



## Botanical Survey Report

### Giacomini Wetland Restoration Project

Golden Gate National Recreation Area  
Point Reyes National Seashore

Marin County, California



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## INTRODUCTION

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The purpose of this report is to provide background information regarding sensitive botanical resources within Giacomini Wetland Restoration Project Area. Point Reyes National Seashore (Seashore) will be preparing an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for this Project. Background information in this report will be used to guide development and assess potential environmental impacts of the Project. As part of the EIS/EIR, the Seashore must consider whether this 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. This study addresses not only the Project Area, but certain areas adjacent to the Project Area (Study Area).

To determine whether any special status plant species occur in the Study Area, a literature review was performed to assess 1) which species have potential to occur in the Study 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 habitats for any of the special status plant species with potential to occur were present in the Study Area. Focused surveys were then conducted in habitats or vegetation communities that might support special status plant species.

### **Regulatory Background**

Numerous species of plants have undergone local, state, or national declines, which has raised concerns about their possible extinction if they are not protected. Special status plant species include those that are legally protected under the federal and California Endangered Species Acts (ESA) or other regulations and those that are considered rare by the scientific community or the Seashore. Special status species can include:

- plants that are listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.11 for animals; various notices in the Federal Register [FR] for proposed species) and/or the California ESA (Fish and Game Code §2050 *et seq.*; 14 CCR §670.1 *et seq.*);
- plants that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 7506 February 28, 1996);
- 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 (CDFG);
- 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 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.
- plant species that the Seashore deems locally rare or of special concern, even though they are not officially listed.

The federal ESA of 1973, as amended, prohibits federal actions that (1) could jeopardize the continued existence of any federally listed plant or animal species (e.g., listed as threatened or endangered) or species proposed for listing, or (2) could result in the destruction or adverse modification of critical or proposed critical habitat. ESA requires federal agencies to consult with the USFWS if a federal action such as a project or management plan may affect a federally listed species. The USFWS has provided the Seashore a list of special status species that have potential to occur in the Seashore, north district of the Golden Gate National Recreation Area (GGNRA), and Marin County. The Seashore has included a list of these species in a table in Appendix A.

The Council of Environmental Quality Regulations for Implementing the National Environmental Policy Act (Section 1508.27) also requires federal agencies to consider if an action may significantly affect the human environment and to determine whether actions may be “significant” by preparing assessing potential impacts using agency-specific NEPA guidelines. Many agencies use federal, state, or local laws or requirements imposed for the protection of the environment as guides for determining significance of the impacts from proposed actions. For this reason, species listed under the California ESA (i.e., those considered endangered or threatened), as well as proposed for listing, by the CDFG are also included in this analysis. The CDFG has created a Natural Diversity Database (NDDDB) of known or reported occurrences of threatened, endangered, rare, or CNPS-listed species within California. Information from the NDDDB on special status plant species within quadrangles in the Seashore and north district of the GGNRA is incorporated into the table in Appendix A, although not all known occurrences within the Seashore and the GGNRA have been reported to the NDDDB historically.

Beyond regulatory mandates to avoid or minimize impacts to special status species, the Park Service Management Policies (2001) encourage parks to “identify and promote the conservation of all federally listed threatened, endangered, or candidate species within park boundaries and their critical habitats.... The National Park Service also will identify all state and locally listed threatened, endangered, rare, declining, sensitive, or candidate species that are native to and present in the parks, and their critical habitats.” Park managers should ensure that park operations do not adversely impact endangered, threatened, candidate, or sensitive species and their critical habitats either within or outside the park and must consider federally and state-listed species and other special-status species in all plans and NEPA documents (NPS-77 Natural Resource Management Guidelines).

## **Project Background**

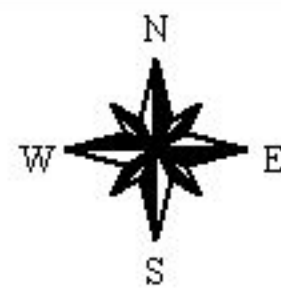
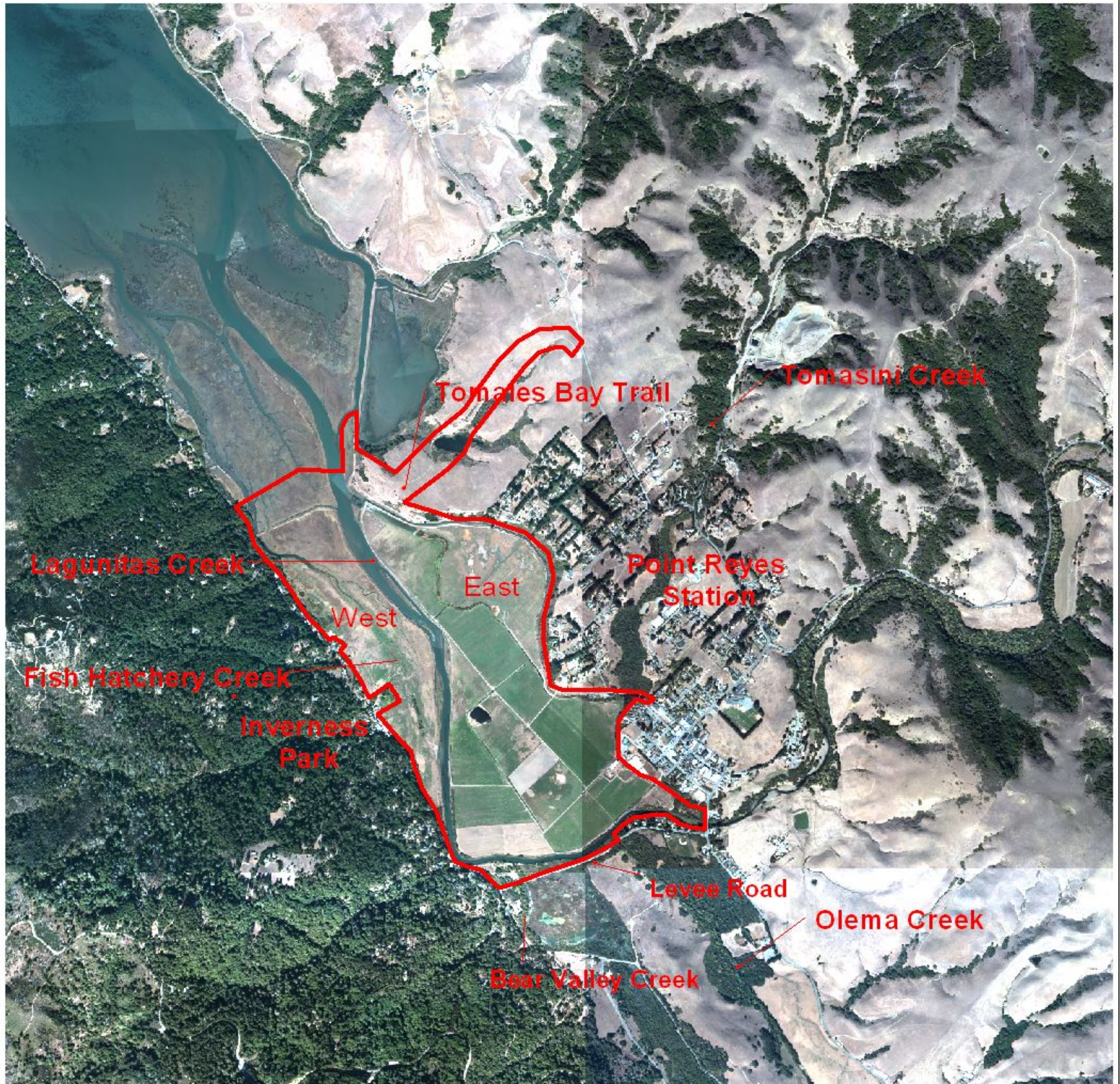
The National Park Service (Park Service) is proposing a 563-acre wetland restoration project at the Waldo Giacomini Ranch (Giacomini Ranch) in the southern end of Tomales Bay in Marin County, California (Figure 1). The Park Service acquired the 563-acre Giacomini Ranch in February 2000 through a combination of congressional appropriations and funding from the California Department of Transportation (CalTrans). The Giacomini Ranch is located in the north district of the GGNRA, which is administered by the Seashore. As part of the purchase agreement with the Giacominis, the Giacomini family was granted a reservation of use agreement



# Giacomini Wetland Restoration Project

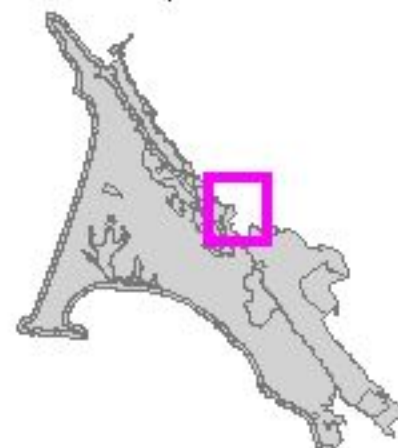
Golden Gate National Recreation Area

Botanical Survey Report



300 0 300 600 Meters

Map Location



National Park Service  
Point Reyes National Seashore  
Water Resources

Figure 1. Location and extent of Study Area



until 2007 on approximately 463 acres. The remaining 100 acres are already under Park Service management. These 100 acres are located in the northwestern corner of the Project Area in the northern portion of the West Pasture: Lagunitas Creek basically bisects the pasturelands into two pasture areas that have been termed the East and West Pastures (Figure 1). The Seashore anticipates that restoration alternatives could include a phased approach that would enable restoration to proceed on these 100 acres before 2007.

Since purchase of the property in 2000, the Seashore has been moving forward with the environmental planning process. Baseline studies on existing wildlife, vegetation, wetland, and cultural resources have been or are being currently conducted. Through integration of this baseline information with restoration science tenets, Park Service directives and management policies, and mitigation and contractual obligations, the Seashore has identified one primary project objective -- specifically, restoration of natural hydrologic tidal and freshwater processes, thereby enabling restoration of ecological processes and functions.

Public and agency scoping for the EIS/EIR ended in December 2002. In January 2003, the Seashore held a series of Alternative Workshops with Park Service staff and wetland and wildlife experts. These workshops resulted in development of a conceptual framework for qualitative prioritization of identified critical resource goals that will be used to guide design of restoration alternatives. These critical resource goals build upon the project's stated primary objective of restoring natural hydrologic and ecological processes and functions by providing some specific concrete measures or goals by which the Park Service can gauge the success of its future restoration efforts.

While alternative design is still in preliminary stages, the Park Service anticipates that the alternatives that will be incorporated into the EIS/EIR will involve some type of hydraulic and/or topographic alterations, such as partial levee breaching, lowering levee elevations, and creation of high marsh or upland areas to serve as high tide refugia habitat for bird species such as black rails and the California clapper rail. Another series of Alternative Workshops to introduce conceptual alternative designs started in fall 2003. Preparation of the environmental document will begin in winter 2004.

## METHODS

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### Literature Review

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

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

Using this information, a table was prepared that lists all special status plant species with potential to occur in the Project Area and vicinity (Appendix A). 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, rocky outcrops), respectively, within the Study Area. A map showing vegetation communities identified within the Study Area was also consulted to determine whether habitat for special status plant species might be present (Parsons and Allen, *in prep.*). 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.

The Seashore has an extensive database (PORE) of rare plant occurrences both within the Seashore and the north district of GGNRA. The Marin County chapter of the CNPS has been conducting rare plant surveys throughout the Seashore and the north district of the GGNRA for more than a decade, and during the last three to four years, the Seashore has been making a concerted effort to document and map all rare plant occurrences through Park Service personnelled surveys, in addition to Park Service-organized volunteer events such as the Rare Plant-A-Thon.

### Field Surveys

Botanical surveys for sensitive plant species were conducted in accordance with USFWS (1996) and CDFG (1997) guidelines. A determination of whether suitable habitat existed for special status plant species was made from a reconnaissance of the Study Area. This initial reconnaissance and subsequent field surveys and monitoring were also used to qualitatively characterize hydrologic sources and influences throughout the Study Area. Lorraine Parsons of the Seashore conducted the reconnaissance during the spring of 2001. The 2001 reconnaissance was conducted on April 13, 16, 18, 24, and 26 and May 5, 17, and 22.

The NDDB describes habitats for special status species 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 by interpretation of aerial photographs, combined with ground-truthing efforts. As the NDDB relies on the Holland classification system to characterize special status species habitats, vegetation communities identified during the reconnaissance were described using both the Holland and Sawyer and Keeler-Wolf systems, when possible.

For portions of the Study Area that had potential for special status species, follow-up botanical surveys were performed. These 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 Study Areas. Lorraine Parsons and Kristin Byrd (Seashore Biological Services Technician) conducted two (2) sets of follow-up botanical surveys in 2001 on the following dates: the first set occurred on June 27 and July 11 and 12, and the second set took place on August 8, 15, and 22. Additional surveys were conducted in 2002 by Lorraine Parsons (Seashore Wetland Ecologist), Leslie Allen (Seashore Wetland Ecologist), and Shelly Benson (Seashore Rare Plant Biologist) on May 1, 7, 8, 15, 22, and September 17. Michelle Coppoletta (Seashore Rare Plant Biologist) and Shelly Benson surveyed portions of the undiked marsh north of the Giacomini Ranch on June 21, 2002. In 2003, Jeanne Taylor (GGNRA Rare Plant Biologist) with the GGNRA and Lorraine Parsons, Leslie Allen, Jane Rodgers (Seashore Vegetation Ecologist), and Ericka Lewis (Seashore Biological Services Technician) surveyed the tidal fringe marshes along Lagunitas Creek and the undiked marsh directly north of the West and East Pastures on the following dates: May 12 and 26 and June 16, 19, and 23.

During field surveys, meandering transects were walked throughout the Study 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: a list of all plant species observed is provided in Appendix B. When necessary, specimens from the herbarium at the Seashore and other 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). Numbers of plants observed were either estimated visually, or individual plants were counted. In some instances, Jeanne Taylor from the GGNRA subsampled populations by counting the numbers of plants within a specified area and then multiplying by the total size of the area. Information on new species occurrences or on resurveyed populations that were previously documented was included on datasheets that were incorporated into the Seashore and the GGNRA databases and sent to the NDDB for inclusion in its database system. Datasheets are provided in Appendix C.

## LITERATURE REVIEW RESULTS

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A list of 83 special status plant species with potential to occur in the Study Area is provided in Appendix A. The table contains information on regulatory status, habitat, and flowering period derived from the NDDDB (2001) and California Native Plant Society Rare Plant Inventory (2001). The plant species listed in Appendix A 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, serpentine areas, broadleaf upland forest, and closed-cone and coniferous forest (NDDDB 2001). Certain sensitive plant species are highly associated with or even restricted to habitats that are associated with specific geologic formations, soil types, and/or hydrologic regimes, such as serpentine grassland, granitic outcroppings, coastal salt marshes, freshwater marshes, or vernal pools. The nature of the Study Area has been sharply defined by this region's unique geologic and land-use history. The San Andreas Fault, responsible for the 1906 Earthquake that devastated San Francisco, runs directly through the Study Area and Tomales Bay. Movement of the Pacific and Continental Plates has produced striking differences in the geologic nature of the lands on the west and east sides of Tomales Bay by displacing lands along this major fault as much as several hundred miles (Shuford and Timossi 1989).

The eastern portion of the Tomales Bay watershed is dominated by the Franciscan formation, composed of sandstone, graywacke, shale, some volcanic and metamorphic rock, and greenstone (U.S. Soil Conservation Service 1985). Within Marin County, serpentine areas occur almost exclusively in the Franciscan Formation and are strongly linked with the Henneke and Montara soil series (U.S. Soil Conservation Service 1985). Serpentine areas are somewhat unique in that the unusual chemical composition of this rock creates harsh conditions for plants that results in sparse vegetation cover and yet also occurrence of a high number of endemic and special status plant species. The Franciscan Formation is typically associated with the higher elevation ridges, mountains, and hills that run along Marin County's western perimeter. Several of the special status plant species in Appendix A can potentially occur in serpentine or granitic or rock outcroppings, including Marin manzanita (*Arctostaphylos virgata*; 1B), San Francisco wallflower (*Erysimum franciscanum*; FSC; 4), and Marin checker lily (*Fritillaria affinis* var. *tristulis*; 1B). Directly adjacent to the Study Area lies a lower-elevation coastal terrace known as the Point Reyes Mesa. Soil types mapped along this terrace include Olompali loam and the Saurin-Bonnydoon complex (U.S. Soil Conservation Service 1985; Figure 2). These soil units are not characterized by serpentine or granitic or rock outcroppings (U.S. Soil Conservation Service 1985). However, fragrant fritillary (*Fritillaria lilacea*; FSC), which is described as being "often on serpentine soils," has been recorded near the eastern end of the Tomales Bay trailhead near Highway 1, northeast of the Study Area (Figure 3).

West of Tomales Bay on the steeply sloped Inverness Ridge – 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, porcelanite, and chert, but, in some areas, the dominant parent



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Golden Gate National Recreation Area

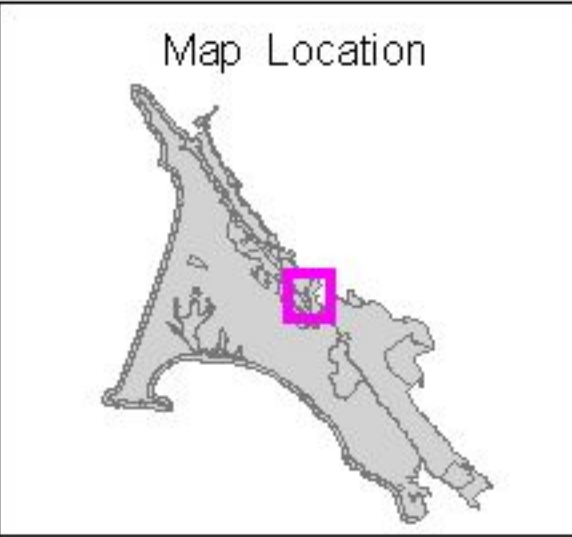
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**Soil Types**

Barnabe very gravelly loam (30-50)	Otom palli (15-30)
Blucher-Cole complex (2-5)	Rock outcrop-xerorhenis complex (50-7.5)
Corlino gravelly sandy loam (0-5)	Sautin-Bonnydoon complex (2-15)
Fluvents, channeled	Sautin-Bonnydoon complex (15-30)
Hydraquents, saline	Sautin-Bonnydoon complex (30-50)
Intemess loam (5-15)	Tocaloma-Gaurin association, very steep
Intemess loam (15-30)	Tocaloma-Gaurin association, extremely steep
Intemess loam (30-50)	Xerorhenis, fill
Intemess loam (50-7.5)	Yorkville clay loam (15-30)
Los O sos-Bonnydoon complex (15-30)	Yorkville clay loam (30-50)
Los O sos-Bonnydoon complex (30-50)	Water
Novato clay	
Otom palli loam (2-9)	
Otom palli (5-15)	

■ Study Area



National Park Service  
Point Reyes National Seashore  
Water Resources

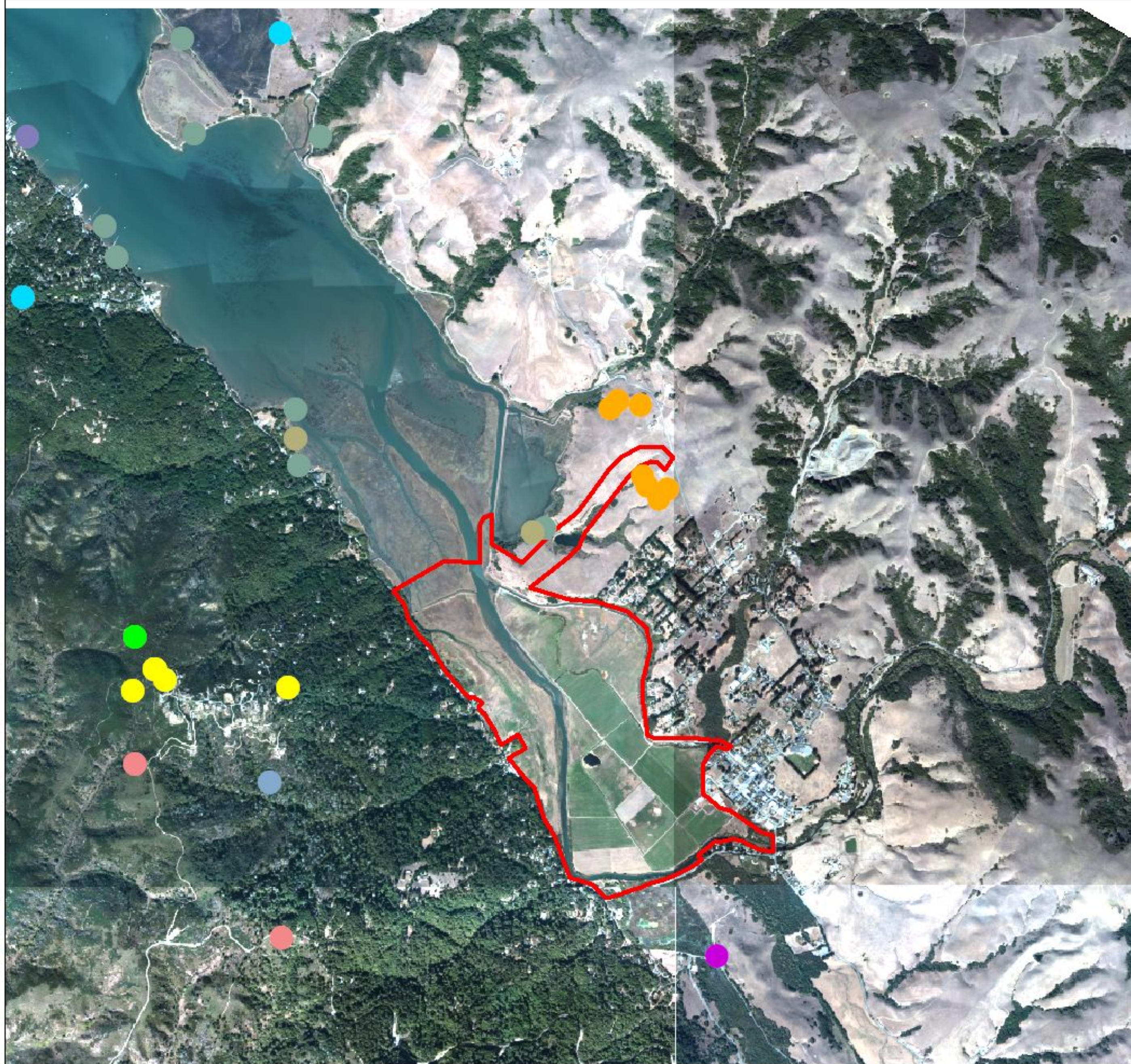
Figure 2. Soil types within the Study Area and vicinity (Soil Conservation Service 1985).



# Giacomini Wetland Restoration Project

## Golden Gate National Recreation Area

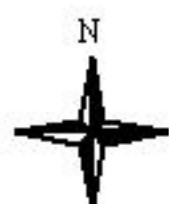
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#### Recorded Species Occurrences

- |                           |                         |
|---------------------------|-------------------------|
| fragrant fritillary       | Point Reyes bird's-beak |
| Humboldt Bay owl's-clover | Sonoma alopecurus       |
| Marin checker lily        | swamp harebell          |
| Marin knotweed            | western leatherwood     |
| Marin manzanita           | Study Area              |
| Mt. Vision ceanothus      |                         |

400 0 400 800 Meters



#### Map Location



#### National Park Service Point Reyes National Seashore Water Resources

Figure 3. Historic occurrences of special status plant species within and near the Study Area as documented by NDDB and the Seashore's rareplant database.



material is mudstone, siltstone, and greenish sandstone that is referred to as the Drakes Bay or Purisma Formation (U.S. Soil Conservation Service 1985). Soils on the portion of the Inverness Ridge directly adjacent to the western boundary of the Study Area are mainly comprised of the Inverness loam series, ranging from 15 to 75 percent slopes, and Tocaloma-Saurin association, extremely steep (U.S. Soil Conservation Service 1985; Figure 2). This soil unit is not characterized as having serpentine inclusions, but small rock outcroppings are occasionally found, mainly on the ridgetops (U.S. Soil Conservation Service 1985). Marin manzanita, Mt. Vision ceanothus, and western leatherwood have all been mapped near the top of Inverness Ridge northwest of the Giacomini Ranch (Figure 3).

The Study Area is comprised primarily of low-elevation lands bounded by Inverness Ridge and the Point Reyes Mesa. Prior to the 1860s, approximately one-third to one-half of the Study Area was actually subtidal or unvegetated intertidal habitat (PWA et al. 1993, Niemi and Hall 1996). The historic coastal salt marsh was relegated to the southeastern corner of the Study Area near the existing dairy facility (PWA et al. 1993). However, during the latter half of the 19<sup>th</sup> century, sedimentation rates rose dramatically, resulting in rapid deltaic aggradation of coarse and fine alluvium in the southern end of Tomales Bay. This increase in sedimentation probably resulted from an increase in logging and other changes in land use practices (PWA et al. 1993, Niemi and Hall 1996), but was undoubtedly exacerbated by the geologic instability characteristic of this region. It has been estimated that, between 1860 and 1950, approximately 5 vertical feet of sediment deposited within southern Tomales Bay, creating 650 acres of new vegetated intertidal habitat (PWA et al. 1993). The greatest sedimentation occurred between 1860-1910 (PWA et al. 1993). The 1906 Earthquake may have subsequently “drowned” some of this deltaic aggradation. There were reports in Bolinas Lagoon of subsidence of up to 1 foot, however, evidence of similar subsidence events in Tomales Bay were not as clear cut (Gilbert 1908). Sedimentation continued to be high until at least the 1950s, when construction of several dams and reservoirs within the Marin Municipal Water District (MMWD)-owned portion of the Tomales Bay watershed began reducing sediment input (PWA et al. 1993, Niemi and Hall 1996).

