Botanical Survey

26921 N. Highway One ~ Fort Bragg CA, 95437

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1.0 INTRODUCTION

On 25 May 2018 Dark Gulch Environmental Consulting performed an Environmentally Sensitive Habitat Area (ESHA) assessment at 26921 North Highway One, Fort Bragg, Mendocino County, California 95437 (Study Area, Figure 1). Additional studies conducted by Dark Gulch Environmental Consulting in the Study Area include rare plant surveys, vegetation mapping, and wildlife assessments performed May 28, June 4, June 7, June 15, June 21, July 5, July 23, July 24 and August 5, 2018. The approximately 4.98-acre Study Area is located approximately 5.72 aerial miles north of Fort Bragg. The purpose of this study was to identify and map areas within a proposed development that are potential environmentally sensitive habitat areas (ESHA), as defined by the California Coastal Commission (CCC). The proposed project involves the creation of 100' defensible space around all structures and entrances to the property and leveling a pile of dirt that exists in the meadow area of the property. This project also includes proper mitigation for previous vegetation removal (Figure 2). Included herein are the results of the ESHA delineation, an evaluation of potential impacts to ESHA due to construction of the proposed project elements, mitigation measures, and an analysis of ESHA buffers as required by the CCC and Mendocino County Local Coastal Plan (LCP)

Figure 2. Poison hemlock (*Conium maculatum*) located at Study Area.

2.0 Regulatory Background

The California Coastal Act (CCA) defines an ESHA as follows:

> *Environmentally sensitive habitat 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.*

The Mendocino County LCP and California Coastal Commission (CCC) Guidelines contain definitions for specific types of ESHAs, including: wetlands, estuaries, streams and rivers, lakes, open coastal waters and coastal waters, riparian habitats, other resource areas, and special status species and their habitats. For the purposes of this report, WRA has taken into consideration any areas that may meet the definition of ESHA as defined by the CCA, CCC guidelines, or the Mendocino County LCP.

2.1 Wetlands

The California Coastal Act and Mendocino County LCP define wetlands as:

> *Wetland means lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*

Public Resources Code Section 30121 CCC Administrative Regulations (Section 13577 (b)) provide a more explicit definition:

> *Wetlands are lands 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 or drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salt or other substance 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 deepwater habitats.*

The CCC considers this definition as requiring the observation of one diagnostic feature of a wetland, such as wetland hydrology, dominance by wetland vegetation (hydrophytes), or presence of hydric soils, as a basis for asserting jurisdiction under the CCA.

In addition to the above definition, the Statewide Interpretive Guidelines for Identifying and Mapping Wetlands and Other Wet Environmentally Sensitive Habitat Areas (CCC 1981) provide technical criteria for use in identifying and delineating wetlands and other ESHAs within the

Coastal Zone. The technical criteria presented in the guidelines are based on the CCA definition and indicate that wetland hydrology is the most important parameter for determining a wetland, recognizing that:

> *". . . the single feature that most wetlands share is soil or substrata that is at least periodically saturated with or covered by water, and this is the feature used to describe wetlands in the Coastal Act. The water creates severe physiological problems for all plants and animals except those that are adapted for life in water or in saturated soil, and therefore only plants adapted to these wet conditions (hydrophytes) could thrive in these wet (hydric) soils. Thus, the presence or absence of hydrophytes and hydric soils make excellent physical parameters upon which to judge the existence of wetland habitat areas for the purposes of the Coastal Act, but they are not the sole criteria."*

The Technical Criteria requires that saturation of soil in a wetland must be at or near the surface continuously for a period of time. The meaning of "at or near the surface" generally is considered to be approximately one-foot from the surface or less (the root zone), and the saturation must be continuously present for a period of time (generally more than two weeks) in order to create the necessary soil reduction (anaerobic) processes that create wetland conditions. For example, water from rain during a storm that causes saturation near the surface but then evaporates or infiltrates to 18 inches or deeper below the surface shortly after the storm does not meet the generally accepted criteria for wetland hydrology.

The presence of wetland classified plants or the presence of hydric soils (generally referred to as the "one parameter approach") can be used to identify an area as a wetland in the Coastal Zone. There is a correlation between the presence of wetland plants, wetland hydrology, and/or hydric soils occurring together, especially in natural undisturbed areas, and in many cases where one of these parameters is found (e.g., wetland plants), the other parameters will also occur. But there are situations which can result in the presence of wetland classified plants without wetland conditions, and these areas are not wetlands. Where these conditions occur, the delineation study must carefully scrutinize whether the wetland classified plants present are growing as hydrophytes, reducing (anaerobic) conditions caused by the presence of wetland hydrology, or for some other (non-wetland) reason. Examples may include wetland-classified plants which are also salt-tolerant (e.g., alkali heath) that may be responding to either wetland conditions or saline soil conditions, but not necessarily both, and deep-rooted trees (e.g., willows) which are able to tap into deep groundwater sources and can grow in dry surface soils but are also found in wetland conditions where surface water is present.
Hydric soils can also occur in upland areas, especially in areas where historic disturbances may have exposed substratum, or in densely vegetated grasslands (Mollisols). Similarly, the delineation must determine if the hydric soil indicators are the result of frequent anaerobic conditions or of non-wetland conditions.

2.2 Riparian Habitats

The CCA and Mendocino County LCP define riparian habitats as follows:

> *"A riparian habitat is an area of riparian vegetation. This vegetation is an association of plant species which grows adjacent to freshwater watercourses, including perennial and intermittent streams, lakes, and other bodies of freshwater."*

The Statewide Interpretive Guidelines (CCC 1981) state:

> *"For the purpose of interpreting Coastal Act policies, another important distinction is between "wetland" and "riparian habitat." While the Service's classification system includes riparian areas as a kind of wetland, the intent of the Coastal Act was to distinguish these two areas. "Riparian habitat" in the Coastal Act refers to riparian vegetation and the animal species that require or utilize these plants. The geographic extent of a riparian habitat would be the extent of the riparian vegetation.*
>
> *. . . Unfortunately, a complete and universally acceptable definition of riparian vegetation has not yet been developed, so determining the geographic extent of such vegetation is rather difficult. The special case of determining consistent boundaries of riparian vegetation along watercourses throughout California is particularly difficult. In Southern California these boundaries are usually obvious; the riparian vegetation grows immediately adjacent to watercourses and only extends a short distance away from the watercourse. . .*
>
> *. . . For the purposes of this guideline, riparian vegetation is defined as that association of plant species which grows adjacent to freshwater watercourses, including perennial and intermittent streams, lakes, and other freshwater bodies. Riparian plant species and wetland plant species either require or tolerate a higher level of soil moisture than dryer upland vegetation and are therefore generally considered hydrophytic. However, riparian vegetation may be distinguished from wetland vegetation by the different kinds of plant species. . ."*

The guidelines include a list of representative riparian plants that are meant to help distinguish wetland areas from riparian areas. Therefore, under the Coastal Act, riparian areas do not have to be wetlands and are determined based primarily on vegetation and that vegetation's ability to provide habitat for animal species.

2.3 Streams, Rivers, and Anadromous Fish Habitat

The CCA and Mendocino County LCP define Streams, Rivers and Anadromous Fish habitats as follows:

> *"A stream or a river is a natural watercourse as designated by a solid line or dash and three dots symbol shown on the United States Geological Survey map most recently published, or any well-defined channel with distinguishable bed and bank that shows evidence of having contained flowing water as indicated by scour or deposit of rock, sand, gravel, soil, or debris."*

"Freshwater streams used as migration corridor or spawning or nursery habitat by fish, such as salmon and steelhead trout, that live most of their adult lives in saltwater."

2.4 Sand Dunes

The CCA and Mendocino County LCP define sand dunes as follows:

"Sand formed in hills or ridges by the wind and sometimes stabilized by vegetation. Dunes are distinct ecosystems made up of various community types, ranging from open unvegetated sand hills to stabilized dune forests, that frequently contain rare, endangered, protected, or unusual plant and animal species. This highly specialized habitat can be extremely unstable, sensitive to the continuous interplay of surf, sand, and wind."

2.5 Coastal Marine Ecosystem

The CCA and Mendocino County LCP define Coastal Marine Ecosystem habitats as follows:

"That area and its environs containing a delicately balanced environmental system which provides a suitable habitat for local indigenous and migrating species, including all life forms in the tidal zones seaward. The Coastal Marine Ecosystem also is recognized to contain and provide valuable food resources, economic opportunities, and aesthetic value to shore-side establishments, residents and the public in general."

2.6 Open Coastal Waters and Coastal Waters

The CCA and Mendocino County LCP define coastal waters as follows:

"The term open coastal waters or coastal waters refer to the open ocean overlying the continental shelf and its associated coastline. Salinities exceed 30 parts per thousand with little or no dilution except opposite mouths of estuaries."

2.7 Pygmy Forests and Pygmy-type Vegetation

The CCC and Mendocino County LCP define pygmy forests and pygmy-type vegetation as follows:

Pygmy forest: *"A stunted forest, with mature vegetation the majority of which is approximately two to twelve feet in height occurring on soils with conditions which severely limit the growth of vegetation such as Blacklock soils and characterized by Mendocino cypresses, Fort Bragg manzanita, Bolander pines, and pygmy Mendocino Bishop pines."*

Pygmy-type vegetation: *"A forest occurring south of the Navarro River, mainly on Gualala series soils, characterized by stunted vegetation on sites with low commercial timber value. Plant species include knobcone pines and manzanita."*

2.8 Natural Communities and Other ESHA

The CCA and Mendocino County LCP define other resource areas as follows:

"Other designated resource areas include: State parks and reserves, underwater parks and reserves, areas of special biological significance, natural areas, special treatment areas, fishing access points, areas of special biological importance, significant California ecosystems, and coastal marine ecosystems."

Other resource areas considered ESHA include California Department of Fish and Wildlife (CDFW) rare natural communities ranked as imperiled globally or in California (G2 S2 or rarer), as noted in the California Natural Diversity Database (CNDDB). These communities have been classified and described by various references, including the List of Vegetation Alliances and Associations (CDFW 2018), Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986), and A Manual of California Vegetation, 2nd Edition (Sawyer et al. 2009).

2.9 Special-status Species

Special-status species and their habitats are defined as ESHA by the CCA and Mendocino County LCP. Special-status species include those species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing by the U.S. Fish and Wildlife Service (USFWS) or CDFW. In addition, CDFW Species of Special Concern are given special consideration under the California Environmental Quality Act (CEQA). However, these Species of Special Concern may only be protected as ESHAs if they are ranked by CDFG as imperiled globally or in California (G2 S2 or rarer). Plant species on California Native Plant Society (CNPS) Ranks 1 or 2 are also considered special-status species and are protected as ESHA.

3.0 METHODS

Prior to conducting field surveys, available reference materials were reviewed, including the *Soil Survey of Mendocino County, Western Part* (USDA 1999), the Inglenook, Fort Bragg, Westport, Lincoln Ridge, Dutchman's Knoll and Noyo Hill 7.5- minute quadrangle topographic maps (USGS 1960), and available aerial photographs. A field survey was conducted by Dark Gulch Environmental Consulting May 25, 2018 to identify and delineate potential ESHAs within the Study Area. Other survey dates include: May 28, June 4, June 7, June 15, June 21, July 5, July 23, July 24 and August 5, 2018. The methodology of the survey is described below. ESHA boundaries were mapped using sub-meter accuracy Global Positioning System (GPS) and/or hand-drawing boundaries. The following sections detail the methods utilized for delineating ESHA that do not have the potential to occur (e.g. sand dunes in interior settings) or are not located within the Study Area, are not included herein.

3.1 Natural Communities and Other ESHA

The Study Area was evaluated for the presence of other ESHA as defined in the CCA and the Mendocino County LCP, as well as natural communities designated in the CNDDB as G2, S2, or rarer (CDFW 2018). The presence of rare natural communities was determined by Dark Gulch Environmental Consulting, based on vegetation community classifications given in Holland (1986), Sawyer et al. (2009), and CDFW (2018). Vegetation or biological community boundaries were mapped using a GPS.

3.2 Special-status Species

Potential occurrences of special-status species in the study Area were evaluated by first determining which special-status species occur in the vicinity of the Study Area through a literature and database search. Database searches for known occurrences of special-status species focused on the Inglenook, Fort Bragg, Westport, Lincoln Ridge, Dutchman's Knoll and Noyo Hill USGS 7.5-minute quadrangles. The following sources were reviewed to determine which special-status plant and wildlife species have been documented to occur in the vicinity of the Study Area:

- California Natural Diversity Database (CNDDB) records (CDFW 2018)
- USFWS quadrangle species lists (USFWS 2018)
- CNPS Electronic Inventory Records (CNPS 2018)
- Consortium of California Herbaria (CCH 2018)

3.2.1 Special-status Plant Species

Protocol-level rare plant surveys were conducted on May 25, May 28, June 4, June 7, June 15, June 21, July 5, July 23, July 24 and August 5, 2018. by Dark Gulch Environmental Consulting biologist Sarah Bradley.

Potential occurrence of special-status plants in the Study Area was evaluated by first determining which special-status species occur in the vicinity of the Study Area or in similar biological communities through a literature and database search (Appendix A). A list of target

plant species with potential to occur in the Study Area was generated, which guided surveys performed during spring and summer 2018.

The protocol-level rare plant surveys consisted of traversing the entire Study Area. All observed plant species (Appendix B) were identified to the appropriate taxonomic level necessary to determine their rarity status. Plants were identified using the *Jepson Manual* (Hickman 1983), Jepson *Manual, 2nd Edition* (Baldwin et al. 2012), and *A Flora of Sonoma County* (Best et al. 1996). Nomenclature follows Baldwin et al. (2012) unless otherwise noted.

