# Botanical Survey Report
# Horseshoe Pond Restoration Project

## Point Reyes National Seashore
## Marin County, California


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May 17, 2002

# CHAPTER 1. INTRODUCTION

## 1.1 REGULATORY BACKGROUND

The purpose of this report is to provide background information regarding botanical resources within the Horseshoe Pond Restoration Project area (Proposed Project Area). Point Reyes National Seashore (Seashore) is preparing an Environmental Assessment (EA) for the Proposed Project. Background information in this report will be used to guide development and assess potential environmental impacts of the Proposed Project. As part of the EA, the Seashore must consider whether the Proposed Project could impact special status plant species, as well as special status wildlife species and other sensitive biological resources such as wetlands and riparian areas.

Special status plant species include those that are legally protected under the federal and California Endangered Species Acts (ESA) or other regulations and species that are considered rare by the scientific community. Special status species are defined as:

- plants that are listed or proposed for listing as threatened or endangered under the California ESA (Fish and Game Code §2050 *et seq*.; 14 CCR §670.1 *et seq*.) and/or the federal ESA (50 CFR 17.11 for animals; various notices in the Federal Register [FR] for proposed species);
- plants that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 7506 February 28, 1996);
- plants that meet the definition of rare or endangered under the California Environmental Quality Act (CEQA) (14 CCR §15380) which includes species not found on state or federal endangered species lists;
- plants that are designated as "species of concern" (former category 2 candidates for listing) by the U.S. Fish and Wildlife Service (USFWS) or "species of special concern" by the California Department of Fish and Game (DFG);
- plants listed under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.); and
- plant species that occur on California Native Plant Society (CNPS) lists.

To determine whether any of these special status plant species occur in the Proposed Project Area, a literature review was performed to assess 1) which species have potential to occur in the Proposed Project Area; and 2) which species have been previously observed in the area. Other resources were consulted, as well, including soil surveys and vegetation maps. After the literature review, a site reconnaissance was performed to determine whether habitat for any of the special status plant species with potential to occur were present in the Proposed Project Area. Focused surveys were then conducted in habitats or vegetation communities that might support special status plant species.

## 1.2 PROJECT BACKGROUND

The Seashore is proposing to restore Horseshoe Pond to a coastal lagoon/tidal estuary. The project is scheduled for Fall 2002, and would include removal of the existing dam, development of mitigation sites, rehabilitation of associated stream habitats, and closeout of old ranch roads.

Horseshoe Pond was constructed for livestock watering between 1943 and 1952 at the now decommissioned D Ranch. Located just west of the mouth to Drakes Estero along Drakes Beach (Figure 1), this site is clearly marked as an estuary in the 1862 US Coast Survey topographic maps. A 350-meter long dam, however, consisting of a concrete spillway and earthen levee at the pond/beach interface, currently excludes most tidal flow, with the exception of overwash during extreme high tide and storm events.

Restoration of Horseshoe Pond would include complete or partial removal of all manmade features associated with the levee and spillway at the pond/beach interface. The levee and concrete spillway restricting the current outflow of the pond would be completely removed. Earthen fill blocking the historic outflow on the west side of the pond would also be removed. Historically, a natural dune barrier separated the pond from the beach along the central portion of the levee. Associated work within the project area would include rehabilitation of the still-scarred quarry site where fill for the dam was originally taken. Two sites have been identified as potential mitigation sites for the enhancement and creation of California red-legged frog habitat, pending issuance of a Biological Opinion by the U.S. Fish and Wildlife Service (US FWS).

The Proposed Project Area (Figure 2) incorporates all of the various components of the Proposed Project, as well as construction access routes to the earthen dam and concrete spillway and the two potential red-legged frog mitigation ponds. As part of the project, the Seashore may elect at the end to decommission and restore these roads, which are severely eroded in many areas and in need of close-out.

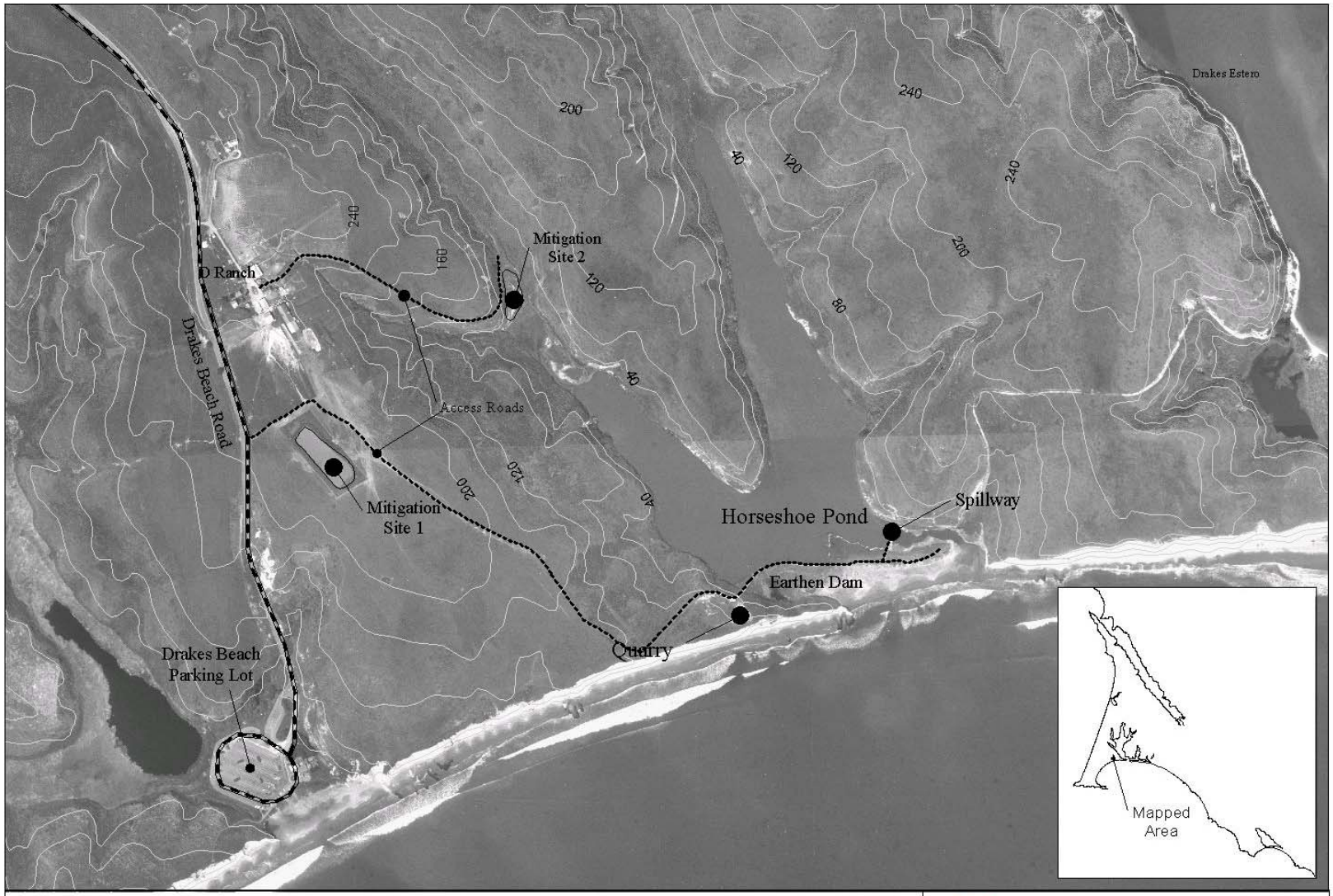


Figure 1. Horseshoe Pond Restoration Site.

