

**Appendix F**  
**Special Status Plant Survey and Vegetation**  
**Community Mapping/ESHA/Wetland Baseline**  
**Evaluation**



# Technical Memorandum

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To: Nordic Aquafarms

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**Subject: Special Status Plant Survey and Vegetation Community Mapping/ESHA/Wetland Baseline Evaluation, Rev. 1**

## 1. Introduction

### 1.1 Summary

This Technical Memorandum reports the results of botanical studies at the Samoa Peninsula Land-based Aquaculture Project proposed by Nordic Aquafarms California, LLC. (NAFC). Botanical studies consisted of seasonally appropriate floristic surveys for special status plants, vegetation mapping, and assessment of Sensitive Natural Communities, Environmentally Sensitive Habitat Areas (ESHA), and wetlands. GHD conducted surveys for special status plant species and vegetation mapping during the spring and summer of 2020 (March 24-July 27).

### 1.2 Project Description

The Samoa Peninsula Land-based Aquaculture Project (Project) would be located at the site of the former Freshwater Tissue Samoa Pulp Mill located on the Samoa Peninsula in the unincorporated community Samoa in Humboldt County, California. See Figure 1 for the Vicinity Map in Appendix A. The Project would include brownfield redevelopment with demolition of existing pulp mill infrastructure and construction of a sustainable land-based finfish aquaculture facility. The land-based finfish aquaculture facility and associated infrastructure would cover approximately 36 acres. Although much of the proposed development would occur within the current footprint of the pulp mill, it is also proposed to expand into the undeveloped, but previously impacted, area of the parcel.

### 1.3 Location

The Project Site is located within Assessor Parcel Number (APN) 401-112-021. The site of the planned aquaculture facility (APN 401-112-021) is owned by the Humboldt Bay Development Association, Inc. (HBDA), and is leased to the Humboldt Bay Harbor, Recreation and Conservation District (HBHRCD).



The Project Site is located in the California Coastal Zone, with primary permitting jurisdiction with the Humboldt County Local Coastal Program. The Project Site is designated for Industrial, Coastal Dependent (MC) land use and is zoned Industrial/Coastal Dependent. Prior to development for use as a pulp mill over 50 years ago, the location on the Samoa peninsula historically consisted of mobile and vegetated coastal dunes. The natural topography of the area has been altered, and the remaining degraded dunes in the project area have been subject to regular anthropogenic disturbance. The industrially developed parcel is bordered by Humboldt Bay to the east, highly invaded coastal dunes to the west and south, and developed area to the north.

## **2. Regulatory Setting**

### **2.1 State Listed and CNPS Rare Species**

Special status plant species under State jurisdiction include those listed as endangered, threatened, or as candidate species by the California Department of Fish and Wildlife (CDFW) under the California Endangered Species Act (CESA). Plant species on California Native Plant Society's (CNPS) California Rare Plant Ranking (CRPR) Lists 1 and 2 are considered eligible for state listing as Endangered or Threatened pursuant to the California Fish and Game Code and CDFW has oversight of these special status plant species as a trustee agency. As part of the CEQA process, such species should be considered as they meet the definition of Threatened or Endangered under Sections 2062 and 2067 of the California Fish and Game Code. CRPR List 3 and 4 plants do not have formal protection under CEQA. CDFW publishes and periodically updates lists of special status species. Additionally, there are 64 plant species designated as "rare" which is a special designation created before plants were rolled into CESA in the 1980s (CDFW 2020a). A project is required to have a "Scientific, Educational, or Management Permit" from CDFW for activities that would result in "take," possession, import, or export of state-listed plant species including research, seed banking, reintroduction efforts, habitat restoration, and other activities relating to any plant designated SE (State endangered), ST (State threatened), SR (State rare), or SC (State candidate for listing).

### **2.2 Federally Listed Species**

Special status plant species under Federal jurisdiction include those listed as endangered, threatened, or as candidate species by the Fish and Wildlife Service (USFWS) under the U.S. Endangered Species Act (ESA).

### **2.3 Sensitive Plant Communities**

CDFW provides oversight of habitats (i.e. plant communities) listed as Sensitive in the California Natural Diversity Database (CNDDDB) and on the California Sensitive Natural Communities List, based on global and state rarity rankings. The natural communities are broken down to alliance level for vegetation types affiliated with ecological sections in California. The list and alliances coincide with A Manual of California Vegetation (Sawyer et al. 2009). CDFW considers alliances and associations with a S1 to S3 rank to be Sensitive (CDFW 2019).



## 2.4 Environmentally Sensitive Habitat Areas/Wetlands

Environmentally Sensitive Habitat Areas (ESHAs) are defined by the Coastal Commission as follows:

*“Environmentally sensitive area” means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments. (Pub. Resources Code, § 30107.5)*

The Coastal Commission’s designation of ESHA generally includes vegetation alliances listed in CDFW’s California Sensitive Natural Communities List with an S1- S3 ranking. The Coastal Commission’s ESHA category is broadly defined, and it includes habitat for special-status species, wetlands, riparian areas, and other areas that provide important ecosystem functions. There is not a specific list of habitats considered to be ESHA for the State or County. The Coastal Commission’s definition of wetlands includes areas that meet at least one wetland parameter (dominance of hydrophytic plants, hydric soils, or hydrology). The Coastal Commission’s regulations define wetlands as follows:

*Wetland shall be defined as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent and drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salts or other substances in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deep-water habitats. (14 CCR Section 13577)*

The Coastal Commission and local counties or municipalities associated with the Local Coastal Program (LCP) are the jurisdictional agencies that exert authority in identifying and protecting ESHA in the course of project activities. The Army Corps of Engineers (USACE) regulates wetlands under Section 404 of the Clean Water Act. The USACE uses a three-parameter definition for wetlands. In order to be a USACE wetland, an area must have wetland plants, hydric soil, and wetland hydrology.

## 3. Methods

### 3.1 Area of Potential Effect

The Area of Potential Effect (APE) was broadly defined to encompass the project footprint and all areas of potential direct or indirect effects. A buffer was mapped between the project boundary and APE boundary to the east (variable width averaging greater than 250 feet) and west (variable width averaging greater than 100 feet). To the south, a buffer of approximately 50 feet between the project boundary and APE was also subject to field investigations. The area south of the project and APE boundary is privately owned and was not accessible for field investigations. The area north of the project is a developed industrial area absent botanical resources; thus a buffer was not necessary. Adding an additional, second buffer to the APE was not deemed necessary, as ground disturbance and other potential impacts to botanical or wetland resources have no potential to occur beyond the APE. Areas beyond the project footprint to the west of Vance Avenue





were also included in the surveys and evaluation within the APE. Areas east of the project footprint, toward the shoreline of Humboldt Bay, were also included in the surveys and evaluation within the APE. Properties located to the south and north of the proposed project are privately owned and thus were not accessible to field investigations. Humboldt County Web GIS resources were referenced in mapping and field investigations; however, these resources are not a suitable substitute for on-the-ground mapping of sensitive resources, which was confined to the APE.

### **3.2 Pre-Survey Investigations**

A scoping list of CRPR plant species and habitats with recorded occurrences in the project vicinity was compiled prior to surveys by consulting the *California Natural Diversity Database* (CNDDB) [CDFW 2020b], the CNPS *Inventory of Rare and Endangered Vascular Plants* (CNPS 2020), and the IPaC database of federally listed plant species maintained by the U.S. Fish and Wildlife Service (USFWS 2020). The scoping list (Appendix B) includes special status plants that occur in habitat similar to the project area with documented occurrences on the Ferndale USGS quadrangle or adjacent quadrangles. The scoping list also contains other taxa that may occur in the project area whose habitat is suitable if the project is within or near the known range of the species. Due to the proximity of the Eureka quadrangle to the coast, the assessment area was defined as the six USGS 7.5' minute quadrangles centered around the Eureka quadrangle (Tyee City, Arcata North, Arcata South, Cannibal Island, Fields Landing, and McWhinney Creek USGS 7.5' quadrangles). The query yielded 33 special status plant species with CRPR rank of 1B or 2 and 14 species with CRPR of 4. All species were reviewed prior to the field survey. For simplicity, only CRPR list 4 species with at least low potential (or greater) to occur within the project area are included in the scoping table. Of the species identified during scoping, eight have a moderate probability of occurring within the study area. CNDDB also documents four Sensitive Habitats (classified according to Holland, 1986) within the assessment area, and these communities were included in the scoping process (CDFW 2020c). Soils were mapped and reviewed (Figure 2 – Soils Map).

### **3.3 Special Status Plant Surveys**

#### **3.3.1 Floristic Surveys**

Floristic surveys were conducted by Amy Livingston, Kelsey McDonald, and Misha Schwarz. Amy Living is qualified as a botanist and wetland scientist with an M.S. in Botany and more than ten years of professional experience. Kelsey McDonald is a CNPS Certified Consulting Botanist with over six years of experience conducting floristic surveys according to CDFW protocols. Misha Schwarz is Certified Professional Soil Scientist and a Professional Wetlands Scientist with over 35 years of experience.

GHD Botanist Amy Livingston conducted an early season survey of the entire APE for special status plant species occurred on April 17, 2020. GHD Botanist Kelsey McDonald conducted follow-up surveys on May 5, May 9, May 22, and June 29. All surveys were conducted during suitable overcast to clear weather conditions absent precipitation. The special status plant surveys were floristic in nature following *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* by the California Natural Resource Agency (CDFW 2018) and *General Rare Plant Survey Guidelines* by the



*Endangered Species Recovery Program* (USFWS 2002). An intuitively controlled survey was conducted that sampled and identified potential habitats for special status species. Plants were identified to the lowest taxonomic level necessary for rare plant identification. Nomenclature follows *The Jepson Manual* (Baldwin et al 2012). The special status plant survey was conducted by walking the site looking for the presence of target species and habitats identified on the scoping list, as well as presence of any other incidental sensitive-listed plant species. A list of species observed within the APE is included (Appendix C). GHD Botanist Amy Livingston and GHD Senior Environmental Scientist Misha Schwarz spent a total of 5 person-hours on the April 17, 2020 early season survey. GHD Botanist Kelsey McDonald spent a total of 20 hours on special status plant surveys between May 5 and June 29.

### **3.3.2 Dark-eyed Gilia Population Estimation**

A population estimate was calculated for dark-eyed gilia (*Gilia millefoliata*), a CNPS-listed (1B.2) special status plant occurring on the property. The annual dune plant was first observed in flower on May 5, 2020 within the Area of Potential Effect and was too numerous to establish total population size with a direct count. Population sampling using a systematic sampling scheme occurred on May 22, 2020. Average population density in 1 square-meter quadrats within the bounds of the largest population polygon provided the basis for calculating population size over the total polygon area. Direct counts determined the number of individuals in small outlier clumps separated from the main population. Pink flagging and points taken on a Trimble XH GPS unit showed the extent of the population within the APE prior to sampling. The flagged boundary of the main population polygon served as a macroplot for systematic sampling along transects. A baseline transect was established along the southern fence that bisects the population, and north-south transects were placed every 60ft on both sides of the fence. The number of dark-eyed gilia plants was counted within 1 square-meter quadrats placed every 15 feet along the north-south transects after a random start between 0-15. Average density within the 1 square-meter quadrats was multiplied by the total area of the macroplot to obtain population estimates for the area.

## **3.4 Sensitive Natural Communities and Environmentally Sensitive Habitat Areas**

### **3.4.1 Vegetation Mapping**

GHD conducted vegetation mapping on March 24, March 25, April 8, April 23, June 29, and July 27, 2020. GHD vegetation mapping in 2020 expanded and updated SHN's previous mapping efforts overlapping the area around Vance Avenue. Vegetation was mapped to the Alliance level according to *A Manual of California Vegetation* (Sawyer et al. 2009). Vegetation Rapid Assessments were completed to characterize the dune mat community and adjacent areas that were strongly dominated by non-native species (Appendix D).

### **3.4.2 Sensitive Natural Community Assessment**

The quality of dune habitats was quantitatively assessed by collecting percent cover data in randomized 1 square-meter plots. Sampling of the degraded dune area near the current footprint of development (north of the southerly cyclone fence) occurred on March 24 and March 25, 2020. Vegetation data was collected in twenty randomized plots north of the fence. Six of these plots were determined to be within the highly invaded yellow bush lupine scrub, and 14 were within the dune mat community. Sampling percent cover of



dune mat areas south of the fence occurred concurrently with dark-eyed gilia sampling on May 22, 2020 using a subset of the randomized plots occurring within the dune mat community.

