

# A FLORA OF VINA PLAINS PRESERVE, TEHAMA COUNTY, CALIFORNIA

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## ABSTRACT

The 626 hectare Vina Plains Preserve is located in southernmost Tehama Co., California, and is a remnant of various native grassland habitats. Geologically, this region is a weathered fanglomerate formed from alluvial deposits of the Tuscan formation and later deposits of silt. A botanical survey of the Preserve between January 1982 and May 1987 resulted in the identification of 53 vascular plant families that included 287 taxa. Native species comprised 67% of the taxa, and annuals comprised 77%. Eight rare plant species were found, their distributions noted, and numbers estimated. All the plants occur in one or more of the six habitats, which include vernal pools, hogwallows, seeps, vernal marshes, uplands, and outcrops. Families with the most species include Poaceae (50), Asteraceae (36), Fabaceae (17), Boraginaceae (13), and Amaryllidaceae (10).

The original species composition of the pristine Californian grasslands is largely unknown (Bartolome and Gemmill 1981). The first direct evidence for the replacement of native perennial bunchgrass by introduced annual species on Californian grassland has been produced by a recent study of opal phytoliths at Jepson Prairie Reserve in Solano Co. (Bartolome et al. 1986). There is little detailed information on the composition of other similar Californian grasslands (Jokerst 1983). Published studies are available for the following areas of the northern Sacramento Valley: Richvale Vernal Pool Site, Butte Co. (Schlising and Sanders 1983), Jepson Prairie Nature Conservancy Preserve, Solano Co. (Holland 1981), Maidu Park, Placer Co. (Holland 1982), and Table Mountain, Butte Co. (Jokerst 1983).

The vernal pools of Californian grasslands contain a high proportion of endemic plants (Holland 1976). With increasing urbanization and the expansion of agribusiness, these habitats are disappearing except where they are protected by specific organizations. One such area of grassland and vernal pools is Vina Plains Preserve in Tehama Co., which is owned and managed by The Nature Conservancy. The purposes of this study were to conduct an inventory of all vascular plant species and their habitats on the Preserve, and to provide detailed information on the occurrence of rare plants.

## STUDY AREA

*Location.* The Vina Plains Preserve is located in southernmost Tehama Co., in the northern portion of the great Central Valley of

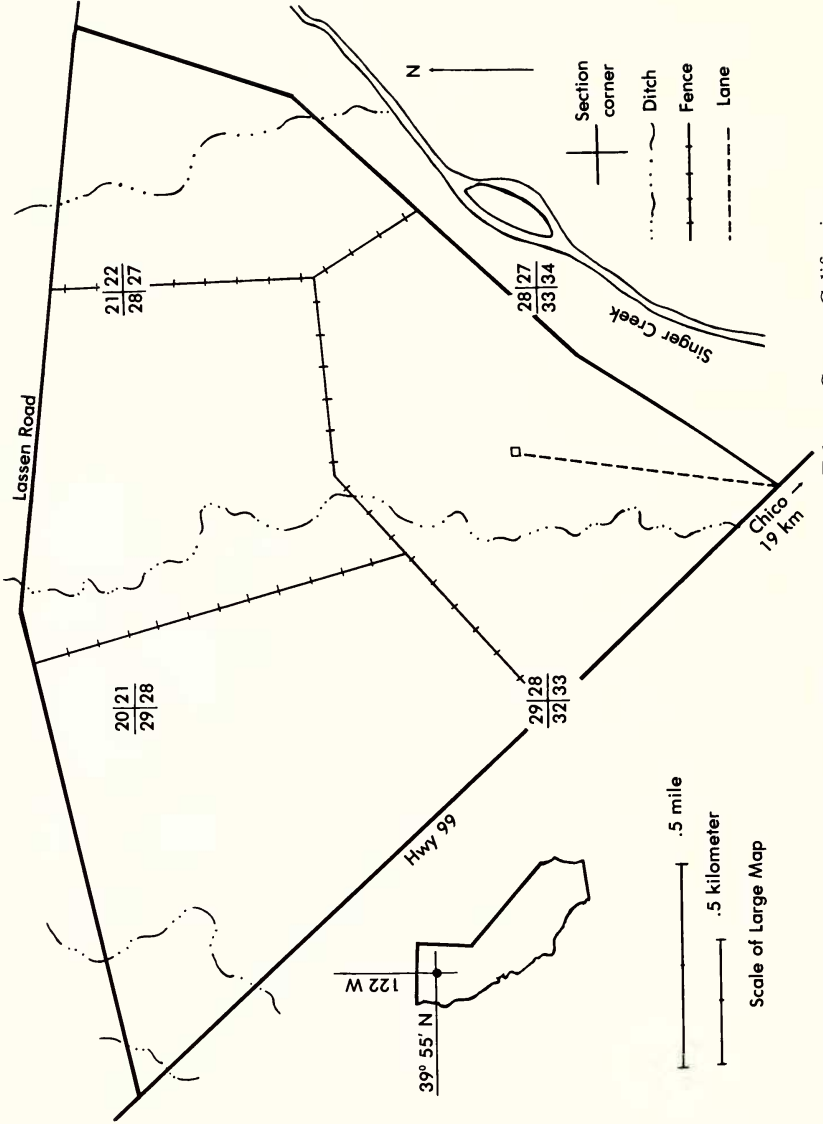


FIG. 1. Location of Vina Plains Preserve, Tehama County, California.



FIG. 2. Aerial view of the Vina Plains Preserve from the south, showing several large vernal pools and a barn located on the access road.

California (Fig. 1). The area is bordered by Tuscan volcanic mudflows of the Cascade Range to the east and the Sacramento River to the west. The elevation is about 66 m, and topographic relief varies by about 4.5 m from north to south. The Wurlitzer addition in 1984 (176 ha) is not included in the present study.

The study area is composed of flat or mounded, rolling grassland, interspersed by several kinds of wet areas (Fig. 2). These wet areas consist of: 1) four drainages that were deepened for irrigation in the past, and that traverse the parcel in a roughly north/south direction; 2) a number of vernal pools of varying sizes; and 3) many hogwallows (Fig. 3), smaller depressions, and natural drainages that hold water for short periods of time.