3.2.2 Special-status Wildlife Species

Potential occurrence of special-status wildlife in the Study Area was evaluated by Dark Gulch Environmental Consulting by determining which special-status species occur in the vicinity of the Study Area or in similar biological communities through a literature and database search. Records from the CNDDB (CDFW 2018) and the USFWS Species list for Mendocino County (USFWS 2018) were reviewed to determine which special-status wildlife species have been documented to occur in the vicinity of the Study Area. A site visit was conducted by Dark Gulch Environmental Consulting biologist Sarah Bradley on May 28 and June 21, 2018 with a follow-up visit on July 24, 2018 to characterize if habitat parameters were suitable to support special-status wildlife species in the area.

4.0 STUDY AREA DESCRIPTION

Within a given location, physical characteristics (e.g. topography, soils, climate) and land-use history (e.g. disturbance regime, built environment) influence the distribution and composition of the biotic environment, including the potential presence of sensitive vegetation communities, wetlands and non-wetland water habitats, and special-status plant and wildlife species. Therefore, the following section is a review of the physical conditions and land-use history, as well as the existing vegetation types, within the Study Area necessary to assess the potential for ESHA to be present.

4.1 Land-use History

The Study Area contains a single-family home, a secondary guest house and a tea house, undeveloped land, with existing landscaping and gardening. It is likely that recreation and residence was the primary historic and contemporary land use. It is unclear the exact historical use of the Study Area; however, because of the position near the ocean and the presence of trees/shrubs in historical aerial photographs, it is unlikely that the site was utilized for grazing. Likewise, because the existing trees on site are not merchantable species, it is unlikely that timbering was conducted historically.

4.2 Topography and Soils

The Study Area is situated on a marine terrace between Inglenook Creek to the north and an unnamed drainage to the south. This terrace is composed of Tertiary-Cretaceous Period sedimentary rock overlain by terrace soils. As such the topography in the east is relatively flat, with a pronounced slope that falls from east to west. Elevation ranges from 26.8 to 38.1 meters.

The *Soil Survey of Mendocino County, Western Part* (USDA 2005) indicates that the Study Area contains two native soil types containing two soil series, Tropaquepts and Sirdak Series (Figure 3). Tropaquepts are a very deep, very poorly drained soil found on marine terraces, with slopes of 0 – 15 percent slopes. Sirdak series consists of very deep, somewhat excessively drained soils that formed in eolian sands. They soils are stabilized sand dunes with slopes ranging between 0 – 15 percent. Details for these soil types are outlined below

Tropaquepts, 0 – 15 percent slopes. This series consists of very deep, very poorly drained soils at the heads of drainageways, along drainageways, or in shallow depressions. These soils are found in marine sediments. These soils are considered hydric and are found at elevations of sea level to 600 feet. Surface run off ranges from ponded to medium permeability. Vegetation is mainly dense stands of Mendocino Cypress and Labrador tea, perennial grasses, sedges and way myrtle

Sirdak, 0 – 15 percent slopes. This series consists of very deep, somewhat excessively drained soils that formed in eolian sands. These soils are found on marine terraces. These soils are not considered hydric and are found at elevations of 30 – 250 feet. Permeability is rapid, available water capacity is moderate. Surface runoff is slow or medium. Vegetation includes perennial grasses and forbs and scattered redwoods.

4.3 Climate and Hydrology

The Study Area is located in the coastal fog belt of Mendocino County. The average annual precipitation of 43.42 inches falls as rain and fog drip in the winter months (December through March). The mean daily low and high temperatures in degrees Fahrenheit range from 44.5 in December to 66.7 in September (WRCC 2018).

Although the Study Area experiences substantial rainfall events, evidence of surface ponding, repeated directional flow, perched water table, and/or saturated substrates for extended periods (14 days or greater) are not present.

4.4 Vegetation and Natural Communities

Dark Gulch Environmental Consulting mapped all vegetation communities within the Study Area (Table 1) and recorded all plant species observed (Appendix B). The potential ESHA status of these communities and plant species is discussed in Section 5.0. Vegetation communities and dominant plant species are described below.

Table 1. Summary of biological communities within the Study Area.

Community Type[1]	Vegetation Community[2]	Vegetation Alliance[3]	Acreage
Non-ESHA			
Developed & Landscaped	N/A	N/A	1.00
ESHA			
Wetland Habitats	Tanoak forest	*Notholithocarpus densiflorus* Forest Alliance Tanoak Forest	1.11
Riparian Habitats	White Alder groves	*Alnus rhombifolia* Forest Alliance White Alder Grove	0.80
Riparian Habitats	Coastal Willow groves	Coastal Willow Grove *Salix hookeriana* Shrubland Alliance	1.10

Developed and Landscaped: This vegetation community is not described in the literature (Holland 1986, Sawyer et al. 2009). Developed areas are generally composed of species adapted to disturbance, such as nutrient-poor soils, toxic soils, or altered hydrologic regime.

Landscaped areas are generally dominated by trees, shrubs, and perennials. The developed areas include three buildings, a paved parking area and driveway and a garden area planted with a variety of horticultural species. The east side of the home forms the boundary for the eastern wetland area. There is approximately one hundred feet of domestic grass/lawn between the home and the top of the slope that is delineated as the eastern boundary of the western riparian zone.

Coast Willow Groves: This vegetation community is characteristic of the North Coast riparian scrub as described in Holland (1986) and the *Salix hookeriana* Shrubland Alliance as described in Sawyer et al. (2009). This community is asterisked (*) (Holland 1986) and is ranked G4, S3 (Sawyer et al. 2009, CDFW 2018). It is characterized by shrubs less than eight meters in height, a continuous canopy and a variable herbaceous layer. *Salix hookeriana* is at least 50% of the relative cover). Within the Study Area, coastal willow groves are located on the western property boundary (Figure 4).

White Alder Groves: This vegetation community is defined by trees with a canopy greater than 35 meters, open to continuous. The shrub layer is sparse to continuous and the herbaceous layer is variable (Sayer et al. 2009). This community is ranked G4 S4 (Sayer et al. 2009), CDFW 2018). Within the Study Area, white alder groves are located in the northwest corner of the project site (Figure 4).

Tanoak Forest: This vegetation community is defined by trees less than 45 meters in height, a continuous canopy, an open shrub layer and sparse herbaceous layer. *Notholithoscarpus densiflorus* is dominant or co-dominant. Holland defined this as a Tan-oak Forest (1986). It has a global rank of G4 and a state ranking of S3.2. This community exists to the east of the house encompassing the majority of the eastern side of the Study Area (Figure 4).

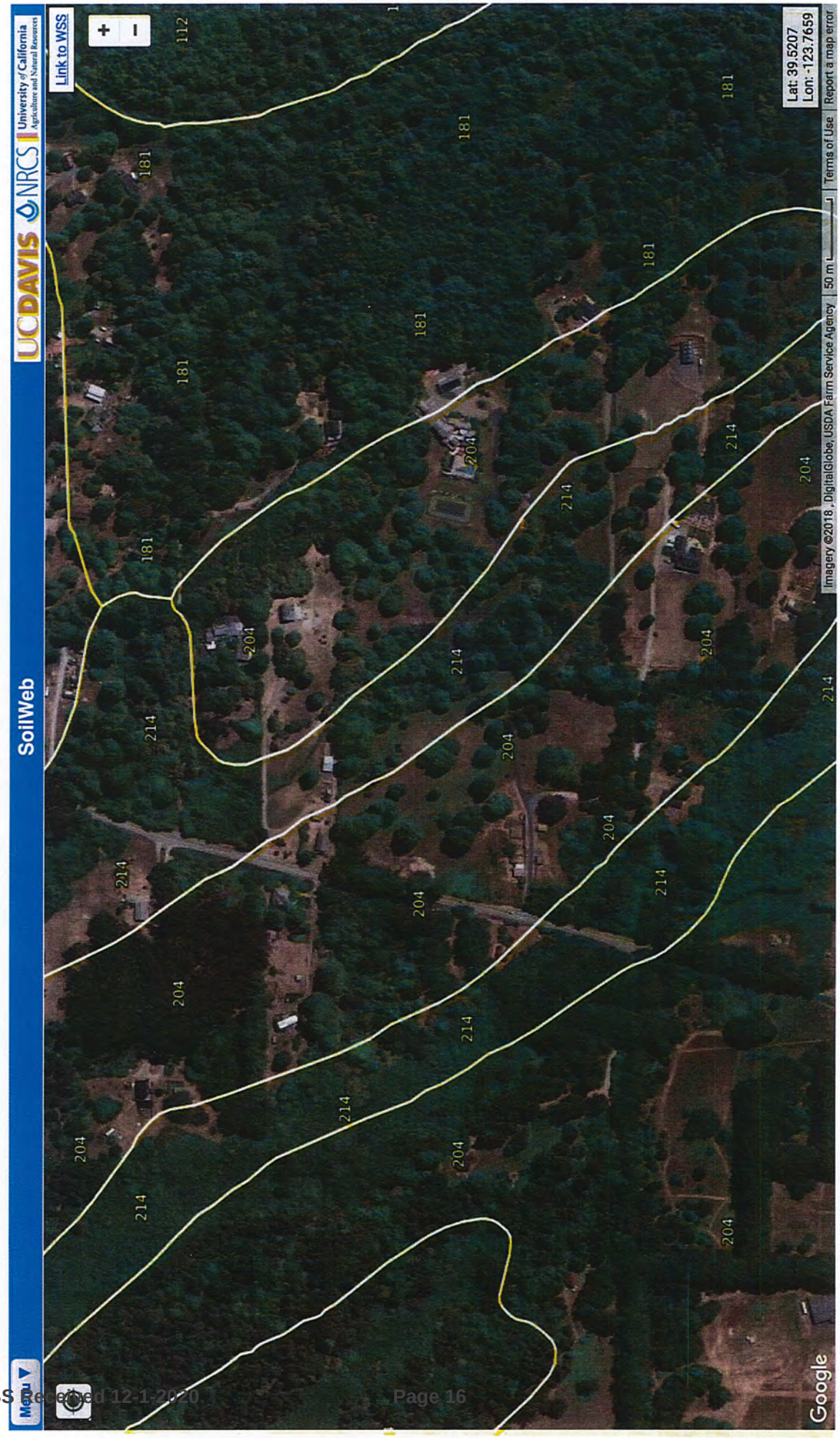
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Figure 4. ESHA Locations

5.0 RESULTS

The following sections contain a description of ESHA documented during DGEC's assessments and surveys. Figure 4 illustrates all ESHA observed in the Study Area. A list of all plant species observed within the Study Area is included in Appendix B. Representative photographs of the Study Area are included in Appendix C.

5.1 Natural Communities and Other ESHA

The Tanoak forest, White Alder Grove and Coastal Willow Grove described in Section 4.4 above are potential sensitive natural community ESHA. These potential ESHA's occupy approximately 1.11, 0.80 and 1.10 acres (48,351.6, 47,916, and 34,848 square feet), respectively within the Study Area.

5.2 S pecial-statusS pecies

5.2.1 Special-status Plant Spe cies

A total of 51 special-status plant species have been documented within. The greater vicinity of the Study Area, of which 19 have the potential to occur within the Study Area (Figure 5). The potential for these species to occur within the Study Area are summarized in Appendix A. Of the 51 special-status species that have been documented, 32 do not have the potential to occur within the Study Area due to one or more of the following reasons:

- Hydrologic conditions (e.g. tidal, riverine) necessary to support the special-status plant species are not present in the Study Area;
- Edaphic (soil) conditions (e.g. volcanic tuff, serpentine) necessary to support the special-status plant species are not present in the Study Area;
- Topographic conditions (e.g. north-facing slope, montane) necessary to support the special-status species are not present in the Study Area;
- Unique pH conditions (e.g. alkali scalds) necessary to support the special-status plant species are not present in the Study Area;
- Associated vegetation communities (e.g. interior chaparral, tidal marsh) necessary to support the special-status plant species are not present in the Study Area;
- The Study Area is geographically isolated (e.g. below elevation, coastal environ) from the documented range of the special-status plant species.

The remaining 19 special-status plant species were assessed to have a moderate to high potential to occur within the Study Area, and formed the target species list for the rare plant surveys performed May 28, June 4, June 7, June 15, June 21, July 5, July 23, July 24, and August 5, 2018. Protocol-level rare plant surveys resulted in no findings of special-status plant species. All species with the potential to occur within the Study Area are described below.

Point Reyes blennosperma (*Blennosperma nanum* var. *robustum*). CNPS Rank 1B. Moderate Potential (Not Observed). Point Reyes blennosperma is an annual forb in the sunflower family

(Asteraceae) that blooms February – April. It typically occurs on sandy bluffs and grassy places in the coastal prairie, northern coastal scrub and wetland/riparian habitat (CDFW 2018, CNPS 2018). Observed associated species include round-headed Chinese houses (*Collinsia corymbose*), beach suncup (*Carmissoniopsis cheiranthifolia*), North Coast phacelia (*Phacelia insularis* var. *continentis*), seacoast angelica (*Angelica lucida*), beach sage (*Artemisia pycnocephala*), Howell's spineflower (*Chorizanthe howellii*), Mendocino paintbrush (*Castilleja mendocinensis*), seaside buckwheat (*Eriogonum latifolium*), and seaside daisy (*Erigeron glaucus*) (CDFW 2018, personal observations 2017, 2018). Point Reyes blennosperma was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of coastal prairie underlain by sandy substrate and associated species; however, this species was not observed during protocol-level rare plant surveys.