Plot locations were randomized in the field by establishing baseline transects inward from the fence lines and selecting random distances along regularly placed transects perpendicular to the baselines. The northern dune assessment area excluded the approximately 50-foot wide strip of land parallel to the western fence line, which had previously been mapped by SHN, and a 25-foot strip of land parallel to the southern fence line.

Absolute percent cover was estimated for all species and bare areas at each 1 square-meter plot. Not all plants could be identified to species during the early survey due to the timing of data collection. Absolute cover of native, non-native, total vascular cover for each plot were used to calculate relative cover of native and non-native species, and to assess the “value” of these plant communities.

### **3.4.3 Potential Wetlands Investigation**

On March 25 and May 22, 2020, Misha Schwarz, a GHD wetlands scientist, investigated the Area of Potential Effect (APE) to map wetland boundaries that meet the three-parameter definition of the U.S. Army Corp of Engineers (USACE) and the one-parameter definition of the Coastal Commission, Coastal Act and Local Coastal Plan. The wetlands delineation followed the approach from the USACE Wetlands Delineation Manual (USACE 1987) and Regional Supplement to the USACE Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (USACE 2010) throughout the APE. Soil pits were dug to approximately 30 inches. Data on soil color, texture and redoximorphic features were collected. Data on hydrologic conditions were collected if observed. The delineation was conducted in the early/late spring once one-half of the annual average rainfall has occurred.

Vegetation data collection consist of listing the dominant species at each plot. The species were then classified as to whether or not they are wetlands indicators, using the most current standard reference for plant wetlands indicators: National Wetland Plant List: Western Mountains, Valleys, and Coast 2012 Final Regional Wetland Plant List (Lichvar 2012). The list classifies plants based on the probability that they would be found in wetlands, ranging from Obligate (almost always in wetlands), Facultative/wet (67% to 99% in wetlands), Facultative (34% to 66% in wetlands), Facultative/up (1% to 33% in wetlands) to Non-indicator (less than 1% in wetlands). Plants not listed are included in the uplands category. If 50% or greater of the dominant plant species at each plot are classified as either Obligate (OBL), Facultative/wet (FACW), or Facultative (FAC), the vegetative mix is determined to be hydrophytic (wetland plants). A determination of the wetland boundary will be made based on soil, hydrology (if present), and vegetative parameters (three-parameter USACE definition) and the Coastal Commission one-parameter definition.

Areas with coastal willow (*Salix hookeriana*) and other wetland indicator plants were investigated for a dominance of hydrophytic species, hydric soils on the dates mentioned above on the southwestern portion of the APE, east of Vance Avenue. Both 1-parameter and 3-parameter wetlands characterized by coastal willow west of Vance Avenue have been mapped by SHN for a different project (see Figure 3a in SHN 2018), and these areas were not further analyzed or investigated.



## **4. Results**

### **4.1 Special Status Plant Surveys**

#### **4.1.1 Floristic Surveys**

Rare dark-eyed gilia (*Gilia millefoliata*) was detected in flower on May 5, 2020 in the degraded dune habitat on the southern side of the project area. No other special status plant species were found within the APE. Dark-eyed gilia is protected under CEQA as a CNPS-listed 1B.2 rare plant. The 1B.2 rank indicates that it is rare or endangered throughout its range, which extends from Northern California into Southern Oregon, and it is fairly endangered within California. NatureServe also ranks dark-eyed gilia as Imperiled globally (G2) and within the state of California (S2). Dark-eyed gilia was identified by its densely glandular stem and calyx, dissected leaves with linear lobes, short pedicels, and yellow funnel-shaped corolla throat with two purple splotches per lobe. Photos can be found in Appendix E.

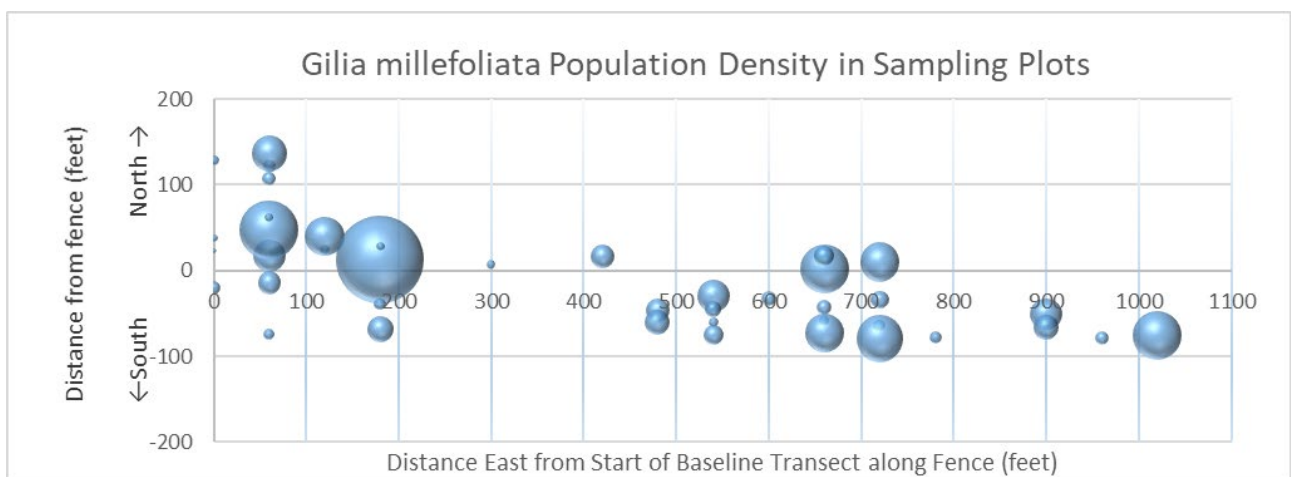
Floristic surveys were appropriately timed to capture the blooming period of early and late blooming special status plants with the potential to occur in the area. The early season survey on April 17, 2020 was timed to target early blooming special status species with potential to occur in the project area, including the two Federally endangered species with potential habitat in the project area, beach layia (*Layia carnosa*) and Menzies' wallflower (*Erysimum menziesii*). At the time of the early survey, Menzies's wallflower had been observed blooming in the dunes in Humboldt County. Beach layia was observed blooming at a nearby reference site in mobile foredunes west of Samoa Blvd. prior to the survey on May 9. Although populations of these endangered foredune species occur nearby, these species are typically found in less degraded areas with intact dune topography, and they are less likely to occur in the project area. No habitat is present within the project areas for western lily (*Lilium occidentale*), the third federally endangered species identified during scoping.

#### **4.1.2 Dark-Eyed Gilia Population**

An estimated population of approximately 100,000 dark-eyed gilia plants occurs within the Area of Potential Effect (APE). See Appendix F for the California Native Species Field Survey Form, which has been submitted to CDFW's CNDDDB, as required by CDFW. Dark-eyed gilia had a clustered distribution scattered from the area west of the clarifiers across the southern end of the property, and extending south beyond the edge of the APE (Appendix A, Figure 3). The highest density of dark-eyed gilia occurred north of the fence along the disturbed access road and in a couple of small patches near the clarifiers. A total of 133 dark-eyed gilia plants were counted in two small, dense clusters west of the clarifiers. A sparser patch on the east side of the property near the current footprint contained 415 plants. Systematic sampling of the main population macroplot (n=146) showed an average density of 17 ( $\pm$  SE of 7) plants per 1 square-meter quadrat area in the area north of the southern cyclone fence, resulting in an estimate of ~60,000 individuals north of the cyclone fence over the ~3700 square-meter area. Sampling the macroplot south of the cyclone fence showed an average density of seven dark-eyed gilia plants ( $\pm$  SE of 2) per 1 square-meter quadrat, resulting in an estimate of ~40,000 individuals in the ~5600 square-meter macroplot within the APE south of the cyclone fence (Table 1, Figure 1).

**Table 1. Dark-Eyed Gilia Population Estimates by Area**

	Area (sqft)	Density (#/sqm)	Number of Plants	Population Estimate Error
Main Population North of Fence	39,950	17	60,000	± 30,000
Main Population South of Fence	60,400	7	40,000	± 10,000
Northeastern Subpopulation	2,990	1.5	415	± 10
Northwestern Subpopulation	40	33	133	± 10



**Figure 1. Spatial Distribution of Dark-Eyed Gilia Density around the Southern Fence Line**

Dark-eyed gilia was most concentrated in the unpaved access road north of the southern cyclone fence line, where intermittent disturbance appears to have prevented dense establishment of vegetation. The rare annual appeared to favor disturbed areas with lower non-native vegetation cover, such as in the access road north of the fence, and the population appeared to be sparser and patchily distributed closer to the former pulp mill and clarifiers. Some small but dense patches also occurred in open tire tracks through the sand around the clarifiers. Dark-eyed gilia also occurred at moderate density in clusters throughout the dune mat community south of the cyclone fence. Dark-eyed gilia was fairly abundant but stunted in areas where shell and gravel have been distributed in the power-pole access area to the south of the cyclone fence. Dark-eyed gilia often associated with native dune mat species such as seaside buckwheat (*Eriogonum latifolium*), yellow sand verbena (*Abronia latifolia*), sand mat (*Cardionema ramosissimum*), beach strawberry (*Fragaria chiloensis*), and dune knotweed (*Polygonum paronychia*), disturbance-associated native miniature lupine (*Lupinus bicolor*), as well as many non-native invasive species such as ripgut brome (*Bromus diandrus*), sheep sorrel (*Rumex acetosella*), and English plantain (*Plantago lanceolata*). Dark-eyed gilia did not occur in areas with high percent cover (>80%) of European beachgrass or other invasive plants. Dark-eyed gilia was in peak flower during May surveys and was >50% in fruit during the June 29<sup>th</sup> site visit. The annual plant was >90% in fruit and dropping seeds during the July 27<sup>th</sup> visit.



## 4.2 Sensitive Natural Communities and Environmentally Sensitive Habitat Areas

### 4.2.1 Vegetation Assessment and Mapping

#### Dune mat (*Abronia latifolia*-*Ambrosia chamissonis* Alliance) (G3 S3)

Herbaceous vegetation (less than 10% shrub cover) with characteristic presence of dune mat species keyed to the *Abronia latifolia*-*Ambrosia chamissonis* Alliance in *A Manual of California Vegetation* (MCV). Dune mat is a Sensitive Natural Community ranked by NatureServe as Vulnerable globally (G3) and within the state of California (S3). Much of the APE contains dune mat species at diagnostic levels. Dune mat within the APE was primarily characterized by yellow sand verbenas, seaside buckwheat, dune knotweed, beach strawberry, and sandmat. Rare dark-eyed gilia, which typically occurs in stabilized dunes, was also widespread in this community. Previous leveling of the natural dune topography, continued anthropogenic disturbance, and the introduction of invasive non-native species have degraded dune mat communities in the area. Much of the area was highly invaded by non-native grasses and forbs, including ripgut brome, sweet vernal grass (*Anthoxanthum odoratum*) and sheep sorrel. Patches of higher quality dune mat were mapped in areas that have retained >50% relative native cover and more natural dune processes with undulating topography and greater sand mobility as a result of lower overall vegetative cover. A total of 6.8 acres of the APE was mapped as dune mat, and an additional 0.34 acres was mapped as high quality dune mat (Appendix A, Figure 4, Table 2).

#### Yellow bush lupine scrub (*Lupinus arboreus* Alliance)

Areas dominated by invasive yellow bush lupine (*Lupinus arboreus*) in the shrub layer were mapped as yellow bush lupine scrub. These areas contained high absolute cover of non-native species and very few native plants. Species commonly associated with yellow bush lupine scrub within the APE included ripgut brome, sweet vernal grass, and velvetgrass (*Holcus lanatus*) among many other non-native weedy species. Yellow bush lupine also appears to be encroaching into areas currently mapped as dune mat, with many seedlings occurring at the transition zone between yellow bush lupine and dune mat communities. Some areas previously mapped as generic non-native vegetation or dune mat were dominated by yellow bush lupine at the time of surveys in 2020, and these areas were updated to show current conditions. An area near the western parking lot previously designated as non-native appeared to have been managed for yellow bush lupine (cut and piled bush lupine and stumps apparent in the area), and this area has been identified as a dune mat community based on current vegetation with at least 10% cover of native dune species. A total of 2.18 acres of yellow bush lupine scrub occurs on the property (Appendix A, Figure 4, Table 2).