*Geology and soils.* The following theory of the formation of parent materials for the soils is based on information from J. W. Guyton (pers. comm.), a geologist at California State University, Chico. The oldest rock type in the area is an alluvial fan deposit. It was derived from the Tuscan formation composed of old volcanic mudflows that make up a considerable portion of the foothills from Red Bluff



FIG. 3. A large hogwallow that displays "rings" of flowering species. Mt. Lassen is visible in background.

southward to the Vina area (Harwood et al. 1981). This deposit consists of coarse sands and gravels that were transported from the foothills on the northeast and east, deposited in alluvial fans, and cemented. This "fanglomerate" is 1 to 2 million yr old, mainly andesitic and basaltic in composition, and well cemented into rock (conglomerate) by materials in the ground water. At Vina Plains Preserve, the strata are exposed in such places as the waterways and edges of the pools. About 100,000 yr ago, weathering weakened the cement, converting the conglomerate back to sand, silt, and gravel to a variable depth of 2–5 m. Subsequently (10,000–20,000 yr ago) the deposition of silt occurred either by wind or by flooding of the Sacramento River during the period of glacial climate. The fine-grained sediment is evident in isolated mounds. Finally, strong winds associated with a dry climate during the period that ended about 4000 yr ago (known as the altithermal) could have removed much of the silt layer and excavated pools in the weathered fanglomerate. The pools hold water because of the basic, slightly permeable fanglomerate floor, and because of the clay that washed in from the higher surroundings. Milder erosion by gentle runoff could have produced the many gullies that occur naturally.

The existing soils are largely of andesitic and basaltic composition, and are described as the "Tuscan series" (U.S.D.A. 1967). The surface is dark brown and cobbly; the subsoil is more reddish, clayey,

and gravelly, and is often exposed at the margins of pools and other eroded areas. Other series include the Keefers, similar to Tuscan, and Anita and Berrendos, that are more clayey. The deeper (Anita and Berrendos) soils are found commonly where pools have formed or in the drainage channels. All soils and pools have an underlying hardpan.

#### HABITATS AND VEGETATION

General trends during one field season indicated that the plants on the Preserve tend to group themselves into six general habitats, with some overlap or transition between habitats. For purposes of this study, these were termed upland, pool, hogwallow, seep, vernal marsh, and outcrop.

*Upland.* The majority of the terrain, consisting of rather well drained areas, is considered upland. The soil is mainly Tuscan loam: it is slightly acidic, with depth from a few centimeters to about one meter (U.S.D.A. 1967), and is slightly cobbly. Water runs off quickly and collects in the internal drainages. Species found in uplands are mainly annual grasses and forbs, such as *Lasthenia californica*, *Layia fremontii*, *Orthocarpus erianthus*, *Lepidium nitidum*, *Hemizonia fitchii*, several species of *Erodium*, *Navarretia*, *Vulpia*, and *Bromus*, and such perennials as *Dodecatheon clevelandii* subsp. *patulum* and *Brodiaea californica*.

*Seeps.* Areas that have at least some moisture supplied by slow-moving water during most of the year are considered seeps. These include margins of irrigation ditches and adjoining low areas. The soil is often deep and contains much silt. Such habitats are found along (east to west) Singer Creek Ditch, Sheep Camp Ditch, and two other ditches traversing the west pasture (Fig. 1). Typical species are: *Callitriche heterophylla* subsp. *bolanderi*, *Centaurium floribundum*, *Elatine heterandra*, *Limosella acaulis*, *Lythrum hyssopifolia*, *Mimulus guttatus*, *Crassula saginoides*, and *Ranunculus muricatus*. In some places, the plants occur in zones. For example, at one site *Eleocharis macrostachya* occurs in standing water of a ditch, *Ammannia coccinea* and *Diplachne fascicularis* on the muddy shore, *Echinochloa crusgalli* on adjacent damp grounds, and *Eragrostis cilianensis* with the last two.

*Hogwallows.* The hundreds of potholes, depressions, and internal drainages that have ephemeral standing water are considered hogwallows. The soil is usually thinner than in seeps. Hogwallows may have rocky bottoms and varying amounts of sand and silt. When silt is present, species occur that also are found in pools. Typical species of hogwallows are: *Lasthenia fremontii*, *Limnanthes douglasii* var. *rosea*, *Plagiobothrys stipitatus* var. *micranthus*, and *Down-*

*ingia ornatissima* or *D. bicolor*. Under optimum conditions, hogwallows display concentric colored "rings" of flowering species.

*Pools.* A "pool" is deeper and larger than a hogwallow and is presumed to have been formed by the blow-out process. The bottom is composed of clay or silt underlain by impermeable fanglomerate. Water accumulated during winter rains remains into late spring or early summer. The maximum depth of the different pools varies from 0.3–1.0 m; however, depth also fluctuates with seasonal rainfall and with drydown. Ten large pools were found to contain *Orcuttia pilosa* and *O. tenuis*.

The largest of these (located in the northern portion of the west pasture) measures about 345 × 142 m. The smallest (located in the northeast portion of the south pasture) measures 80 × 65 m. Most are in areas of Anita clay loam, but three are on Tuscan loam. All have some degree of silt or clay accumulated by erosion from surrounding higher ground. The deepest pool retained water (in 1982) into June, but most had no standing water by early to mid-May. In some, the margins are sandy, whereas in others there are many cobbles with heavy varnish that indicates great age. Typical species are: *Asclepias fascicularis*, *Eryngium vaseyi* var. *vallicola*, *Marsilea vestita*, *Navarretia leucocephala*, *Psilocarphus brevissimus*, *Downingia bella*, *D. bicornuta*, *Orcuttia pilosa*, *O. tenuis*, *Tuctoria greenii*, and *Chamaesyce hooveri*. Although there is a greater species richness on the upland, the species listed for pools (except *C. hooveri* and *Orcuttia tenuis*) usually occur in all the large pools.

*Vernal marshes.* The vernal marsh differs from the hogwallow habitat in its greater area and from the pool habitat in that it lacks deep, standing water. Water remains in the marsh habitat longer than in the hogwallows, but not as long as in the pools. The soil is thin Tuscan loam and often contains additional clay deposited from erosion. Species found here include primarily native annual forbs found in the pools and hogwallows, and some native annual grasses, which include those that are generally found in upland habitats and hogwallows. *Boisduvalia cleistogama* and *B. glabella*, native forbs found in the pools, are present in this habitat. Other typical species include: *Alopecurus saccatus*, *Limnanthes douglasii* var. *rosea*, and *Plagiobothrys stipitatus* var. *micranthus*.

*Outcrops.* This is a habitat of thin, poor, rocky or sometimes gravelly soil. These outcrops usually occur on the upland, but also occasionally are found within the dried pools. Usually, the outcrop is the driest habitat, and the plants are small, native or introduced annuals. Typical outcrop species are: *Crassula connata*, *Parvisedum pumilum*, *Koeleria phleoides*, and occasionally *Plantago erecta* and *P. bigelovii*.

## FLORA

*Summary.* Fifty-three vascular plant families were found that consist of 287 taxa. Two other species (*Populus fremontii* and *Salix* sp.) have been extirpated by the razing of a man-made reservoir. Of the total taxa, 192 (67%) are native and 95 (33%) are introduced; 221 (77%) are annuals and 66 (23%) are perennials.