**Point Reyes**
**National Seashore**

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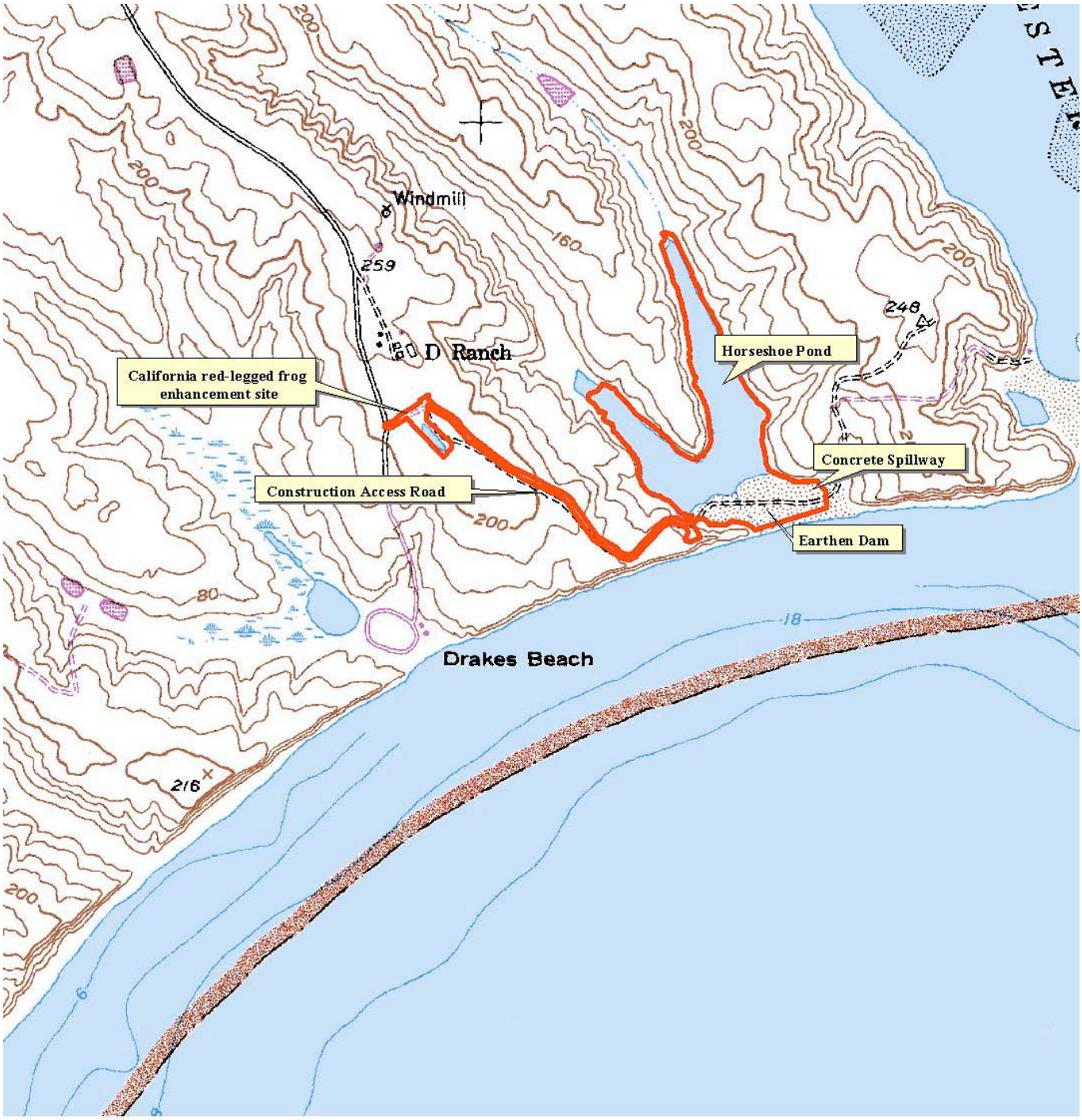


Figure 2. Proposed Project Area for Horseshoe Pond Restoration Project.

# CHAPTER 2. METHODS

## 2.1 LITERATURE REVIEW

An assessment of botanical resources with potential to occur in the Proposed Project Area was conducted by performing a literature review. The literature review consisted of a search of the following:

- California Natural Diversity Data Base (NDDB) for occurrences of special status plant species and habitats in all 7.5 minute U.S. Geological Survey (USGS) quadrangles within the Seashore (NDDB 2001).
- US FWS Endangered and Threatened Species List (April 2001) for the Seashore and Marin County.
- Point Reyes National Seashore rare plant database (PORE 2001).
- California Native Plant Society's Inventory of rare and endangered vascular plants of California (August 2001).

In addition, the Soil Survey of Marin County, California (U.S. Soil Conservation Service, 1985) was reviewed to determine soil types and special geologic features (e.g. serpentine, seeps), respectively, within the Proposed Project Area. Maps showing vegetation communities identified within the Seashore were also consulted to determine whether habitat for special status plant species might be present. Lastly, as many special status plant species are annuals that are sensitive to rainfall totals and distribution, rainfall records (California Data Exchange Center, Lagunitas Lake station) were reviewed to determine precipitation patterns within the period when most species germinate, flower, and set seed.

## 2.2 FIELD SURVEYS

Botanical surveys for sensitive plant species were conducted in accordance with FWS (1996) and DFG (1997) guidelines. Lorraine Parsons, Michelle Coppoletta, and Shelly Benson of the Seashore conducted the botanical surveys. Botanical surveys were timed to coincide with both the documented (CNPS 2001) and observed flowering periods of sensitive species with potential to occur in habitats observed in the Proposed Project Area. Botanical surveys were conducted on the following dates: May 17, 2001; August 16, 2001; March 5, 2002; March 26, 2002; April 22, 2002; and May 14, 2002.

A determination of whether suitable habitat existed for special status plant species was made from a reconnaissance of the Proposed Project Area. During the reconnaissance, biologists also assessed whether any NDDB special habitats were present. The NDDB classifies its habitats using vegetation classification system developed in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Holland modified an earlier system developed by Cheatham and Haller (1975), so that a uniform system for describing communities

in which sensitive plant and animal species are found could be developed for the NDDB. Subsequently, a new vegetation classification system has been introduced in *A Manual of California Vegetation* by Sawyer and Keeler-Wolf (1995). The Seashore has been mapping vegetation communities using a Seashore-specific version of the Sawyer and Keeler-Wolf system (Keeler-Wolf February 1999): communities were mapped primarily by interpretation of aerial photographs, combined with selective ground-truthing efforts. It should be noted that the vegetation map has not been finalized. As the NDDB relies on the Holland classification system to characterize special habitats, vegetation communities identified during the reconnaissance were described using both the Holland and Sawyer and Keeler-Wolf systems, when possible.

During field surveys, meandering transects were walked throughout the Proposed Project Area to ensure that all habitats present were surveyed. All plant species observed were identified to the level necessary to ensure that any special status species present would be detected. When necessary, specimens from herbariums in the San Francisco Bay area are examined to resolve any taxonomic ambiguities. While several taxonomic keys were used to identify plant species observed (e.g., Hickman 1993, Mason 1969, Howell 1970), scientific and common nomenclature followed *The Jepson Manual* (Hickman 1993).

# CHAPTER 3. RESULTS

## 3.1 LITERATURE REVIEW

### Special Status Plants

A list of 81 special status plant species with potential to occur in the Proposed Project Area is provided in Table 1**.** The table contains information on regulatory status, habitat, and flowering period derived from the NDDB (2001) and California Native Plant Society Rare Plant Inventory (2001). The plant species listed in Table 1 occur in a variety of habitats present in Marin County, including freshwater marshes, coastal salt marsh, coastal prairie, coastal dunes, coastal scrub, riparian scrub, chaparral, valley and foothill grassland, serpentinite areas, broadleaf upland forest, and closed-cone and coniferous forest (NDDB 2001). Certain sensitive plant species are highly associated with or even restricted to habitats that are associated with specific geologic formations and/or hydrologic regimes, such as serpentine grassland, granitic outcroppings, coastal salt marshes, freshwater marshes, or vernal pools.

Within Marin County, serpentine areas occur almost exclusively in the Franciscan Formation, which has pockets of serpentine within sandstone, graywacke, shale, some volcanic rock, and greenstone (U.S. Soil Conservation Service 1985). These serpentine pockets are strongly linked with the Henneke and Montara soil series (U.S. Soil Conservation Service 1985). The Franciscan Formation lies largely to the east of the San Andreas Fault, which borders the Seashore to the east (U.S. Soil Conservation Service 1985). West of the fault – and within most of the Seashore – granitic rock such as quartz-diorite and granodiorite dominate, forming the backbone of the Point Reyes peninsula (U.S. Soil Conservation Service 1985). Overlying the granitic rock in most areas are shale, sandstone, porcelainite, and chert, but, in some areas, the dominant parent material is the Drakes Bay Formation, which dates to the Pliocene age and is comprised of mudstone, siltstone, and greenish sandstone (U.S. Soil Conservation Service 1985). The rounded and rolling topography of the area between Point Reyes, Abbotts Lagoon, and Limantour Beach results from the softness of the Drakes Bay Formation material (U.S. Soil Conservation Service 1985). Based on the soil and vegetation maps, the Proposed Project Area does not incorporate any major serpentine areas, but a small portion of the Proposed Project Area on the east side of the concrete spillway was mapped as the Tocaloma-McMullin complex, which incorporates "small areas of rock outcrops." Several of the special status plant species in Table 1 can potentially occur in granitic or rock outcroppings, including *Arctostaphylos virgata* (Marin manzanita), *Erysimum franciscanum* (San Francisco wallflower), and *Fritillaria affinis* var. *tristulis* (fritillary).