#### European beach grass swards (*Ammophila arenaria* Semi-Natural Stand)

European beach grass (*Ammophila arenaria*) has invaded a great deal of the remaining dune topography within the APE, and it is widespread in dunes in the surrounding areas. European beach grass swards were mapped according to MCV online membership rules, and only include areas with >80% relative cover of European beach grass. European beach grass swards covered 0.70 acres of the APE (Appendix A, Figure 4, Table 2).





#### Coastal willow thickets (*Salix hookeriana* Alliance) (G4 S3)

Coastal willow thickets were dominated by mature *Salix hookeriana*, with lower cover of other shrub species such as coyote brush (*Baccharis pilularis*). Coastal willow thickets are a Sensitive Natural Community with a state rank of S3. Coastal willow thickets primarily occurred in swale topography along Vance Ave (east and west), and Brewer's rush (*Juncus breweri*) was common in the understory. Coastal willow thickets were first mapped in the area by SHN in 2018 mapping for the Samoa Peninsula Wastewater Project. Spatial data showing coastal willow thickets from the previous SHN mapping effort was incorporated into current mapping, and the southern willow thicket east of Vance Ave. was expanded slightly to include associated swale vegetation. Coastal willow thickets cover 0.27 acres of the APE (Appendix A, Figure 4, Table 2). See section 4.2.3 below with regard to these willow thickets and their wetlands status.

#### Coastal brambles (*Rubus ursinus* Alliance) (G4 S3)

Coastal brambles are a Sensitive Natural Community with a state rank of S3. Coastal brambles within the APE primarily consisted of mixed native shrubs, co-dominated by California blackberry (*Rubus ursinus*) with coast silk tassel (*Garrya elliptica*), coyotebrush (*Baccharis pilularis*), and wax myrtle (*Morella californica*). A mixture of native and non-native species occurred in the herbaceous layer. SHN identified and mapped coastal brambles within the APE for the Samoa Peninsula Wastewater Project in 2018, and this spatial data was incorporated into current vegetation mapping. Coastal brambles occurred in a single 0.20 acre patch along the roadside ridge east of Vance Ave (Appendix A, Figure 4, Table 2).

**Table 2. Acreage of Vegetation Types within the APE**

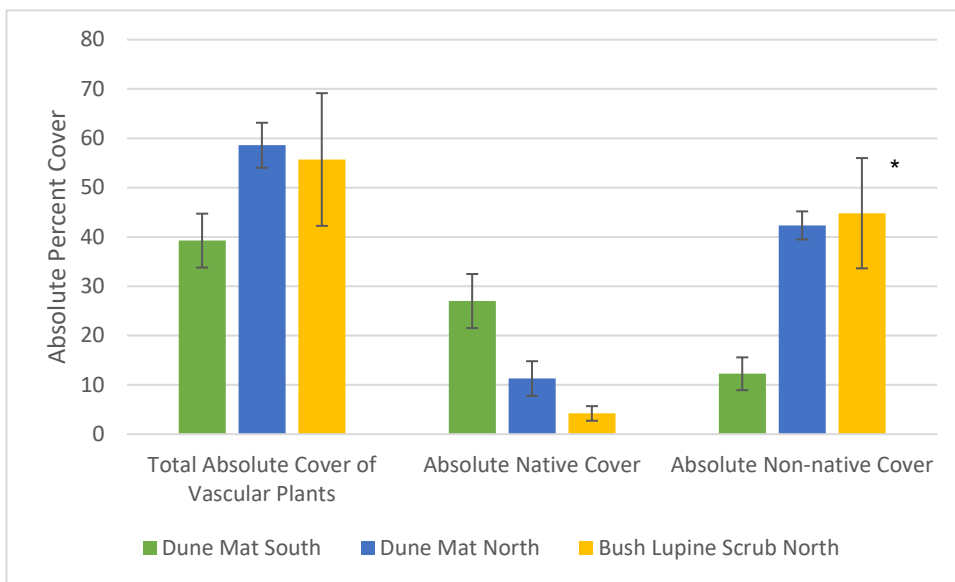
Vegetation Type	Area (acres)
Coastal Brambles	0.20
Coastal Willow Thicket	0.27
Developed	30.27
Dune Mat	6.81
High Quality Dune Mat	0.34
Invasive European Beach Grass Swards	0.70
Invasive Yellow Bush Lupine Scrub	2.18
<b>Grand Total</b>	<b>40.77</b>

#### 4.2.2 Sensitive Natural Community Assessment

The quality of the dune mat Sensitive Natural Community varied within the project's APE, and randomized percent cover plots were used to characterize the dune mat community and yellow bush lupine scrub. Quantitative analysis showed that dune mat to the north of the fence has intermediate levels of native cover compared to high quality dune mat to the south and adjacent invasive bush lupine scrub (Figure 4). The northern dune mat area also had high non-native cover similar to bush lupine scrub (Figure 4). Dune mat areas south of the cyclone fence (n=6) contained a dominance of native species, low overall cover of

vascular plants, and low cover of non-native species. The area south of the cyclone fence contains a berm structure that is similar to natural dune topography, and areas of high-quality dune mat mapped in the area are characterized by mobile sand and a strong dominance of dune mat species (68% relative native cover, 27% absolute native cover). European beach grass swards and yellow bush lupine scrub also occur in the APE south of the cyclone fence.

In contrast, dune mat plots north of the cyclone fence (n=14), near the current footprint of the pulp mill, showed diagnostic levels of native dune species (11% absolute cover), but they are dominated by non-native species (76% relative cover of non-native species). The project area north of the cyclone fence is former coastal dune habitat that has been leveled during construction of the pulp mill in the mid to late 60s. Although the natural dune topography has been removed, many dune mat plants, including the rare dark-eyed gilia, have persisted in this altered and highly invaded habitat. Plots within the adjacent yellow bush lupine scrub (n=6) near the footprint of the former pulp mill showed similar total vascular plant cover and presence of non-native plants, but very low cover of native species (4% absolute cover). The access road north of the southern fence line, where dark-eyed gilia was concentrated, appeared to have more areas with open sand and a higher percentage of native dune mat species, but no plots occurred within this area.



\*Error bars represent standard error.

**Figure 2. Mean Absolute Percent Cover in Dune Habitats**

#### 4.2.3 Potential Wetlands Investigation

A U.S. Army Corp of Engineers formatted wetland report was not prepared because there are no three-parameter wetlands within the project footprint, no three-parameter wetlands would be impacted by the project, and Clean Water Act Section 401 and 404 permits, as administered by the North Coast Regional





Water Quality Control Board and the U.S. Army Corps of Engineers, respectively, are not needed for the project.

Coastal willow thickets within the APE are characterized by a strong dominance of *Salix hookeriana*, a Facultative-Wetland species, and qualify as one-parameter wetlands in addition to being S3 Sensitive Natural Communities. The coastal willow thickets east of Vance Avenue were investigated as potential three or one-parameter wetlands on May 22, 2020. The first willow thicket investigated was the most southerly, on the southwest corner of the APE (see Appendix A, Figure 4). A soil pit was dug to 30 inches and consisted of sand with a matrix color of 2.5Y 3/2 with no redoximorphic features. The soil in this pit was dripped with alpha-alpha-Dipyridyl at 10" and at 20", and no reaction was observed. Sandy soils have very low iron due to their coarse texture. A negative reaction to alpha-alpha-Dipyridyl in sandy soils does not necessarily mean the soil are not saturated within the growing zone during the growing season. Soils were moist when observed and a pit was dug to 30 inches (deeper than normally dug for wetlands investigations) to ensure groundwater was absent far beneath the 12-inch requirement for wetlands hydrology. No groundwater was observed. The second willow thicket investigated was just north of the first willow thicket investigated. A soil pit was dug to 30 inches and consisted of sand with a matrix color of 2.5Y 3/2 with no redoximorphic features. The soil in this pit was dripped with alpha-alpha-Dipyridyl at 10" and at 20", and no reaction was observed. Soils were moist. No groundwater was observed. Based on the lack of hydric soil, absence of observable groundwater and negative reaction to alpha-alpha-Dipyridyl both of the willow thickets are judged to be one-parameter wetlands. The investigation was appropriately conducted during early and late spring after half of the annual rainfall in 2020. Additional site visits are planned for early spring 2021, after half of the average annual rainfall, to confirm findings.

A small patch of coastal willow (*Salix hookeriana*) was identified in an area northwest of the western clarifier within the APE on March 23, 2020, and this area was investigated as a potential wetland. The coastal willow was growing with California blackberry (*Rubus ursinus*) in the shrub stratum. Sweet vernal grass (*Anthoxanthum odoratum*), was the most dominant herbaceous species. Of the three dominant species, only the coastal willow classifies as wetland vegetation, and therefore the vegetation did not pass the dominance test for wetland vegetation. A soil pit was dug to 30 inches to investigate soils and potential hydrology. No groundwater was observed. From 0-4", the matrix color was 10YR 3/2 and the texture was sand. From 4-10" the matrix color was 2.5 Y 3/2 and the texture was gravelly sand (consisting of fill material). From 10-14" the matrix color was 2.5 Y 3/2 and the texture was silt loam (fill material). From 14-30" the matrix color was 2.5 Y 3/2 and the texture was gravelly sand (fill material). No redoximorphic features were observed. The soil in this pit was dripped with alpha-alpha-Dipyridyl at 10" and at 20", and no reaction was observed. This small willow patch does not meet criteria for jurisdictional (3-parameter) or Coastal Commission (1-parameter) wetlands, nor ESHA. There are piles of cut vegetation in this area, and it appears this small willow patch may have sprouted from previously cut willow branches.

## **5. Conclusion**

The purpose of this evaluation was to conduct seasonally appropriate surveys for state, federal, and other sensitive listed plant species, and Sensitive Natural Communities per CDFW or Environmentally Sensitive Habitat Areas (ESHA) and wetlands per the Coastal Commission and Local Coastal Plan guidelines within



the project area. This evaluation does not include impact assessment for special-status plants, ESHAs, or wetlands. Impact assessment, including avoidance and minimization measures is included in the project's CEQA Initial Study/Mitigated Negative Declaration and the Restoration and Monitoring Plan (GHD 2020a, GHD 2020b).

A rare plant population of ~100,000 rare dark-eyed gilia (*Gilia millefoliata*) (2B.2) occurs within dune mat in the APE, and the population extends out of the APE to the south of District-owned land. Dark-eyed gilia was most concentrated near the southern fence line and appeared to be associated with open patches of lower vegetative cover and the presence of other native dune mat species.

Sensitive Natural Communities within the APE include dune mat (G3 S3), coastal willow thickets (G4 S3), and coastal brambles (G4 S3). Dune mat quality varies in the area, with higher quality patches characterized by a dominance of native dune mat species, lower total vascular plant cover, and undulating topography. Lower quality dune mat with higher percent cover of invasive species and lower percent cover of native species occurred to the north. Invasive, nitrogen-fixing yellow bush lupine has established strong dominance in several areas around the APE, and these areas were associated with high percent cover of invasive annual grasses and other non-native species. Invasive European beach grass has also established strong dominance in dune habitat south of the fence.

Coast willow thickets, a Sensitive Natural Community (G4 S3), east of Vance Avenue are also considered one-parameter wetlands. Areas with coast willow (*Salix hookeriana*) east of Vance Avenue were investigated for potential jurisdictional one or three-parameter wetlands, but no hydric soils or wetlands hydrology occurred in these areas, and thus they are judged to be one-parameter wetlands. Coastal willow thickets west of Vance Avenue were mapped by SHN (2018), and these include 1-parameter and 3-parameter wetlands that were not investigated further for this study. Native coastal brambles, another previously mapped Sensitive Natural Community (G4 S3), occurred on the ridge east of Vance Ave. In summary, although previous land use and invasive plants have degraded habitat quality in the area, the Samoa Peninsula Land-based Aquaculture Project APE contains sensitive botanical resources, including a population of rare plants and three Sensitive Natural Communities.