*Rare plants.* Eight species at Vina Plains Preserve are mentioned in the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plants of California* (Smith and York 1984). A ninth, *Paronychia ahartii*, is too recently described for listing, but is being considered for inclusion.

*Astragalus pauperculus* has been found scattered at a few sites on thin Tuscan soil where gaps in the vegetation occur. It is inconspicuous, and may occur more often than indicated. Smith and York (1984) list it as rare but not endangered, and endemic to California. Its Federal status is "widespread, not threatened."

*Cuscuta howelliana* was found in three of the pools and a hogwallow. Due to the twining, meandering nature of the plant, counts must be based on the number of host plants; these vary from a few (3–15) to many, covering about one fourth of one pool. Although not endangered (CNPS, Federal), this species is rare and endemic to California, and requires monitoring.

*Chamaesyce hooveri* was found in six of the pools and a hogwallow. Population size varied from a single plant in the hogwallow to about 3000 in the largest pool. Mature plants form mats up to one meter in diameter by late summer. It is rare and endemic to California and is endangered throughout its range (CNPS) because of loss of vernal-pool habitat. Insufficient data, however, are available for Federal listing.

*Fritillaria pluriflora* has been found at seven sites; all but one of these occurred in deep clay soil. Population size was from 15–30, and usually approached the latter. Although rare and endemic to California, it is considered endangered (CNPS) in only a portion of its range and is not on the Federal list.

*Lepidium latipes* has been found in a few hogwallows. A census in 1985 at one large hogwallow revealed a population of 584 plants. This species is rare, but not endangered in California, and is not on the Federal list.

*Orcuttia pilosa* was found in six pools, but occurred in large numbers in only the four deepest ones. Numbers were estimated in the thousands. It was found in association with *Tuctoria greenei* in only one pool. It is rare and endangered in California throughout its range (CNPS) due to reduction of habitat. Data are on file to support a Federal listing.

*Orcuttia tenuis* occurs in one small pool at the northeast corner of the Preserve. Numbers were estimated at 5000–10,000 plants. A second germination took place following mid-summer rains in 1982, and this population was estimated at about 1000 plants. The status of this species is similar to *O. pilosa*.

*Paronychia ahartii* Ertter was found at one location in the eastern portion of the Preserve in April 1984. It was known previously only from a few, widely separated areas in northern California, from collections made by J. T. Howell, and from the Lowell Ahart Ranch in Butte Co. (J. Jokerst pers. comm.). It is being considered for CNPS listing; more data are needed to support a Federal listing.

*Tuctoria greenei* is more widespread than *Orcuttia pilosa* or *O. tenuis*. Most populations of it are smaller and usually consist of a few hundred plants; however, about 30,000 plants have occurred in one exceptional pool. Tufting makes accurate counts difficult to obtain. This is a rare endemic of California and is endangered throughout its range due to reduction of habitat (CNPS). Data are on file to support a Federal listing.

*Annotated catalogue.* The following list includes all species collected between late January–October 1982 and March–May 1983. Seven additions have been made from 1984–1987. Fifty-two visits were made in the original study, most frequently during the peak flowering season. Voucher specimens are housed at CHSC. Nomenclature follows Munz (1959, 1968). Current regional authorities are followed whenever possible. Synonyms are included if names differ from Munz. Each entry includes information on habitat and flowering phenology at the Preserve, and whether the species is annual (A), biennial (B), perennial (P). If the plant is not native to the area, it is marked with an asterisk. Occurrence of most species is noted as abundant, common, occasional, and uncommon. Rare plants listed in Smith and York (1984) are noted.

#### VASCULAR PLANTS OF VINA PLAINS PRESERVE

##### LEPIDOPHYTA

##### Isoetaceae

*Isoetes howellii* Engelm. P; standing water of seeps, hogwallows, and pool margins.  
*Isoetes nuttallii* A. A. Eat. P; habitat as for *I. howellii*, but appears earlier in spring.

##### PTEROPHYTA

##### Marsileaceae

*Marsilea vestita* Hook. & Grev. P; abundant in vernal pools, occasional in hogwallows.  
*Pilularia americana* A. Br. P; standing water of irrigation ditches, occasional at margins of pools.



## ANTHOPHYTA—DICOTYLEDONEAE

## Amaranthaceae

- \**Amaranthus albus* L. A, common; dried pools and low places; Jul–Sep.  
*Amaranthus blitoides* Wats. A; disturbed areas; Jun–Aug.

## Apiaceae

- \**Anthriscus scandicina* (Weber) Mansf. A, occasional; upland; Feb.  
*Eryngium vaseyi* Coult. & Rose var. *vallicola* (Jeps.) Munz. B or P, locally abundant; vernal wet areas; Jun–Jul.  
*Lomatium humile* (Coult. & Rose) Hoov. ex Math. & Const. P, common; upland, on gentle slope or depression; Tuscan loam; Mar–Apr.  
*Sanicula bipinnatifida* Dougl. ex Hook. B or P, common; upland slope or shallow depression; Tuscan loam or deeper soils; Mar–Apr.

## Asclepiadaceae

- Asclepias eriocarpa* Benth. P, occasional; upland; Jun.  
*Asclepias fascicularis* Dcne. in A. DC. P; abundant in dried pools, occasional long internal drainages and ditches; Anita clay or Tuscan or Keefers loam; Jun–Sep.

## Asteraceae

- Achyrachaena mollis* Schauer. A; hogwallows and upland where heavier soils hold moisture; Apr.  
*Blennosperma nanum* (Hook.) Blake. A, common; hogwallows and vernal marshes, shallow to deep; thin or cobbled soils or clay; Feb–Mar.  
 \**Centaurea solstitialis* L. A, widespread, especially on disturbed soil; May–Aug.  
 \**Conyza canadensis* (L.) Cronq. A; scattered locations of upland; Tuscan and Keefers loam; Aug–Sep.  
*Evax acaulis* (Kell.) Greene. A, occasional; upland or hogwallow; May–Apr.  
*Evax caulescens* (Benth.) Gray. A; vernal moist areas, especially pool edges and hogwallows; clay soil; Apr–Jun.  
 \**Filago gallica* L. A, occasional; disturbed Tuscan loam; Apr–May.  
 \**Gnaphalium luteo-album* L. A, common, especially on disturbed sites; Jul.  
*Hemizonia fitchii* Gray. A, common; entire Preserve except wet areas; May–Sep.  
*Hemizonia luzulaefolia* DC. subsp. *rudis* (Benth.) Keck. A; hogwallow areas and, to a lesser extent, borders of seeps; more gregarious than *H. fitchii* but less widespread; Jul–Sep.  
 \**Hypochoeris glabra* L. A, common; upland, vernal marsh, and hogwallow; May–Jun.  
 \**Lactuca saligna* L. A; scattered locations of upland, especially in disturbed areas; Jul–Aug.  
 \**Lactuca serriola* L. A; more common than the previous species but similar habitat; Aug.  
*Lagophylla glandulosa* Gray subsp. *glandulosa*. A, abundant; upland on thin or clayey Tuscan loam; Jun–Sep.  
*Lagophylla glandulosa* Gray subsp. *serrata* (Greene) Keck. A, common; upland open slopes; thin Tuscan loam; May–Jun.  
*Lasthenia californica* DC. ex Lindl. [*L. chrysostroma* (Fisch. & Mey.) Greene] A, common; widespread in many habitats except wettest or most drained; Mar–May.  
*Lasthenia fremontii* (Torr. ex Gray) Greene. A, common; widespread in hogwallows and margins of pools, less so on drained upland; Tuscan loam or sometimes deeper soils; Mar–May.  
*Lasthenia glaberrima* DC. A; dried pools; May–Jun.  
*Lasthenia glabrata* Lindl. subsp. *coulteri* (Gray). A; upland; Apr.

