaflets somewhat ovate and wavy-margined. Flowers white, 3 - 4 mm (+/- 0.1 in), and bloom March through November. Fruit is a narrowly oblong capsule, 10-15 mm (+/- 0.5 in), borne on an ascending stalk. Tiny round seeds are borne in 2 rows in each of the capsule chambers.

Habitat & Distribution: Watercress is very commonly found in streams, springs, marshes, and lake margins throughout California and many other temperate regions. It often forms extensive floating or rooted mats in shallow waters.

Notes: A common synonym of *Rorippa nasturtium-aquaticum* is *Nasturtium officinale* R. Br. This common species of many plant communities can be found worldwide; it is commonly cultivated for its edible foliage.

CAMPANULACEAE (Bellflower Family)



Downingia bicornuta A. Gray

COMMON NAME: DOUBLE-HORNED DOWNINGIA

Description: Annual herb with erect or reclining stem, 5-40 cm (0.2-1.6 ft) long. Leaves are borne directly on the stem and often fall off before flowers appear. Leaves are of two types: submersed leaves are linear, emersed leaves are broader in outline. Flowers are borne directly along an unbranched stem, with the terminal flowers often aborting. Flowers are bilaterally symmetrical, generally inverted at full bloom April through July. Corolla is much larger than the calyx, 7-9 mm (0.3 in) long, and bear a dense covering of white hairs in the corolla tube. Lower petal is blue-purple with a central white blotch and yellow-green spots. Base of lower petal is purple with 2 nipple-like projections. Stamens united; anthers are borne at a 45° angle to their filaments. Two large bristles are found at the tips of the two smaller anthers, and are generally twisted together. Fruit is a capsule 35-90 mm (1.4-3.6 in) long.

Habitat & Distribution: Doubled-Horned Downingia is a conspicuous member of the Sacramento Valley vernal pool, lake margins, and wet grassland flora; it is rare in the San Joaquin Valley. This downingia is equally common northward, extending into northeastern California, southern Oregon, southwestern Idaho, and western Nevada.

Notes: *Downingia bicornuta* has two recognized varieties: *D. bicornuta* var. *bicornuta* and *D. bicornuta* var. *picta*. The genus is characteristic of vernal pools and other seasonally inundated wetlands of California, and is not readily confused with other conspicuous members of the Sacramento Valley's vernal pool flora. Other common species include Hoover's Downingia (*Downingia bella*), Maroon-Spot Downingia (*D. concolor*), and Solano Downingia (*D. ornatissima*), among others.

CAPRIFOLIACEAE (Honeysuckle Family)



Sambucus mexicana C. Presl

COMMON NAME: BLUE ELDERBERRY

Description: Large shrub 2-8 m (8-32 ft), typically as wide as tall, multiple-trunked. Leaves are pinnately compound, with 3-9 elliptic or egg-shaped leaflets, 3-20 cm (1-8 in) long, and sometimes hairy. Axis of the leaf is often curved. Large, terminal, flat-topped inflorescence is composed of many white or cream-colored, 5-parted, radially symmetrical flowers. Central axis of inflorescence is shorter and weaker than its branches. Flowering occurs June through September. Fruit is a 1-seed berry, blue-black, and covered with a whitish, waxy sheen.

Habitat & Distribution: Blue Elderberry is a common understory member of riparian forests, being a distinctive component of stream bank vegetation. Elderberry also can occur as isolated individuals in open, moist depressions and wet meadows below 3000 m (10,000 ft) throughout the Central Valley and California.

Notes: The stem of elderberries is composed of a conspicuous spongy pith, and the plant can be toxic if eaten in quantity. Blue Elderberry is quite variable, as evidenced by the recent subsuming of *Sambucus cerulea* under *S. mexicana* (Hickman 1993). It is easily distinguished from other species of elderberry by its blue-black fruit that appears waxy. Elderberry is the host plant for the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*), a Federally listed threatened species.

CARYOPHYLLACEAE (Pink Family)



Spergularia marina (L.) Griseb.

COMMON NAME: SALTMARSH SAND-SPURRY

Description: Delicate annual arising from taproot. Leaves are fleshy, and bear a pair of triangular, dull white, and sometimes inconspicuous stipules 1.2-3 mm (+/- 0.1 in) long. Glandular-hairy inflorescence is 1X to 3X compound, or flowers are borne singly in the leaf axils. Radially symmetrical flowers are 5-parted and bear small, fused sepals, white to pink or rosy petals, 2-5 stamens, and bloom March through September. Fruit is a 3-valved, egg-shaped capsule with several to many, light brown or reddish brown seeds.

Habitat & Distribution: Saltmarsh Sand-Spurry is found on mud flats, seasonally wet alkaline fields, sandy river bottoms, and high salt marshes throughout the Central Valley and California. It is tolerant of severe disturbances, and can persist under open and harsh conditions. *Spergularia marina* extends northward to Washington, eastward to the eastern United States, Eurasia, and southward to South America.

Notes: Saltmarsh Sand-Spurry is a common member of many open, salt- or alkaline-affected communities, and is distinguished from the other commonly occurring species of *Spergularia*, particularly Purple Sand-Spurry (*S. rubra*), primarily by its smaller number of stamens (2-5 versus 6-10), absence of axillary clusters of leaves, and triangular versus lance-shaped stipules.

CHENOPODIACEAE (Goosefoot Family)



Allenrolfea occidentalis (S. Watson) Kuntze

COMMON NAME: IODINE BUSH

Description: Shrub 5-20 dm (1.6-6.7 ft) in height, with many jointed, branches of fleshy stems, green and sometimes white-waxy in appearance. Internodes range from 5-20 mm (0.2-0.8 in) in length. Triangular, scale-like leaves are borne directly on the stem and extend downward from the point of insertion. Inflorescence is composed of bisexual flowers without petals; sepals 1-1.5 mm (+/- 0.05 in) and 4 to 5-lobed. The very small, inflated, bladder-like fruit bears one seed.

Habitat & Distribution: Iodine Bush is commonly found on saline soils throughout California, particularly in the eastern San Francisco Bay region, San Joaquin Valley, Interior South Coast Ranges, and eastward into the deserts of California. Iodine Bush also is found in Oregon, Idaho, Texas, and the northern states of Mexico.

Notes: Iodine Bush is the only member of the genus *Allenrolfea*.

CHENOPODIACEAE (Goosefoot Family)



Atriplex patula L.

COMMON NAME: FAT HEN, SPEAR ORACLE

Description: Annual herb 4-15 dm (1.3-5 ft), with a single stem arising from the base; stems glabrous or somewhat fine-scaly. Leaf blades 1.5-7 cm (0.6-3 in), linear to lance-shaped; leaf margins entire or minutely toothed. Inflorescence branching with spike-like branches bearing separate male and female flowers, appearing July through November. Male flowers typically are borne on an inflorescence; female flowers are without a calyx but are enclosed by 2 triangular to egg-shaped leaves that are either minutely bumpy or smooth. Seeds are either 1-2 mm (<0.1 in) and black, or 2.5-4 mm (<0.2 in) and brown.

Habitat & Distribution: Fat Hen is found in saline soils that are often seasonally wet. It is widely distributed throughout the greater San Francisco Bay region, the North Coast and Cascade Ranges, northward to Alaska, and eastward to eastern North America and Eurasia.

Notes: *The Jepson Manual* (Hickman 1993) recognizes two intergrading varieties. *Atriplex patula* var. *patula* is very similar in appearance to the native Spearscale (*A. triangularis*=*A. prostrata*), but differs primarily from Spearscale by its oblong or lance-shaped (not mostly triangular) lower leaves, and the shape of the base of the fruit bract. *Atriplex patula* var. *obtusa* is similar in appearance to *Atriplex joaquiniana*, but is a rare species seldom encountered with a more southerly distribution, although it can be found in the southern Sacramento Valley and greater San Francisco Bay area.

CHENOPODIACEAE (Goosefoot Family)



Salicornia virginica L.

COMMON NAME: PICKLEWEED; VIRGINIA GLASSWORT

Description: Perennial, spreading rhizomatous subshrub, with many-branched, jointed stems and greenish, fleshy internodes. Inflorescence a dense, cylindrical spike, 3-4 mm (<0.2 in) wide, 15-60 mm (0.6-2.4 in) long, and flowering to the tip. Flowers arranged generally 3 per axil, borne directly on the stem and sunken in the axis, blooming April through September. Flowers bear a bladder-like calyx, deciduous when in fruit; petals absent. Fruit one-seed, inflated.

Habitat & Distribution: *Salicornia virginica* is a dominant member of the coastal salt marshes of California, as well as the interior alkaline flats of the San Joaquin Valley. It is also found widely in coastal wetlands in Alaska, Baja California, the eastern United States and Caribbean, and in the Mediterranean Basin.

Notes: Dodder (*Cuscuta salina*), an annual parasitic vine, with typically bright orange, threadline stems, is often found growing on *Salicornia virginica*. A similar species, *S. subterminalis* (= *Arthrocnemum subterminale*), is often misidentified as *S. virginica* and may be locally more abundant than *S. virginica*.



Lotus corniculatus L.

COMMON NAME: BIRD'S-FOOT TREFOIL

Description: Annual herb with stiff, straight, sharp, appressed hairs or without. Stem either reclining on the ground or ascending. Compound leaves are composed of 5 leaflets, 5-20 mm (0.2-0.8 in), and linear or slightly larger above the middle in shape. Three leaflets are arranged palmately at the leaf axis tip; remaining two leaflets are arranged oppositely at the base of the axis. Gland-like stipules are present. Inflorescence is composed of 3-8 bright yellow flowers with or without some red, 8-14 mm (0.3-0.5 in) long, appearing June through September. Fruit is a capsule, 1.5-3.5 cm (0.6-1 in), narrowly oblong, and opening at maturity.

Habitat & Distribution: Bird's-Foot Trefoil is often found in open, seasonally wet flats and depressions that dessicate by mid-summer. It is characteristic of many disturbed habitats in the Central Valley and in California.