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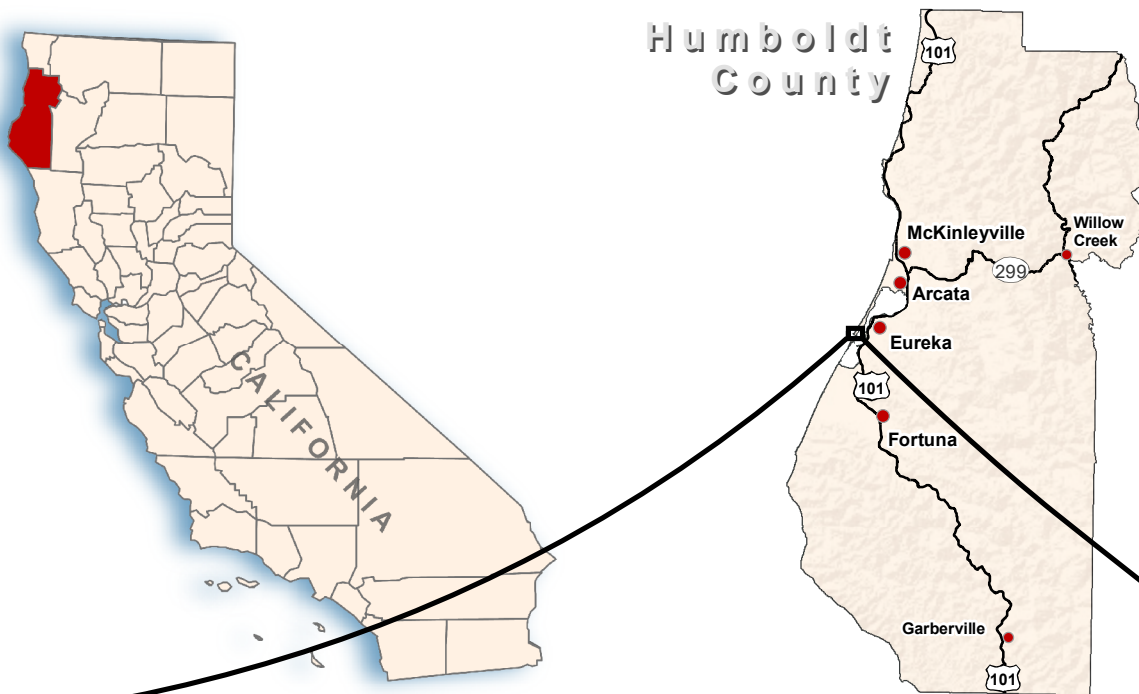
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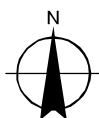
## **Appendices**

- A. Map Figures**
- B. Scoping Table**
- C. Plant Species Observed**
- D. Rapid Assessment Data Sheets**
- E. Photo Index**
- F. CNDDDB Field Survey Forms**



Paper Size ANSI A  
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Feet

Map Projection: Lambert Conformal Conic  
Horizontal Datum: North American 1983  
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet



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Samoa, Humboldt County, California

Project No. 11205607  
Revision No. 1  
Date Jan 2021

Vicinity Map

FIGURE 1





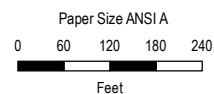
**Legend**

Area of Potential Effect

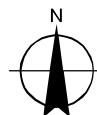
**NRCS Soils**

1014- Urban land- Anthraltic Xerorthents association, 0-2% slopes

155- Samoa Clambeach complex, 0 -50% slopes



Map Projection: Lambert Conformal Conic  
Horizontal Datum: North American 1983  
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet



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Date **Jan 2021**

**NRCS Soils**

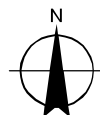
**FIGURE 2**



- Legend**
- Gilia millefoliata*
  - Area of Potential Effect
  - x — Cyclone Fence

Paper Size ANSI A  
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Feet

Map Projection: Lambert Conformal Conic  
Horizontal Datum: North American 1983  
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet



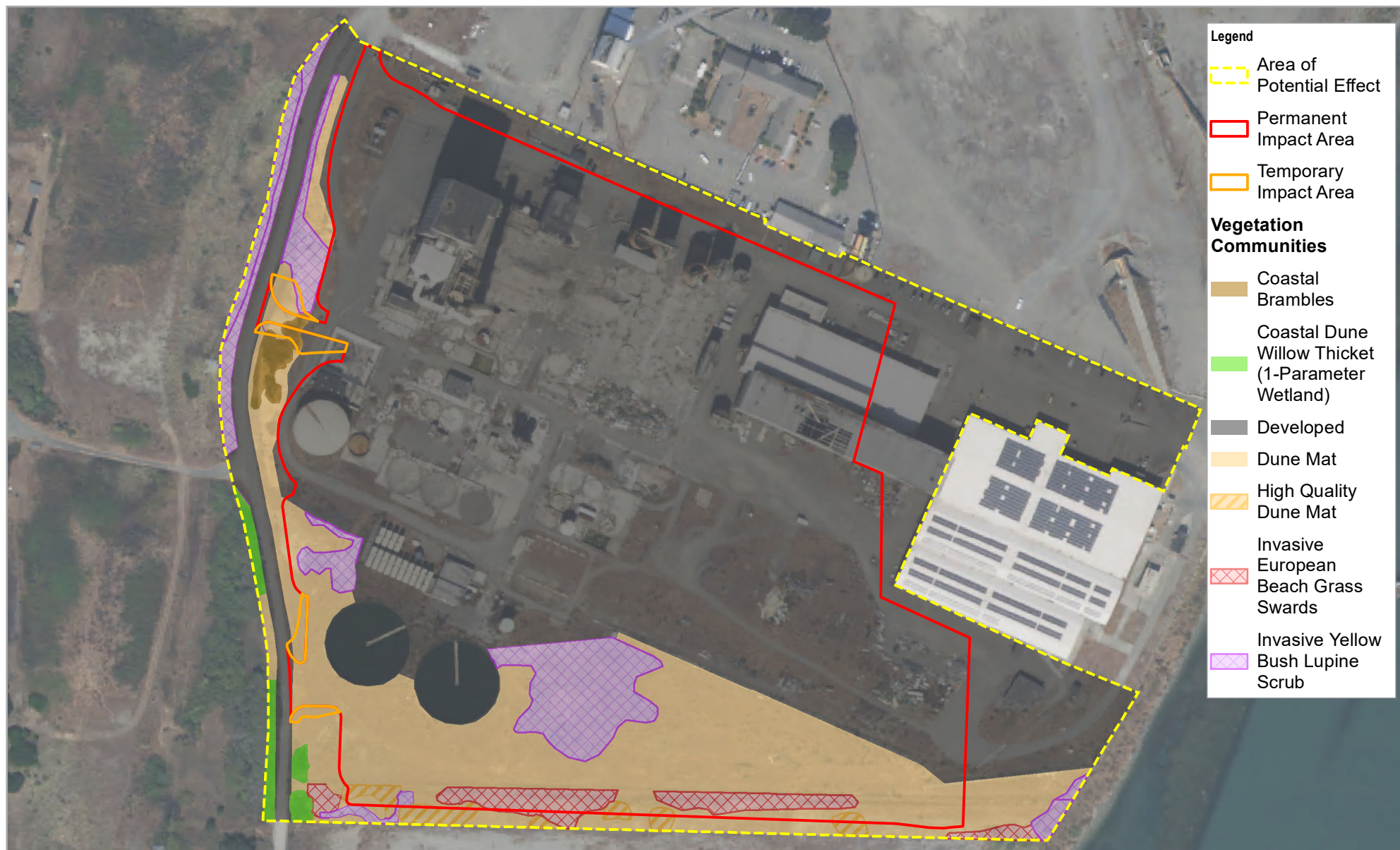
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**Sensitive Plant Species**

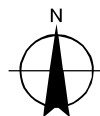
**FIGURE 3**





Paper Size ANSI A  
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Feet

Map Projection: Lambert Conformal Conic  
Horizontal Datum: North American 1983  
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet



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Revision No. 1  
Date Feb 2021

**Sensitive Vegetation Communities**

**FIGURE 4**

Appendix B Nordic Farms - 7-QUAD Database Search of USFWS IPaC, CDFW CNDDDB, CNPS 4/17/20											
Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*	
Abronia umbellata var. breviflora	pink sand-verbena	None	None	G4G5T2	S2	1B.1	Coastal dunes	Coastal dunes and coastal strand.	Foredunes and interdunes with sparse cover. A. umbellata var. breviflora is usually the plant closest to the ocean. 0-75 m.	<b>Moderate Potential.</b> Known from near project. Abronia sp. is present in project area. It was not flowering during early season visit. A survey for this species during its blooming period (June-Oct) should occur.	
Angelica lucida	sea-watch	None	None	G5	S3	4.2	Coastal bluff scrub, Coastal dunes, Coastal scrub, Marshes and swamps (coastal salt). 0-150 m.			<b>Moderate Potential.</b> Some low quality coastal dune habitat occurs within project area.	
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	None	None	G2T2	S2	1B.2	Coastal dunes   Coastal scrub   Marsh & swamp   Wetland	Coastal dunes, marshes and swamps, coastal scrub.	Mesic sites in dunes or along streams or coastal salt marshes. 0-155 m.	<b>Low Potential.</b> Low quality coastal dune habitat is present, but specific habitat for this species are not present.	
Bryoria spiralifera	twisted horsehair lichen	None	None	G1G2	S1S2	1B.1	North coast coniferous forest	North coast coniferous forest.	Usually on conifers. 5-30 m.	<b>No Potential.</b> North coast coniferous forest is not present.	
Cardamine angulata	seaside bittercress	None	None	G4G5	S3	2B.1	Lower montane coniferous forest   North coast coniferous forest   Wetland	North coast coniferous forest, lower montane coniferous forest.	Wet areas, streambanks. 5-515 m.	<b>No Potential.</b> Habitat for this species does not occur in project area.	
Carex arcta	northern clustered sedge	None	None	G5	S1	2B.2	Bog & fen   North coast coniferous forest   Wetland	Bogs and fens, north coast coniferous forest.	Mesic sites. 60-1405 m.	<b>No Potential.</b> Habitat for this species does not occur in project area.	



Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*
Carex leptalea	bristle-stalked sedge	None	None	G5	S1	2B.2	Bog & fen   Freshwater marsh   Marsh & swamp   Meadow & seep   Wetland	Bogs and fens, meadows and seeps, marshes and swamps.	Mostly known from bogs and wet meadows. 3-1395 m.	<b>No Potential.</b> Habitat for this species does not occur in project area.
Carex lyngbyei	Lyngbye's sedge	None	None	G5	S3	2B.2	Marsh & swamp   Wetland	Marshes and swamps (brackish or freshwater).	0-200 m.	<b>No Potential.</b> No marsh or swamp habitat occurs in project area.
Carex praticola	northern meadow sedge	None	None	G5	S2	2B.2	Meadow & seep   Wetland	Meadows and seeps.	Moist to wet meadows. 15-3200 m.	<b>No Potential.</b> No meadow or seep habitat within project area.
Castilleja ambigua var. humboldtensis	Humboldt Bay owl's-clover	None	None	G4T2	S2	1B.2	Marsh & swamp   Salt marsh   Wetland	Marshes and swamps.	In coastal saltmarsh with Spartina, Distichlis, Salicornia, Jaumea. 0-20 m.	<b>No Potential.</b> No coastal salt marsh habitat within project area.
Castilleja litoralis	Oregon coast paintbrush	None	None	G3	S3	2B.2	Coastal bluff scrub   Coastal dunes   Coastal scrub	Coastal bluff scrub, coastal dunes, coastal scrub.	Sandy sites. 5-255 m.	<b>Low Potential.</b> Some low quality dune habitat is present, but not coastal bluff of coastal scrub habitat.
Chloropyron maritimum ssp. palustre	Point Reyes salty bird's-beak	None	None	G4?T2	S2	1B.2	Marsh & swamp   Salt marsh   Wetland	Coastal salt marsh.	Usually in coastal salt marsh with Salicornia, Distichlis, Jaumea, Spartina, etc. 0-115 m.	<b>No Potential.</b> No coastal salt marsh or swamp habitat is present.
Collinsia corymbosa	round-headed Chinese-houses	None	None	G1	S1	1B.2	Coastal dunes	Coastal dunes.	0-30 m.	<b>Moderate Potential.</b> Some low quality coastal dune habitat occurs within project area.

Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*
Erysimum menziesii	Menzies' wallflower	Endangered	Endangered	G1	S1	1B.1	Coastal dunes	Coastal dunes.	Localized on dunes and coastal strand. 1-25 m.	<b>Moderate Potential.</b> Some low quality coastal dune habitat occurs within project area. This species is known from surrounding area. Coastal strand habitat is not present.
Erythronium revolutum	coast fawn lily	None	None	G4G5	S3	2B.2	Bog & fen   Broadleaved upland forest   North coast coniferous forest   Wetland	Bogs and fens, broadleaved upland forest, north coast coniferous forest.	Mesic sites; streambanks. 60-1405 m.	<b>No Potential.</b> The specific habitats for this species are not present within the project area.
Fissidens pauperculus	minute pocket moss	None	None	G3?	S2	1B.2	North coast coniferous forest   Redwood	North coast coniferous forest.	Moss growing on damp soil along the coast. In dry streambeds and on stream banks. 30-1025 m.	<b>No Potential.</b> The specific habitats for this species are not present within the project area.
Gilia capitata ssp. pacifica	Pacific gilia	None	None	G5T3	S2	1B.2	Chaparral   Coastal bluff scrub   Coastal prairie   Valley & foothill grassland	Coastal bluff scrub, chaparral, coastal prairie, valley and foothill grassland.	5-1345 m.	<b>No Potential.</b> The specific habitats for this species are not present within the project area.
Gilia millefoliata	dark-eyed gilia	None	None	G2	S2	1B.2	Coastal dunes	Coastal dunes.	1-60 m.	<b>High Potential/Occuring.</b> This species can occur in stabilized dunes, and has been previously mapped on the edge of the APE. Found on property 5/5/2020.
Glehnia littoralis ssp. leiocarpa	American glehnia	None	None	G5T5	S2S3	4.2	Coastal dunes. 0-20 m.			<b>Moderate Potential.</b> Some low quality coastal dune habitat occurs within project area.

Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*
Hesperervax sparsiflora var. brevifolia	short-leaved evax	None	None	G4T3	S2	1B.2	Coastal bluff scrub   Coastal dunes   Coastal prairie	Coastal bluff scrub, coastal dunes, coastal prairie.	Sandy bluffs and flats. 0-640 m.	<b>Low Potential.</b> Some low quality coastal dune habitat occurs within project area.
Lasthenia californica ssp. macrantha	perennial goldfields	None	None	G3T2	S2	1B.2	Coastal bluff scrub   Coastal dunes   Coastal scrub	Coastal bluff scrub, coastal dunes, coastal scrub.	5-185 m.	<b>Low Potential.</b> Some low quality coastal dune habitat occurs within project area.
Lathyrus japonicus	seaside pea	None	None	G5	S2	2B.1	Coastal dunes	Coastal dunes.	3-65 m.	<b>Moderate Potential.</b> Some low quality coastal dune habitat occurs within project area.
Lathyrus palustris	marsh pea	None	None	G5	S2	2B.2	Bog & fen   Coastal prairie   Coastal scrub   Lower montane coniferous forest   Marsh & swamp   North coast coniferous forest   Wetland	Bogs & fens, lower montane coniferous forest, marshes and swamps, north coast coniferous forest, coastal prairie, coastal scrub.	Moist coastal areas. 2-140 m.	<b>Low Potential.</b> Specific habitats of this species are generally lacking. However, low quality coastal dune habitat occurs with some mesic habitat.
Layia carnosa	beach layia	Endangered	Endangered	G2	S2	1B.1	Coastal dunes   Coastal scrub	Coastal dunes, coastal scrub.	On sparsely vegetated, semi-stabilized dunes, usually behind foredunes. 3-30 m.	<b>Low Potential.</b> Low quality coastal dune habitat is present. Foredunes are not present. This species is known from the surrounding area.

Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*
<i>Lilium occidentale</i>	western lily	Endangered	Endangered	G1	S1	1B.1	Bog & fen   Coastal bluff scrub   Coastal prairie   Coastal scrub   Freshwater marsh   Marsh & swamp   North coast coniferous forest   Wetland	Coastal scrub, freshwater marsh, bogs and fens, coastal bluff scrub, coastal prairie, north coast coniferous forest, marshes and swamps.	Well-drained, old beach washes overlain with wind-blown alluvium and organic topsoil; usually near margins of Sitka spruce. 3-110 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Monotropa uniflora</i>	ghost-pipe	None	None	G5	S2	2B.2	Broadleaved upland forest   North coast coniferous forest	Broadleaved upland forest, north coast coniferous forest.	Often under redwoods or western hemlock. 15-855 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Montia howellii</i>	Howell's montia	None	None	G3G4	S2	2B.2	Meadow & seep   North coast coniferous forest   Vernal pool   Wetland	Meadows and seeps, north coast coniferous forest, vernal pools.	Vernally wet sites; often on compacted soil. 10-1215 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Oenothera wolfii</i>	Wolf's evening-primrose	None	None	G2	S1	1B.1	Coastal bluff scrub   Coastal dunes   Coastal prairie	Coastal bluff scrub, coastal dunes, coastal prairie, lower montane coniferous forest.	Sandy substrates; usually mesic sites. 0-125 m.	<b>Moderate Potential.</b> Low quality coastal dune habitat is present within the project area.
<i>Puccinellia pumila</i>	dwarf alkali grass	None	None	G4?	SH	2B.2	Marsh & swamp   Wetland	Marshes and swamps.	Mineral spring meadows and coastal salt marshes. 1-10 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.

Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*
<i>Sidalcea malviflora</i> ssp. <i>patula</i>	Siskiyou checkerbloom	None	None	G5T2	S2	1B.2	Coastal bluff scrub   Coastal prairie   North coast coniferous forest	Coastal bluff scrub, coastal prairie, north coast coniferous forest.	Open coastal forest; roadcuts. 5-1255 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Sidalcea oregana</i> ssp. <i>eximia</i>	coast checkerbloom	None	None	G5T1	S1	1B.2	Lower montane coniferous forest   Meadow & seep   North coast coniferous forest   Wetland	Meadows and seeps, north coast coniferous forest, lower montane coniferous forest.	Near meadows, in gravelly soil. 5-1805 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Silene scouleri</i> ssp. <i>scouleri</i>	Scouler's catchfly	None	None	G5T4T5	S2S3	2B.2	Coastal bluff scrub   Coastal prairie   Valley & foothill grassland	Coastal bluff scrub, coastal prairie, valley and foothill grassland.	5-315 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Spergularia canadensis</i> var. <i>occidentalis</i>	western sand-spurrey	None	None	G5T4	S1	2B.1	Marsh & swamp   Wetland	Marshes and swamps (coastal salt marshes).	0-3 m.	<b>No Potential.</b> No marsh or swamp habitat occurs in project area.
<i>Trichodon cylindricus</i>	cylindrical trichodon	None	None	G4G5	S2	2B.2	Broadleaved upland forest   Meadow & seep   Upper montane coniferous forest	Broadleaved upland forest, upper montane coniferous forest, meadows and seeps.	Moss growing in openings on sandy or clay soils on roadsides, stream banks, trails or in fields. 35-2005 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.
<i>Viola palustris</i>	alpine marsh violet	None	None	G5	S1S2	2B.2	Bog & fen   Coastal scrub   Wetland	Coastal scrub, bogs and fens.	Swampy, shrubby places in coastal scrub or coastal bogs. 0-150 m.	<b>No Potential.</b> The specific habitats of this species are lacking within the project area.

Scientific Name	Common Name	FESA	CESA	GRank	SRank	CRPR	Habitats	General Habitat	Micro Habitat	Potential to Occur*
Northern Coastal Salt Marsh	Northern Coastal Salt Marsh	N	N	G3	S3.2		Marsh & swamp   Wetland			<b>Not Present</b> within project area.
Sitka Spruce Forest	Sitka Spruce	N	N	G1	S1.1		Marsh & swamp   Wetland			<b>Not Present.</b>
Coastal Terrace Prairie	Coastal Terrace Prairie	N	N	G2	S2.1		Coastal prairie			<b>Not Present.</b>
Northern Foredune Grassland	Northern Foredune Grassland	N	N	G1	S1.1		Coastal dunes		Coastal dunes	<b>Not Present.</b> Altered, low quality dune habitat is present but natural foredune habitat is not present.

**\*Potential to Occur:**

No Potential      Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, etc.)

Low Potential      Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable.

Moderate Potential      Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable.

High Potential      All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable.

\*\*Microhabitat details from CNDDB 2019

**Key:**

FE = Federal Endangered	1A = CRPR List 1A: Plants presumed extinct in California
FT = Federal Threatened	1B = CRPR List 1B: Plants rare, threatened or endangered in California and elsewhere
FC = Federal Candidate	2 = CRPR List 2: Plants rare, threatened, or endangered in California, but more common elsewhere
FD = Federal Delisted	3 = CRPR List 3: Plants about which more information is needed (a review list)
BCC = USFWS Birds of Conservation Concern	4 = CRPR List 4: Plants of limited distribution (a watch list)
SE = State Endangered	
SD = State Delisted	
ST = State Threatened	
SR = State Rare	
SSC = CDFG Species of Special Concern	
CFP = CDFG Fully Protected Animal	



### Appendix C. Plant Species Observed

Scientific Name	Common Name	Family	Status	Observer
<i>Abronia latifolia</i>	yellow sand verbena	Nyctaginaceae	native	KM
<i>Achillea millefolium</i>	western yarrow	Asteraceae	native	AL
<i>Acmispon</i> sp.	lotus	Fabaceae		AL
<i>Ammophila arenaria</i>	European beachgrass	Poaceae	invasive	AL
<i>Anthemis cotula</i>	dog fennel	Asteraceae	non-native	KM
<i>Anthoxanthum odoratum</i>	sweet vernal grass	Poaceae	invasive	AL
<i>Anthriscus caucalis</i>	bur chervil	Apiaceae	non-native	KM
<i>Armeria maritima</i> subsp. <i>californica</i>	sea thrift	Plumbaginaceae	native	AL
<i>Artemisia pycnocephala</i>	beach sagewort	Asteraceae	native	KM
<i>Avena barbata</i>	slender oats	Poaceae	invasive	AL
<i>Baccharis pilularis</i>	coyote brush	Asteraceae	native	AL
<i>Bellardia trixago</i>	Mediterranean linseed	Orobanchaceae	invasive	KM
<i>Briza maxima</i>	rattlesnake grass	Poaceae	invasive	AL
<i>Briza minor</i>	annual quaking grass	Poaceae	non-native	AL
<i>Bromus diandrus</i>	ripgut brome	Poaceae	invasive	AL
<i>Bromus hordeaceus</i>	soft chess brome	Poaceae	invasive	AL
<i>Calandrinia ciliata</i>	red maids	Montiaceae	native	AL
<i>Calytonia rubra</i> subsp. <i>depressa</i>	red stemmed spring beauty	Montiaceae	native	AL
<i>Camissoniopsis cheiranthifolia</i>	beach evening primrose	Onagraceae	native	AL
<i>Cardamine oligosperma</i>	Idaho bittercress	Brassicaceae	native	KM
<i>Cardionema ramosissimum</i>	sand mat	Caryophyllaceae	native	AL
<i>Carpobrotus chilensis</i>	sea fig	Aizoaceae	invasive	KM
<i>Carpobrotus edulis</i>	iceplant	Aizoaceae	invasive	KM
<i>Castilleja attenuata</i>	narrow leaved owl's clover	Orobanchaceae	native	KM
<i>Cerastium glomeratum</i>	mouse-eared chickweed	Caryophyllaceae	non-native	AL
<i>Cetranthus ruber</i>	red valerian	Valerianaceae	non-native	KM
<i>Clarkia davyi</i>	Davy's clarkia	Onagraceae	native	KM
<i>Claytonia perfoliata</i>	miner's lettuce	Montiaceae	native	AL
<i>Conium maculatum</i>	poison hemlock	Apiaceae	invasive	KM
<i>Cortaderia jubata</i>	purple pampas grass	Poaceae	invasive	AL
<i>Crocasmia ×crocosmiiflora</i>	monbretia	Iridaceae	invasive	KM