- Lasthenia platycarpa* (Gray) Greene. A, locally common; hogwallows or wet upland; Feb–Apr.
- Layia fremontii* (T. & G.) Gray. A; ubiquitous on upland and bordering hogwallows; Feb–May.
- \**Leontodon leysseri* (Wallr.) G. Beck. A, common; Tuscan or deeper soil of upland, or near seeps; Jun.
- \**Leontodon taraxacoides* (Vill.) Meart. A; Tuscan loam or heavier soils of upland, or near seeps; May.
- Lessingia nana* Gray in Benth. A, abundant; upland; Jul–Aug.
- Matricaria matricarioides* (Less.) Porter. A, common on disturbed sites; Mar–Jul.
- Micropus californica* F. & M. A, common; dried hogwallows or open upland; Tuscan loam; Apr–May.
- Microseris acuminata* Greene. A; upland; Apr.
- Microseris douglasii* (DC.) Sch.-Bip. subsp. *douglasii*. A; upland or hogwallows; Tuscan loam; Apr.
- Microseris douglasii* (DC.) Sch.-Bip. subsp. *tenella* (Gray) Chamb. A, occasional; upland; Tuscan loam or deeper soils; May.
- Psilocarphus brevissimus* Nutt. A, common; dried vernal pools, hogwallows, and vernal marshes; Apr–Jun.
- Psilocarphus oregonus* Nutt. A, less common than the preceding species; habitat and phenology similar.
- \**Senecio vulgaris* L. A; disturbed areas; Jan–Sep.
- \**Silybum marianum* (L.) Gaertn. A, occasional; near irrigation ditches; May.
- \**Sonchus asper* L. A, occasional; Jul.
- \**Sonchus oleraceus* L. Similar to *S. asper*.
- \**Xanthium strumarium* L. var. *canadense* (Mill.) T. & G. A; dried vernal pools, abundant in some; Jul–Aug.

## Boraginaceae

- Amsinckia intermedia* F. & M. A; found on a grassy slope near a fence; Apr.
- Amsinckia menziesii* (Lehm.) Nels. & Macbr. A; found with *A. intermedia*; Apr.
- \**Heleotropium europaeum* L. A; scattered locations on upland; Tuscan or clay loam; Aug–Sep.
- Plagiobothrys austinae* (Greene) Jtn. A; vernal wet, slight depressions; Tuscan or deeper soils; Mar–Apr.
- Plagiobothrys canescens* Benth. A; occasional populations on upland; May–Jun.
- Plagiobothrys fulvus* (H. & A.) Jtn. var. *campestris* (Greene) Jtn. A; occasional populations on upland; Mar–Apr.
- Plagiobothrys glyptocarpus* (Piper) Jtn. A; seeps; Tuscan or Keefers loam; Apr–May.
- Plagiobothrys greenei* (Gray) Jtn. A; hogwallows and other slight, vernal wet depressions; Tuscan or deeper soils; Mar–Apr.
- Plagiobothrys humistratus* (Greene) Jtn. A; phenology and habitat as for *P. scriptus*. According to Schling (1984), may be conspecific.
- Plagiobothrys leptocladus* (Greene) Jtn. A; seeps and shallow hogwallows; Tuscan or heavier soils; Apr–May.
- Plagiobothrys scriptus* (Greene) Jtn. A, uncommon; upland on thin Tuscan or deeper soils, sometimes hogwallows; prostrate and inconspicuous; Feb–Mar.
- Plagiobothrys stipitatus* (Greene) Jtn. var. *micranthus* (Piper) Jtn. A; pools (mostly) and hogwallows; Mar–Jun.
- Plagiobothrys stipitatus* (Greene) Jtn. var. *stipitatus*. A; hogwallows; Mar–Apr.

## Brassicaceae

- Athyasanus pusillus* (Hook.) Nutt. A; occasional populations in many habitats except wettest; Feb–Mar.
- \**Brassica campestris* L. A; occasional on disturbed soil; Apr–May.

- \**Capsella bursa-pastoris* (L.) Medic. A, common; disturbed areas; Feb–Apr.  
*Cardamine oligosperma* Nutt. A, occasional; Tuscan loam or deeper soils; Mar–Apr.  
*Draba verna* L. A, scattered locations on vernal moist upland; thin soil; Mar–Apr.  
*Lepidium lasiocarpum* Nutt. A, occasional; clayey soil; Apr.  
*Lepidium latipes* Hook. A; found at two sites: several small, scattered populations in hogwallows near barn in south pasture; single, larger population in deep soil near irrigation ditch in south pasture; Mar.  
*Lepidium nitidum* Nutt. A, common and widespread; Feb–Mar.  
 \**Raphanus raphanistrum* L. B, common; disturbed areas; Jan–Apr.  
 \**Raphanus sativus* L. Similar to *R. raphanistrum*.  
*Rorippa palustris* (L.) Bess. subsp. *glabra* (O. E. Schultz) Stuckey. A or B, occasional; disturbed areas; Apr.  
 \**Sisymbrium officinale* (L.) Scop. A, occasional; disturbed soil near an irrigation ditch; Apr.

#### Callitrichaceae

- Callitriche hermaphroditica* L. var. *hermaphroditica*. A, occasional; irrigation ditches; Apr.  
*Callitriche heterophylla* (Pursh.) subsp. *bolanderi* (Hegelm.) Calder & Taylor. P, common and widespread in pools, hogwallows, and ditches, less common in vernal marshes; Mar.  
*Callitriche longipedunculata* Morong. A, occasional; hogwallows; Apr.  
*Callitriche marginata* Torr. A, occasional; pools and hogwallows; Apr.