Soil types mapped within the relatively level pastures of the Giacomini Ranch are consistent with this area’s unique history (Figure 2). The northern 60 percent of the Project Area is comprised of Novato Clay (U.S. Soil Conservation Service 1985). Novato Clay is described as “very deep, very poorly drained soil...in saltwater marshes ...formed in alluvium derived from various kinds of rock” (U.S. Soil Conservation Service 1985). The historic coastal salt marsh in the southeastern corner of the Study Area and the portion of Lagunitas Creek along Levee Road is mapped as Blucher Cole complex (U.S. Soil Conservation Service 1985). The Blucher-Cole complex is also formed in alluvium from various kinds of rock, although this mapping unit is typically found in basins and on alluvial fans. Both components of this mapping unit are characterized as very deep soils that are somewhat poorly drained with seasonally high water tables and occasional periods of flooding (U.S. Soil Conservation Service 1985). However, soil borings conducted in 2003 indicate that soil patterns within the Project Area are much more complex than the soil map would suggest. The historic salt marsh areas in the southern and eastern portions of the East Pasture typically have deep, intermixed estuarine clays and peats overlain with a thin (~0.3 –0.5 m) loam or clayey loam layer (Greg Kamman, Hydrologist, *pers comm.*). The loams probably date to the period in which the Project Area was isolated from tidal and freshwater flow influence and started being actively farmed. The very southern portion of



the East Pasture has a very thick (2.5 m) layer of silts and sands that appears to have resulted from the Giacomini's efforts to deliberately direct flood overflows from Lagunitas Creek to this portion of the property (G. Kamman, *pers comm.*). Conversely, sediment in many of the historic subtidal areas directly adjacent to historic and current Lagunitas Creek channels are comprised of loam or silty loam overlain on interbedded silt, clays, and sands. This interbedded layer rests on a very deep layer of extremely permeable coarse-grained sands and gravels that were probably deposited by historic bedload and suspended sediment transport during storm events (G. Kamman, *pers comm.*).

The undiked marsh north of the Giacomini Ranch has been mapped as almost exclusively Hydraquents, saline, with slightly smaller pockets of Novato Clay and Xerorthents, fill, at the base of the Tomales Bay trailhead, directly north of the East Pasture and the outlet of Tomasini Creek into Tomales Bay (Figure 2). Hydraquent, saline, soil types consist of "nearly level soils along the coast" typified by "stratified deposits of silt and clay with thin layers of peat" that are "continuously waterlogged" (U.S. Soil Conservation Service 1985). Xerorthents, fill, is comprised of soil material that has been moved mechanically and mixed (U.S. Soil Conservation Service 1985). This unit was also mapped at the corner of Sir Francis Drake Boulevard and Levee Road near White House Pool. Not surprisingly, none of these soil-mapping units is listed as having either serpentine or rocky/granitic outcropping inclusions.

Approximately 21 of these special status species with potential to occur in the Study Area are found in wetland features such as coastal salt marsh, brackish marsh, freshwater marsh, bogs and fens, vernal pools, and seasonal wetlands. Vernal pools represent a unique type of wetland ecosystem within Mediterranean climates such as California. These depression- or swale-type features occur in areas where unique geologic or soil characteristics encourage prolonged seasonal ponding or soil saturation during spring months. The term "seasonal wetlands" is often used to characterize seasonally saturated or inundated depression or basin features that have neither the soils, geology, nor suite of characteristic flora and fauna associated with vernal pools. While vernal pools are not as common in the Tomales Bay watershed as in other regions of California, the Study Area's formational history, combined with its complex hydrology, promotes development of an extremely wide variety of different wetland habitats (Figure 4). This variety stems to a large degree from the sharp juxtaposition between tidal and freshwater influences.

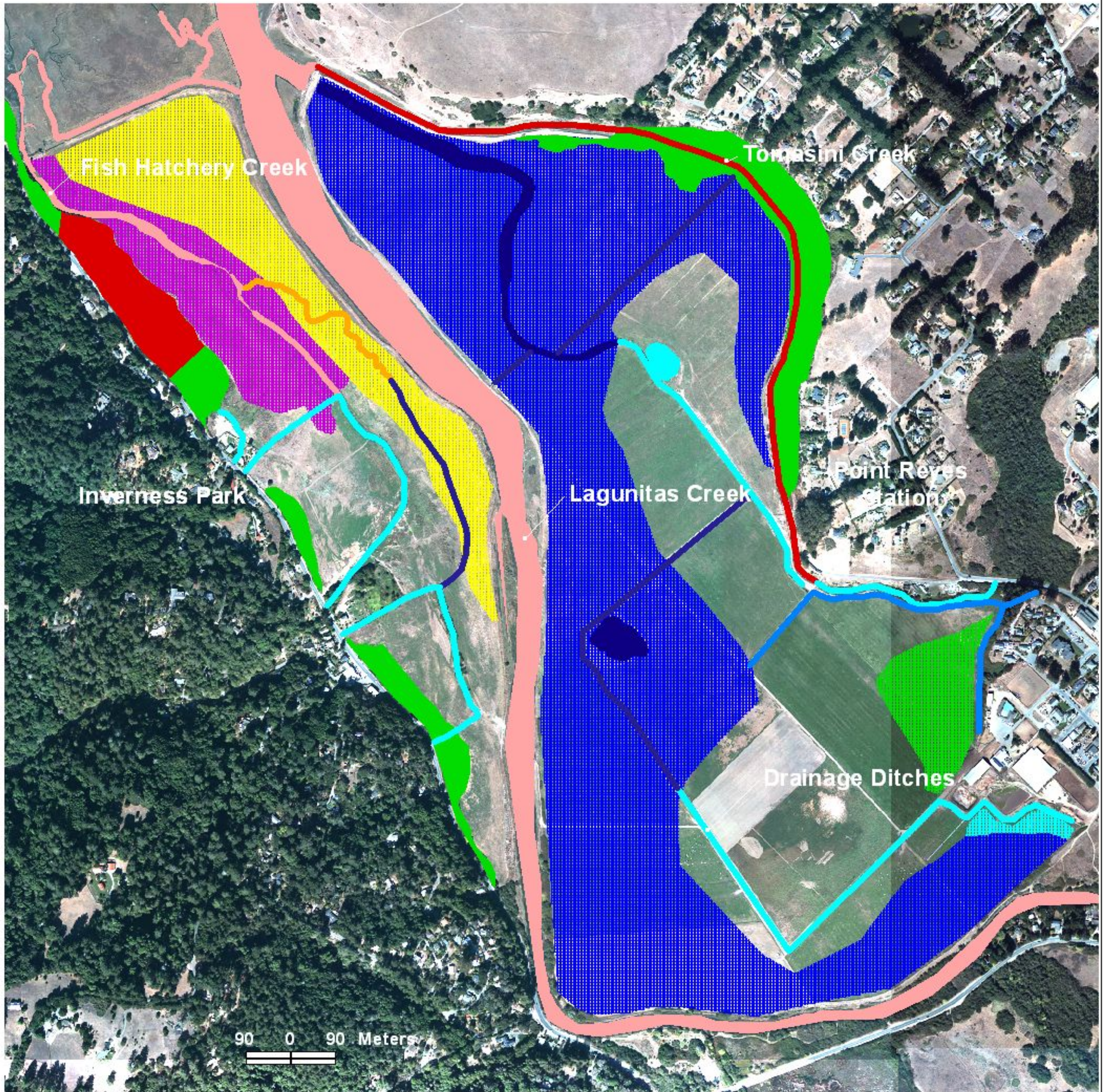
From an estuarine perspective, the Study Area represents the mixing zone for oceanic tides from the Pacific Ocean and freshwater fluvial flows from several perennial/seasonal creeks and drainages, including Lagunitas, Fish Hatchery, and Tomasini creeks, as well as several smaller, unnamed drainages. Tomales Bay is characterized as a typical "classic," winter-stratified estuary, with salinities ranging from freshwater near 0-5 ppt in the winter to brackish and even saline (15-30 ppt) in the summer and fall. Both Fish Hatchery and Tomasini Creeks, which flow through the diked West and East Pastures, respectively, are tidally influenced to a large degree, because the so-called "one-way" tidegate or flashboard dam structures are malfunctioning, allowing significant tidal inflow. Another source of freshwater influences within the Study Area is seep flow from groundwater sources along Inverness Ridge and Point Reyes Mesa, which again relates



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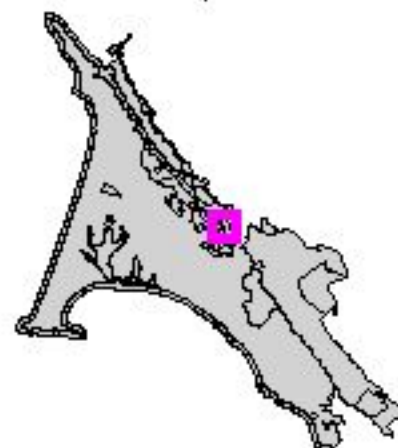
## Golden Gate National Recreation Area

### Botanical Survey Report



- Hydrologic Sources**
- Groundwater - Freshwater
  - Surface - Freshwater
  - Surface - Freshwater/Groundwater - Freshwater
  - Surface - Freshwater/Groundwater - Tidally Influenced
  - Surface - Tidally Influenced
  - Surface - Tidally Influenced/Groundwater - Freshwater
  - Surface - Tidally Influenced/Groundwater - Tidally Influenced
- Hydrologic Influences**
- Groundwater-Freshwater
  - Groundwater-Tidally Influenced
  - Surface-Freshwater
  - Surface-Tidally Influenced

Map Location



National Park Service  
Point Reyes National Seashore  
Water Resources

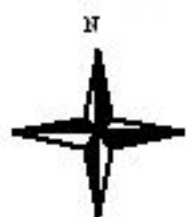


Figure 4. Hydrologic sources and influences within the Project Area. Some areas have multiple sources of hydrologic sources and influences.



strongly to this area's unique and unstable geologic history. These seeps emerge at the base of the higher elevation ridges and terraces and then sheetflow out onto the relatively level pastures or drainages (Figure 4). These freshwater influences appear to be mediated to some extent by some minor subsidence and a strong hydraulic connection between tidally influenced Lagunitas Creek and some portions of the pastures. Rapid deltaic formation through deposition of coarse alluvium has created a very permeable soil substrate that promotes a strong groundwater connection between the brackish to saline Lagunitas Creek and the adjacent diked pastures (Figure 4). This connectivity is reflected in the presence of several halophytic plant communities within lower elevation portions of the pastures such as Diked Salt Marsh, Diked Brackish Marsh, and so-called Salt Marsh Pasture.

This hydrologic complexity undoubtedly accounts for the wide variety of wetland habitats present in the Study Area, including Freshwater Marsh, Vernal Marsh, Seasonal Wetland, Wet Meadow, Tidal/Diked Salt Marsh, Tidal/Diked Brackish Marsh, Moist Grassland, Scrub-shrub Riparian, and Forested Riparian (Figure 5). Even some of the limited coastal scrub habitat present incorporates a mesic component, with perennial or seasonal seep flow on the Point Reyes Mesa creating a unique vegetation community dominated by both arroyo willow (*Salix lasiolepis*) and coyote brush (*Baccharis pilularis*). The mesa is not grazed by cattle. Most of the Project Area has been mapped as Wet Pasture (Figure 5). Wet Pasture is managed grassland dominated by grasses and herbs that are predominantly facultative or obligate hydrophytes or wetland species. Lower elevation portions of the West Pasture and a smaller portion of the East Pasture also incorporate another vegetation community, Salt Marsh Pasture, that supports the halophytic grass, saltgrass (*Distichlis spicata*) and other halophytic herbs such as alkali heath (*Frankenia salina*), as well as pastoral grasses such as bent grass (*Agrostis stolonifera*) and blue grass (*Poa trivialis*; Figure 2). Scrub-shrub and Forested Riparian communities primarily occur along the western boundary of the West Pasture, the southern portion of Lagunitas Creek; Wildlife Conservation Board lands near White House Pool and the Green Bridge; and along limited portions of Tomasini and Fish Hatchery Creeks and other small drainages. Grazing has eliminated riparian habitat along most of the drainages within the pastures themselves. Outboard of the Lagunitas Creek levee and downstream of the Giacomini Ranch, the predominant vegetation communities are Tidal Salt Marsh, Tidal Brackish Marsh, and, to a lesser extent, Moist Grassland.

Wetland-related special status plant species have primarily been observed in the undiked portions of southern Tomales Bay (Figure 3). The closest recorded occurrences include coastal salt marsh-associated species such as Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*; FSC) and Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis* FSC; Figure 3) in Shields Marsh and Millerton Point area, approximately 1 to 2 miles north of the Project Area. Unrecorded observations also documented occurrence of these two species along or near the Tomales Bay Trail on GGNRA lands, which is directly north of the Project Area. A species of potential regional significance, salt marsh owl's-clover (*Castilleja ambigua* ssp. *ambigua*), has also been noted previously to occur along the Tomales Bay trailhead in undiked high marsh/upland ecotone adjacent to Tomales Bay. Freshwater species such as Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*; FE; 1B) and swamp harebell (*Campanula californica*; FSC) have been observed historically in the southern portion of the Tomales Bay

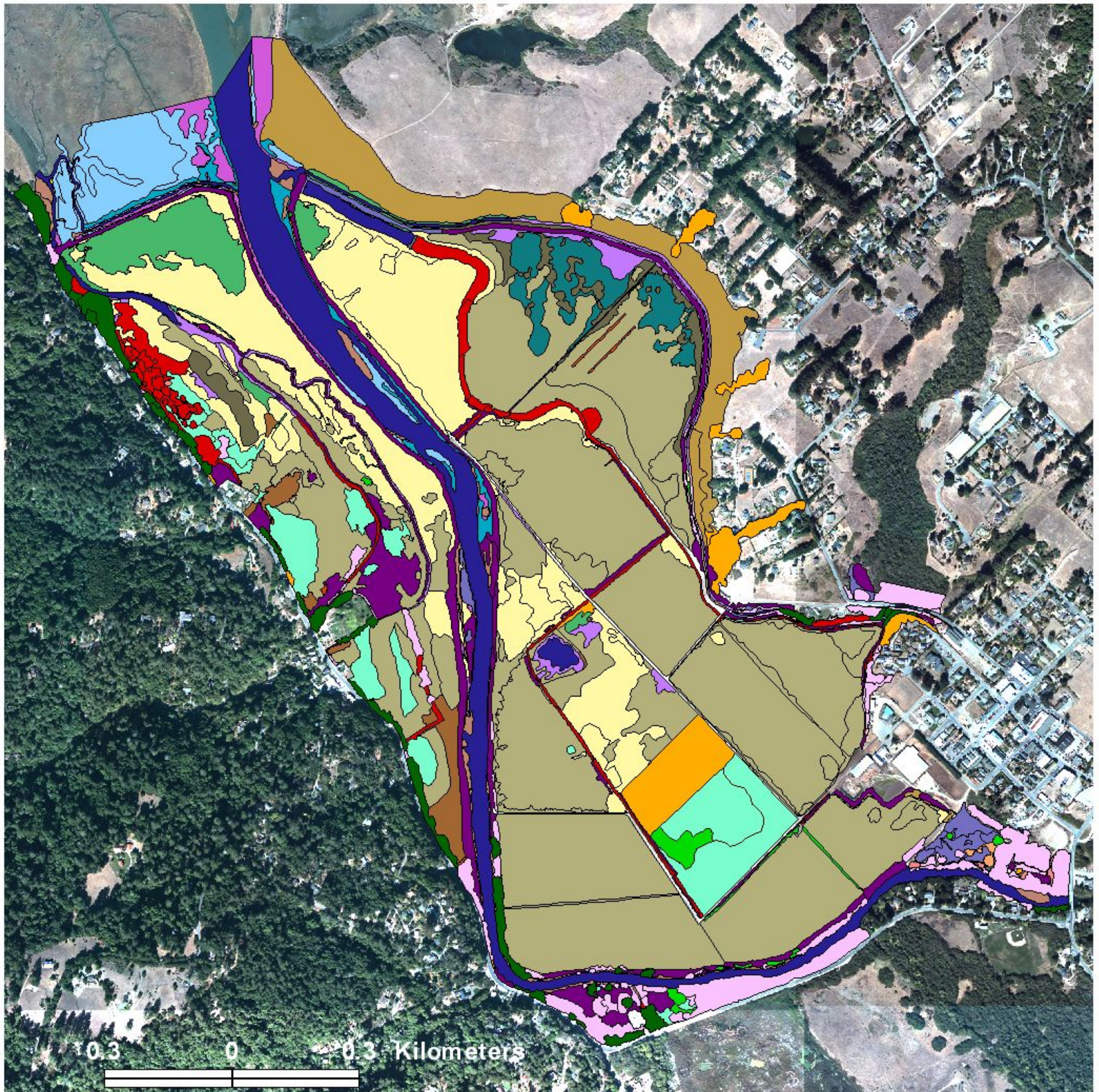


# Giacomini Wetland Restoration Project

## Golden Gate National Recreation Area

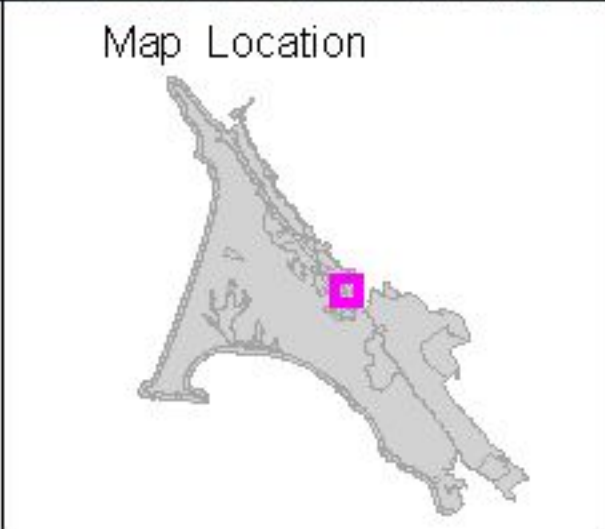


### Botanical Survey Report



**Vegetation Sub-Alliances**

Coyote Brush Coastal Scrub	Riparian
Diked Brackish Marsh	Salt Marsh Pasture
Diked Salt Marsh-High	Scrub-Scrub Riparian
Diked Salt Marsh-Mid	Seasonal Wetland
Diked Salt Marsh-Midflat/Panue	Tidal Brackish Marsh
Distributed	Tidal Salt Marsh-High
Dry Grassland	Tidal Salt Marsh-High/Upland
Dry Pasture	Tidal Salt Marsh-Low
Forested Riparian	Tidal Salt Marsh-Mid
Freshwater Marsh	Unvegetated
Mesic Coastal Scrub	Vernal Marsh
Moist Grassland	Wet Meadow
Moist Meadow	Wet Pasture
Open Water	



National Park Service  
Point Reyes National Seashore  
Water Resources

Figure 5. Vegetation sub-alliances or habitat types within the Study Area.



watershed. Swamp harebell has been found along several drainages on the Inverness Ridge (Figure 3). *Sonoma alopecurus* was observed along Bear Valley Creek south of the Study Area, but the last observation for the closest occurrence near Olema Marsh was 1898 (Figure 3).

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 winters of 2000-2001 and 2002-2003 was slightly above average. Rainfall for the months of October through April totaled 134.05 cm (53.62 in) for 2001-2002 and 134.98 cm (53.99 in) for 2002-2003 (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 was approximately 114 percent of “normal.”

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## RESULTS/DISCUSSION

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Based on the habitat reconnaissance, we determined that the Study Area contained habitats with potential to support special status plant species -- primarily wetland- and riparian-associated species. Of the 83 plant species with potential to occur in the Study Area and vicinity, there appeared to be at least the general type of habitat for 51 of those. However, the number of species with real potential to occur in the Study Area is probably lower, closer to 44, for several reasons. First, some of the species in Appendix A -- Delta mudwort (*Limosella subulata*; 2), Mason's lilaeopsis (*Lilaeopsis masonii*; FSC; SR; 1B), and Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*; FSC; 1B) -- that were recorded as occurring in Marin County may have resulted from erroneous identifications, as they have never been observed outside the Sacramento Delta or San Francisco Bay areas. Secondly, some of the habitats identified as occurring within the Study Area are very disturbed (e.g., many of the areas mapped as freshwater marsh or seasonal wetlands) and therefore marginal in terms of potential for rare plants. Third, some of the terms in the NDDDB such as "freshwater marsh" cover wide variations in this general type of habitat, with most of these species tending to occur in a very specific type of that general habitat (e.g., Sonoma alopecurus along shallowly sloped margins of freshwater marshes or ponds).

Focused surveys were conducted within habitats identified as having potential for supporting special status plant species. These surveys documented the presence of three (3) special status plant species in the Study Area: Point Reyes bird's-beak (FSC; 1B), Humboldt Bay owl's-clover (FSC; 1B), and Marin knotweed (*Polygonum marinense*; FSC; 1B; Figure 6). The three (3) species were observed in the tidal salt marsh habitat that has developed on the outboard portion of the Giacomini Ranch levees, the end of the Tomales Bay trailhead, and in the undiked marsh north and east of the Giacomini Ranch in Tomales Bay. Several other species, including salt marsh owl's-clover (*Castilleja ambigua* ssp. *ambigua*) and Pacific cordgrass (*Spartina foliosa*), could be potentially considered species of local or regional concern and are therefore discussed in this document, as well. A list of all plant species observed during surveys is provided in Appendix B, and datasheets for new and resurveyed populations is provided in Appendix C.

### Special Status Species

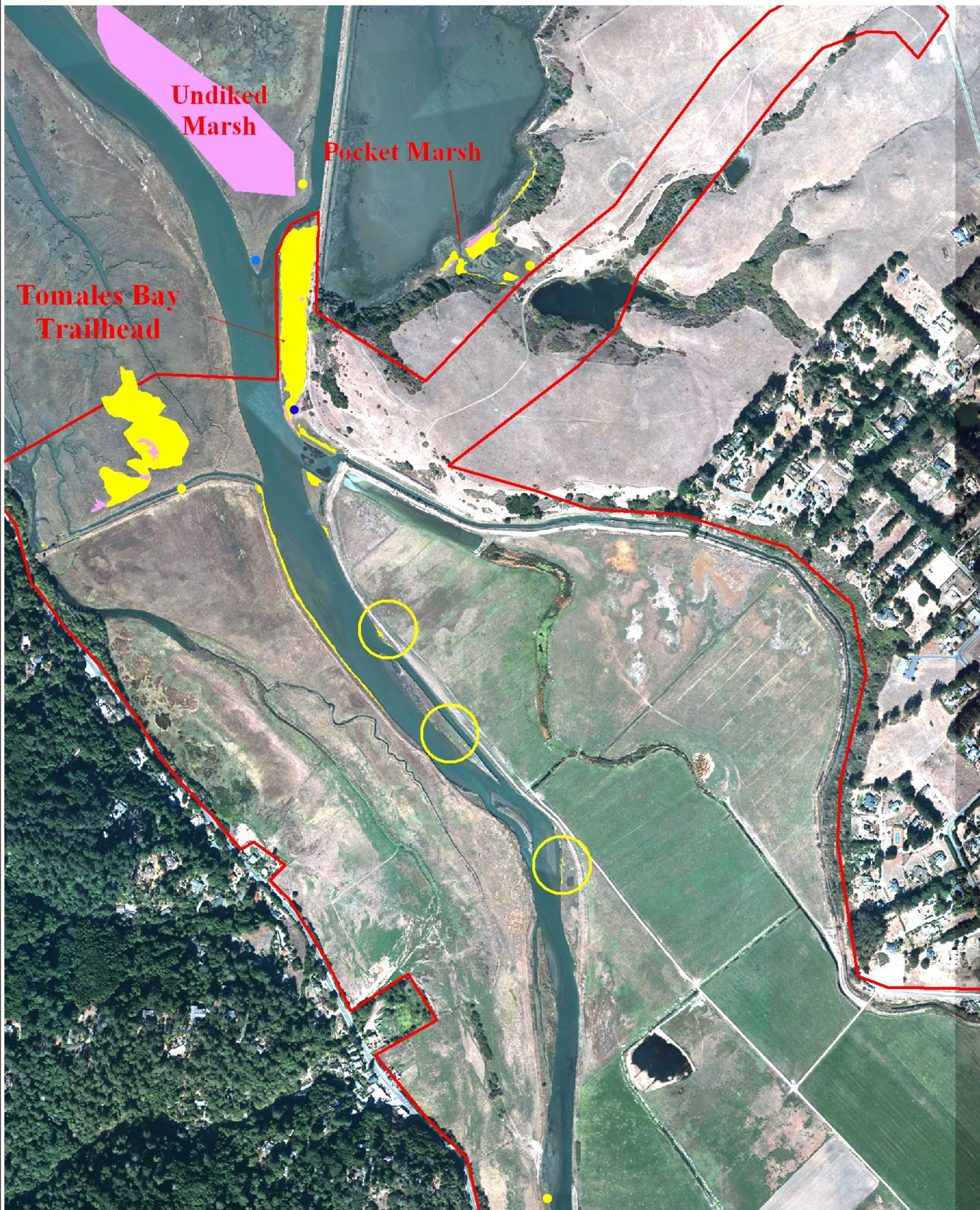
***Cordylanthus maritimus* ssp. *palustris*:** Point Reyes bird's-beak is a hemiparasitic annual herb that grows in the mid- to high marsh areas of coastal salt marshes. Blooming from June through October, it is distinguished by its distinctive purple-tipped white, "bird's beak"-type flowers and salt-encrusted foliage. Marin County represents the southern end of the existing range for this species, which stretches into Oregon (CNPS 2001). It once occurred in Alameda, Santa Clara, and San Mateo counties, but the historical populations are believed to have been extirpated (CNPS 2001). Its federally listed congener, *Cordylanthus maritimus* ssp. *maritimus* (salt marsh bird's-beak; FE) is very similar in habit to the northern subspecies, with the principal difference being the ecological and geographic separation (USFWS *in prep.*). Range of the southern species stretches from Morro Bay to Baja California.