Scientific Name	Common Name	Family	Status	Observer
<i>Cryptantha leiocarpa</i>	popcorn flower	Boraginaceae	native	KM
<i>Cynosurus echinatus</i>	hedgehog dogtail	Poaceae	invasive	AL
<i>Cyperus eragrostis</i>	tall nutsedge	Cyperaceae	native	AL
<i>Cytisus scoparius</i>	scotch broom	Fabaceae	invasive	AL
<i>Daucus carota</i>	Queen Anne's lace	Apiaceae	non-native	KM
<i>Elymus mollis</i>	American dune grass	Poaceae	native	KM
<i>Epilobium ciliatum</i>	slender willow herb	Onagraceae	native	KM
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail	Equisetaceae	native	KM
<i>Erigeron canadensis</i>	horseweed	Asteraceae	native	KM
<i>Eriogonum latifolium</i>	seaside wild buckwheat	Polygonaceae	native	AL
<i>Erodium cicutarium</i>	redstem filaree	Geraniaceae	invasive	AL
<i>Euphorbia peplus</i>	Petty spurge	Euphorbiaceae	non-native	KM
<i>Festuca myuros</i>	rattail grass	Poaceae	invasive	AL
<i>Festuca rubra</i>	red fescue	Poaceae	native	AL
<i>Foeniculum vulgare</i>	fennel	Apiaceae	invasive	AL
<i>Fragaria chiloensis</i>	beach strawberry	Rosaceae	native	AL
<i>Galium aparine</i>	goose grass	Rubiaceae	native	AL
<i>Gamochaeta ustulata</i>	featherweed	Asteraceae	native	KM
<i>Garrya elliptica</i>	coast silk tassel	Garryaceae	native	KM
<i>Geranium dissectum</i>	cutleaf geranium	Geraniaceae	invasive	AL
<i>Gilia millefoliata</i>	dark-eyed gilia	Polemoniaceae	rare, native	KM
<i>Hedera helix</i>	English ivy	Araliaceae	invasive	KM
<i>Hirschfeldia incana</i>	mustard	Brassicaceae	invasive	KM
<i>Holcus lanatus</i>	velvet grass	Poaceae	invasive	AL
<i>Hypochaeris glabra</i>	smooth cat's ear	Asteraceae	non-native	KM
<i>Hypochaeris radicata</i>	hairy cats ear	Asteraceae	invasive	KM
<i>Juncus breweri</i>	Brewer's rush	Juncaceae	native	KM
<i>Juncus patens</i>	rush	Juncaceae	native	KM
<i>Lamium purpureum</i>	dead nettle	Lamiaceae	non-native	AL
<i>Linum bienne</i>	pale flax	Linaceae	non-native	AL
<i>Logfia gallica</i>	narrow leaf cotton rose	Asteraceae	non-native	KM
<i>Lonicera involucrata</i>	twinberry	Caprifoliaceae	native	AL
<i>Lotus corniculatus</i>	bird's-foot trefoil	Fabaceae	non-native	AL
<i>Lupinus arboreus</i>	yellow bush lupine	Fabaceae	invasive	AL





Scientific Name	Common Name	Family	Status	Observer
<i>Lupinus arboreus</i> x	blue hybrid bush lupine	Fabaceae	invasive	KM
<i>Lupinus bicolor</i>	miniature lupine	Fabaceae	native	AL
<i>Lysimachia arvensis</i>	scarlet pimpernel	Myrsinaceae	non-native	AL
<i>Lythrum hyssopifolia</i>	hyssop loosestrife	Lythraceae	invasive	AL
<i>Malva neglecta</i>	dwarf mallow	Malvaceae	non-native	KM
<i>Matricaria discoidea</i>	pineapple weed	Asteraceae	native	AL
<i>Medicago polymorpha</i>	California burclover	Fabaceae	invasive	AL
<i>Melilotus alba</i>	white sweetclover	Fabaceae	non-native	AL
<i>Mentha pulegium</i>	pennyroyal	Lamiaceae	invasive	AL
<i>Morella californica</i>	wax myrtle	Myricaceae	native	AL
<i>Nuttallanthus canadensis</i>	Canada toadflax	Scrophulariaceae	native	KM
<i>Oxalis articulata</i> ssp. <i>rubra</i>	windowbox wood sorrel	Oxalidaceae	non-native	KM
<i>Parentucellia viscosa</i>	yellow glandweed	Scrophulariaceae	invasive	AL
<i>Petrohagia dubia</i>	proliferous pink	Caryophyllaceae	non-native	AL
<i>Plantago coronopus</i>	cut leaf plantain	Plantaginaceae	non-native	AL
<i>Plantago erecta</i>	California plantain	Plantaginaceae	native	KM
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae	invasive	AL
<i>Platystemon californicus</i>	cream cups	Papaveraceae	native	AL
<i>Polygonum paronychia</i>	dune knotweed	Polygonaceae	native	AL
<i>Polypodium glycyrrhiza</i>	licorice fern	Polypodiaceae	native	KM
<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed	Asteraceae	non-native	KM
<i>Raphanus sativus</i>	radish	Brassicaceae	invasive	AL
<i>Rubus armeniacus</i>	Himalayan blackberry	Rosaceae	invasive	AL
<i>Rubus ursinus</i>	California blackberry	Rosaceae	native	AL
<i>Rumex acetosella</i>	common sheep sorrel	Polygonaceae	invasive	AL
<i>Salix hookeriana</i>	coastal willow	Salicaceae	native	AL
<i>Salix lasiandra</i> var. <i>lasiandra</i>	Pacific willow	Salicaceae	native	KM
<i>Salix lasiolepis</i>	arroyo willow	Salicaceae	native	KM
<i>Scrophularia californica</i>	California figwort	Schrophulariaceae	native	AL
<i>Silene gallica</i>	common catchfly	Caryophyllaceae	non-native	KM
<i>Solidago spathulata</i>	coast goldenrod	Asteraceae	native	AL
<i>Sonchus oleraceus</i>	common sow thistle	Asteraceae	non-native	KM
<i>Spartina densiflora</i>	dense-flowered cord grass	Poaceae	invasive	KM



Scientific Name	Common Name	Family	Status	Observer
<i>Tanacetum bipinnatum</i>	dune tansy	Asteraceae	native	AL
<i>Tanacetum parthenium</i>	feverfew	Asteraceae	non-native	AL
<i>Trifolium dubium</i>	little hop clover	Fabaceae	non-native	AL
<i>Trifolium repens</i>	white clover	Fabaceae	non-native	AL
<i>Tropaeolum majus</i>	garden nasturtium	Tropaeolaceae	non-native	KM
<i>Typha latifolia</i>	broad-leaved cattail	Typhaceae	native	KM
<i>Vicia americana</i> subsp. <i>americana</i>	American vetch	Fabaceae	native	AL
<i>Vicia benghalensis</i>	purple vetch	Fabaceae	non-native	KM
<i>Vicia hirsuta</i>	tiny vetch	Fabaceae	non-native	KM
<i>Vicia sativa</i>	garden vetch	Fabaceae	non-native	AL
<i>Vicia tetrasperma</i>	sparrow vetch	Fabaceae	non-native	AL
<i>Vicia villosa</i> ssp. <i>villosa</i>	hairy vetch	Fabaceae	non-native	KM
<i>Zantedeschia aethiopica</i>	callalily	Araceae	invasive	KM



## Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance <u>Yellow bush lupine scrub</u>
		Association	<u>Lupinus arboreus / Bromus diandrus</u>
I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION			
Database #: <u>NORD0001</u>	Date: <u>6/29/20</u>	Name of recorder: <u>Helsey McDonald</u>	circle: Relevé or <u>RA</u>
	UID:	Other surveyors:	
		Location Name: <u>Nordic Fish Farms</u>	
GPS name: <u>Collector</u>		For Relevé only: Bearing°, left axis at ID point _____ of Long / Short side	
UTME _____ UTMN _____		Zone: 11 NAD83 GPS error: ft./ m./ PDOP _____	
Decimal degrees: LAT _____		LONG _____	
GPS within stand? <u>(Yes)</u> / No If No, cite from GPS to stand: distance (m) _____ bearing ° _____ inclination ° _____			
and record: Base point ID _____ Projected UTM: UTM _____ UTMN _____			
Camera Name: <u>iphone</u> Cardinal photos at ID point: <u>NESW 10:54 AM</u>			
Other photos:			
Stand Size (acres): <u>(1, 1-5, &gt;5)</u>   Plot Area (m <sup>2</sup> ): 100 / _____   Plot Dimensions _____ x _____ m   RA Radius <u>30</u> m			
Exposure, Actual °: _____ NE NW SE SW <u>(Flat)</u> Variable   Steepness, Actual °: <u>(0°)</u> 1-5° > 5-25° > 25			
Topography: Macro: top upper mid lower bottom   Micro: convex <u>(flat)</u> concave undulating			
Geology code: _____ Soil Texture code: <u>sand</u>   <u>(Upland)</u> or Wetland/Riparian (circle one)			
% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)			
H <sub>2</sub> O: <u>0</u> BA Stems: <u>30</u> Litter: <u>20</u> Bedrock: <u>0</u> Boulder: <u>0</u> Stone: <u>0</u> Cobble: <u>0</u> Gravel: <u>5</u> Fines: <u>45</u> =100%			
% Current year bioturbation <u>2</u> Past bioturbation present? <u>(Yes)</u> / No   % Hoof punch _____			
Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.			
Site history, stand age, comments: <u>Previously graded, highly disturbed sand substrate has been colonized by invasive Lupinus arboreus, Rubus armeniacus, Brassica nigra, Raphanus sativus, Bromus diandrus, Arthroxanthum odoratum, Briza maxima, Vicia villosa. Almost no native species in center of polygon, fades to invaded dune mat characterized by Abronia latifolia, Fragaria chilensis, Eriogonum latifolium at edges.</u>			
Disturbance code / Intensity (L,M,H): <u>05/4 1/4 2/1</u> / _____ / _____ "Other" _____ / _____			
II. HABITAT DESCRIPTION			
Tree DBH: <u>T1</u> (<1" dbh), <u>T2</u> (1-6" dbh), <u>T3</u> (6-11" dbh), <u>T4</u> (11-24" dbh), <u>T5</u> (>24" dbh), <u>T6</u> multi-layered (13 or 14 layer under T5, >60% cover)			
Shrub: <u>S1</u> seedling (<3 yr. old), <u>S2</u> young (<1% dead), <u>S3</u> mature (1-25% dead), <u>S4</u> decadent (>25% dead)			
Herbaceous: <u>H1</u> (<12" plant ht.), <u>H2</u> (>12" ht.)			
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)			
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)			
III. INTERPRETATION OF STAND			
Field-assessed vegetation Alliance name: <u>Lupinus arboreus semi-natural stand</u>			
Field-assessed Association name (optional): _____			
Adjacent Alliances/direction: <u>Dune Mat</u> / <u>S, E</u> / _____			
Confidence in Alliance identification: L <u>(M)</u> H Explain: <u>Indistinct line between non-native/dune mat</u>			
Phenology (F,P,I): Herb <u>P</u> Shrub <u>P</u> Tree <u>/</u> Other identification or mapping information: _____			



## Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

SPECIES SHEET

Database #: NRD-0001

#### IV. VEGETATION DESCRIPTION

% NonVasc cover: \_\_\_\_\_ Total % Vasc Veg cover: 80<sup>+</sup>

% Cover - Conifer tree / Hardwood tree: 0 / 0 Regenerating Tree: - Shrub: 35 Herbaceous: 50

Height Class - Conifer tree / Hardwood tree: NA/- Regenerating Tree: - Shrub: 2 Herbaceous: 1-2

Height classes: 1= $\leq 1/2$ m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10= $\geq 50$ m

**Stratum categories:** T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

**% Cover Intervals for reference:** r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

[illegible]