Coastal bluff morning-glory (*Calystegia purpurata* ssp. *saxicola*). CNPS Rank 1B. Moderate Potential (Not Observed). Coastal bluff morning-glory is a perennial forb in the morning-glory family (Convolvulaceae) that blooms from May to September. It typically occurs on bluffs within coastal dune and coastal scrub habitat at elevations ranging from 0 – 105 meters (CDFW 2018, CNPS 2018). Observed associated species include Bishop Pine (*Pinus muricata*), shore pine (*Pinus contorta* ssp. *contorta*), coyote brush (*Baccharis pilularis*), tree lupine (*Lupinus arboreus*), poison oak (*Toxicodendron diversilobum*), Douglas iris (*Iris douglasiana*), California blackberry (*Rubus ursinus*), sea lettuce (*Dudleya farinosa*), bracken fern (*Pteridium aquilinum*), ice plant (*Carpobrotus edulis*), seaside wooly sunflower (*Eriophyllum staechadifolium*), common velvet grass (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*), and little rattlesnake grass (*Briza minor*)(CDFW 2018, personal observation 2017, 2018). Coastal bluff morning-glory was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of coastal scrub habitat and several associated species; however this species was not observed during protocol-level rare plant surveys.

Swamp harebell (*Campanula californica*). CNPS Rank 1B. High Potential (Not Observed). Swamp harebell is a perennial forb in the harebell family (Campanulaceae) that blooms from June to October. It typically occurs on mesic sites in bog, fen, closed-cone coniferous forest, coastal prairie, meadow, seep, freshwater marsh ad North Coast coniferous forest habitat at elevations ranging from 1 – 405 meters (CDFW 2018, CNPS 2018). Soil survey data at know locations suggest that this species is typically located on moderately acid to neutral (pH 5.6 to 6.7) loams to sandy loams derived from sandstone (CDFW 2018, CSRL 2018). Observed associated species include Douglas fir (*Pseudotsuga menziesii*), coast redwood (*Sequoia sempervirens*), arroyo willow (*Salix lasiolepis*), rushes, sedges, water parsley, nootka rose (*Rosa nutkana*), California blackberry (*Rubus ursinus*), musk monkeyflower (*Mimulus guttatus*), coastal hedgenettle (*Stachys chamissonis*), common velvet grass (*Holcus lanatus*), and tinker's penny (*Hypericum anagalloides*) (CDFW 2018). Swamp harebell was initially evaluated to have a high potential to occur in the Study Area due to the presence of associated species and vegetation communities; however, it was not observed during protocol-level rare plant surveys conducted in spring 2018.

Deceiving sedge (*Carex saliniformis*). CNPS Rank 1B. Moderate Potential (Not Observed). Deceiving sedge is a perennial graminoid in the sedge family (Cyperaceae) that blooms from

June to July, but is identifiable into August based on fruit and vegetative characters. It typically occurs in mesic areas of coastal prairie, coastal scrub, meadows, seeps, and coastal salt marsh habitat at elevations ranging from 3 – 230 meters (CDFW 2018, CNPS 2018). This species has a wetland indication status of facultative wetland (FACW) on the National Wetland Plant List (Lichvar et. al, 2016). Observed associated species include marsh sandwort (*Arenaria paludicola*), slough sedge (*Carex obnupta*), witch grass (*Panicum acuminatum*), low bulrush (*Isolepsis cernua*), golden-eyed grass (*Sisyrinchium californicum*), blue-eyed grass (*S. bellum*), bracken fern (*Pteridium aquilinum*), common velvet grass (*Holcus lanatus*), coastal tufted hair grass (*Deschampsia cespitosa* ssp. *holciformis*), California oat grass (*Danthonia californica*), beach strawberry (*Fragaria chiloensis*), hawkbit (*Leontodon saxatilis*), and Douglas iris (*Iris douglasiana*) (CDFW 2018, personal observation 2018). Deceiving sedge was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of associated species and vegetation communities; however, it was not observed during protocol-level rare plant surveys.

Oregon Coast Paintbrush (*Castilleja litoralis*). CNPS Rank 2B. Moderate Potential (Not Observed). Coast paintbrush is a perennial hemiparasitic forb in the broomrape family (Orobanchaceae) that blooms in June. It typically occurs on sandy substrates within coastal bluff scrub, coastal scrub and coastal dune habitat at elevations ranging from 15 – 100 meters (CDFW 2018, CNPS 2018). Observed associated species include Sitka spruce (*Picea sitchensis*), red alder (*Alnus rubra*), coyote brush (*Baccharis pilularis*), California blackberry (*Rubus ursinus*), twinberry (*Lonicera involucrata*), wax myrtle (*Morella californica*), salal (*Gaultheria shallon*), sticky monkey (*Mimulus aurantiacus*), common yarrow (*Achillea millefolium* leafy reed grass (*Calamagrostis foliosa*), pearly everlasting (*Anaphalis margaritacea*), horsetails (*Equisetum* sp.), Douglas iris (*Iris douglasiana*), tough-leaf iris (*I. tenax*), and coastal mugwort (*Artemisia suksdorfii*) (CDFW 2018). Oregon coast paintbrush was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of associated species and vegetation communities; however it was not observed during protocol-level rare plant surveys conducted in summer 2018.

Mendocino paintbrush (*Castilleja mendocinensis*). CNPS Rank 1B. High Potential (Not Observed). Mendocino paintbrush is a perennial hemiparasitic forb in the broomrape family (Orobanchaceae) that blooms from April to August. It typically occurs on coastal bluff faces and near bluff edges within coastal bluff scrub, closed-cone coniferous forest, coastal dune, coastal prairie, and coastal scrub habitat at elevations ranging from 0 – 160 meters (CDFW 2018, CNPS 2018). Observed associated species include Bishop Pine (*Pinus muricata*), shore pine (*Pinus contorta* ssp. *contorta*), coyote brush (*Baccharis pilularis*), blue blossom (*Ceonothus thyrsiflorus* var. *thyrsiflorus*), sticky monkey (*Mimulus aurantiacus*), poison oak (*Toxicodendron diversilobum*), common yarrow (*Achillea millefolium*), coast angelica (*Angelica hendersonii*), varied lupine (*Lupinus variicolor*), sea lettuce (*Dudleya farinosa*), sea pink (*Armeria maritima* ssp. *californica*), coastal buckwheat (*Eriogonum latifolium*), Blasdale's bentgrass (*Agrostis blasdalei*), coast onion (*Allium dichlamydeum*), beach knotweed (*Polygonum paronychia*), seaside daisy (*Erigeron glaucus*), beach strawberry (*Fragaria chiloensis*), and common wooly sunflower (*Eriophyllum lanatum* var. *arachnoideum*) (CDFW 2018, personal observations 2017,

2018). Mendocino paintbrush was initially evaluated to have a high potential to occur within the Study Area due to presence of coastal bluff, as well as associated species and vegetation communities; however, it was not observed during protocol-level rare plant surveys.

Bluff wallflower (*Erysimum concinnum*). CNPS Rank 1B. Moderate Potential (Not Observed). Bluff wallflower is a low, succulent, biennial to short-lived perennial member of the mustard family (Brassicaceae) that blooms from March to June. It typically occurs in on cliffs, coastal bluffs, dunes and prairies at elevations from 0 – 185 meters. Observed associated species include seaside daisy (*Erigeron glaucus*), sea thrift (*Armeria maritima*), Douglas iris (*Iris douglasiana*) and checkerbloom (*Sidalcea malviflora* ssp. *malviflora*) (CDFW 2018, CNPS 2018). Bluff wallflower was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of associated species and vegetation communities; however, this species was not observed during protocol-level rare plant surveys conducted in summer 2018.

Pacific gilia (*Gilia capitata* ssp. *pacifica*). CNPS Rank 1B. High Potential (Not Observed). Pacific gilia is an annual form in the phlox family (Polemoniaceae) that blooms from April to August. It typically occurs in. ravines, steep slopes and open flats in coastal dune, coastal bluff scrub, coastal prairie, and valley and foothill grassland habitat at elevations ranging from 5 – 1665 meters (CDFW 2018, CNPS 2018, Baldwin et al. 2012). Observed associated species include tanoak (*Notholithocarpus densiflorus*), Douglas fir (*Pseudotsuga menziesii*), poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), cow parsnip (*Heracleum maximum*), California oat grass (*Danthonia californica*), Italian rye grass (*Festuca perennis*), dogtail grass (*Cynosurus echinatus*), ripgut brome (*Bromus diandrus*), little rattlesnake grass (*Briza minor*), big rattlesnake grass (*B. maxima*), wild oats (*Avena barbata, A. fatua*), bentgrass (*Agrostis* sp.), blue wild rye (*Elymus glaucus*), soap plant (*Chlorogalum pomeridianum*), bracken fern (*Pteridium aquilnum*), bee plant (*Scrophularia californica*), rough cat's-ear (*Hypochaeris radicata*), English plantain (*Plantago lanceolata*), Canada thistle (*Cirsium arvense*), and silver hair grass (*Aira caryophyllea*) (CDFW 2018). Pacific gilia was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of coastal prairie underlain by sandy substrate and associated species; however, this species was not observed during protocol-level rare plant surveys.

Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*). CNPS Rank 1B. High Potential (Not Observed). Short-leaved evax is an annual forb in the sunflower family (Asteraceae) that germinates and leaf's-out in late winter, blooms from March to June, and senesces in late summer. It typically occurs on sandy substrate on bluffs and flats in coastal bluff scrub and coastal dune habitat at elevations of 0 – 215 meters (CDFW 2018, CNPS 2018). Observed associated species include round-headed Chinese houses (*Collinsia corymbose*), beach suncup (*Carmissoniopsis cheiranthifolia*), North Coast phacelia (*Phacelia insularis* var. *continentis*), seacoast angelica (*Angelica lucida*), beach sage (*Artemisia pycnocephala*), Howell's spineflower (*Chorizanthe howellii*), Mendocino paintbrush (*Castilleja mendocinensis*), seaside buckwheat (*Eriogonum latifolium*), and seaside daisy (*Erigeron glaucus*) (CDFW 2018, personal observations 2017, 2018). Short-leaved evax was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of coastal prairie underlain by sandy substrate and

associated species; however, this species was not observed during protocol-level rare plant surveys.

Perennial goldfields (*Lasthenia californica* ssp. *macranthera*). CNPS Rank 1B. High Potential (Not Observed). Perennial goldfields are annual to perennial forbs in the sunflower family (Asteraceae) that bloom from January to November. It typically occurs on mesas, benches and bluff faces in coastal bluff scrub, coastal dune, and coastal scrub at elevations from 5 – 520 meters (CDFW 2018, CNPS 2018). Observed associated species include coyote brush (*Baccharis pilularis*), poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), brownie thistle (*Cirsium quercetorum*), Douglas iris (*Iris douglasiana*), sea lettuce (*Dudleya farinosa*), California buttercup (*Ranunculus californicus*), Pacific reed grass (*Calamagrostis nutkaensis*), Italian rye grass (*Festuca perennis*), selfheal (*Prunella vulgaris*), English plantain (*Plantago lanceolata*), dwarf checkerbloom (*Sidalcea malviflora*), beach strawberry (*Fragaria chiloensis*), narrow-leaf mule's-ears (*Wyethia angustifolia*), coast angelica (*Angelica hendersonii*), soap plant (*Chlorogalum pomeridianum*), and coast coyote thistle (*Eryngium armatum*) (CDFW 2018, personal observations 2017, 2018). Perennial goldfields was initially evaluated to have a high potential to occur within the Study Area due to the presence of associates species and vegetation communities; however this species was not observed during protocol-level rare plant surveys conducted in summer 2018.

Coast lily (*Lilium maritimum*). CNPS Rank 1B. Moderate Potential (Not Observed). Coast lily is a bulbiferous perennial forb in the lily family (Liliaceae) that blooms from May to August. It typically occurs on sandy, acidic often hummocky substrates derived from marine sediments and sedimentary rock in bogs, closed-cone coniferous forest (e.g. Bishop pine, pygmy cypress), coastal prairie, coastal scrub, broadleaf upland forest and North Coast coniferous forest habitats at elevations ranging from 5 – 475 meters (CDFW 2018, CNPS 2018). Observed associated species include pygmy cypress (*Hesperocyparis pygmaea*), Bishop pine (*Pinus muricata*), Bolander's pine (*P.contorta* ssp. *contorta*), coast redwood (*Sequoia sempervirens*), wax myrtle (*Morella californica*), evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), Pacific rhododendron (*Rhododendron macrophyllum*), Labrador tea (*R. columbianum*), slough sedge (*Carex obnupta*), California sedge (*C. californica*), Pacific reed grass (*Calamagrostis nutkaensis*) and bracken fern (*Pteridium aquilinum*) (CDFW 2018, personal observations 2107, 2018). Coast lily was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of associated species and vegetation communities; however, this species was not observed during protocol-level rare plant surveys conducted in summer 2018.

Wolf's evening-primrose (*Oenothera wolfii*). CNPS Rank 1B. High Potential (Not Observed). Wolf's evening-primrose is a perennial herb in the evening-primrose family (Onagraceae) that blooms May through October. It typically occurs in sandy, usually mesic soil, coastal bluff scrub, coastal dunes, coastal prairie and lower montane coniferous forest at an elevation range of 3 – 800 meters (CDFW 2018, CNPS 2018). Observed associated species include round-headed Chinese houses (*Collinsia corymbose*), beach suncup (*Carmissoniopsis chamaenerioides*), North Coast phacelia (*Phacelia insularis* var. *continentis*), seacoast angelica (*Angelica lucida*), beach

sage (*Artemisia pycnocephala*), Howell's spineflower (*Chorizanthe howellii*), Mendocino paintbrush (*Castilleja mendocinensis*), seaside buckwheat (*Eriogonum latifolium*), and seaside daisy (*Erigeron glaucus*) (CDFW 2018, personal observations 2017, 2018). Wolf's evening-primrose was initially evaluated to have a high potential to occur within the Study Area due to the presence of coastal prairie underlain by sandy substrate and associated species; however, this species was not observed during protocol-level rare plant surveys.