#### Campanulaceae

- Downingia bella* Hoov. A, abundant; pools, hogwallows, and seeps; Apr–May.  
*Downingia bicornuta* Gray. A; hogwallows, seeps, and pools; Apr–May.  
*Downingia cuspidata* (Greene) Greene. A; pools; May.  
*Downingia ornaticissima* Greene. A; seeps, hogwallows, and shallow pools or vernal marshes; Apr–May. This species occurs with *D. bella*, but with *D. bicornuta* at only one location, a wet depression.  
*Githopsis specularioides* Nutt. A, uncommon; upland; Apr.

#### Caryophyllaceae

- \**Cerastium glomeratum* Thuill. A, widespread on upland, and common in disturbed areas; Mar–Apr.  
*Minuartia californica* (Gray) Mattf. [*Arenaria californica* (Gray) Brew.] A, common; thin soils and cobbled areas of Tuscan loam, and especially in dried hogwallows; Feb–May.  
*Paronychia ahartii* Ertter. A; small population found on thin soil of well-drained upland at northeast corner of Preserve; Mar–Apr.  
 \**Petrorhagia velutina* (Gussone) Ball & Heywood. [*Tunica prolifera* L., *Kohlrauschia velutina* (Guss.) Reichb.] A, common; upland or less moist seeps; Apr.  
 \**Sagina apetala* Ard. A; dried thin or rocky soil of disturbed areas; Apr.  
*Sagina decumbens* (Ell.) T. & G. subsp. *occidentalis* (Wats.) Crow. [*S. occidentalis* Wats.] A, common; scattered in low or disturbed areas of Tuscan loam or deeper soils; Apr.  
 \**Silene gallica* L. A, occasional; disturbed areas; Apr.  
 \**Spergularia bocconii* (Scheele) Foucaud. A, occasional; disturbed areas; Apr.  
 \**Spergularia rubra* (L.) J. & C. Presl. A; disturbed, low and dried areas; Apr–May.  
 \**Stellaria media* (L.) Vill. A; disturbed areas; Apr.

#### Chenopodiaceae

- \**Chenopodium vulvaria* L. A; disturbed Tuscan loam; Jul.

## Convolvulaceae

- \**Convolvulus arvensis* L. P, abundant; disturbed areas, becoming invasive in pools; May–Aug.

## Crassulaceae

- Crassula connata* (Ruiz. & Pav.) Berger var. *eremica* (Jepson) Bywater & Wickens [*C. erecta* H. & A.] A; dried hogwallows, outcrops, and thin soil of upland; Feb–Mar.
- Crassula saginoides* (Maxim.) Bywater & Wickens [*Tillaea drummondii* Torr. & Gray var. *bolanderi* (Wats.) Jepson. A; hogwallows and seeps; Mar–Apr.
- \**Crassula tillaea* Lester-Garland [*C. muscosa* (L.) Roth] A; shallow depressions on upland; Tuscan loam; Mar–Apr.
- Parvisedum pumilum* (Benth.) Clausen. A; outcrops on Tuscan soils; Apr–May.

## Cuscutaceae

- Cuscuta howelliana* Rubtzoff. A, uncommon; hogwallows and shallow, dried pools; parasitic on *Navarretia leucocephala*, *Boisduvalia cleistogama*, *Eryngium vaseyi* var. *vallicola*, and *Downingia* species; May–Jun.

## Elatinaceae

- \**Elatine heterandra* Mason. A, common; wet mud and sand of seeps; May–Jun.

## Euphorbiaceae

- Chamaesyce glyptosperma* (Engelm.) Small. [*Euphorbia glyptosperma* Engelm.] A; found at one site: disturbed soil near an irrigation ditch at crossing under Highway 99; Jun.
- Chamaesyce hooveri* (Wheeler) Burch. [*Euphorbia hooveri* Wheeler] A, rare; dried vernal pools; Jun–Sep.
- \**Chamaesyce maculata* (L.) Small [*Euphorbia maculata* L.] A; found in a hogwallow on Tuscan loam; Aug.
- Chamaesyce ocellata* (Dur. & Hilg.) Millsp. [*Euphorbia ocellata* Dur. & Hilg.] A, common; pools, hogwallows, or flat upland; Jul–Oct.
- Eremocarpus setigerus* (Hook.) Benth. A, ubiquitous; dried vernal pools and flat upland; thin Tuscan or clay loam; Jun–Aug.

## Fabaceae

- Astragalus gambelianus* Sheld. A, occasional; upland; Tuscan or deeper soil; Mar–Apr.
- Astragalus pauperculus* Greene. A, rare; thin soil of well-drained Tuscan upland; Mar–Apr.
- Lupinus bicolor* Lindl. subsp. *pipersmithii* (Heller) D. Dunn. A; upland, drained sites or shallow hogwallows; thin Tuscan or deeper soils; Mar–Apr.
- Lupinus nanus* Dougl. in Benth. subsp. *apricus* (Greene) Ell., Hard., & Mank. [*L. vallicola* Heller subsp. *apricus* (Greene) D. Dunn.] A; upland; Tuscan loam; Mar–Apr.
- Lupinus polycarpus* Greene. A; upland; Tuscan loam; Mar–Apr.
- Lupinus subvexus* C. P. Sm. A, occasional; low areas of Anita clay; Apr–May.
- \**Medicago polymorpha* L. var. *polymorpha*. A, common; upland, edges of hogwallows, pools, and outcrops; Mar–Apr.
- \**Medicago polymorpha* L. var. *brevispina* (Benth.) Heyn. A; with var. *polymorpha*; Mar–Apr.
- Trifolium alborpurpleum* T. & G. A, occasional; upland; Tuscan loam; Apr–May.
- Trifolium amplexens* T. & G. A, common; Tuscan loam or deeper soils; Apr–May.

*Trifolium depauperatum* Desv. A, abundant; flat or drained areas of upland; Tuscan or deeper soils; Mar–Apr.

\**Trifolium fragiferum* L. P; damp edges of irrigation ditches and disturbed areas; Mar–Apr.

\**Trifolium hirtum* All. A; upland; thin, baked Tuscan loam or clay loam; Apr–May.

*Trifolium microcephalum* Pursh. A, uncommon; Tuscan loam; May.

\**Trifolium repens* L. P; damp areas along irrigation ditches; Jun–Jul.

*Trifolium tridentatum* Lindl. var. *tridentatum*. A; upland or less moist areas of seeps; Tuscan loam or deeper soils; Apr–May.

*Trifolium variegatum* Nutt. A; edges of irrigation ditches; Apr–May.

#### Gentianaceae

*Centaurium floribundum* (Benth.) Rob. A; less moist portions of seeps; often forms a zone between more typical seep species and those of dry upland; Jun–Aug.

*Centaurium venustum* (Gray) Rob. subsp. *abramsii* Munz. A; open, flat upland; Tuscan or Keefers loam; Jun–Jul.