Approximately 19 of special status species with potential to occur in the Proposed Project Area are found in wetland features such as coastal salt marsh, brackish marsh, freshwater marsh, bogs and fens, and vernal pools. Vernal pools represent a unique type of wetland ecosystem within Mediterranean climates such as California. These depressional- or swale-type features occur in

**Table 1. List of Special Status Plant Species with Potential to Occur in the Horseshoe Pond Restoration Project Area and Vicinity.** Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (April 2001; Marin County); California Natural Diversity Database (NDDB; 2001; Inverness, Tomales, Drakes Bay, Bolinas quadrangles), Point Reyes National Seashore rare plant database (PORE 2001), and Skinner and Pavlik (CNPS; 2001; Inventory of rare and endangered vascular plants of California).

| SCIENTIFIC NAME | COMMON NAME | STATUS | HABITAT | HABITAT PRESENT | COMMENTS | FLOWERING PERIOD |
|---|---|---|---|---|---|---|
| *Abronia umbellata* ssp. *brevifolia* | pink sand-verbena | FSC; 1B | Disturbed sandy areas; coastal dunes and scrub; <100 m. | Yes | Present in Park (PORE 2001). Most occurrences have few plants (CNPS 2001). | June-Oct |
| *Agrostis blasdalei* | Blasdale's bent grass | FSC; 1B | Coastal dunes, prairie, bluffs, and scrub. | Yes | Known from fewer than 15 occurrences (CNPS 2001). Present in Park (PORE 2001). | May-July |
| *Agrostis clivicola* var. *punta-reyesensis* | Point Reyes bent grass | FSC | Coastal bluffs. | No | Present in Park (PORE 2001). Considered by CNPS for listing, but rejected, because species is a synonym of *A. densiflora*, a common species (CNPS 2001; Hickman 1993). | |
| *Alopecurus aequalis* var. *sonomensis* | Sonoma alopecurus | FE; 1B | Freshwater marshes and swamps; riparian scrub; wet meadows. | Yes | Known from fewer than five native occurrences (CNPS 2001). Present in coastal areas of Park. Jepson does not differentiate var. *sonomensis* (Hickman 1993). | May-July |
| *Arabis blepharophylla* | coast rock cress | 4 | Coastal prairie, bluffs, and scrub; broadleaved upland forest. | Yes | Present in Park (PORE 2001). | Feb-May |
| *Arctostaphylos hookeri* ssp. *montana* | Tamalpais manzanita | FSC, 1B | Serpentinite areas in chaparral and valley and foothill grassland | No | Known from fewer than 20 occurrences (CNPS 2001). | |
| *Arctostaphylos virgata* | Marin manzanita | 1B | Broadleafed upland forest; closed-cone coniferous forest; chaparral; North Coast coniferous forest; on sandstone or granitic soil. | No | Known from fewer than 20 occurrences (CNPS 2001). Mapped in Bishop pine forest near Mount Vision (NDDB 2001). | |
| *Astragalus pycnostachyus* var. *pycnostachyus* | | 1B | Coastal marshes or seeps; <30 m. | Yes | Present in Park (PORE 2001). | April-Oct |
| *Blennosperma nanum* var. *robustum* | Point Reyes blennosperma | FSC; SR; 1B | Coastal prairie and scrub. | Yes | Known from fewer than 15 occurrences; some Pt. Reyes | Feb-April |

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| SCIENTIFIC NAME | COMMON NAME | STATUS | HABITAT | HABITAT PRESENT | COMMENTS | FLOWERING PERIOD |
|---|---|---|---|---|---|---|
| *Blennosperma nanum* var. *robustum* (cont.) | | | | | populations intermediate to *B.* var. *nanum* (CNPS 2001). | |
| *Calamagrostis crassiglumis* | Thurber's reed grass | FSC; 2 | Mesic areas in coastal scrub and freshwater marshes. | Yes | Known in California from fewer than 10 occurrences (CNPS 2001). Present in Park (PORE 2001), but threatened by grazing (CNPS 2001). Jepson does not differentiate between *C. stricta* ssp. *inexpansa* (Hickman 1993). | June-July |
| *Calochortus tiburonensis* | Tiburon mariposa lily | FT, ST; 1B | Serpentinite areas in valley and foothill grassland. | No | Known from only one occurrence at Ring Mountain (CNPS 2001). | |
| *Calystegia purpurata* ssp. *saxicola* | morning-glory | 1B | Coastal dunes, coastal scrub; <100 m. | Yes | Not known from Park (PORE 2001). | May-Aug |
| *Campanula californica* | swamp harebell | FSC; 1B | Bogs and fens; closed-cone and North Coast coniferous forest; coastal prairie; meadows; freshwater marsh. | Yes | Mapped in several locations along the western side of Tomales Bay and Inverness Ridge (NDDB 2001). | June-Sept |
| *Carex buxbaumii* | sedge | 4 | Bogs and fens, meadows and seeps (mesic), marshes and swamps; < 3300 m. | Yes | Not known from Park (PORE 2001). | March-Aug |
| *Carex leptalea* | flaccid sedge | 2 | Bogs and fens; meadows; marshes and swamps. | Yes | Not known from Park (PORE 2001). Apparently extirpated from Marin County (CNPS 2001). | May-July |
| *Castilleja affinis* ssp. *neglecta* | Tiburon Indian paintbrush | FE; CT; 1B | Serpentinite areas in valley and foothill grassland. | No | Known from six occurrences (CNPS 2001). Not known from Park (PORE 2001). | |
| *Castilleja ambigua* ssp. *humboldtiensis* | Humboldt Bay owl's-clover | FSC; 1B | Coastal salt marsh. | Yes | Known only from Humboldt and Marin counties (NDDB 2001). | May-Aug |
| *Ceanothus gloriosus* var. *exaltatus* | glory brush | 4 | Shrubby slopes; ridges; chaparral; coniferous forest; <500 m. | No | Present in GGNRA (PORE 2001). | |
| *Ceanothus gloriosus* var. *gloriosus* | Point Reyes ceanothus | 4 | Sandy areas in coastal bluff scrub and scrub, coniferous forest, and coastal dunes. | Yes | Present in Park (PORE 2001). | March-May |

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| SCIENTIFIC NAME | COMMON NAME | STATUS | HABITAT | HABITAT PRESENT | COMMENTS | FLOWERING PERIOD |
|---|---|---|---|---|---|---|
| *Ceanothus gloriosus* var. *porrectus* | Mount Vision ceanothus | FSC; 1B | Closed-cone coniferous forest; coastal prairie; coastal scrub; valley and foothill grassland. | Yes | Known from fewer than 15 occurrences in the Mount Vision area in the Park (CNPS 2001; NDDB 2001). | March-May |
| *Ceanothus masonii* | Mason's ceanothus | FSC; SR; 1B | Serpentinite areas in chaparral. | No | Known from approximately five occurrences; may be a variety of *C. gloriosus* (CNPS 2001). Present in GGNRA (PORE 2001). | |
| *Chorizanthe cuspidata* var. *cuspidata* | spineflower | FSC; 1B | Sandy areas in coastal dunes, coastal prairie, and coastal scrub. | Yes | Not known from Park (PORE 2001). "Some plants from Point Reyes probably intermediate to var. *villosa*" (CNPS 2001). Jepson does not differentiate species into varieties (Hickman 1993). | April-Aug |
| *Chorizanthe cuspidata* var. *villosa* | spineflower | 1B | Sandy areas in coastal dunes, coastal prairie, and coastal scrub. | Yes | Known from fewer than 10 occurrences (CNPS 2001). Not known from Park (PORE 2001). Jepson does not differentiate species into varieties (Hickman 1993). | May-Aug |
| *Chorizanthe valida* | Sonoma spineflower | FE; SE; 1B | Sandy areas in coastal prairie. | Yes | Thought extinct at one time; only known extant occurrence in Park (CNPS 2001; PORE 2001). | June-Aug |
| *Cirsium andrewsii* | Franciscan thistle | 1B | Sometimes serpentinite areas in broadleafed upland forest and coastal bluff scrub. | No | Present in Park (PORE 2001). | |
| *Cirsium hydrophilum* var. *vaseyi* | Mount Tamalpais thistle | FSC; 1B | Serpentinite seeps in broadleafed upland forest and chaparral. | No | Known from fewer than 10 occurrences on Mount. Tamalpais (CNPS 2001). | |
| *Clarkia concinna* ssp. *raichei* | Raiche's red ribbons | FSC; 1B | Coastal bluff scrub. | No | Known from only one occurrence near Tomales (CNPS 2001). | |

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|---|---|---|---|---|---|---|
| *Collinsia corymbosa* | round-headed chinese houses | 1B | Coastal dunes. | Yes | Not known from Park (PORE 2001). | April-June |
| *Cordylanthus maritimus* ssp. *palustris* | Point Reyes bird's-beak | FSC; 1B | Coastal salt marsh. | Yes | Present in several areas in Drakes Estero and Limantour Marsh (NDDB 2001, PORE 2001). | June-Oct |
| *Cordylanthus mollis* ssp. *mollis* | soft bird's beak | FE; SR; 1B | Coastal salt marsh. | Yes | Known from fewer than 20 occurrences (CNPS 2001). Species is located exclusively on San Francisco Bay and Sacramento-San Joaquin Delta. Has never been observed in marshes on west coast of Marin and Sonoma counties. | July-Sept |
| *Delphinium bakeri* | Baker's larkspur | FE; SR; 1B | Coastal scrub. | Yes | Known from only one occurrence along Salmon Creek (CNPS 2001). | March-May |
| *Dirca occidentalis* | western leatherwood | 1B | Broadleafed upland forest; chaparral; closed-cone and North coast coniferous forest; cismontane woodland; riparian scrub; riparian woodland; on brushy, mesic slopes; mostly in mixed evergreen and foothill woodland communities. | Yes | Mapped along Nicasio Creek and Inverness Ridge (NDDB 2001). | Jan-April |
| *Elymus californicus* | California bottle-brush grass | 4 | North coast coniferous forest. | No | Present in Park (PORE 2001). | |
| *Erigeron supplex* | supple daisy | FSC; 1B | Coastal bluff scrub; coastal prairie. | Yes | Possibly extirpated from the area (USFWS April 2001). | May-July |
| *Erysimum franciscanum* | San Francisco wallflower | FSC; 4 | Coastal dunes; coastal scrub; often serpentinite or granitic areas in valley and foothill grassland. | Yes | Not known from Park (PORE 2001). | March-June |
| *Fritillaria lanceolata* var. *tristulis* | fritillary | 1B | Coastal bluff scrub; coastal scrub; coastal prairie. | Yes | Endemic to Marin County. Known from fewer than 10 occurrences (CNPS 2001). | |