Seacoast ragwort (*Packera bolanderi* var. *continentis*). CNPS Rank 2B (Moderate Potential). Seacoast ragwort is a perennial rhizomatous herb in the sunflower family (Asteraceae) that blooms January – August (CDFW 2018, CNPS 2018). It typically occurs in coastal scrub and north coast coniferous forest at elevations between 30 – 650 meters. Observed associated species include Bishop Pine (*Pinus muricata*), shore pine (*Pinus contorta* ssp. *contorta*), coyote brush (*Baccharis pilularis*), blue blossom (*Ceonothus thyrsiflorus* var. *thyrsiflorus*), sticky monkey (*Mimulus aurantiacus*), poison oak (*Toxicodendron diversilobum*), common yarrow (*Achillea millefolium*), coast angelica (*Angelica hendersonii*), varied lupine (*Lupinus variicolor*), sea lettuce (*Dudleya farinosa*), sea pink (*Armeria maritima* ssp. *californica*), coastal buckwheat (*Eriogonum latifolium*), Blasdale's bentgrass (*Agrostis blasdalei*), coast onion (*Allium dichlamydeum*), beach knotweed (*Polygonum paronychia*), seaside daisy (*Erigeron glaucus*), beach strawberry (*Fragaria chiloensis*), and common wooly sunflower (*Eriophyllum lanatum* var. *arachnoideum*) (CDFW 2018, personal observations 2017, 2018). Mendocino paintbrush was initially evaluated to have a high potential to occur within the Study Area due to presence of coastal bluff, as well as associated species and vegetation communities; however, it was not observed during protocol-level rare plant surveys.

White-flowered rein orchid (*Piperia candida*). CNPS Rank 1B. Moderate Potential (Not Observed). White-flowered rein orchid is a perennial herb found in the orchid family (Orchidaceae) that blooms March through May. It typically occurs in broad leaved upland forest, lower montane coniferous forest, North coast coniferous forest and sometimes in serpentine soil at an elevation of 30 – 1310 meters (CDFW 2018, CNPS 2018). Observed associated species include varied lupine (*Lupinus variicolor*), Blasdale's bentgrass (*Agrostis blasdalei*), sea pink (*Armeria maritima*), English daisy (*Bellis perennis*), rough cat's-ear (*Hypochaeris radicata*), tufted hair grass (*Deschampsia cespitosa*), hillside suncups (*Taraxia ovata*), sheep sorrel (*Rumex acetosella*), dog violet (*Viola adunca*), soap plant (*Chlorogalum pomeridianum*), Pacific false bindweed (*Calystegia purpurata*), perennial goldfields (*Lasthenia californica* ssp. *macranthа*), coast coyote thistle (*Eryngium armatum*), dwarf plantain (*Plantago erecta*), English plantain (*P. lanceolata*), featherweed (*Gamochaeta ustulata*), seaside daisy (*Erigeron glaucus*), Wight's paintbrush (*Castilleja wightii*), common yarrow (*Achillea millefolium*), common velvet grass (*Holcus lanatus*), big rattlesnake grass (*Briza maxima*), and sweet vernal grass (*Anthoxanthum odoratum*) (CDFW 2018, personal observation 2017, 2018). White-flowered rein orchid was initially evaluated as moderate potential to occur within the Study Area due to the presence of associated vegetation communities and species; however, this species was not observed during protocol-level rare plant surveys conducted in summer 2018.

Maple-leaved checkerbloom (*Sidalcea malachroides*). CNPS Rank 4.2. High Potential (Not Observed). Maple-leaved checkerbloom is a perennial forb in the mallow family (Malvaceae) that blooms March to August. It typically occurs in disturbed areas in broad leaved upland forest, coastal prairie, coastal scrub, North coast coniferous forest, and riparian woodland at an elevation of 0 – 730 meters (CDFW 2018, CNPS 2028). Observed associated species include varied lupine (*Lupinus variicolor*), Blasdale's bentgrass (*Agrostis blasdalei*), sea pink (*Armeria maritima*), English daisy (*Bellis perennis*), rough cat's-ear (*Hypochaeris radicata*), tufted hair grass (*Deschampsia cespitosa*), hillside suncups (*Taraxia ovata*), sheep sorrel (*Rumex acetosella*), dog violet (*Viola adunca*), soap plant (*Chlorogalum pomeridianum*), Pacific false bindweed (*Calystegia purpurata*), perennial goldfields (*Lasthenia californica* ssp. *macranthera*), coast coyote thistle (*Eryngium armatum*), dwarf plantain (*Plantago erecta*), English plantain (*P. lanceolata*), featherweed (*Gamochaeta ustulata*), seaside daisy (*Erigeron glaucus*), Wight's paintbrush (*Castilleja wightii*), common yarrow (*Achillea millefolium*), common velvet grass (*Holcus lanatus*), big rattlesnake grass (*Briza maxima*), and sweet vernal grass (*Anthoxanthum odoratum*) (CDFW 2018, personal observation 2018). Maple-leaved checkerbloom was initially evaluated as moderate potential to occur within the Study Area due to the presence of associated vegetation communities and species; however, this species was not observed during protocol-level rare plant surveys conducted in summer 2018.

Purple-stemmed checkerbloom (*Sidalcea malviflora* ssp. *purpurea*). CNPS Rank 1B. High Potential (Not Observed). Purple-stemmed checkerbloom is a perennial forb in the mallow family (Malvaceae) that blooms from May to June. It typically occurs in openings, meadows and prairies within broadleaf upland forest and coastal scrub habitat at elevations ranging from 15 – 85 meters (CDFW 2018, CNPS 2018). This species has a wetland indicator status of facultative wetland (FACW) species on the National Wetland Plant List (Lichvar et al., 2018). Observed associated species include varied lupine (*Lupinus variicolor*), Blasdale's bentgrass (*Agrostis blasdalei*), sea pink (*Armeria maritima*), English daisy (*Bellis perennis*), rough cat's-ear (*Hypochaeris radicata*), tufted hair grass (*Deschampsia cespitosa*), hillside suncups (*Taraxia ovata*), sheep sorrel (*Rumex acetosella*), dog violet (*Viola adunca*), soap plant (*Chlorogalum pomeridianum*), Pacific false bindweed (*Calystegia purpurata*), perennial goldfields (*Lasthenia californica* ssp. *macranthera*), coast coyote thistle (*Eryngium armatum*), dwarf plantain (*Plantago erecta*), English plantain (*P. lanceolata*), featherweed (*Gamochaeta ustulata*), seaside daisy (*Erigeron glaucus*), Wight's paintbrush (*Castilleja wightii*), common yarrow (*Achillea millefolium*), common velvet grass (*Holcus lanatus*), big rattlesnake grass (*Briza maxima*), and sweet vernal grass (*Anthoxanthum odoratum*) (CDFW 2018, personal observation 2018). Purple-stemmed checkerbloom was initially evaluated as high potential to occur within the Study Area due to the presence of associated vegetation communities and species; however, this species was not observed during protocol-level rare plant surveys conducted in summer 2018.

Coastal triquetrella (*Triquetrella californica*). CNPS Rank 1B. High Potential (Not Observed). Coastal triquetrella is a moss in the family Pottiaceae at elevations of 10 – 100 meters. Most occurrences of this species have been found within ten miles of the coast, on sandy habitats, on oil or rock but usually adjacent to the coast. This species is also found in inland chaparral.

Grows on exposed to shaded soil, rocks or sand, in dry or moist situations. Also found in coastal shore pine and Sitka spruce forest and in dense chaparral on north facing slopes. Associated species include *Racomitrium heterostichum* and *Cladonia.*

Alpine marsh violet (*Viola palustris*). CNPS Rank 2B. Moderate Potential (Not Observed). Alpine marsh violet is a perennial rhizomatous herb in the viola family (Violaceae) that blooms April – July. It typically occurs in marshes, swamps, boggy open sites and streambanks at elevations of 0 – 225 meters (CDFW 2018, CNPS 2018). Observed associated species include marsh sandwort (*Arenaria paludicola*), slough sedge (*Carex obnupta*), witch grass (*Panicum acuminatum*), low bulrush (*Isolepsis cernua*), golden-eyed grass (*Sisyrinchium californicum*), blue-eyed grass (*S. bellum*), bracken fern (*Pteridium aquilinum*), common velvet grass (*Holcus lanatus*), coastal tufted hair grass (*Deschampsia cespitosa* ssp. *holciformis*), California oat grass (*Danthonia californica*), beach strawberry (*Fragaria chiloensis*), hawkbit (*Leontodon saxatilis*), and Douglas iris (*Iris douglasiana*) (CDFW 2018, personal observation 2018). Alpine marsh violet was initially evaluated to have a moderate potential to occur within the Study Area due to the presence of associated species and vegetation communities; however, it was not observed during protocol-level rare plant surveys.

5.2.2 Special-status Wildlife Species

A total of 25 special status wildlife species have been documented within the greater vicinity of the Study Area, of which six have the potential to occur within the Study Area (Figure 6). The potential for these species to occur within the Study Area are summarized in Appendix A. Thirty-three of the 42 special-status wildlife species do not have the potential to occur within the Study Area due to one or more of the following reasons:

- Aquatic habitats (e.g. rivers, ponds, estuaries) necessary to support the special-status wildlife species are not present in the Study Area.
- Vegetation habitats (e.g. oak woodlands, old-growth Douglas fir – coast redwood) that provide nesting and/or foraging resources necessary to support the special-status wildlife species are not present in the Study Area.
- Structures or vegetation (e.g. caves, old-growth trees) necessary to provide nesting or cover habitat to support the special-status wildlife species are not present in the Study Area.
- Host plants (e.g. dog violet, harlequin lotus) necessary to provide larval and nectar resources for the special-status wildlife species are not present in the Study Area.
- The Study Area is outside (e.g. north of, west of) of the special-status wildlife species documented nesting range.

Great blue heron, Obscure bumble bee, Crotch bumble bee, Western bumble bee, Townsends big-eared bat, and Hoary bat were evaluated to have potential to occur within the Study Area. However, with the exception of the Obscure bumble bee and Western bumble bee, and White-tailed kite, the other species were determined to not occur within the Study Area.

The Great blue heron was not observed at any time within the Study Area, nor in the surrounding areas to the Study Area. Crotch bumble bees were not observed during any of the

site visits. There was no evidence of Townsend's big-eared bat at the Study Area, nor in any of the surrounding areas. While the Study Area does contain appropriate habitat for the Hoary bat, there is no evidence of them utilizing the Study Area nor are there any known occurrences in the surrounding area; no individuals were observed during any of the site visits.

Obscure bumble bee (*Bombus occidentalis*). CDFW Decreasing Population. High Potential. The Obscure bumble bees inhabits open grassy coastal prairies and Coast Range meadows. This species nests underground as well as above ground in abandoned bird nests. Nests are often located underground in abandoned rodent nests or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. This species feeds on *Ceonothus, Cirsium, Clarkia, Keckiella, Lathyrus, Lotus, Lupinus, Rhododendron, Rubus, Trifolium and Vaccinium* (Williams et al. 2014). This species was observed on three occasions during the protocol-level surveys conducted in summer 2018 concurrent with special-status plant species.

Western bumble bee (*Bombus occidentalis*). CDFW Decreasing Population. Moderate Potential
Western bumble bees inhabit underground cavities such as old squirrel or other animal nests and in open west-southwest slopes boarded by trees, although a few nests have been reported from above-ground locations such as in logs among railroad ties. Availability of nest sites may depend on rodent abundance. Western bumble bees are generalist foragers and visit a wide variety of flowers. Of particular importance are flowers in the Fabaceae, Asteraceae, Rhamnaceae, and Rosaceae families. This species was observed on two occasions during protocol-level surveys conducted in summer 2018 concurrent with special-status plant species.