**Unusual species:**

Native spp. present at edges



# Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

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For Office Use:	Final database #:	Final vegetation type:	Alliance <u>Dune mat</u> Association
I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION			circle: Relevé or <u>RA</u>
Database #: <u>NORD0002</u>	Date: <u>6/29/20</u>	Name of recorder: <u>Helsey McDonald</u>	
	UID:	Other surveyors:	
		Location Name: <u>Nordie Fish Farms</u>	
GPS name: <u>Collector</u>		For Relevé only: Bearing°, left axis at ID point ____ of <u>Long</u> / <u>Short</u> side	
UTME _____ UTMN _____		Zone: <u>11</u> NAD83 GPS error: ft./ m./ PDOP _____	
Decimal degrees: LAT _____		LONG _____	
GPS within stand? <u>Yes</u> / No If No, cite from GPS to stand: distance (m) _____ bearing ° _____ inclination ° _____			
and record: Base point ID _____ Projected UTM: UTM _____ UTMN _____			
Camera Name: <u>iphone</u> Cardinal photos at ID point: <u>NESW</u>			
Other photos:			
Stand Size (acres): <1, <u>1-5</u> , >5   Plot Area (m²): 100 / _____   Plot Dimensions _____ x _____ m   RA Radius <u>30</u> m			
Exposure, Actual °: _____ NE NW SE SW <u>Flat</u> Variable   Steepness, Actual °: _____ <u>0°</u> 1-5° >5-25° >25			
Topography: Macro: top upper mid lower bottom   Micro: convex <u>flat</u> concave undulating			
Geology code: _____ Soil Texture code: <u>Sand</u>   <u>Upland</u> or Wetland/Riparian (circle one)			
% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)			
H <sub>2</sub> O: BA Stems: <u>30</u> Litter: <u>15</u> Bedrock: Boulder: Stone: Cobble: Gravel: <u>5</u> Fines: <u>50</u> =100%			
% Current year bioturbation <u>1</u> Past bioturbation present? <u>Yes</u> / No   % Hoof punch _____			
Fire evidence: Yes / <u>No</u> (circle one) If yes, describe in Site history section, including date of fire, if known.			
Site history, stand age, comments: <u>Highly invaded dune mat, previously graded, irregularly driven across. Gilia millefoliata present, especially abundant in road along fence line (unpaved sand w/ tire tracks). Percent cover varies widely, with invasive dominance and up to 100% cover non-natives in stabilized areas (especially around Lupinus arboreus), and open patches of higher-quality dune mat interspersed throughout, especially where sand appears to be mobilized by intermittent disturbance.</u>			
Disturbance code / Intensity (L,M,H): <u>05 / H 02 / M 01 / M</u> / _____ / _____ "Other" _____ / _____			
II. HABITAT DESCRIPTION			
Tree DBH: <u>T1</u> (<1" dbh), <u>T2</u> (1-6" dbh), <u>T3</u> (6-11" dbh), <u>T4</u> (11-24" dbh), <u>T5</u> (>24" dbh), <u>T6</u> multi-layered (T3 or T4 layer under T5, >60% cover)			
Shrub: <u>S1</u> seedling (<3 yr. old), <u>S2</u> young (<1% dead), <u>S3</u> mature (1-25% dead), <u>S4</u> decadent (>25% dead)			
Herbaceous: <u>H1</u> (<12" plant ht.), <u>H2</u> (>12" ht.)			
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)			
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)			
III. INTERPRETATION OF STAND			
Field-assessed vegetation Alliance name: <u>Abronia latifolia-Ambrosia chamissonis-DuneMat</u>			
Field-assessed Association name (optional): _____			
Adjacent Alliances/direction: <u>Lupinus arboreus / N, E. Ammophila arenaria / SE</u>			
Confidence in Alliance identification: L <u>(M)</u> H Explain: <u>Highly invaded, but dune species present</u>			
Phenology (E,P,L): Herb <u>P</u> Shrub <u>P</u> Tree <u>-</u> Other identification or mapping information:			



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SPECIES SHEET

SPECIES SHEET

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# Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance <u>Yellow bush lupine scrub</u>
			Association <u>Lupinus arboreus/Anthoxanthum odoratum</u>
<b>I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION</b>			
Database #: <u>NORD00003</u>	Date: <u>6/29/20</u>	Name of recorder: <u>Kelsey McDonald</u>	circle: Relevé or <u>(RA)</u>
UID:		Other surveyors:	
Location Name: <u>Nordic Fish Farms</u>			
GPS name: <u>Collector</u> For Relevé only: Bearing°, left axis at ID point ____ of Long / Short side			
UTME _____ UTMN _____		Zone: 11 NAD83 GPS error: ft./ m./ PDOP _____	
Decimal degrees: LAT _____ LONG _____			
GPS within stand? <u>(Yes)</u> / No If No, cite from GPS to stand: distance (m) _____ bearing ° _____ inclination ° _____			
and record: Base point ID _____		Projected UTM: UTM _____ UTMN _____	
Camera Name: <u>phone</u> Cardinal photos at ID point: <u>NESW</u>			
Other photos:			
Stand Size (acres): <u>(1, 1-5, &gt;5)</u>   Plot Area (m²): 100 / _____   Plot Dimensions _____ x _____ m   RA Radius <u>30</u> m			
Exposure, Actual °: _____ NE NW SE SW Flat Variable   Steepness, Actual °: _____ 0° 1-5° >5-25° >25			
Topography: Macro: top upper mid lower bottom   Micro: convex <u>(flat)</u> concave undulating			
Geology code: _____ Soil Texture code: <u>sand</u>   <u>(Upland)</u> or Wetland/Riparian (circle one)			
% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)			
H20: BA Stems: <u>80</u> Litter: <u>10</u> Bedrock: Boulder: Stone: Cobble: Gravel: <u>5</u> Fines: <u>5</u> =100%			
% Current year bioturbation _____ Past bioturbation present? Yes / No   % Hoof punch _____			
Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.			
Site history, stand age, comments: <u>Highly invaded eastern edge along Humboldt Bay. Characterized by Lupinus arboreus, Cortaderia jubata, Anthoxanthum odoratum, Holcus lanatus, Dune mat species &lt;20% cover, Abronia latifolia present, but high shrub cover.</u>			
Disturbance code / Intensity (L,M,H): <u>OS/H 01/H 02/L</u> / _____ / _____ "Other" _____ / _____			
<b>II. HABITAT DESCRIPTION</b>			
Tree DBH: <u>T1</u> (<1" dbh), <u>T2</u> (1-6" dbh), <u>T3</u> (6-11" dbh), <u>T4</u> (11-24" dbh), <u>T5</u> (>24" dbh), <u>T6</u> multi-layered (T3 or T4 layer under T5, >60% cover)			
Shrub: <u>S1</u> seedling (<3 yr. old), <u>S2</u> young (<1% dead), <u>S3</u> mature (1-25% dead), <u>S4</u> decadent (>25% dead)			
Herbaceous: <u>H1</u> (<12" plant ht.), <u>H2</u> (>12" ht.)			
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)			
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)			
<b>III. INTERPRETATION OF STAND</b>			
Field-assessed vegetation Alliance name: <u>Lupinus arboreus semi-natural stand</u>			
Field-assessed Association name (optional): _____			
Adjacent Alliances/direction: <u>Dune mat</u> / <u>W</u> / <u>Ammophila arenaria</u> / <u>S</u>			
Confidence in Alliance identification: L <u>(M)</u> H Explain: <u>Highly invaded and human-modified</u>			
Phenology (E,P,L): Herb <u>P</u> Shrub <u>P</u> Tree _____ Other identification or mapping information: _____			



## 6

Database #: NORD-0003

#### IV. VEGETATION DESCRIPTION

□ □ □

**Height Class** - Conifer tree / Hardwood tree: — / — Regenerating Tree: — Shrub: 3 Herbaceous: 1-3

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

**Stratum categories:** T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

1

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# Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance <u>Dune mat</u>
			Association
<b>I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION</b>			
Database #:	Date:	Name of recorder:	circle: Relevé or <u>RA</u>
<u>NORD00004</u>	<u>6/29/20</u>	<u>Kelsey McDonald</u>	
	UID:	Other surveyors:	
		Location Name:	<u>Nordic Fish Farms</u>
GPS name: _____ For Relevé only: Bearing°, left axis at ID point _____ of Long / Short side			
UTME _____ UTMN _____ Zone: 11 NAD83 GPS error: ft./ m./ PDOP _____			
Decimal degrees: LAT _____ LONG _____			
GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) _____ bearing ° _____ inclination ° _____			
and record: Base point ID _____ Projected UTM: UTM _____ UTMN _____			
Camera Name: <u>iphone</u> Cardinal photos at ID point: <u>NESW</u>			
Other photos: _____			
Stand Size (acres): <1, <u>1-5</u> , >5   Plot Area (m²): 100 / _____   Plot Dimensions _____ x _____ m   RA Radius <u>30</u> m			
Exposure, Actual °: _____ NE NW SE SW <u>Flat/Variable</u>   Steepness, Actual °: _____ <u>0°</u> 1-5° > 5-25° <u>&gt;25</u>			
Topography: Macro: top upper mid lower bottom   Micro: convex <u>flat</u> concave <u>undulating</u>			
Geology code: _____ Soil Texture code: <u>Gravel, sand</u>   Upland or Wetland/Riparian (circle one) <u>Berm</u>			
% Surface cover: (Incl. outerops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)			
H <sub>2</sub> O:	BA Stems:	Litter:	Bedrock: Boulder: Stone: Cobble: Gravel: Fines: =100%
% Current year bioturbation _____ Past bioturbation present? Yes / No   % Hoof punch _____			
Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.			
Site history, stand age, comments: <u>Eastern area south of the fence has been highly modified and invaded, but dune mat species still present at diagnostic levels. Juncus breweri ~35% cover on man-made berm w/ dense Anthoxanthum odoratum (50% cover) and Ammophila arenaria (10%). Scoured area under telephone poles has low vascular cover (~25%) and relatively high non-vascular cover (~25%) forming biotic crust in some areas on the gravel &amp; shells. Eriogonum latifolium &amp; Fragaria chiloensis are characteristic w/ high densities of Gilia millefoliata growing stunted on the biotic crust.</u>			
Disturbance code / Intensity (L,M,H): <u>G5/M01/H02/H</u> / _____ / _____ "Other" _____ / _____			
<b>II. HABITAT DESCRIPTION</b>			
Tree DBH: <u>T1</u> (<1" dbh), <u>T2</u> (1-6" dbh), <u>T3</u> (6-11" dbh), <u>T4</u> (11-24" dbh), <u>T5</u> (>24" dbh), <u>T6</u> multi-layered (T3 or T4 layer under T5, >60% cover)			
Shrub: <u>S1</u> seedling (<3 yr. old), <u>S2</u> young (<1% dead), <u>S3</u> mature (1-25% dead), <u>S4</u> decadent (>25% dead)			
Herbaceous: <u>H1</u> (<12" plant ht.), <u>H2</u> (>12" ht.)			
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)			
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)			
<b>III. INTERPRETATION OF STAND</b>			
Field-assessed vegetation Alliance name: <u>Dune mat</u>			
Field-assessed Association name (optional): _____			
Adjacent Alliances/direction: <u>Lupinus arboreus</u> / E <u>Ammophila arenaria</u> / W, SE			
Confidence in Alliance identification: <u>L</u> M H Explain: <u>Unnatural topography, highly invaded</u>			
Phenology (E,P,L): Herb <u>P</u> Shrub <u>P</u> Tree <u>-</u> Other identification or mapping information: _____			



## Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

Database #: NORD-6004

SPECIES SHEET

#### IV. VEGETATION DESCRIPTION

% NonVasc cover: 15    Total % Vasc Veg cover: 50

**% Cover -** Conifer tree / Hardwood tree: — / — Regenerating Tree: — Shrub: 1 Herbaceous: 100/25

Height Class - Conifer tree / Hardwood tree: — / — Regenerating Tree: — Shrub: 2 Herbaceous: 1-2

Height classes: 1= $\leq 1/2$ m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10= $\geq 50$ m

**Stratum categories:** T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

**% Cover Intervals for reference:** r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

[illegible]