Notes: This Eurasian native is widely naturalized throughout California and the northern United States. Some individuals produce cyanide releasing compounds and may be toxic to livestock.



Lotus corniculatus L.

COMMON NAME: BIRD'S-FOOT TREFOIL

Description: Annual herb with stiff, straight, sharp, appressed hairs or without. Stem either reclining on the ground or ascending. Compound leaves are composed of 5 leaflets, 5-20 mm (0.2-0.8 in), and linear or slightly larger above the middle in shape. Three leaflets are arranged palmately at the leaf axis tip; remaining two leaflets are arranged oppositely at the base of the axis. Gland-like stipules are present. Inflorescence is composed of 3-8 bright yellow flowers with or without some red, 8-14 mm (0.3-0.5 in) long, appearing June through September. Fruit is a capsule, 1.5-3.5 cm (0.6-1 in), narrowly oblong, and opening at maturity.

Habitat & Distribution: Bird's-Foot Trefoil is often found in open, seasonally wet flats and depressions that dessicate by mid-summer. It is characteristic of many disturbed habitats in the Central Valley and in California.

Notes: This Eurasian native is widely naturalized throughout California and the northern United States. Some individuals produce cyanide releasing compounds and may be toxic to livestock.

FABACEAE (Legume Family)



Trifolium variegatum Nutt.

COMMON NAME: WHITE-TIP CLOVER

Description: Annual (possibly perennial) herb, with prostrate or erect stems, wiry or fleshy, mostly glabrous. Leaves palmately compound and borne along the stem. Stipules entire below, deeply cut above. Leaflets 3, wider above the middle or wedge-shaped. Inflorescence head-like, 1 to many flowers, and borne within the leaves or not; whorl of leaves below inflorescence (involucre) conspicuous, wheel-shaped. Flowers bilaterally symmetrical, 3.5-6 mm (+/- 0.2 in); corolla lavender to purple and white-tipped. Fruit an indehiscent capsule; seeds 1-2.

Habitat & Distribution: White-Tip Clover is widespread in many wetland and upland habitats throughout California, and extends northward to British Columbia and Montana, eastward to Colorado and Arizona, and southward to Baja California.

Notes: Hickman (1993) states that White-Tip Clover is the most variable of all the native *Trifolium* species. California variants have been treated as 4 phases, based on plant and inflorescence size, and flower number. In the Central Valley, particularly the Sacramento region, *Trifolium variegatum* is a common member of the vernal pool/swale flora.



Quercus lobata Nee

COMMON NAME: VALLEY OAK; ROBLE

Description: Deciduous tree, less than 35 m (115 ft), single trunk. Leaf simple, 5-12 cm (2-5 in), broader above the middle, tip generally rounded, margins deeply 6-10 lobed, lobes coarsely toothed. Upper leaf surface dark green and often shiny; lower surface dull or pale green and finely hairy. Fruit an acorn, maturing in one year. Acorn cup 14-30 mm (0.5-1.2 in) wide, 10-30 mm (0.4-1.2 in) deep and hemispheric in shape. Nut 30-50 mm (1-2 in) long, 12-20 mm (0.5-0.8 in) wide, long-conic in shape and tapered at the tip.

Habitat & Distribution: Valley Oak, formerly common and characteristic of the Central Valley's bottomlands and savannahs, is now somewhat rare in occurrence. It is still found in these habitats in North Coast Ranges, foothills of the Sierra Nevada and Cascade Ranges, San Francisco Bay region, northwestern portion of southern California, and on the Channel Islands.

Notes: As is true for most species of oak, *Quercus lobata* is known to hybridize with a variety of other species, including Blue Oak (*Q. douglasii*), Oregon Oak (*Quercus garryana*), and Engelmann Oak (*Q. engelmannii*).

FRANKENIACEAE (Frankenia Family)



Frankenia salina Cham. & Schldl.

COMMON NAME: ALKALI HEATH

Description: Mat-forming subshrub, less than 3 dm (1 ft) in diameter. More or less prostrate stem 1-6 dm (0.3-2 ft), bearing twigs with or without hairs. Leaf blades 4-15 mm (0.2-0.6 in) long, 1-6 mm (<0.2 in) wide, typically with rolled margins and with or without hairs. Flowers borne singly or clustered on branched inflorescences in leaf axils. Flowers typically bisexual, radially symmetrical, with 4-7 sepals and 4-7 pink (white, or blue-purple) petals, 5-14 mm (0.2-0.6 in). Fruit is a capsule.

Habitat & Distribution: Alkali Heath is a very common member of eusaline or hypersaline salt marshes and alkaline flats. It is distributed throughout the Central Valley, central and southern Coast Ranges, Great Basin, Mojave Desert and into Nevada, Mexico, and South America.

Notes: This species was previously known as *Frankenia grandiflora*.



Mentha pulegium L.

COMMON NAME: PENNYROYAL

Description: Perennial herb; short-hairy, branched, with reclining or ascending stems, 1-6 dm (0.3-2 ft), arising from rhizomes. Leaf blades narrowly egg-shaped to elliptical, 1.5-2.5 cm (0.6-1 in); leaves smaller toward stem tip. Leaf margins entire or finely toothed; lower leaf surface hairy. Headlike, axillary inflorescences are subtended by reflexed leaves. Flowers bloom June through September. Calyx 2.5-4 mm (<0.2 in), short-hairy; corolla 5-8 mm (0.2-0.3 in), violet to lavender. Fruit is composed of 4 nutlets.

Habitat & Distribution: The exotic Pennyroyal is found in moist, sometimes shaded soils along streambanks below 1000 m (3300 ft.) in northwestern and central western California, San Joaquin Valley, and South Coast Ranges. It is also found in similar habitats in Oregon and the eastern United States.

Notes: Unlike the oil of other congeners, the oil of Pennyroyal is toxic and can be fatal when ingested. The oil can be used as an insect repellent.

LAMIACEAE (Mint Family)



Pogogyne zizyphoroides Benth.

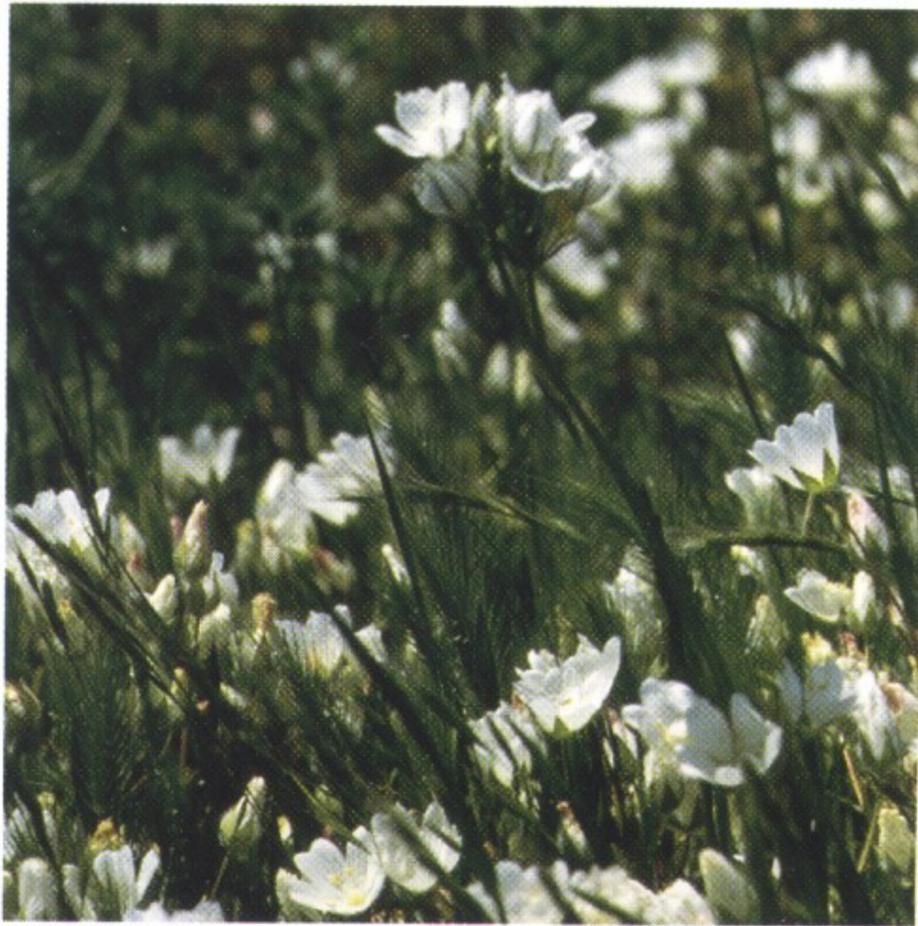
COMMON NAME: SACRAMENTO MESAMINT

Description: Annual herb, with an erect or ascending, often branched stem. Inflorescence dense and headlike, both terminal and axillary. Flowers borne in 2 or more, bristly-hairy bracts, blooming March through May. Calyx 2-lipped, 5-lobed, often bearing coarse hairs; corolla lavender to purple. Stamens 2-4, the upper two vestigial. Fruit is composed of 4 hairy nutlets.

Habitat & Distribution: Sacramento Mesamint is a common member of vernal pools and other seasonally ponded depressions throughout the Central Valley below 400 m (1300 ft), greater San Francisco Bay area, the outer region of the North Coast Ranges, and the Sierra Nevada foothills.

Notes: *Pogogyne* is a small genus, consisting of 7 species, mostly in California west of the Sierra Nevada crest, Oregon, and Baja California. Another common species of *Pogogyne* in the Central Valley is *Pogogyne douglasii*, a highly variable taxon distinguished by a conspicuous corolla and a relatively larger inflorescence.