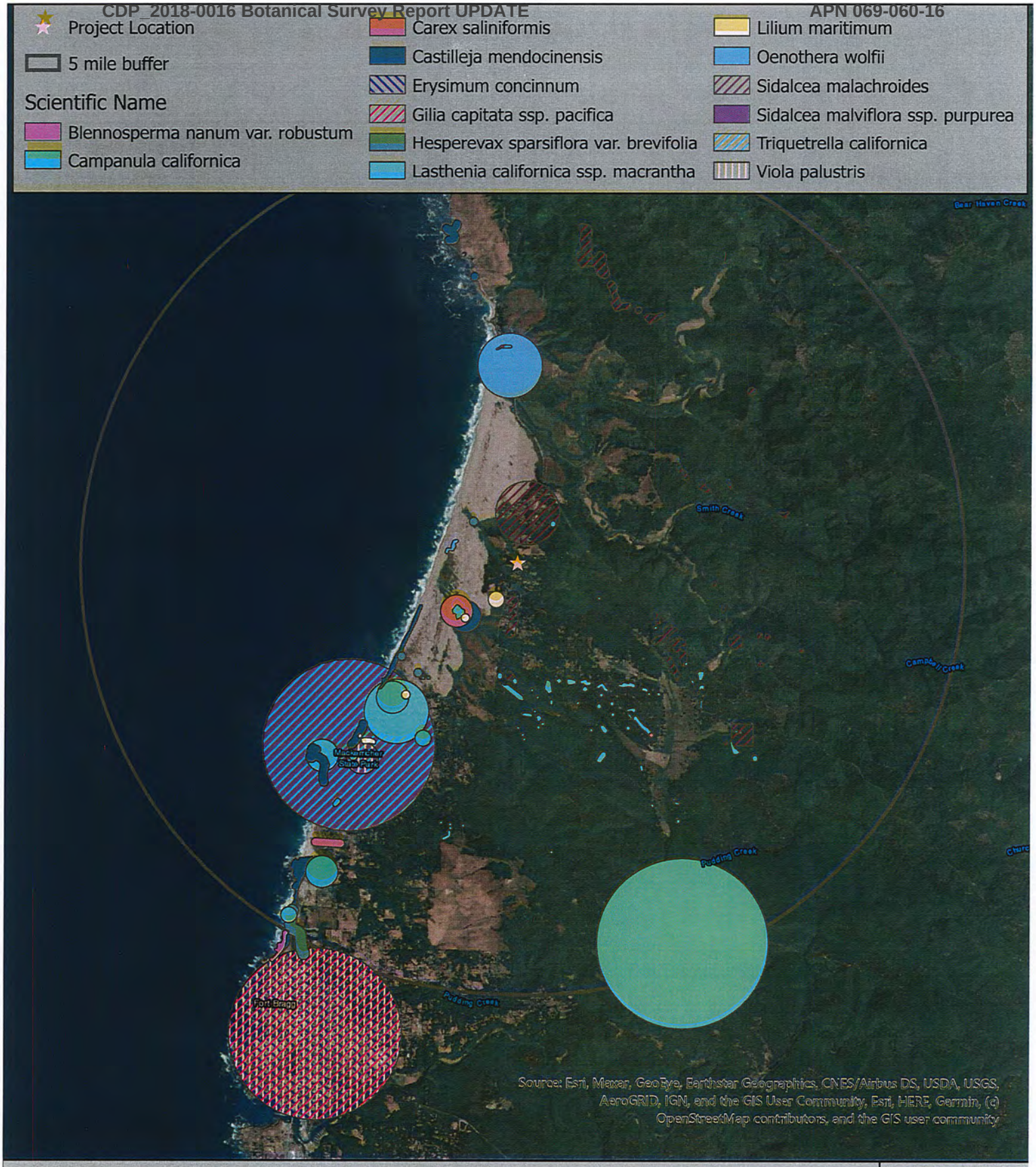

Figure 5.

Special-status Plant Species within 5 miles of the Study Area

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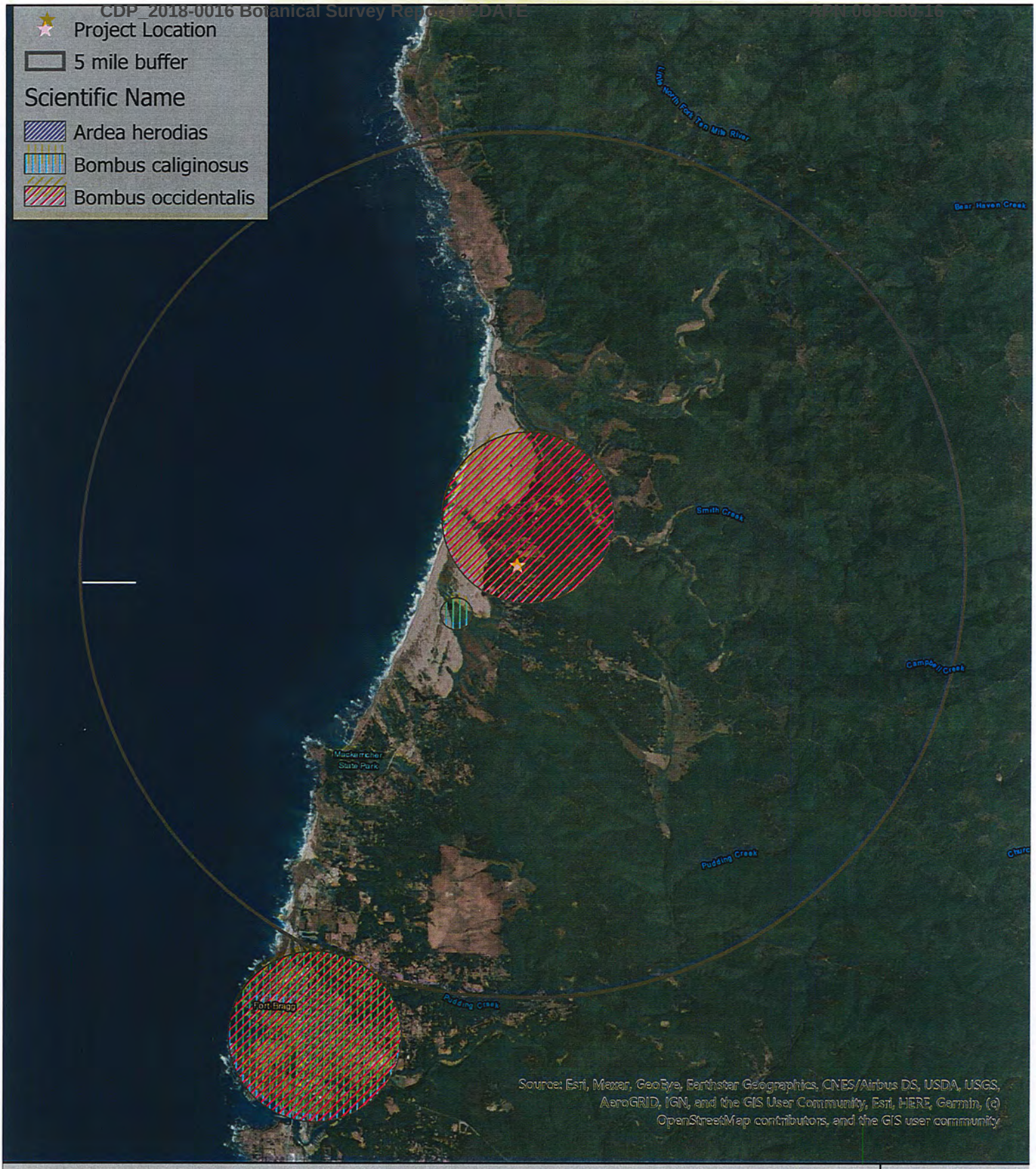
Miles

Dark Gulch Environmental Consulting



F igure 6
Special-status Animal Species within 5 miles of the Study Area

N

0 1 2 4 6
Miles

Dark Gulch Environmental Consulting

6.0 PROPOSED PROJECT DESCRIPTION

The proposed project involves the removal of trees and other vegetation around the house and other structures to create defensible space. Further project work includes the revegetation of the riparian zone along the western boundary of the property, encompassing an area from Highway 1 on the west and the top of the slope of the east, revegetation of the wetland zone east of the home encompassing an area 100 feet to the east of the small seasonal stream/drainage and to the eastern side of the home. This work will not include trees or shrubs taller than eight feet within the eastern revegetation area due to the 100-foot defensible space clearing or within the expanded utility easement when the power lines run across the middle of the meadow. Prior to application for permits, trees and shrubs were removed from the property, including removal of twelve White Alders (*Alnus rhombifolia*) from the riparian area on the western side of the property. Numerous other trees were removed, including Bishop pines (*Pinus muricata*), tan oaks (*Notholithocarpus densiflorus*), willows (*Salix hookeriana*), red alders (*Alnus rubra*), and one Grand Fir (*Abies grandis*). Many of the stumps were ground down prior to the botanical surveys being done, so the exact number of trees removed is impossible to ascertain.

A row of screening trees will be planted along the southern property boundary to create a visual break between the project site and surrounding properties. It is proposed that redwoods (*Sequoia sempervirens*) be used for this purpose because they are endemic and will provide good screening potential as well as providing appropriate habitat for animals and insects in the area. These trees will not be planted within 30 feet of the existing power lines to maintain defensible space and prevent the need for trimming or removal of the trees in the future.

Further project work will include:

Thinning of existing redwoods (*Sequoia sempervirens*) to the east of the structures and within the 100-foot defensible space. This thinning will be done in a manner that will allow for 20 foot vertical spacing, allowing for maintenance of the defensible space and appropriate spacing for healthy canopy cover.

A 14-foot clearing of trees, plants and shrubs along the easement driveway to allow for accommodation of emergency vehicles.

Maintenance clearing and removal of dead trees and branches as needed to reduce fire danger.

The creation of pedestrian walkways within the east and west mitigation areas to allow for ease of access. These walkways will be maintained with hand tools and will be created in a manner to prevent erosion.

Stumps will be removed from the areas not to be revegetated by use of a stump grinder.

The area within the 100-foot defensible space will not have ground litter including leaves, limbs or other debris and will be mowed to maintain the firesafe space.

Raised planting beds will be installed within the 100-foot defensible space and will be planted with vegetables and ornamental plants and shrubs. They will be kept free of dry debris to insure the firesafe nature of this space.

Flowers, shrubs and fruit trees will be planted within the 100-foot defensible space but will be kept irrigated and free of dry material to maintain the firesafe space.

7.0 ESHA IMPACTS ANALYSIS

The proposed project involves the removal of vegetation within 100-feet of the house, structures and driveways to create defensible space. However, previously removed vegetation has impacted the surrounding ESHA's. Each of these areas will need to be revegetated with appropriate native species to mitigate the existing damage. It is of importance to note that all of these areas were previously impacted by the planting and propagation of non-native species as "ornamental". The entire Study Area is located within the 100-foot ESHA buffer and the majority is within the 50-foot buffer.

The project involved the removal of many trees, including Bishop pines (*Pinus muricata*), tan oaks (*Notholithocarpus densiflorus*), willows (*Salix hookeriana*), red alders (*Alnus rubra*), Grand Fir (*Abies grandis*) and White Alders (*Alnus rhombifolia*). It is impossible to ascertain the exact number of trees that were removed due to the stump grinding and removal of some stumps. Many of the trees that were removed were well within the area defined as "defensible space" surrounding the home. These trees and shrubs were within the defined 100-foot ESHA buffer but were also growing over the roof of the house and surrounding structures. The overgrown presence of these trees, some of which were dead or dying, presented enormous risk the home in the case of a wildland fire. While the removal of these trees and shrubs does reduce the ESHA in the area directly east of the home, it is impractical and unsafe to replace these trees due to the high fire risk present in this area. Replacing this vegetation with native ferns, rhododendrons and other native species that are appropriate for the climate, while limiting the number of trees that are planted that could create a fire danger to the home and structures is the prudent solution.

The ESHA located on the western side of the property, defined by the unnamed stream and riparian area was impacted by the removal of vegetation as well. Again, the exact extent of tree removal can only be surmised due to the removal of some stumps. Many of the remaining stumps have begun to regrow, therefore exacerbating the need for replacement.

Projects that propose work with a buffer of less than 100 feet from an ESHA must provide information that indicates a lesser buffer distance will not have a significant adverse impact on the habitat. The buffer zone analysis utilizing Mendocino LCP Zoning Ordinance 20.496.020(A)[(1) through (4)(k)] is described below in Table 2.

Table 2: ESHA Development Criterial Analysis
Mendocino County Zoning Code Section 20.496.020

(A) Buffer Areas. A buffer shall be established adjacent to all environmentally sensitive habitat areas. The purpose of this buffer area shall be to provide for a sufficient area to protect the environmentally sensitive habitat from degradation resulting from developments and shall be compatible with the continuance of such areas.	
Sections 1-3: Development between 50 and 100 feet from ESHA	
1. Width. The width of the buffer area shall be a minimum of one hundred feet, unless an applicant can demonstrate after consultation and agreement with California Department of Fish and Wildlife, and County Planning staff, that one hundred feet is not necessary to protect the resources from that particular habitat area from possible significant disruption caused by the proposed development. The buffer areas shall be measured from the outside edge of the Environmentally Sensive Habitat Areas (ESHA's) and shall not be less than fifty feet in width. New land divsion shall not be allowed which will create new parcels entirely within a buffer area. Developments permitted within a buffer area shall generally be the same as those uses permitted in the adjacent ESHA.	Three separate ESHA's have been impacted by this project; the tanoak area to the east of the home, the White alder grove to the north west of the Study Area and the Coastal willow groves to the south west of the Study Area. Vegetation has been removed from both areas. Due to the lack of construction in all areas, the impacts are limited to the vegetation removal. No new land division is proposed.
1 (a). Biological Significance of Adjacent Lands. The degree of significance depends upon the habitat requirements of the species in the habitat area. Where a significant functional relationship exists, the land adjacent to a wetland, stream or riparian habitat area shall also be considered to be part of the ESHA, and the buffer zone shall be measured from the edge of these lands and be sufficiently wide to protect these functional relationships.	The Study Area includes one ESHA that extend onto adjacent lands. The Tanoak forest extends to the north and south onto adjacent parcels. The Adjacent lands also include ESHA's but they have not been impacted by the project. No special status plants have been identified in the Study Area.

1 (b). Sensitivity of Species to Disturbance. The width of the buffer zone shall be based, in part, on the distance necessary to ensure that the most sensitive species of plants and animals will not be disturbed significanly the the permitted development. Such a determination shall be based on the following:	
(i). Nesting, feeding, breeding, resting, or other habitat requirements for both resident and migratory fish and wildlife species	(i) Protocol-level botanical surveys concluded that special-status plant species are not present inside the Study Area. Great blue heron, Obscure bumble bee, Crotch bumble bee, Western bumble bee, Townsend's big-eared bat, Hoary bat, and Red-bellied newt were the only special-status wildlife with the potential to occur within the Study Area.
(ii). An assessment of the short-term and long-term adaptability of various spcies to human disturbance.	(ii) The continued use of the Study Area by common species is expected to continue following the completion of work outlined in the project description. The common plant species that compose the vegetation communities will continue to persist following the completion of work. Common wildlife species that currently frequent the site likely frequest neighboring rural residential parcels with little interruption to their routine functions.
(iii). An assessment of the impact and activity levels of the proposed development on the resource.	(iii) The completed project will include revegetation of native plant species in the ESHA's that have been impacted by the work already done. The replacement of these species unlikely to negatively affect any surrounding ESHAs.
1(c) Susceptibility of Parcel to Erosion. The width of the buffer zone shall be based, in part, on an assessment of the slope, soils, impervious surface coverage, runoff characteristics, and vegetative cover of the parcel and to what degree the development will change the potential for erosion. A sufficient buffer to allow for the interception of any additional material eroded as a result of the proposed development should be provided.	The existing dwellings are situated on relatively flat areas where persistent soil erosion is unlikely. Standard best management practices (BMP) will be deployed during the completion of the project to further mitigate potential soil erosion. The residence relies on an existing driveway.