*Cicendia quadrangularis* (Lam.) Griseb. A; open flats of upland, and depressions; Mar–Apr.

#### Geraniaceae

\**Erodium botrys* (Cav.) Bertol. A, common outside of wettest areas; Feb–Apr.

\**Erodium brachycarpum* (Godr.) Thell. [*E. obtusiplicatum* (Maire, Weiller & Wilcz.) T. J. Howell] A, abundantly weedy outside of wettest areas; Mar–May.

\**Erodium cicutarium* (L.) L'Her. A, less common than *E. brachycarpum*; upland in disturbed areas but outside of wettest parts; Feb–Apr.

\**Erodium moschatum* (L.) L'Her. A, least common *Erodium* species; disturbed areas; Apr–May.

\**Geranium dissectum* L. A, occasional on upland, more common near seeps or vernal pools on deeper soil; Apr–Jun.

#### Hydrophyllaceae

*Nemophila pedunculata* Dougl. ex. Benth. A; upland; thin Tuscan loam, on fresh soil of pocket gopher mounds; Apr.

#### Hypericaceae

*Hypericum anagalloides* Cham. & Schlecht. A, occasional; along edge of irrigation ditch in rich clay loam; Jul.

#### Lamiaceae

*Pogogyne zizyphoroides* Benth. A, common in hogwallows, occasional on upland, and later in pools; Apr–May.

*Trichostema lanceolatum* Benth. A; upland; thin Tuscan loam; Aug–Sep.

#### Limnanthaceae

*Limnanthes douglasii* R. Br. var. *rosea* (Hartw. in Benth.) C. T. Mason. A, common; vernal marshes and hogwallows or edges of pools; Feb–Apr.

#### Lythraceae

*Ammannia coccinea* Rottb. A; wet mud along irrigation ditches; May–Aug.

*Lythrum hyssopifolia* L. A, common; wet mud of irrigation ditches; May–Aug.

## Malvaceae

- \**Malva nicaeensis* All. A; disturbed area around barn; Tuscan loam; Jun.  
*Sidalcea diploscypha* (T. & G.) Gray. A, common but widely scattered on upland slopes or near vernal wet flats; May–Jun.  
*Sidalcea hartwegii* Gray ex Benth. A; scattered on upland; Tuscan loam; Apr.  
*Sidalcea hirsuta* Gray. A, occasional along irrigation ditches, sometimes abundant in pools; May–Jun.

## Martynaceae

- \**Proboscidea louisianica* (Mill.) Thell. A, common in larger vernal pools, occasional near irrigation ditches and near barn; Jun–Jul, and in Sep after late rain.

## Molluginaceae

- \**Mollugo verticillata* L. A; edges of drying pools, seeps, and hogwallows, especially where soil is rocky, sandy, or gravelly; late May–Aug.

## Onagraceae

- Boisduvalia cleistogama* Curran. A, common in pools and vernal marshes, occasional in hogwallows; May–Jun.  
*Boisduvalia densiflora* (Lindl.) Wats. A, occasional; seeps; Jun–Aug.  
*Boisduvalia glabella* (Nutt.) Walp. A, occasional; small pools and hogwallows; Jun–Jul.  
*Boisduvalia stricta* (Gray) Greene. A, common; seeps, hogwallows, and edges of pools; Apr–May.  
*Clarkia purpurea* (Curt.) Nels. & Macbr. subsp. *quadrivulnera* (Doug.) Lewis & Lewis. A, occasional; upland; Tuscan loam; May–Jun.  
*Ludwigia palustris* (L.) Ell. P, occasional; standing water of irrigation ditches; Aug.  
*Ludwigia peploides* (HBK.) Raven. P, common; standing or slowly moving water of irrigation ditches; May–Aug.

## Papaveraceae

- Eschscholzia lobbii* Greene. A, uncommon; upland; Tuscan loam; Mar.

## Plantaginaceae

- Plantago bigelovii* Gray. A; upland, hogwallow or margins of pools, especially on thinner soils; Mar.  
 \**Plantago coronopus* L. A, occasional; Tuscan loam; May.  
*Plantago erecta* Morris. [*P. hookeriana* F. & M. var. *californica* (Greene) Poe.] A, common except in wettest habitats; Mar–Apr.  
 \**Plantago lanceolata* L. P, occasional between dry upland and seep; Jun.

## Polemoniaceae

- Gilia tricolor* Benth. A, common; upland; Tuscan loam or deeper soils; Apr–May.  
*Linanthus bicolor* (Nutt.) Greene. A, common; upland; Tuscan loam; Mar–Apr.  
*Navarretia heterandra* Mason. A; upland; low but drained Tuscan loam or deeper soils; May.  
*Navarretia intertexta* (Benth.) Hook. A; low areas; Tuscan loam or deeper soils; May.  
*Navarretia leucocephala* Benth. A, common; hogwallows, pools, and vernal marshes; Mar–Jun.  
*Navarretia nigellaeformis* Greene. A; found at only one site on Tuscan loam; May.  
*Navarretia pubescens* (Benth.) H. & A. A; scattered on upland; Tuscan loam; May–Jun.  
*Navarretia tagetina* Greene. A; scattered on upland; Tuscan loam; May–Jun.

## Polygonaceae

- Chorizanthe polygonoides* T. & G. A; upland; thin Tuscan loam; Apr–May.  
 \**Polygonum aviculare* L. A; upland; disturbed Tuscan loam; Jun–Sep.  
*Polygonum californicum* Meissn. A; upland; disturbed Tuscan loam; Jun.  
*Polygonum hydropiperoides* Michx. var. *asperifolium* Stanf. P; bordering seeps; May.  
 \**Rumex crispus* L. P, becoming common on disturbed sites of upland and seeps, and invading some pools; May–Jun.

## Portulacaceae

- Calandrinia ciliata* (R. & P.) DC. var. *menziesii* (Hook.) Macbr. A, occasional; drained or seep habitats; Mar.  
*Claytonia perfoliata* Willd. [*Montia perfoliata* (Donn.) Howell var. *perfoliata*] A; a damp, disturbed site on Keefers loam; Apr.  
*Montia fontana* L. subsp. *amphoritana* Sennen. [*H. hallii* (Gray) Greene] A; vertical north surface of exposed fanglomerate near an irrigation ditch; Mar–Apr.  
*Montia linearis* (Doug.) Greene. A; a large, shallow hogwallow; Anita clay; Mar.  
 \**Portulaca oleracea* L. A, occasional; margins of pools or in hogwallows; Jul.