**Combined Vegetation Rapid Assessment and Relevé Field Form**  
(Revised March 27, 2018)

9

For Office Use:	Final database #:	Final vegetation type: Alliance <u>Dune Mat</u> Association	
<b>I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION</b>			circle: Relevé or <u>RA</u>
Database #: <u>NORD00005</u>	Date: <u>6/29/20</u>	Name of recorder: <u>Heleey McDonald</u>	
	UID:	Other surveyors:	
		Location Name: <u>Nordic Fish Farms</u>	
GPS name: _____		For Relevé only: Bearing°, left axis at ID point _____ of Long / Short side	
UTME _____ UTMN _____		Zone: 11 NAD83 GPS error: ft./ m./ PDOP _____	
Decimal degrees: LAT _____ LONG _____			
GPS within stand? <u>Yes</u> / No If No, cite from GPS to stand: distance (m) _____ bearing° _____ inclination° _____			
and record: Base point ID _____ Projected UTM: UTM _____ UTMN _____			
Camera Name: <u>iphone</u>		Cardinal photos at ID point: <u>NESW</u>	
Other photos:			
Stand Size (acres): <u>&lt;1</u> , 1-5, >5   Plot Area (m²): 100 / _____   Plot Dimensions _____ x _____ m   RA Radius <u>30</u> m			
Exposure, Actual°: _____ NE NW SE SW Flat Variable   Steepness, Actual°: _____ 0° 1-5° >5-25° >25			
Topography: Macro: top upper mid lower bottom   Micro: convex flat concave <u>undulating</u>			
Geology code: _____ Soil Texture code: <u>Sand</u>   <u>Upland</u> or Wetland/Riparian (circle one)			
% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)			
H <sub>2</sub> O: BA Stems: <u>30</u> Litter: <u>35</u> Bedrock: _____ Boulder: _____ Stone: _____ Cobble: _____ Gravel: _____ Fines: <u>34</u> =100%			
% Current year bioturbation <u>1</u> Past bioturbation present? <u>Yes</u> No   % Hoof punch _____			
Fire evidence: Yes / <u>No</u> (circle one) If yes, describe in Site history section, including date of fire, if known.			
Site history, stand age, comments: <u>Appears to be the best natural dune mat community on the property, with undulating topography and only moderately invaded. Dense patches of Gilia millefoliata present. Characterized by Abrochia latifolia, Eriogonum latifolium, polygonum paronychia. Areas with &lt;80% cover of Ammophila arenaria and not dominated by Lupinus arboreus are included as dune mat. High non-vascular cover (~30%), low vascular cover near fence, where it is less invaded.</u>			
Disturbance code / Intensity (L,M,H): <u>05 / M 02 / L 03 / M</u> / _____ / _____ "Other" _____ / _____			
<b>II. HABITAT DESCRIPTION</b>			
Tree DBH: <u>T1</u> (<1" dbh), <u>T2</u> (1-6" dbh), <u>T3</u> (6-11" dbh), <u>T4</u> (11-24" dbh), <u>T5</u> (>24" dbh), <u>T6</u> multi-layered (T3 or T4 layer under T5, >60% cover)			
Shrub: <u>S1</u> seedling (<3 yr. old), <u>S2</u> young (<1% dead), <u>S3</u> mature (1-25% dead), <u>S4</u> decadent (>25% dead)			
Herbaceous: <u>H1</u> (<12" plant ht.), <u>H2</u> (>12" ht.)			
Desert Riparian Tree/Shrub: <u>1</u> (<2ft. stem ht.), <u>2</u> (2-10ft. ht.), <u>3</u> (10-20ft. ht.), <u>4</u> (>20ft. ht.)			
Desert Palm/Joshua Tree: <u>1</u> (<1.5" base diameter), <u>2</u> (1.5-6" diam.), <u>3</u> (>6" diam.)			
<b>III. INTERPRETATION OF STAND</b>			
Field-assessed vegetation Alliance name: <u>Dune mat</u>			
Field-assessed Association name (optional): _____			
Adjacent Alliances/direction: <u>Ammophila arenaria / W</u> . <u>Lupinus arboreus / S, E</u>			
Confidence in Alliance identification: L <u>M</u> H Explain: <u>Edges of Ammophila arenaria &amp; Lupinus arboreus dom.</u>			
Phenology (E,P,L): Herb _____ Shrub _____ Tree _____ Other identification or mapping information: <u>not clearly defined</u>			



(Revised March 27, 2018)

#### IV. VEGETATION DESCRIPTION

% Cover - Conifer tree / Hardwood tree: — / —

Regenerating Tree: — Shrub: 4 Herbaceous: 30

**Height Class** - Conifer tree / Hardwood tree: — / —

Regenerating Tree: — Shrub: 2-3 Herbaceous: 1

Height classes: 1= $\leq 1/2$ m, 2= $1/2$ -1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10= $\geq 50$ m

**Stratum categories:** T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

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**Unusual species:** *Gilia millefoliata* - 1



## Appendix E. Photo Index



Photo 1. Rare annual dark-eyed gilia (*Gilia millefoliata*) May 5, 2020.



Photo 2. Dark-eyed gilia in stabilized dune mat.





Photo 3. Dark-eyed gilia with invasive ripgut brome (*Bromus diandrus*).



Photo 4. Dune mat habitat characterized by yellow sand verbena (*Abronia latifolia*) in the area north of the fence, where dark-eyed gilia was concentrated.





Photo 5. Dark-eyed gilia in an open patch of sand surrounded by ripgut brome.



Photo 6. Dark-eyed gilia beginning to drop seeds in June 29, 2020.





Photo 7. Dune mat habitat near the clarifiers.



Photo 8. Dune mat habitat with beach sagewort (*Artemisia pycnocephala*) and dune goldenrod (*Solidago spathulata*) on the southeast side of the property.





Photo 9. High quality dune mat south of the fence



Photo 10. The intersection of high quality dune mat (left), European beach grass swards (right), and yellow bush lupine scrub in the distance to the east.





Photo 11. Yellow bush lupine scrub east of the clarifiers with high cover of non-native species.



Photo 12. Yellow bush lupine scrub on the southeast end of the property.





Photo 13. Coast willow (*Salix hookeriana*) thickets with Brewer's rush (*Juncus breweri*) (left), a small patch of dune mat (right), and European beach grass swards beyond it to the north.



Photo 14. Yellow bush lupine scrub and native coastal brambles along the ridge east of Vance Ave.





Photo 14. Dune mat also occurred along the east side of Vance Ave.

# CNDDDB Online Field Survey Form Report



California Natural Diversity Database  
Department of Fish and Wildlife  
1416 9th Street, Suite 1266  
Sacramento, CA 95814  
Fax: 916.324.0475  
[cnddb@wildlife.ca.gov](mailto:cnddb@wildlife.ca.gov)  
[www.dfg.ca.gov/biogeodata/cnddb/](http://www.dfg.ca.gov/biogeodata/cnddb/)



Source code MCD20F0006  
Quad code 4012472  
Occ. no. \_\_\_\_\_  
EO index no. \_\_\_\_\_  
Map index no. \_\_\_\_\_

This data has been reported to the CNDDDB, but may not have been evaluated by the CNDDDB staff

Scientific name: *Gilia millefoliata*

Common name: dark-eyed gilia

Date of field work (mm-dd-yyyy): 07-27-2020

Comment about field work date(s): Observed in flower: 5/5/20, 5/22/20; going to fruit 6/29/20; dropping seeds 7/27/20

## OBSERVER INFORMATION

Observer: Kelsey McDonald

Affiliation: GHD

Address: 718 Third Street, Eureka, CA 95501

Email: [kelsey.mcdonald@ghd.com](mailto:kelsey.mcdonald@ghd.com)

Phone: (707) 798-7494

Other observers:

## DETERMINATION

Keyed in: Jepson Manual

Compared w/ specimen at:

Compared w/ image in: CalPhotos

By another person:

Other:

Identification explanation: Dark-eyed gilia was identified by its densely glandular stem and calyx, dissected leaves with linear lobes, short pedicels, and yellow funnel-shaped corolla throat with two purple splotches per lobe.

Identification confidence: Very confident

Species found: Yes If not found, why not?

Level of survey effort: five survey visits with population counts March 24-July 27 2020

Total number of individuals: ~100,000

Collection? No

Collection number:

Museum/Herbarium:

## PLANT INFORMATION

Phenology:	1 %	9 %	90 %
	vegetative	flowering	fruiting

## SITE INFORMATION

Habitat description: Brownfield and surrounding area with variable habitat quality and many invasive species. Dark-eyed gilia often associated with native dune mat species such as seaside buckwheat (*Eriogonum latifolium*), yellow sand verbenas (*Abronia latifolia*), sand mat (*Cardionema ramosissimum*), beach strawberry (*Fragaria chiloensis*), and dune knotweed (*Polygonum paronychia*), disturbance-associated native miniature lupine (*Lupinus bicolor*), as well as many non-native invasive species such as ripgut brome (*Bromus diandrus*), sheep sorrel (*Rumex acetosella*), and English plantain (*Plantago lanceolata*). Dark-eyed gilia did not occur in areas with high percent cover (>80%) of European beachgrass or other invasive plants.

Slope: variable/flat

Land owner/manager: Humboldt Bay Harbor District/Nordic Aquafarms

Aspect: variable/flat

Site condition + population viability: Good

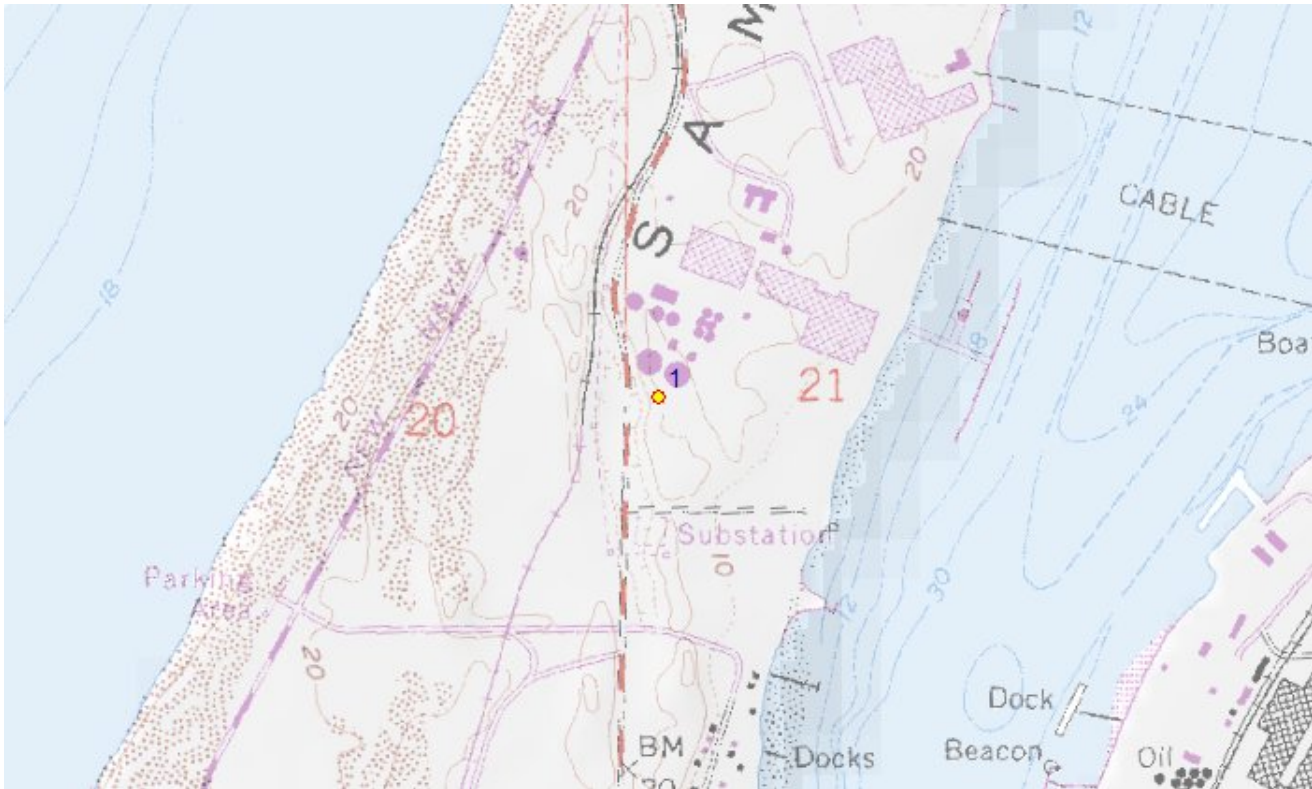
Immediate & surrounding land use: Industrial

Visible disturbances: Site previously graded and regularly disturbed (gilia growing in tire tracks).

Threats: To be developed for aquaculture. A Habitat Mitigation and Monitoring Plan has been developed for preservation of remainder onsite and translocation for offsite restoration.

General comments:

#### MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Humboldt	Eureka	23	40.80274	-124.19600	399114	4517548	10
1	Public Land Survey	Feature Comment						
	H T05N R01W 21	Approximate centroid of population on parcel						

The mapped feature is accurate within: 20 m

Source of mapped feature: digitally placed on map

Mapping notes: Precise population boundaries were mapped in the field with a high accuracy Trimble GPS unit, and an approximate centroid is provided here.

Location/directions comments: East of Vance Avenue, north of the powerlines on the southern end of the Harbor District property.

Attachment(s):