# Giacomini Wetland Restoration Project

Golden Gate National Recreation Area

Botanical Survey Report



### Special Status Plant Species

- Point Reyes bird's-beak colonies
- Humboldt Bay owl's-clover colonies
- Humboldt Bay owl's-clover spot occurrences
- Marin knotweed spot occurrences
- salt marsh owl's clover occurrence
- Study Area

100 0 100 200 300 400 Meters



Map Location



National Park Service  
Point Reyes National Seashore  
Water Resources

Figure 6. Locations of special status plant species observed within the Study Area and vicinity



In Marin County, *Cordylanthus maritimus* ssp. *palustris* occurs both in coastal salt marshes along the coast and in marshes on the margin of San Francisco Bay. Point Reyes bird's-beak has been documented in several locations within the Seashore and the north district of the GGNRA, principally in Drakes Estero, Limantour Marsh, and in marshes within Tomales Bay. Most occurrences of this species within the Seashore and the GGNRA number from hundreds to thousands of individuals (Michelle Coppoletta, *pers comm.*). Some geographic variation in plant morphology exists, with more coastal populations such as some of those at Drakes Estero often supporting plants with gray-green foliage and narrow, cream-colored flowers with reddish tips (see picture; USFWS *in prep.*). Populations in San Francisco Bay and portions of Tomales Bay and Drakes Estero display the more characteristic cyanin-derived purple-tinged foliage and darkly reddish colored flowers.

Habitat for this species tends to encompass the intermediate portions of the salt marsh within what might be called the “high mid-marsh” or “low high-marsh.” These variations in low, mid, and high marsh zones result not only from subtle elevational gradients on marsh perimeters between the marsh and uplands, but also from microtopographic complexity (e.g., shallow depressions and mounds) within the so-called “flat” marsh plains. Areas colonized by subspecies *palustris* are somewhat wetter than those colonized by its congener, subspecies *maritimus*, but are not subject to daily tidal action or lower high tides such as the “low mid-marsh” that is typically dominated by jaumea (*Jaumea carnosa*), pickleweed (*Salicornia virginica*), saltgrass, and arrow-grass (*Trigochlin maritima*).



*Cordylanthus maritimus* ssp. *palustris*  
Point Reyes bird's-beak

*Cordylanthus* often assumes a “patchy” distribution, with plants clustered in some of these microtopographic lows or depressions. Plants associated with *Cordylanthus* include western marsh rosemary (*Limonium californicum*), saltgrass, pickleweed (*Salicornia virginica*), alkali heath (*Frankenia salina*), and arrow-grass (*Trigochlin maritima* and *concinna*). Within some of the deltaic undiked marshes north of the Giacomini Ranch, areas colonized by *Cordylanthus* are often easily distinguished in the summer by the blanket of purple-flowered marsh rosemary that grows in the “high” mid-marsh or “low” high marsh. Some have speculated that this strong plant association may be driven to some extent by the fact that this species is a facultative hemiparasite and thrives better when tapped into certain species more than others, although laboratory studies testing this assumption have resulted in variable and, therefore, non-conclusive results (Fink and Zedler 1991, Vanderwier and Newman 1984). A group of researchers at Audubon Canyon Ranch conducted a study on plant associates of *Cordylanthus* within Tomales Bay during the early 1990s and concluded that the species was most often found in association with marsh rosemary and arrow-grass, which they surmised were the species that provided the most benefit to



*Cordylanthus* in terms of potential transport water and/or organic substances (sugars, carbohydrates, nitrogenous compounds). *Cordylanthus* can live at least temporarily without a host connection, probably during the seedling stage when resources are most abundant: pulses of freshwater from flooding or rainfall appear to be crucial for triggering germination (Parsons and Zedler 1997).

As with subspecies *maritimus*, subspecies *palustris* tends to preferentially colonize areas with sandy substrates and relatively sparse, short salt marsh vegetation: Kelly and Fletcher (1994) noted a negative correlation between plant height and *Cordylanthus* occurrence in Tomales Bay populations. High frequency of marsh rosemary in sparse, low turfy salt marsh vegetation is also a consistent indicator of suitable habitat throughout the range of this species (Peter Baye, Ecologist, *pers obs.* 1985-1998). This preference for areas with sandy substrates and low-growing vegetation reflects the strong relationship between *Cordylanthus* distribution and abundance and natural disturbance events such as wrack or alluvial material deposition or vegetation dieback that create openings suitable for recruitment and establishment (US FWS *in prep.*).

In the Study Area, there were four (4) populations and/or groups of plants (Figure 6):

- **Pocket Marsh:** A previously documented population occurs on the northern side of the Tomales Bay Trailhead near one of the stock ponds in what has been referred to as the “Pocket Marsh.” The Pocket Marsh borders the Bivalve Channel embayment. Within this marsh, a thin, oblong patch was mapped in the sparsely vegetated “high marsh” habitat near the high tide wrack line adjacent to the Bivalve Channel embayment (Figure 3). Approximately 2,000 plants were present in 2001, growing in diked salt marsh characterized by saltgrass, pickleweed, marsh rosemary, and alkali heath. In 2003, 1,507 plants were counted. This marsh shows visible evidence of trampling by cattle, although it was not clear whether plants had been directly grazed.
- **Tomales Bay Trailhead:** A moderately sized population of Point Reyes bird’s-beak has established in the undiked marsh at the end of the Tomales Bay Trailhead, just north of the Tomasini Creek outlet. The plants again occurred within the more sparsely vegetated high marsh areas near the High Tide wrack line. Plant associates included saltgrass, pickleweed, alkali heath, jaumea, and marsh rosemary. While only 250 plants were observed in 2001, several more colonies had established in this area in 2003, increasing total numbers to approximately 5,750 plants. This marsh shows visible evidence of trampling by cattle, although it was not clear whether plants had been directly grazed.
- **Undiked Marsh-Bivalve:** In 2002, hundreds of plants were observed over a rather large portion of one of the deltaic undiked marshes directly north of the Bivalve Channel area.
- **Undiked Marsh-Fish Hatchery:** Hundreds of plants were also observed in 2003 in the undiked marsh directly north of the West Pasture and directly east of Fish Hatchery Creek. Again, plants tended to be restricted to sparsely vegetated high mid-marsh and low high marsh habitat characterized by a predominance of marsh rosemary.

Throughout its range, this species has experienced a dramatic decrease in numbers due to impacts such as development, foot traffic, non-native plants, and altered hydrology (CNPS

2001). Within the Seashore and the north district of the GGNRA, the main threats to this species appear to be trampling and grazing by tule elk and cattle (PORE; P. Baye, *pers comm.*).

***Castilleja ambigua* ssp. *humboldtiensis*:**

This species is another hemiparasitic member of the Scrophulariaceae family that also grows in intertidal salt marshes, although its flowering time and plant associations often differ slightly from that of *Cordylanthus*. Taxonomically, the various varieties of *Castilleja ambigua* have been recently realigned with the parasitic broomrape family (Orobanchaceae; USFWS *in prep.*). This annual is listed as occurring in Humboldt and Marin counties (CNPS 2001). Within the Seashore and north district of the Golden Gate National Recreation District (GGNRA), it occurs commonly in intertidal salt marshes along Drakes Estero and in the southern portion of Tomales Bay.

There has been some speculation that some of the populations in the Seashore and Tomales Bay might be taxonomically distinct from their northern, Humboldt County counterparts (P. Baye, *pers comm.*). The Humboldt Bay form occurs in slightly higher elevation, more sparsely vegetated portions of marshes and has hairy leaves and stems and very showy bracts tipped bright rose-fuchsia (P. Baye, *pers comm.*). The Tomales Bay form is distributed in lower elevation and slightly wetter portions of marshes and has succulent, glabrous leaves and stems with white-tipped, truncate flower bracts (L. Parsons, *pers obs.*, P. Baye, *pers comm.*). A “white” form of this species has been apparently identified from one locality in Humboldt Bay (Jacoby Creek; USFWS *in prep.*), and it is possible that the Tomales Bay form either derived from this Jacoby Creek population or is independently derived (USFWS *in prep.*). Flowering of *Castilleja* in its southern range typically begins in April and may extend into June (L. Parsons, *pers obs.*; USFWS *in prep.*). Unlike the Humboldt Bay form, the Tomales Bay form can often co-occur in the same intertidal zone (mid-marsh) with *Cordylanthus* (USFWS *in prep.*), although it does appear to establish in slightly lower elevation micro-topographic habitats that support a different suite of marsh plant species (“low” mid-marsh; L. Parsons, *pers obs.*). Common plant associates of populations in Tomales Bay include saltgrass, pickleweed, arrow-grass, and jaumea, although individuals can occur in lower marsh areas with alkali bulrush (*Scirpus maritimus*) and in the high marsh, as well (L. Parsons, *pers obs.*).



*Castilleja ambigua* ssp. *humboldtiensis*  
Humboldt Bay owl’s-clover

Some of the largest populations of this “Tomales Bay owl’s-clover” occur in the southern portion of Tomales Bay within the Study Area. There were eight (8) occurrences within the Study Area (Figure 6):

- **Pocket Marsh:** A large previously documented population occurs on the northern side of the Tomales Bay Trailhead near one of the stock ponds in what has been referred to as the “Pocket Marsh.” The Pocket Marsh borders the Bivalve Channel embayment. This species covers extensive portions of mid-marsh, both in the northern and southern portions of the marsh. Thousands of individuals occur in this marsh every year. This marsh shows visible evidence of trampling by cattle, although it was not clear whether plants had been directly grazed.
- **Tomales Bay Trailhead:** This previously documented population occurs at the end of the Tomales Bay Trailhead in undiked marsh directly north of the Tomasini Creek outlet. It is consistently large, numbering greater than 10,000 individuals in most years. Plants were observed in the more saturated portions of the mid-marsh below the High Tide wrack line. Plant associates included arrow-grass, pickleweed, cinquefoil (*Potentilla anserina*), and jaumea. Another more common congener of *Castilleja ambigua* -- *Castilleja ambigua* ssp. *ambigua* – also occurs within the Tomales Bay Trailhead marsh and other locations within the Seashore (P. Baye, *pers comm.*, L Parsons, *pers obs.*). This species has distinct ecotypes that grow in salt marshes, as well as coastal grasslands (USFWS *in prep.*). This marsh shows visible evidence of trampling by cattle, although it was not clear whether plants had been directly grazed.
- **Undiked Marsh – Fish Hatchery:** Another extremely large population occurs in the undiked marsh north of the West Pasture and east of Fish Hatchery Creek. While not necessarily dense in terms of cover, the population stretched over a considerable area, with total plants probably numbering 10,000 or more in 2003. Another colony that often numbers only 100 to 200 individuals occurs directly across the “borrow ditch” from the Undiked Marsh in undiked salt marsh habitat along the concrete spillway and adjacent to the borrow ditch.
- **Undiked Marsh – Bivalve Channel:** Some individuals were found in the undiked deltaic marsh island directly north of Bivalve Channel. As the species had completed flowering, it is possible that this population is larger than what was documented during the 2002 surveys.
- **Undiked Marsh – Deltaic Islands:** A few individuals were found growing in mid-marsh areas on the undiked deltaic islands that occur between the eastern and western levees along Lagunitas Creek.
- **West Pasture Levee – North:** Another sizeable population occurs on the northern portion of the outboard salt marsh “shelf” or fringe that has developed along the West Pasture levee. In 2001, approximately 10,000 individuals were counted in the mid-marsh habitat directly below the High Tide wrack line. Plant associates included pickleweed, arrow-grass, gumplant (*Grindelia* sp.), jaumea, and saltgrass.
- **West Pasture Levee – South:** One to two individuals were observed in both 2001 and 2002 on a low-elevation marsh “shelf” directly adjacent to the area where the cattle cross Lagunitas Creek. Cattle disturbance in this area was high. Plant associates included jaumea, saltgrass, gumplant, and birdfoot trefoil (*Lotus corniculatus*).

- **East Pasture Levee – North:** More than 300 plants were observed in 2001 growing on a salt marsh “shelf” on the northern portion of the outboard East Pasture levee directly below the High Tide wrack line. Plant associates included arrow-grass, pickleweed, cinquefoil, and jaumea. In the 2003, the total number of plants within this area was actually estimated at 16,000.

Threats to this species include loss of salt marsh habitat due to diking and filling for agriculture and urbanization (USFWS *in prep.*). Within the Seashore and GGNRA lands, severe cattle trampling and grazing pose a significant threat to populations of this species (P. Baye, *pers comm.*).

***Polygonum marinense:***

This annual herb is found principally in Marin, Napa, and Sonoma counties (CNPS 2001). Few occurrences have been documented (CNPS 2001). Hickman (1993) noted that the taxonomic status of the species is uncertain and that it may either be related to *Polygonum arenastrum* or may actually be *Polygonum robertii*, a non-native species from the Mediterranean. Populations of this species found within the Seashore have typically been small, although sometimes spatially dispersed (M. Coppoletta, *pers comm.*). It is possible that the extent of Marin knotweed within the Seashore and the north district of the GGNRA has been underestimated due to the difficulty of seeing this non-descript plant. Only one occurrence of this species has been documented within the Study Area (Figure 6). One individual was observed growing on the undiked marsh deltaic island directly north of Bivalve Channel in an area dominated by saltgrass with an occasional scattered gumplant. *Polygonum marinense* has an extended flowering period, with its tiny white flowers typically appearing in April and lasting as long as October. The primary threat to this species has been characterized as salt marsh development (CNPS 2001).



*Polygonum marinense*  
Marin knotweed

**Species of Regional or Local Significance**

The US FWS Draft Tidal Marsh Recovery Plan (US FWS *in prep.*) also identified a number of plant species that are not special status, but that could be considered of regional or local significance. Most of these species are characterized as significant because their numbers have been greatly reduced within the San Francisco Bay watershed due to habitat losses, indirect impacts, and/or threats from invasive species. While numbers and/or populations of these species within coastal marshes have not been as heavily impacted by agricultural, residential,



and commercial development, it seems important to consider their regional status in planning and restoration efforts.

*Spartina foliosa*:

Pacific cordgrass (*Spartina foliosa*) occurs in low elevational zones such as tidal mudflats and channel banks of salt marshes and estuaries along the southern and central California coasts and San Francisco Bay. In San Francisco Bay, however, populations of *Spartina foliosa* are in danger of being extirpated by the introduction and rapid spread in San Francisco Bay of Atlantic cordgrass (*Spartina alterniflora*), its congener from the East and Gulf of Mexico coasts. This member of the grass family was accidentally introduced into San Francisco Bay as part of a wetland restoration project. Both *S. alterniflora* and *S. foliosa* are perennial grass species that spread through both clonal (rhizomatous) spreading and sexual reproduction (seed). *Spartina alterniflora* rapidly spread throughout the South Bay and has been steadily moving northward in the Bay since its introduction. Initially, *Spartina alterniflora* appeared to outcompete its native counterpart primarily by recruiting more vigorously and establishing a broader elevational range of distribution. However, researchers from University of California, Davis, have also determined that *Spartina alterniflora* is actually hybridizing with *Spartina foliosa*, creating intermediate forms and so-called introgressants (multiple generations of hybrids crossed back to *Spartina foliosa*; USFWS *in prep.*). This hybridization greatly complicates identification of non-native *Spartina* plants in marshes, with genetic analysis now being required to verify “pure” *Spartina foliosa* stands. Because of the difficulty in identifying and thereby protecting pure *Spartina foliosa* stands, it is likely that future cordgrass marshes will be composed entirely of hybrid derivatives of *Spartina foliosa* and *Spartina alterniflora*, which will entirely replace the “pure” native species through genetic assimilation (USFWS *in prep.*).



*Spartina foliosa* (Pacific cordgrass)  
at north end of Giacomini levee

The threat of *Spartina alterniflora* and hybridization with *Spartina foliosa* has now expanded outside San Francisco Bay with the recent discovery of *Spartina alterniflora* in Drakes Bay Estero within the Seashore.

The Seashore, which manages Drakes Bay Estero, took prompt action to eradicate the six (6) stands that were conclusively identified as non-native by covering actively growing culms with black tarp. These efforts had appeared to be successful, although at least one of the stands started spreading beyond the black tarp (Kim Cooper, plant biologist, *pers comm.*). In this area, the Seashore proceeded with hand removal of plants (K. Cooper, *pers comm.*). Repeated surveys have been conducted in Tomales Bay, but no *Spartina alterniflora* or hybrids have been positively identified. One occurrence of *Spartina densiflora* (dense-flowered cordgrass) was found in northern Tomales Bay, but it was eradicated and has not been sighted since (K. Cooper, *pers comm.*).

The potential for Tomales Bay – the next large embayment north of Drakes Bay Estero -- to be invaded by *Spartina alterniflora* or hybrids is high. Interestingly, *Spartina foliosa* was not sighted in Tomales Bay during most of the 20<sup>th</sup> century: it is possible that historic populations were lost during ground subsidence associated with the 1906 Earthquake (P. Baye, *pers comm.*). However, in the early 1990s, a few colonies were observed growing in southern Tomales Bay (PWA et al. 1993). By 2003, *Spartina foliosa* had greatly increased its areal extent, colonizing vast stretches of intertidal mudflat at the tip of the Lagunitas Creek delta that were formed through the excessive sedimentation that occurred throughout the late 1800s-early 1900s. Most of the major stands of *Spartina foliosa* within embayments north of San Francisco Bay are apparently associated with past deltaic deposition (US FWS *in prep.*). Within the Study Area, *Spartina foliosa* principally grows in scattered patches along the channel banks of fully tidal marshes in the undiked marsh north of Giacomini Ranch and along the northern portions of the Giacomini Ranch levees. It is often intermixed to some degree with alkali bulrush (*Scirpus maritimus*), pickleweed (*Salicornia virginica*), and even tules (*Scirpus californicus*). This grass species typically ranges from Mean Sea Level (MSL) to Mean High Water (MHW) tidal elevations. Unlike many of the other rare plant species, which are primarily threatened by habitat loss, the largest threat to this species appears to be genetic assimilation by non-native *Spartina* species.

#### ***Castilleja ambigua* ssp. *ambigua*:**

This species has distinct ecotypes that grow in salt marshes, as well as coastal grasslands (USFWS *in prep.*). While this species is not formally listed by the USFWS, CDFG, or CNPS, the rarity of the salt marsh ecotype within the San Francisco Bay region could eventually lead to salt marsh owl's clover being considered a species of regional significance. As with its listed congener, *Castilleja ambigua* ssp. *humboldtiensis* (FSC; 1B), this species is another hemiparasitic member of the Scrophulariaceae family that can grow in intertidal salt marshes, although its flowering time and plant associations often differ slightly from that of subspecies *humboldtiensis*. Within salt marshes, subspecies *ambigua* tends to establish at higher elevations near Mean High Higher Water (MHHW) that are often ecotonal to grasslands and is distinguished from subspecies *humboldtiensis* by its hairy stems and leaves. In habitat requirements, this species more closely resembles the Humboldt Bay form of subspecies *humboldtiensis*. Taxonomically, the various varieties of *Castilleja ambigua* has been recently realigned with the parasitic broomrape family (Orobanchaceae; USFWS *in prep.*).

This annual is listed as ranging from Vancouver Island, British Columbia, to Monterey County, California (USFWS *in prep.*). It was once described as “common along the borders of salt marshes” in the late 19<sup>th</sup> century (Greene 1894 *in USFWS in prep.*), but Munz characterized it as only an “occasional” inhabitant of the “low ground along the upper reaches of the salt marshes” by the mid 20<sup>th</sup> century (USFWS *in prep.*). Almost all historic populations of *Castilleja ambigua* ssp. *ambigua* in the San Francisco estuary are apparently extirpated, with only one large modern population extant in Whittell Marsh in Contra Costa County and potentially a few others in diked San Pablo Baylands (USFWS *in prep.*). There are a few, usually small, salt-tolerant populations of this species along central California coastal marshes outside of San

Francisco Bay, including at Rodeo Lagoon, Marin Headlands, and Pine Gulch Creek in Bolinas Lagoon (USFWS *in prep.*).

Within the Seashore and north district of the GGNRA, this species occurs in the Tomales Bay Trailhead marsh and Limantour Marsh. The largest salt marsh population of subspecies *ambigua* occurs in Limantour Marsh at the extreme eastern end of Limantour Estero (USFWS *in prep.*). At the Tomales Bay Trailhead marsh, which is within the Study Area, it occurs in conjunction with subspecies *humboldtiensis*, although in a higher elevation portion of the marsh that might be characterized as high marsh/upland ecotone (Figure 6). Flowering of *Castilleja* in its southern range typically begins in April and may extend into June (USFWS *in prep.*). Threats to this species include loss of salt marsh habitat due to diking and filling for agriculture and urbanization (USFWS *in prep.*). Within the Seashore and GGNRA lands, severe cattle trampling and grazing pose a significant threat to populations of both subspecies (P. Baye, *pers comm.*).

### Other Species

*Baccharis douglasii*: Marsh baccharis (*Baccharis douglasii*) is an erect, subshrubby perennial herb in the aster family (Asteraceae), which forms clonal colonies along the upper edges of brackish tidal and moist brackish diked baylands (US FWS *in prep.*). This species once occurred frequently in the so-called “willow-composite” community that dominated the tidal marsh-alluvial ecotone of south San Francisco Bay (Cooper 1926). As with the other member of the Asteraceae family commonly found in marshes, *Grindelia*, colonies of this species may have provided refugia for marsh wildlife during tidal flooding due to its semi-evergreen, dense, tall vegetation (US FWS *in prep.*). This habitat and others that are characterized by gently sloping tidal marsh edges and freshwater influences from seeps, high groundwater, or surface drainages have been lost to diking, channelization, and other factors, thereby causing a decline in *Baccharis* numbers (US FWS *in prep.*). Within Marin County, *Baccharis* has been found uncommonly and locally along brackish tidal marsh edges in Drakes Estero, Limantour Estero, and Tomales Bay (P. Baye, *pers comm.*) and historically in estuarine marshes near Mill Valley (Howell 1949). A moderately sized stand of *Baccharis* occurs within the Study Area near White House Pool, where it grows densely along the upper banks of Lagunitas Creek.

**Tidal Marsh Edge *Juncus* species:** Several perennial rush species (*Juncus* spp.) were historically described as common in the San Francisco Bay estuary, but are now considered rare or extirpated in tidal marsh ecosystems in that region (US FWS *in prep.*). Most of these species, which include *Juncus effusus* var. *brunneus* (rush), *Juncus balticus* (rush), and *Juncus lesueurii* (rush), occur in the brackish/subsaline edges of maritime salt marshes of Marin County (P. Baye, *pers comm.*). All three of these species were observed in the Study Area, with *Juncus effusus* and *balticus* more common within the glycophytic and diked brackish habitats in the Project Area, while *Juncus lesueurii* was more common in the undiked tidal marsh areas. The latter species typically grows at the upper edges of marshes or in sandy substrates, which occur frequently along the salt marsh “shelves” on the outboard portion of the levees and along the alluvial levees in the undiked marsh north of the Project Area.

*Leymus triticoides*: Historically, creeping wildrye (*Leymus triticoides*) has colonized the brackish edges of salt marshes, particularly the lowland grasslands that have established on

alluvial fans and stream deltas (US FWS *in prep.*). A member of the grass family, *Leymus* occurs in a wide range of grassland habitats, including saline and alkaline soils, and infrequently flooded portions of both diked and tidal marshes (US FWS *in prep.*). It can form extensive and almost monotypic stands through a very dense network of rhizomes. These stands can provide substantial cover for rodents and perhaps other wildlife species (US FWS *in prep.*). The substantial stands of *Leymus* that once characterized ecotonal areas of San Francisco Bay marshes are now largely extirpated, with remaining ones restricted to widely scattered colonies in relatively undisturbed natural salt marsh edges (e.g., Rush Ranch, Solano County; China Camp, Marin County, etc.; US FWS *in prep.*). Within the Study Area, *Leymus* occurred frequently as scattered, very dense, monotypic stands within the Project Area, particularly in the West Pasture. It also grows in selected areas along the levees and berms.