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|---|---|---|---|---|---|---|
| *Fritillaria liliacea* | fragrant fritillary | FSC; 1B | Often on serpentinite soils in coastal scrub, coastal prairie, and valley and foothill grassland. | Yes | Present in Park (PORE 2001, NDDB 2001). | Feb-April |
| *Gilia capitata* ssp. *chamissonis* | dune gilia | 1B | Coastal sandhills; <60 m. | No | Present in Park (PORE 2001). | |
| *Gilia millefoliata* | | 1B | Stabilized coastal dunes; <10 m. | Yes | Not known from Park (PORE 2001). | April-July |
| *Grindelia hirsutula* var. *maritima* | San Francisco gumplant | FSC; 1B | Sandy, serpentinite soils in coastal bluff scrub, coastal scrub, and valley and foothill grassland. | Yes | Present in Park (PORE 2001). | Aug-Sept |
| *Helianthella castanea* | Diablo helianthella | FSC; 1B | Broadleafed upland forest; chaparral; cismontane woodland; coastal scrub; riparian woodland; valley and foothill grassland. | Yes | Possibly extirpated from the area (USFWS April 2001). | April-June |
| *Hemizonia congesta* ssp. *leucocephala* | hayfield tarplant | 3 | Coastal scrub; valley and foothill grassland**.** | Yes | Present in Park (PORE 2001). Intergrades with *H. congesta* ssp. *congesta* (CNPS 2001). | April-Oct |
| *Hemizonia multicaulis* ssp. *multicaulis* | seaside tarweed | FSC | Coastal grassland, sometimes serpentine; gen <300 m. | Yes | Considered but rejected by CNPS for listing because considered synonym of *H. congesta* ssp. *congesta*, a common species (CNPS 2001). | |
| *Hemizonia multicaulis* ssp. *vernalis* | Tiburon tarweed | FSC | Coastal grassland, sometimes serpentine; gen <300 m. | Yes | Considered but rejected by CNPS for listing because considered synonym of *H. congesta* ssp. *congesta*, a common species (CNPS 2001). | |
| *Hesperevax sparsiflora* var. *brevifolia* | short-leaved evax | 2 | Coastal bluff scrub; coastal dunes. | Yes | Present in Park (PORE 2001). | March-June |
| *Hesperolinon congestum* | Marin dwarf flax | FT; ST; 1B | Serpentinite areas in chaparral and valley and foothill grassland. | No | Present in GGNRA (PORE 2001). Known from fewer than 20 occurrences (CNPS 2001). | |

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|---|---|---|---|---|---|---|
| *Holocarpha macradenia* | Santa Cruz tarplant | FT; SE; 1B | Often clay and sandy soils in coastal prairie, coastal scrub, and valley and foothill grassland. | Yes | Known from fewer than 15 occurrences. Last remaining natural population in San Francisco Bay extirpated in 1993 (CNPS 2001). | June-Oct |
| *Horkelia cuneata* ssp. *sericea* | Kellogg's horkelia | FSC; 1B | Old dunes; coastal sandhills; gen < 200 m. | No | Not known from Park (PORE 2001). Possibly extirpated from the area (USFWS April 2001). Occurrence from Mt. Bruno area probably last remaining one in San Francisco Bay (CNPS 2001). | |
| *Horkelia marinensis* | Point Reyes horkelia | FSC; 1B | Coastal dunes, prairie, and scrub. | Yes | Present in Park (PORE 2001). Known from fewer than 20 occurrences (CNPS 2001). | May-Sept |
| *Lasthenia macrantha* ssp. *macrantha* | goldfields | 1B | Coastal bluff scrub, coastal dunes, coastal scrub, and grasslands along immediate coast; <500 m. | Yes | Present in Park (PORE 2001). | Jan-Nov |
| *Lathyrus jepsonii* var. *jepsonii* | Delta tule pea | FSC; 1B | Freshwater and brackish marsh. | Yes | Species is located exclusively on San Francisco Bay and Sacramento-San Joaquin Delta. Has never been observed in marshes on west coast of Marin and Sonoma counties. | May-June |
| *Layia carnosa* | beach layia | FE; SE; 1B | Coastal dunes. | Yes | Present in Park (PORE 2001). | March-July |
| *Lessingia micradenia* var. *micradenia* | Tamalpais lessingia | FSC; 1B | Usually serpentinite areas in chaparral and valley and foothill grassland; often along roadsides. | Yes | Known only from four occurrences near Mount Tamalpais (CNPS 2001). | June-Oct |
| *Lilaeopsis masonii* | Mason's lileaopsis | FSC; SR; 1B | Freshwater and brackish marshes; riparian scrub; in muddy or silty soil formed through river deposition. | Yes | Questionable identification of species in 1939; May have been *L. occidentalis*. Hydrology of site since altered (NDDB 2001). | April-Oct |

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|---|---|---|---|---|---|---|
| *Lilium maritimum* | coast lily | FSC; 1B | Broadleafed upland forest; closed-cone coniferous forest; coastal prairie; coastal scrub; and North coast coniferous forest. | Yes | Present in Park (PORE 2001). | May-July |
| *Limnanthes douglasii* ssp. *sulphurea* | Point Reyes meadowfoam | FSC; SE; 1B | Coastal prairie; mesic areas in meadows; freshwater marsh; and vernal pools. | Yes | Known from approximately 10 occurrences (CNPS 2001). Present in Park (PORE 2001). | March-May |
| *Limosella subulata* | Delta mudwort | 2 | Marshes and swamps. | Yes | Known in California from occurrences in the Delta; occurrence from PORE needs verification (CNPS 2001). Jepson classifies as native of eastern coast of North America and Europe (Hickman 1993). | May-Aug |
| *Linanthus grandiflorus* | large-flower linanthus | 4 | Coastal bluff scrub; closed-cone coniferous forest; cismontane woodland; coastal dunes; coastal prairie; coastal scrub; and valley and foothill grassland. | Yes | Present in Park (PORE 2001). | April-July |
| *Linanthus rosaceus* | rosy linanthus | 1B | Coastal bluff scrub, coastal scrub. | Yes | Not known from Park (PORE 2001). Known from only one occurrence near Pacifica (CNPS 2001). Jepson does not recognize this species (Hickman 1993). | April-June |
| *Lupinus tidestromii* | Tidestrom's lupine | FE; SE; 1B | Coastal dunes. | Yes | Present in Park (PORE 2001). | April-June |
| *Microseris paludosa* | | 1B | Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland; < 300 m. | Yes | Not known from Park (PORE 2001). | April-June |
| *Monardella undulata* | curly-leaved monardella | 4 | Chaparral; coastal dunes; coastal scrub; ponderosa pine sandhills in lower montane coniferous forest. | Yes | Present in Park (PORE 2001). | May-Sept |

**Table 1. List of Special Status Plant Species with Potential to Occur in the Horseshoe Pond Restoration Project Area and Vicinity.** Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (April 2001; Marin County); California Natural Diversity Database (NDDB; 2001; Inverness, Tomales, Drakes Bay, Bolinas quadrangles), Point Reyes National Seashore rare plant database (PORE 2001), and Skinner and Pavlik (CNPS; 2001; Inventory of rare and endangered vascular plants of California).

| SCIENTIFIC NAME | COMMON NAME | STATUS | HABITAT | HABITAT PRESENT | COMMENTS | FLOWERING PERIOD |
|---|---|---|---|---|---|---|
| *Pentachaeta bellidiflora* | white-rayed pentachaeta | FE; SE; 1B | Often serpentinite areas in valley and foothill grassland. | Yes | Known from only one extended occurrence near Highway 280 on San Francisco Peninsula (CNPS 2001). | March-May |
| *Perideridia gairdneri* ssp. *gairdneri* | Gairdner's yampah | FSC; 4 | Mesic areas in broadleafed upland forest, chaparral, valley and foothill grassland, and vernal pools. | Yes | Present in Park (PORE 2001). | June-Oct |
| *Phacelia insularis* var. *continentis* | northcoast phacelia | FSC; 1B | Coastal bluff scrub; coastal dunes. | Yes | Known from approximately seven occurrences (CNPS 2001). Present in Park (PORE 2001). | March-May |
| *Piperia elegans* ssp. *decurtata* | Point Reyes rein orchid | 1B | Generally dry, open sites; coastal bluff scrub; coniferous forest; < 500 m. | No | Present in Park (PORE 2001). Jepson does not recognize subspecies (Hickman 1993). | |
| *Plagiobothrys diffusus* | San Francisco popcorn-flower | FSC; SE; 1B | Coastal prairie; valley and foothill grassland | Yes | Known from fewer than 10 occurrences (CNPS 2001). Not known from Park (PORE 2001). Jepson characterized species as indistinct from *P. reticulatus* var. r*ossianorum* (Hickman 1993). | April-June |
| *Pleuropogon hooverianus* | North Coast semaphore grass | FSC; SR; 1B | Mesic areas in broadleafed upland forest, meadows, North Coast coniferous forest, and vernal pools. | No | Known from fewer than 10 occurrences (CNPS 2001). | |
| *Pleuropogon refractus* | nodding semaphore grass | 4 | Mesic areas in lower montane coniferous forest, meadows, North Coast coniferous forest, and riparian forest. | No | Present in Park (PORE 2001). | |
| *Polygonum marinense* | Marin knotweed | FSC; 3 | Coastal salt marshes and brackish marshes. | Yes | Known from fewer than 15 occurrences; taxonomic status uncertain (CNPS 2001). Present in several locations in the Park (PORE 2001). | June-Aug (CNPS) April-Oct (PORE) |