LIMNANTHACEAE (Meadowfoam Family)



Limnanthus alba Benth. var. *alba*

COMMON NAME: WHITE MEADOWFOAM

Description: Annual herb with reclining or erect stems, less than 30 cm (12 in). Leaves odd-pinnately lobed, with 5-9 leaflets, linear or egg-shaped, entire or deeply-lobed. Stalked, cup or bell-shaped flowers are solitary in leaf axils, and bloom throughout the spring. Sepals 7-8 mm (0.3 in); petals 10-15 mm (0.4-0.6 in); white. Nutlets are 3-4 mm (0.1-0.2 in) and widely ridged.

Habitat & Distribution: White Meadowfoam is a conspicuous member of winter wetland communities, particularly vernal pools, grasslands, woodlands, edges of ponds, and ephemeral streams and drainages below 1800 m (6000 ft). It is found in the Central Valley, and the foothills of the Sierra Nevada and Cascade Ranges, as well as the southern North Coast Ranges.

Notes: Two varieties of *Limnanthus alba* are currently recognized in *The Jepson Manual* (Hickman 1993). *Limnanthus alba* ssp. *alba* is distinguished from *Limnanthus alba* ssp. *versicolor* by its densely hairy sepals, widely ridged fruit, and generally lower elevational range. The former is much more common in the Central Valley. While several other species of meadowfoam are conspicuous in various regions of California, another meadowfoam species, *Limnanthus douglasii*, is widely distributed in wet meadows and the edges of vernal pools and ephemeral streams throughout the northern portion of the state.

LYTHRACEAE (Loosestrife Family)



Lythrum hyssopifolia L.

COMMON NAME: HYSSOP LOOSESTRIFE

Description: Annual, sometimes biennial herb, <1-6 dm (0.3-2 ft) tall. Branching stem is either prostrate or erect, bearing opposite leaves below and alternative leaves in the upper portion. Leaves 0.5-3 cm (0.2-1.2 in), oblong or elliptic. Inflorescence composed of sessile flowers in a terminal spike, blooming April through October. Flowers are distinguished by a fusion of the basal parts of the calyx, corolla, and floral axis, cylindrical in shape, 4-6 mm (0.2 in). Sepals 4-6, awl-shaped; petals 4-6, 2-5 mm (0.1-0.2 in), pink to rose. Fruit is an egg-shaped capsule, bearing many, minute seeds.

Habitat & Distribution: Hyssop Loosestrife is found at the margins of vernal pools and other seasonally inundated or saturated depressions below 1600 m (5300 ft). It is distributed throughout the Central Valley and most of California, except the desert and Great Basin provinces. The geographic distribution of *Lythrum hyssopifolia* extends to the eastern United States.

Notes: *Lythrum hyssopifolia*, an exotic species of European origin, is found commonly in disturbed vernal pools and the margins of other depressional wetlands. It is never found under permanently inundated conditions, but tolerates a wide range of seasonally saturated or inundated conditions. Hyssop Loosestrife is quite variable in size, depending upon microclimatic conditions, particularly water duration.



Malvella leprosa (Ortega) Krapov

COMMON NAME: ALKALI MALLOW; WHITE WEED

Description: Perennial herb with prostrate or reclining stem, 1-4 dm (0.3-1.3 ft), and covered with dense, star-shaped, bristly, or scale-like hairs. Leaf blade 1-3 cm (0.4-1.2 in), kidney-shaped, round or triangular, and bearing toothed and wavy margins. Inflorescence composed of 1-3 five-parted flowers borne in leaf axils, subtended by 3 small leaves, and flowering May through October. Calyx 6-100 mm (0.2-4 in); petals 10-15, creamy white or yellow, and bearing star-shaped hairs when in bud. Fruit a dry capsule with 6-10 segments, 3 mm (0.1 in), and often bearing netted veins laterally. Seeds 1 per segment.

Habitat & Distribution: Alkali Mallow is characteristic of irrigated fields and orchards throughout California, and is particularly common in the saline, or alkaline agricultural landscape of the Central Valley. It is found in many disturbed seasonally saturated or temporarily flooded wetlands, and tolerates severe disturbance. *Malvella leprosa* is widely distributed in the western United States, and is known as a pestiferous species in Washington, Idaho, and Texas, as well as in Mexico and South America.

Notes: *Malvella* is a small genus, consisting of only 4 species. Alkali Mallow was formerly recognized as *Sida leprosa* (Ortega) Schumann var. *hederaceae* (Hook.) Schumann or *Sida hederaceae*. It is considered a noxious weed and is known to be toxic to some livestock.

MALVACEAE (Mallow Family)



Sidalcea calycosa M.E. Jones

COMMON NAME: CHECKER MALLOW; CHECKERBLOOM

Description: Annual from rhizomes, 3-9 dm (1-3 ft) tall, smooth to sparsely hairy stems. Upper leaves nearly compound with 5-11 linear to oblanceolate divisions. Inflorescence dense with bracts, simple or 2-lobed. Flower calyx 4-12 mm (0.2-0.5 in), often purple tinged or membranous, lobes narrowly ovate, acuminate; petals 12-25 mm (0.5-1 in), pale purple (rarely white); filaments in 2 distinct continuous series. Fruit segment 2.5-4.5 mm (0.1-0.2 in) with the back longitudinally grooved and smooth.

Habitat & Distribution: Checker Mallow is found in vernal pools and swales below 1200 m (4000 ft). It is distributed in the outer north coast ranges, Cascade Range foothills, Sierra Nevada foothills and in the San Francisco Bay area.

Notes: Checker Mallow often will form one of the outer distinct rings of flowers in vernal pools as shown in the photograph on the cover of this booklet. Subspecies *rhizomata* is very uncommon and restricted to near the coast below 30 m (100 ft) in Mendocino, Sonoma and Marin Counties. It is easily distinguished by large, fused, ciliate bracts.



Fraxinus latifolia Benth

COMMON NAME: OREGON ASH

Description: Deciduous tree < 25 m (80 ft) in height; dioecious. Leaves opposite, pinnately compound with 5-7 leaflets; petiole glabrous to minutely hairy. Leaflets are 2-10 cm (0.8-4 in) long, elliptic to narrowly egg-shaped; margins entire or finely toothed. Separate male and female flowers are borne in axillary clusters, and generally appear March through May. Male flowers bear two stamens; female flowers are without petals. Fruit is a winged, one-seed fruit.

Habitat & Distribution: Oregon Ash is occasional or locally common tree along streamsides, canyons, and woodlands throughout the Central Valley, northwestern California, the greater San Francisco Bay region, and northward into the Modoc Plateau, extending to British Columbia. Like the Box Elder, it is a conspicuous and distinctive member of the riparian forest community.

Notes: Four species of *Fraxinus* occur in California. California Ash (*Fraxinus dipetala*), is also found throughout California, but is readily distinguished from Oregon Ash by its often shrubby appearance and the presence of two petals on the female flowers. Another ash more common in the southern portion of the state, Velvet Ash (*Fraxinus velutina*) is distinguished from Oregon Ash by its short-stalked (not sessile) lateral leaflets and its generally smaller fruit. Species of ash are readily identified by their distinctive winged fruits, and with their large, pinnately compound leaves, and are rarely confused with other riparian forest trees or shrubs.

ONAGRACEAE (Evening Primrose Family)



Epilobium ciliatum Raf.

COMMON NAME: HAIRY WILLOW-HERB

Description: Perennial herb less than 19 dm (6 ft), arising from basal rosettes or fleshy bulblets. Stems various hairy. Leaves stalked, 1-15 cm (0.4-6 in); blades narrowly lance-shaped or egg-shaped. Inflorescence branching, densely covered with straight, stiff, appressed hairs, often glandular. Flowers 4-parted; basal parts of flower and floral axis fused, 0.5-2.6 mm (<0.1 in). Sepals 2-7 mm (0.1-0.3 in); petals 2-14 mm (0.1-0.5 in), white to rose-purple, blooming May through August. Fruit is a straight, cylindrical capsule 15-100 mm (0.6 - 4 in), hairy. Seeds 1 per chamber, ridged, and bearing a white tuft of hairs.

Habitat & Distribution: Hairy Willow Herb is a common member of the herbaceous flora of many riparian wetlands, often colonizing sand and gravel bars. It is also found in depressional and slope wetlands, such as wet meadows, shallow freshwater marshes, and at the margins of ponds and deep freshwater marshes. *Epilobium ciliatum* is tolerant of moderate site disturbances, and can persist even after prolonged disturbance. It is widely distributed throughout California, and throughout most of North America and worldwide.

Notes: Hickman (1993) recognizes three subspecies of *Epilobium ciliatum*. Flowers of *Epilobium ciliatum* ssp. *watsonii* are larger than other subspecies and bloom May through July; the inflorescence is rather flat-topped; and its geographic distribution is more coastal than the other two subspecies. *Epilobium ciliatum* ssp. *glandulosum* also bears larger flowers than *Epilobium ciliatum* ssp. *ciliatum*, blooming July through August, but does not have well developed, leafy rosettes from which the stem ascends.

ONAGRACEAE (Evening Primrose Family)



Ludwigia peploides (Kunth) Raven

COMMON NAME: WATER PRIMROSE

Description: Perennial herb, typically matted with floating or creeping stems, 1-30 dm (0.3-10 ft), simple or branched. Leaves less than 10 cm (4 in), alternate, and clustered. Leaf blade oblong or rounded, sometimes with spreading hairs on upper surface. Unbranched inflorescence bears flowers blooming May through October. Persistent calyx of 5-6 sepals, 3-12 mm (0.1-0.5 in); petals 5 or 6, 7-24 mm (0.3-1 in), white or yellow. Ten or 12 stamens are arranged in 2 unequal sets. Fruit a cylindrical, 5-angled, reflexed capsule; seeds embedded in fruit wall.

Habitat & Distribution: Water Primrose is commonly found in ditches, pond margins and streams as a rooted aquatic with floating leaves and stems, and rooted along lakeshores with stems floating at the water margin. It is widely distributed below 900 m (3000 ft) in California, and is nearly cosmopolitan in distribution.