*Plantago maritima* var. *juncooides*: *Plantago maritima* var. *juncooides* (plantain) is a taprooted herb that is usually found on well-drained sandy salt marsh plains with low or sparse, open vegetation, or along high marsh edges in vegetation gaps, or on partially eroded coarse substrates (US FWS *in prep.*). It remains rare in San Francisco Bay, probably because this type of habitat has mostly been eliminated, however, it is relatively abundant in maritime salt marshes of central California (US FWS *in prep.*). Within the Study Area, this species was observed only infrequently, primarily in the undiked marsh at the base of the Tomales Bay trail.



## SUMMARY/CONCLUSIONS

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### Summary of Results

Based on our reconnaissance, we determined that the Study Area had a number of habitats with potential to support special status plant species. Most of these “potential” habitats were marshes or riparian areas due in large part not only to the “wetness” of the Study Area, but the hydrologic complexity created by the strong interface between tidal and freshwater fluvial and groundwater hydrologic sources. Of the 83 plant species with potential to occur in the Study Area and Vicinity (Appendix A), there would appear to be at least general habitat for 51 of those. However, the number of species with real potential to occur in the Study Area is probably closer to 44, for several reasons, including possible errors in extension of ranges for some marsh species, specificity in types of habitat, etc.

Results from previous and current botanical surveys indicate that three (3) special status species and one (1) species of potential regional significance occur in the Study Area. Previous surveys and unrecorded observations had documented the occurrence of Point Reyes bird’s beak (*Cordylanthus maritimus* ssp. *palustris*; FSC; 1B) and Humboldt Bay owl’s-clover (*Castilleja ambigua* ssp. *humboldtiensis*; FSC; 1B) in several areas of southern Tomales Bay, including in or near the Tomales Bay Trail, which is directly north of the Giacomini Ranch (Figure 3). A species of potential regional significance, salt marsh owl’s-clover (*Castilleja ambigua* ssp. *ambigua*), had also been noted previously to occur along the Tomales Bay trailhead in undiked high marsh/upland ecotone adjacent to Tomales Bay. Fragrant fritillary (*Fritillaria lilacea*; FSC; 1B) was also found growing along the Tomales Bay Trail, but near the trailhead and outside the Study Area. Sonoma alopecurus and swamp harebell have also been documented historically, but both occurred outside the Study Area, and the last sighting of Sonoma alopecurus in Olema Marsh was in 1898.

Our surveys expanded the number of occurrences of Point Reyes bird’s-beak, Humboldt Bay owl’s-clover, and Marin knotweed (*Polygonum marinense*; FSC; 1B; Figure 6) within southern Tomales Bay. In total, four (4) occurrences of Point Reyes bird’s-beak and eight (8) occurrences of Humboldt Bay owl’s-clover were recorded during the botanical surveys. Some of these occurrences included previously documented populations that were resurveyed. Point Reyes bird’s beak occurred exclusively in undiked progradational or deltaic marshes directly north of the Giacomini Ranch or along the Tomales Bay trail. The species typically established in sparsely vegetated, low-growing “high” mid-marsh or “low” high-marsh areas that were distinguished by a mixture of species, the most characteristic being the purple-flowered western marsh rosemary (*Limonium californicum*). Humboldt Bay owl’s-clover occurred in many of these same marshes, but was also found in the undiked fringe marshes along the Lagunitas Creek levee. These species occurred at a slightly lower elevation than Point Reyes bird’s-beak in what might be termed the “low” mid-marsh. Marin knotweed was only observed once some distance north of the Giacomini Ranch in an undiked deltaic island marsh.

## **Potential Impacts**

While none of these species is listed either federally or by the state as endangered, threatened, or candidate, the Park Service is directed by its Management Policies (2001) to identify, conserve, and avoid adverse impacts to all “sensitive” species, which includes Federal Species of Concern, as well as state-listed and species of state, regional, or local importance.

While no alternatives have been developed as yet, potential impacts to these special status species could include both direct and indirect impacts. Any removal of levees could affect Humboldt Bay owl’s-clover occurrences directly as several colonies were found growing along the marsh shelves on the outboard portions of the levees. In addition, removal of levees and initiation of new tidal creeks and drainages could cause erosion of adjacent, undiked lands and changes in water circulation patterns, thereby indirectly impacting any special status species colonies or populations in existing tidal marsh areas such as the undiked marsh north of Giacomini Ranch or the Tomales Bay Trailhead marsh.

## **Potential Mitigation Measures**

Some measures that might be taken to ensure that the Project does not negatively affect the special status plant species populations might include:

- 1) timing levee removal towards the latter half of the summer when the plants have already gone to seed;
- 2) flagging populations that can be avoided to minimize the potential for impacts from construction equipment access and equipment stockpiling;
- 3) stockpiling topsoils from areas in which impacts cannot be avoided and which support special status plant species for use once the levees are removed; and/or
- 4) collecting seed prior to dehiscence for sowing in appropriate areas after construction is completed.

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## APPENDICES

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**Appendix A. Special Status Plant Species with Potential to  
Occur in the Study Area**

**Appendix Table A. List of Special Status Plant Species with Potential to Occur in the Giacomini Wetland Restoration Project Study 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 (NDDDB; 2001; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2001; Inventory of rare and endangered vascular plants of California).

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Abronia umbellata</i> ssp. <i>brevifolia</i>	pink sand-verbena	FSC; 1B	Disturbed sandy areas; coastal dunes and <b>scrub</b> ; <100 m.	Yes	Present in Seashore (PORE).	No
<i>Agrostis blasdalei</i>	Blasdale's bent grass	FSC; 1B	Coastal dunes, prairie, bluffs, and <b>scrub</b> .	Yes	Known from fewer than 15 occurrences (CNPS 2001). Present in Seashore (PORE).	No
<i>Agrostis clivicola</i> var. <i>punta-reyesensis</i>	Point Reyes bent grass	FSC	Coastal bluffs.	No	Present in Seashore (PORE). Considered by CNPS for listing, but rejected, because species is a synonym of <i>A. densiflora</i> , a common species (CNPS 2001; Hickman 1993).	
<i>Alopecurus aequalis</i> var. <i>sonomensis</i>	Sonoma alopecurus	FE; 1B	<b>Freshwater marshes and swamps; riparian scrub; wet meadows.</b>	Yes	Known from fewer than five native occurrences (CNPS 2001). Mapped in marshy area of creek near Inverness Park in 1898, but not observed in that area since (NDDDB 2001). Present in coastal areas of Seashore. Jepson does not differentiate var. <i>sonomensis</i> (Hickman 1993).	No
<i>Arabis blepharophylla</i>	coast rock cress	4	Coastal prairie, bluffs, and <b>scrub</b> ; broadleaved upland forest.	Yes	Present in Seashore (PORE).	No
<i>Arctostaphylos hookeri</i> ssp. <i>montana</i>	Tamalpais manzanita	FSC, 1B	Serpentinite areas in chaparral and valley and foothill grassland	No	Known from fewer than 20 occurrences in the Mt. Tamalpais area (CNPS 2001).	
<i>Arctostaphylos virgata</i>	Marin manzanita	1B	Broadleaved 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 (NDDDB 2001).	
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>		1B	<b>Coastal marshes or seeps</b> ; <30 m.	Yes	Present in Seashore (PORE).	No

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SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Blennosperma nanum</i> var. <i>robustum</i>	Point Reyes blennosperma	FSC; SR; 1B	Coastal prairie and <b>scrub</b> .	Yes	Known from fewer than 15 occurrences; some Pt. Reyes populations intermediate to <i>B. var. nanum</i> (CNPS 2001).	No
<i>Calamagrostis crassiglumis</i>	Thurber's reed grass	FSC; 2	<b>Mesic areas in coastal scrub and freshwater marshes.</b>	Yes	Known in California from fewer than 10 occurrences (CNPS 2001). Present in Seashore (PORE). Jepson does not differentiate between <i>C. stricta</i> ssp. <i>inexpansa</i> (Hickman 1993).	No
<i>Calochortus tiburonensis</i>	Tiburon mariposa lily	FT, ST; 1B	Serpentinite areas in valley and foothill grassland.	No	Known from only one occurrence at Ring Mountain (CNPS 2001).	
<i>Calystegia purpurata</i> ssp. <i>saxicola</i>	morning-glory	1B	Rocky coastal scrub; <100 m.	No	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	
<i>Campanula californica</i>	swamp harebell	FSC; 1B	Bogs and fens; closed-cone and North Coast coniferous forest; coastal prairie; <b>meadows; freshwater marsh.</b>	Yes	Mapped in several locations along the western side of Tomales Bay and Inverness Ridge (NDDDB 2001).	No
<i>Carex buxbaumii</i>	sedge	4	<b>Wet places;</b> < 3300 m.	Yes	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	No
<i>Carex leptalea</i>	flaccid sedge	2	Bogs and fens; meadows; <b>marshes and swamps.</b>	Yes	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001). Apparently extirpated from Marin by wetland loss (CNPS 2001).	No
<i>Castilleja affinis</i> ssp. <i>neglecta</i>	Tiburon Indian paintbrush	FE; CT; 1B	Serpentinite areas in valley and foothill grassland.	No	Known from six occurrences (CNPS 2001). Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	
<i>Castilleja ambigua</i> ssp. <i>ambigua</i>	salt marsh owl's-clover	None	High marsh/upland ecotone of salt marshes.	Yes	Potentially a species of regional significance (USFWS <i>in prep.</i> ). Marsh ecotype populations have declined significantly. Reporting as occurring at Tomales Bay Trail and Limantour Marshes.	Yes



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SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Castilleja ambigua</i> ssp. <i>humboldtiensis</i>	Humboldt Bay owl's-clover	FSC; 1B	Coastal salt marsh. Mid-marsh.	Yes	Known only from Humboldt and Marin counties (NDDDB 2001). Reported previously as present in a few locations on western and eastern sides of Tomales Bay, including along Tomales Bay Trail. Observed along Giacomini Ranch levee and in undiked marsh north of Ranch, as well.	Yes
<i>Ceanothus gloriosus</i> var. <i>exaltatus</i>	glory brush	4	Shrubby slopes; ridges; chaparral; coniferous forest; <500 m.	No	Present in GGNRA (PORE).	
<i>Ceanothus gloriosus</i> var. <i>gloriosus</i>	Point Reyes ceanothus	4	Sandy areas in coastal bluff scrub, closed-cone coniferous forest, coastal dunes, and <b>coastal scrub</b> .	Yes	Present in Seashore (PORE).	No
<i>Ceanothus gloriosus</i> var. <i>porrectus</i>	Mount Vision ceanothus	FSC; 1B	Closed-cone coniferous forest; coastal prairie; <b>coastal scrub</b> ; valley and foothill grassland.	Yes	Mapped in Bishop pine forest near Mount Vision (NDDDB 2001). Known from fewer than 15 occurrences (CNPS 2001).	No
<i>Ceanothus masonii</i>	Mason's ceanothus	FSC; SR; 1B	Serpentinite areas in chaparral.	No	Known from approximately five occurrences; may be a variety of <i>C. gloriosus</i> (CNPS 2001). Present in GGNRA (PORE).	
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	spineflower	FSC; 1B	Sandy areas in coastal dunes, coastal prairie, and <b>coastal scrub</b> .	Yes	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001). "Some plants from Point Reyes probably intermediate to var. <i>villosa</i> " (CNPS 2001). Jepson does not differentiate species into varieties (Hickman 1993).	No

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SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Chorizanthe cuspidata</i> var. <i>villosa</i>	spineflower	1B	Sandy areas in coastal dunes, coastal prairie, and <b>coastal scrub</b> .	Yes	Endemic to coastline from Bodega Bay to Point Reyes (CNPS 2001). Not known from Seashore (PORE) or Tomales Bay area (NDDB 2001). Jepson does not differentiate species into varieties (Hickman 1993).	No
<i>Chorizanthe valida</i>	Sonoma spineflower	FE; SE; 1B	Sandy areas in coastal prairie.	No	Thought extinct at one time; only known extant occurrence in Seashore (CNPS 2001; PORE).	
<i>Cirsium andrewsii</i>	Franciscan thistle	1B	Sometimes serpentinite areas in broadleaved upland forest and coastal bluff scrub.	No	Present in Seashore (PORE).	
<i>Cirsium hydrophilum</i> var. <i>vaseyi</i>	Mount Tamalpais thistle	FSC; 1B	Serpentinite seeps in broadleaved upland forest and chaparral.	No	Known from fewer than 10 occurrences on Mt. Tamalpais (CNPS 2001).	
<i>Clarkia concinna</i> ssp. <i>raichei</i>	Raiche's red ribbons	FSC; 1B	<b>Coastal bluff scrub</b> .	Yes	Known from only one occurrence near Tomales (CNPS 2001).	No
<i>Collinsia corymbosa</i>	round-headed chinese houses	1B	Coastal dunes.	No	Not known from Seashore (PORE) or Tomales Bay area (NDDB 2001).	
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	Point Reyes bird's-beak	FSC; 1B	<b>Coastal salt marsh</b> . Higher portions of mid marsh or high marsh.	Yes	Reported previously as present in several areas on western and eastern sides of Tomales Bay. Observed in undiked marsh at end of Tomales Bay Trail and north of Giacomini Ranch.	Yes
<i>Cordylanthus mollis</i> ssp. <i>mollis</i>	soft bird's beak	FE; SR; 1B	<b>Coastal salt marsh</b> .	Yes	Known from fewer than 10 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.	No
<i>Delphinium bakeri</i>	Baker's larkspur	FE; SR; 1B	<b>Coastal scrub</b> .	Yes		No

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SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Dirca occidentalis</i>	western leatherwood	1B	Broadleafed upland forest; chaparral; closed-cone and North coast coniferous forest; cismontane woodland; <b>riparian scrub; riparian woodland; on brushy, mesic slopes;</b> mostly in mixed evergreen and foothill woodland communities.	Yes	Mapped along Nicasio Creek and Inverness Ridge (NDDDB 2001).	No
<i>Elymus californicus</i>	California bottle-brush grass	4	North coast coniferous forest.	No	Present in Seashore (PORE).	
<i>Erigeron supplex</i>	supple daisy	FSC; 1B	<b>Coastal bluff scrub;</b> coastal prairie.	Yes	Possibly extirpated from the area (USFWS April 2001).	No
<i>Erysimum franciscanum</i>	San Francisco wallflower	FSC; 4	Coastal dunes; <b>coastal scrub;</b> often serpentinite or granitic areas in valley and foothill grassland.	Yes	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	No
<i>Fritillaria affinis</i> var. <i>tristulis</i>	fritillary	1B	Coastal bluff scrub; <b>coastal scrub;</b> coastal prairie; in canyon, riparian, and rock outcrop areas; often on serpentine.	Yes	Endemic to Marin County. Found near Nicasio Reservoir and eastern side of Tomales Bay (NDDDB 2001). Known from fewer than 10 extant occurrences (CNPS 2001).	No
<i>Fritillaria liliacea</i>	fragrant fritillary	FSC; 1B	Often on serpentinite soils in coastal scrub, coastal prairie, and <b>valley and foothill grassland.</b>	Yes	Previously mapped near Nicasio Reservoir, Limantour, and east side of Tomales Bay at the eastern end of Tomales Bay Trail (NDDDB 2001).	Yes <i>Adjacent to Study Area</i>
<i>Gilia capitata</i> ssp. <i>chamissonis</i>	dune gilia	1B	Coastal sandhills; <60 m.	No	Present in Seashore (PORE).	
<i>Gilia millefoliata</i>		1B	Stabilized coastal dunes; <10 m.	No	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	
<i>Grindelia hirsutula</i> var. <i>maritima</i>	San Francisco gumplant	FSC; 1B	Sandy, serpentinite soils in coastal bluff scrub, <b>coastal scrub,</b> and <b>valley and foothill grassland.</b>	Yes	Present in Seashore (PORE).	No
<i>Helianthella castanea</i>	Diablo helianthella	FSC; 1B	Broadleafed upland forest; chaparral; cismontane woodland; <b>coastal scrub; riparian woodland; valley and foothill grassland.</b>	Yes	Possibly extirpated from the area (USFWS April 2001).	No

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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 (NDDDB; 2001; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2001; Inventory of rare and endangered vascular plants of California).

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Hemizonia congesta</i> ssp. <i>leucocephala</i>	hayfield tarplant	3	<b>Coastal scrub; valley and foothill grassland.</b>	Yes	Present in Seashore (PORE). Intergrades with <i>H. congesta</i> ssp. <i>congesta</i> (CNPS 2001).	No
<i>Hemizonia multicaulis</i> ssp. <i>multicaulis</i>	seaside tarweed	FSC	Coastal grassland, sometimes serpentine; gen <300 m.	No	Considered but rejected by CNPS for listing because considered synonym of <i>H. congesta</i> ssp. <i>congesta</i> , a common species (CNPS 2001).	
<i>Hemizonia multicaulis</i> ssp. <i>vernalis</i>	Tiburon tarweed	FSC	Coastal grassland, sometimes serpentine; gen <300 m.	No	Considered but rejected by CNPS for listing because considered synonym of <i>H. congesta</i> ssp. <i>congesta</i> , a common species (CNPS 2001).	
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i>	short-leaved evax	2	<b>Coastal bluff scrub;</b> coastal dunes.	Yes	Present in Seashore (PORE).	No
<i>Hesperolinon congestum</i>	Marin dwarf flax	FT; ST; 1B	Serpentinite areas in chaparral and valley and foothill grassland.	No	Present in GGNRA (PORE). Known from fewer than 20 occurrences (CNPS 2001).	
<i>Holocarpha macradenia</i>	Santa Cruz tarplant	FT; SE; 1B	Often clay soils in coastal prairie and valley and foothill grassland.	Yes	Last remaining population in San Francisco Bay extirpated in 1993 (CNPS 2001).	No
<i>Horkelia cuneata</i> ssp. <i>sericea</i>	Kellogg's horkelia	FSC; 1B	Old dunes; coastal sandhills; gen < 200 m.	No	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001). Possibly extirpated from the area (USFWS April 2001). Occurrence from Mt. Bruno area probably last remaining one in San Francisco Bay (CNPS 2001).	
<i>Horkelia marinensis</i>	Point Reyes horkelia	FSC; 1B	Coastal dunes, prairie, and <b>scrub.</b>	Yes	Present in Seashore (PORE). Known from fewer than 20 occurrences (CNPS 2001).	No
<i>Lasthenia macrantha</i> ssp. <i>macrantha</i>	goldfields	1B	Grasslands and dunes along immediate coast; <500 m.	No	Present in Seashore (PORE).	

**Appendix Table A. List of Special Status Plant Species with Potential to Occur in the Giacomini Wetland Restoration Project Study 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 (NDDDB; 2001; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2001; Inventory of rare and endangered vascular plants of California).

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	Delta tule pea	FSC; 1B	<b>Freshwater and brackish marsh.</b>	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.	No
<i>Layia carnosa</i>	beach layia	FE; SE; 1B	Coastal dunes.	No	Present in Seashore (PORE).	
<i>Lessingia micradenia</i> var. <i>micradenia</i>	Tamalpais lessingia	FSC; 1B	Usually serpentinite areas in chaparral and valley and foothill grassland; often along roadsides.	No	Known only from Mt. Tamalpais (CNPS 2001),	
<i>Lilaeopsis masonii</i>	Mason's lileaeopsis	FSC; SR; 1B	<b>Freshwater and brackish marshes; riparian scrub;</b> in muddy or silty soil formed through river deposition.	Yes	Questionable identification of species in 1939; May have been <i>L. occidentalis</i> . Hydrology of site since altered (NDDDB 2001).	No
<i>Lilium maritimum</i>	coast lily	FSC; 1B	Broadleaved upland forest; closed-cone coniferous forest; coastal prairie; <b>coastal scrub;</b> and North coast coniferous forest.	Yes	Present in only one location in Marin County within the Park near Bull Point (PORE).	No
<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i>	Point Reyes meadowfoam	FSC; SE; 1B	Coastal prairie; mesic areas in meadows; <b>freshwater marsh;</b> and vernal pools.	Yes	Known from approximately 10 occurrences (CNPS 2001). Present in Seashore (PORE).	No
<i>Limosella subulata</i>	Delta mudwort	2	<b>Marshes and swamps.</b>	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).	No
<i>Linanthus grandiflorus</i>	large-flower linanthus	4	Coastal bluff scrub; closed-cone coniferous forest; cismontane woodland; coastal dunes; coastal prairie; <b>coastal scrub;</b> and <b>valley and foothill grassland.</b>	Yes	Present in Seashore (PORE).	No

**Appendix Table A. List of Special Status Plant Species with Potential to Occur in the Giacomini Wetland Restoration Project Study 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 (NDDDB; 2001; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2001; Inventory of rare and endangered vascular plants of California).

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Linanthus rosaceus</i>	rosy linanthus	1B		NA	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001). Jepson does not recognize this species (Hickman 1993).	
<i>Lupinus tidestromii</i>	Tidestrom's lupine	FE; SE; 1B	Coastal dunes.	No	Present in Seashore (PORE).	
<i>Microseris paludosa</i>		1B	<b>Moist grassland</b> or open woods; < 300 m.	Yes	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	No
<i>Monardella undulata</i>	curly-leaved monardella	4	Chaparral; coastal dunes; <b>coastal scrub</b> ; ponderosa pine sandhills in lower montane coniferous forest.	Yes	Present in Seashore (PORE).	No
<i>Pentachaeta bellidiflora</i>	white-rayed pentachaeta	FE; SE; 1B	Often serpentinite areas in valley and foothill grassland.	No	Known from only one extended occurrence near Highway 280 on San Francisco Peninsula (CNPS 2001).	
<i>Perideridia gairdneri</i> ssp. <i>gairdneri</i>	Gairdner's yampah	FSC; 4	Mesic areas in broadleaved upland forest, chaparral, <b>valley and foothill grassland</b> , and vernal pools.	Yes	Present in Seashore (PORE).	No
<i>Phacelia insularis</i> var. <i>continentis</i>	northcoast phacelia	FSC; 1B	<b>Coastal bluff scrub</b> ; coastal dunes.	Yes	Known from approximately seven occurrences (CNPS 2001). Present in Seashore (PORE).	No
<i>Piperia elegans</i> ssp. <i>decurtata</i>	Point Reyes rein orchid	1B	Generally dry, open sites; shrubland; coniferous forest; < 500 m.	No	Present in Seashore (PORE). Jepson does not recognize subspecies (Hickman 1993).	
<i>Plagiobothrys diffusus</i>	San Francisco popcorn-flower	FSC; SE; 1B	Coastal prairie; <b>valley and foothill grassland</b>	Yes	Known from six occurrences (CNPS 2001). Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001). Jepson characterized species as indistinct from <i>P. reticulatus</i> var. <i>rossianorum</i> (Hickman 1993).	No
<i>Pleuropogon hooverianus</i>	North Coast semaphore grass	FSC; SR; 1B	Mesic areas in broadleaved upland forest, <b>meadows</b> , North Coast coniferous forest, and vernal pools.	Yes	Known from approximately 12 occurrences (CNPS 2001).	No

**Appendix Table A. List of Special Status Plant Species with Potential to Occur in the Giacomini Wetland Restoration Project Study 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 (NDDDB; 2001; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2001; Inventory of rare and endangered vascular plants of California).

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Pleuropogon refractus</i>	nodding semaphore grass	4	Mesic areas in lower montane coniferous forest, <b>meadows</b> , North Coast coniferous forest, and <b>riparian forest</b> .	Yes	Present in Seashore (PORE).	No
<i>Polygonum marinense</i>	Marin knotweed	FSC; 3	<b>Coastal salt marshes and brackish marshes.</b>	Yes	Known from fewer than 10 occurrences (CNPS 2001). Present in several locations in the Seashore. Mapped previously on western side of Tomales Bay north of Inverness (NDDDB 2001). One individual observed in undiked marsh 2,000 feet north of Giacomini Ranch.	Yes
<i>Ranunculus lobbii</i>	Lobb's aquatic buttercup	4	Mesic areas in cismontane woodland, North Coast coniferous forest, <b>valley and foothill grassland</b> , and vernal pools.	Yes	Present in Seashore (PORE).	No
<i>Rhynchospora californica</i>	California beaked-rush	FSC; 1B	Bogs and fens; lower montane coniferous forest; seeps in meadows; <b>freshwater marshes.</b>	Yes	Known from fewer than 10 occurrences (CNPS 2001). Mapped on western side of Tomales Bay. Last seen in 1945 (NDDDB 2001).	No
<i>Sagittaria sanfordii</i>	Sanford's arrowhead	FSC; 1B	Assorted <b>shallow freshwater marshes and swamps.</b>	Yes		No
<i>Sidalcea calycosa</i> ssp. <i>rhizomata</i>	checkerbloom	1B	<b>Marshes and swamps</b> near coast.	Yes	Present in Seashore (PORE).	No
<i>Sidalcea hickmanii</i> ssp. <i>viridis</i>	Marin checkerbloom	FSC; 1B	Serpentinite areas in chaparral.	No	Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	
<i>Stebbinsoseris decipiens</i>	Santa Cruz microseris	FSC; 1B	Open areas, sometimes serpentinite, in broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, and <b>coastal scrub.</b>	Yes	Known from fewer than 20 occurrences (CNPS 2001). Not known from Seashore (PORE) or Tomales Bay area (NDDDB 2001).	No

**Appendix Table A. List of Special Status Plant Species with Potential to Occur in the Giacomini Wetland Restoration Project Study 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 (NDDDB; 2001; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2001; Inventory of rare and endangered vascular plants of California).