**Table 1. List of Special Status Plant Species with Potential to Occur in the Horseshoe Pond Restoration Project Area and Vicinity.** Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (April 2001; Marin County); California Natural Diversity Database (NDDB; 2001; Inverness, Tomales, Drakes Bay, Bolinas quadrangles), Point Reyes National Seashore rare plant database (PORE 2001), and Skinner and Pavlik (CNPS; 2001; Inventory of rare and endangered vascular plants of California).

| SCIENTIFIC NAME | COMMON NAME | STATUS | HABITAT | HABITAT PRESENT | COMMENTS | FLOWERING PERIOD |
|---|---|---|---|---|---|---|
| *Ranunculus lobbii* | Lobb's aquatic buttercup | 4 | Mesic areas in cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pools. | Yes | Present in Park (PORE 2001). | March-May |
| *Rhynchospora californica* | California beaked-rush | FSC; 1B | Bogs and fens; lower montane coniferous forest; seeps in meadows; freshwater marshes. | Yes | Known from fewer than 10 occurrences (CNPS 2001). Last seen in 1945 (NDDB 2001). | May-July |
| *Sagittaria sanfordii* | Sanford's arrowhead | FSC; 1B | Assorted shallow freshwater marshes and swamps. | Yes | | May-Aug |
| *Sidalcea calycosa* ssp. *rhizomata* | checkerbloom | 1B | Marshes and swamps near coast. | Yes | Present in Park (PORE 2001). | April-Sept |
| *Sidalcea hickmanii* ssp. *viridis* | Marin checkerbloom | FSC; 1B | Serpentinite areas in chaparral. | No | Not known from Park (PORE 2001). | |
| *Stebbinsoseris decipiens* | Santa Cruz microseris | FSC; 1B | Open areas, sometimes serpentinite, in broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, and coastal scrub. | Yes | Known from fewer than 20 occurrences (CNPS 2001). Not known from Park (PORE 2001). | April-May |
| *Stellaria littoralis* | starwort | 4 | Bogs and fens, coastal bluff scrub, coastal dunes, coastal scrub, marshes and swamps < 40 m. | Yes | Considered common in Park (PORE 2001). | March-July |
| *Streptanthus batrachopus* | Tamalpais jewelflower | FSC; 1B | Serpentinite areas in closed-cone coniferous forest and chaparral. | No | Known from fewer than 10 occurrences in the Mount Tamalpais area (CNPS 2001). | |
| *Streptanthus glandulosus* ssp. *pulchellus* | Mount Tamalpais jewelflower | 1B | Serpentinite areas in chaparral and valley and foothill grassland. | No | Endemic to the Mt. Tamalpais area. Present in GGNRA (PORE 2001). | |
| *Streptanthus niger* | Tiburon jewelflower | FE; SE; 1B | Serpentinite areas in valley and foothill grassland. | No | Known from only three occurrences on Tiburon peninsula (CNPS 2001). | |
| *Trifolium amoenum* | showy Indian clover | FE; 1B | Valley and foothill grassland; coastal bluff scrub; sometimes on serpentine soil; open, sunny areas; swales | Yes | Last recorded in Olema area in 1886. Thought extinct, but rediscovered twice since 1993: only one extant as of 1996 (CNPS 2001). | April-June |

**Table 1. List of Special Status Plant Species with Potential to Occur in the Horseshoe Pond Restoration Project Area and Vicinity.** Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (April 2001; Marin County); California Natural Diversity Database (NDDB; 2001; Inverness, Tomales, Drakes Bay, Bolinas quadrangles), Point Reyes National Seashore rare plant database (PORE 2001), and Skinner and Pavlik (CNPS; 2001; Inventory of rare and endangered vascular plants of California).

| SCIENTIFIC NAME | COMMON NAME | STATUS | HABITAT | HABITAT PRESENT | COMMENTS | FLOWERING PERIOD |
|---|---|---|---|---|---|---|
| *Triphysaria floribunda* | San Francisco owl's-clover | FSC; 1B | Serpentinite areas in coastal prairie and valley and foothill grassland. | No | Present in Park (PORE 2001). | |

FEDERAL, STATE, AND CNPS STATUS CODES

**FEDERAL LISTING**

FE = Listed as endangered under federal Endangered Species Act.
FT = Listed as threatened under federal Endangered Species Act.
FPE = Proposed for listing as endangered under the federal Endangered Species Act.
FPT = Proposed for listing as threatened under the federal Endangered Species Act.
FSC = A U.S. Fish and Wildlife Service Species of Concern (formerly a category 2 candidate for listing).

**STATE LISTING**

SE = Listed as endangered under the California Endangered Species Act.
ST = Listed as threatened under the California Endangered Species Act.
SR = Listed as rare under the California Endangered Species Act.

**CALIFORNIA NATIVE PLANT SOCIETY (CNPS) LISTING**

1A = Plants presumed extinct in California.
1B = Plants rare, threatened, or endangered in California.
2 = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which we need more information – a review list.
4 = Plants of limited distribution – a watch list.

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areas where unique geologic or soil characteristics encourage prolonged seasonal ponding or soil saturation during spring months. Vernal pools, which are usually associated with clay soils that have extremely low permeability or soils with an impermeable claypan or cemented clay lens, typically support a distinctive flora and fauna. However, some of so-called vernal pool plant species may also grow in seasonal wetlands: the term "seasonal wetlands" is often used to characterize seasonally saturated or inundated depressional features that have neither the soils, geology, or characteristic flora and fauna associated with vernal pools.

The very nature of the Proposed Project Area suggests that potential for wetland-related special status species is high, as the Project Area runs along the southern edge of Horseshoe Pond. The soil map identified another constructed pond along the construction access road. In addition, the earthen dam that separates Horseshoe Pond from the Pacific Ocean was mapped as a hydric soil: Humaquepts, seeped. The Seashore vegetation map identified several communities that could potentially incorporate wetlands, including Pickleweed Alliance, Rush Alliance, and Saltgrass Alliance (Figure 3). The Pickleweed and Saltgrass Alliances were mapped on the north and southwestern sides of the earthen dam. Wetland delineations conducted using both a modified Cowardin (U.S. Fish and Wildlife Service 1985) and U.S. Army Corps of Engineers (Environmental Laboratory1987) methodologies also identified the presence of wetlands along the earthen dam, concrete spillway, and within and adjacent to the two potential red-legged frog mitigation areas (Point Reyes National Seashore September 2001; Point Reyes National Seashore February 2002).

Perhaps the highest potential for special status species in the earthen dam area comes from the fact that coastal dunes have developed on the oceanward side. The vegetation map for the Seashore mapped the eastern portion of the dam as Dune Sagebrush – Goldenbush Alliance Complex. Approximately 14 of the special status plant species with potential to occur in the Proposed Project Area can occur in coastal dune habitats.

At least one species, *Abronia umbellata* ssp. *breviflora* (pink sand-verbena; 1B), has been historically documented in the Proposed Project Area. Virginia Norris from the Marin chapter of the California Native Plant Society first observed this species growing on a "coastal dune terrace" in 1994, but did not officially reports its presence until 1995, when she documented 20 individuals (PORE 2001; NDDB 2001). Another species, *Limnanthes* douglasii ssp. *sulphurea* (Point Reyes meadowfoam; SE; 1B) was found near – but not in – the Proposed Project Area in swales northwest of a large pond adjacent to the Drakes Beach parking lot (NDDB 2001).

Germination of most sensitive annual plant species is tied to rainfall, and below-average rainfall conditions can delay flowering or even inhibit germination, particularly in species with long-lived seed banks. Rainfall during the winter of 2000-2001 was below average, while that during the winter of 2001-2002 was slightly above average. Rainfall for the months of October through April totaled 83.43 cm (33.37 inches) for 2000-2001 and 134.05 cm (53.62 inches) for 2001-2002 (California Data Exchange Center, Lagunitas Lake station). The average rainfall for this period totals 118.43 cm (47.37 inches), so rainfall during the study period ranged from 70.5 (2001)- to 113 percent (2002) of "normal."