Notes: The taxonomy of *Ludwigia peploides* has long been confused. A common synonym of this species is *Jussiaea repens* L., but this name is missapplied. Hickman (1993) recognizes two subspecies of Water Primrose, one of which, *Ludwigia peploides* ssp. *montevidensis*, is considered an exotic subspecies native to South America. The other subspecies, *Ludwigia peploides* ssp. *peploides*, is widely distributed throughout the Western Hemisphere. Water Primrose is considered by some to be a pestiferous weed of wetlands and agricultural landscapes. Another native species of water primrose, Marsh Water Primrose (*Ludwigia palustris*), is common in roadside ditches, wet meadows, and pond margins in much of California, including the greater San Francisco Bay region and the San Joaquin Valley.

PLATANACEAE (Plane Tree, Sycamore Family)



Platanus racemosa Nutt.

COMMON NAME: WESTERN SYCAMORE

Description: A large deciduous tree, 10-35 m (33-115 ft) with smooth, pale bark. Leaf blades 10-25 cm (4-10 in), palmate with 3-5 lobes, acute to acuminate. Stipules 2-3 cm (+/- 1.2 in); petiole 3-8 cm (1.2-3.2 in). Flower heads 3-5 cm (1.2-2.0 in) appearing February to April; fruit heads 2-3 cm (+/- 1.2 in), sessile or not.

Habitat & Distribution: Common along streambeds and canyons below 2000 m (6500 ft). Western Sycamore is widely distributed in central and southern California, Sierra Nevada foothills, Tehachapi Mountains, Central Valley, central western California, southwest California and Baja California.

Notes: Western Sycamore is often used as a shade and ornamental tree, however, is susceptible to sycamore anthracnose. The mottled bark and coarse, light green foliage are distinctive.

POLEMONIACEAE (Phlox Family)



Navarretia leucocephala Benth.

COMMON NAME: WHITE-HEAD NAVARRETIA

Description: Erect annual herb, with spreading branches covered with recurved hairs. Leaves simple, alternate, and deeply pinnately lobed; lobes 1-2, linear. Inflorescence bears white flowers in head-like clusters, subtended by spiny, toothed, needle-like leaves; flowers bloom April through May. Calyx 4, 5-parted, gland-dotted and minutely hairy; corolla 4-10 mm (0.2-0.4 in), stamens exerted. Fruit is a translucent capsule that adheres to the seeds until wetted.

Habitat & Distribution: White-Head Navarretia is widely distributed in vernal pools, pond margins, and seasonally inundated or saturated wetlands below 1700 m (5500 ft), throughout the Central Valley, interior North Coast Ranges, Cascade Ranges, northern Sierra Nevada, and the Great Basin. It is also distributed northward to Washington and eastward to Nevada.

Notes: The genus *Navarretia* is a conspicuous member of vernal pools, pond margins, and seasonally inundated or saturated wetlands throughout the state. Other common vernal pool species in the Central Valley and adjacent regions include Cotula Navarretia (*Navarretia cotulifolia*), Needle-Leaf Navarretia (*N. intertexta*), Pincusion Navarretia (*N. myersii*), *N. nigelliformis*, Skunkweed (*N. squarrosa*), and Marigold Navarretia (*N. tagetina*).

POLYGONACEAE (Buckwheat Family)



Rumex crispus L.

COMMON NAME: CURLY DOCK

Description: Stout perennial herb, < 15 dm (5 ft) in height, arising from a stout taproot. Erect stem generally unbranched below the inflorescence. Leaves simple, alternate, and borne in a basal rosette and along the stem. Leaf blades lance-shaped, with curly margins, especially near the leaf base. Branched inflorescence is dense, rather narrow, and leafy. Flowers bisexual, < 3 mm (0.1 in), generally green, with 6 persistent perianth lobes; flowers bloom throughout the year. The outer three lobes are inconspicuous, and the inner three lobes enlarged, hardened, and typically bearing 3 relatively large, unequal, conspicuous swellings. Fruit a shiny, brown nutlet.

Habitat & Distribution: Curly Dock is common and widespread in wet or moist meadows, flats, and shallow marshes of fresh and brackish waters. It is found widely throughout California and North America.

Notes: Curly Dock is perhaps the most common and conspicuous exotic weed of California's wetlands. Its red-brown stems are abundant in many disturbed places, and it can tolerate a wide range of flooding regimes and soil chemistries. It is easily recognizable by its reddish-brown color and curly leaves. Native *Rumex* species include Golden Dock (*Rumex maritimus*) in the Central Valley and adjacent regions, a species found in more or less salty environments; and the highly variable Willow Dock (*R. salicifolius*), a dock common to many moist habitats.



Cephalanthus occidentalis L. var. *californicus* Benth.

COMMON NAME: BUTTONBUSH; BUTTON WILLOW

Description: Shrub or small tree, 2-10 m (6.5-32.5 ft) in height. Stems round, reddish and glabrous when young. Leaves borne opposite or in whorls of 3, 7-20 cm (3-8 in), elliptic or egg-shaped, glabrous at maturity. Inflorescence a dense, spherical head, borne on a stalk 2.5-5 cm (1-2 in). Flowers white or sometimes yellowish, blooming June through September. Calyx 4-toothed; corolla narrowly funnel-shaped; spherical stigma exerted from the corolla up to 4 mm (0.2 in). Fruit consists of 2-4 nutlets.

Habitat & Distribution: Buttonbush is found in moist or saturated, irregularly flooded banks, margins, and bars of lakes, rivers and streams in the Central Valley, Sierra Nevada foothills, and interior North Coast Ranges, between 3-1000 m (10-3300 ft). The species' range extends north to Canada and east across North America.

Notes: Buttonbush is often found as a cluster of individuals, but never grows in extensive stands along stream and river banks. It is easily recognized by its often whorled leaves and dense inflorescence of showy white flowers.

SALICACEAE (Willow Family)



Populus balsamifera L. ssp. *trichocarpa* (Torrey & A. Gray)

COMMON NAME: BLACK COTTONWOOD

Description: Tree less than 30 m (100 ft), with brown twigs that become gray with age; with or without hairs. Winter buds are finely hairy, resinous, fragrant when opening. Young bark smooth, pale yellow to green or gray, becoming distinctively furrowed and brown to gray as it matures. Leaves generally without hairs, blades borne on petioles rounded below and channeled above, near the leaf blade. Pair of glands are borne at the junction of the blade and petiole. Blade 3-7 cm (1-3 in), upper surface green or dark green, lower surface with a white waxy appearance; ovate; leaf margins finely scalloped. Inflorescence a pendent catkin of unisexual flowers, appearing March through April before the leaves. Sessile flowers are without a perianth and borne on a cup-shaped disk. Fruit a spheric or conic capsule, 3-12 mm (0.1-0.5 in).

Habitat & Distribution: Black Cottonwood is characteristic of alluvial bottomlands and stream banks and margins below 2800 m (9200 ft) throughout California, except the Modoc Plateau. It extends northward to Alaska and to the north Rocky Mountains, Utah, and northern Baja California.

Notes: Black Cottonwood is one of the two most commonly occurring cottonwoods, but is larger at maturity than Fremont Cottonwood (*P. fremontii*), and is found at higher elevations. Black Cottonwood is also known as *Populus trichocarpa*.

SALICACEAE (Willow Family)



Salix exigua Nutt.

COMMON NAME: SANDBAR WILLOW; NARROW-LEAVED WILLOW

Description: Many branched shrub, < 7 m (23 ft), sprouting by roots. Stem twigs brownish, initially hairy, later becoming glabrous. Leaves simple, opposite, borne on very short petioles. Mature leaf blades 5-12.4 cm (2-5 in), linear, sometimes with sharply toothed margins; both surfaces silky, appearing whitish. Inflorescence a catkin of unisexual flowers, borne on a leafy shoot, appearing March through May. Inflorescence appears at the same time or after leaves expand. Flowers are without a perianth. Fruit a 2-valved capsule.

Habitat & Distribution: Sandbar Willow is a very common willow along stream banks, bars, and along the shores of ponds, lakes, deep and shallow marshes throughout California below 2700 m (9000 ft).

Notes: Sandbar Willow is an easily identifiable willow because of its shrub-like habit and silky, silvery, linear leaves. It is not readily confused with other willow species in its habitat. Arroyo Willow (*S. lasiolepis*) (pictured above, right) is also common and widespread in depressional and riverine wetlands throughout California below 2800 m (9200 ft). Pacific Willow (*S. lasiandra* or *S. lucida* ssp. *lasiandra*) and Red Willow (*S. laevigata*) are other common wetland species occurring throughout California.

SCROPHULARIACEAE (Figwort Family)



Mimulus guttatus DC

COMMON NAME: COMMON MONKEY FLOWER

Description: Annual or rhizomatous perennial herb; stem erect, 2-150 cm (1-60 in) in height, often hairy. Leaves opposite, generally borne directly on the stem, but sometimes stalked. Leaf blades egg-shaped or rounded, rounded teeth along the margin. Inflorescence branched, bearing 5 or more flowers. Flowers either closed or open; calyx green, lobes 5, unequal, swollen in fruit. Petals yellow; blooming March through August; corolla deciduous. Fruit an egg-shaped capsule.

Habitat & Distribution: Common Monkey Flower is a very widespread wildflower, often found on stream and river banks and bars, lake and pond margins, and in many other moist or saturated soils throughout California below 2500 m (8300 ft). It is widespread through the western United States.

Notes: The genus *Mimulus* is large, and many species are rather similar in appearance. They can be difficult to key without fresh material that includes both flowers and fruits.

TAMARICACEAE (Tamarisk Family)



Tamarix parviflora DC

COMMON NAME: SMALL-FLOWERED TAMARISK

Description: Shrub or small tree, 1.5-5 m (5-17 ft) in height. Stems are green, without hairs; twigs jointed, slender, and often drooping. Leaves alternate, sessile, generally overlapping, more or less linear, 2-2.5 mm (+/- 0.1 in), with long leaf tips. Unbranched inflorescence 1-4 cm (0.4-1.6 in), in branched clusters. Flowers 4-parted; sepals 1-1.5 mm (<0.1 in) wide; petals about 2 mm (+/- 0.1 in) wide, white to reddish, often appearing pink; 4-lobed nectary at base of corolla. Flowers bloom March through April. Fruit is a capsule, bearing many, hairy-tufted seeds.