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT	HABITAT PRESENT	COMMENTS	SPECIES PRESENT
<i>Stellaria littoralis</i>	starwort	4	<b>Marshy fields; marshes;</b> coastal bluffs; < 40 m.	Yes	Common in coastal portions of Park (PORE). Not common in Tomales Bay area (NDDDB 2001).	No
<i>Streptanthus batrachopus</i>	Tamalpais jewelflower	FSC; 1B	Serpentinite areas in closed-cone coniferous forest and chaparral.	No	Known from fewer than 10 occurrences in the Mt. Tamalpais area (CNPS 2001).	
<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	Mount Tamalpais jewelflower	1B	Serpentinite areas in chaparral and valley and foothill grassland.	No	Endemic to the Mt. Tamalpais area. Present in GGNRA (PORE).	
<i>Streptanthus niger</i>	Tiburon jewelflower	FE; SE; 1B	Serpentinite areas in valley and foothill grassland.	No	Known from only three occurrences (CNPS 2001).	
<i>Trifolium amoenum</i>	showy Indian clover	FE; 1B	<b>Valley and foothill grassland; coastal bluff scrub;</b> sometimes on serpentine soil; open, sunny areas; swales	Yes	Last recorded in Olema area in 1886. One plant rediscovered in Bodega area in 1993 (CNPS 2001).	No
<i>Triphysaria floribunda</i>	San Francisco owl's-clover	FSC; 1B	Serpentinite areas in coastal prairie and valley and foothill grassland.	No	Present in Seashore (PORE).	

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.



## References

- California Natural Diversity Database (NDDDB). 2001. Search of Inverness, Tomales, and Point Reyes NE 7.5 minute U.S. Geological Survey quadrangles. California Department of Fish and Game, Sacramento, CA.
- California Native Plant Society. 2001. Inventory of rare and endangered vascular plants of California. Sixth Edition. California Native Plant Society, Sacramento, CA.
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- USFWS (U.S. Fish and Wildlife Service). In preparation. *Coastal salt marsh recovery plan*. Prepared by U.S. Fish and Wildlife Service.

**Appendix B. List of Plant Species Observed within the Study Area**

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Aceraceae</b>																
<i>Acer negundo</i> var. <i>californicum</i>	box elder			X						X						
<b>Alismataceae</b>																
<i>Alisma lanceolatum</i>	water plantain		X	X							X					
<i>Alisma plantago-aquatica</i>	water plantain					X					X					
<b>Anacardiaceae</b>																
<i>Toxicodendron diversilobum</i>	poison oak		X	X		X				X						
<b>Apiaceae</b>																
<i>Conium maculatum</i>	poison hemlock		X	X			X					X				
<i>Eryngium armatum</i>						X										X
<i>Foeniculum vulgare</i>	fennel		X	X			X					X				
<i>Heracleum lanatum</i>	cow parsnip			X												
<i>Hydrocotyle ranunculoides</i>			X	X		X					X			X		
<i>Lomatium dasycarpum</i>				X												
<i>Oenanthe sarmentosa</i>			X	X			X				X					
<i>Scandix pecten-veneris</i>	Venus' needle					X										X
<i>Torilis arvensis</i>				X								X				
<b>Apocynaceae</b>																
<i>Vinca major</i>	greater periwinkle			X						X						
<b>Aquifoliaceae</b>																
<i>Ilex aquifolium</i>	English holly			X						X						X
<b>Araliaceae</b>																
<i>Aralia californica</i>	elk clover			X						X						X
<i>Hedera helix</i>	English ivy			X						X						X





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Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Blechnaceae</b>																
<i>Blechnum spicant</i>	deer fern			X								X				
<b>Boraginaceae</b>																
<i>Borago officinalis</i>				X						X						
<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	popcorn flower					X										X
<b>Brassicaceae</b>																
<i>Barbarea orthoceras</i>	common winter cress			X												
<i>Barbarea vulgaris</i>	common wintercress		X													
<i>Brassica nigra</i>	black mustard		X	X		X	X					X				
<i>Brassica rapa</i>	field mustard															
<i>Capsella bursa-pastoris</i>	shepherd's purse			X												
<i>Cardamine oligosperma</i>	bitter-cress		X								X					
<i>Lepidium campestre</i>	peppergrass		X	X												
<i>Raphanus raphanistrum</i>	jointed charlock		X	X			X					X				
<i>Raphanus sativus</i>	wild radish		X	X			X					X				
<i>Rorippa curvisiliqua</i>	water cress		X	X							X				X	
<i>Rorippa nasturtium-aquaticum</i>	water cress		X	X			X				X			X		
<i>Rorippa palustris</i> var. <i>occidentalis</i>	water cress										X					
<i>Sisymbrium officinale</i>	hedge mustard		X			X										
<b>Callitrichaceae</b>																
<i>Callitriche heterophylla</i> var. <i>bolanderi</i>	water starwort					X					X					



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Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Chenopodiaceae</b>																
<i>Atriplex triangularis</i>	spearscale		X	X				X	X		X				X	
<i>Chenopodium album</i>	lamb's quarters			X						X	X					
<i>Chenopodium ambrosioides</i>	Mexican tea		X									X				
<i>Salicornia virginica</i>	pickleweed		X	X	X	X		X	X						X	
<b>Convolvulaceae</b>																
<i>Calystegia purpurata</i> ssp. <i>purpurata</i>	morning glory		X	X			X	X					X			
<b>Cucurbitaceae</b>																
<i>Marah fabaceus</i>	California man-root		X				X			X						
<b>Cupressaceae</b>																
<i>Cupressus</i> sp.	cypress						X									
<i>Juniperus</i> sp.	juniper							X				X				
<b>Cuscutaceae</b>																
<i>Cuscuta salina</i> var. <i>major</i>	dodder			X						X						
<b>Cyperaceae</b>																
<i>Carex barbarae</i>	sedge		X	X						X		X				
<i>Carex densa</i>	sedge			X			X									
<i>Carex dudleyi</i>	sedge						X									
<i>Carex obnupta</i>	sedge			X						X						
<i>Carex praegracilis</i>	sedge			X												
<i>Carex subbracteata</i>	sedge			X							X			X		
<i>Carex tumulicola</i>	sedge						X									
<i>Cyperus eragrostis</i>	nutsedge		X	X			X	X			X			X		
<i>Eleocharis macrostachya</i>	spikerush		X	X			X				X			X	X	
<i>Scirpus acutus</i> var. <i>occidentalis</i>	tule		X	X							X					
<i>Scirpus americanus</i>				X							X					





**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Fabaceae</b>																
<i>Lotus corniculatus</i>	birdfoot trefoil		X	X		X	X		X		X	X			X	X
<i>Lotus formosissimus</i>						X										X
<i>Lupinus arboreus</i>	yellow bush lupine		X	X								X				
<i>Lupinus bicolor</i>	miniature lupine		X			X						X				X
<i>Lupinus nanus</i>	lupine		X	X								X				
<i>Lupinus variicolor</i>	lupine					X										
<i>Medicago polymorpha</i>	California burclover		X	X		X	X					X				X
<i>Trifolium depauperatum</i> var. <i>depauperatum</i>	clover					X										X
<i>Trifolium dubium</i>	little hop clover		X	X		X	X					X			X	X
<i>Trifolium fragiferum</i>	strawberry clover		X	X		X	X				X	X	X	X		
<i>Trifolium fucatum</i>	clover															
<i>Trifolium oliganthum</i>	clover		X													
<i>Trifolium repens</i>	white clover		X	X		X	X					X	X	X		X
<i>Trifolium subterraneum</i>	subterranean clover		X	X		X						X	X			X
<i>Trifolium variegatum</i>	clover			X							X			X		
<i>Vicia hirsuta</i>	vetch			X												
<i>Vicia sativa</i> ssp. <i>nigra</i>	narrow-leaved vetch		X	X		X						X				X
<i>Vicia sativa</i> ssp. <i>sativa</i>	spring vetch		X	X								X				
<i>Vicia tetrasperma</i>	vetch									X		X				

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Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Fagaceae</b>																
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	coast live oak		X			X						X				
<b>Frankeniaceae</b>																
<i>Frankenia salina</i>	alkali heath		X	X				X	X						X	
<b>Gentianaceae</b>																
<i>Centaurium muehlenbergii</i>	centaury					X										X
<b>Geraniaceae</b>																
<i>Erodium botrys</i>	storksbill			X		X										
<i>Erodium cicutarium</i>	storksbill		X	X								X				
<i>Erodium moschatum</i>	storksbill		X	X								X				
<i>Geranium carolinianum</i>	geranium		X	X		X						X		X		
<i>Geranium dissectum</i>	geranium		X	X		X	X					X		X		X
<i>Geranium molle</i>	geranium		X			X						X				X
<b>Grossulariaceae</b>																
<i>Ribes sanguineum</i>	red flowering currant			X						X						
<i>Ribes menziesii</i>	canyon gooseberry			X								X				
<b>Hippocastanaceae</b>																
<i>Aesculus californica</i>	California buckeye		X	X						X						
<b>Iridaceae</b>																
<i>Sisyrinchium bellum</i>	blue-eyed-grass		X			X						X				X
<i>Sisyrinchium californicum</i>	golden-eyed-grass			X									X			
<b>Juncaceae</b>																
<i>Juncus balticus</i>	rush		X	X		X	X					X		X		
<i>Juncus bolanderi</i>	rush			X			X			X	X					
<i>Juncus bufonius</i> var. <i>bufonius</i>	toad rush			X										X		



**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Lamiaceae</b>																
<i>Stachys chamissonis</i>	hedge nettle			X						X	X					
<b>Lauraceae</b>																
<i>Umbellularia californica</i>	California bay		X	X		X				X						
<b>Lemnaceae</b>																
<i>Lemna</i> sp.	duckweed		X	X		X	X				X					
<b>Liliaceae</b>																
<i>Allium unifolium</i>	onion					X										X
<i>Amaryllis belladonna</i>	naked pink lady															
<i>Chlorogalum pomeridianum</i>	soap plant		X			X										X
<i>Smilacina</i> sp.	false solomon's seal			X						X						X
<b>Linaceae</b>																
<i>Linum usitatissimum</i>	common flax					X										X
<b>Lythraceae</b>																
<i>Lythrum hyssopifolium</i>	loosestrife		X			X	X				X					
<b>Malvaceae</b>																
<i>Malva neglecta</i>	common mallow			X												
<i>Malva nicaeensis</i>	bull mallow		X													
<i>Malva sylvestris</i>	high mallow		X													
<i>Modiola caroliniana</i>			X	X								X				
<b>Myricaceae</b>																
<i>Eucalyptus globulus</i>			X													
<b>Myricaceae</b>																
<i>Myrica californica</i>	wax myrtle					X										
<b>Onagraceae</b>																
<i>Camissonia ovata</i>	sun cup		X			X						X				X

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Onagraceae</b>																
<i>Epilobium angustifolium</i>	fireweed		X	X								X				
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	willow herb			X							X					
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	willow herb			X		X	X				X					
<i>Ludwigia peploides</i>	water primrose		X								X					
<b>Oxalidaceae</b>																
<i>Oxalis rubra</i>				X									X			X
<b>Papaveraceae</b>																
<i>Eschscholzia californica</i>	California poppy		X	X		X	X					X				X
<b>Pinaceae</b>																
<i>Pinus muricata</i>						X										
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas fir					X										
<b>Plantaginaceae</b>																
<i>Plantago lanceolata</i>	English plantain		X	X		X	X					X				X
<i>Plantago major</i>	common plantain		X	X							X		X			
<i>Plantago maritima</i> var. <i>juncoides</i>	plantain			X		X		X								
<b>Plumbaginaceae</b>																
<i>Limonium californicum</i>	western marsh rosemary		X	X		X		X	X							
<b>Poaceae</b>																
<i>Agrostis capillaris</i>	bent grass															
<i>Agrostis stolonifera</i>	creeping bent grass		X	X			X			X		X				
<i>Agrostis viridis</i>	bent grass			X												
<i>Aira caryophyllea</i>	European hairgrass		X	X		X						X				X

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Poaceae</b>																
<i>Alopecurus geniculatus</i>	water foxtail			X							X				X	
<i>Alopecurus pratensis</i>	meadow foxtail		X	X									X		X	
<i>Avena barbata</i>	slender wild oat		X	X		X	X					X				X
<i>Avena fatua</i>	wild oat		X													
<i>Briza maxima</i>	quaking grass		X	X		X	X					X				X
<i>Briza minor</i>	quaking grass		X			X						X				X
<i>Bromus carinatus</i> var. <i>carinatus</i>	California brome		X	X		X						X				X
<i>Bromus catharticus</i>	rescue grass		X				X					X				
<i>Bromus diandrus</i>	ripgut brome		X	X		X	X					X				
<i>Bromus hordeaceus</i>	brome		X	X		X	X					X				X
<i>Bromus tectorum</i>	cheat grass			X									X			
<i>Cynodon dactylon</i>	Bermuda grass			X										X		
<i>Cynosurus echinatus</i>	hedgehog dogtail		X			X						X				X
<i>Dactylis glomerata</i>	orchard grass		X	X								X	X			
<i>Danthonia californica</i>						X										X
<i>Distichlis spicata</i>			X	X	X	X		X	X						X	
<i>Echinochloa crus-galli</i>			X								X					
<i>Festuca arundinacea</i>	tall fescue		X	X			X					X	X	X	X	
<i>Festuca rubra</i>	red fescue		X	X	X			X								
<i>Glyceria leptostachya</i>	manna grass			X							X					
<i>Glyceria occidentalis</i>	manna grass		X	X		X					X			X		

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Poaceae</b>																
<i>Holcus lanatus</i>	common velvet grass			X		X	X									X
<i>Hordeum brachyantherum</i> ssp. <i>brachyantherum</i>	barley		X	X		X	X							X		X
<i>Hordeum jubatum</i>	barley			X								X				
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley		X	X			X	X							X	
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	Mediterranean barley		X	X		X	X					X				X
<i>Leymus triticoides</i>			X	X			X	X				X			X	
<i>Lolium multiflorum</i>	Italian ryegrass		X	X		X	X					X		X		X
<i>Nassella pulchra</i>	purple needlegrass					X										X
<i>Paspalum dilatatum</i>	Dallis grass						X									
<i>Phalaris aquatica</i>	Harding grass		X	X		X	X				X	X				
<i>Phalaris arundinacea</i>	canary reed grass						X									
<i>Poa annua</i>	annual blue grass		X	X		X					X	X	X	X		X
<i>Poa trivialis</i>	rough bluegrass		X	X							X					
<i>Polypogon australis</i>	Chilean beard grass			X							X					
<i>Polypogon interruptus</i>	ditch beard grass		X	X		X					X			X		
<i>Polypogon monspeliensis</i>	annual beard grass		X	X		X			X							
<i>Spartina foliosa</i>	cordgrass		X		X							X				
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	weak mannagrass					X					X					
<i>Vulpia bromoides</i>			X	X		X				X		X				X



**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Poaceae</b>																
<i>Vulpia myuros</i> var. <i>hirsuta</i>			X	X												
<b>Polemoniaceae</b>																
<i>Navarretia squarrosa</i>	skunkweed			X		X										X
<b>Polygonaceae</b>																
<i>Polygonum arenastrum</i>	common knotweed		X			X	X					X				
<i>Polygonum hydropiper</i>	marshpepper		X	X		X	X									
<i>Polygonum hydropiperoides</i>	waterpepper			X							X					
<i>Polygonum persicaria</i>	lady's thumb		X	X		X	X				X					
<i>Polygonum punctatum</i>				X						X						
<i>Rumex acetosella</i>	sheep sorrel		X	X		X	X					X	X			
<i>Rumex conglomeratus</i>	dock		X	X			X									
<i>Rumex crispus</i>	curly dock		X	X		X	X		X		X	X	X	X		
<i>Rumex obtusifolius</i>	bitter dock			X							X					
<i>Rumex occidentalis</i>	western dock		X	X				X								
<i>Rumex pulcher</i>	fiddle dock		X	X			X					X	X			
<i>Rumex salicifolius</i> var. <i>crassus</i>	willow dock			X							X					
<i>Rumex salicifolius</i> var. <i>salicifolius</i>	willow dock			X							X					
<i>Rumex salicifolius</i> var. <i>transitorius</i>	willow dock		X	X								X				
<b>Potamogetonaceae</b>																
<i>Potamogeton nodosus</i>	long-leaved pondweed					X					X					
<i>Ruppia cirrhosa</i>	ditch grass		X								X					
<i>Zannichella palustris</i>	horned-pondweed					X					X					

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Primulaceae</b>																
<i>Anagallis arvensis</i>	scarlet pimpernel		X	X		X						X				
<b>Ranunculaceae</b>																
<i>Ranunculus aquatilis</i>	buttercup					X					X					
<i>Ranunculus californicus</i>	buttercup					X										X
<i>Ranunculus muricatus</i>	buttercup		X	X		X								X	X	
<i>Ranunculus occidentalis</i>	buttercup		X	X												
<b>Rhamnaceae</b>																
<i>Rhamnus californica</i> ssp. <i>californica</i>	California coffeeberry			X		X				X						
<b>Rosaceae</b>																
<i>Cotoneaster franchetti</i>						X										
<i>Heteromeles arbutifolia</i>	toyon					X										
<i>Holodiscus discolor</i>	oceanspray			X						X						
<i>Oemleria cerasiformis</i>	oso berry					X				X						
<i>Potentilla anserina</i> ssp. <i>pacifica</i>	cinquefoil		X	X		X		X	X		X		X		X	
<i>Potentilla glandulosa</i> ssp. <i>glandulosa</i>	cinquefoil					X										
<i>Prunus</i> sp.	plum		X	X						X		X				
<b>Rosaceae</b>																
<i>Rosa californica</i>	California rose					X	X									X
<i>Rosa eglanteria</i>										X						
<i>Rubus discolor</i>	Himalayan blackberry		X	X		X	X			X		X				

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Rosaceae</b>																
<i>Rubus parviflorus</i>	thimbleberry			X						X						
<i>Rubus spectabilis</i>	salmonberry			X						X						
<i>Rubus ursinus</i>	California blackberry			X		X	X			X						
<b>Rubiaceae</b>																
<i>Galium aparine</i>	bedstraw		X	X						X		X				
<i>Galium trifidum</i> var. <i>pacificum</i>	bedstraw			X							X					
<i>Sherardia arvensis</i>	field madder		X									X				
<b>Salicaceae</b>																
<i>Populus alba</i>	poplar															
<i>Salix laevigata</i>	red willow		X	X			X				X					
<i>Salix lasiolepis</i>	arroyo willow		X	X		X	X			X	X					
<i>Salix lucida</i> ssp. <i>lasiandra</i>	shining willow		X				X			X						
<b>Scrophulariaceae</b>																
<i>Castilleja ambigua</i> ssp. <i>ambigua</i>	salt marsh owl's clover					X		X								
<i>Castilleja ambigua</i> ssp. <i>humboldtiensis</i>	Humboldt Bay owl's clover	FSC; 1B	X	X	X	X		X								
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	Point Reyes bird's-beak	FSC; 1B				X		X	X							
<i>Digitalis purpurea</i>	foxglove			X						X						
<i>Mimulus aurantiacus</i>	monkey flower					X										
<i>Mimulus guttatus</i>	monkey flower			X							X			X		
<i>Mimulus moschatus</i>	musk monkey flower			X							X					
<i>Scrophularia californica</i> ssp. <i>californica</i>	California figwort		X	X			X			X		X				
<i>Verbascum blattaria</i>	moth mullein			X								X				

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

Scientific Name	Common Name	Status	Giacomini		SLC Land	TBT	Mesa	SM	DSM	R	FW	B	DP	WP	SMP	NG
			East	West												
<b>Scrophulariaceae</b>																
<i>Veronica americana</i>	American brooklime		X	X			X				X			X		
<i>Veronica anagallis-aquatica</i>	water speedwell			X			X				X			X		
<b>Solanaceae</b>																
<i>Datura</i> sp.	jimson weed		X								X					
<i>Solanum americanum</i>	nightshade			X						X						
<b>Taxodiaceae</b>																
<i>Sequoia sempervirens</i> - cultivar	redwood – possible cultivar						X					X				
<b>Typhaceae</b>																
<i>Sparganium erectum</i> ssp. <i>stoloniferum</i>	bur-reed		X	X							X					
<i>Typha angustifolia</i>	narrow-leaved cattail		X	X			X				X					
<i>Typha latifolia</i>	broad-leaved cattail			X		X	X									
<b>Urticaceae</b>																
<i>Urtica dioica</i>	stinging nettle		X	X						X						
<i>Urtica urens</i>	dwarf nettle		X													
<b>Verbenaceae</b>																
<i>Phyla nodiflora</i> var. <i>nodiflora</i>			X									X				

**Key:**

- Giacomini East – East Pasture
- Giacomini West – West Pasture
- SLC Land – SLC Lands
- TBT – Tomales Bay Trail
- Mesa – Mesa Road
- SM – Undiked Salt Marsh

**Appendix Table B-1. List of Plant Species Observed Within the Giacomini Wetland Restoration Study Area.** Initials in table columns refer to areas observed within Study Area: key is provided at back of table.

DSM – Diked Salt Marsh

R – Riparian

FW – Freshwater Marsh

B – Berm/Levee

DP – Dry Pasture

WP – Wet Pasture

SMP – Salt Marsh Pasture

NG – Non-native Grassland



**Appendix C: Datasheets for Special Status Species Documented or Resurveyed  
During Survey Efforts**

## **2001 Datasheets**

meta ✓ (V) MC

# Rare Plant Species Field Survey Form Point Reyes National Seashore

Mail To:  
Natural Diversity Data Base  
California Dept. of Fish and Game  
1416 Ninth Street, 12<sup>th</sup> Floor  
Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____
Copy to _____	Map Index # _____

Date of field work: 07-18-01  
mo day year

Scientific Name (no codes): Cordylanthus maritimus palustris

Type of survey (circle one): Initial Survey Monitoring

Known PORE Population? Yes  No

Population #: ~~250~~

Species Found?  [ ]  
yes no if not, why?