1(d). Use of Natural Topographic Features to Locate Development. Hills and bluffs adjacent to ESHAs shall be used, where feasible, to buffer habitat areas. Where otherwise permitted, development should be located on the side of hills away from ESHA's. Similarly, bluff faces should not be developed, but shall be included in the buffer zone.	The residence footprint and the previously landscaped/developed has not changed since the house was built. The existing driveway will continue to be utilized as access. No further development is proposed.
1(e). Use of Existing Cultural Features to Locate Buffer Zones. Cultural features (e.g. roads and dikes) shall be used, where feasible, to buffer habitat areas. Where feasible, deveopment shall be located on the side of roads, dikes, irrigation canals, flood controle channels, etc. away from the ESHA.	The residence footprint has not changed. The existing driveway will continue to be utilized as access.
1(f). Lot Configuration and Location of Existing Development. Where an existing subdivision or other development is largely built-out and the buildings are a uniform distance from a habitat area, at least that same distance shall be required as a buffer zone for any new development permitted. However, if that distance is less than one hundred feet, additional mitigation measures (e.g. planting of native vegetation) shall be provided to ensure additional protection. Where development is proposed in an area that is largely undeveloped, the wides and most protective buffer zone feasible shall be required.	The existing residence will reside on its existing footprint. The nearest neighboring residences are greater than 350 feet away from the existing residence. Most residences are at least partially screened by trees and are visible from California Highway 1.
1(g). Type and Scale of Development Proposed. The type and scale of the proposed development will, to a large degree, determine the size of the buffer zone necessary to protect the ESHA. Such evaluations will be made on a case-by-case basis depending upon the resources involved, the degree to which adjacent lands have been developed, and the type of development in the area.	The existing residence is similar in size to other neighboring residences; the style of homes in this area are ecclectic. They are situated in similar habitats and topographic positions.

2. Configuration. The buffer area shall be measured from the nearest outside edge of the ESHA (e.g. for a wetland from the landward edge of the wetland; for a stream from the landward edge of the riparing vegetation or the top of the bank).	The proposed buffer areas are measured from the delineated outermost extent of the several on-site ESHAs including wetland ESHA and riparian ESHAs.
3. Land Division. New subdivisions or boundary line adjustments shall not be allowed which will create or provide for new parcels entirely within a buffer area.	Not applicable; the property owner does not propose to subdivide the parcel.
Section 4: Development within 50 feet of ESHA	
4. Permitted Development. Development permitted within the buffer area shall comply at a minimum with the following standards:	The proposed project takes advantage of the exising residence's footprint and will reduce the amount of vegetation removal. The majority of vegetation to be removed is non-native.
4(a). Development shall be compatible with the continuance of the adjacent habitat area by maintaing the functional capacity, their ability to be self-sustaining and maintain natural species diversity.	Additionally, a vegetation planting plan will incorporate native species to enhance existing habitats on-site.
4(b). Structures will be allowed within the buffer area only if there is no other feasible site available on the parcel.	The existing dwelling is situated in the least environmentally damaging location within the Study Area. he existing nature of the residence and associated structures, are not being expanded.
4(c). Development shall be sited and designed to prevent impacts which would degrade adjacent habitat areas. The determination of the best site shall include consideration of drainage, access, soil type, vegetation, hydrological characteristics, elevation, topography, and distance from natural stream channels.	The existing dwelling is sited in an acceptable area on the project site. No new building is proposed as part of this project.
	Additionally, a vegetation planting plan will incorporate native species to enhance existing habitats on-site.
4(d). Same as 4(a).	See above

4(e). Structures will be allowed within the buffer area only if there is no other feasibl site available on the parcel. Mitigation measures, such as planting riparian vegetation, shall be required to replace the protective values of the buffer area on the parcel, at a minimum ratio of 1:1, which are lost as a result of development under this solution.	The existing dwelling is sited in an acceptable area on the project site. No new building is proposed as part of this project. A vegetation planting plan will be developed to provide both enhanced habitat and visual screening. Immediate vegetation impacts are overwhelmingly to non-native species.
4(f). Development shall minimize the following: impervious surfaces, removal of vegetation, amount of bare soils, noise, dust, artificial light, nutrient runoff, air pollution, and human intrusion in to the wetlands and minimize alteration of natural landforms.	The proposed project calls for replanting of native species in ESHAs. Due to the fact that many of the stumps were removed prior to protocol level surveys, it is impossible to determine the actual number of trees removed. Revegetation will utilize native species appropriate to the habitat and that will enhance adjacent ESHAs
4(g). Where riparian vegetation is lost due to development, such vegetation shall be replaced at a minimum ration of 1:1 to restore the protective values of buffer area.	The proposed project calls for replanting of native species in ESHAs. Due to the fact that many of the stumps were removed prior to protocol level surveys, it is impossible to determine the actual number of trees removed. Revegetation will utilize native species appropriate to the habitat and that will enhance adjacent ESHAs
4(h). Aboveground structures shall allow peak surface water flows from a 100 year flood to pass with no significant impediment.	Not applicable; no structures are impacting streams.
4(i). Hydraulic capacity, subsurface flow patterns, biological diversity, and/or biological or hydrological processes, either terrestrial or aquatic, shall be protected.	The proposed project would not have a significant impact on the biological diversity of the Study Area. The buffer shall be enhanced with native plant species (see migigation measure 1-4).

4(j). Priority for drainage conveyance from a development site shall be through the natural steam environment zones, if any exist in the development area. In the drainage system design report or development plan, the capacity of natural stream enviroment zones to convey runoff from the completed development shall be evaluated and integrated with the drainage system whenever possible. No structure shall interrupt the flow of groundwater within a buffer strip. Foundations shall be situated with the long axis of interrupted impermeable vertical surfaces oriented parallel to the groundwater flow direction.	The proposed project does not require any changes to foundations.
4(k). If findings are made that the effects of developing an ESHA buffer area may result in significant adverse impacts to the ESHA, mitigation measures will be required as a condition of project approval. Noise barriers, buffer areas in permanent open space, land dedication for erosion control, and wetland restoration, including off-site drainage improvements, may be required as mitigation measures for developments adjacent to environmentally senstive habitats.	ESHAs have been adversely effected by vegetatiion removal. This project calls for appropriate mitigation to create revegetated areas within the effected ESHAs. These revegetated areas will enhance both onsite and adjacent ESHAs by the addition of locally appropriate native species.

8.0 MITIGATION MEASURES

The following mitigation measures are recommended to compensate for the disturbance within the ESHA.

Potential Impact 1: The project as completed has resulted in a loss of approximately 130,680 square feet of ESHA habitat. Recolonization of the impacted areas has begun occurring, with regrowth of tree species from stumps and distribution of native plants from the seed bank. Direct impacts include the removal of native herbaceous species and native trees. Effects of soil erosion have been mitigated by the seeding and growth of grass species.

Mitigation Measure 1-1: Replant tree species at a rate of 4:1. This replanting will be done in such a manner as to ensure that the replanted species will not create the hazardous situation by reducing recommended defensible space around the home, other structures and will not hamper ingress/egress.

Mitigation Measure 1-2: Where feasible, remove highly invasive species such as Himalayan blackberries (*Rubus armeniacus*) utilizing mechanical methods to create open space that will be populated by native species.

Mitigation Measure 1-3: Plant wet-garden type shrubs in area to the east of the home including native rhododendrons, ferns and other endemic species.

Mitigation Measure 1-4: Plant screening trees along the southern boundary of the property, creating improved habitat areas.

Mitigation Measure 1-5: Plantings should include a variety of endemic shrubs and herbaceous plants, as well as trees to create a viable mosaic of species and create suitable habitat for a wide variety of animals and insects.

Potential Impact 2: Work associated with removal of invasive species and replanting appropriate native species has the potential to remove vegetation which buffer soil migration and erosion.

Mitigation 2-1: Implementation of standard erosion best management practices such as straw waddles, silt fencing, etc. to prevent sediment migration. Where feasible, conduct work during the dry season to reduce sediment migration.

Mitigation 2-2: Reseed and/or replant with fast-growing, native herbaceous species atop any disturbed area that is sloped.

Mitigation 2-3: During construction, materials and equipment should be lain down in non-ESHAs such as the existing driveway which are clearly designated by high visibility construction fencing or other signage. Spill prevention devices should be utilized for all toxic liquids including but not limited to gasoline, diesel, motor oil, solvents, paints and herbicides.

Potential Impact 3: Work associated with the proposed project has the potential to impact breeding birds during the nesting season. Impacts to breeding birds are prohibited by the

Migratory Bird Treaty Act (MBTA).

Mitigation 3-1: The bird breeding season typically extends from February to August. Ideally, the clearing of vegetation and the initiation of work can be done in the non-breeding season between September and January. If these activities cannot be done in the non-breeding season, a qualified biologist shall perform pre-construction breeding bird surveys within 14 days of the onset of work or clearing of vegetation and consult with CDFW. If active breeding bird nests are observed, no ground disturbance activities shall occur within a minimum 100-foot exclusion zone. These exclusion zones shall remain in place around the active nest until all young are no longer dependent upon the nest. A biologist should monitor the nest site weekly during breeding season to ensure the buffer is sufficient to protect the nest site from potential disturbances.

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Appendix A

Special-status Species with Potential to Occur in the Study Area

Table A-1. Special-status plant and wildlife species habitat suitability and survey results for 26921 North Highway One (Study Area). List compiled from California Department of Fish and Game (CDFG) Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) Electronic Inventory searches (September 2018) of the Inglenook, Fort Bragg, Westport, Lincoln Ridge, Dutchmans Knoll and Noyo Hill USGS 7.5' quadrangles. Several additional regionally significant species are listed based on potential to occur in coastal Mendocino.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Plants				
pink sand verbena *Abronia umbellata* var. *breviflora*	Rank 1B	Coastal dune, coastal strand; located on foredunes and interdunes with low vegetation cover. Elevation range: 0 – 10 meters. Blooms: June – October.	No Potential. The Study Area does not contain coastal dune habitat necessary to support this species.	**Not Present**. No suitable habitat present.
Blasdale's bent grass *Agrostis blasdalei*	Rank 1B	A perennial rhizomatous herb found on coastal dunes, coastal bluff scrub, coastal prairie; located on sandy to gravelly substrate close to rocks of bluff faces; typically located in nutrient poor areas with sparse vegetation cover. Elevation range: 0 – 150 meters. Blooms: May – July.	No Potential. The Study Area does not contain appropriate habitat sufficient to support this species.	**Not Present**. No suitable habitat present.
pygmy manzanita *Arctostaphylos nummularia* ssp. *mendocinensis*	Rank 1B	A perennial evergreen shrub that occurs in closed-cone coniferous forests (acidic sandy clay). Elevation 90 – 200 meters. Blooms: January	No Potential. The Study Area does not contain pygmy forest or podzol soils necessary to support this species.	**Not Present.** No suitable habitat present.
Humboldt County milk-vetch *Astragalus agnicidus*	Rank 1B	A perennial herb found in broadleaved upland forest, North coast coniferous forests; openings and disturbed areas. Elevation range: 120 – 800 meters. Blooms: April – September	No Potential. The Study Area is below the accepted elevation range for this species.	**Not Present.** No suitable habitat present.
Point Reyes blennosperma *Blennosperma nanum* var. *robustum*	Rank 1B	An annual herb found in coastal prairie, northern coastal scrub and wetland/riparian habitat. Elevation range: 10 – 145 meters. Blooms: February – April.	Moderate Potential. The Study Area has appropriate habitat and is in the accepted elevation range but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Thurber's reed-grass *Calamagrostis crassiglumis*	Rank 2B	A perennial rhizomatous herb found in coastal scrub, and freshwater marshes and swamps. Elevation range: 10 – 60 meters. Blooms: May – August.	No Potential. The Study Area does not contain the appropriate habitat for this species.	**Not Present.** No suitable habitat present.
Leafy reed grass *Calamagrostis foliosa*	Rank 4.2	A perennial herb found in rocky habitat associated with coastal bluff scrub and north coast coniferous forest. Elevation: 0 – 1220 meters. Blooms: May – September.	No Potential. The Study Area does not contain the appropriate habitat for this species	**Not Present.** No suitable habitat present.
coastal bluff morning-glory *Calystegia purpurata* ssp. *saxicola*	Rank 1B	A perennial herb found in coastal dunes, coastal scrub; located on coastal bluffs. Elevation range: 0 – 105 meters. Blooms: May – September.	Moderate Potential. The Study Area contains coastal bluff scrub habitat sufficient to support this species but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
swamp harebell *Campanula californica*	Rank 1B	A perennial rhizomatous herb found in bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, freshwater marsh, North Coast coniferous forest; typically located in wetlands within a variety of surrounding habitats. Elevation range: 1 - 405 meters. Blooms: June – October.	Moderate Potential. The Study Area contains riparian habitat that may support this species; however, this species typically occurs in areas with a longer hydro-period and there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
California sedge *Carex californica*	Rank 2B	A perennial rhizomatous herb found in bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, marshes and swamps; located in drier areas of swamps, bogs, and marsh margins. Elevation range: 90 – 335 meters. Blooms: May – August.	No Potential. The Study Area is below the accepted elevation range.	**Not Observed.** This species was not observed during the rare plant surveys.
Lagoon sedge *Carex lenticularis* var. *limnophila*	Rank 2B	A perennial herb found on gravelly shores and beaches, bogs, fens, marshes, swamps, and north coast coniferous forest. Elevation range: 0 -6 meters. Blooms June – August.	No Potential. The Study Area is above the accepted elevation range.	**Not Present.** No suitable habitat.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Lyngbye's sedge *Carex lyngbyei*	Rank 2B	A perennial rhizomatous herb found in marshes and swamps, brackish or freshwater. Elevation range: 0 -10 meters. Blooms April – August	No Potential. The Study Area does not contain appropriate habitat	**Not Present**. No suitable habitat present.
Deceiving sedge *Carex saliniformis*	Rank 1B	A perennial rhizomatous herb found in coastal prairie, coastal scrub, marsh & swamp, meadow & seep, pond shores, wet openings. Elevation range: 3 - 230 meters. Blooms May – July.	High Potential. The Study Area contains suitable habitat and there are occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Green yellow sedge *Carex viridula ssp. Viridula*	Rank 2B	A perennial herb found in bogs and fens, marshes and swamps and the North coast coniferous forest. Elevation range: 0 – 1600 meters. Blooms: June – November.	No Potential. The Study Area does not contain appropriate habitat	**Not Present**. No suitable habitat present.
Oregon Coast paintbrush *Castilleja litoralis*	Rank 2B	A perennial hemiparasitic herb found in sandy soils, coastal bluff scrub, coastal dunes and coastal scrub. Elevation range: 15 -100 meters. Blooms: June.	Moderate Potential. The Study Area contains appropriate habitat but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Mendocino Coast paintbrush *Castilleja mendocinensis*	Rank 1B	A perennial hemiparasitic herb found in coastal bluff scrub, coastal scrub, coastal prairie, closed-cone coniferous forest, coastal dune; typically located on open sea bluffs and cliffs. Elevation range: 0 – 160 meters. Blooms: April – August.	High Potential. The Study Area contains coastal bluff scrub habitat that may support this species and there are occurrences within the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Howell's spineflower *Chorizanthe howellii*	FE; ST; Rank 1B	An annual herb found in sandy, often disturbed soils of coastal dunes, coastal prairie and coastal scrub. Elevation range: 0 – 45 meters. Blooms May – July.	No Potential. The Study Area does not contain appropriate habitat	**Not Present**. No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS

Whitney's farewell-to-spring *Clarkia amoena* ssp. *Whitneyi*	Rank 1B	An annual herb found in coastal bluff scrub and coastal scrub. Elevation range: 10 – 100 meters. Blooms: June – August.	No Potential. The Study Area does not contain appropriate habitat.	**Not Present**. No suitable habitat present.
Round-headed Chinese-houses *Collinsia corymbosa*	Rank 1B	An annual herb found in coastal dunes. Elevation range: 0 – 20 meters. Blooms April – June.	No potential. The Study Area does not contain sand dunes	**Not Present**. No suitable habitat present.
Oregon goldthread *Coptis laciniata*	Rank 4.2	A perennial rhizomatous herb found in meadows and seeps, North coast coniferous forest, wetlands, streambanks. Elevation range: 500 – 2000 meters. Blooms February – November.	No potential. The Study Area is at a much lower elevation	**Not Present**. No suitable habitat present.
bunchberry *Cornus canadensis*	Rank 2B	A perennial rhizomatous herb found in bogs and fens, meadows and seeps, north coast coniferous forest. Elevation range: 60 – 1920 meters. Blooms: May – July.	No potential. The Study Area is at a much lower elevation.	**Not Present**. No suitable habitat present. too low.
Mendocino dodder *Cuscauta pacifica* var. *papillate*	Rank 1B	An annual parasitic vine found on coastal dunes. Elevation range: 0 – 50 meters. Blooms June – October.	No potential. The Study Area does not contain coastal dunes	**Not Present**. No suitable habitat present.
bluff wallflower *Erysimum concinnum*	Rank 1B	An annual/perennial herb found on cliffs, coastal bluffs, dunes and prairies. Elevation: 0 – 185 meters. Blooms March – June.	Moderate Potential. The Study Area contains coastal prairie habitat; however, this species is typically located on looser sands and more open areas than are present in the Study Area and there are no know occurrences in the immediate vicinity.	**Not Observed**. First survey conducted near end of inflorescent period.
Menzies' wallflower *Erysimum menziesii*	Rank 1B	A perennial herb found in coastal dunes. Elevation range: 0 – 35 meters. Blooms: March – September.	No Potential. The Study Area does not contain coastal dune habitat necessary to support this species.	**Not Present**. No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Pacific gilia *Gilia capitata* ssp. *Pacifica*	Rank	An annual herb found in the chaparral, Coastal bluff scrub, Coastal prairie, Valley and foothill grassland. Elevation: 5 – 1665 meters. Blooms April – August.	High Potential. The Study Area contains appropriate habitat and there are known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
dark-eyed gilia *Gilia millefoliata*	Rank 1B	An annual herb found in coastal dune habitat. Elevation range: 2 – 30 meters. Blooms: April – July	No Potential. The Study Area does not contain coastal dune habitat necessary to support this species.	**Not Present**. No suitable habitat present.
Congested-headed hayfield tarplant *Hemizonia congesta* ssp. *Congesta*	Rank 1B	An annual herb found along roadsides and in valley and foothill grasslands. Elevation: 20 – 560 meters. Blooms April – November.	No Potential. The Study Area does not contain the appropriate habitat to support this species.	**Not Present**. No suitable habitat present.
short-leaved evax *Hesperevax sparsiflora* var. *brevifolia*	Rank 1B	An annual herb found in coastal bluff scrub, coastal dune; located on sandy bluffs and flats near the immediate coastline. Elevation range: 0 – 215 meters. Blooms: March – June.	High Potential. The Study Area contains coastal bluff scrub that may support this species and there are known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
pygmy cypress *Hesperocyparis pygmaea*	Rank 1B	A perennial evergreen tree found in a closed-cone coniferous forest; located on podzol-like soils (Blacklock series). Elevation range: 30 – 600 meters	No Potential. The Study Area does not contain pygmy forest or podzol-like soils necessary to support this species.	**Not Present**. No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Point Reyes horkelia *Horkelia marinensis*	Rank 1B	A perennial herb found on sandy coastal flats. Elevation: 5 – 755 meters. Blooms May – September.	No Potential. The Study Area does not contain coastal dune habitat necessary to support this species.	**Not Present**. No suitable habitat present.
Hair-leaved rush *Juncus supiniformis*	Rank 2B	A perennial rhizomatous herb found in marshes, swamps, bogs and fens located near the coast. Elevation: 19 – 99 meters. Blooms: April – September.	No Potential. Although the Study Area contains wetland habitat, this species is closely associated with highly acidic, nutrient-poor perennial wetlands not present.	**Not Present.** No suitable habitat present.
Baker's goldfields *Lasthenia californica* ssp. *Bakeri*	Rank 1B	A perennial herb found in closed-cone coniferous forest, coastal scrub; located in openings in scrub and coastal forest habitat. Elevation range: 60 – 520 meters. Blooms: April – October.	High Potential. The Study Area contains coastal bluff scrub that may support this species and there are known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
perennial goldfields *Lasthenia californica* ssp. *macrantha*	Rank 1B	Coastal bluff scrub, coastal dune, coastal scrub. Elevation range: 15 – 1690 feet. Blooms: January – November.	High Potential. The Study Area contains coastal bluff scrub habitat that may support this species.	**Not Observed.** This species was not observed during the rare plant surveys.
coast lily *Lilium maritimum*	Rank 1B	A perennial bulbiferous herb found in closed-cone coniferous forest, coastal prairie, coastal scrub, broadleaf upland forest, North Coast coniferous forest; typically located on sandy soils, often in raised hummocks or bogs, and roadside ditches. Elevation range: 5 – 475 meters. Blooms: May – August.	Moderate Potential. The Study Area contains coastal prairie and coniferous forest habitat that may support this species; however, the seasonal hydro- period in the Study Area reduces the potential of this species.	**Not Observed.** This species was not observed during the rare plant surveys.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Running pine *Lycopodium clavatum*	Rank 4.1	A perennial rhizomatous herb found often along edges, openings and roadsides in lower montane coniferous forest, marshes and swamps, and north coast coniferous forests. Elevation range: 45 – 1225 meters. Blooms: June – September.	No Potential. No suitable habitat exists, the Study Area is below the accepted elevation range and there are no known occurrences in the vicinity.	**Not Present**. No suitable habitat present.
Leafy-stemmed mitrewort *Mitellastra caulescens*	Rank 4.2	A perennial rhizomatous herb found in broadleaved upland forest, lower montane coniferous forest, meadows and seeps, and North coast coniferous forests. Elevation range: 45 – 1700 meters. Blooms: March – October.	Moderate Potential. Suitable habitat exists but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Wolf's evening-primrose *Oenothera wolfii*	Rank 1B	Perennial herb that grows in sandy usually mesic soil. Coastal bluff scrub, coastal dunes, coastal prairie, lower montane coniferous forest. Elevation range: 3 – 800 meters. Blooms May – October	High Potential. The Study Area contains appropriate habitat and there are known occurrences within the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Seacoast ragwort *Packera bolanderi* var. *bolanderi*	Rank 2B	A perennial rhizomatous herb found in coastal scrub and north coast coniferous forests. Elevation range: 30 -650 meters. Blooms: January – August.	Moderate Potential. The Study Area contains appropriate habitat but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
North coast phacelia *Phacelia insularis* var. *continentis*	Rank 1B	An annual herb found in sandy, sometimes rocky soils in coastal bluff scrub and coastal dunes. Elevation range: 10 - 170 meters. Blooms: March – May.	No Potential. The study site does not contain this habitat type.	**Not Present**. No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Bolander's beach pine *Pinus contorta* ssp. *Bolanderi*	Rank 1B	A perennial evergreen tree found in podzol-like soil in closed-coned coniferous forests. Elevation range: 75 – 250 meters.	No Potential. The Study Area does not contain pygmy forest or podzol-like soils necessary to support this species	**Not Present**. No suitable habitat present.
White-flowered rein orchid *Piperia candida*	Rank 1B	Perennial herb that sometimes exists in serpentinite soil. Broadleaved upland forest, lower montane coniferous forest, North coast coniferous forest. Elevation range: 30-1310 meters. Blooms March – May.	Moderate Potential. The Study Area contains appropriate habitat but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
dwarf alkali grass *Puccinellia pumila*	Rank 2B	A perennial herb found in coastal salt marshes and swamps. Elevation range: 1 – 10 meters. Blooms July.	No potential. The Study Area does not contain mineral springs or coastal salt marshes	**Not Present**. No suitable habitat present.
Angel's hair lichen *Ramalina thrausta*	Rank 2B	An epiphytic fruticose lichen found on dead twigs and other lichens in the north coast coniferous forest. Elevation range: 75 – 430 meters.	No Potential. The Study Area is below the accepted elevation range.	**Not Present**. No suitable habitat present.
white beaked-rush *Rhynchospora alba*	Rank 2B	A perennial rhizomatous herb found in bogs and fens, meadows and seeps, and freshwater marshes and swamps. Elevation range: 60 – 2040 meters. Blooms: June – August.	Minimal potential in wetlands; elevation is lower than species has been observed prior.	**Not Observed.** This species was not observed during the rare plant surveys.
great burnet *Sanguisorba officinalis*	Rank 2B	A perennial rhizomatous herb often found in serpentine soils. Found in bogs and fens, broadleaved upland forest, meadows and seeps, marshes and swamps, north coast coniferous forest and riparian forests. Elevation range: 120 - 1400 meters. Blooms: July – October.	Minimal potential in wetlands; elevation is lower than species has been observed prior	**Not Observed.** This species was not observed during the rare plant surveys.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Maple-leaved checkerbloom *Sidalcea malachroides*	Rank 4.2	A perennial herb often found in disturbed areas. Broadleaved upland forest, coastal prairie, coastal scrub, North coast coniferous forest, riparian woodland. Elevation range: 0 – 730 meters. Blooms March – August.	High Potential. The Study Area contains appropriate habitat and there are known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Purple-stemmed checkerbloom *Sidalcea malviflora* ssp.*purpurea*	Rank 1B	A perennial rhizomatous herb that lives in broadleaved upland forest and coastal prairies. Elevation: 15 – 85 meters. Blooms: May – June.	High Potential. The Study Area contains appropriate habitat and there are known occurrences in the vicinity	**Not Observed.** This species was not observed during the rare plant surveys.
Robust false lupine *Thermopsis robusta*	Rank 1B	A perennial rhizomatous herb found in broadleaved upland forests and in North Coast coniferous forests. Elevation: 150 – 1500 meters. Blooms: May – July.	Moderate Potential. The Study Area contains appropriate habitat, but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Coastal triquetrella *Triquetrella californica*	Rank 1B	A moss found growing on soils in the coastal bluff scrub and coastal scrub. Elevation range: 10 – 100 meters.	High Potential. The Study Area contains appropriate habitat and there are known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.
Methuselah's beard lichen *Usnea longissima*	Rank 4.2	A fruticose epiphytic lichen found on tree branches, usually on old growth hardwoods and conifers, broadleaved upland forest and North coast coniferous forest. Elevation range: 50 – 1460 meters.	No Potential. The Study Area is below the elevation range for this species.	**Not Present.** No suitable habitat present.
alpine marsh violet *Viola palustris*	Rank 2B	Marshes, swamps, boggy open sites and streambanks. Elevation range: 0 – 225 feet. Blooms April – July.	Moderate Potential: The study site contains suitable habitat but there are no known occurrences in the vicinity.	**Not Observed.** This species was not observed during the rare plant surveys.