## Primulaceae

- \**Anagallis arvensis* L. A; hogwallows, vernal marshes, and margins of ditches on moist soil; Mar–Apr.  
*Anagallis minima* (L.) Krause. A; seeps and pool margins; May.  
*Dodecatheon clelandii* Greene subsp. *patulum* H. J. Thomps. P, abundant; upland; Tuscan loam; Jan–Mar.

## Ranunculaceae

- Delphinium variegatum* T. & G. f. *emiliae* (Greene) Ewan. P; upland; Tuscan loam; Mar–Apr.  
*Myosuros minimus* L. var. *filiformis* Greene. A; hogwallows; Mar–Apr.  
*Myosuros minimus* L. subsp. *apus* (Greene) Campb. var. *sessiliflorus* (Huth.) Campb. A; scattered in low places; Apr.  
*Ranunculus aquatilis* L. var. *hispidulus* E. Drew. P, common; irrigation ditches; Mar–Apr.  
 \**Ranunculus muricatus* L. A, common on moist banks of ditches, scattered in low vernal wet areas; Apr.  
*Ranunculus occidentalis* Nutt. var. *eisenii* (Kell.) Gray. P, occasional between seep and upland; Tuscan loam; Jun.  
*Ranunculus pusillus* Poir. A; seeps; May.  
 \**Ranunculus sceleratus* L. A, uncommon; along irrigation ditches; Apr.

## Rosaceae

- Alchemilla occidentalis* Nutt. A, occasional; upland; thin Tuscan or deeper soils; Mar.

## Rubiaceae

- \**Galium aparine* L. A; found at one site, on disturbed Tuscan loam; Jul.

## Saxifragaceae

- Saxifraga nidifica* Greene. A, occasional on upland slopes; Mar.

## Scrophulariaceae

- \**Dopatrium junceum* (Roxb.) Buch.-Ham. in Benth. A; standing or slow-moving water of irrigation ditches; Jul.

- Limosella acaulis* Ses. & Moc. A, abundant; mud or deeper water of irrigation ditches; May.  
*Lindernia dubia* L. var. *anagallidea* (Michx.) Cooperider. A; mud of irrigation ditches; Aug.  
*Mimulus guttatus* Fisch. ex DC. A or P, common in seeps, less common at margins of pools; Apr–Aug.  
*Mimulus tricolor* Hartw. ex Lindl. A; hogwallows and margins of pools; Tuscan loam or deeper soils; Apr.  
*Orthocarpus attenuatus* Gray. A; upland; Tuscan loam; Mar–Apr.  
*Orthocarpus erianthus* Benth. A, abundant; upland; Feb–Apr.  
 \**Verbascum blattaria* L. B or P; found at one site, on disturbed soil; Jul.  
*Veronica peregrina* L. subsp. *xalapensis* (HBK.) Penn. A, abundant; seeps, hogwallows, and vernal marshes; Mar–May.  
 \**Veronica persica* Poir. A; found at one site, on disturbed soil; Mar.

## Solanaceae

- Physalis angulata* L. var. *lanceifolia* (Nees) Waterfall. A, occasional; upland; Tuscan loam; Jul–Sep.

## Violaceae

- Viola douglasii* Steud. P, occasional; upland; Mar.

## Zygophyllaceae

- \**Tribulus terrestris* L. A, uncommon; disturbed sites; Jul–Sep.

## ANTHOPHYTA—MONOCOTYLEDONEAE

## Alismataceae

- Alisma triviale* Pursh. P; in a few places in seeps, standing water of irrigation ditches; Jul–Aug.  
*Echinodorus rostratus* (Nutt.) Engelm. A, occasional; sandy mud of seeps along irrigation ditches; Aug.  
*Sagittaria calycina* Engelm. P, occasional; seeps of irrigation ditches; Aug.

## Amaryllidaceae

- Allium amplexans* Torr. P, abundant; upland; Apr.  
*Brodiaea californica* Lindl. P, common; upland, including minor drainages, near seeps, and in thin, gravelly or disturbed soil; May–Jun.  
*Brodiaea coronaria* (Salisb.) Engler. P, occasional; upland; May.  
*Brodiaea elegans* Hoover. P, common; well-drained upland sites; May.  
*Brodiaea minor* (Benth.) S. Wats. P, abundant; thin soils; Apr–May.  
*Dichelostemma multiflorum* (Benth.) Heller. [*Brodiaea multiflora* Benth.] P, common and widespread; Apr–May.  
*Dichelostemma pulchellum* (Salisb.) Heller. [*Brodiaea pulchella* (Salisb.) Greene] P, common; Mar.  
*Triteleia hyacinthina* Greene. [*Brodiaea hyacinthina* (Lindl.) Baker] P, common; Tuscan or deeper soils; Apr. Some specimens appear to be intermediate between this species and *T. lilacina*; there are no clearcut differences in habitat.  
*Triteleia laxa* Benth. [*Brodiaea laxa* (Benth.) Wats.] P, common; upland; Apr–May.  
*Triteleia lilacina* Greene. [*Brodiaea hyacinthina* (Lindl.) Baker var. *greenei* (Hoov.) Munz.] P; Anita clay loam. Phenology as for *T. hyacinthina* (see for comments).

## Cyperaceae

- \**Cyperus difformis* L. A, occasional along seeps; Jul.  
*Cyperus eragrostis* Lam. P, common along seeps; May–Jun.



*Cyperus niger* R. & P. var. *capitatus* (Britton) O'Neill. P, occasional along seeps; Jun-Jul.

*Cyperus strigosus* L. P; seeps; Jun-Jul.

*Eleocharis acicularis* (L.) R. & S. P; seeps; Jun-Jul.

*Eleocharis bella* (Piper) Svenson. A; seeps; May-Jun.

*Eleocharis macrostachya* Britton. P, abundant along seeps and margins of some pools (does not flower in the latter); Apr.

*Scirpus acutus* Muhl. P, occasional along ditches; not seen to flower.

\**Scirpus mucronatus* L. P; seeps; Jul.

#### Juncaceae

*Juncus acuminatus* Michx. f. *sphaerocephalus* Herm. A or P; margins of irrigation ditches in rich, clay loam; May-Jun.

*Juncus balticus* Willd. P; habitat as for *J. acuminatus*; May.

*Juncus bufonius* L. A; seeps and margins of pools and hogwallows; May.

*Juncus dubius* Engelm. P, occasional; margins of irrigation ditches in rich, clay loam; Jul.

*Juncus uncialis* Greene. A, uncommon; hogwallows, seeps, and pools; Apr.

#### Lilaeaceae

*Lilaea scilloidea* (Poir.) Haum. A, common; seeps, emergent in ditches or drainage of pools; May-Jun.

#### Liliaceae

*Calochortus luteus* Doug. ex Lindl. P, uncommon; upland; Tuscan loam; Apr.

*Chlorogalum angustifolium* Kell. P; upland; Tuscan loam, clay, or Keefers loam; Apr-May.