Is this an existing NDDDB occurrence? [ ]  [ ]  
Yes, Occ. # no unk

Reporter: Kristin Byrd / LORRAINE PARSONS  
 Address: Point Reyes National Seashore  
 Phone: (415) 464-5221  
 Other knowledgeable individuals (name/address/phone):  
Lorraine Parsons  
464-5193

### Plant Information:

Total # Individuals: ~250

How did you derive total #? (circle one) Censusing Sampling Ocular Estimate

Population Area (exact number if possible): < 1 m2 1-5 m2 5-10 m2 10-100 m2 100m2-1ha 1 ha+ (=2 1/2 ac)

How did you obtain area? (circle one) GPS Measured Estimated Area

Phenology: 10 90  
% vegetative % flowering % fruiting

Comments:

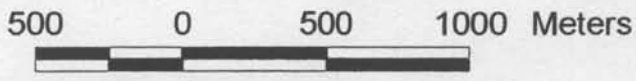
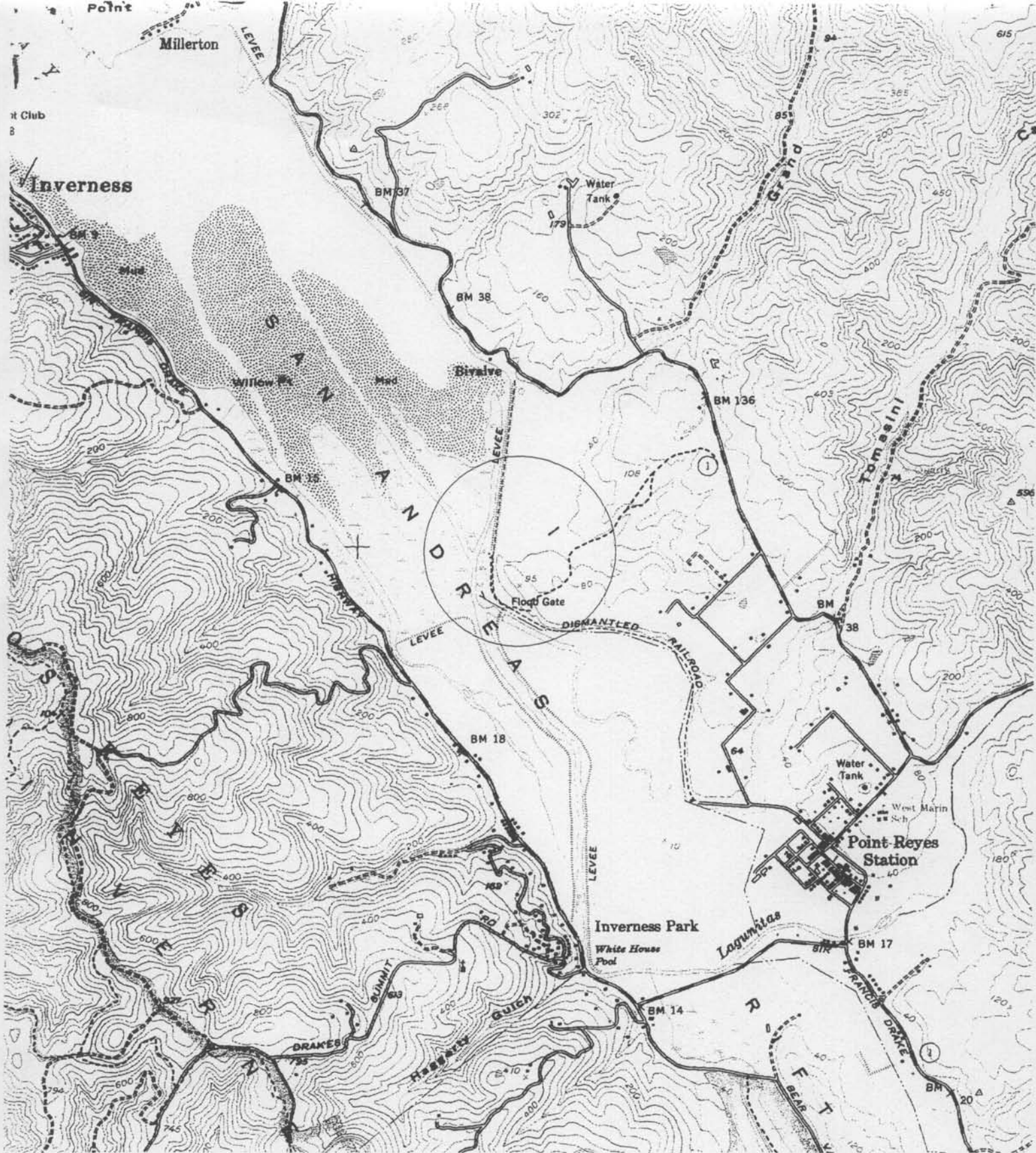
Location: (Please also attach or draw map on page 4.)

see shape file in s:1615/vector/veg/rareplants/  
covers / cordylanthus maritimus palustris /

PRNS:

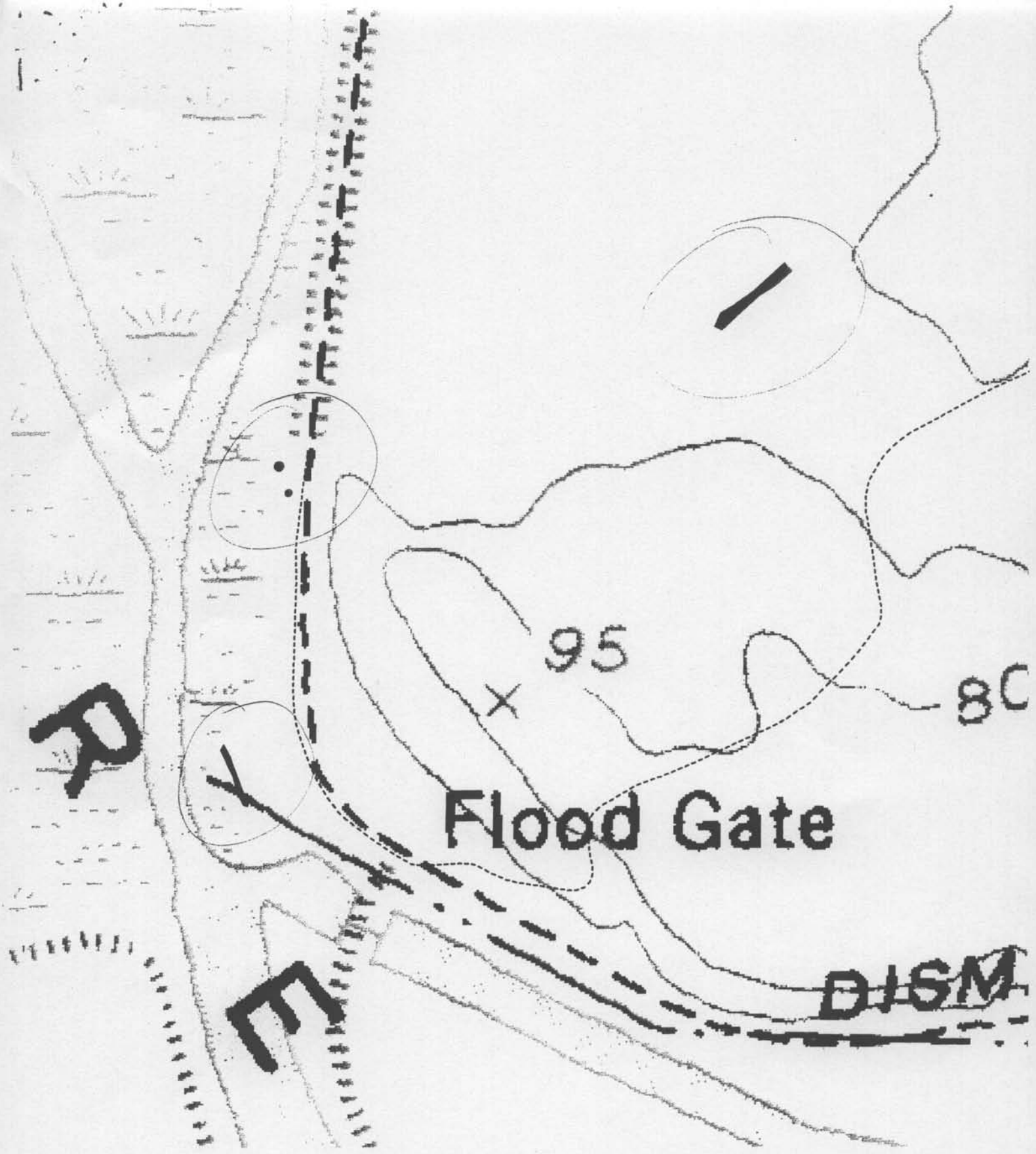
Giacomini Ranch - From Pt. Reyes station walk dismantled  
railroad past the flood gate to the beginning of the population.  
See attached maps.

County: Main Landowner/Mgr: NPS - PORE  
Quadrant Name: Inverness Elevation: sealevel Datum \_\_\_\_\_  
R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_



*Cordylanthus maritimus palustris*  
7-18-01

\* See close up map for position of holotype



70 0 70 140 Meters

● *Cordylanthus maritimus palustris*  
7-18-01  
250 plants





GPS unit: **Garmin GPS III+** GPS accuracy: N/A Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn map

UTME	UTMN	Center of Polygon/ Occurrence	Distinct Cluster of Plants	Individual Plants (indicate #)
<b>Occurrence:</b>				
1) 515,679	4,213,322	X		
2) 515,240	4,214,420	X		
3) 514,724	4,214,569	X		
4) 515,288	4,214,536	X		
5) 515M192	4,214,944	X		

### Habitat Description:

Aspect (check )  N  E  S  W  Flat  Multiple directions

Slope: (check one)  0°- 20  20°- 45  45° +  Vertical

Does plant community key?  Yes  No

If yes, Keeler/Wolf designation: Alliance: Pickleweed Association: Salicornia virginica/Distichlis spicata/Jaumea carnos  
Holland designation: Coastal salt marsh

Other rare spp. present: *Cordylanthus maritimus* ssp. *palustris* has some overlap with Occurrence 5, although these species are usually not present, at least in flowering form, during the same time of year.

Habitat Description (Plant communities, substrates/soils, etc): Occurrences typically were present in what might be described as mid-marsh areas that were sparsely to moderately vegetated. Plants established above the low marsh, often defined by a thin fringe of *Scirpus maritimus* or *Spartina foliosa*, and below High Tide wrack "line." Dominant associates include *Trigochlin concinna*, *Jaumea carnos*, *Distichlis spicata*, and *Salicornia virginica*. Other species sometimes present included *Potentilla anserina*, *Grindelia* sp., and *Lotus corniculatus*.

### Site Information:

Current /surrounding land use: Surrounding land use is primarily agricultural for grazing of either dairy or beef cattle.

Visible disturbances, possible threats: Visible disturbances include heavy trampling by cattle, causing major disturbance to soft, wet soils in marsh areas. No grazing of plants was apparent, however. Occurrences 1, 2, and 4 were subject to trampling by dairy cattle, although trampling appeared to be low to moderate. Occurrence 3 was not subject to grazing. Occurrence 5 was heavily trampled by beef cattle.

Overall site quality:  Excellent  Good  Fair  Poor

Degree of cattle impacts:  High  Medium  Low  None: See Visible disturbances question.

### Determination: (Check one or more, fill in the blanks)

Keyed in a site reference: Known population at Tomales Bay Trailhead pocket marsh

\_\_\_\_ Compared with specimen housed at: \_\_\_\_\_

\_\_\_\_ Compared with photo/drawing in: \_\_\_\_\_

\_\_\_\_ By another person (name): \_\_\_\_\_

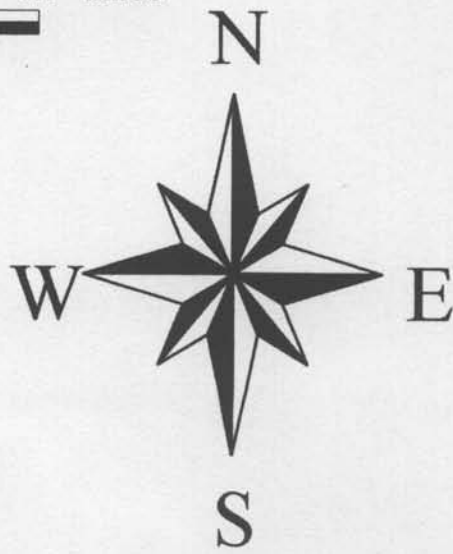
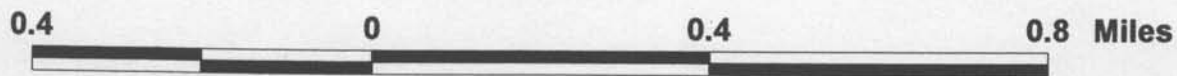
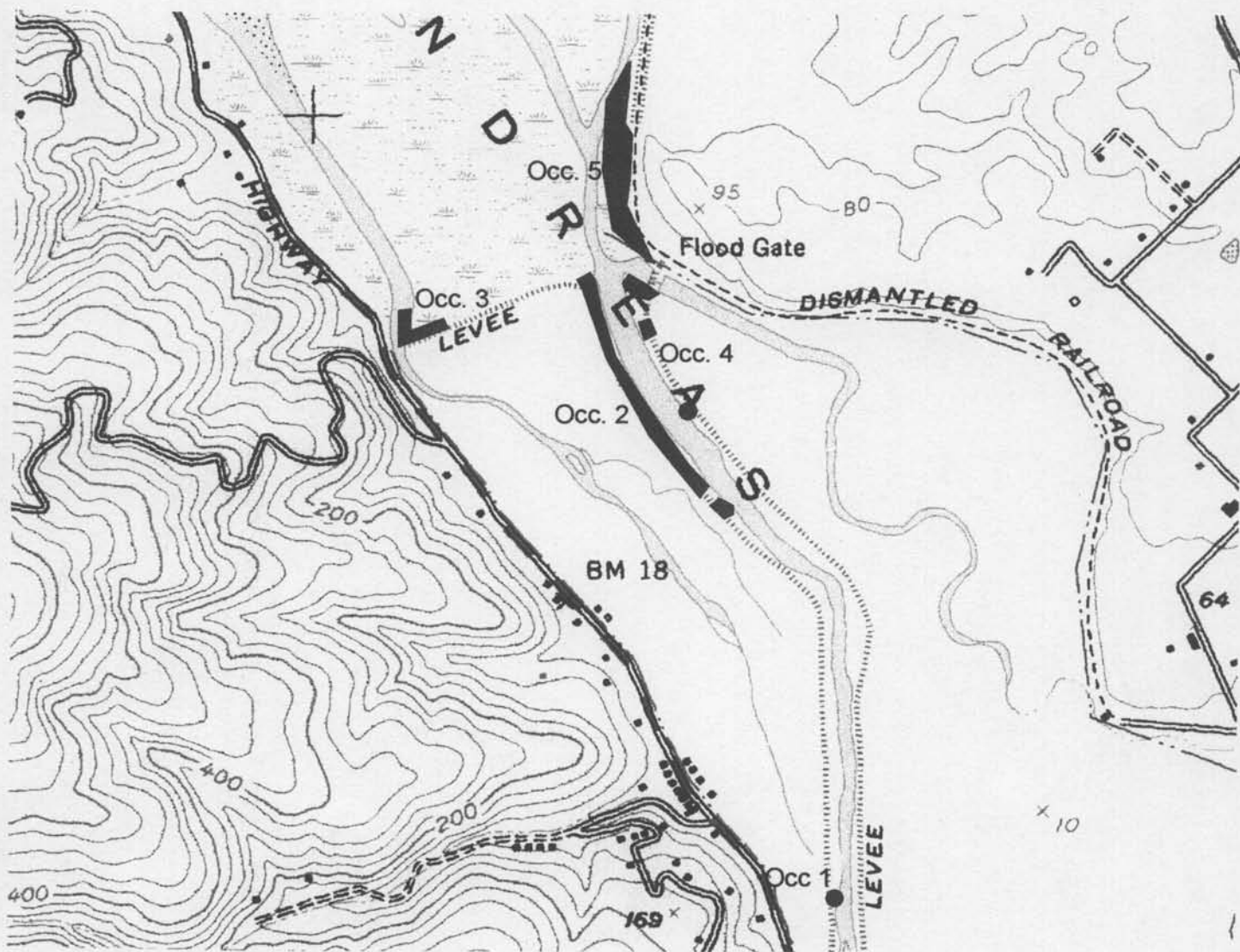
### Photographs: (Check one or more)

	Digital	Slide	Print
Plant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense?  yes  no



Occurrences of Humboldt Bay owl's clover observed in upper Tomales Bay in 2001.



■ Humboldt Bay owl's clover



## **2002 Datasheets**



## Rare Plant Species Field Survey Form Point Reyes National Seashore

Mail To:  
Natural Diversity Data Base  
California Dept. of Fish and Game  
1416 Ninth Street, 12<sup>th</sup> Floor  
Sacramento, CA 95814

For office use only

Source Code \_\_\_\_\_ Quad Code \_\_\_\_\_  
Elm Code \_\_\_\_\_ Occ # \_\_\_\_\_  
Copy to \_\_\_\_\_ Map Index # \_\_\_\_\_

Date of field work: 6 - 21 - 02  
mo day year

Scientific Name (no codes): Cordylanthus maritimus ssp. palustris

Type of survey (circle one): Initial Survey Monitoring

Known PORE Population? Yes No  
Population #: outside of PORE  
Species Found? [] [ ] \_\_\_\_\_  
yes no if not, why?  
Is this a existing NDDDB occurrence? [ ] [ ] [ ]  
Yes, Occ. # no unk

Reporter: Michelle Coppoletta / Shelly Benson  
Address: Point Reyes National Seashore  
Phone: (415) 464-5221 5242  
Other knowledgeable individuals (name/address/phone):

### Plant Information:

Total # Individuals: no count - hundreds  
How did you derive total #? (circle one) Censusing Sampling Ocular Estimate  
Areal Extent (sq m): \_\_\_\_\_ How did you obtain area? (circle one) GPS Measured Estimated Area  
Phenology: \_\_\_\_\_ 100 \_\_\_\_\_  
% vegetative % flowering % fruiting

Comments:

plants seemed VERY purple  
NOT all of the "island" was surveyed! See the map for what was missed

Location: (Please also attach or draw map on page 4.)

This population is located on an "island" of salt marsh in Tomales Bay. It is West of the Martinelli Ranch property and north of the old flood gate. The easiest way to access this population is by boat! We put in at White House Pool and paddled up the main channel. See map for better idea of location.

County: Marin Landowner/Mgr: \_\_\_\_\_  
Quad Name: Inverness Elevation: 0-10' Datum \_\_\_\_\_  
T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_

GPS unit: Trimble Geo 3 - BC3 GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn map

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
------	------	-------------------	----------------------------	--------------------------------

x points were taken and connected in Arcview

**Habitat Description:**

Aspect (check ) \_\_\_\_\_ N \_\_\_\_\_ E \_\_\_\_\_ S \_\_\_\_\_ W  Flat \_\_\_\_\_ Multiple directions

Slope: (check one)  0°- 20 \_\_\_\_\_ 20°- 45 \_\_\_\_\_ 45°+ \_\_\_\_\_ Vertical

Does plant community key? Yes No

If yes, Alliance: \_\_\_\_\_ Association: \_\_\_\_\_

Other rare ssp. present:

Polygonum mannense, Casilleja ambigua ssp humboldtensis (potential)

Habitat Description (Plant communities, substrates/soils, etc):

saltmarsh dominated by salicornia. Around the edges where it seems to be higher we found more ~~Dichlis~~ Dichlis and Grindelia spicata

**Site Information:**

Current /surrounding land use:

none

Visible disturbances, possible threats:

?

Overall site quality: [] Excellent [] Good [ ] Fair [ ] Poor

Degree of cattle impacts: [ ] High [ ] Medium [ ] Low [] None

**Determination:** (Check one or more, fill in the blanks)

\_\_\_\_ Keyed in a site reference: \_\_\_\_\_

\_\_\_\_ Compared with specimen housed at: \_\_\_\_\_

\_\_\_\_ Compared with photo/drawing in: \_\_\_\_\_

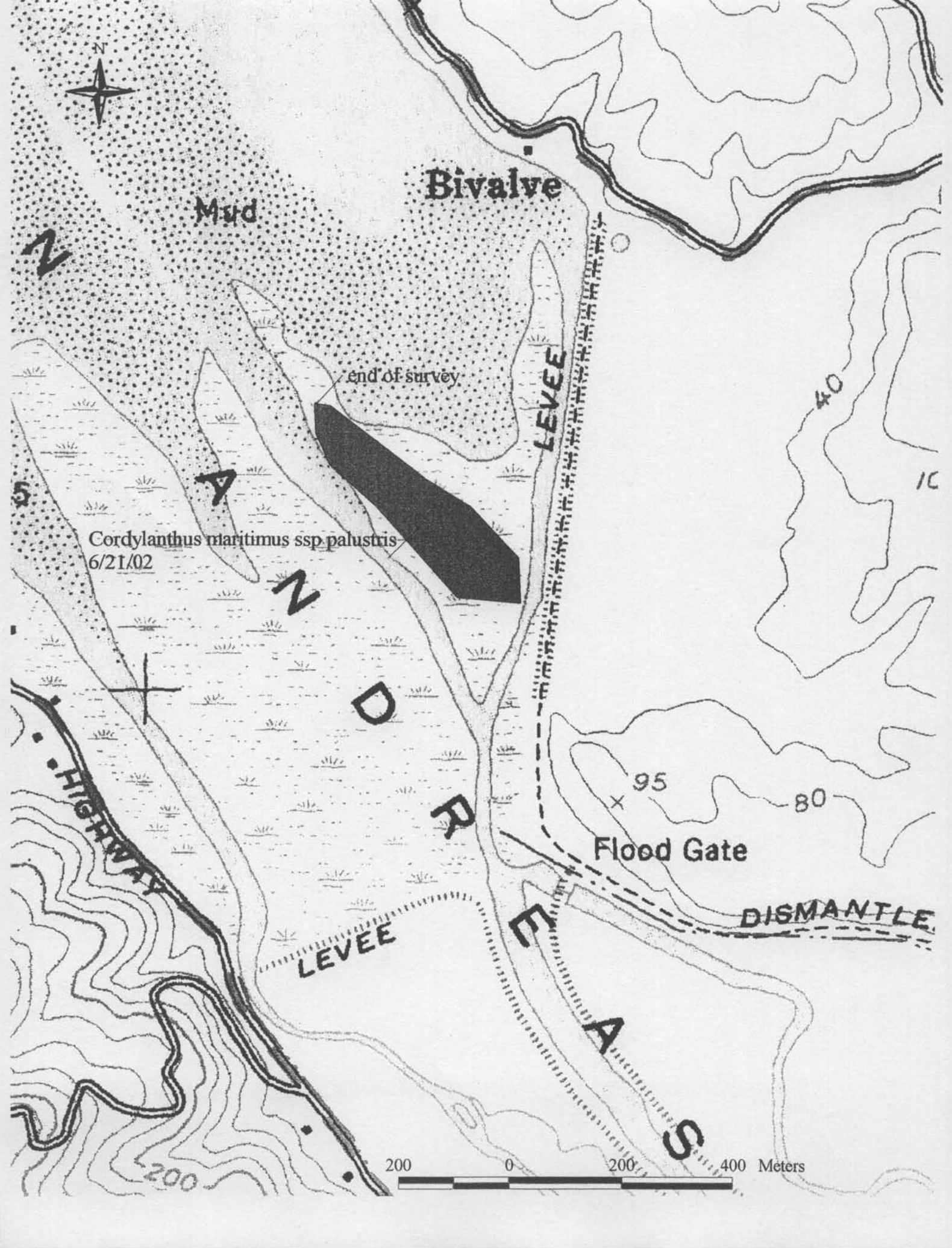
\_\_\_\_ By another person (name): \_\_\_\_\_

\_\_\_\_ Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	_____	_____	_____
Habitat	_____	_____	_____
Diagnostic Feature	_____	_____	_____
Other	_____	_____	_____

May we obtain duplicates at our expense? [ ] yes [ ] no



*Cordylanthus maritimus ssp. palustris*  
6/21/02

Bivalve

Mud

end of survey

LEVEE

Flood Gate

DISMANTLE

HIGHWAY

LEVEE

LEVEE

200 0 200 400 Meters

N



200

40

10

95

80



## Rare Plant Species Field Survey Form

### Point Reyes National Seashore

Mail To:  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only

Source Code \_\_\_\_\_ Quad Code \_\_\_\_\_  
 Elm Code \_\_\_\_\_ Occ # \_\_\_\_\_  
 Copy to \_\_\_\_\_ Map Index # \_\_\_\_\_

Date of field work: 6 - 21 - 02  
 mo day year

Scientific Name (no codes): Polygonum mannense

Type of survey (circle one): Initial Survey Monitoring

Known PORE Population? Yes No  
 Population #: outside of PORE  
 Species Found? [] [ ] \_\_\_\_\_  
yes no if not, why?  
 Is this a... existing NDDDB occurrence? [ ] [ ] [ ]  
Yes, Occ. # no unk

Reporter: Michelle Coppoletta | Shelly Benson  
 Address: Point Reyes National Seashore  
 Phone: (415) 464-5227 5242  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: 1 \*  
 How did you derive total #? (circle one) Censusing Sampling Ocular Estimate  
 Areal Extent (sq m): \_\_\_\_\_ How did you obtain area? (circle one) GPS Measured Estimated Area  
 Phenology: \_\_\_\_\_  
% vegetative % flowering % fruiting

Comments:

\* we only found one plant but there could easily have been more that we missed! A more comprehensive survey needs to be completed.

Location: (Please also attach or draw map on page 4.)

This population is located on an "island" of saltmarsh in Tomales Bay. It is west of the Martinelli Ranch (GENRA) and north of the old flood gate. The easiest way to access this population is by boat! We put in at White House Pool and paddled up the main channel. See map for better idea of location.

County: Marin Landowner/Mgr: \_\_\_\_\_  
 Quad Name: Inverness Elevation: 0-10' Datum \_\_\_\_\_  
 T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_

GPS unit: Trimble Geo3-B0B GPS accuracy: \_\_\_\_\_ Mapped (check one) \_\_\_\_\_ as polygon in GIS \_\_\_\_\_ on hand drawn map

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
515126	4215108			1

**Habitat Description:**

Aspect (check)  N  E  S  W  Flat  Multiple directions

Slope: (check one)  0°-20  20°-45  45°+  Vertical

Does plant community key? Yes No

If yes, Alliance: \_\_\_\_\_ Association: \_\_\_\_\_

Other rare ssp. present:

*Cordylanthus maritimus* ssp. *palustris*, *Castilleja ambigua*

Habitat Description (Plant communities, substrates/soils, etc):

salt marsh dominated by Salicornia. Where Polygonum individual was found was dominated by Distichlis spicata w/ scattered Gninetia.