Habitat & Distribution: Small-Flowered Tamarisk is a common exotic species in seasonally wet, often disturbed places such as river beds, irrigation canals, roadsides, slope wetlands, and washes. It is distributed in California throughout the Central Valley, as well as in the North Coast Ranges, the greater San Francisco Bay area, the South Coast Ranges and desert regions.

Notes: Five species of *Tamarix* are known in California, and all are considered highly invasive weeds with deep roots that lower water tables, especially at springs, along channels and irrigation canals. *Tamarix parviflora* has been incorrectly known as *Tamarix tetrandra* Pallas.

SELECTED REFERENCES

- Barbour, M.G. and J. Major. 1988. *Terrestrial Vegetation of California*. California Native Plant Society Special Publication No. 9, second edition. California Native Plant Society, Sacramento.
- Ferren, W.R., Jr., P.L. Fiedler and R.A. Leidy. 1995. *Wetlands in the Central and Southern California Coast and Coastal Watersheds: A Methodology for the Description and Classification*. Final Report submitted the U.S. Environmental Protection Agency, IX. February 1995.
- Harris, J.G. and M.W. Harris. 1994. *Plant Identification Terminology*. Spring Lake Publishing, Spring Lake, Utah.
- Hickman, J.C., ed. 1993. *The Jepson Manual. Higher Plants of California*. University of California Press, Berkeley.
- Kartesz, J.T. 1994. *A Synonomized Checklist of the Vascular Flora of the United States, Canada, and Greenland*. 2 vols. 2nd ed. Timber Press, Oregon.
- Janeway, L.P. 1992. *Cyperaceae of Butte County, California. Part 1: Carex*. Studies from the Herbarium. California State University, Chico No. 9. 79 pp.
- Mason, H.L. 1969. *A Flora of the Marshes of California*. University of California Press, Berkeley.
- Munz, P.A. 1968. *A California Flora with Supplement*. Produced in collaboration with D.D. Keck. University of California Press, Berkeley.

GLOSSARY

acid: referring to soil or water chemistry exhibiting a pH < 5.5.

alkaline: referring to soil or water chemistry influenced by calcium salts and exhibiting a pH > 7.4

alternate: plant parts not opposite; typically one part attached per node.

annual: refers to a plant that dies after setting seed in one year.

ascending: rising upward.

awn: a narrow, bristle-like appendage, often terminal, and typically found as part of the grass flower.

axillary: arising from the flower or leaf axil, i.e., that angle made by the juncture of any two stems.

bilaterally symmetrical: having only one plane of symmetry, herein used to refer to flowers, e.g., flowers of the Fabaceae.

bisexual: bearing both sexes.

blade: broad, flattened portion of a leaf.

brackish: referring to coastal waters with a salinity between 0.5 - 30 ppt; also referred to as mixosaline.

bract: modified leaf.

calyx: the outermost whorl of leaves (sepals) in a flower, typically green and protective in function.

capsule: dry fruit that splits open, shedding seed, at maturity.

catkins: spike or spike-like inflorescence, typically composed of, but not always, unisexual flowers without sepals and/or petals.

circumneutral: referring to a soil or water chemistry with a pH within the range of 5.5 to 7.4.

compound leaf: leaf composed of more than one leafy structure (leaflet), arranged either like a feather (pinnate) or like the palm of a hand (palmate).

corm: an underground stem, often oblong or somewhat spherical in shape.

corolla: the second whorl of leaves (petals) in a flower, typically brightly colored and serving to attract pollinators. In some prominent wetland plant families, the petals are highly reduced or absent (e.g., Chenopodiaceae, Salicaceae).

cosmopolitan: referring to a geographic distribution that is worldwide.

creeping: habit of a plant that is low in stature and that typically roots at the nodes.

deciduous: losing all leaves at once.

dichotomous: branched or forked in two more or less equal parts.

dicot (dicotyledoneae): a class of flowering plants whose members possess two seed leaves, or cotyledons, e.g., buttercups (Ranunculaceae), sunflowers (Asteraceae), roses (Rosaceae), etc.

dioecious: referring to species with separate male and female plants.

disk: central portion of the floral axis bearing the tubular (or disk) flowers, used primarily in reference to the flowering heads of the sunflower family (Asteraceae).

dominant: the most abundant member of a community, typically estimated by biomass or canopy coverage.

entire: referring to a margin without teeth or lobes.

ephemeral: persisting for only a very short period of time.

erect: upright.

euhaline: referring to ocean waters with a salinity between 30 - 40 ppt.

eusaline: referring to inland waters with a salinity between 30 - 40 ppt.

exotic: referring to a species that has been introduced from somewhere else.

family: a group of related genera, often grossly similar in appearance or salient characteristics. Plant family scientific names usually ends in the suffix "-aceae."

floret: a small, often reduced flower, characteristic of the grass family (Poaceae), among others.

forb: herbaceous plant, typically a member of the dicotyledon class of flowering plants.

frond: leaf of a fern or palm; also used to refer to the vegetative organs of duckweeds (*Lemna* spp.) that are not differentiated into stems and leaves.

genus: the first name, always capitalized, in the Latin binomial, or scientific name of an organism. For example, the scientific name of the Narrowleaved Cattail is *Typha angustifolia*. The genus name is *Typha*. The plural form of genus is genera.

glabrous: smooth; without hairs or other surface covering.

glaucous: covered with a white or bluish waxy coating

globose: 3-dimensional globe-shaped.

glume: one of a pair of modified, scale-like leaves at the base of a grass inflorescence (spikelet).

graminoid: growth form resembling grasses (e.g., rushes [*Juncus*] or sedges [*Carex*]); also sometimes used to refer to a member of the grass family (Poaceae).

halophyte: a plant capable of tolerating salty growing conditions.

herb: a plant that does not bear woody tissue.

herbaceous: having characteristics of an herb; not bearing woody tissue.

hybrid: offspring of a mating between parents of two different species.

hyperhaline: extremely salty; containing an extremely high concentration of sodium salts (> 40 ppt) derived from ocean waters.

hypersaline: extremely salty; containing an extremely high concentration of sodium, magnesium, calcium, and/or potassium salts (> 40 ppt) not derived from ocean waters, but typically from internally drained basins.

inflorescence: the entire flower cluster of a plant.

internode: portion of a stem between two nodes or points of attachment.

keel: a prominent longitudinal ridge, like the keel of a boat, often formed at the juncture of two similar structures, e.g., leaves.

key: an outline or sequence of statements used to identify species by the process of elimination.

leaflet: one part of a compound leaf.

lemma: lowermost modified leaf that subtends a grass flower, typically paired and ensheathing the palea.

ligule: tongue or strap-shaped organ, typically used to refer to a membranaceous extension of the inner epidermis of a leaf, arising at the junction of the blade and sheath in many grasses (Poaceae) and sedges (Cyperaceae).

mesic: intermediate conditions between dry and wet.

midrib: the central axis or nerve of a leaf.

mixohaline: referring to coastal waters with a salinity between 0.5 - 30 ppt; also referred to as brackish.

mixosaline: referring to inland waters with a salinity between 0.5 - 30 ppt.

monocot (monocotyledoneae): a class of flowering plants whose members possess only one seed leaf, or cotyledon, e.g., grasses (Poaceae), sedges (Cyperaceae), rushes (Juncaceae), orchids (Orchidaceae), etc.

monotypic: referring to only one species.

native: referring to a species indigenous to a region.

naturalized: referring to a species introduced to a region in the past, now is established as part of the flora.

node: joint along a stem where a leaf is attached.

nonpersistent emergent: an aquatic emergent plant whose upper portions die back at the end of the growing season (e.g., water plantain, arrowweed).

nutlet: a small, dry fruit that does not split open along a seam or surface; technically a small, one-seeded dry fruit; thicker-walled than an akene.

oblong: longer than broad with nearly parallel sides.

opposite: two leaves (or branches) borne opposite each other at a single node.

ovary: case-like portion of a flower that matures into a fruit containing ovules that mature into seeds.

palea: upper and typically smaller modified leaf that subtends a grass flower, paired with the lemma.

palmate leaf: compound leaf with leaflets attached to a single terminal point of the leaf axis.

peat: accumulation of partially decomposed organic matter, sometimes of considerable thickness and extent.

pedicel: stalk of a single flower.

perennial: referring to a plant that lives three or more years.

perigynium: flask-shaped, sheathing papery structure that surrounds the ovary in species of the genus *Carex*; a critically important taxonomic character for identification of *Carex* species. Plural form is perigynia.

persistent emergent: aquatic emergent plant that remains standing throughout the winter and into at least the start of the next growing season (e.g., bulrush, cattail).

petiole: stalk of a leaf.

phyllary: whorl(s) of modified leaves at the base of the inflorescences of the Asteraceae.

pinnate leaf: compound leaf with leaflets arranged along a single axis.

pioneer: plant species that typically colonizes recently exposed soils.

pistil: seed-bearing and pollen-receiving portion of a flowering plant; female organ composed of a stigma, style, and ovary.

pistillate: referring to "the female" or seed-bearing organ.

pith: central portion of stems, often spongy or chambered.

ppt: parts per thousand, referring to salinity or halinity.

prostrate: laying on the ground.

ray: strap-shaped marginal flower radiating from a flower head, characteristic of members in the sunflower family (Asteraceae).

receptacle: enlarged portion of the apex of the stalk bearing a flower.

recurved: curved backward.

rhizome: underground stem, typically horizontal.

rosette: congested, circular arrangement of leaves.

rush: any member of the rush family, Juncaceae, but often referring to species in the genus *Juncus*.

scale: small, modified leaf subtending an individual flower, often in reference to sedges and other monocots.

sedge: any member of the sedge family, Cyperaceae, but often referring to species in the genus *Carex*.

sepal: a single segment or leaf of the calyx.

sessile: borne directly on the stem; without a stalk.

spikelet: small spike with greatly reduced flowers on a central axis; often used in reference to the inflorescence of grasses (Poaceae) and sedges (*Carex*; Cyperaceae).

stamen: pollen-bearing portion of a flowering plant; composed of a male organ composed of a stalk or filament and the sac-like anther at the distal end.

staminate: referring to the male.

stigma: terminal portion of the pistil, often sticky, that receives pollen.

stipe: stalk.

stipule: appendage borne at the base of a petiole, often leafy or thorny.

stolon: above-ground, horizontal stem.

style: portion of the pistil between the style and ovary, often greatly modified.

subtending: borne below another structure or having a structure borne directly below.

taxon: any taxonomic entity in the classification hierarchy, e.g., species, genus, family. Plural form is taxa.

tuber: starchy, enlarged portion of a stem or rhizome.

umbel: flat-topped inflorescence where all pedicels arise from a common point.

unisexual: bearing only one sex, either male or female, but not both.

upland: referring to an area that does not support hydrologic conditions required for the development of wetland soils and the establishment of wetland plants.