*Chlorogalum pomeridianum* (DC.) Kunth. P, occasional; upland; May-Jun.

*Fritillaria pluriflora* Torr. in Benth. P; occasional populations on upland, heavier clay soils and nearly always in association with *Zigadenus fremontii*; Mar.

*Odontostomum hartwegii* Torr. P, common; upland; Tuscan loam or deeper soils; May.

*Zigadenus fremontii* Torr. P, abundant; low areas of upland in heavier soils; Feb-Mar.

#### Poaceae

\**Agrostis avenacea* Gmel. A, occasional; upland; May-Jun.

\**Aira caryophyllea* L. A; upland; Mar-Apr.

*Alopecurus carolinianus* Walt. A, occasional; upland; May.

*Alopecurus saccatus* Vasey. A; vernal marshes, pools, and hogwallows; Mar-Apr.

*Aristida oligantha* Michx. A; upland; Jul.

\**Avena barbata* Brot. A, common; upland or flat places; Mar-Apr.

\**Avena fatua* L. A, uncommon; upland; Apr-May.

\**Briza minor* L. A; upland; Apr-May.

\**Bromus diandrus* Roth. A; upland; Mar-Apr.

\**Bromus madritensis* L. A, occasional; upland; May.

\**Bromus mollis* L. A, common; widespread but infested with smut where invading small pools; Mar-Apr.

\**Bromus rubens* L. A, common; upland; Mar-Apr.

\**Crypsis schoenoides* (L.) Lam. [*Heleochoa schoenoides* L.] A; margins of pools, vernal marshes; Jun.

\**Crypsis vaginiflora* (Forsk.) Opiz. [*C. niliaca* Fig. & DeNot.] A; habitat similar to *C. schoenoides*; Jul.

\**Cynodon dactylon* (L.) Pers. P, common in disturbed areas; Apr.

- Deschampsia danthonioides* (Trin.) Munro ex Benth. A, common; hogwallows, small pools, and vernal marshes; Apr.
- Diplachne fascicularis* (Lam.) Beauv. [*Leptochloa fascicularis* (Lam.) Gray] A, abundant; seeps; Jun–Jul.
- \**Echinochloa colonum* (L.) Link. A, abundant; seeps; Jul.
- \**Echinochloa crusgalli* (L.) Beauv. var. *crusgalli*. Similar to *E. colonum*.
- \**Echinochloa crusgalli* (L.) Beauv. var. *oryzicola* (Vasing) Ohwi [*E. oryzicola* (Vasing) Vasing] Occasional; seeps; phenology as for *E. colonum*.
- \**Eragrostis cilianensis* (All.) E. Mosher. A, abundant; seeps; Jul.
- \**Gastridium ventricosum* (Gouan) Schinz. & Thell. A; upland or hogwallows; May.
- \**Hordeum geniculatum* Allioni. [*H. hystrix* Roth.] A; upland or seep; Tuscan loam; Apr–May.
- \**Hordeum leporinum* Link. A; upland, especially disturbed areas; Apr–May.
- \**Koeleria phleoides* (Vill.) Pers. A; upland, especially outcrops; Apr–May.
- \**Lolium multiflorum* Lam. P, common; upland or seep; Apr–May.
- \**Lolium perenne* L. P; upland or seep; Jun.
- Melica imperfecta* Trin. A, uncommon; upland; Apr.
- Orcuttia pilosa* Hoover. A, rare; dried vernal pools; abundant in large pools; Jun–Jul.
- Orcuttia tenuis* Hitchc. A, rare; dried vernal pools; found in one pool, where it was abundant; May, or Jul after late rain.
- Panicum dichotomiflorum* Michx. A, common; muddy margins of irrigation ditches; Jun–Jul.
- \**Paspalum dilatatum* Poir. P; mud or standing water of irrigation ditches; Jun–Jul.
- Paspalum paspaloides* (Michx.) Scribn. [*P. distichum* L.] P; muddy margins of irrigation ditches; Jun.
- \**Phalaris paradoxa* L. A; upland; Tuscan loam or deeper soils; May.
- \**Poa annua* L. A; upland, outcrop, and shallow pools and hogwallows; Mar–May.
- Poa scabrella* (Thurb.) Benth. ex Vasey. P, occasional; Anita clay; May.
- Poa tenerrima* Scribn. P; upland, especially near or in hogwallows; Tuscan loam; Mar–Apr.
- \**Polypogon interruptus* HBK. P; found at one site, near a seep on Tuscan loam; May.
- \**Polypogon maritimus* Willd. A, common; damp areas near irrigation ditches; Tuscan or Keefers loam; May.
- \**Polypogon monspeliensis* (L.) Desf. A, common near seeps and in hogwallows; Tuscan loam or deeper soils; May.
- Scribneria bolanderi* (Thurb.) Hack. A, occasional; Tuscan loam; Apr.
- \**Sorghum halapense* (L.) Pers. P, occasional; gravelly areas; Jun.
- Stipa pulchra* Hitchc. P, occasional on upland Tuscan loam, more common on deeper, clay soils; Apr–May.
- Tuctoria greenei* (Vasey) J. Reeder [*Orcuttia greenei* Vasey] A, rare; dried vernal pools; common but not abundant in pools on Preserve; Jul.
- \**Taeniatherum caput-medusae* (L.) Nevski. [*T. asperum* (Simonkai) Nevski, *Elymus caput-medusae* L.] A; scattered on upland, especially disturbed areas; Tuscan loam or Anita clay; May.
- \**Vulpia bromoides* (L.) S. F. Gray [*Festuca dertonensis* (All.) Asch & Graebn.] A; upland or near seep or hogwallow; Tuscan loam; Apr.
- Vulpia microstachys* (Nutt.) Benth. var. *ciliata* (Beal) Lonard & Gould. [*Festuca eastwoodae* Piper] A, common; well-drained upland; Apr.
- Vulpia microstachys* (Nutt.) Benth. var. *confusa* (Piper) Lonard & Gould. [*Festuca confusa* Piper] A, common; thin soils of upland; Apr.
- \**Vulpia myuros* (L.) K. C. Gmelin var. *hirsuta* Hack. [*Festuca megalura* Nutt.] A, common; upland; Tuscan or deeper soils; Mar–Apr.
- \**Vulpia myuros* (L.) D. C. Gmelin var. *myuros* [*Festuca myuros* L.] A, common; similar to *V. myuros* var. *hirsuta*; Mar–Apr.

## Potamogetonaceae

*Potamogeton diversifolius* Raf. P; slow-moving water of irrigation ditches; May.

## Typhaceae

*Typha angustifolia* L. P, occasional; irrigation ditches; Jun.

*Typha latifolia* L. P, occasional; irrigation ditches; Jun.

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