**Site Information:**

Current /surrounding land use:

none

Visible disturbances, possible threats:

Overall site quality:  Excellent  Good  Fair  Poor

Degree of cattle impacts:  High  Medium  Low  None

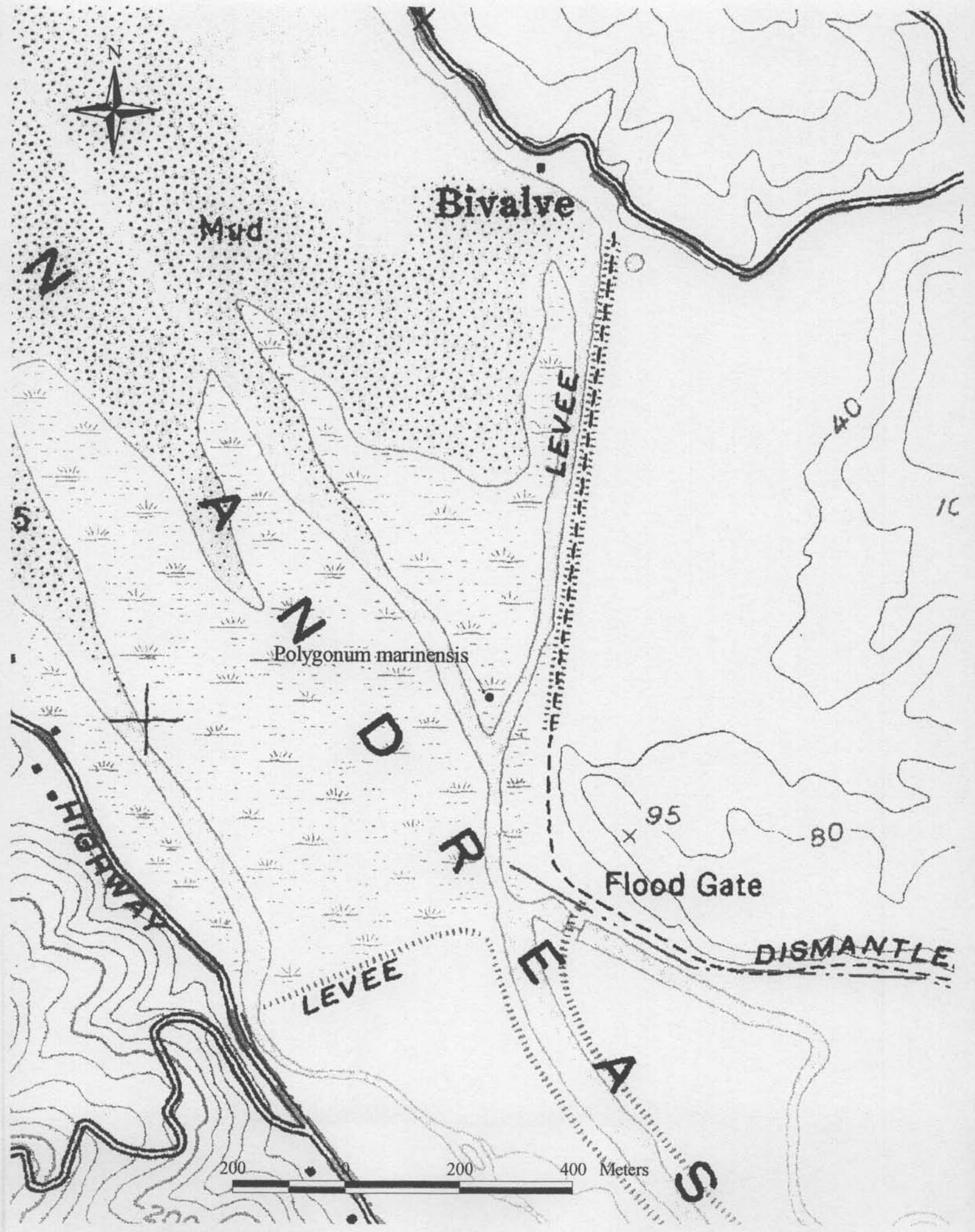
**Determination:** (Check one or more, fill in the blanks)

- \_\_\_\_ Keyed in a site reference: \_\_\_\_\_
- \_\_\_\_ Compared with specimen housed at: \_\_\_\_\_
- \_\_\_\_ Compared with photo/drawing in: \_\_\_\_\_
- \_\_\_\_ By another person (name): \_\_\_\_\_
- \_\_\_\_ Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	_____	_____	_____
Habitat	_____	_____	_____
Diagnostic Feature	_____	_____	_____
Other	_____	_____	_____

May we obtain duplicates at our expense?  yes  no



N

Mud

Bivalve

LEVEE

40

10

Polygnum marinensis

95

80

Flood Gate

DISMANTLE

HIGHWAY

LEVEE

E A S

200 400 Meters



## Rare Plant Species Field Survey Form

### Point Reyes National Seashore

Mail To:  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____
Copy to _____	Map Index # _____

Date of field work: 6 - 21 - 02  
mo day year

Scientific Name (no codes): Castilleja ambigua ssp ~~humboldtii~~ humboldtensis

Type of survey (circle one): Initial Survey Monitoring

Known <del>PORE</del> Population? Yes No
Population #: <u>NOT in PORE</u>
Species Found? <input checked="" type="checkbox"/> [ ] <small>yes no if not, why?</small>
Is this a. existing NDDB occurrence? [ ] [ ] [ ] <small>Yes, Occ. # no unk</small>

<b>Reporter:</b> <u>Michelle Coppolletta / Shelly Benson</u>
Address: <u>Point Reyes National Seashore</u>
Phone: <u>(415) 464-<del>5227</del> 5242</u>
Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: no count

How did you derive total #? (circle one)    Censusing    Sampling    Ocular Estimate

Areal Extent (sq m): \_\_\_\_\_    How did you obtain area? (circle one)    GPS    Measured    Estimated Area

Phenology: \_\_\_\_\_  
% vegetative    % flowering    100  
% fruiting

Comments:

- ~~most~~ all plants were dried up and "crisp"! This site definitely needs to be revisited when this plant is flowering to confirm id. We feel fairly confident though that what we found was C. ambigua ssp humboldtensis even though it was pretty far past its prime!

**Location:** (Please also attach or draw map on page 4.)

This population is located on an "island" of salt marsh in Tomales Bay. It is west of the Martinelli Ranch (GENRA) and north of the old flood gate. The easiest way to access this population is by boat! we put in at White House Pool and paddled up the main channel. See map for better idea of location.

County: Marin    Landowner/Mgr: \_\_\_\_\_

Quad Name: Inverness    Elevation: 0-10'    Datum \_\_\_\_\_

T \_\_\_\_\_ R \_\_\_\_\_    1/4 of \_\_\_\_\_    1/4 Sec \_\_\_\_\_

GPS unit: Timbic 603-BOB GPS accuracy: \_\_\_\_\_ Mapped (check one) \_\_\_\_\_ as polygon in GIS \_\_\_\_\_ on hand drawn map

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
<del>515</del> 515 200	4 215234	✓		

**Habitat Description:**

Aspect (check)  N  E  S  W  Flat  Multiple directions

Slope: (check one)  0°-20  20°-45  45°+  Vertical

Does plant community key? Yes No

If yes, Alliance: \_\_\_\_\_ Association: \_\_\_\_\_

Other rare ssp. present:

*Cordyianthus maritimus* ssp. *palustris*, *Polygonum maritimum*

Habitat Description (Plant communities, substrates/soils, etc):

salt marsh. Plants are found in "higher" marsh where the dominant species is *Distichlis spicata*.

**Site Information:**

Current /surrounding land use:

none?

Visible disturbances, possible threats:

Overall site quality:  Excellent  Good  Fair  Poor

Degree of cattle impacts:  High  Medium  Low  None

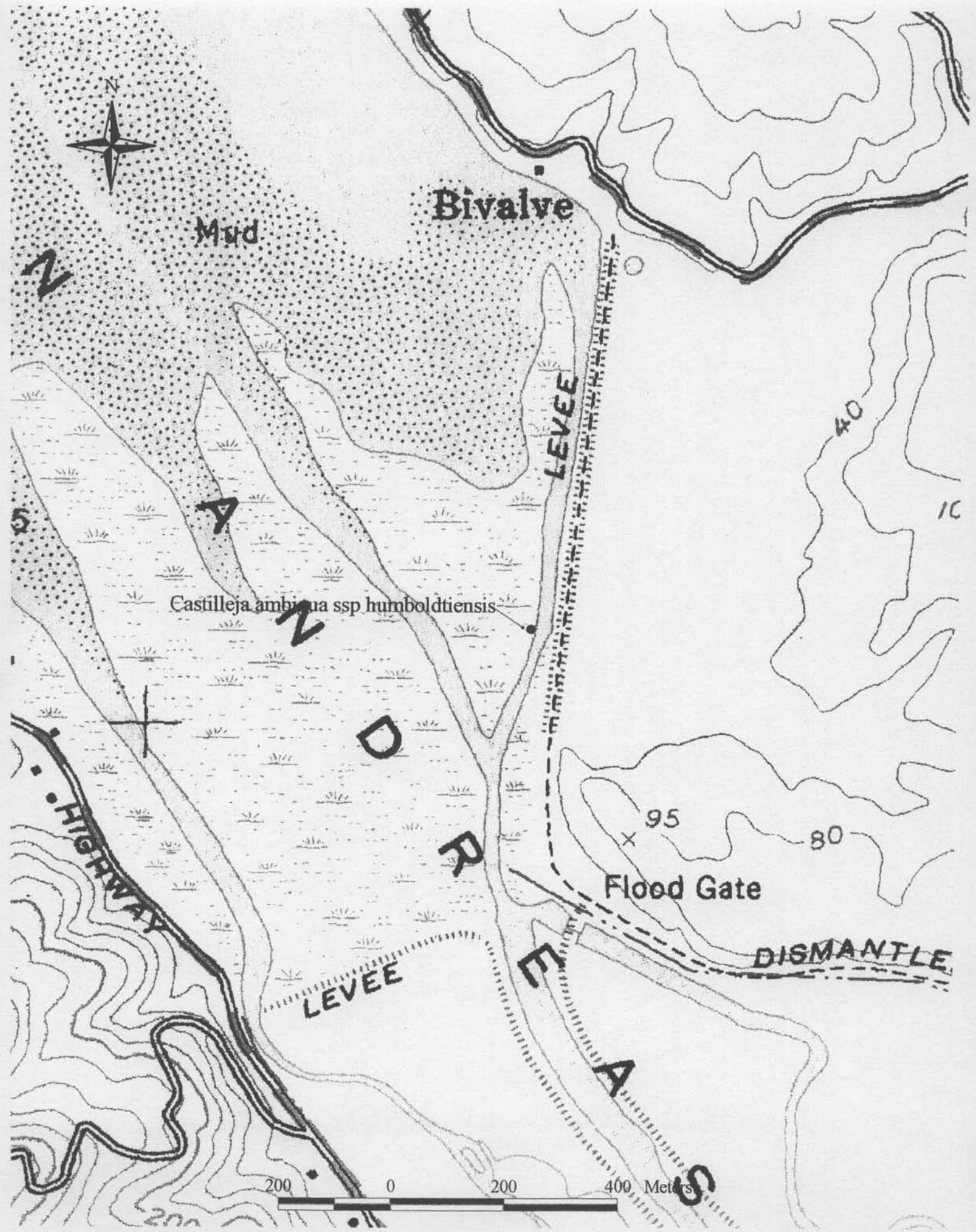
**Determination:** (Check one or more, fill in the blanks)

Keyed in a site reference: \_\_\_\_\_  
 Compared with specimen housed at: \_\_\_\_\_  
 Compared with photo/drawing in: \_\_\_\_\_  
 By another person (name): \_\_\_\_\_  
 Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	_____	_____	_____
Habitat	_____	_____	_____
Diagnostic Feature	_____	_____	_____
Other	_____	_____	_____

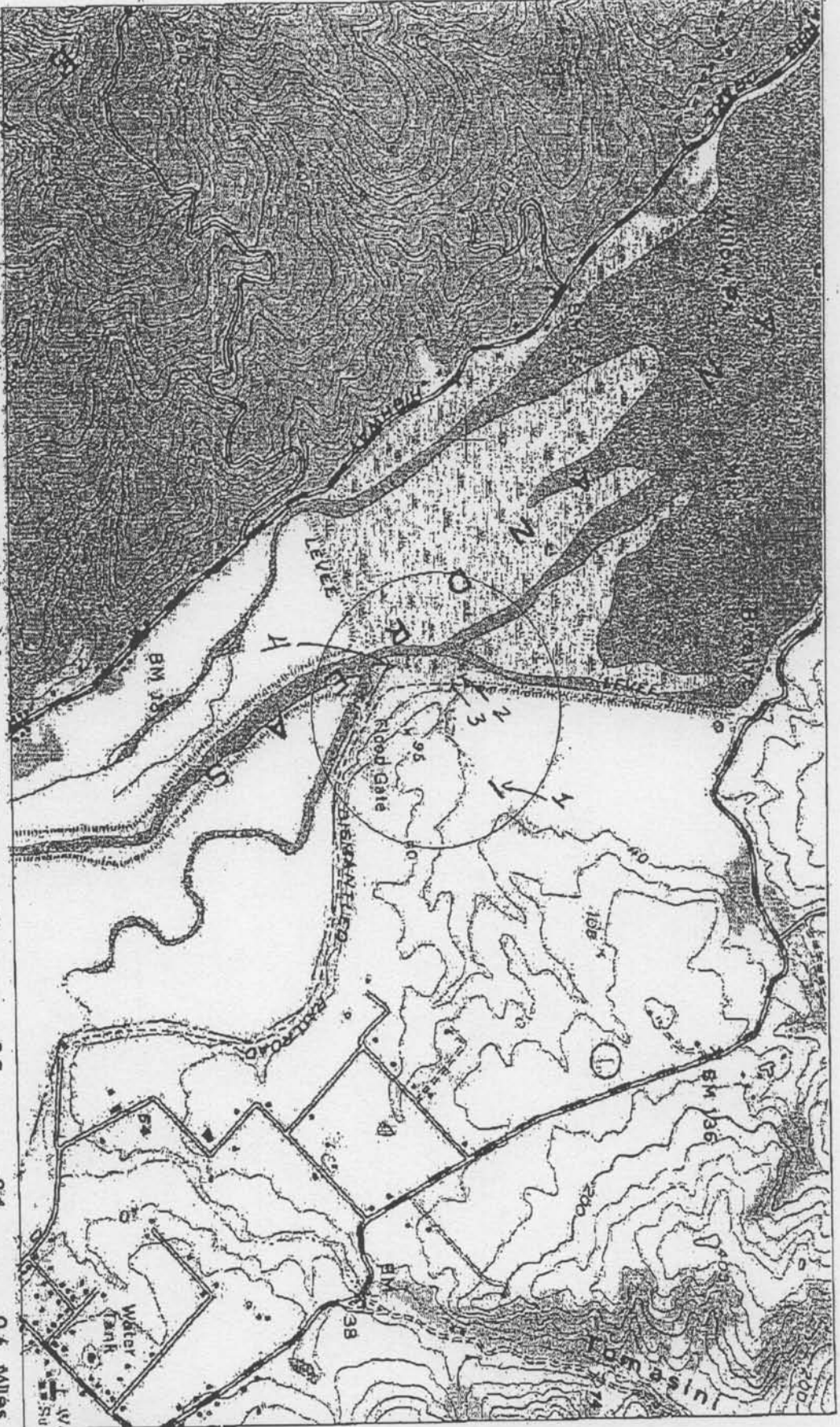
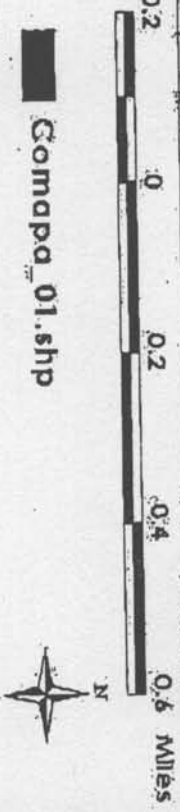
May we obtain duplicates at our expense?  yes  no





## **2003 Datasheets**

*Cordylanthus maritimus* ssp. *palustris*  
 Martinelli Ranch/Giacomini Welland, 2001  
 Inverness Quadrangle







COMAPA #1

Page 2 of

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn 

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
515,576	421515B ± 16.7	East end of polygon		

**Habitat Description:**Aspect (check)  N  E  S  W  Flat  Multiple directionsSlope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare ssp. present:

*Castilleja ambigua* ssp. *humboldtiana*

Habitat Description (Plant communities, substrates/soils, etc):

Marsh habitat dominated by *Distichlis spicata*.**Site Information:**

Current /surrounding land use:

Pasture land to east currently grazed

Visible disturbances, possible threats:

Small exotic species presence

Overall site quality: [ ] Excellent [  ] Good [ ] Fair [ ] Poor**Determination:** (Check one or more, fill in the blanks) Keyed in a site reference: The Jepson Manual Compared with specimen housed at: \_\_\_\_\_ Compared with photo/drawing in: \_\_\_\_\_ By another person (name): \_\_\_\_\_ Other: \_\_\_\_\_**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense? [ ] yes [  ] no

COMAPA #1

Plant Composition: (use percent cover or cover class)

## Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Rhynchospora spicata</i>	70%	5
<i>Alicornia virginica</i>	2%	2
<i>Juncus catharticus</i>	5%	2
<i>Juncus</i>	<1	1
<i>Pectua rubra?</i>	<1	2
<i>Tridactyon</i>	4%	2
<i>Aggiton a?</i> (hatched lf)	<1	1
<i>Plantago</i>	<1	1
<i>Franklinia salina</i>	<1	1

## Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Hordeum murinum</i>	<1	1
<i>Bromus hordeaceus</i>	<1	1
<i>Polygonum mansuetianum</i>	<1	1
<i>Colium multiflorum</i>	<1	1

1. cover classes: (1) &lt;1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%

## Rare Plant Species Field Survey Form Golden Gate National Recreation Area

Mail To:  
Natural Diversity Data Base  
California Dept. of Fish and Game  
1416 Ninth Street, 12<sup>th</sup> Floor  
Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 6 - 23 - 03  
mo day year

Scientific Name (no codes): *Cordy lanthus merittimus* ssp *palustris*

Type of survey (circle one): Initial Survey  **Monitoring**

Known GOGA Population? <input checked="" type="radio"/> Yes <input type="radio"/> No
Population #: <u>2</u>
Species Found? <input checked="" type="checkbox"/> [ ] <input type="checkbox"/> [ ] yes no (if not, why?)
Is this an existing NDDDB occurrence? [ ] [ ] [ ] Yes, Occ. # no unk

Reporter: Jeanne Taylor  
Address: 34 Marie, Sausalito, CA  
Phone: 415-331-8737 94962  
Other knowledgeable individuals (name/address/phone):

### Plant Information:

Total # Individuals: 230

How did you derive total #? (circle one) **Censusing**  Sampling  Ocular Estimate

Population Area (exact number if possible): < 1 m<sup>2</sup> 1-5 m<sup>2</sup> 5-10 m<sup>2</sup> 10-100 m<sup>2</sup>  100m<sup>2</sup>-1ha 1 ha+ (=2 ac)

How did you obtain area? (circle one) **GPS**  Measured  Estimated Area

Phenology: 30% 70% \_\_\_\_\_  
% vegetative % flowering % fruiting

Comments:

### Location: (Please also attach or draw map on page 4.)

Diabromi wetland. Area accessed from Tomales Bay Trailhead on Highway 1, north of Point Reyes Station. Follow trail out towards bay past 2 ponds. Trail widens into old road. Follow to end until reach flood gate. From flood gate proceed west then north curving around slope to east. Continue north until come to an old fence. Population is found on the north side of the fence.

County: Marin Landowner/Mgr: Golden Gate NRA  
Quad Name: Inverness Elevation: \_\_\_\_\_ Datum: \_\_\_\_\_  
T R 1/4 of 1/4 Sec



COMAPA #2

Page 2 of 2

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME

UTMN

Center of Polygon

Distinct Cluster  
of PlantsIndividual Plants  
(indicate #)**Habitat Description:**Aspect (check)  N  E  S  W  Flat  Multiple directionsSlope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare spp. present:

*Castilleja ambigua* ssp. *humboldtiana*

Habitat Description (Plant communities, substrates/soils, etc):

Marsh habitat dominated by *Distichlis spicata* and  
*Triglochin***Site Information:**

Current /surrounding land use:

Pasture land to east currently grazed

Visible disturbances, possible threats:

Overall site quality:  Excellent  Good  Fair  Poor**Determination:** (Check one or more, fill in the blanks)

- Keyed in a site reference: The Jepson Manual
- Compared with specimen housed at: \_\_\_\_\_
- Compared with photo/drawing in: \_\_\_\_\_
- By another person (name): \_\_\_\_\_
- Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense?  Yes  No



## Rare Plant Species Field Survey Form

### Golden Gate National Recreation Area

Mail To:  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 6 - 23 - 03  
mo day year

Scientific Name (no codes): *Cordylanthus maritimus* ssp. *palustris*

Type of survey (circle one): Initial Survey  **Monitoring**

Known GOGA Population? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Population #: <u>3</u>
Species Found? <input checked="" type="checkbox"/> [ ] <input type="checkbox"/> _____ <small>yes no if not, why?</small>
Is this an existing NDDDB occurrence? [ ] [ ] [ ] <small>Yes, Occ. # no unk</small>

Reporter: Jeanne Taylor  
 Address: 34 Maria, Sausalito, CA 94964  
 Phone: 415/331-8737  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: 3,010

How did you derive total #? (circle one) **Censusing**  Sampling  Ocular Estimate

Population Area (exact number if possible): \_\_\_\_\_ < 1 m<sup>2</sup> \_\_\_\_\_ 1-5 m<sup>2</sup> \_\_\_\_\_ 5-10 m<sup>2</sup> \_\_\_\_\_ 10-100 m<sup>2</sup> \_\_\_\_\_ 100m<sup>2</sup>-1ha \_\_\_\_\_ 1 ha+ (=2.3 ac)

How did you obtain area? (circle one) **GPS**  Measured  Estimated Area

Phenology: 30% 70% \_\_\_\_\_  
% vegetative % flowering % fruiting

Comments:

**Location:** (Please also attach or draw map on page 4.)

*Araucaria* wetland. Area accessed from Tomales Bay Trailhead on Highway 1, north of Point Reyes Station. Follow trail out towards bay past 2 ponds. Trail widens into old road. Follow to end until reach flood gate. From flood gate proceed west then north during covered slope to east. Continue north until come to old fence. Population begins south of fence.

County: Marin Landowner/Mgr: Golden Gate NRA

Quad Name: 1A6B22 Elevation: \_\_\_\_\_ Datum \_\_\_\_\_

T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_



COMAPA #3

Page 2

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_ Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (Indicate #)

**Habitat Description:**

Aspect (check)  N  E  S  W  Flat  Multiple directions

Slope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare ssp. present:  
*Castilleja ambigua* ssp. *humboldtiana*

Habitat Description (Plant communities, substrates/soils, etc):  
 Marsh habitat dominated by *Distichlis spicata*,  
*Adicnema virginica*, and *Troglodan*

**Site Information:**

Current /surrounding land use:  
 Pasture land to east currently grazed

Visible disturbances, possible threats:

Overall site quality:  Excellent  Good  Fair  Poor

**Determination:** (Check one or more, fill in the blanks)

Keyed in a site reference: The Jepson Manual

Compared with specimen housed at: \_\_\_\_\_

Compared with photo/drawing in: \_\_\_\_\_

By another person (name): \_\_\_\_\_

Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense?  Yes  No

COMPARA #3

Plant Composition: (use percent cover or cover class)

## Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Distichlis spicata</i>	40%	4
<i>Salicornia virginica</i>	15%	3a
<i>Triglochin</i>	20%	3b
<i>Juncus carnesa</i>	15%	3a
<i>Limnolobos californicus</i>	<1	1
<i>Plantago</i>	<1	1
<i>Potentilla</i>	<1	1

## Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Catula conyersii</i> folia	<1	1
<i>Polypogon monspeliensis</i>	<1	1

1. cover classes: (1) &lt;1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%





COMADA #4

Page 2

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME

UTMN

Center of Polygon

Distinct Cluster  
of PlantsIndividual Plants  
(Indicate #)**Habitat Description:**Aspect (check)  N  E  S  W  Flat  Multiple directionsSlope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare spp. present:

*Cuscutilla umbryana* ssp. *humboldtianensis*

Habitat Description (Plant communities, substrates/soils, etc):

Marsh habitat dominated by *Distichlis spicata*,  
*Typhochloa* sp.; and *Salicornia virginica*.**Site Information:**

Current /surrounding land use:

Pasture land to east currently grazed.