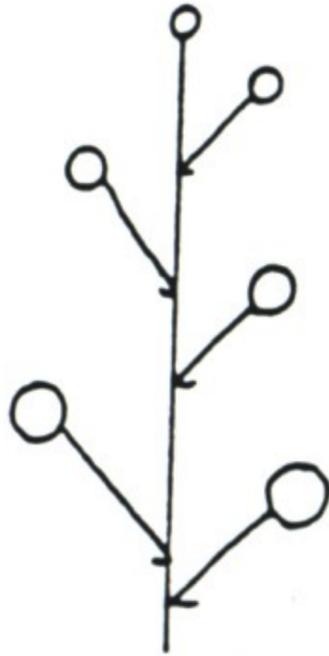
veins: a vascular bundle, typically visible, as in many leaves.

whorl: three or more parts at a node.

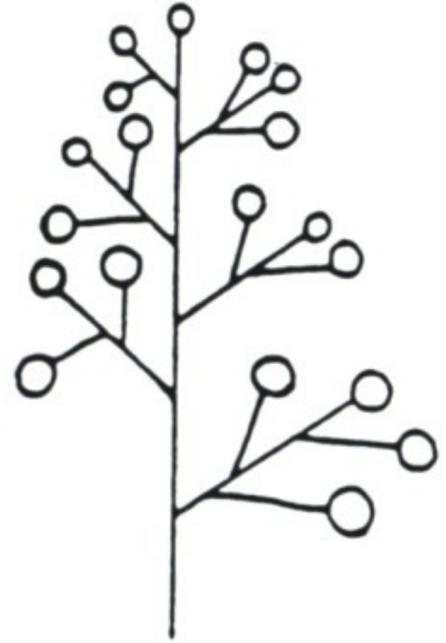
INFLORESCENCE TYPES



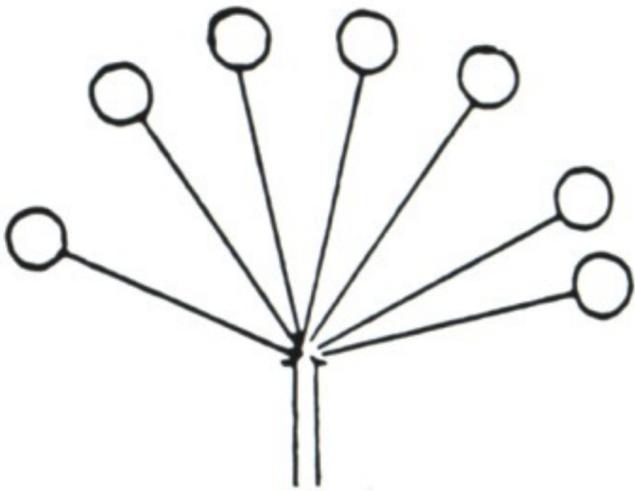
Spike



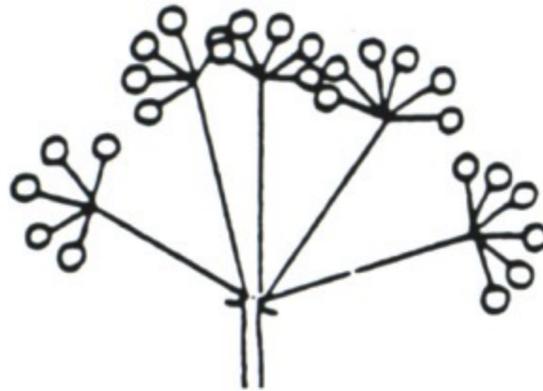
Raceme



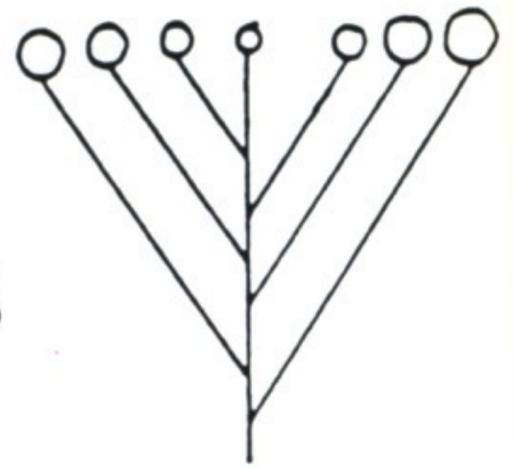
Panicle



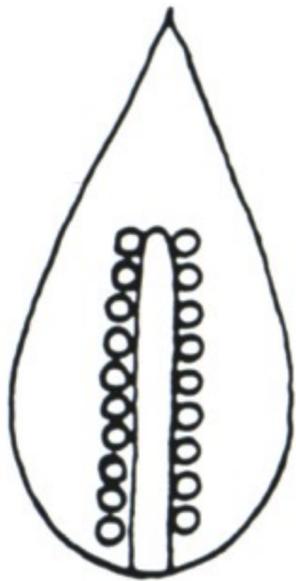
Umbel



Compound Umbel



Corymb



Spathe and Spadix



Catkin

LEAF SHAPES



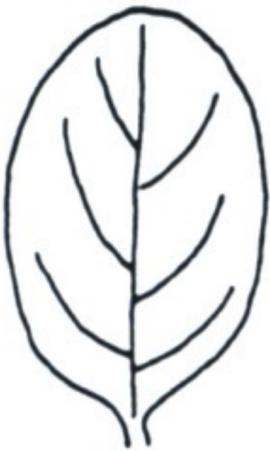
Linear



Oblong



Orbicular



Oval



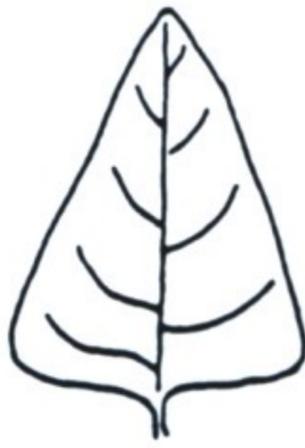
Ovate



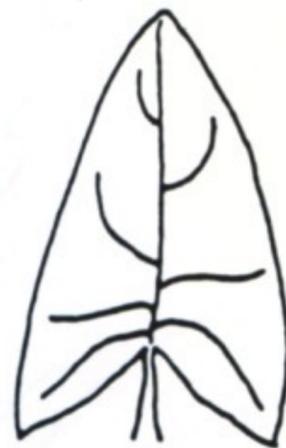
Heart-Shaped



Lanceolate



Deltoid



Sagittate



Elliptic



Kidney-shaped



Obovate

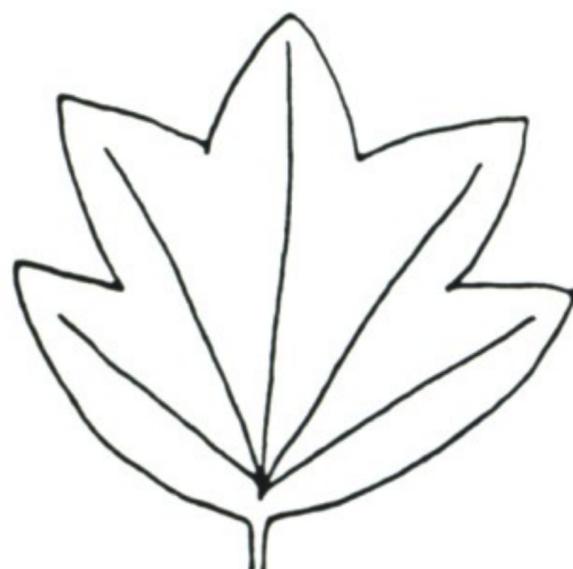
LEAF VENATION



Parallel



Pinnate

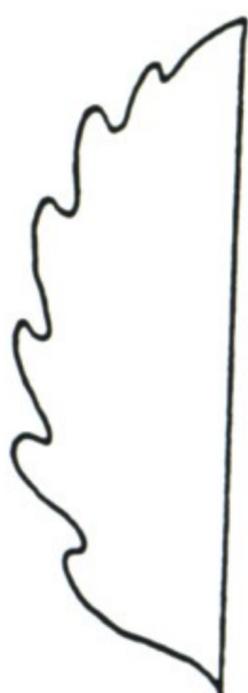


Palmate

LEAF MARGINS



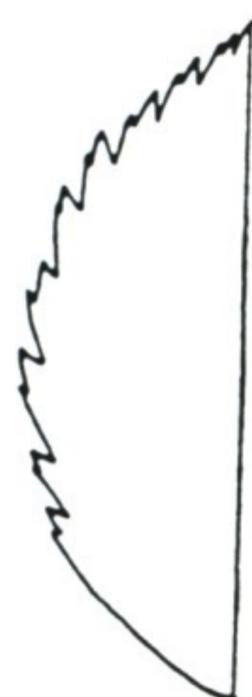
Entire



Crenate



Serrate



Doubly Serrate



Serrulate

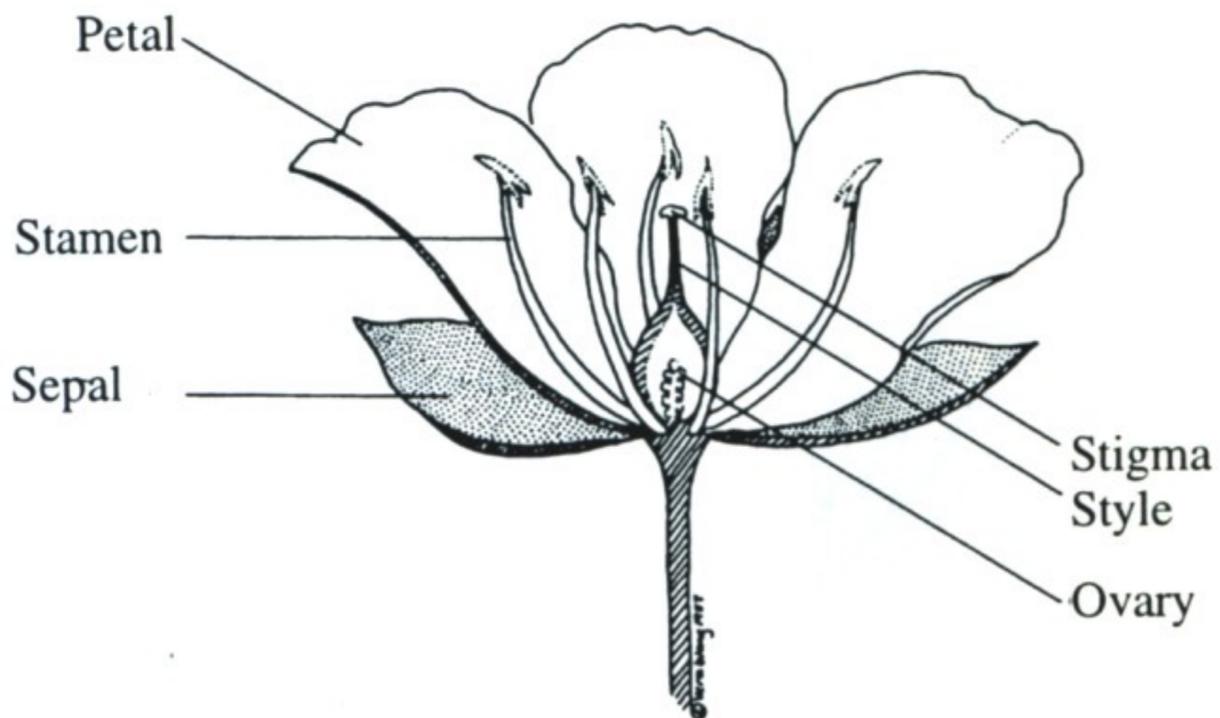


Ciliate

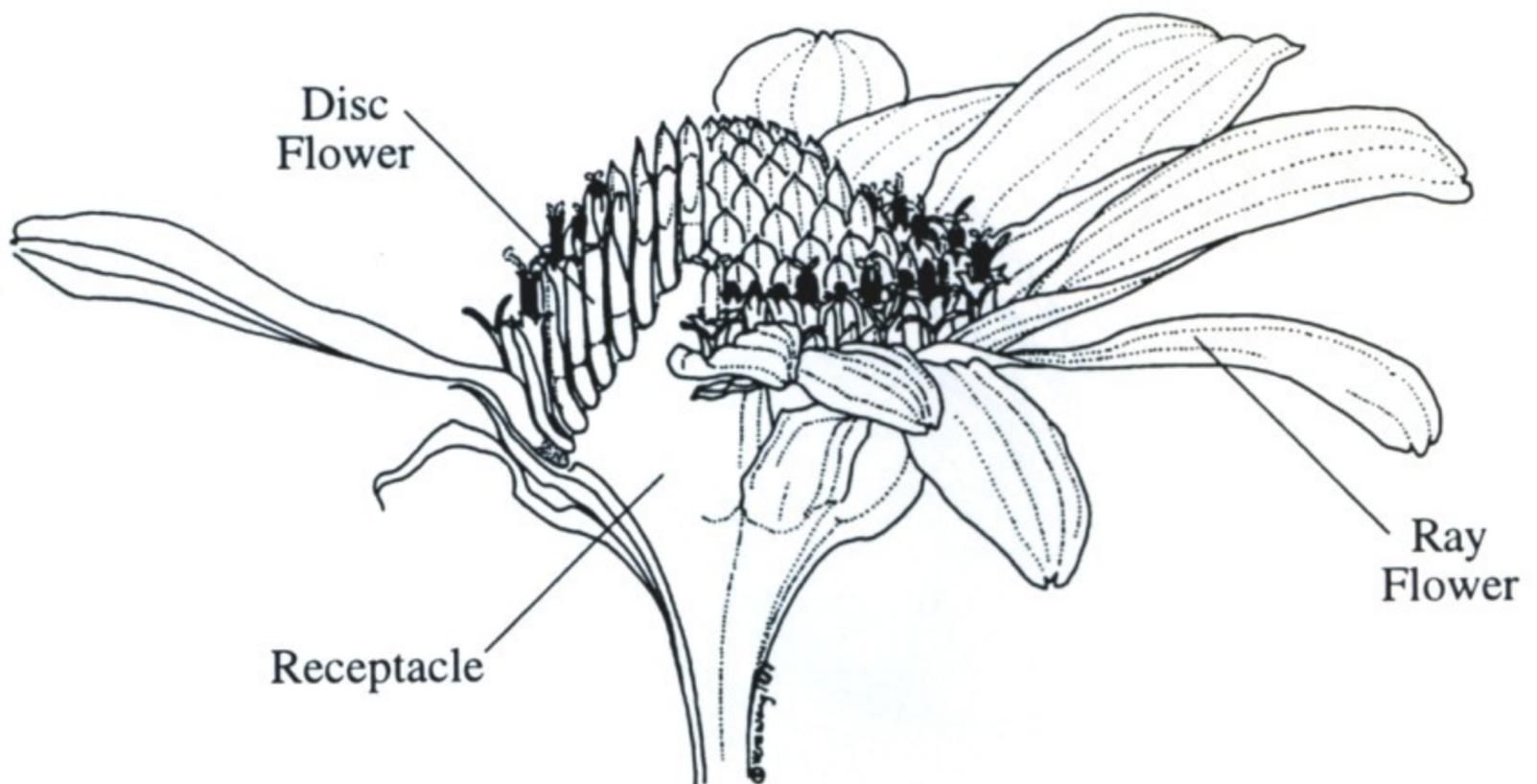


Dentate

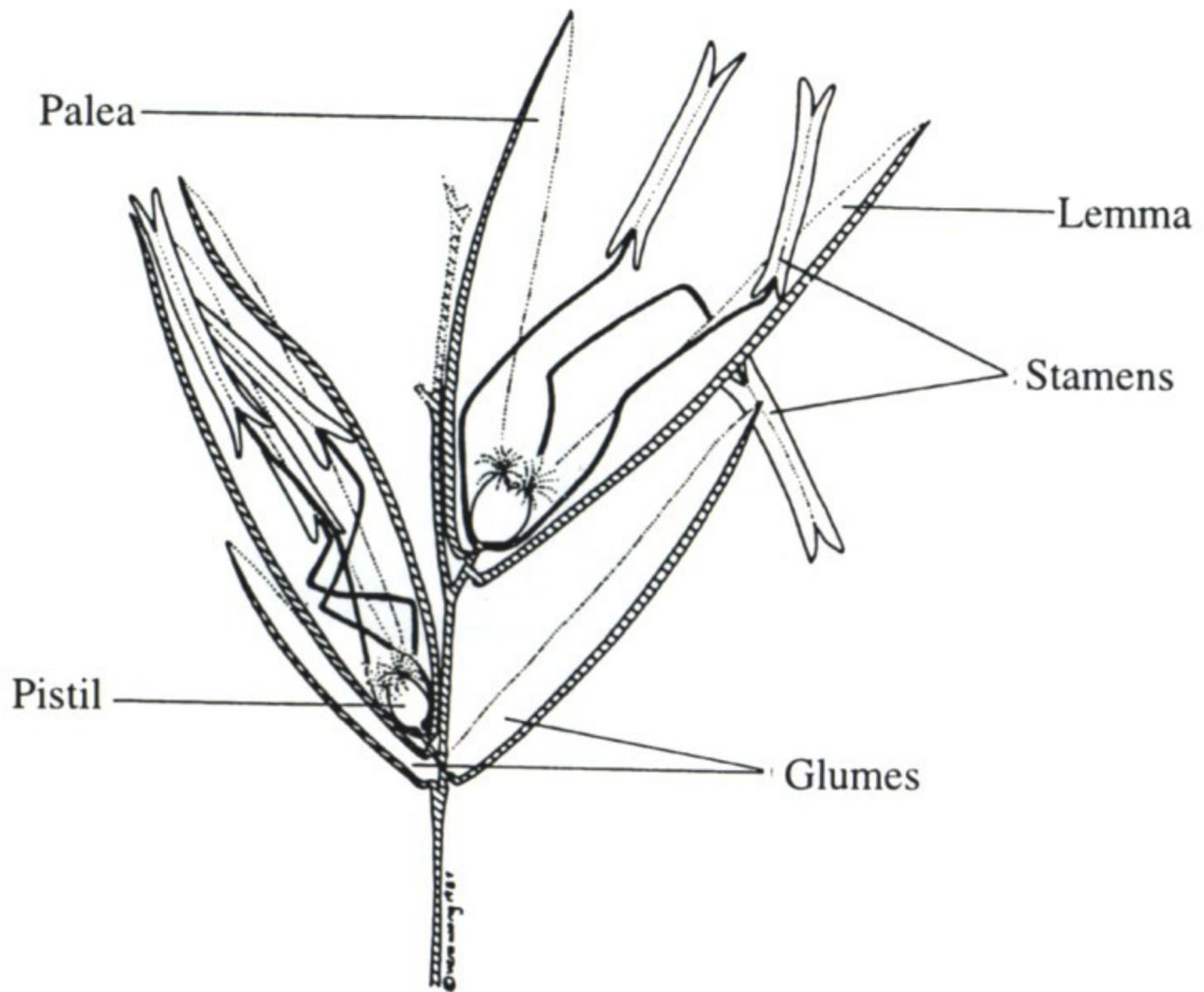
CROSS SECTION OF A TYPICAL FLOWER



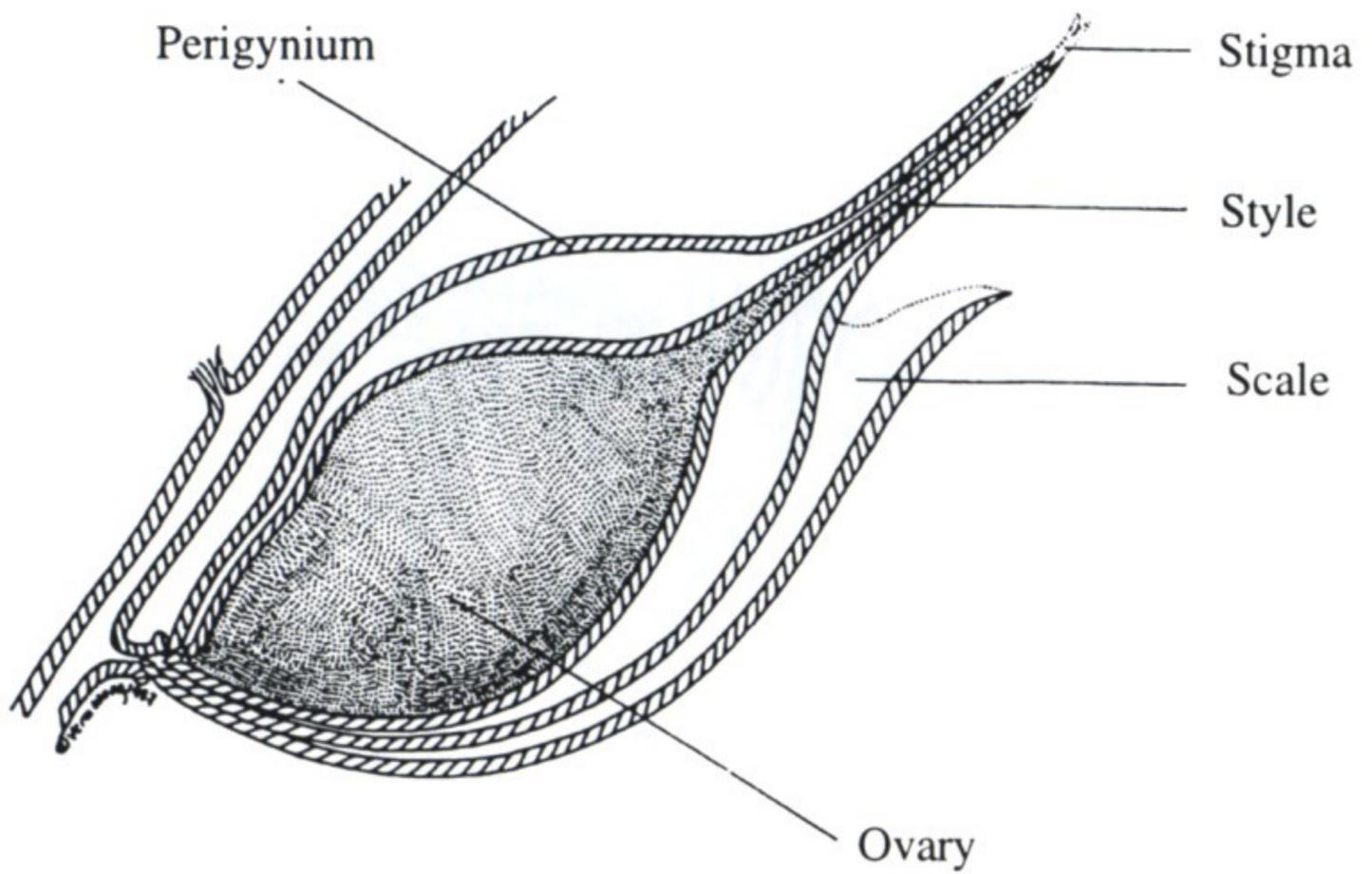
CROSS SECTION OF A TYPICAL COMPOSITE FLOWER (COMPOSITAE)



CROSS SECTION OF A TYPICAL GRASS SPIKELET



CROSS SECTION OF A PERIGYNIUM (*Carex*)



INDEX OF DESCRIBED SPECIES

<i>Acer negundo</i>	35
<i>Agrostis stolonifera</i>	21
<i>Alisma plantago-aquatica</i>	9
<i>Allenrolfea occidentalis</i>	54
<i>Alopecurus saccatus</i>	22
Arrowgrass, Seaside	20