Appendix B
Plant Species Observed In Study Area

Plant taxa 26921 N. Highway One Fort Bragg CA 95437

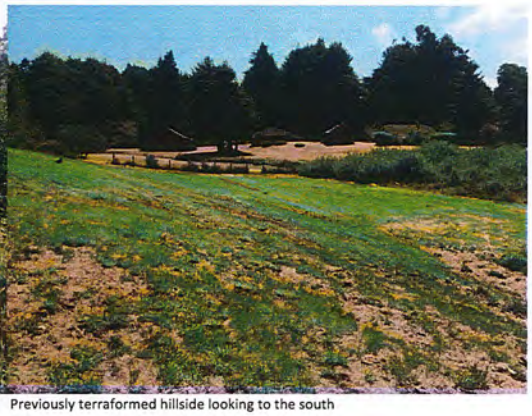
Scientific Name	Common Name
Alnus rhombifolia	White alder
Anagallis arvensis	scarlet pimpernel
Arctostaphylos glandulosa	manzanita
Argyranthemum spp.	margariete daisy
Cirsium occidentale	thistle
Collinsia gladiflora	Chinese houses
Conium maculatum	poison hemlock
Cyperus eragrostis	flat sedge
Cytisus scoparius	Scotch broom
Digitalis purpurea	foxglove
Equisteum arvense	horsetail reed
Gaultheria shallon	salal
Juncus effusus var. *pacificus*	Pacific rush
Leucanthemum vulgare	shasta daisy
Notholithocarpus densiflorus var. *densiflorus*	tanoak
Oxalis oregana	Redwood sorrel
Pinus muricata	Bishop pine
Pinus radiata	Monterey pine
Polystichum californicum	sword fern
Pteridium aquilinum var. *pubsecens*	Bracken fern
Rubus armeniacus	Himayayan blackberry
Rubus parviflorus	Thimbleberry
Rubus ursinus	California blackberry
Lolium spp.	Ryegrass species
Salix spp.	Willow species
Sequioa sempervirens	Redwood
Solanum aviculare	nightshade
Taraxacum erythrospermum	red-seeded dandilion
Taraxacum officinale	common dandilion
Tsuga heterophylla	western hemlock
Vaccinium ovatum	California huckleberry
Vicia sativa sub. *sativa*	spring vetch

Appendix C
Site Photos

East side of property; created defensible space

View of existing fence with remnant vegetation

Vegetation in riparian zone (Western)



Previously terraformed hillside looking to the south

Appendix D
Qualifications and Site Visit Review

QUALIFICATIONS and SITE VISIT REVIEW

Sarah Bradley is the primary investigator for this Botanical Assessment of 26921 N. Highway One, Fort Bragg CA 95437. I have a Master of Science in Ecology & Sustainability from California State University Stanislaus. I have a minor in Botany, with extensive experience in identifying species by use of dichotomous keys.

John Huff acted as an assistant to the primary investigator. He has extensive forestry experience from his ten years of experience with CalFire and the US Forest Service. Mr. Huff assisted by taking measurements of cleared land, identification of trees by the remaining stumps. He also assisted by acting as a scribe to leave the PI's hands free.

Surveys were conducted on:
May 28, 2018 – performed an Environmentally Sensitive Habitat Area (ESHA) Assessment of the Study Site at the location indicated above. Initial identification of vegetation types conducted. Investigated the extent of vegetation removal from the site. Total of 60 man hours.

June 4, 2018 – PI focused on the north end of the project site. Identification of species present as well as identifying and quantifying the tree species that were cut down previously. The assistant identified tree species cut down in this area as well as mapped location of all stumps. Total of 4 5-man hours.

June 7, 2018 – PI focused on riparian zone to the west of the project site. Assistant identified trees cut down in this area as well as mapped location of all stumps. Total of 4 0-man hours.

June 15, 2018 – PI focused on hillside area of the project site. Total of 2 0-man hours.

June 21, 2018 - PI again focused on hillside area of the project site. Assistant identified tree species removed in this area as well as mapped location of all stumps. Total of 4 0-man hours.

July 5, 2018 – PI focused on previously flagged species that were in question, to determine if they were flowering or displaying other identifying characteristics. Total of 2 0-man hours.

July 23, 2018 – PI again focused on previously flagged species that were in question. Total of 2 0-man hours.

July 24, 2019 - PI focused on riparian area to east of the house. Total of 3.0 man hours.

August 5, 2018 - PI focused on all previously flagged species that were in question. Total of 3.0 man hours.

Riparian Restoration Planting Plan

26921 North Highway 1 ~ Fort Bragg CA, 95437

Prepared for: Bob & Julie Edwards
Contact:
Bob Edwards
etrexangus@aol.com

Date: October 2020

Dark Gulch Environmental Consulting ~ 23817 Quail Lane, Fort Bragg CA 95437 ~ 707.734.0922

26921 N. Highway One Fort Bragg CA 95437

Edwards Map showing corner markers

40m

Directions: North on CA State Highway 1 from Fort Bragg. Follow CA State Highway 1 to the site address, located on the East side of CA 1.

26921 N. Highway One, Fort Bragg CA 95437 Restoration Areas

PARCELQUEST
LIST 1
DETAIL

☑ 23 Property Address: 26921 N HWY 1 FORT BRAGG CA 95437-8904

Ownership

County:	**MENDOCINO, CA**
Assessor:	**KATRINA BARTOLOMIE, ASSESSOR**
Parcel # (APN):	**069-060-16-00**
Parcel Status:	**ACTIVE**
Owner Name:	**EDWARDS BOB S JR & JULIE E**
Mailing Address:	**26921 N HWY 1 FORT BRAGG CA 95437**
Legal Description:	

Assessment

Total Value:	**$746,870**	Use Code:	**0001**	Use Type:	**RESID. SINGLE FAMILY**
Land Value:	**$422,144**	Tax Rate Area:	**076-043**	Zoning:	**RR2 2**
Impr Value:	**$324,726**	Year Assd:	**2020**	Census Tract:	**103.00/2**
Other Value:		Property Tax:		Price/SqFt:	
% Improved:	**43%**	Delinquent Yr:			
Exempt Amt:		HO Exempt:	**N**		

Sale History

	Sale 1	Sale 2	Sale 3	Transfer
Document Date:	**08/07/2015**	**09/01/1986**		**08/07/2015**
Document Number:	**10916**	**15317**		**10916**
Document Type:				
Transfer Amount:	**$690,000**	**$64,000**		
Seller (Grantor):				

Property Characteristics

Bedrooms:		Fireplace:	Units:
Baths (Full):		A/C:	Stories:
Baths (Half):		Heating:	Quality:
Total Rooms:		Pool:	Building Class:
Bldg/Liv Area:		Park Type:	Condition:
Lot Acres:	**4.980**	Spaces:	Site Influence:
Lot SqFt:	**216,928**	Garage SqFt:	Timber Preserve:
Year Built:			Ag Preserve:
Effective Year:			

Site Suitability

Site suitability evaluation: This site has been previously disturbed at least twice. The most recent disturbance was the clearing of vegetation creating the need for restoration. The areas affected are all endangered species habitat areas (ESHA's) and will be restored to add to the overall environmental benefits of the region. Due to the fact that this is mitigation work related to a violation, no studies related to soils, hydrology, characterization of water table depths and water availability have been completed.

All plants used in the restoration are outlined below. Site preparation will be minimal, to prevent erosion of the delicate soils. No heavy equipment work will be necessary. Planting stock is separated by restoration area.

Eastern Riparian Planting
20 – 5-gallon California Rhododendron (*Rhododendron macropyllum*)
20 – 1-gallon Western Labrador tea (*Rhododendron columbianum*)
20 – 1-gallon California Azalea (*Rhododendron occidentale*)
10 – 5-gallon English Lavender (*Lavandula angustifolia*)
10 – 5-gallon Winter Bee Spanish Lavender (*Lavandula stoechas*)
10 – 10-gallon Russian Sage (*Perovskia atriplicifolia*)
10 – 10-gallon Santa Barbara Mexican Bush Sage (*Salvia leucantha*)
5 – 5-gallon Sassafras (*Sassafras albidum*)
10 – Persimmon (*Dispynos virginiana*)
10 – 5-gallon Santa Rosa Plum (*Prunus subcordata*)
10 – 10-gallon Doug Fir (*Psuedotsuga menziesii* var. *menziesii*)
All plants will be planted according to the attached riparian planting maps. All plants will be planted in holes hand dug at approximately two- and one-half times the diameter of the root ball and will be backfilled with removed soil.

South Boundary Screening Tree Planting:
20 – 10-gallon Redwood (*Sequoia sempervirens*). Trees will be planted along the southern boundary of the property to provide a visual screen between the project site and the other properties in the area. Trees will be planted in holes hand dug at approximately two- and one-half times the diameter of the root ball and will be backfilled with removed soil.

Western Riparian Planting
50 – 5-gallon White Alder (*Alnus rhombifolia*)
20 -1-gallon Bishop Pine (Pinus *muricata*)
25 – 1-gallon California Blackberry (*Rubus ursinus*)
25 - 1-gallon Thimbleberry (*Rubus pariflorus*)
25 - 1-gallon Red Huckleberry (*Vaccinium parvifolium*)
25 – 1-gallon Salmonberry (*Rubus spectabilis*)
25 1- gallon Yarrow (*Achillea millefolium*)
10 – 1-gallon Red box Elder (*Acer negundo*)
10 – 1 gallon Cranberry Highbush (*Vaccinium macrocarpon*)
25 – 5-gallon Red Maple (*Acer macrophyllum*)
All plants will be planted according to the attached riparian planting maps. All plants will be planted in holes hand dug at approximately two- and one-half times the diameter of the root ball and will be backfilled with removed soil

Appropriate irrigation will be set up at the time of planting and will be maintained until such time as the plants have become established. Irrigation will be in the form of a drip system on a timer, to provide a set amount of water to the plants on a regular basis.

All plants will be sourced from local, native suppliers if possible. Plants that are not native will be sourced from local suppliers and will not be treated with neonicotinoid pesticides.

All plants will be planted with marking stakes and/or protective tubing. This will help support the plants and protect them from herbivory.

All plants will be planted in rows. While they can be viewed as visually unappealing, but they facilitate post planting maintenance and machine-based site preparation and future maintenance. Random patters may feel more natural at the beginning but makes finding the plants for monitoring or maintenance more difficult.

Maintenance of Plants

Irrigation:
The use of container stock should prevent the need for watering for the first year. All plants will be irrigated on an as-needed basis for the first year. Once the first year has passed, it is assumed that the root structures will have been established and ancillary water will not be necessary. However, if signs of desiccation do appear, irrigation will be implemented as needed. Proper plant health will be indicated by appropriate growth, healthy leaves and fruiting as appropriate by season.

Non-native vegetation:
The areas immediately surrounding the planted species will be kept free of non-native vegetation. Planted areas will be cleared of non-native vegetation on a monthly basis to prevent out-competition. All non-native vegetation will be removed by manual methods.

Prevention of Herbivory:
No overt methods to prevent herbivory will be taken unless it becomes necessary. Protective tubing will be installed at the time of planting and will need to be adjusted as the plants grow. If there are still signs of herbivory, including damage to plants, then measures to exclude herbivorous animals will be taken. This will include, but not be limited to putting fencing around the plants. These measures will be implemented if signs of damage to the plants are seen.

Success Criteria

Success is evaluated by the foliage volume or cover of foliage by height for a defined area. For example, a mature Alder forest provides a high layer of canopy cover that shades out the shrub and ground layers of vegetation, depending on the density of the alder trees. Where there are gaps in the trees, enough sunlight is available to lower growing species. Shrubs planted to density will not allow sufficient herbaceous cover to develop.

Success will be measured a cumulative survival of all plants and trees after the period of five years of at least 70 percent. In addition to survival, height and cover, or diameter at breast height of individuals of all species will be monitored on an annual basis to track growth.

Monitoring Methods:
The following assumptions are made:

- Monitoring design, data collection, analysis, and interpretation are supervised by a qualified plant ecologist.
- Other factors influencing plant species composition (confounding factors) such as grazing, mechanical disturbance, fire, etc. have been recognized and account for in data analysis and interpretation.

Permanent corners for all restoration areas will installed and will be used to establish monitoring locations. Transect locations will be established and used as the monitoring templates. Presence of woody and herbaceous plants is recorded at regular intervals along each transect.

Tree health will be assed visually through an evaluation of canopy condition comparted to estimated full canopy, otherwise known as vigor class. Water stress, disease, insect infestation, etc. May lead to leaf wilting, leaf discoloration, partial or complete leaf death, and branch dieback. Vigor class will be recorded for each tree that is measured.

Categories of vigor (canopy condition) for trees.

Vigor	Criteria for Assessing Condition
Critically stressed	Major leaf death and or branch die back (>50% of canopy volume affected)
Significantly stressed	Prominent leaf death and/or branch die back (21-50% of canopy volume affected)
Stressed	Minimal leaf death and/or branch die back (11-20% of canopy affected)
Normal	Little or no sign of leaf water stress/no water stress related leaf death (between 5 and 10 percent of canopy affected)
Vigorous	No sign of leaf water stress/very healthy-looking canopy (<5% of canopy affected)

Counting of living and dead plants and taking photos from the established permanent photo-points are good, simple approaches to track changes over time.

Plants will be counted by locating stakes and plastic tubes that were installed with all plants at the time of planting. If many plants have died, a decision will have to be made if replanting is necessary. Some supplemental planting may be required after a particularly dry summer.

Clear photos will be taken from the established photo points, using the same lens and zoom. Signs with plot numbers and date visible in the photographs will help with monitoring photographs.