Visible disturbances, possible threats:

Overall site quality: [ ] Excellent [  ] Good [ ] Fair [ ] Poor**Determination:** (Check one or more, fill in the blanks) Keyed in a site reference: The Jepson Manual Compared with specimen housed at: \_\_\_\_\_ Compared with photo/drawing in: \_\_\_\_\_ By another person (name): \_\_\_\_\_ Other: \_\_\_\_\_**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense? [ ] yes [  ] no

COMADA #4

Plant Composition: (use percent cover or cover class)

## Dominant Plant Species

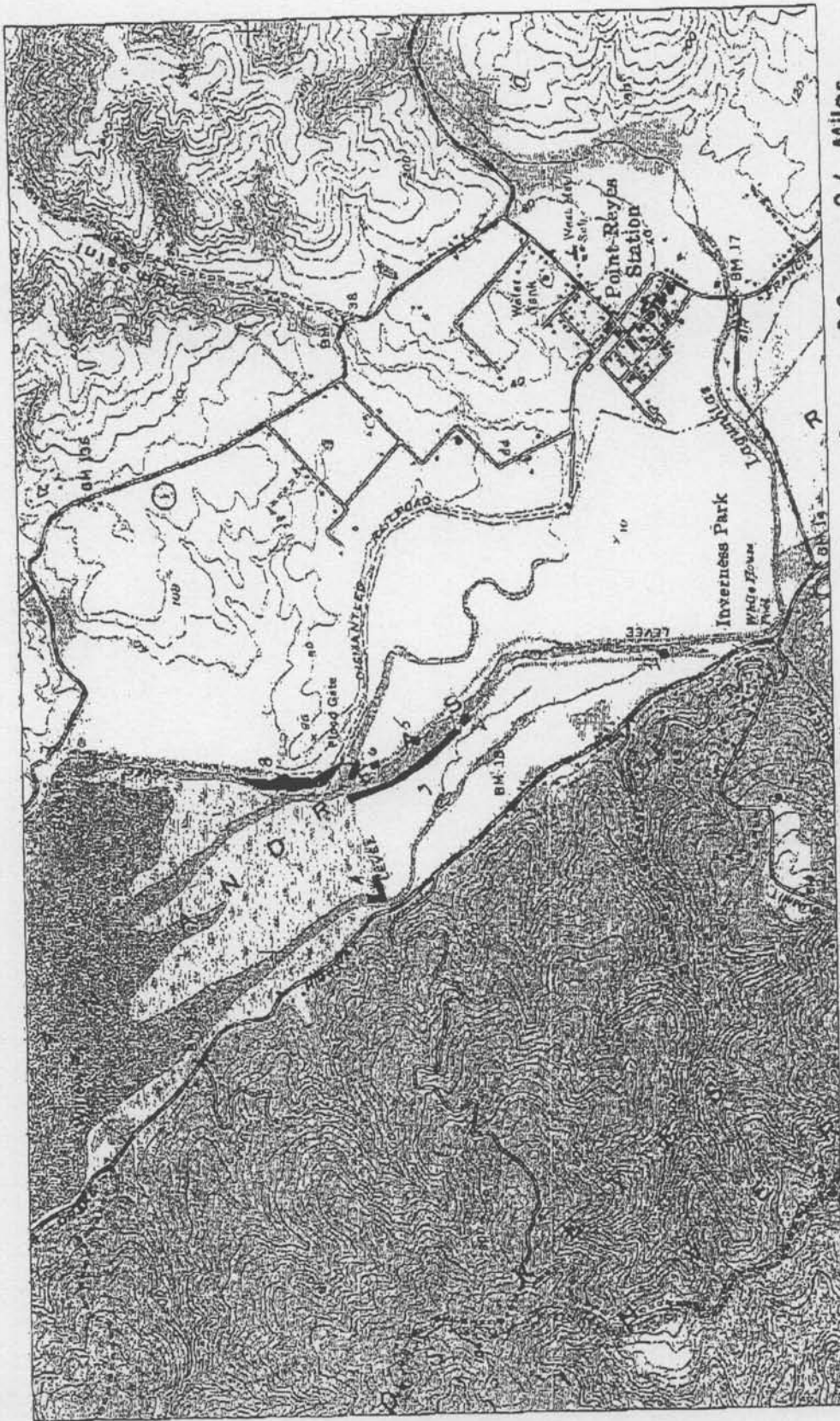
Species	Percent Cover	Cover Class <sup>1</sup>
<i>Ornithoglossum spicatum</i>	55%	5
<i>Triglochin</i>	5%	2
<i>Juncus carnosus</i>	1%	2
<i>Galium aparine</i>	10%	3a
<i>Frankia sp.</i>	1%	2

## Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Cotula coronopifolia</i>	<1	1
<i>Polygonum monspeliense</i>	<1	1

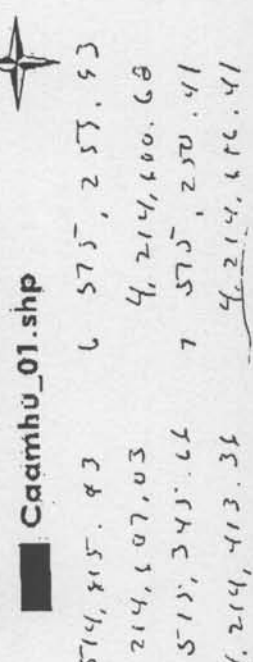
1. cover classes: (1) <1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%

8 lower area 575, 213, 21  
 4, 214, 743, 51  
 upper area 575, 203, 13  
 4, 215, 181, 71



**Castilleja ambigua ssp. humboldtensis**

Martineil Ranch/Giacomini Wetland, 2001  
 Inverness Quadrangle



Caamhu\_01.shp

1	575, 682, 21	3	lower area	575, 350, 11	4	574, 815, 43	6	575, 253, 93
	4, 213, 337, 03			4, 214, 223, 21		4, 214, 107, 03	4	214, 600, 68
2	575, 428, 21		upper area	575, 123, 41	5	513, 343, 66	7	575, 250, 41
	4, 214, 280, 63			4, 114, 714, 58		4, 214, 413, 36	4	214, 616, 41



## Rare Plant Species Field Survey Form

### Golden Gate National Recreation Area

Mail To:  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 5 - 26 - 03  
mo day year

Scientific Name (no codes): Castilleja ambigua ssp. Humboldtiana

Type of survey (circle one): Initial Survey  **Monitoring**

Known GOGA Population? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Population #: <u>3</u>
Species Found? <input checked="" type="checkbox"/> [ ] <input type="checkbox"/> <small>yes no if not, why?</small>
Is this an existing NDDDB occurrence? [ ] [ ] [ ] <small>Yes, Occ. # no unk</small>

Reporter: Jeanne Taylor  
 Address: 34 Marie, Sausalito, CA 94965  
 Phone: 415/331-8737  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: 165,300\*

How did you derive total #? (circle one) Censusing  **Sampling**  Ocular Estimate

Population Area (exact number if possible):  < 1 m<sup>2</sup>  1-5 m<sup>2</sup>  5-10 m<sup>2</sup>  10-100 m<sup>2</sup>  100m<sup>2</sup>-1 ha  1 ha+ (=2 ac)

How did you obtain area? (circle one) **GPS**  Measured  Estimated Area

Phenology:  % vegetative  100% % flowering  % fruiting

#### Comments:

\*Total # of individuals w/in entire population (polygon) was estimated by extrapolating from total # of individuals found in 5-7 1m<sup>2</sup> long area of polygon was walked from NW → SE, at every 10 meters the total # of individuals occurring in a 1 meter square was recorded. Many plants very diminutive - single stemmed, rather than multi-stemmed.

#### Location: (Please also attach or draw map on page 4.)

St. Acorn's wetland - Marsh habitat occurring along west bank of White House creek. Area accessed from St. Francis Drive of White House creek. Area accessed from St. Francis Drive, pull into 2<sup>nd</sup> Blvd. Heading north on St. Francis Drive, pull into 2<sup>nd</sup> Blvd. Heading north on St. Francis Drive (East side of road). Enter turnout after Dralica View Drive (East side of road). Enter through small metal gate and proceed towards bay (east) along levee. Population occurs on west bank of creek channel extending from weather station @ north end south to point

County: Marin Landowner/Mgr: Golden Gate NRA

Quad Name: Laverness Elevation: \_\_\_\_\_ Datum \_\_\_\_\_

T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_

where flat bank ends and levee meets water's edge

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_ Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
515, 390	4, 214, 229	South end of polygon		
575, 120	4, 214, 714	North end of polygon		

**Habitat Description:**

Aspect (check)  N  E  S  W  Flat  Multiple directions

Slope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare spp. present:

**Habitat Description (Plant communities, substrates/soils, etc):**

Marsh habitat on west bank of White House Creek. Habitat dominated by *Triglochin* sp., *Sagittaria virginica* and *Diatryblon spicatum*. Dominance of each species varies as move through length of population. A levee runs parallel to bank along west edge.

**Site Information:**

Current/surrounding land use:

Pasture land to west, currently grazed

Visible disturbances, possible threats:

A few exotic species present primarily along west edge of bank @ base of levee

Overall site quality: [ ] Excellent [  ] Good [ ] Fair [ ] Poor

**Determination:** (Check one or more, fill in the blanks)

- Keyed in a site reference: The Jepson Manual
- Compared with specimen housed at: \_\_\_\_\_
- Compared with photo/drawing in: \_\_\_\_\_
- By another person (name): \_\_\_\_\_
- Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense? [ ] yes [ ] no

CAAMITHU #3

Plant Composition: (use percent cover or cover class)

## Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Dianthus spicatus</i>	20%	4
<i>Acalycornis virginica</i>	35%	4
<i>Triglochin</i>	55%	5
<i>Helianthus strictus?</i>	1%	2
<i>Limonium californicum</i>	1%	2
<i>Potentilla</i>	<1%	1
<i>Festuca rubra?</i>	2%	2

## Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Polygonum monspeliense</i>	1%	2
<i>Centaurea coronopifolia</i>	<1%	1
<i>Hordeum murinum</i>	<1%	1

1. cover classes: (1) <1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%

Dominance of *Dianthus*, *Acalycornis* and *Triglochin* vary along length of polygon. Above numbers represent an average cover throughout habitat.



## Rare Plant Species Field Survey Form

### Golden Gate National Recreation Area

**Mail To:**  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 5 - 12 - 03  
mo day year

Scientific Name (no codes): Castilleja ambigua ssp. humboldtensis

Type of survey (circle one): Initial Survey  **Monitoring**

Known GOGA Population? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Population #: <u>#5</u>
Species Found? [ <input checked="" type="checkbox"/> ] [ ] <small>yes no if not, why?</small>
Is this an existing NDDDB occurrence? [ ] [ ] [ ] <small>Yes, Occ. # no unk</small>

**Reporter:** Jeanne Taylor  
**Address:** 34 Marie, Sausalito, CA 94965  
**Phone:** 415/331-8737  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: ≈ 100

How did you derive total #? (circle one) Censusing  Sampling  **Ocular Estimate**

Population Area (exact number if possible):  < 1 m<sup>2</sup>  1-5 m<sup>2</sup>  5-10 m<sup>2</sup>  10-100 m<sup>2</sup>  100m<sup>2</sup>-1ha  1 ha+ (=2 1/2 ac)

How did you obtain area? (circle one) GPS  Measured  **Estimated Area**

Phenology: 100%  
% vegetative % flowering % fruiting

Comments:

Population consists of 2 small patches separated by approximately 10 meters. 2<sup>nd</sup> patch north of 1<sup>st</sup>. Both patches approximately 4m x 5m.

**Location:** (Please also attach or draw map on page 4.)

Alicornai wetland - southern most population of three populations occurring south of flood gate, NE side of channel. Area reached from Pomoles Bay Trailhead on Highway 1, north of Point Reyes Station. Follow trail out towards bay, past 2 ponds. Trail widens into old road. Follow to end until reach flood gate and old railroad levee. (See attached map). Cross over flood gate and continue south along  
 County: Marin Landowner/Mgr: Golden Gate NRA

Quad Name: Inverness Elevation: \_\_\_\_\_ Datum \_\_\_\_\_

T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_

marsh pond. Use GPS coordinates to locate center of population

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

## UTM Coordinates:

## Point Represents:

UTME

UTMN

Center of Polygon

Distinct Cluster  
of PlantsIndividual Plants  
(Indicate #)

515365

4,214386.

**Habitat Description:**

Aspect (check)  N  E  S  W  Flat  Multiple directions

Slope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare ssp. present:

Habitat Description (Plant communities, substrates/soils, etc):

Lightly disturbed salt marsh habitat. Disturbance <sup>spicata</sup> Disturbance predominant w/ some Salicornia virginica and Triglochin sp.  
Polypogon monspeliensis and Cotula coronopifolia present.

**Site Information:**

Current /surrounding land use:

Pasture to the NE, currently grazed Cows present found w/in population

Visible disturbances, possible threats:

Some trampling by cattle

Overall site quality: [ ] Excellent [ ] Good [  ] Fair [ ] Poor

**Determination:** (Check one or more, fill in the blanks)

Keyed in a site reference: The Jepson Manual  
 Compared with specimen housed at: \_\_\_\_\_  
 Compared with photo/drawing in: \_\_\_\_\_  
 By another person (name): \_\_\_\_\_  
 Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	_____	_____	_____
Habitat	_____	_____	_____
Diagnostic Feature	_____	_____	_____
Other	_____	_____	_____

May we obtain duplicates at our expense? [ ] yes [  ] no

CAAMHU #5

Plant Composition: (use percent cover or cover class)

Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Adicorua virginica</i>		
<i>Rotifolia spicata</i>		
<i>Triglochin</i>		
<i>Hemerocallis californicum</i>		
<i>Festuca rubra?</i>		

Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Cotula coronopifolia</i>		
<i>Polypogon monspeliensis</i>		
<i>Convolvulus arvensis</i>		

1. cover classes: (1) <1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%



## Rare Plant Species Field Survey Form

### Golden Gate National Recreation Area

Mail To:  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 5 - 12 - 03  
mo day year

Scientific Name (no codes): Castilleja ambigua ssp. humboldtiana

Type of survey (circle one): Initial Survey  **Monitoring**

Known GOGA Population? <input checked="" type="radio"/> Yes <input type="radio"/> No
Population #: <u>6</u>
Species Found? [ <input checked="" type="checkbox"/> ] [ <input type="checkbox"/> ] _____ <small>yes no if not, why?</small>
Is this an existing NDDDB occurrence? [_____] [ ] [ ] <small>Yes, Occ. # no unk</small>

Reporter: Jeanne Taylor  
 Address: 34 Marre, Sausalito, Cal 94965  
 Phone: 415/321-8737  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: 144

How did you derive total #? (circle one) **Censusing**  Sampling  Ocular Estimate

Population Area (exact number if possible): \_\_\_\_\_ < 1 m<sup>2</sup> \_\_\_\_\_ 1-5 m<sup>2</sup> \_\_\_\_\_ 5-10 m<sup>2</sup>  10-100 m<sup>2</sup> \_\_\_\_\_ 100m<sup>2</sup>-1ha \_\_\_\_\_ 1 ha+ (=2 1/2 ac)

How did you obtain area? (circle one) GPS  Measured  **Estimated Area**

Phenology: \_\_\_\_\_ % vegetative \_\_\_\_\_ 100% % flowering \_\_\_\_\_ % fruiting

Comments:

**Location:** (Please also attach or draw map on page 4.)

Graciami wetland - middle of three populations occurring south of flood gate, NE side of channel. Area reached from Tomales Bay Trail head on Highway 1, north of Point Reyes Station. Follow trail out towards bay, past 2 ponds. Trail widens into old road. Follow to end until reach flood gate and old rail road levee (see attached map.) Cross over flood gate and continue south along bank. Population is adjacent to cement trough.

County: Marin Landowner/Mgr: Golden Gate NRA

Quad Name: Inverness Elevation: \_\_\_\_\_ Datum \_\_\_\_\_

T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 Sec \_\_\_\_\_

CAAMHU #6

Page 2 of &lt;

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
515, 259	4,214, 600	<input checked="" type="checkbox"/>		

**Habitat Description:**Aspect (check)  N  E  S  W  Flat  Multiple directionsSlope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare ssp. present:

Habitat Description (Plant communities, substrates/soils, etc):

Moderately disturbed marsh habitat. Numerous cow prints, fair amount of bare ground. Distraction is a predominant plant followed by *Triglochin* sp.; some *Alicornia virginica*.

**Site Information:**

Current /surrounding land use:

Pasture land to NE, currently grazed

Visible disturbances, possible threats:

Trampling by cows

Overall site quality:  Excellent  Good  Fair  Poor**Determination:** (Check one or more, fill in the blanks)

Keyed in a site reference: The Jepson Manual  
 Compared with specimen housed at: \_\_\_\_\_  
 Compared with photo/drawing in: \_\_\_\_\_  
 By another person (name): \_\_\_\_\_  
 Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense?  Yes  No

Plant Composition: (use percent cover or cover class)

Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Diatrichlis spicata</i>	27%	4
<i>Tirglochin</i>	10%	3a
<i>Aclerorhiza virginica</i>	2%	2
<i>Festuca rubra?</i>	1%	2
<i>Gaumea cornosa</i>	1%	2
Bare ground	20%	3b

Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Polypogon monspeliensis</i>	<1%	1
<i>Cotula coronopifolia</i>	1%	2

1. cover classes: (1) <1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%



### Rare Plant Species Field Survey Form Golden Gate National Recreation Area

Mail To:  
Natural Diversity Data Base  
California Dept. of Fish and Game  
1416 Ninth Street, 12<sup>th</sup> Floor  
Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 5-12-03  
mo day year

Scientific Name (no codes): Castilleja ambigua ssp. humboldtiana

Type of survey (circle one): Initial Survey Monitoring

Known GOGA Population?  Yes  No  
 Population #: 7  
 Species Found?     
yes no if not, why?  
 Is this an existing NDDDB occurrence?     
Yes, Occ. # no unk

Reporter: Jeanne Taylor  
 Address: 34 Marin, Sausalito, CA 94965  
 Phone: 415/331-8737  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: 15,750\*  
 How did you derive total #? (circle one) Censusing  Sampling  Ocular Estimate  
 Population Area (exact number if possible):  < 1 m<sup>2</sup>  1-5 m<sup>2</sup>  5-10 m<sup>2</sup>  10-100 m<sup>2</sup>  100m<sup>2</sup>-1ha  1 ha+ (=2 1/2 ac)  
 How did you obtain area? (circle one) GPS  Measured  Estimated Area  
 Phenology:  % vegetative  100% % flowering  % fruiting

Comments: \*Total # of individuals within entire population (poly gym) was estimated by extrapolating from total # of individuals found in 30 m<sup>2</sup> long axis of poly gym was walked from NW to SE end. At every 10 meters the total # of individuals occurring in a 1m<sup>2</sup> square was recorded. Most individuals concentrated in the SE portion of poly gym.

#### Location: (Please also attach or draw map on page 4.)

Area contains wetland - northern most population of three pops. found south of flood gate, NE side of channel. Area reached from Tomales Bay Trail head on Highway 1 north of Pt. Reyes Station. Follow trail out towards bay past 2nd trail widens into old road. Follow to end until reach flood gate and old rutroad levee (see attached map). Cross over flood gate and proceed to NW end of marsh. Begin counts

County: Marin Landowner/Mgr: Golden Gate NRA  
 Quad Name: 1449200 Elevation: \_\_\_\_\_ Datum \_\_\_\_\_  
 T \_\_\_\_\_ R \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/8 Sec \_\_\_\_\_

at water edge and proceed to SE edge of pop.

CAAMITU #7

Page 2 of 2

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME

UTMN

Center of Polygon

Distinct Cluster  
of PlantsIndividual Plants  
(indicate #)

575, 250

4, 214, 686

**Habitat Description:**Aspect (check)  N  E  S  W  Flat  Multiple directionsSlope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare ssp. present:

Habitat Description (Plant communities, substrates/soils, etc):

Undisturbed salt marsh habitat. North end of pop. bordered by water w/ dense concentration of *Distichlis spicata*, *Triglochin* sp., *Salicornia virginica*, *Potentilla* sp. South end west portions of pop. *Salicornia rubra* more predominant. *Castilleja* concentrated in SE portion of polygon

**Site Information:**

Current /surrounding land use:

Pasture land to east currently grazed

Visible disturbances, possible threats:

None

Overall site quality:  Excellent  Good  Fair  Poor**Determination:** (Check one or more, fill in the blanks) Keyed in a site reference: The Jepson Manual Compared with specimen housed at: \_\_\_\_\_ Compared with photo/drawing in: \_\_\_\_\_ By another person (name): \_\_\_\_\_ Other: \_\_\_\_\_**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	_____	_____	_____
Habitat	_____	_____	_____
Diagnostic Feature	_____	_____	_____
Other	_____	_____	_____

May we obtain duplicates at our expense?  Yes  No

CAAMHU #7

Plant Composition: (use percent cover or cover class)

## Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Dactyloctenium aegyptium</i>	50%	4
<i>Triglochin</i>	38%	4
<i>Abricoraria virginica</i>	25%	3b
<i>Limonium californicum</i>	<1	1
<i>Portulaca</i>	8%	3a
<i>Festuca rubra</i>	15%	3a
<i>Castilleja ambigua</i>	1%	2
<i>Grindelia (stricta) ?</i>	1%	2
Bare ground	1	2

## Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Cotula coronopifolia</i>	<1	2
<i>Festuca arundinacea</i>	<1	2

1. cover classes: (1) &lt;1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%



## Rare Plant Species Field Survey Form

### Golden Gate National Recreation Area

Mail To:  
 Natural Diversity Data Base  
 California Dept. of Fish and Game  
 1416 Ninth Street, 12<sup>th</sup> Floor  
 Sacramento, CA 95814

For office use only	
Source Code _____	Quad Code _____
Elm Code _____	Occ # _____

Date of field work: 5 - 26 - 03  
mo day year

Scientific Name (no codes): Castilleja ambigua ssp humboldtiana

Type of survey (circle one): Initial Survey  **Monitoring**

Known GOGA Population? <input checked="" type="radio"/> Yes <input type="radio"/> No
Population #: <u>8</u>
Species Found? [ <input checked="" type="checkbox"/> ] [ ] <small>yes no if not, why?</small>
Is this an existing NDDDB occurrence? [ ] [ ] [ ] <small>Yes, Occ. # no unk</small>

Reporter: Jeanne Taylor  
 Address: 34 Marie Sausalito, CA 94965  
 Phone: 415/331-8737  
 Other knowledgeable individuals (name/address/phone):

#### Plant Information:

Total # Individuals: 344,800 <sup>4</sup>

How did you derive total #? (circle one) Censusing  **Sampling**  Ocular Estimate

Population Area (exact number if possible):  < 1 m<sup>2</sup>  1-5 m<sup>2</sup>  5-10 m<sup>2</sup>  10-100 m<sup>2</sup>  100m<sup>2</sup>-1ha  1 ha+ (=2 1/2 ac)

How did you obtain area? (circle one) GPS  Measured  Estimated Area

Phenology: 100%  
% vegetative % flowering % fruiting

Comments:  
 \*Total # of individuals w/in entire population (polygon) was estimated by extrapolating from total # of individuals found in 60 1m<sup>2</sup> long axis of polygon was walked from N→S. At every 10 meters the total # of individuals occurring in a 1m<sup>2</sup> square was recorded. South end of polygon is more weedy than North end. CAAMH occurs in both weedy and non-weedy areas

Location: (Please also attach or draw map on page 4.)

Atacomini wetland - large flat area of marsh which extends west of flood gate and north around a low ridge covered with annual grassland and coastal scrub. Willows occur along base of slope bordering marsh. Area reached from Tomales Bay Trail head on Highway 1, north of Point Reyes station. Follow trail out towards bay past 2 ponds. Trail widens into old road. Follow to end until reach flood gate. Atayine on north side of channel, pop. begins in more disturbed marsh habitat west of flood gate and

County: Marin Landowner/Mgr: Golden Gate NRA  
 Quad Name: 144965 Elevation: \_\_\_\_\_ Datum \_\_\_\_\_  
T R 1/4 of 1/4 Sec

CAAM114 #8

Page 2

GPS unit: \_\_\_\_\_ GPS accuracy: \_\_\_\_\_ Mapped (check one)  as polygon in GIS \_\_\_\_\_ on hand drawn

UTM Coordinates: \_\_\_\_\_

Point Represents: \_\_\_\_\_

UTME	UTMN	Center of Polygon	Distinct Cluster of Plants	Individual Plants (indicate #)
515, 209	4, 215, 181	North end of polygon		
515, 275	4, 214, 743	South end of polygon		

**Habitat Description:**Aspect (check)  N  E  S  W  Flat  Multiple directionsSlope: (check one)  0°-20  20°-45  45°+  Vertical

Other rare ssp. present:

*Cordylaanthus maritimus* ssp. *palustris* (not yet flowering)

Habitat Description (Plant communities, substrates/soils, etc):

Marsh habitat with varying degree of disturbance. North end of population near flood gate moderately disturbed. *Salicornia* *multiflorum*, *Spartina* *corniculata*, *Hedysarum* *maritimum* found in this area. As more north through population, cover of weedy species decreases and habitat is dominated by *Triglochin* sp., *Salicornia* *virginica* and *Distichlis* *spicata*.

**Site Information:**

Current /surrounding land use:

Pasture land currently grazed

Visible disturbances, possible threats:

No disturbance in north end. Lower end likely to have been disturbed during installation of flood gate and railroad levee.

Overall site quality:  Excellent  Good  Fair  Poor**Determination:** (Check one or more, fill in the blanks)

- Keyed in a site reference: The Jepson Manual  
 Compared with specimen housed at: \_\_\_\_\_  
 Compared with photo/drawing in: \_\_\_\_\_  
 By another person (name): \_\_\_\_\_  
 Other: \_\_\_\_\_

**Photographs:** (Check one or more)

	Digital	Slide	Print
Plant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Diagnostic Feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense?  Yes  No

CAAM 11A #8

Plant Composition: (use percent cover or cover class)

## Dominant Plant Species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Distichlis spicata</i>	20%	3b
<i>Triglochin</i>	35%	4
<i>Salicornia virginica</i>	10%	3a
<i>Castilleja ambigua</i> ssp. <i>humboldtiana</i>	4%	2
<i>Frankia salina</i>	1%	2
<i>Limnium californicum</i>	<1%	1
<i>Spergularia macrotheca</i>	<1%	1
<i>Jaumea carnosa</i>	11%	3a

## Non-Native plant species

Species	Percent Cover	Cover Class <sup>1</sup>
<i>Polypogon monspeliensis</i>	<1	1
<i>Catula coronopifolia</i>	<1	1
<i>Hordeum <u>marinum</u> ?</i>	.1	2
<i>Lolium multiflorum</i>	<1	1
<i>Lotus corniculatus</i>	<1	1
<i>Rumex</i>		

1. cover classes: (1) ≤1% (2) 1-5% (3a) 6-15% (3b) 16-25% (4) 26-50% (5) 51-75% (6) 76-100%