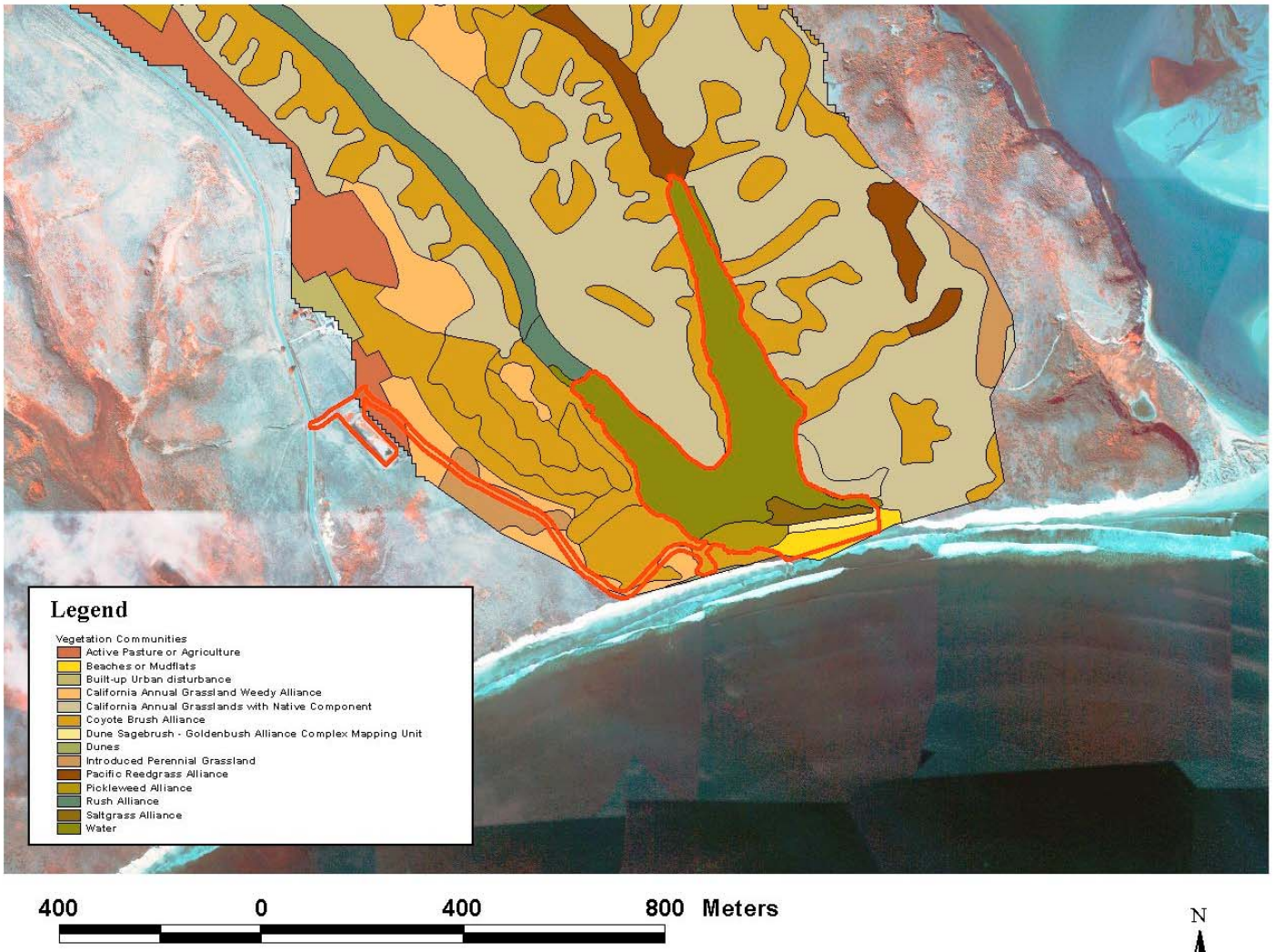


Figure 3. Vegetation communities mapped in the Horseshoe Pond Restoration Project Proposed Project Area using modified version of Sawyer and Keeler-Wolf (1996) classification system.

**NDDB Special Habitats**

The search of the NDDB identified six special habitats with potential to occur within the vicinity of the Proposed Project Area: central dune scrub, coastal and valley freshwater marsh, coastal terrace prairie, serpentine bunchgrass, northern coastal salt marsh, and northern maritime chaparral (NDDB 2001). Central dune scrub is documented from the Point Reyes Lighthouse and Abbotts Lagoon areas. Coastal freshwater marsh is documented from a 34-acre marsh immediately west of Drakes Beach. Northern coastal salt marsh is documented from the head of Tomales Bay. Northern maritime chaparral is documented from an area just south of Tomales Bay State Park. Occurrences of coastal terrace prairie and serpentine bunchgrass fell outside the Seashore and Golden Gate National Recreation Area, north district, boundaries. None of these documented locations are within the Proposed Project Area.

## 3.2 FIELD SURVEYS

The site reconnaissance identified quite a few habitats within the Proposed Project Area that had the potential to support special status plant species. Indeed, the number and variety of habitats observed largely accounts for the fact that, of the 81 special status species listed in Table 1, as many as 59 of them actually had some potential to occur in the Proposed Project Area based on the appropriate habitat being present. Habitats present included:

- coastal prairie (California annual grassland weedy alliance/California annual grassland with native component-California oatgrass alliance),
- coastal scrub (Coyote brush-California blackberry/weedy association),
- coastal dunes (*Ammophila arenaria-Cardionema ramossisima* assocation),
- northern coastal salt marsh (*Distichlis spicata-Frankenia salina-Jaumea carnosa* association),
- coastal brackish marsh (Spikerush alliance), and
- freshwater marsh/seasonal wetlands (California annual grassland weedy alliance and other communities not described by Sawyer and Keeler-Wolf).

At least two of these habitats could potentially qualify as a NDDB special habitat: northern coastal salt marsh and coastal brackish marsh. Northern coastal salt marsh occurred on the oceanward side of the concrete spillway channel that connects Horseshoe Pond, at least intermittently, to the Pacific Ocean. This section of northern coastal salt marsh is characterized by a typical high marsh assemblage that is dominated by *Distichlis spicata* (saltgrass), with *Frankenia salina* (alkali heath) and *Jaumea carnosa* also present. The high marsh is fringed by a rush community largely composed of *Juncus lesueurii* (rush). Another patch of northern coastal salt marsh occurs on the oceanward side of the earthen dam in the historic channel inlet area. Dominant species in this occurrence include salt grass, rush, *Scirpus pungens* (common threesquare), and *Cotula coronopifolia* (brass-buttons), with *Lotus corniculatus* (birdfoot trefoil) also present.

While not listed as being present in Proposed Project Area, coastal brackish marsh is another NDDB special habitat. Coastal brackish marsh occurs on the pondward side of the earthen dam

and concrete spillway. Periodic overwashing of tidal flow into Horseshoe Pond during high and storm tide events, probably coupled with groundwater exchange through the porous sandy material present in the earthen dam, has led to moderately saline conditions, particularly in the southern portion of the pond. Species present in the marsh fringe bordering the earthen dam and concrete spillway attest to the brackish conditions present in the pond, with dominant species *being Eleocharis macrostachya* (spikerush), rush, common threesquare, and *Potentilla anserina* ssp. *pacifica* (cinquefoil).

Freshwater marsh was observed in a small drainage near the D Ranch buildings. However, the high percent cover of the non-native grass *Lolium* spp. (ryegrass) in the feature, which was co-dominant with *Rorippa nasturtium-aquaticum* (water cress), would argue against it being classified as a NDDB special habitat.

As noted earlier, coastal dunes have developed on the oceanward side of the earthen dam. The dunes are dominated by non-native species such as *Ammophila arenaria* (European beachgrass) and *Cakile maritima* (sea rocket), with *Bromus diandrus* (ripgut grass), *Bromus catharticus* (rescue grass), *Hypochaeris radicata* (rough cat's-ear), and *Plantago lanceolata* (English plantain) also common. Some of the native dune species present include *Cardionema ramosissimum, Abronia latifolia* (sand verbena), and *Camissonia cheiranthifolia* ssp. *cheiranthifolia* (beach evening primrose).

To some extent, the vegetation community occurring along the construction access road could be described as coastal prairie, although most of the habitat appears to be extremely disturbed, most likely as a result of historic grazing followed by cessation of grazing once the D Ranch operations were abandoned. Most of the grassland along the construction access road is dominated almost exclusively by non-native grasses and forbs such as *Lolium multiflorum* (Italian ryegrass), *Hordeum murinum* (barley), and *Medicago polymorpha* (California burclover). At the southern end of the construction access, a moderate shift in species occurs, with more native species characteristic of coastal prairie and coastal scrub beginning to appear. Among the native species observed were *Sisrinchyum bellum* (blue-eyed grass), *Iris douglasiana* (iris), *Danthonia californica* (California oatgrass), *Sidalcea malvaeflora* (checker mallow), *Achillea millefolium* (yarrow), *Deschampsia caespitosa* (tufted hairgrass), and *Wyethia glabra* (mules ears). Near the quarry, grassland begins to convert into coastal scrub dominated by *Baccharis pilularis* (coyote brush) and *Rubus ursinus* (California blackberry), at least on the northern portion of the road.

Freshwater marsh/seasonal wetlands were observed in several areas within the Proposed Project Area. The pond along the construction access road, which was developed to store manure waste from D Ranch, floods during the winter months, although herbaceous annuals such as Italian ryegrass and *Polypogon monspeliensis* (annual beard grass) colonize the pond bottom once waters have evaporated. Seasonally saturated and/or inundated swales and depressions along the construction access road near the constructed pond also principally support Italian ryegrass and annual beard grass, although *Atriplex triangularis* (spearscale) was also occasionally present. As noted earlier, ryegrass and the inundation-tolerant floating emergent, water-cress, have established in a drainage adjacent to D Ranch that appears to be fed by a perennial, or at least long-lived seasonal, seep.

The quarry site from which soils were taken to construct the earthen dam does not fall readily into any vegetation classification. For the most part, it is sparsely vegetated (<15 percent cover) and is dominated by an eclectic mixture of native and non-native species, including English plantain, *Lupinus nanus* (lupine), *Holcus lanatus* (velvet grass), *Toxicodendron diversilobum* (poison oak), and tufted hair-grass.