Arrowhead, Broad-Leaved	10
Ash, Oregon	67
<i>Atriplex patula</i>	55
Barley, Mediterrean	28
Barnyard Grass	26
<i>Bidens laevis</i>	39
Bird's-Foot Trefoil	57
Box Elder	35
Brass Buttons	40
Bulrush, Hard-Stem	16
Bulrush, Saltmarsh	17
Bur Marigold (Begger's Ticks)	39
Buttonbush (Button Willow)	73
<i>Carex nebrascensis</i>	11
Cattail	32
<i>Cephalanthus occidentalis</i>	73
Clover, Whitetip	58
Cocklebur	46
<i>Conium maculatum</i>	36
Cottonwood, Black	74
<i>Cotula coronopifolia</i>	40
Coyote Thistle, Vasey's	37
<i>Crypsis schoenoides</i>	23
<i>Cyperus</i> spp.	13
<i>Deschampsia danthonioides</i>	24
<i>Distichlis spicata</i>	25
Dock, Curly	72
<i>Downingia bicornuta</i>	51
Downingia, Double-Horned	51
<i>Echinochloa crus-galli</i>	26
Elderberry, Blue	52
<i>Eleocharis macrostachya</i>	15
<i>Epilobium ciliatum</i>	68
<i>Eryngium vaseyi</i>	37
Fat Hen (Spear Oracle)	55
Foxtail, Pacific	22

<i>Frankenia salina</i>	60
<i>Fraxinus latifolia</i>	67
Goldfields	43
<i>Grindelia integrifolia</i>	41
Gumplant, Marsh	41
Hairgrass, Annual	24
Heath, Alkali	60
Heliotrope, Seaside	47
<i>Heliotropium curassavicum</i>	47
Hemlock, Poison	36
<i>Holcus lanatus</i>	27
<i>Hordeum marinum</i> ssp. <i>gussonianum</i>	28
Iodine Bush	54
<i>Jaumea carnosa</i>	42
Jaumea, Fleshy	42
Jointgrass (Joint Paspalum)	30
<i>Juncus balticus</i>	18
<i>Juncus bufonius</i>	19
<i>Lasthenia</i> spp.	43
<i>Lepidium latifolium</i>	49
<i>Limnanthes alba</i>	63
<i>Lolium perenne</i> (= <i>L. multiflorum</i>)	29
Loosestrife, Hyssop	64
<i>Lotus corniculatus</i>	57
<i>Ludwigia peploides</i>	69
<i>Lythrum hyssopifolia</i>	64
Mallow, Alkali (White Weed)	65
Mallow, Checker (Checkerbloom)	66
<i>Malvella leprosa</i>	65
Meadowfoam, White	63
<i>Mentha pulegium</i>	61
Mesamint, Sacramento	62
<i>Mimulus guttatus</i>	76
Monkey Flower, Common	76
<i>Navarretia leucocephala</i>	71
Navarretia, White-Headed	71
Oak, Valley (Roble)	59
<i>Oenanthe sarmentosa</i>	38
Parsley, Water	38
<i>Paspalum distichum</i>	30
Pennyroyal	61
Peppergrass, Broadleaf	49
Pickleweed (Virginia Glasswort)	56

<i>Plagiobothrys stipitatus</i>	48
Plantain, Water	9
<i>Platanus racemosa</i>	70
<i>Pogogyne zizyphoroides</i>	62
<i>Polypogon monspeliensis</i>	31
Popcorn Flower, Slender	48
<i>Populus balsamifera</i>	74
Primrose, Water	69
<i>Psilocarphus brevissimus</i>	45
<i>Quercus lobata</i>	59
Rabbitfoot Grass (Annual Beard Grass)	31
Redtop (Creeping Bentgrass)	21
<i>Rorippa nasturtium-aquaticum</i>	50
<i>Rumex crispus</i>	72
Rush, Baltic	18
Rush, Toad	19
Ryegrass, Perennial (=Italian Ryegrass)	29
<i>Sagittaria latifolia</i>	10
<i>Salicornia virginica</i>	56
<i>Salix exigua</i>	75
Saltgrass	25
<i>Sambucus mexicana</i>	52
Sand-Spurry, Saltmarsh	53
<i>Scirpus acutus</i>	16
<i>Scirpus maritimus</i>	17
Sedge, Nebraska	11
Sedge, Umbrella (Nutsedge)	66
<i>Spergularia marina</i>	53
Spikerush, Creeping	15
Sycamore, Western	70
Tamarisk, Small-Flowered	77
<i>Tamarix parviflora</i>	77
Timothy, Swamp (Swamp Grass)	23
<i>Trifolium variegatum</i>	58
<i>Triglochin maritima</i>	20
<i>Typha</i> spp.	32
Velvet Grass	27
Watercress	50
Willow-Herb, Hairy	68
Willow, Sandbar (Narrow-Leaved Willow)	75
Woolymarbles, Dwarf	45
<i>Xanthium strumarium</i>	46