Focused surveys documented the presence of three (3) special status plant species in the Proposed Project Area (Figure 4). Two of the species were observed in the coastal dune area on the oceanward side of the earthen dam: *Abronia umbellata* ssp. *breviflora* (pink sand-verbena; FSC; 1B) and *Chorizanthe cuspidata* (spineflower; FSC; 1B. One was found in the coastal salt marsh near the concrete spillway: *Astragalus pycnostachyus* var. *pycnostachyus* (vetch; 1B). A list of all plant species observed during surveys is provided in Appendix A.

***Abronia umbellata* ssp. *breviflora***: Marin County is the southern extent of the range for pink sand-verbena, which stretches as far north as Oregon (CNPS 2001). Within the Seashore, there are five occurrences of this species (PORE 2001). Most occurrences of this species have very few numbers, ranging from one or two individuals to 13 individuals in a season (CNPS 2001). These populations are very dynamic in nature and appear to be adapted to disturbance events, perhaps functioning almost like metapopulations. During one season, a few plants will appear in certain areas, particularly dunes that have been recently disturbed by overwash events, only to disappear the following season, with new occurrences then sighted in other locations. In fact, within the Seashore, the Horseshoe Pond population ranks as the largest and most stable of the populations. This particular occurrence covers approximately 1,060 square meters of dune. As noted earlier, Virginia Norris first discovered this population in 1994 and documented 20 individuals in 1995. In 2001, as many as 65 plants were found by Michelle Coppoletta of PORE, 26 of which were in flower (PORE 2001). In 2002, 22 flowering plants were observed by Shelly Benson of PRNS (PRNS 2001). Based on taxonomy, it appears that these plants may be hybrids between *Abronia umbellata* ssp. *breviflora* and *Abronia latifolia* (coastal sand- verbena; M. Coppoletta, pers comm.). Throughout its range, this species has experienced a dramatic decrease in numbers due to impacts such as vehicles, non-native plants, and foot traffic (CNPS 2001).


This annual herb, which blooms from June through October, is distinguished by its distinctive magenta flowers.


***Chorizanthe cuspidata***: A population of *Chorizanthe cuspidata* was also found growing in

the dunes alongside *Abronia umbellata* ssp. *breviflora*. While considered rare throughout its range, this species is actually quite common within the Seashore (M. Coppoletta, pers comm.). Because of the significant difficulties discerning the different varieties of *C. cuspidata* – var. *cuspidata* and var. *villosa* – the Seashore simply lumps these two varieties together for purposes of monitoring (M. Coppoletta, pers comm.). Most of the existing populations of *Chorizanthe* are concentrated in and around the dunes at Abbotts Lagoon (PORE 2001).

***Astragalus pycnostachyus* var. *pycnostachyus***: *Astragalus pycnostachyus* var. *pycnostachyus* was observed growing in the strip of rushes bordering the high marsh near the concrete spillway (Figure 4). At least two large individuals were found. This species is a perennial herb with canescent or white-woolly herbage and cream to greenish white flowers (Hickman 1993). It is closely related to another species, *Astragalus pycnostachyus* var. *lanosissiumus* (Ventura Marsh milkvetch; FPE, SE, 1B), which at one point was presumed extinct but was recently rediscovered near Oxnard, California, in 1997 (Hickman 1993; CNPS 2001). *Astragalus* historically ranged from Humboldt to San Mateo counties, but is believed to have been since extirpated from Humboldt county (CNPS 2001). CNPS (2001) characterized this species as having potentially fewer than 10 populations. However, there are at least 13 populations within the Seashore, most of which are in tidal fringe marshes bordering the various "bays" in Drakes Estero and Estero de Limantour (PORE 2001). Persistence of this species may possibly be threatened by "cattle trampling and erosion" (CNPS 2001). Declining numbers are apparently what prompted CNPS to include this species for the first time in its 2001 rare plant inventory as a List 1B species (Rare or endangered in California or elsewhere). The plant typically blooms from April through October.


Figure 4. Location of special status plant species in the Proposed Project Area. Spineflower was not mapped specifically, but overlaps with pink sand-verbena. Mapped over infrared imagery - 2003

# CHAPTER 4. DISCUSSION

Three special status plant species were observed in the Proposed Project Area: pink sand-verbena, spineflower, and vetch. Two of the species – pink sand-verbena and spineflower -- occurred in the coastal dunes that have developed on the oceanward side of the earthen dam, while the third was observed in a marsh area directly southwest of the concrete spillway. While construction equipment will need to travel across the earthen dam to remove the concrete spillway, it may be possible to avoid impacts to these species by carefully routing and flagging the construction access road so as to ensure that it bypasses these populations/occurrences.

## CHAPTER 5. REFERENCES


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# APPENDICES

# Appendix A. List of Plant Species Observed

## Table 1. Plant species observed in Horseshsoe Pond Restoration Project Area.

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| Aizoaceae | | | | | | | | | |
| | *Carpobrotus chilensis* | sea fig | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Carpobrotus edulis* | hottentot fig | ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Carpobrotus sp.* | | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Anacardiaceae | | | | | | | | | |
| | *Toxicodendron diversilobum* | Pacific poison oak | ☐ | ☑ | ☐ | ☑ | ☐ | ☐ | ☑ |
| Apiaceae | | | | | | | | | |
| | *Angelica hendersonii* | Henderson's angelica | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Conium maculatum* | poison hemlock | ☐ | ☐ | ☑ | ☐ | ☑ | ☑ | ☑ |
| | *Eryngium armatum* | coastal eryngo | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| | *Foeniculum vulgare* | sweet fennel | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| | *Heracleum lanatum* | | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☐ |
| | *Oenanthe sarmentosa* | water parsely | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☑ |
| Asteraceae | | | | | | | | | |
| | *Achillea millefolium* | common yarrow | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Ambrosia chamissonis* | beach-bur | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Anthemis cotula* | stinking chamomile | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Aster chilensis* | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Baccharis pilularis* | coyotebrush | ☑ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Carduus pycnocephalus* | Italian plumeless thistle | ☑ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| | *Cirsium vulgare* | bull thistle | ☑ | ☐ | ☑ | ☐ | ☑ | ☑ | ☑ |
| | *Cotula coronopifolia* | common brassbuttons | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☑ |
| | *Erechtites glomerata* | cutleaf burnweed | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Erechtites minima* | coastal burnweed | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Eriophyllum staechadifolium* | seaside woolly sunflower | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Gnaphalium canescens ssp. beneolens* | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Gnaphalium palustre* | western marsh cudweed | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Gnaphalium purpureum* | | ☐ | ☐ | ☑ | ☐ | ☑ | ☐ | ☐ |
| | *Gnaphalium sp.* | | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☑ |
| | *Grindelia hirsutula* | gumweed | ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Grindelia sp.* | | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| | *Helenium puberulum* | rosilla | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Hypochaeris glabra* | smooth catsear | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Hypochaeris radicata* | hairy catsear | ☑ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Jaumea carnosa* | marsh jaumea | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Senecio vulgaris* | old-man-in-the-Spring | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Silybum marianum* | blessed milkthistle | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Sonchus asper* | spiny sowthistle | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ |
| | *Sonchus oleraceus* | common sowthistle | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Wyethia glabra* | Coast Range mule-ears | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| Brassicaceae | | | | | | | | | |
| | *Brassica nigra* | black mustard | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Cakile maritima* | European searocket | ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Cardamine sp.* | bittercress | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Raphanus raphanistrum* | wild radish | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Raphanus sativus* | cultivated radish | ☐ | ☐ | ☐ | ☐ | ☑ | ☑ | ☑ |
| | *Rorippa nasturtium-aquaticum* | watercress | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Campanulaceae | | | | | | | | | |
| | *Campanula sp.* | bellflower | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Caryophyllaceae | | | | | | | | | |
| | *Cardionema ramosissimum* | sandcarpet | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Cerastium fontanum ssp. vulgare* | big chickweed | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Spergularia macrotheca var. macrotheca* | sticky sandspurry | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Spergularia rubra* | red sandspurry | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Stellaria littoralis* | beach starwort | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Stellaria media* | common chickweed | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Stellaria sp.* | | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Chenopodiaceae | | | | | | | | | |
| | *Atriplex leucophylla* | beach saltbush | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Atriplex triangularis* | | ☑ | ☐ | ☑ | ☐ | ☐ | ☑ | ☑ |
| | *Salicornia virginica* | Virginia glasswort | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Convolvulaceae | | | | | | | | | |
| | *Calystegia purpurata ssp. purpurata* | Pacific false bindweed | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Calystegia soldanella* | seashore false bindweed | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Convolvulus arvensis* | field bindweed | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Crassulaceae | | | | | | | | | |
| | *Dudleya farinosa* | powdery liveforever | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| Cucurbitaceae | | | | | | | | | |
| | *Marah fabaceus* | California manroot | ☐ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ |
| Cyperaceae | | | | | | | | | |
| | *Carex densa* | dense sedge | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Carex obnupta* | slough sedge | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Carex sp.* | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Carex subbracteata* | smallbract sedge | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☐ |
| | *Carex tumulicola* | splitawn sedge | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Cyperus eragrostis* | tall flatsedge | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Eleocharis macrostachya* | | ☑ | ☐ | ☑ | ☐ | ☐ | ☑ | ☑ |
| | *Scirpus americanus* | | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Scirpus californicus* | | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Scirpus maritimus* | | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Scirpus pungens* | | ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☑ |
| Dennstaedtiaceae | | | | | | | | | |
| | *Pteridium aquilinum var. pubescens* | hairy brackenfern | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| Ericaceae | | | | | | | | | |
| | *Gaultheria shallon* | salal | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Vaccinium ovatum* | California huckleberry | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| Fabaceae | | | | | | | | | |
| | *Astragalus pycnostachyus var. pycnostachyus* | marsh milkvetch | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Lotus corniculatus* | birdfoot deervetch | ☑ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Lotus heermannii var. orbicularis* | Heermann's bird's-foot trefo | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Lupinus arboreus* | yellow bush lupine | ☐ | ☑ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Lupinus bicolor* | miniature lupine | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Lupinus nanus* | sky lupine | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| | *Lupinus sp.* | | ☑ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Medicago polymorpha* | burclover | ☐ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ |
| | *Melilotus indica* | annual yellow sweetclover | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Trifolium dubium* | suckling clover | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Trifolium fragiferum* | strawberry clover | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Trifolium oliganthum* | clover | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Trifolium repens* | white clover | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Trifolium sp.* | unknown clover | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Trifolium variegatum* | whitetip clover | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| | *Vicia gigantea* | | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| | *Vicia sativa ssp. nigra* | garden vetch | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| | *Vicia sativa ssp. sativa* | garden vetch | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☐ |
| | *Vicia sp.* | vetch | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Geraniaceae | | | | | | | | | |
| | *Geranium carolinianum* | Carolina geranium | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| | *Geranium dissectum* | cutleaf geranium | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☐ |
| | *Geranium sp.* | geranium | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Iridaceae | | | | | | | | | |
| | *Iris douglasiana* | Douglas iris | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| | *Sisyrinchium bellum* | western blue-eyed grass | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| Juncaceae | | | | | | | | | |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Juncus balticus* | Baltic rush | ☑ | ☐ | ☐ | ☑ | ☑ | ☑ | ☑ |
| | *Juncus bufonius* | toad rush | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |
| | *Juncus effusus* | rush | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☑ |
| | *Juncus effusus var. brunneus* | lamp rush | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☑ |
| | *Juncus lesueurii* | salt rush | ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☑ |
| | *Juncus mexicanus* | | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Juncus occidentalis* | western rush | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Juncus patens* | spreading rush | ☑ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Juncus sp.* | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Luzula comosa* | Pacific woodrush | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |
| Juncaginaceae | | | | | | | | | |
| | *Triglochin concinna var. concinna* | Utah arrowgrass | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Lamiaceae | | | | | | | | | |
| | *Stachys sp.* | hedgenettle | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| Lemnaceae | | | | | | | | | |
| | *Stachys ajugoides* | hedgenettle | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| Liliaceae | | | | | | | | | |
| | *Chlorogalum pomeridianum var. divaricatum* | wavyleaf soap plant | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| Lythraceae | | | | | | | | | |
| | *Lythrum hyssopifolia* | hyssop loosestrife | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Malvaceae | | | | | | | | | |
| | *Malva parviflora* | cheeseweed mallow | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| | *Malva sp.* | mallow | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Modiola caroliniana* | Carolina bristlemallow | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |
| | *Sidalcea malviflora ssp. malviflora* | dwarf checkerbloom | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| Myricaceae | | | | | | | | | |
| | *Myrica californica* | California wax myrtle | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Nyctaginaceae | | | | | | | | | |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Abronia latifolia* | coastal sand verbena | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Abronia umbellata* | pink sand verbena | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Abronia umbellata ssp. breviflora* | pink sand verbena | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| Onagraceae | | | | | | | | | |
| | *Camissonia cheiranthifolia* | | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Camissonia ovata* | goldeneggs | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Epilobium ciliatum ssp. watsonii* | fringed willowherb | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Oxalidaceae | | | | | | | | | |
| | *Oxalis sp.* | woodsorrel | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Papaveraceae | | | | | | | | | |
| | *Eschscholzia californica* | California poppy | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Plantaginaceae | | | | | | | | | |
| | *Plantago erecta* | dotseed plantain | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☑ |
| | *Plantago lanceolata* | narrowleaf plantain | ☑ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Plantago major* | common plantain | ☐ | ☐ | ☑ | ☐ | ☑ | ☐ | ☐ |
| | *Plantago subnuda* | tall coastal plantain | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Poaceae | | | | | | | | | |
| | *Agrostis pallens* | seashore bentgrass | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Aira caryophyllea* | silver hairgrass | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☐ |
| | *Aira sp.* | | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |
| | *Ammophila arenaria* | European beachgrass | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Avena barbata* | slender oat | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Avena sp.* | | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Bromus carinatus* | | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Bromus catharticus* | rescuegrass | ☐ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Bromus diandrus* | ripgut brome | ☐ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Bromus hordeaceus* | soft brome | ☑ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Cynosurus echinatus* | bristly dogstail grass | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☐ |
| | *Dactylis glomerata* | orchardgrass | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Danthonia californica* | | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Deschampsia cespitosa* | tufted hairgrass | ☑ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Deschampsia sp.* | hairgrass | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☐ |
| | *Digitaria sanguinalis* | hairy crabgrass | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Distichlis spicata* | inland saltgrass | ☑ | ☑ | ☑ | ☐ | ☑ | ☐ | ☑ |
| | *Elymus glaucus* | blue wildrye | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Festuca arundinacea* | | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Glyceria occidentalis* | northwestern mannagrass | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ | ☑ |
| | *Holcus lanatus* | common velvetgrass | ☑ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Hordeum brachyantherum* | meadow barley | ☑ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| | *Hordeum marinum ssp. gussonianum* | Mediterranean barley | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Hordeum murinum* | mouse barley | ☐ | ☑ | ☐ | ☐ | ☑ | ☑ | ☑ |
| | *Leymus mollis ssp. mollis* | American dunegrass | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Leymus triticoides* | beardless wildrye | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Lolium multiflorum* | | ☑ | ☐ | ☐ | ☐ | ☑ | ☑ | ☑ |
| | *Lolium perenne* | perennial ryegrass | ☑ | ☐ | ☑ | ☑ | ☐ | ☑ | ☑ |
| | *Nassella pulchra* | purple tussockgrass | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Paspalum dilatatum* | dallisgrass | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Phalaris aquatica* | bulbous canarygrass | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Phalaris sp.* | canarygrass | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| | *Poa annua* | annual bluegrass | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Polypogon monspeliensis* | annual rabbitsfoot grass | ☑ | ☐ | ☑ | ☐ | ☐ | ☑ | ☑ |
| | *Vulpia bromoides* | brome fescue | ☐ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ |
| | *Vulpia sp.* | | ☑ | ☑ | ☑ | ☑ | ☑ | ☐ | ☐ |
| Polygonaceae | | | | | | | | | |
| | *Chorizanthe cuspidata* | | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | *Eriogonum latifolium* | seaside buckwheat | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☐ |
| | *Polygonum arenastrum* | oval-leaf knotweed | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Rumex acetosella* | common sheep sorrel | ☑ | ☑ | ☑ | ☑ | ☑ | ☐ | ☑ |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| | *Rumex conglomeratus* | clustered dock | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☑ |
| | *Rumex crispus* | curly dock | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ |
| | *Rumex occidentalis* | | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Rumex pulcher* | fiddle dock | ☑ | ☐ | ☐ | ☐ | ☑ | ☐ | ☑ |
| | *Rumex salicifolius var. crassus* | willow dock | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| | *Rumex sp.* | dock | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Primulaceae | | | | | | | | | |
| | *Anagallis arvensis* | pimpernel | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Ranunculaceae | | | | | | | | | |
| | *Ranunculus californicus* | California buttercup | ☐ | ☐ | ☐ | ☑ | ☑ | ☐ | ☑ |
| | *Ranunculus muricatus* | spinyfruit buttercup | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| Rhamnaceae | | | | | | | | | |
| | *Ceanothus thyrsiflorus* | blueblossom | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| Rosaceae | | | | | | | | | |
| | *Fragaria chiloensis* | beach strawberry | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Fragaria sp.* | | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |
| | *Potentilla anserina ssp. pacifica* | | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ |
| | *Rubus ursinus* | California blackberry | ☐ | ☐ | ☑ | ☑ | ☑ | ☐ | ☑ |
| Rubiaceae | | | | | | | | | |
| | *Galium aparine* | stickywilly | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| Ruppiaceae | | | | | | | | | |
| | *Ruppia sp.* | widgeonweed | ☑ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |
| Scrophulariaceae | | | | | | | | | |
| | *Castilleja rubicundula ssp. lithospermoides* | cream sacs | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ |
| | *Castilleja wightii* | | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |
| | *Veronica americana* | American speedwell | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Typhaceae | | | | | | | | | |
| | *Typha latifolia* | broadleaf cattail | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ |

| Family | Full Species Name | Common Name | Spillway | Dune | Historic Channel | Quarry | Road | Mitigation 1 | Mitigation 2 |
|---|---|---|---|---|---|---|---|---|---|
| Urticaceae | | | | | | | | | |
| | *Urtica dioica* | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |
| Violaceae | | | | | | | | | |
| | *Viola sp.* | violet | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ |