

BOTANICAL RESOURCE SURVEY REPORT

BOWMAN CANYON BASELINE SURVEYS AND HABITAT ASSESSMENTS

MARIN COUNTY, CALIFORNIA



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Prepared for



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Section 1. INTRODUCTION

At the request of Marin County Parks Nomad Ecology, LLC (Nomad) conducted protocol-level surveys for sensitive botanical resources¹ within the Bowman Canyon study area in unincorporated Marin County. The study area is located west of, and shares a boundary with, Mt. Burdell Open Space Preserve and is just beyond the city limits of Novato, in Marin County, California. The study area consists of approximately 167 acres near the intersection of Novato Boulevard and Bowman Canyon Road (Figures 1 and 2). It also lies within the San Francisco Bay Area subregion of the California Floristic Province (Baldwin et al. 2012).

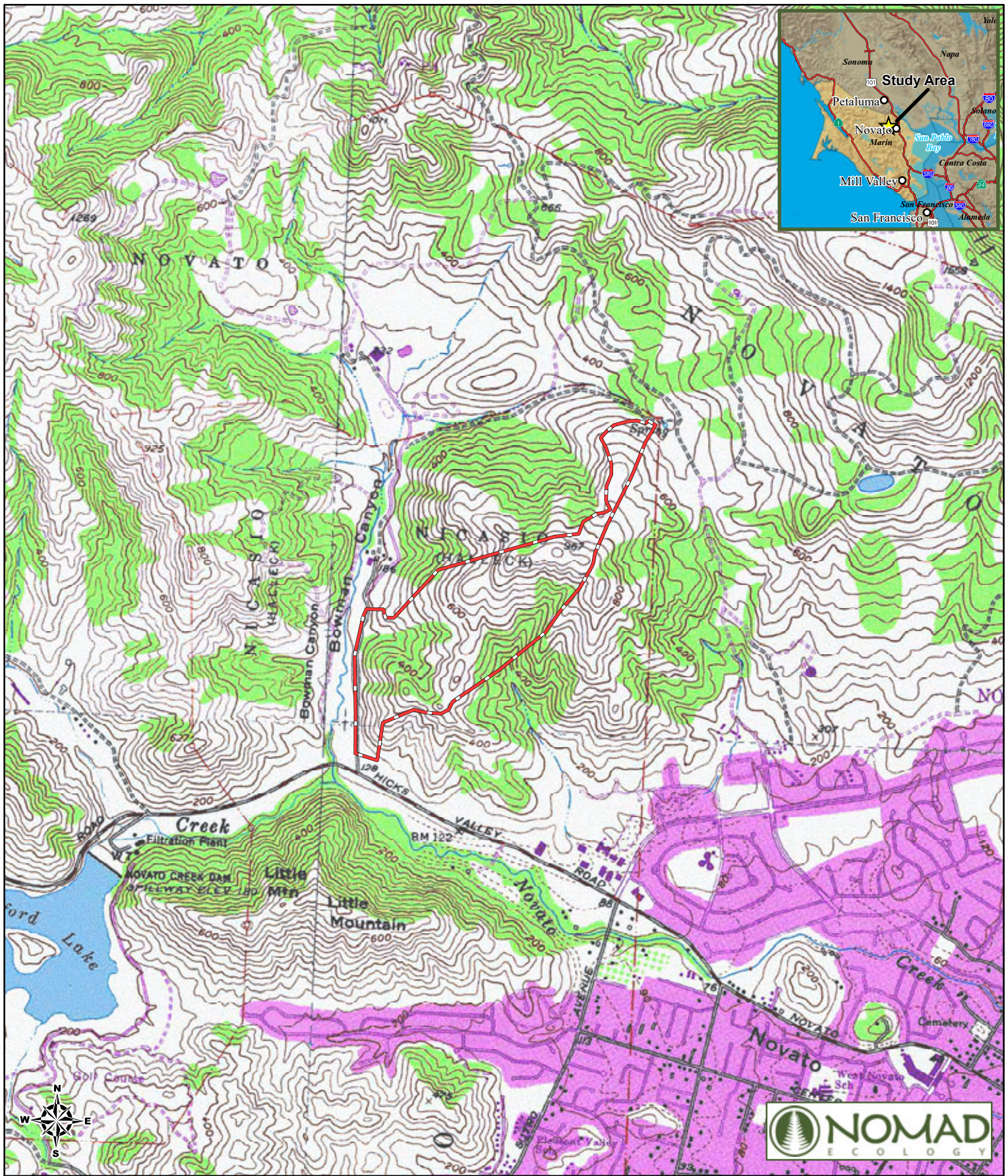
1.1. PURPOSE OF THE REPORT

The purpose of this Botanical Resource Survey Report is to present the results of protocol-level botanical surveys that targeted 11 special status plant species² considered to have the potential to occur within the study area, in addition to any sensitive natural communities observed on site. Protocol-level botanical surveys were conducted within the study area by Nomad botanists in March, April, May, June, and September of 2019. Based on the results of these studies, further botanical surveys are not considered necessary within the study area presented in this report.

This document provides: (1) a description of study methodologies; (2) a discussion of the regulatory context; (3) an assessment of the existing conditions and natural communities; (4) the results of protocol-level and floristic surveys for special status botanical resources including the numbers, size, condition, and photographs of all special status species occurrences observed; (5) a summary of potential threats and management considerations for these occurrences; (6) a brief discussion of risks posed by non-native plant species; (7) a comprehensive list of all vascular plants observed; and (8) maps that identify the locations of sensitive natural communities and special status plant species found on site.

¹ Sensitive botanical resources refers to sensitive natural communities, special status plant species, and locally rare plants.

² Special status plant species are those considered listed as Endangered, Threatened, or Rare by the U.S. Fish and Wildlife Service (under the Federal Endangered Species Act) and/or the California Department of Fish and Wildlife (under the California Endangered Species Act and Native Plant Protection Act) as well as plant species included in the California Native Plant Society's *Inventory of Rare and Endangered Plants of California*.



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Section 2. STUDY METHODS

2.1. DATA RESOURCES

Background information on potentially occurring endangered, threatened, and rare plant and sensitive natural communities was compiled through a review of the following resources:

U.S. Fish and Wildlife Service (USFWS):

- Endangered and Threatened Wildlife and Plants (USFWS 1999, 2014)
- Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in Marin County (USFWS 2019)
- *Hesperolinon congestum* (Marin dwarf-flax) 5-Year Review: Summary and Evaluation (USFWS 2011)

California Department of Fish and Wildlife (CDFW):

- California Natural Community List, the Vegetation Classification and Mapping Program (CDFW 2018)
- State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2019a)
- Special Vascular Plants, Bryophytes, Lichens List (CDFW 2019b)
- California Natural Diversity Database (CNDDB) Query for the Cotati, Glen Ellen, Sonoma, Petaluma, Petaluma River, Sears Point, San Geronimo, Novato, and Petaluma Point 7.5-minute USGS quadrangles (CDFW 2019c)

Other Sources:

- Consortium of California Herbaria One (CCH1) (CCH 2019)
- Consortium of California Herbaria Two (CCH2) (CCH 2019)
- Marin County Flora (2007)
- Marin Flora (Howell 1970)The California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2019)
- The Jepson eFlora (JFP 2019)
- The Jepson Manual: Vascular Plants of California (Baldwin et al. 2012)

Botanical taxonomy and nomenclature conform to *The Jepson Manual* (Baldwin et al. 2012), with the exception of updates posted on the Jepson eFlora (JFP 2019) website. Common names of plant species are derived from the Calflora Database (Calflora 2019). Taxonomy and nomenclature for special status plant species conform to the *Inventory of Rare and Endangered Plants of California* (CNPS 2019) and *Special Vascular Plants, Bryophytes and Lichens List* (CDFW 2019d).

Vegetation communities described herein conform to *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), *California Vegetation* (Holland and Keil 1995), and/or *A Manual of California Vegetation* (Sawyer et al. 2009). Wetland and deepwater habitat classifications conform to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin 1979), where appropriate.

2.2. REGULATORY FRAMEWORK

The following section summarizes the regulatory framework related to botanical resources such as sensitive natural communities and special status plants.

2.2.1 SENSITIVE NATURAL COMMUNITIES

Sensitive Natural Communities are characterized as plant assemblages that are unique in constituent components, restricted in distribution, supported by distinctive edaphic conditions, considered locally rare, potentially support special status plant or wildlife species, and/or receive regulatory protection from municipal, county, state and/or federal entities. The regulatory framework that protects sensitive natural communities is derived from local, state, and federal laws and regulations including Section 10 of the federal Rivers and Harbors Act, sections 401 and 404 of the federal Clean Water Act, Section 1600 et seq. of the California Fish and Game Code, Section 15065 of the CEQA guidelines, and various other city or county codes. Implementation and enforcement of these regulations are conducted by their respective regulatory entities such as the U.S. Army Corps of Engineers, California Regional Water Quality Control Board, California Department of Fish and Wildlife, lead agency, and/or various cities or counties. Natural Communities with ranks of S1, S2, and S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of CEQA and its equivalents (CDFW 2018).

2.2.2 SPECIAL STATUS PLANT SPECIES

Special status plant species are defined as those species listed as endangered or threatened, are proposed or candidates for listing, or are designated as rare under one or more of the following regulatory statutes: Federal Endangered Species Act, as amended (Code of Federal Regulations, Title 50, Section 17); California Endangered Species Act (California Code of Regulations Title 14, Section 670.5); California Fish and Game Code (Sections 1901, 2062, 2067), the Native Plant Protection Act (NPPA) of 1977, and/or are included in the CNPS Inventory (CNPS 2019).

The California Native Plant Society (CNPS) has developed and maintains an inventory of Rare, Threatened and Endangered plants of California. This information is published in the Inventory of Rare and Endangered Vascular Plants of California (CNPS 2019). The rarity ranking contained in the CNPS inventory is endorsed by the CDFW and effectively serves as its list of “candidate” plant species. The following identifies the definitions of the CNPS California Rare Plant Ranks:

- Rank 1A: Plants presumed to be extinct in California;
- Rank 1B: Plants that are rare, Threatened, or Endangered in California and elsewhere;
- Rank 2A: Plants presumed extirpated in California, but more common elsewhere;
- Rank 2B: Plants that are rare, Threatened, or Endangered in California, but are more common elsewhere;
- Rank 3: Plants about which more information is needed (a review list); and
- Rank 4: Plants of limited distribution (a watch list).

California Rare Plant Rank 1B and 2 species are considered eligible for state listing as Endangered or Threatened pursuant to the California Fish and Game Code. As part of the CEQA process, such species should be fully considered, as they meet the definition of Threatened or Endangered under the NPPA and Sections 2062 and 2067 of the California Fish and Game Code. California Rare Plant Rank 3 and 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state

listing, and CNPS and CDFW recommend that these species be evaluated for consideration during the preparation of CEQA documents (CNPS 2001, CNPS 2019), as some of these species may meet NPPA and CESA criteria as Threatened or Endangered.

The status of these species is based on their rarity and endangerment throughout all or portions of their range. Such species are referred to as special status species or “target species” herein.

2.2.3 LOCALLY RARE PLANT SPECIES

In addition to the designations described above, CEQA requires that impacts to “resources that are rare or unique to that region” be evaluated [CEQA Guidelines 15125(c)]. This includes botanical resources that are, but not limited to, peripheral populations, disjunct subpopulations, sensitive, declining, or have a restricted distribution. These are informal terms that refer to those species that might be declining or be in need of concentrated conservation actions to prevent decline or extirpation but have no legal protection of their own. Also, CEQA Guidelines Section 15380 states “a species not included in any listing...shall nevertheless be considered to be rare or Endangered if the species is likely to become Endangered within the foreseeable future throughout all or a significant portion of its range and may be considered Threatened as that term is used in the ESA.” Local floristic expert Doreen Smith has developed a preliminary list of locally rare plants of Marin County based on her work on the flora of Marin County spanning 30 years.

2.3. IDENTIFICATION OF TARGET SPECIES

The identification of target species for this protocol-level survey effort is based on a background review of available databases and literature (USFWS 1999, 2014, 2019; CDFW 2019a,b,c; CNPS 2019; CCH1 2019; CCH2 2019; Baldwin et al. 2012), Nomad’s expertise with the regional flora, and habitats present within the study area. This background review resulted in the determination that 11 special status plant species, out of 75 known from the region, had the potential to occur within the study area based on the presence of suitable habitat. All of the species have conservation status from the California Native Plant Society (CNPS 2019), and one of these is also state and federally listed as Threatened under the Endangered Species Act. One of these species, *Streptanthus anomalus* is a newly described species, that was published this year (Preston et al. 2019) and was given a CNPS Rank of 1B.1 on August 21, 2019 as it is restricted to two known populations. The species in Table 1 were considered target species for the purposes of these protocol-level rare plant surveys. It should also be noted that two additional special status plant species, Lobb’s aquatic buttercup (*Ranunculus lobii*, CRPR 4.2) and Franciscan onion (*Allium peninsulare* var. *franciscanum*, CRPR 1B.2), which were not originally considered targets for these surveys, were observed within the study area. The details of these species’ occurrences are also detailed in the results section below (Section 4).

Table 1. Target Species

SPECIES NAME	COMMON NAME	STATUS ¹
FEDERAL/STATE LISTED SPECIES		
<i>Hesperolinon congestum</i>	Marin western flax	FT, ST, 1B.1
CALIFORNIA NATIVE PLANT SOCIETY RANKED SPECIES		
<i>Amorpha californica</i> var. <i>napensis</i>	Napa false indigo	1B.2
<i>Amsinckia lunaris</i>	bent-flowered fiddleneck	1B.2
<i>Erigeron biolettii</i>	streamside daisy	3
<i>Eriogonum luteolum</i> var. <i>caninum</i>	Tiburon buckwheat	1B.2
<i>Fritillaria liliacea</i>	fragrant fritillary	1B.2
<i>Hemizonia congesta</i> subsp. <i>congesta</i>	congested-headed hayfield tarplant	1B.2
<i>Leptosiphon acicularis</i>	bristly leptosiphon	4.2
<i>Lessingia hololeuca</i>	woolly-headed lessingia	3
<i>Streptanthus anomalus</i>		---
<i>Streptanthus glandulosus</i> subsp. <i>pulchellus</i>	Mt. Tamalpais bristly jewelflower	1B.2

¹Explanation of Status Codes

Federal Codes

FT Federally Threatened

State Codes

SR State Rare

California Native Plant Society codes:

1B Rare, Threatened, or Endangered in California and elsewhere

3 Plants about which more information is needed (a review list)

4 Plants of limited distribution – Watch list

California Native Plant Society Threat Codes:

.1 Seriously threatened in California (over 80% of occurrences Threatened / high degree and immediacy of threat)

.2 Moderately threatened in California (20-80% occurrences Threatened)

2.4. PERSONNEL AND FIELD INVESTIGATION

The following personnel conducted the field investigations:

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Cody Ender
Botanist
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Adam Chasey
Botanist
Nomad Ecology, LLC

Protocol-level rare plant surveys were conducted by Nomad senior botanist Heath Bartosh (HB) as well as Nomad botanists Cody Ender (CE), and Adam Chasey (AC). These surveys were conducted during the months of March, April, May, June, and September of 2019. Table 2 details the dates, survey targets, and personnel for these studies. This report was prepared by Mr. Bartosh and Nomad botanist Cody Ender.

Table 2. 2019 Survey Effort Details for Target Plant Species

SURVEY TIMING		TARGETS	PERSONNEL
Month	Day(s)		
March	12	fragrant fritillary	HB, CE
April	10	bent-flowered fiddleneck	HB, CE
May	10	Napa false indigo Marin western flax bristly leptosiphon <i>Streptanthus anomalous</i> Mt. Tamalpais bristly jewelflower	CE, AC
June	20	Tiburon buckwheat congested-headed hayfield tarplant Marin western flax woolly-headed lessingia	CE, AC
September	10	congested-headed hayfield tarplant woolly-headed lessingia	CE, AC

The purpose of these surveys was to conduct an inventory of vascular plants of the study area to document occurrences of rare, threatened or endangered species, and other special status plants, as well as sensitive natural communities. All surveys generally began at 7:30am and concluded at approximately 4:00pm each day (with short breaks for meals). All vegetation communities within the study area were visited and evaluated for their potential to support sensitive botanical resources. March, April, and September surveys were conducted on foot and progressed in a clockwise fashion, starting on the southwestern end of the property covering all habitats within the study area. March surveys also targeted aquatic features for future aquatic wildlife surveys. May and June surveys targeted serpentine grassland, seasonal wetland, and chaparral habitat identified during earlier field visits, and were conducted on foot after driving on to the property. Purple needlegrass grasslands were mapped during May surveys. Vegetation communities were ground-truthed during September surveys. All plant species in bloom, or otherwise recognizable, were identified to a level necessary (floristic) to determine their regulatory status. During these surveys, an inventory of plant species observed was recorded (Appendix A).

Botanical surveys were conducted in accordance with the California Native Plant Society's *Botanical Survey Guidelines* (CNPS 2001), California Department of Fish and Wildlife's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018), and the U.S. Fish and Wildlife Service's *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000).

2.5. RESOURCE DOCUMENTATION AND MAPPING

Field data, including locations of special status plant species occurrences, were collected using Backcountry Navigator Pro on an Android device, Gaia GPS on an Apple device, or hand-drawn on paper maps.

2.5.1 VEGETATION MAPPING

Vegetation communities were characterized and mapped based on *A Manual of California Vegetation* (Sawyer et al. 2009). Vegetation polygons were delineated in the field using a high quality color aerial photograph printed on field maps at approximately 1:3,00 scale that were flown in 2018. These field maps were then heads-up digitized in-house (at 1:2,000 scale) using a desktop computer Geographic Information System (GIS) platform operating ESRI ArcGIS 10.1 for creating polygons and populating attribute tables. Minimum mapping units for vegetation communities are approximately 0.10 acres.

2.5.2 SPECIAL STATUS SPECIES OCCURRENCES

Special status plant populations encountered within the study area were recorded using California Natural Diversity Database Field Survey Forms (Appendix F). A GPS data point was recorded for each occurrence³. Populations of target species recorded as a part of this study are identified by a six- to ten-character alphanumeric code that is derived from the first three letters of the *Genus*, *Species*, and *subspecies* or *variety* name plus a population number. For example, a population of Marin western flax (*Hesperolinon congestum*) was given the code Hescon1. Each subsequent new population would be sequentially numbered, e.g. Hescon2, however this situation did not apply for the study area.

2.5.3 HERBARIUM VOUCHERS

Where feasible, a voucher collection of an individual from a population of special status species were collected. In addition, voucher specimens of other plant species with regional significance were collected during our study. Plant species considered as having regional significance include those not previously known as occurring in Marin County or are uncommon species in the County. A GPS data point was recorded for each of these locations.

2.6. REFERENCE SITES AND HERBARIUM SPECIMENS

To ensure the timing of botanical surveys coincided with the flowering phenology of the target species, reference populations and collection dates of herbaria specimens were examined. Known populations of four target species were visited at reference sites with similar characteristics to the study area such as habitat, topography, and climate to determine appropriate survey timing. Table 3 depicts the details of reference population observations and provides an optimal survey timing by which surveys for the subject taxon should be completed by, based on observed phenology. For the remaining target species for which reference populations were not visited, examination of herbaria specimens was performed using the Consortium of California Herbaria Database (CCH1 2019). The purpose of this analysis was to ensure survey timing corresponds with flowering and reproductive maturation since plant species are typically collected at peak flowering phenology.

³ Per the CNDDDB an occurrence (also referred to as population), is a single population or a series of colonies within one-quarter mile of each other (Bittman 2001). If individuals or colonies are greater than a distance of 0.25-mile they are treated as separate occurrences (populations)

Table 3. Reference Population Observation Details

SPECIES NAME / COMMON NAME	DATE VISITED	LOCATION	CNDDDB OCCURRENCE (Y/N)	PRESENT (Y/N)	# OF INDIVIDUALS	TIMEFRAME TO CONDUCT SURVEY
FEDERAL/STATE ENDANGERED OR THREATENED AND CALIFORNIA RARE SPECIES						
<i>Hesperolinin congestum</i> Marin western flax	5/9/19	Farm Hill	No	Yes	3,397	2-3 weeks
CALIFORNIA RARE PLANT RANK SPECIES						
<i>Amsinckia lunaris</i> bent-flowered fiddleneck	4/22/19	Briones Regional Park	Yes (EONDX 62471)	Yes	100: <5% in bud; 20% flowering; 75+% in fruit or past flowering	0-2 weeks
<i>Fritillaria liliacea</i> fragrant fritillary	3/3/19	Mount Burdell	Yes (EONDX #21920)	Yes	200: 80-90% flowering	1-2 weeks
<i>Streptanthus anomalous</i>	5/10/19	Mount Burdell	No	Yes	500: 90% in bud, 10% flowering	5 weeks

For target species that did not have accessible reference populations or were not visited, an estimation of blooming periods was attained by averaging the collection dates of herbarium specimens by month (CCH1 2019). Duplicate collections and specimens with label information lacking a collection month were not included in the averages. Herbaria specimen collection dates and corresponding survey timing are presented in Table 4. All of the species appearing in Table 4, with the exception of streamside daisy (*Erigeron bioletti*), have peak blooming periods during the months of March, April, May, June, or September and match the months during which botanical surveys were conducted. Although herbarium records show peak blooming period for streamside daisy to be in July, the surveys occurred toward the latter half of June and vegetative material of this perennial species would have been identifiable at that time.

Table 4. Herbaria Specimen Collection Dates and Correspondence of Survey Timing

SPECIES	HERBARIA SPECIMEN COLLECTIONS AVERAGED BY MONTH											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CALIFORNIA RARE PLANT RANK SPECIES												
<i>Amorpha californica</i> var. <i>napensis</i> Napa false indigo	2%	0%	0%	4%	33%	22%	17%	9%	11%	2%	0%	0%
<i>Erigeron bioletti</i> streamside daisy	3%	0%	0%	3%	0%	8%	49%	21%	10%	5%	3%	0%
<i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	0%	0%	0%	1%	7%	28%	25%	12%	20%	7%	1%	0%
<i>Hemizonia congesta</i> subsp. <i>congesta</i> congested-headed hayfield tarplant	1%	0%	0%	1%	17%	30%	21%	11%	10%	6%	2%	0%
<i>Leptosiphon acicularis</i> bristly leptosiphon	2%	0%	1%	42%	50%	4%	2%	0%	0%	0%	0%	0%
<i>Lessingia hololeuca</i> woolly-headed lessingia	1%	0%	0%	1%	0%	3%	13%	14%	48%	18%	1%	0%
<i>Streptanthus glandulosus</i> subsp. <i>pulchellus</i> Mt. Tamalpais bristly jewelflower	0%	0%	0%	0%	38%	50%	10%	2%	0%	0%	0%	0%

Note: Shaded areas indicate months when botanical surveys were conducted. Bolded numbers denote peak period(s) for survey. Species flowering phenology represented as a percent (%) by month, percentages are rounded; months where collection dates have not been reported are designated as 0%.

2.7. LIMITATIONS

Survey efforts were carefully designed to maximize the likelihood that the timing and effort of the surveys coincided with the optimum timing of flowering phenology and were conducted in suitable habitat for each of the target species. However, this subsection discusses the unavoidable limitations inherent in rare plant surveys, with respect to specifics of this effort.

Based on the timing of this assessment, a determination of presence for target species within the study area was possible for species with blooming periods corresponding to the March, April, May, June, and September 2019 surveys. Based on the timing of the surveys, all plant species possibly present within the study area may not have been observed due to varying flowering phenologies and life forms that may not emerge every growing season, such as bulbs, biennials, and annuals. These lifeforms, especially annuals, may be absent in some years due to annual variations in temperature and rainfall, which influence germination and plant phenology. Colonization of new populations or species within an area may also occur from year to year.

No information on vegetation communities, based on vegetation mapping and classification protocols, were collected during the field work, however species composition by community was characterized during field surveys and included on CNDDDB field forms. Detailed vegetation mapping would require a data collection methodology that was outside the scope of this work. Vegetation descriptions below are based on observations from a single year. Therefore, since vegetation descriptions and associate species are based on data samples from selected seasons or a single year, they may be subject to change in the event multi-year data are collected as species dominance, especially regarding annuals, can vary depending on sample timing and duration. In the vegetation descriptions below, the phrase “in part” is used to signify the limitations inherent in these descriptions.

Some specific plant species identifications in this report may be tentative due to the absence of morphological characters, resulting from immature reproductive structures or seasonal desiccation, which

may be required to make species level determinations, however, all plant species in bloom or otherwise recognizable were identified to a level necessary to determine their regulatory status. In these cases *cf* (compares to) is used to indicate provisional species identification based on gestalt, vegetative morphology, and/or its known range. It is highly unlikely that any of the provisional species identifications would be revised to recognize a sensitive taxon.

The proposed activities and work areas evaluated in this report are based on the study area provided by Marin County Parks. Changes to the study area may warrant further analysis.

Section 3. ENVIRONMENTAL SETTING

3.1. SETTING

The 167-acre study area is in unincorporated northeastern Marin County, California. It is approximately 2.25 miles northwest of downtown Novato, 0.8 miles northeast of Stafford Lake, and 1 mile southwest of Mount Burdell. According to the Public Land Survey System it is located within the Nicasio land grant of the Mount Diablo Baseline and Meridian. It is located within the San Francisco Bay Area Subregion of the California Floristic Province (Baldwin et al. 2012). It lies within the Novato Creek Planning Watershed. The study area appears on the Petaluma River (34852) and Novato (32627) 7.5-minute USGS topographic quadrangles.

3.1.1 REGIONAL SETTING

As described in the *Ecological Subregions of California* (USDA 1997), the area is located within the Marin Hills and Valleys subsection of the Northern California Coast Section. This subsection is described in detail below. The *Ecological Subregions of California* form the basis for describing regional variation in California alliance descriptions in *A Manual of California Vegetation* (Sawyer et al. 2009).

Marin Hills and Valleys

The Marin Hills and Valleys consist of mountains and hills between San Francisco Bay and the San Andreas fault that are north of the Golden Gate. This region is characterized as temperate and humid, with substantial marine influence on climate (USDA 1997). This is a subsection of mountains and hills with rounded ridges, steep and moderately steep sides, and narrow canyons. Most of the mountains are elongated in north-northwest to northwest directions and range from sea-level to about 2,604 feet in elevation at Mount Tamalpais. Mass wasting and fluvial erosion are the main geomorphic processes. The Marin Hills and Valleys are mainly comprised of Franciscan sedimentary, minor volcanic, and metamorphic rocks that are intensely deformed. Ultramafic rocks are scattered through the Franciscan complex (USDA 1997). For this region the mean annual precipitation ranges from 20 to 60 inches and there is a considerable amount of fog. The mean annual temperature is generally between 50° to 59°F and the mean freeze-free period is from 250 to 300 days. Hydrologically, runoff is rapid and most of the smaller streams are dry by the end of the summer except in the southwestern part of the subsection (USDA 1997).

3.1.2 LOCAL SETTING

The study area is located west of the City of Novato and east of Stafford Lake in Marin County and is accessed from Bowman Canyon Road via Novato Boulevard. The study area runs approximately northeast-southwest and is adjacent to Mount Burdell Open Space Preserve, which serves as the eastern boundary. Novato Boulevard just beyond the southern boundary, and the private Bowman Canyon road forms a boundary to the west. It is abutted on the northwestern and eastern sides by private property. The Bowman study area runs a length of approximately 1.2 miles. It begins at an access road (13 Oaks trail), which passes through private property before running along the length of the study area along a ridgeline. Beyond the high point of the ridge line, the study area continues northeast descending onto the north slopes to a serpentine body near the northern tip of the study area. Additional smaller roads/trails pass through the wooded area northwest of the ridge as well as around the summit on the northern end of the study area.

No fires greater than 10 acres have been recorded on the property since 1878 (beginning of record keeping), based on Cal Fire (2016) fire perimeter data. No evidence of recent fire was observed within the study area during the 2019 site visits. It appears fire road maintenance occurs annually as road blading.

Topography and Climate

The topography of the study area is comprised of a central ridge with its summit near the northern end of the property. The slope north of the summit is north facing serpentine grassland with rock outcrops. The slopes on either side of the ridge are steep annual grasslands and purple needlegrass grasslands becoming oak woodland and bay forest at lower elevations. The slope east of the ridge descends into a canyon that carries a stream with seasonally wet pools and then back up into chaparral at the far eastern boundary. There is also a spring-fed seasonal pond on the west side of the property. Elevation at the site ranges from 967 feet (295 meters) to 160 feet (49 meters).

Locally the climate of the study area is characterized as temperate and humid, with substantial marine influence. The study area receives summer fog and afternoon coastal wind.

Geology and Soils

The underlying geology is mainly comprised of marine sedimentary and metasedimentary rocks of the Franciscan Complex as well as serpentinite and alluvium (Blake et al. 1999). A total of seven soil mapping units are located within the study area (USDA/NRCS 2001). These soil mapping units and the represented acreage in the study area is shown in Table 5. The symbol column in this table refers to the abbreviation for this soil type used in the soil survey (USDA 2001). Henneke soils are derived from serpentinite.

Table 5. Soil Mapping Units in the Study Area

SYMBOL	SOIL MAPPING UNIT	ACREAGE
101	Ballard gravelly loam, 2 to 9 percent slopes	6.42
108	Bonnydoon Variant-Gilroy Variant loams, 50 to 75 percent slopes	33.91
129	Henneke stony clay loam, 15 to 50 percent slopes	15.84
142	Los Osos-Bonnydoon Complex, 30 to 50 percent slopes	0.09
164	Saurin-Bonnydoon Complex, 15 to 30 percent slopes	73.98
179	Tocaloma-McMullin Complex, 30 to 50 percent slopes	0.05
180	Tocaloma-McMullin Complex, 50 to 75 percent slopes	36.59
Total		166.88

Hydrology Characteristics

Hydrology onsite is influenced by precipitation, surface water runoff, geologic stratigraphy, topography, soil permeability, and plant cover. Obvious drainages within the study area include an unnamed creek in the southwest, and another unnamed creek on the eastern edge of the study area. Both creeks carry flow during the wet season, into the spring months, and are dry towards the end of summer. The unnamed creek on the east side of the ridge flows east towards San Marin High School. The western creek flows west off the ridge and then south in Bowman Canyon for 0.4 miles, converging with Novato Creek on the other side of Novato Boulevard. This creek showed signs of major incision and had a head cut approximately 10 feet deep partway down the drainage.



Head cut in drainage on southwestern side of the Bowman property.

A small pond was observed west of the ridge, and feeds into the drainage on that side of the study area. The pond retained water in March through June and was dry in September. The earthen dam at the outlet is eroded, and while still functioning to retain water, should be monitored, and repaired as necessary. Management considerations related to hydrology should include restoration of the head cut on the western drainage as well as maintenance of the pond dam.



The earthen dam at the outlet of the pond showing signs of erosion.

Land-Use

The study area consists of preserved land that is part of Marin County Parks and contains ranch roads and trails that do not currently connect with Mount Burdell's designated roads and trails. The area is grazed seasonally by cattle from an adjacent ranch.

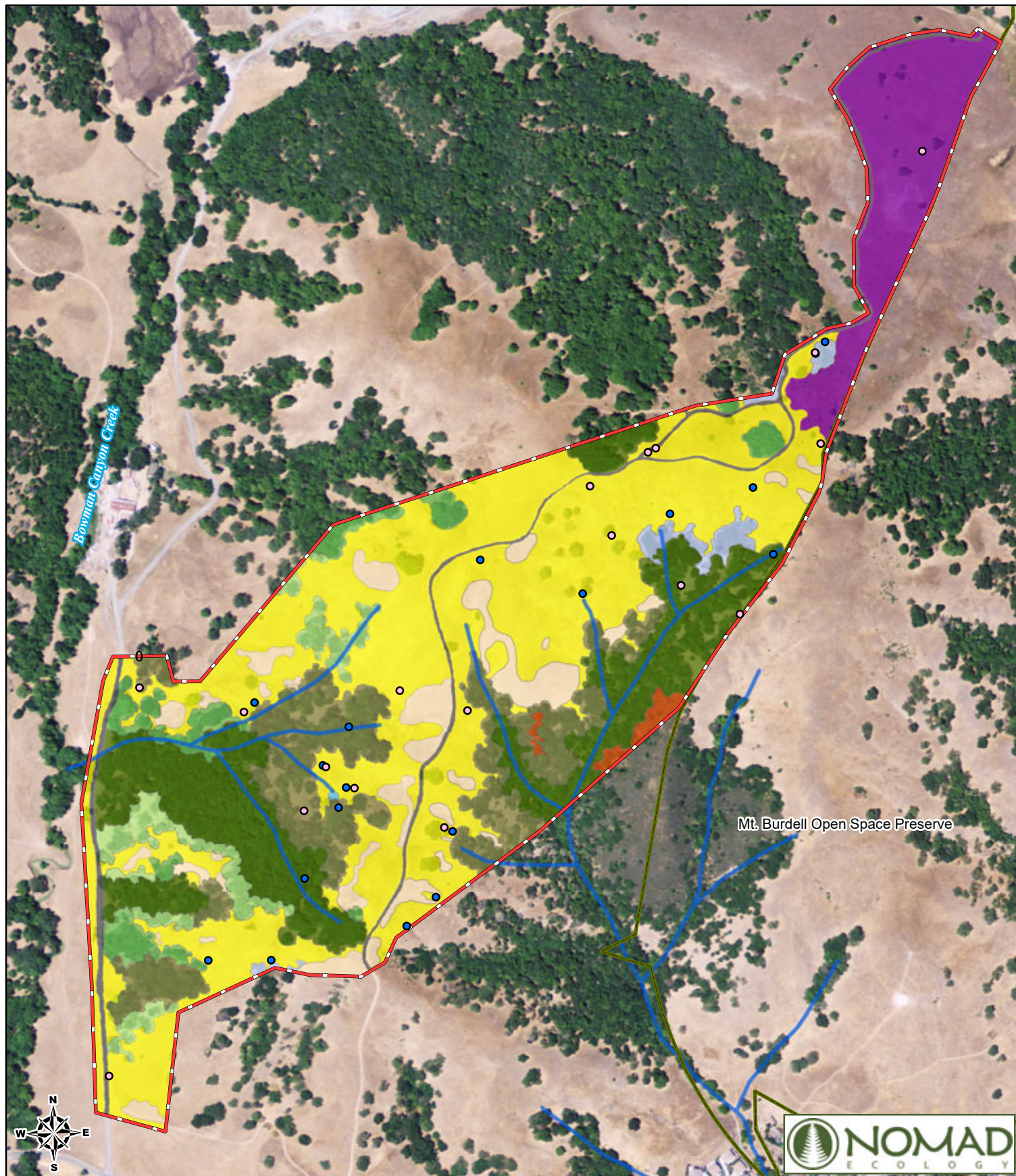
3.2. VEGETATION COMMUNITIES

This subsection describes vegetation utilizing two vegetation classification systems developed by Holland (1986) and Sawyer et al. (2009). Holland (1986) or Holland and Keil (1995) provide a generalized natural community-level description for natural communities present within the study area which include Non-Native Grassland, Purple Needlegrass Grassland, Serpentine Grassland, Chamise Chaparral, Coastal Scrub, Northern Coyote Brush Scrub, California Bay Forest, Coast Live Oak Forest / Woodland, Mixed Evergreen Forest, Valley Oak Woodland, and Seasonal Wetland (Table 6; Figure 3). The access road is contained in the acreage for Non-Native Grassland. These vegetation communities are described below.

Table 6. Land Cover Types in the Study Area

LAND COVER	ACREAGE
<u>Upland Herbaceous Dominated Vegetation Types</u>	
Non-Native Grassland	73.38
Purple Needlegrass Grassland	10.89
Serpentine Grassland	15.90
<u>Shrub Dominated Vegetation Types</u>	
Chamise Chaparral	1.23
Northern Coastal Scrub	2.34
<u>Woodland and Forest Vegetation Types</u>	
California Bay Forest	29.74
Coast Live Oak Forest / Woodland	20.74
Mixed Evergreen Forest	6.40
Valley Oak Woodland	6.23
<u>Wetland Herbaceous Dominated Vegetation Types</u>	
Seasonal Wetland	0.05
Total:	166.9

Table 7 relates vegetation types identified within the study area to other commonly used vegetation classification systems including *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), *Manual of California Vegetation, Second edition* (Sawyer et al. 2009), *CNPS Inventory of Rare and Endangered Plants of California* (CNPS 2001, 2019), and *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The codes used in Table 7 reflect those associated with Holland (1986) types and the *Vegetation Classification and Mapping Program List of California Vegetation Alliances* (CDFW 2018).



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Legend		
Bowman Canyon	Vegetation Communities	California Bay Forest*
Mt. Burdell Park Boundary	Non-Native Grassland	Coast Live Oak Forest
Seep	Purple Needlegrass Grassland*	Mixed Evergreen Forest*
Purple Needlegrass	Serpentine Grassland*	Valley Oak Woodland*
	Chamise Chaparral	Seasonal Wetland*
	Northern Coastal Scrub	Road

* Sensitive Natural Communities

Sources: NAIP 2009. Projection: State Plane NAD 83 Feet.

Figure 3
Vegetation Communities
Bowman Canyon
Marin County Parks

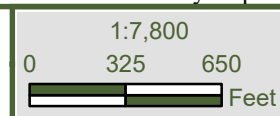


Table 7. Vegetation Community Classification Systems Comparison

<u>VEGETATION COMMUNITY CLASSIFICATION SYSTEMS</u>			
TERRESTRIAL COMMUNITIES ¹	CALIFORNIA VEGETATION ²	CNPS INVENTORY ³	WETLANDS & DEEPWATER HABITATS ⁴
<u>UPLAND HERBACEOUS DOMINATED VEGETATION TYPES</u>			
Non-Native Grassland (42200)	<i>Bromus (diandrus, hordeaceus)</i> – <i>Brachypodium distachyon</i> Semi-Natural Herbaceous Stand (Annual Brome grasslands) (42.026.00), in part <i>Hypochaeris glabra</i> – <i>Festuca bromoides</i> Semi-Natural Herbaceous Stand (Annual brome grasslands) (42.026.26), in part <i>Briza maxima</i> Semi-Natural Herbaceous Stand (Wild oats and annual brome grasslands) (42.027.01), in part	Valley and Foothill Grassland	Upland
Purple Needlegrass Grassland (42110)	<i>Stipa pulchra</i> Herbaceous Alliance (Purple Needlegrass Grassland) (41.150.04) S3?	Valley and Foothill Grassland	Upland
Serpentine Grassland (42130)	<i>Stipa pulchra</i> Herbaceous Alliance (Purple Needlegrass Grassland) (41.150.04), in part S3?	Valley and Foothill Grassland	Upland
<u>SHRUB DOMINATED VEGETATION TYPES</u>			
Chamise Chaparral (37200)	<i>Adenostoma fasciculatum</i> Shrubland Alliance (Chamise chaparral) (37.101.00)	Chaparral	Upland
Northern Coastal Scrub (32100)	<i>Artemisia californica</i> Shrubland Alliance (California sagebrush scrub) (32.010.00) <i>Baccharis pilularis</i> Shrubland Alliance (Coyote Brush Scrub) (32.060.00) <i>Baccharis pilularis</i> / <i>Stipa pulchra</i> Shrubland Association (Coyote Brush Scrub) (32.060.21) S3	Coastal Scrub	Upland
<u>WOODLAND AND FOREST VEGETATION TYPES</u>			
California Bay Forest (81200)	<i>Umbellularia californica</i> Forest Alliance (California Bay Forest) (74.100.00) S3	Cismontane Woodland Broadleaved Upland Forest	Upland

¹ Terrestrial Natural Communities of California (Holland 1986)² A Manual of California Vegetation (Sawyer *et al.* 2009) or California Natural Community List (CDFW 2018) that were observed in the field.³ CNPS Inventory of Rare and Endangered Plants of California Habitat Types (CNPS 2001)⁴ Classification of Wetlands & Deepwater Habitats of the U.S. (Cowardin *et al.* 1979)

<u>VEGETATION COMMUNITY CLASSIFICATION SYSTEMS</u>			
TERRESTRIAL COMMUNITIES ¹	CALIFORNIA VEGETATION ²	CNPS INVENTORY ³	WETLANDS & DEEPWATER HABITATS ⁴
Coast Live Oak Forest / Woodland (81310 / 71160)	<i>Quercus agrifolia</i> Woodland Alliance (Coast Live Oak Woodland) (71.060.00)	Cismontane Woodland Broadleaved Upland Forest	Upland
Mixed Evergreen Forest (81100)	<i>Quercus agrifolia</i> – <i>Umbellularia californica</i> Alliance (Coast Live Oak – Bay Woodland) (71.060.48) S3	Cismontane Woodland Broadleaved Upland Forest	Upland
Valley Oak Woodland (71130)	<i>Quercus lobata</i> Woodland Alliance (Valley Oak Woodland) (71.040.00) S3	Cismontane Woodland Broadleaved Upland Forest	Upland
<u>WETLAND HERBACEOUS DOMINATED VEGETATION TYPES</u>			
Seasonal Wetland (Not Described)	<i>Eleocharis macrostachya</i> Herbaceous Alliance (Pale spike rush marshes) (45.230.01), in part <i>Juncus xiphioides</i> Herbaceous Alliance (Iris-leaf rush seeps) (45.568.01), in part	Meadows and Seeps Marshes and Swamps	Palustrine Non-persistent Emergent Wetland

3.2.1 UPLAND HERBACEOUS VEGETATION TYPES

Non-Native Grassland

Non-native grassland is dominated by a sparse to dense cover of non-native grasses and weedy annual and perennial forbs, primarily of Mediterranean origin, that have replaced native perennial grasslands because of human disturbance. However, where not completely outcompeted by weedy non-native plant species, scattered native wildflower species and native perennial grass species considered remnants of the original vegetation may also be common (Holland 1986). This community occurs on fine-textured, usually clay soils, which are moist or waterlogged during the winter rainy season and very dry during the summer and fall. Germination occurs with the onset of the late fall rains while growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer and fall dry season, persisting as seeds. This community usually occurs below 3,000 feet (914 meters) but reaches 4,000 feet (1,219 meters) in the Tehachapi Mountains and interior San Diego County, and intergrades with coastal prairie along the Central Coast (Holland 1986).

Scattered individuals of oak trees valley oaks (*Quercus lobata*) and coast live oaks (*Quercus agrifolia* var. *agrifolia*) were also present in this vegetation type. These scattered individuals were not mapped where they were considered a component of the larger grassland matrix. Conversely, Non-native Grasslands readily intergrade within the understories of deciduous, open canopy oak woodlands on site.

Non-native Grasslands occur in the higher elevation areas of the study area along the ridge and in openings in oak woodlands and are represented as several alliances. Due to the difficulty in separating these stands as discrete polygons they are only mapped as Non-Native Grassland. Within the study area three vegetation alliances characterized as Non-Native Grassland are present: *Bromus* (*diandrus**, *hordeaceus**) – *Brachypodium distachyon** Semi-Natural Herbaceous Stand, *Hypochaeris glabra** – *Festuca bromoides** Semi-Natural Herbaceous Stand, and *Briza maxima* Semi-Natural Herbaceous Stand. These alliances are described below.

Bromus (*diandrus*, *hordeaceus*) – *Brachypodium distachyon* Semi-Natural Herbaceous Stand (Annual brome grasslands)

This stand is described by Sawyer et al (2009) with false brome (*Brachypodium distachyon**) and ripgut brome (*Bromus diandrus**) and/or soft chess (*Bromus hordeaceus**) being dominant or co-dominant with other herbaceous nonnatives. Emergent trees and shrubs may be present at low cover. The membership rules for this alliance require, false brome or ripgut brome to be greater than 60% relative cover in the herbaceous layer or soft chess to be greater than 50% relative cover in the herbaceous layer with other non-natives and natives with low or insignificant cover. Habitat for this alliance is foothills, waste places, rangelands, and openings in woodlands at all topographic settings.

Some of the herbaceous species present in this type of stand include smooth brome (*Bromus racemosus**), false brome (*Brachypodium distachyon**), rough cat's ear (*Hypochaeris radicata**), dove lupine (*Lupinus bicolor*), rose clover (*Trifolium hirtum**), narrowleaf cottonrose (*Logfia gallica**), red-stemmed filaree (*Erodium cicutarium**), valley tassels (*Castilleja attenuata*), and scattered individuals of purple needlegrass (*Stipa pulchra*).

Hypochaeris glabra – *Festuca bromoides* Semi-Natural Herbaceous Stand (Annual brome grasslands)

This association is listed but not described in Sawyer et al. (2009) and falls within the annual brome grasslands stand type. There is substantial overlap between species in this association and the other Non-

* Denotes a non-native species that has an origin other than that of California.

native Grassland stand types. Some of the species present in this community include: smooth cat's ear*, brome fescue*, white-stem filaree (*Erodium moschatum**), annual bluegrass (*Poa annua**), common chickweed (*Stellaria media**), windmill pink (*Silene gallica**), burclover (*Medicago polymorpha**), shining peppergrass (*Lepidium nitidum*), common soliva (*Soliva sessilis**), sandspurrey (*Spergularia rubra**), calf lotus (*Acmispon wrangelianus*), mouse-ear chickweed (*Cerastium glomeratum**), groundsel (*Senecio vulgaris**), long-beaked filaree (*Erodium botrys**), dove lupine, narrowleaf cottonrose*, dovefoot geranium (*Geranium molle**), and dwarf plantain (*Plantago erecta*).

Briza maxima Semi-Natural Herbaceous Stand (Wild oats and annual brome grasslands)

This association is listed as provisional but is not described in Sawyer et al. (2009). It falls within the wild oats and annual brome grasslands stand type and contains substantial overlap with the other Non-native Grassland stand types. Some of the species present in this community include: tocalote (*Centaurea melitensis**), bigseed biscuitroot (*Lomatium macrocarpum*), California poppy (*Eschscholszia californica*), shamrock clover (*Trifolium dubium**), spring vetch (*Vicia sativa* subsp. *nigra**), tomcat clover (*Trifolium wildenovii**), ground iris (*Iris macrosiphon*), blue-eyed grass (*Sisyrinchium bellum*), rose clover*, narrowleaf cottonrose*, windmill pink*, and slender oats (*Avena barbata**).



Non-native grassland dominated by false brome* in the southwest corner of the study area.



Slender oats and smooth cat's ear in late season Non-native Grassland.

Purple Needlegrass Grassland

As described by Holland (1986) this community is a mid-height grassland growing up to 2 feet tall, dominated by the perennial bunchgrass, purple needlegrass (*Stipa pulchra*). Native and introduced annuals occur between the perennials, often actually exceeding the bunchgrasses in cover. This community usually occurs on fine-textured (often clay) soils that are moist or even waterlogged during winter but very dry in summer. It often intertwines with Oak Woodlands on moister, better drained sites. In the past, this community was thought to be extensive around the Sacramento, San Joaquin, and Salinas Valleys, as well as the Los Angeles Basin (Holland 1986). Now ecologists think that purple needlegrass was dominant in wetter sites such as coastal grasslands, windward portions of the Coast and near waterways and marshlands in the Central Valley and was more opportunistic and less dominant in drier valley grassland habitats (Sawyer et al. 2009).

Purple Needlegrass Grassland is represented by a single vegetation alliance, *Stipa pulchra* Herbaceous Alliance, described below.

Stipa pulchra Herbaceous Alliance (Purple Needlegrass Grassland)

According to Sawyer et al. (2009), this alliance is either dominated by purple needlegrass or characteristically present in the herbaceous layer of other native perennial grasses and herbs, with a relative cover of 10 percent or greater. Annual herbs and other shrubs and trees may be present at low cover. It occurs in valley and foothill areas on all topographic locations. Although plants produce large quantities of viable seed, seedling establishment is generally low.

Within the study area this plant community was scattered throughout the Non-native Grassland on either side of the access road and along the edge of Coast Live Oak Woodland. Plant species typical of Non-Native Grassland are also present in of Purple Needlegrass Grassland including silver hairgrass (*Aira caryophyllea**), yarrow (*Achillea millefolium*), rose clover*, rattlesnake grass (*Briza maxima**), soap plant (*Chlorogalum pomeridianum* var. *pomeridianum*), wine cup clarkia (*Clarkia purpurea* subsp. *quadrivulnera*), narrowleaf cottonrose*, windmill pink*, and California poppy.



Purple Needlegrass Grassland adjacent to Non-Native Grassland and Coast Live Oak Woodland.

Serpentine Grassland

As described by Holland (1986) this community is an open grassland dominated by perennial bunchgrasses. Total cover is typically low, but is markedly dominated by native species, usually much more so than in Purple Needlegrass Grassland or Non-Native Grasslands. This community is restricted to serpentine sites. It is distributed widely through the Coast Ranges and is less common in the Sierra Nevada and southern California mountains.

Serpentine Grassland is represented by one vegetation alliance, *Stipa pulchra* Herbaceous Alliance, which, was described above.

Stipa pulchra Herbaceous Alliance (Purple Needlegrass Grassland)

This alliance is similar to the Purple Needlegrass Grassland described above but only occurs on serpentine sites. Within the study area this plant community was found on the northern end of the property, on a north-facing slope. Some of the other species present in this community include: dwarf plantain, Tiburon buckwheat (*Eriogonum luteolum* var. *caninum*), Marin western flax (*Hesperolinon congestum*), cream cups (*Platystemon californicus*), leather oak (*Quercus durata* var. *durata*), small fescue (*Festuca microstachys*), longspur seablush (*Plectritis ciliosa*), wild carrot (*Daucus pusillus*), bluehead gilia (*Gilia capitata* var. *capitata*), bedstraw (*Galium aparine*), hillside collinsia (*Collinsia sparsiflora* var. *sparsiflora*), thimble clover (*Trifolium microdon*), California saxifrage (*Micranthes californica*), shooting stars (*Primula hendersonii*), western lady's mantle (*Aphanes occidentalis*) and few-flowered evax (*Hesperisandra sparsiflora* subsp. *sparsiflora*).



Western lady's mantle (left) and cream cups (right) in the Serpentine Grassland on the northern end of the Bowman property.

3.2.2 SHRUB DOMINATED VEGETATION TYPES

Chamise Chaparral

As described by Holland (1986), Chamise Chaparral is a chaparral dominated by chamise reaching 3 to 10 feet (1 to 3 meters) tall. This community is adapted to repeated fires by stump sprouting. Associated species contribute little to cover, and mature stands are densely interwoven with very little herbaceous understory or litter. It occurs on sites similar to Upper Sonoran Mixed Chaparrals, but on shallower, drier soils or at somewhat lower elevations. This community often occurs on xeric slopes and ridges.

Within the study area, Chamise Chaparral is represented by a single alliance, *Adenostoma fasciculatum* Shrubland Alliance, described below.

Adenostoma fasciculatum Shrubland Alliance (Chamise chaparral)

This stand is described by Sawyer et al (2009) with chamise (*Adenostoma fasciculatum*) being dominant in the shrub canopy with other native shrubs. Shrubs are less than 13 feet (4 m) tall and the canopy ranges from intermittent to continuous. Membership rules for this alliance require chamise to be greater than 50% relative cover in the shrub layer. Chamise chaparral commonly occurs on varied topography on shallow soils over colluvium and many kinds of bedrock between 33 and 5,906 feet (10 to 1,800 meters).

This vegetation community was found on the southeastern border of the study area and in a small patch within Coast Live Oak Forest / Woodland east of the access road. Typical species present in this community include chamise, climbing bedstraw (*Galium porrigens* var. *porrigens*), Napa false indigo (*Amorpha californica* var. *napensis*), rayless ragwort (*Senecio aronicoides*), bush monkeyflower (*Diplacus aurantiacus*), chaparral clematis (*Clematis lasiantha*), sticky cinquefoil (*Drymocallis glandulosa* var. *glandulosa*), coyote brush (*Baccharis pilularis* subsp. *consanguinea*), soap plant, canyon live oak (*Quercus chrysolepis*), poison oak (*Toxicodendron diversilobum*), and common skullcap (*Scutellaria tuberosa*).



Chamise chaparral on the eastern side of the Bowman property.

Northern Coastal Scrub

As described by Holland (1986), Northern Coastal Scrub consists of low shrubs, usually 2 to 7 feet (0.5 to 2 meters) tall, usually dense but with scattered grassy openings. Most growth and flowering occur in late spring and early summer. It occurs on windy, exposed sites with shallow, rocky soils. It is patchily distributed from southern Oregon to Pt. Sur, Monterey County and is often interspersed with Coastal Terrace Prairie.

Within the study area, Northern Coastal Scrub is represented by three vegetation types, *Artemisia californica* Shrubland Alliance, *Baccharis pilularis* Shrubland Alliance, and *Baccharis pilularis* / *Stipa pulchra* Shrubland Association, described below.

Artemisia californica Shrubland Alliance (California Sagebrush Scrub)

California sagebrush scrub is described by Sawyer et al (2009) with California sagebrush (*Artemisia californica*) as dominant or co-dominant in the shrub canopy with other native shrubs. The shrub layer is less than 7 feet (2 meters) or in two tiers with a second at less than 16 feet (5 meters) tall. The shrub canopy is intermittent to continuous and the herbaceous layer is variable both seasonally and annually. Membership rules require that California sagebrush is greater than three times the cover of coyote brush and other shrubs or greater than 60% relative cover in the shrub canopy. This alliance occurs on slopes that are usually steep and rarely flooded and on low-gradient deposits along streams between 0 and 3,937 feet (0 to 1,200 meters). It occurs on shallow alluvial or colluvial derived soils.

Within the study area, California Sagebrush Scrub occurs immediately north of the California Bay Forest to the east of the access road, and at the southern end of the study area west of the access road. Sage Scrub habitat was found adjacent to woodlands. Typical species found in this alliance include California Sage, coyote brush, bush monkeyflower, thymeleaf mesa mint (*Pogogyne serpylloides*), gold back fern (*Pentagramma triangularis* subsp. *triangularis*), poison oak, lady's tobacco (*Pseudognaphalium californicum*), and tocalote*.

Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub)

According to Sawyer et al. (2009), this alliance is dominated by coyote brush or else coyote brush is co-dominant with other native shrubs reaching no greater than 10 feet (3 meters). The shrub canopy and

herbaceous layers are variable. The membership rules for this alliance state that coyote brush is greater than 15% cover over a grassy understory, greater than 50% relative cover with other shrubs, or greater than 50% absolute cover in the shrub layer. Habitat for this alliance is river mouths, stream sides, terraces, stabilized dunes of coastal bars, spits along the coastline, coastal bluffs, open slopes, and ridges on sandy to relatively heavy clay soils between 0 and 4,921 feet (0 to 1,500 meters).

Coyote Brush Scrub occurs in a couple of patches on the northern end of the study area along the northwestern boundary and adjacent to the Serpentine Grassland. Species associated with Coyote Brush Scrub include mugwort (*Artemisia douglasiana*), featherweed (*Gamochaeta ustulata*), figwort (*Scrophularia californica*), and hedge nettle (*Stachys rigida* var. *quercetorum*). Coyote brush scrub occurred in areas surrounded by Non-Native Grassland and Serpentine Grassland, so herbaceous species present in those vegetation communities were also found in Coyote Brush Scrub.



Northern Coastal Scrub on the northern end of the Study Area.

Baccharis pilularis / *Stipa pulchra* Herbaceous Association

This association is classified within the Coyote Brush alliance (Sawyer et al. 2009) but is not described in the *Manual of California Vegetation Online*. Within the study area, this association occurs just north of the summit, and upslope from the serpentine Purple Needlegrass Grassland. This association is characterized by a co-dominance of coyote brush and purple needle grass. However, it is likely that coyote brush has encroached an area previously dominated solely by purple needlegrass judging by the age of the shrubs. . Some of the other species present in this community include coyote mint (*Monardella villosa* subsp. *villosa*), coffee fern (*Pellaea andromedifolia*), nude buckwheat (*Eriogonum nudum* var. *nudum*), wood rush (*Luzula comosa* var. *comosa*), lady's mantle, bitter cress (*Cardamine oligosperma*), and checkermallow (*Sidalcea malviflora* subsp. *laciniata*.)



Coyote brush encroachment on the northern end of the Bowman property.

3.2.3 WOODLAND AND FOREST VEGETATION TYPES

California Bay Forest

As described by Holland (1986) this community is similar to Mixed Evergreen Forest, but typically consists entirely of California bay, a broadleaved sclerophyll tree that grows up to 30 meters tall. It often forms dense, wind-pruned stands less than ten meters tall on exposed coastal slopes. Even away from the coasts, stands are usually dense and support little to no understory. This is a moist community that usually occurs on exposed slopes and ridges to the north of San Francisco Bay and on north-facing slopes further south. It is adapted to the sea winds of exposed coastal slopes and responds to fire by crown-sprouting. It is distributed in the Outer Coast Ranges from the Oregon border to northern San Luis Obispo County and is best developed away from the immediate coast to the north of San Francisco Bay and close to the coast south of the Bay.

California Bay Forest is represented by a single vegetation alliance, *Umbellularia californica* Forest Alliance, described below.

Umbellularia californica Forest Alliance (California Bay Forest)

This alliance is described with California bay dominant or co-dominant in the tree canopy or tall shrub canopy with other native trees. Trees are less than 82 feet (25 meters) and the canopy ranges from intermittent to continuous cover. The shrub layer is open to intermittent and the herbaceous layer is sparse to abundant. The membership rules for this alliance state that California bay is greater than 30% relative cover in the tree canopy. Habitat for this alliance is alluvial benches, stream sides, valley bottoms, coastal bluffs, inland ridges, steep north-facing slopes, and rocky outcrops between 0 to 3,937 feet (0 to 1,200 meters) in elevation (Sawyer et al. 2009).

Within the study area, California Bay Forest is present along the two unnamed streams and in lower elevation drainages. These areas are characterized by a dominance of California bay in the overstory. Understory species include poison oak, hooded coralroot (*Corallorhiza striata*), hound's tongue (*Cynoglossum grande*), hedge nettle, roughleaf aster (*Eurybia radulina*), California maidenhair fern (*Adiantum jordanii*), bedstraw, drops of gold (*Prosartes hookeri*), wood fern (*Dryopteris arguta*), sweet cicely (*Osmorhiza berteroi*), Pacific sanicle (*Sanicula crassicaulis*), American vetch (*Vicia americana* subsp. *americana*), California brome (*Bromus carinatus* var. *carinatus*), and redberry (*Rhamnus crocea*). California bay is also a major component of Coast Live Oak Forest / Woodland and Mixed Evergreen Forest in the study area.



California Bay Forest on the west side of the study area.

Coast Live Oak Forest / Woodland

Coast Live Oak Forest is typically dominated by one tree species, coast live oak, which is evergreen and reaches 33-83 feet (10-25 meters). Coast Live Oak Woodland is similar to Coast Live Oak Forest but with fewer trees, forming a more open woodland. The shrub layer is poorly developed, but may include toyon, gooseberry (*Ribes* spp.), and blue elderberry (*Sambucus nigra* subsp. *caerulea*). The herb component is sparse to continuous and dominated by ripgut brome* and several other introduced taxa. This community typically occurs in valley bottoms as well as on slopes, with moister sites leaning towards forest and drier sites leaning towards woodland. Coast Live Oak Forest is distributed throughout the Coast Ranges from Sonoma County to Santa Barbara County and often occurs adjacent to Mixed Evergreen Forest in the north or merging with Coast Live Oak Woodland in the south usually below 3,000 feet (914 meters).

Within the study area Coast Live Oak Forest / Woodland is represented by a single alliance, *Quercus agrifolia* Woodland Alliance, described below.

Quercus agrifolia Woodland Alliance (Coast Live Oak Woodland)

This alliance is described with coast live oak being dominant or co-dominant in the tree canopy and occurring with other native broadleaved trees. Trees are less than 98 feet (30 meters) tall, the canopy is open to continuous, the shrub layer is sparse to intermittent, and the herbaceous layer is sparse or grassy. The membership rules for this alliance require coast live oak be greater than 50% relative cover in the tree canopy. Habitat for this alliance is found on alluvial terraces, canyon bottoms, stream banks, slopes, and flats where soils are deep, sandy or loamy with high organic matter between 0 to 3,937 feet (0 to 1,200 meters) in elevation (Sawyer et al. 2009).

Within the study area, Coast Live Oak Forest / Woodland occurs on the edges of California Bay Forest and higher up in the drainages of the two unnamed streams. Other trees present in this vegetation alliance include scattered black oaks (*Quercus kelloggii*), valley oaks (*Quercus lobata*), and California bay. In addition to supporting non-native annual grasses typical of the region such as dogtail grass (*Cynosurus echinatus**), the understory of this community includes characteristic shrubby and herbaceous species such as hedge parsley (*Torilis arvensis**), miner's lettuce (*Claytonia perfoliata* subsp. *perfoliata*), narrow leaved miner's lettuce (*Claytonia parviflora* subsp. *parviflora*), bedstraw, Pacific sanicle, California buttercup (*Ranunculus californicus* var. *californicus*), purple sanicle (*Sanicula bipinatifida*), blue wildrye (*Elymus*

glaucus subsp. *glaucus*), creeping snowberry (*Symphoricarpos mollis*), sweet cicely, Torrey's melic grass (*Melica torreyana*), Hartweg's tauschia (*Tauschia hartwegii*), California honeysuckle (*Lonicera hispidula*), Douglas' iris (*Iris douglasiana*), and milkmaids (*Cardamine californica*).



Coast Live Oak Woodland on the west side of the study area.

Mixed Evergreen Forest

Holland (1986) describes Mixed Evergreen Forest as dominated by broadleaved trees, 33 to 98 feet (10 to 30 meters) tall, often with taller conifers interspersed, forming a closed forest. Most species are sclerophyllous evergreens, but winter-deciduous species also occur. Relatively little understory grows under the dense canopy. This community type often occurs in small, mosaic-like patches, surrounded by grassland on heavier soils. Most species are relatively inactive during the winter, and growth increases rapidly in spring and continues at a reduced rate into summer. It occurs on moist, well-drained, coarse soils, usually on slopes. It is geographically and biologically transitional between the dense coniferous forests of northwestern California and the open woodlands and savannas of the interior. This community occurs more or less continuously from Santa Cruz County northward through the outer coast ranges into Oregon, usually away from the immediate coast. Elevations range from 200 to 300 feet (60 to 910 meters) in the north to 1,000 to 4,000 feet (300 to 1,210 meters) in the south.

Within the study area Mixed Evergreen Forest is represented by a single type, *Quercus agrifolia* – *Umbellularia californica* Woodland Alliance, described below.

Quercus agrifolia- *Umbellularia californica* Woodland Alliance (Coast Live Oak - California Bay Woodland)

This alliance is listed but not described in Sawyer et al. (2009). This alliance was mapped where coast live oak and California Bay were co-dominant in the canopy. Trees are less than 30 meters tall, the canopy is open to continuous, the shrub layer is sparse to intermittent, and the herbaceous layer is sparse or grassy. Coast Live Oak – California Bay Woodland occurs on the west side of the study area on the edges of California Bay Forest and Coast Live Oak Forest / Woodland. Understory species are characteristic of coast live oak woodland alliance.



A mix of coast live oak and California bay in Mixed Evergreen Forest on the west side of the study area.

Valley Oak Woodland

Holland (1986) describes Valley Oak Woodland as an open grassy-understory savanna rather than a closed woodland. Valley oak is usually the only tree present and mature individuals reach 15-35 meters in height. Many stands consist of open-canopy growth form trees and seldom exceed 30-40% absolute cover. It occurs on deep, well-drained alluvial soils usually in valley bottoms that contain more moisture than adjacent upland slopes. It is distributed in the Sacramento and San Joaquin valleys adjacent to the Sierra Nevada foothills; valleys of the Coast Ranges from Lake County to western Los Angeles County, usually below 2,000 feet (610 meters) in elevation.

Within the study area, Valley Oak Woodland is represented by a single alliance, *Quercus lobata* Woodland Alliance, described below.

Quercus lobata Woodland Alliance (Valley Oak Woodland)

This alliance is described with valley oak being dominant or co-dominant in the tree canopy and occurring with other native broadleaved trees including oaks, willows, and other trees. Trees are less than 98 feet (30 meters) tall, the canopy is open to continuous, and shrubs are common to occasional with vines also present. The membership rules for this alliance require valley oak be greater than 50% relative cover in the tree canopy or greater than 30% relative cover when other tree species are present. Habitat for this alliance is found on valley bottoms and seasonally saturated soils that may intermittently flood lower slopes and summit valleys between 0 and 2,542 feet (0 and 775 meters) in elevation (Sawyer et al. 2009).

Within the study area, Valley Oak Woodland is located on the western end of the parcel on the margins of California Bay Forest and Coast Live Oak Forest / Woodland. Other trees present in this vegetation alliance include scattered coast live oaks, black oaks, and California bay. Understory species are characteristic of Coast Live Oak Forest / Woodland.



Valley Oak Woodland on the western side of the Bowman property.

3.2.4 WETLAND HERBACEOUS DOMINATED VEGETATION TYPES

Seasonal Wetlands

Seasonal Wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall. Seasonal wetlands, although not specifically described in Holland (1986) or Holland and Keil (1995), would be classified by Cowardin (1979) as seasonally persistent palustrine emergent wetlands. As defined, this classification indicates that surface water is present for extended periods, especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface. Vegetation is characterized by species of annual and perennial native and non-native grasses and forbs that begin their growth as aquatic or semiaquatic plants, typically resembling a wetland community that transitions to a dry-land environment as the pool dries. Upland grasses and forbs can become established while wetland species desiccate. The length of time that water persists has a major effect on species composition. During and after the establishment of upland species, these sites may no longer resemble wetlands. These plant species usually have a wetland indicator status between obligate and facultative. Although seasonal wetlands and vernal pools share similar hydrologic characteristics, species composition of seasonal wetlands is typically ruderal in nature. Therefore, seasonal wetlands are not considered vernal pools, which support a more specialized and less common native flora.

Seasonal Wetlands are represented by two vegetation alliances within the study area, *Eleocharis macrostachya* herbaceous alliance and *Juncus xiphioides* herbaceous alliance, described below.

Eleocharis macrostachya Herbaceous Alliance (Pale spike rush marshes)

This alliance is described by Sawyer et al (2009) with pale spike rush being dominant or co-dominant in the herbaceous layer with other native and non-native herbs. Herbs are less than 3 feet (1 meter) and cover is open to continuous. The membership rules for this alliance require pale spike rush be greater than 30-70% relative cover in the herbaceous layer but greater than 30% relative cover with non-natives. Habitat for this alliance is found on lakeshores, streambeds, swales, vernal pools, pastures, ditches, and natural and artificial ponds between 0 and 8,202 feet (0 to 2,500 meters). Soils are alluvial and often highly organic and are flooded part of the growing season with alkaline, brackish, or fresh water.

Within the study area, pale spike rush marshes occurred at the top of one of the tributaries of the unnamed stream on the west side associated with two seeps. This seasonally wet pond had an eroded earthen dam that allowed it to retain water through June. In September the soil in the pond was still moist but no standing water was present. Other species associated with pale spike rush (*Eleocharis macrostachya*) marshes in the study area include spiny buttercup (*Ranunculus muricatus**), Lobb's aquatic buttercup (*Ranunculus lobbii*), mannagrass (*Glyceria* sp.), pennyroyal (*Mentha pulegium**), western water plantain (*Alisma triviale*), iris-leaved rush (*Juncus xiphioides*), common yellow monkeyflower (*Erythranthe gutattus*), variegated clover (*Trifolium variegatum* var. *variegatum*), flowering quillwort (*Triglochin scilloides*), rabbitsfoot grass (*Polypogon monspeliensis**), and swamp grass (*Crypsis schoenoides**).

Juncus xiphioides Herbaceous Alliance (Iris-leaf rush seeps)

This provisional alliance is described by Sawyer et al (2009) with iris-leaved rushes being dominant in the herbaceous layer with other native and non-native herbs. Herbs are less than 3 feet (1 meter) tall and cover is intermittent to continuous. Habitat is found in seeps, mainly on metamorphic, serpentine, and volcanic substrates between 0 and 5,249 feet (0 to 1,600 meters). Iris-leaf rush (*Juncus xiphioides*) is a wetland obligate plant (USFWS 1996).

Iris-leaf rush seeps were present in the pond on the west side of the study area as well as scattered on either side of the access road at the tops of drainages that feed into the two unnamed streams associated with the seeps. Other species found in iris-leaf rush seeps in the project area include hyssop loostripe (*Lythrum hyssopifolia**), baltic rush (*Juncus balticus* subsp. *ater*), hoary nettle (*Urtica dioica* subsp. *holosericea*), common rush (*Juncus patens*), fiddle dock (*Rumex pulcher**), strawberry clover (*Trifolium fragiferum**), and pennyroyal*.



Seasonal wetland at the top of an unnamed drainage in the west side of the study area in April (Top Left), June (Top Right), and September (Bottom).

Section 4. RESULTS

During this study, a total of 247 plant species were observed within the study areas. Of these species, 181 (73%) observed are considered native species and 66 (27%) are considered non-native species that have an origin other than California. Generally, native species comprised higher cover and abundance than non-native plant species within forest / woodland and serpentine grassland communities. Although non-native species were more abundant in non-native grasslands, this community still supported a number of native grassland species. A complete list of plant species observed within the study area is presented in Appendix A.

4.1. SENSITIVE NATURAL COMMUNITIES

During the 2019 surveys, a total of seven sensitive natural communities currently recognized by CDFW (2019) were observed within the study area. These communities appear in Table 8 and are described below. The locations of these communities are depicted in Figure 3. Though not considered a sensitive natural community by CDFW (2019), seasonal wetlands would qualify as a protected aquatic resource based on regulations associated with the Clean Water Act.

Table 8. Sensitive Natural Communities the Study Area

VEGETATION TYPE	CONSERVATION STATUS RANK	ACREAGE
<u>UPLAND HERBACEOUS</u>		
<i>Stipa pulchra</i> Herbaceous Alliance	S3?	10.89
<i>Stipa pulchra</i> Herbaceous Alliance (on serpentine)	S3?	4.85
<u>SHRUB DOMINATED</u>		
<i>Baccharis pilularis</i> / <i>Stipa pulchra</i> Association	S3	1.34
<i>Quercus agrifolia</i> – <i>Umbellularia californica</i> Woodland Alliance	S3	6.40
<i>Quercus lobata</i> Woodland Alliance	S3	6.23
<i>Umbellularia californica</i> Forest Alliance	S3	29.74
<u>WETLAND</u>		
<i>Juncus xiphioides</i> Herbaceous Alliance, in part	S2?	.05
	Total:	42.42

¹Explanation of Status Codes

State Codes

- S1 Critically Imperiled
- S2 Imperiled
- S3 Vulnerable

? A question mark (?) denotes an inexact numeric rank because we know we have insufficient samples over the full expected range of the type, but existing information points to this rank

Juncus xiphioides Herbaceous Alliance is present in seasonal wetlands on site. This alliance has a Conservation Status Rank of S2? (CDFW 2018). A rank of S2 indicates a vegetation alliance or association as “Imperiled” because of rarity due to very restricted range, very few populations, steep declines, or other

factors making it very vulnerable to extirpation from jurisdiction (NatureServe 2019). A question mark (?) denotes an inexact numeric rank due to insufficient samples over the full expected range of the type, but existing information points to this rank (CDFW 2018). Seasonal wetlands that are not part of the *Juncus xiphioides* Herbaceous Alliance would still be considered a sensitive natural community as they may qualify as wetlands or waters of the U.S. and/or waters of the State falling under U.S. Army Corps of Engineers or Regional Water Quality Control Board jurisdictions through the Clean Water Act and/or the Porter-Cologne Water Quality Control Act.

The remaining 6 sensitive natural communities within the study area include *Stipa pulchra* Herbaceous Alliance, *Baccharis pilularis* / *Stipa pulchra* Association, *Quercus agrifolia* – *Umbellularia* Woodland Alliance, *Quercus lobata* Woodland Alliance, and *Umbellularia californica* Forest Alliance. These communities have a Conservation Status Rank of S3 (CDFW 2018). A rank of S3 indicates a vegetation alliance or association as “Vulnerable” meaning it is at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2019).

4.2. SPECIAL STATUS PLANTS

Based on a review of available databases and literature (USFWS 1999, 2014, 2019; CDFW 2019a, 2019b, 2019c; CNPS 2019; Baldwin et al. 2012); familiarity with the regional flora; and presence of specific vegetation types, a total of 11 special status plant species were determined to be targets of the 2019 protocol-level rare plant surveys. Surveys for these 11 targets were conducted during the appropriate blooming periods in 2019. Although not originally a target, Lobb’s aquatic buttercup (*Ranunculus lobbii*; CRPR 4.2) and Franciscan onion (*Allium peninsulare* var. *franciscanum*; CRPR 1B.2) were also observed during surveys. A summary of the survey results is presented in Table 9 and their locations appear in Figure 4.

Table 9. Occurrence Summary of Special status Plants Within the Study Area

SPECIES NAME	COMMON NAME	STATUS ¹	SURVEY RESULTS
<u>FEDERAL/STATE LISTED SPECIES</u>			
<i>Hesperolinon congestum</i>	Marin western flax	FT, ST, 1B.1	Observed
<u>CALIFORNIA RARE PLANT RANK SPECIES</u>			
<i>Allium peninsulare</i> var. <i>franciscanum</i>	Franciscan onion	1B.2	Observed
<i>Amorpha californica</i> var. <i>napensis</i>	Napa false indigo	CEQA, 1B.2	Observed
<i>Amsinckia lunaris</i>	bent-flowered fiddleneck	CEQA, 1B.2	Not observed
<i>Erigeron biolettii</i>	streamside daisy	CEQA, 3	Not observed
<i>Eriogonum luteolum</i> var. <i>caninum</i>	Tiburon buckwheat	CEQA, 1B.2	Observed
<i>Fritillaria liliacea</i>	fragrant fritillary	CEQA, 1B.2	Not observed
<i>Hemizonia congesta</i> subsp. <i>congesta</i>	congested-headed hayfield tarplant	CEQQ, 1B.2	Not observed
<i>Leptosiphon acicularis</i>	bristly leptosiphon	CEQA, 4.2	Not observed
<i>Lessingia hololeuca</i>	woolly-headed lessingia	CEQA, 3	Not observed
<i>Ranunculus lobbii</i>	Lobb's aquatic buttercup	CEQA, 4.2	Observed
<i>Streptanthus anomalus</i>	---	CEQA,	Not observed
<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	Mt. Tamalpais bristly jewelflower	CEQA, 1B.2	Not observed

¹Explanation of State and Federal Listing Codes

Federal listing codes:

FT Federally listed as Threatened

California listing codes:

ST State listed as Threatened

California Native Plant Society codes:

1B Rare, Threatened, or Endangered in California and elsewhere

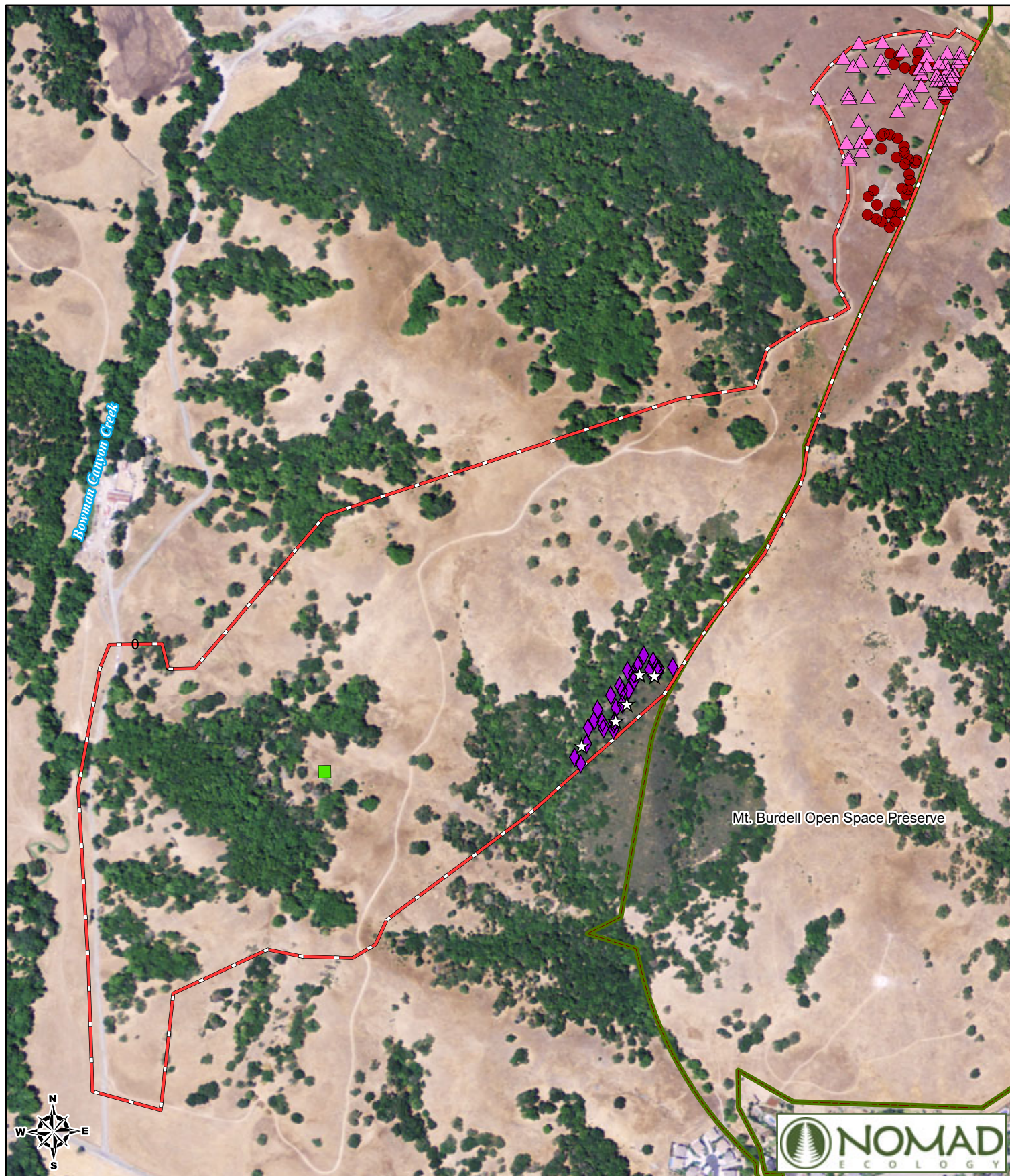
3 Plants about which more information is needed (a review list)

4 Plants of limited distribution – Watch list

California Native Plant Society threat codes:

.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)



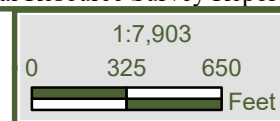
October 2019

Botanical Resource Survey Report

October 2017

<

Figure 4
Special-Status Plant Species
within the Study Area
 Bowman Canyon
 Marin County Parks



4.2.1 FEDERAL- AND/OR STATE-LISTED AND CALIFORNIA RARE PLANT SPECIES

Based on the field investigations, review of available databases and literature, familiarity with local flora, and on site habitat suitability, one federal- and/or State-listed and California rare plant species was observed within the study area: Marin western flax. A brief description of this species, its habitat requirements, occurrence information, and threats and management considerations are discussed below. CNDDDB field survey forms for these occurrences appear in Appendix B.

Marin Western Flax (*Hesperolinon congestum*)

Status, Distribution and Habitat Requirements

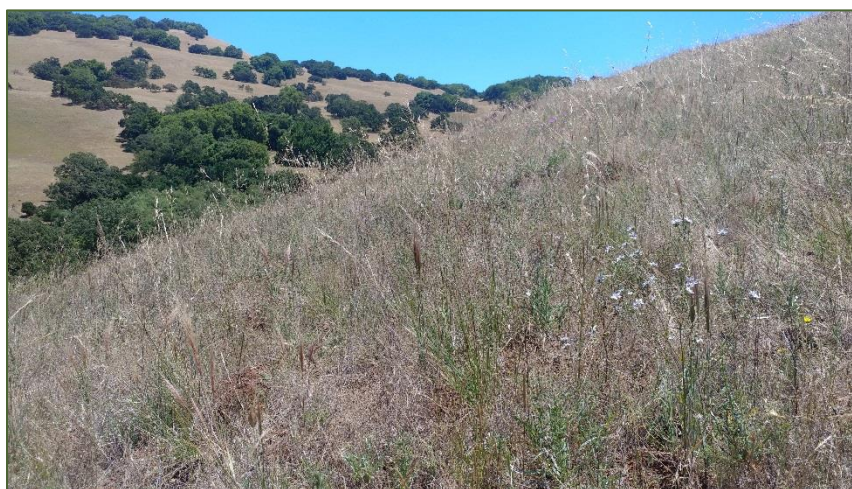
Marin western flax [*Hesperolinon congestum* (A. Gray) Small] is federally- and state-listed as threatened and has a California Rare Plant Rank of 1B.1 indicating that it is rare in California and elsewhere and is seriously threatened throughout its range (CNPS 2019). Marin western-flax is an erect herbaceous annual in the flax family (Linaceae). The type locality for this species is from an 1863 Bolander collection in Marin County, California (Small et al. 1907). The etymology of *Hesperolinon* is from the Greek words ‘hesperos’ meaning western and ‘linos’, meaning flax (McDill in Baldwin et al. 2012).



Marin western flax in bud (left) and in bloom (right) on the Bowman Canyon property.

Marin western flax grows to about 2 to 5.9 inches (5 to 15 centimeters) tall and is generally branched throughout (McDill in Baldwin et al. 2012). It has well developed stipule glands with red exudate, and linear leaves that are more or less glabrous (Ibid.). It has dense, pedicelled inflorescences with 0.12 to 0.16 inch (3 to 4 millimeters) hairy sepals that are minutely glandular on the margins, and 0.12 to 0.32 inch (3 to 8 millimeters) petals that are pink to rose (Ibid.). Marin western flax is differentiated from other species in the genus by its dense inflorescence of rose to pink flowers and its hairy sepals (Ibid.). This species flowers from April to July (CNPS 2019).

It is supported by serpentine soils in chaparral and valley and foothill grassland at elevations between 16 and 1,200 feet (5 and 366 meters) (CNPS 2019). It is recorded as being distributed in Marin, San Mateo, and San Francisco counties (Ibid.).



Serpentine grassland supporting Marin western flax.

Occurrence Data and Habitat Characteristics

There are no known records of Marin western flax within the study area based on information from the CNDDDB (CDFW 2019c). The nearest CNDDDB occurrence (EONDX #91970) is a nonspecific location southwest of Burdell Mountain, approximately 0.14 miles east of the study area (but 0.5 miles from Hescon1). This occurrence does not contain a population estimate, although occurrence information notes plants were observed in 2009.

During surveys on June 20, 2019, a single population of Marin western flax was recorded within the study area in the serpentine grassland on the north end of the Bowman Canyon property (Figure 4, Table 10). A total of approximately 920 individuals are represented by this occurrence determined by direct population count.

Table 10. Marin Western Flax Populations Recorded in 2019

POPULATION NUMBER	GENERAL LOCATION	EXISTING CNDDDB POPULATION	NUMBER OF INDIVIDUALS
Hescon1	N end of Bowman property, in serpentine grassland.	No	920 ⁺

⁺ Number of individuals determined by direct population count.

Population Hescon1 was found on shallow, well drained stony clay loam soils (Henneke soil series) with underlying serpentine geology (SoilWeb 2019; Blake et al. 1999). The habitat supporting these plants is serpentine grassland on a fairly steep north facing slope between 344 and 535 feet (105 to 163 meters). This grassland had high native integrity with common associates including: Douglas' sandwort (*Minuartia douglasii*), purple needlegrass, gold back fern, Tiburon buckwheat, needle goldfields (*Lasthenia gracilis*), slender cottonweed (*Micropus californicus* var. *californicus*), small fescue, Muhlenberg's centaury (*Zeltnera muehlenbergii*), bluehead gilia, harvest brodiaea (*Brodiaea elegans* subsp. *elegans*), hayfield tarweed (*Hemizonia congesta* subsp. *lutescens*), big squirreltail (*Elymus multisetus*), slender clarkia (*Clarkia gracilis* subsp. *gracilis*), nit grass (*Gastridium phleoides**), and yellow mariposa lily (*Calochortus luteus*).

Threats and Management Considerations

Current threats to Marin western flax include residential and recreational development, non-native plants, foot traffic, and potentially hydrological alterations (CNPS 2019; USFWS 2011). Within the study area, the habitat supporting Marin western flax was excellent quality overall, however, a road containing barbed

goatgrass (*Aegilops triuncialis**) runs alongside one edge of the population. Management considerations should include control of barbed goatgrass* through hand removal, herbicide use, and/or moderate grazing.

4.2.2 CALIFORNIA RARE PLANT RANK SPECIES

Based on the field investigations, review of available databases and literature, familiarity with local flora, and on-site habitat suitability, four California Rare Plant Rank species were observed within the study area: Franciscan onion, Napa false indigo, Tiburon buckwheat, and Lobb's aquatic buttercup. A brief description of these species, their habitat requirements, occurrence information, and threats and management considerations are discussed below. CNDDB field survey forms for these occurrences appear in Appendix B.

Franciscan Onion (*Allium peninsulare* var. *franciscanum*)

Status, Distribution and Habitat Requirements

Franciscan onion [*Allium peninsulare* var. *franciscanum* D. McNeal & Ownbey] has a California Rare Plant Rank of 1B.2 indicating that it is rare in California and elsewhere and is moderately threatened throughout its range (CNPS 2019). It is an herbaceous perennial bulbiferous species of the onion family (Alliaceae). The type locality is from Jasper Ridge Experimental Area in San Mateo County, California (McNeal 1992). The etymology of *Allium* genus is from the Latin word meaning 'garlic' (McNeal & Jacobsen in Baldwin et al. 2012).

Franciscan onion reaches heights of 17.7 inches (45 centimeters), has ≥ 2 leaves per stem, and an umbel of 3 to many flowers with 3 minute, 2-lobed crests on the ovaries (McNeal & Jacobsen in Baldwin et al. 2012). Its bulb reaches diameters of 0.32 to 0.59 inches (8 to 15 millimeters), is ovoid to more or less spheric, and has outer coat cells that are transversely elongate in a herringbone pattern (Ibid.). It differs from the more common *A. p.* var. *peninsulare* in range, having curved leaves, slightly smaller flowers, and an unlobed stigma (Ibid.). This species blooms from May to June, sometimes as early as April (CNPS 2019).

Franciscan onion inhabits clay, volcanic, and serpentine substrates in cismontane woodland and valley and foothill grassland at elevations between 171 and 1,000 feet (52 and 305 meters) (CNPS 2019). It is recorded as occurring in Mendocino, Napa, Santa Clara, San Mateo, and Sonoma counties (Ibid.).

Occurrence Data and Habitat Characteristics

There are no known records of Franciscan onion within the study area nor for Marin County. The nearest CNDDB occurrence (EONDX #45129) is a nonspecific occurrence located approximately 5.5 miles north of the study area in the vicinity of Petaluma. This occurrence is based on an 1880 Congdon collection.

During surveys on May 10, 2019, a single population of Franciscan onion was recorded within the study area on the southeastern edge of the property (Figure 4, Table 11). A total of 129 individuals are represented by this occurrence determined by direct population count.

Table 11. Franciscan Onion Populations Recorded in 2019

POPULATION NUMBER	GENERAL LOCATION	EXISTING CNDDB POPULATION	NUMBER OF INDIVIDUALS
Allpenfra1	SE edge of Bowman property	No	129 ⁺

⁺ Number of individuals determined by direct population count.

Population Allpenfra1 was found on well and somewhat excessively drained loamy to fine-loamy soils weathered from sandstone, shale, and basic igneous and metamorphic rocks (Tocaloma-McMullin complex) with underlying geology consisting of a mélange of fragmented and sheared Franciscan complex

rocks (SoilWeb 2019; Blake et al. 1999). The habitat supporting this population is the understory of Oak-Bay woodland on a fairly steep west to northwest facing slope with weak serpentine influence. The population spanned elevations between 335 and 436 feet (102 to 133 meters). Associates include Kellogg's tauschia (*Tauschia kelloggii*), Torrey's melic grass (*Melica torreyana*), poison oak, pacific sanicle, and Napa false indigo.

Threats and Management Considerations

The CNPS Inventory indicates that this species is threatened by development, foot traffic, non-native plants, and trail maintenance (CNPS 2019). Within the study area, Franciscan onion is not threatened by development, and is far from trails and roads on the preserve. The habitat supporting this species has high native integrity, and no signs of cattle damage or any other threats or disturbances were observed.

Napa False Indigo (*Amorpha californica* var. *napensis*)

Status, Distribution and Habitat Requirements

Napa false indigo [*Amorpha californica* Nutt. var. *napensis* Jeps.] has a California Rare Plant Rank of 1B.2 indicating it is rare in California and elsewhere and is moderately threatened throughout its range (CNPS 2019). This is a shrub species of the legume family (Fabaceae). The type locality this species of a 1916 Jepson collection from Howell Mountain (JFP 2019). The etymology of *Amorpha* comes from the Greek word for deformed, referring to the single-petaled flowers (Boyd and Isely in Baldwin et al. 2012).

Napa false indigo is a deciduous shrub with odd pinnate leaves containing prickly-like glands along the main axis (Boyd and Isely in Baldwin et al. 2012). The leaflet midribs generally end as sessile, head-like glands (Ibid.). The inflorescences are spike-like and terminal, generally one per stem tip (Ibid.). This taxon has purple flowers with corollas reduced to a single petal forming the banner and 10 exserted stamens that are fused near the base (Ibid.). It is distinguished from other taxa in the genus by being glabrous, having prickly-like glands on leaf axes, and having shorter calyx lobes (longest calyx lobe 0.5 to 1 mm) (Ibid.). This taxon flowers from April to July (CNPS 2019).

Napa false indigo usually inhabits openings in broadleaved upland forest, as well as chaparral, and cismontane woodland between 394 and 6,562 feet (120 and 2,000 meters) (CNPS 2019). It is a California endemic that is reported as occurring in Lake, Monterey, Marin, Napa, and Sonoma counties (Ibid.).



Napa false indigo on the Bowman property.

Occurrence Data and Habitat Characteristics

There are no previously known CNDDDB occurrences within the study area. The nearest CNDDDB occurrence (EONDX #45288) is a nonspecific occurrence located 1.1 miles northeast of the study area in Olompali State Historic Park. An unknown number of plants were last seen in 2016 according to CNDDDB.

During surveys on May 10, 2019, a single population of Napa false indigo was recorded within the study area on the southeastern edge of the Bowman Canyon property (Figure 4, Table 12). A total of approximately 246 individuals are represented by this occurrence determined by direct population count.

Table 12. Napa False Indigo Populations Recorded in 2019

POPULATION NUMBER	GENERAL LOCATION	EXISTING CNDDDB POPULATION	NUMBER OF INDIVIDUALS
Amocalnap1	SE edge of Bowman property	No	246 ⁺

⁺ Number of individuals determined by direct population count.

Population Amocalnap1 was found on well and somewhat excessively drained loamy to fine-loamy soils weathered from sandstone, shale, and basic igneous and metamorphic rocks (Tocaloma-McMullin complex) with underlying geology consisting of a mélange of fragmented and sheared Franciscan complex rocks (SoilWeb 2019; Blake et al. 1999). The habitat supporting this population is the understory of Oak-Bay woodland on a west, northwest facing, fairly steep slope. These plants occurred just beyond the chaparral ecotone between 315 and 571 feet (96 and 174 meters). This habitat had high native integrity with associates including California bay, coast live oak, Kellogg's tauschia (*Tauschia kelloggii*), Torrey's melic grass (*Melica torreyana*), poison oak, pacific sanicle, and bush monkeyflower.

Threats and Management Considerations

The CNPS Inventory (CNPS 2019) indicates that this species is potentially threatened by development, habitat alteration, and road maintenance. In the study area, Napa false indigo is not threatened by development, and is far from trails and roads on the preserve. No signs of cattle damage, or any other threats or disturbances were observed.

Tiburon buckwheat (*Eriogonum luteolum* var. *caninum*)

Status, Distribution and Habitat Requirements

Tiburon buckwheat [*Eriogonum luteolum* Greene var. *caninum* (Greene) Reveal.] has a California Rare Plant Rank of 1B.2 indicating it is rare in California and elsewhere and is moderately threatened throughout its range (CNPS 2019). This is an annual species of the buckwheat family (Polygonaceae). The type locality for this species is from the dry hills in Tiburon, California (Abrams 1955). The etymology of *Eriogonum* is Greek for woolly knees, referring to the hairy nodes of the first named species in the genus (Reveal and Rosatti in Baldwin et al. 2012).

Tiburon buckwheat is a glabrous annual herb reaching 2.0 to 11.8 inches (5 to 30 cm) (Reveal and Rosatti in Baldwin et al. 2012). The stems are generally prostrate to weakly erect with basal and cauline leaves with wide blades (Ibid.). The inflorescences are 1.2 to 11.8 inches (3 to 30 cm), with sessile involucre 0.12 to 0.16 inches (3 to 4 mm) in length (Ibid.). The flowers of this taxon are 0.06 to 0.10 inches (1.5 to 2.5 mm) and colored white to rose (Ibid.). It has glabrous fruits that are 0.055 to 0.063 inches (1.4 to 1.6 mm) (Ibid.). The treatment by Reveal restricts var. *caninum* to Marin and Alameda counties and indicates that this taxon merges with var. *luteolum* to the north and west of Mt. Tamalpais (Reveal 1989, CNPS 2019). Tiburon buckwheat flowers from May to September (CNPS 2019).

This taxon usually occupies chaparral, cismontane woodland, coastal prairie, and valley and foothill grassland on serpentine and sandy to gravelly soils between 0 and 2,297 feet (0 and 700 meters) (CNPS 2019). It is a California endemic that is reported as occurring in Alameda, Contra Costa, and Marin counties (Ibid.). It may have occurred in Sonoma County but is presumed extirpated if once present (Ibid.).



Tiburon buckwheat in flower on the Bowman property.

Occurrence Data and Habitat Characteristics

There is one previously known record of Tiburon buckwheat within the study area based on information from the CNDDB (CDFW 2019c). CNDDB occurrence EONDX #94377 is a nonspecific location in the central-north part of Mt. Burdell Open Space Preserve. This occurrence does not contain a population estimate and has not been revisited since 2007 (according to CNDDB records).

During surveys on June 20, 2019, a single population of Tiburon buckwheat was recorded within the study area in the serpentine grassland on the northern end of the Bowman Canyon property (Figure 4, Table 13). This population coincides with and expands the area for the existing CNDDDB record EONDY #94377. A total of approximately 28,550 individuals are represented by this occurrence, determined by visual estimate. The morphology exhibited by some of the individuals of this population did in fact appear to be intermediates between var. *luteolum* and var. *caninum* as indicated in the Jepson Manual treatment. However, this population is treated as var. *caninum* as a whole for conservation and stewardship purposes.

Table 13. Tiburon Buckwheat Populations Recorded in 2019

POPULATION NUMBER	GENERAL LOCATION	EXISTING CNDDDB POPULATION	NUMBER OF INDIVIDUALS
Erilutcan1	N end of Bowman property, in serpentine grassland.	94377	28,550 [^]

[^] Number of individuals determined by visual estimate

Population Erilutcan1 was found on shallow, well drained stony clay loam soils (Henneke soil series) with underlying serpentine geology (SoilWeb 2019; Blake et al. 1999). The habitat supporting these plants is a serpentine outcrop surrounded by purple needlegrass grassland on a north facing slope between 394 and 591 feet (120 to 180 meters). These plants were found growing with Marin western flax, Douglas' sandwort, purple needlegrass, gold back fern, needle goldfields, slender cottonweed, small fescue, Muhlenberg's centaury, bluehead gilia, harvest brodiaea, hayfield tarweed, big squirreltail (*Elymus multisetus*), slender clarkia (*Clarkia gracilis* subsp. *sonomensis*), nit grass, and yellow mariposa lily (*Calochortus luteus*).



Serpentine grassland supporting Tiburon buckwheat on the Bowman property.

Threats and Management Considerations

The CNPS Inventory (CNPS 2019) indicates that this species is threatened by development, foot traffic, and non-native plants. As with Hescon1, the serpentine grassland itself has very high native integrity, but is threatened by barbed goatgrass* growing in the road to the west which should be managed.

Lobb's Aquatic Buttercup (*Ranunculus lobbii*)

Status, Distribution and Habitat Requirements

Lobb's aquatic buttercup [*Ranunculus lobbii* (Hiern) A. Gray] has a California Rare Plant Rank of 4.2 indicating it has limited distribution and is moderately endangered in California (CNPS 2019). This is an annual species of the buttercup family (Ranunculaceae). The type locality for this species is given as Oregon (Abrams 1955). The etymology of *Ranunculus* is a Latin diminutive of *Rana*, meaning frog, for the wet habitats inhabited by many species in the genus (Whittemore in Baldwin et al. 2012).

This species grows to a height of 2.0 to 11.8 inches (20 to 80 cm) and has a floating habit with no roots or creeping on mud and rooting at nodes (Whittemore in Baldwin et al. 2012). Floating leaves are 0.20 to 0.31 inches (0.5 to 0.8 cm) long and 0.35 to 0.59 inches (0.9 to 1.5 cm) wide, reniform, and deeply three-parted with elliptic or obovate segments. Submersed leaves are generally 2-3 times dissected, petioled, with reduced stipules fused to the stem. Flowers have glabrous receptacles, five spreading sepals that are deciduous, five white petals 0.16 to 0.24 inches (4 to 6 mm), sometimes with yellow claws, and long styles that are 0.04 to 0.06 inches (1 to 1.5 mm). This taxon has 2 to 6 fruits, each 0.08 to 0.09 inches (2 to 2.4 mm) long and 0.06 to 0.07 inches (1.4 to 1.8 mm) wide, and are lenticular, transversely wrinkled, and with deciduous beaks. Lobb's aquatic buttercup flowers from February to May (CNPS 2019).

This taxon usually occupies mesic sites in cismontane woodland, north coast coniferous forest, valley and foothill grassland, and vernal pools between 49 and 1,542 feet (15 and 470 meters) (CNPS 2019). It is reported as occurring in Alameda, Contra Costa, Mendocino, Marin, Napa, Solano, and Sonoma counties (Ibid.). It may have also once occurred in Santa Cruz and San Mateo counties but is presumed extirpated if once present (Ibid.).



Lobb's aquatic buttercup in flower on the Bowman property.

Occurrence Data and Habitat Characteristics

There are no known records of Lobb's aquatic buttercup within the study area based on information from the CCH (2019). The nearest record is a 1946 Howell collection (CAS-BOT-BC83443) from Ignacio in Novato.

During surveys on April 10, 2019, a single population of Lobb's aquatic buttercup was recorded within the study area in a seasonal wetland on the southwestern end of the Bowman Canyon property (Figure 4, Table

14). A total of approximately 50 individuals are represented by this occurrence, determined by visual estimate.

Table 14. Lobb's Aquatic Buttercup Populations Recorded in 2019

POPULATION NUMBER	GENERAL LOCATION	EXISTING CNDDDB POPULATION	NUMBER OF INDIVIDUALS
Ranlob1	SW end of Bowman property	No	50 [^]

[^] Number of individuals determined by visual estimate

Population Ranlob1 was found on shallow to moderately deep, well drained to somewhat excessively drained, loamy to fine-loamy soils formed in material weathered from sandstone and shale (Saurin-Bonnydoon complex) with underlying geology consisting of a mélange of fragmented and sheared Franciscan complex rocks (SoilWeb 2019; Blake et al. 1999). The habitat supporting these plants is a small seep-fed artificial pond on the margin of live oak woodland in open grassland on a west facing slope. Plants were growing on the west and downstream side of the pond, whose dimensions were approximately 60 x 30 feet at the time of surveys. Found growing with manna grass (*Glyceria* sp.), creeping spikerush (*Eleocharis macrostachya*), spiny buttercup (*Ranunculus muricatus**), pennyroyal*, and western water plantain (*Alisma triviale*).

Threats and Management Considerations

The CNPS Inventory (CNPS 2019) indicates that this species is threatened by urbanization, habitat alteration, agriculture, and development. Within the study area, potential threats include failure of the earthen dam, which, is showing signs of erosion. Alteration to water retention in the pond could pose a threat to this population in the future. Additionally, there is potential for manna grass to choke out native diversity in the pond. Management considerations should include repairs to the dam and control of manna grass through hand pulling or selective herbicide use.

4.2.3 LOCALLY RARE PLANT SPECIES

As consistent with CEQA's Article 9 and Guidelines §15125(a) and §15380, which state that "special emphasis should be placed on environmental resources that are rare or unique to that region" and CNPS's goal of preserving plant biodiversity on a regional and local scale, this study also assessed the occurrence of locally significant plant species. Locally significant plant species are those considered to be at the outer limits of their known distribution, a range extension, a rediscovery, or rare or uncommon in a local context (CNPS 2001). These species are not regarded as special status species by the USFWS or CDFW and are therefore not tracked by these agencies. However, a list of locally rare plants is maintained by local floristic expert Doreen Smith.

Based on the results of the 2019 surveys a total of 4 locally rare plant species were observed within the study area. These species are Sonoma clarkia, California filago, oak mistletoe, and thymeleaf mesa mint. Table 15 summarizes the general locations of these taxa in the study area. These species should be considered in local planning and management efforts, however including them in environmental review documents is up to the discretion of the lead agency.

Table 15. Locally Rare Plant Species Observed within the Study Area

SCIENTIFIC NAME	COMMON NAME	GENERAL LOCATIONS
<i>Clarkia gracilis</i> subsp. <i>sonomensis</i>	Sonoma clarkia	Serpentine Grassland at N end of study area
<i>Logfia filaginoides</i>	California filago	Serpentine Grassland at N end of study area
<i>Phoradendron leucarpum</i> subsp. <i>tomentosum</i>	oak mistletoe	Serpentine Grassland at N end of study area
<i>Pogogyne serpylloides</i>	thymeleaf mesa mint	California Sagebrush Scrub E of central access road, S of summit

Sonoma Clarkia (*Clarkia gracilis* subsp. *sonomensis*)

Sonoma Clarkia [*Clarkia gracilis* (Piper) A. Nelson & J.F. Macbr. subsp. *sonomensis* (C.L. Hitchc.) H. Lewis & M. Lewis] is an annual species in the evening-primrose family (Onagraceae). The type locality for this species is from near Glen Ellen, Sonoma County, California (Abrams 1955). The etymology for the genus *Clarkia* is from Captain William Clark of the Lewis and Clark Expedition (Lewis in Baldwin et al. 2012). Sonoma clarkia occurs in openings in woodland and forests below 1,640 feet (500 meters) (Ibid.). It has been collected from the North Coast Ranges and Central Coast subregions (JFP 2019).

Within the study area, this species was found on an outcrop within the Serpentine Grassland at the northern end of Bowman Canyon. This vegetation community had high native integrity and supported multiple special status plant species. No immediate ecological stressors were observed, but barbed goatgrass* was found growing nearby in the road. If it continues to spread, this invasive species could eventually threaten Sonoma Clarkia and other species in the Serpentine Grassland. Management consideration should include control of barbed goatgrass* through hand removal, herbicide use, and/or moderate grazing.

California Cottonrose (*Logfia filaginoides*)

California cottonrose [*Logfia filaginoides* (Hook. & Arn.) Morefield] is an annual species of the sunflower family (Asteraceae). The type locality for this species is given as near Santa Barbara, California (Abrams 1955). The etymology for the genus *Logfia* is an anagram of *Filago*, which, comes from Latin meaning with threads, for woolly hairs (Morefield in Baldwin et al. 2012). California cottonrose is common, more or less weedy, and occurs in bare, rocky, or grassy sites and drainages below 5,906 feet (1,800 meters) (Morefield in Baldwin et al. 2012). It is especially abundant after fires. It has been collected throughout the California Floristic Province, East of Sierra Nevada, and Desert Province (JFP 2019).

This species was found in Serpentine Grassland at the northern end of the study area. Individuals observed during 2019 surveys appeared stable and lacking ecological stressors. As already mentioned, an infestation of barbed goatgrass* poses a potential threat to the serpentine grassland and should be considered a management priority.

Oak Mistletoe (*Phoradendron leucarpum* subsp. *tomentosum*)

Oak mistletoe [*Phoradendron leucarpum* (Raf.) Reveal & M.C. Johnst. *tomentosum* (DC.) J.R. Abbott & R.L. Thomps.] is a perennial species of the mistletoe family (Viscaceae). The type locality for this species is from San Luis Potosí, Mexico (Tropicos 2019). The etymology for the genus *Phoradendron* is from Greek meaning tree thief (Kuijt in Baldwin et al. 2012). Oak mistletoe is generally found on *Quercus*, rarely on *Adenostoma*, *Arctostaphylos*, *Cercocarpus ledifolius*, *Rhus*, or *Umbellularia* at elevations between 197 and 6,890 feet (60 to 2,100 meters) (Ibid.). It has been collected from throughout the California Floristic

Province except for the North Coast and Central Coast Subregions as well as the Mojave Desert region (JFP 2019).

This species was found on leather oak in Serpentine Grassland at the northern end of the study area. Plants observed during 2018 surveys appeared stable and lacking ecological stressors. No management considerations are necessary at this time.

Thymeleaf Mesa Mint (*Pogogyne serpylloides*)

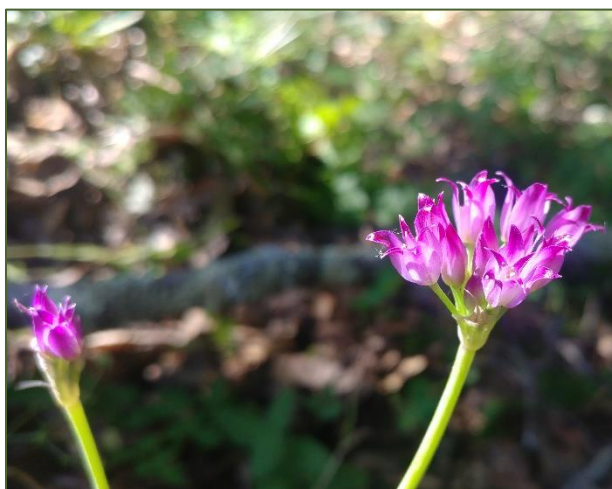
Thymeleaf mesa mint [*Pogogyne serpylloides* (Torr.) A.Gray] is an annual species of the mint family (Lamiaceae). The type locality for this species is from Martinez, Contra Costa County, California (Abrams 1955). The etymology for the genus *Pogogyne* is from Greek meaning bearded style (Silveira, Simpson and Jokerst in Baldwin et al. 2012). Thymeleaf mesa mint is inconspicuous and occurs in grassy or brushy areas below 3,938 feet (1,200 meters) (Ibid.). It has been collected from the North Coast Ranges, Sierra Nevada Foothills, Central Coast, San Francisco Bay Area, and South Coast Ranges subregions (JFP 2019).

This species was found in the understory of California Sagebrush Scrub, east of the main access road and south of the ridge summit. It is expected to occur elsewhere, in other Coastal Scrub habitat. Plants observed during 2018 surveys appeared stable and lacking ecological stressors. No management considerations are necessary at this time.

4.3. NOTEWORTHY COLLECTIONS

During the 2019 field surveys, any plant species occurrences that were considered significant, such as range extensions, new county records, or under-collected taxa, were collected as herbarium voucher specimens. A total of one noteworthy collection was made within the study area: San Francisco onion (*Allium peninsulare* var. *franciscanum*).

San Francisco onion was collected by Mr. Chasey on May 10, 2019 (collection #11) from Oak Woodland towards the northeastern corner of the study area. It was growing with San Joaquin tarweed, and senesced species typical of late season non-native grasslands. Based on the information available in CCH2 (2019), this taxon has not been previously collected in Marin County and would therefore be considered a new county record.



Collection #11 of San Francisco onion.

4.4. NOXIOUS/INVASIVE WEEDS

During this study, 66 (approximately 27%) of the plant species observed within the study area were non-native plant species. A non-native plant species is defined as a species that is occurring outside of its native distributional range having arrived here by human activity. Some of the non-native plant species encountered in the study area are tracked by the California Department of Food and Agriculture (CDFA 2019) and the California Invasive Plant Council (Cal-IPC 2019) due to their noxious, invasive, or weedy behavior. Species tracked by these organizations are given a certain rating based on criteria such as ecological impacts, treatment or eradication priority, and threats they pose to agricultural economics.

A total of 27 plant species with elevated threat rankings (e.g. Cal-IPC rating of Limited, Moderate, or High or on the California Noxious Weed List) were observed within the study area. Most of these species were observed in the Non-Native Grassland, although some were also found next to the Serpentine Grassland, in Northern Coastal Scrub, or in Seasonal Wetlands.

Of the non-native plant species tracked by Cal-IPC and CDFA, the following discussion only includes those that were dominant on the landscape in a given area, pose a potential threat to sensitive botanical resources, or have the potential to spread within the study area (Table 16). While other non-native plant species tracked by Cal-IPC and CDFA were observed within the study area and noted on the plant list (Appendix A), they were either too ubiquitous or do not currently pose a threat to sensitive botanical resources to warrant discussion here.

Table 16. Non-Native Species with Elevated Threat Rankings Observed in the Study Area

SPECIES NAME	COMMON NAME	California Invasive Plant Council Rank (Cal-IPC 2019)*	California Department of Food and Agriculture Noxious Weed List (CDFA 2019)**
<u>NOXIOUS/INVASIVE PLANTS OF CONCERN</u>			
<i>Aegilops triuncialis</i>	barbed goatgrass	High	On List
<i>Bromus madritensis</i> subsp. <i>rubens</i>	foxtail chess	High	---
<i>Centaurea melitensis</i>	tocalote	Moderate	---
<i>Centaurea solstitialis</i>	yellow star thistle	High	On List
<i>Elymus caput-medusae</i>	medusahead grass	High	On List
<u>OTHER NON-NATIVE SPECIES WITH ELEVATED RANKINGS</u>			
<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i>	Italian thistle	Moderate	---
<i>Avena barbata</i>	slender oats	Moderate	---
<i>Brachypodium distachyon</i>	false brome	Moderate	---
<i>Briza maxima</i>	rattlesnake grass	Limited	---
<i>Bromus diandrus</i>	ripgut brome	Moderate	---
<i>Bromus hordeaceus</i>	soft chess	Limited	---
<i>Cynosurus echinatus</i>	dogtail grass	Moderate	---
<i>Erodium cicutarium</i>	red-stemmed filaree	Limited	---
<i>Geranium dissectum</i>	cut-leaf geranium	Moderate	---
<i>Hordeum marinum</i> subsp. <i>gussoneanum</i>	Mediterranean barley	Moderate	---

SPECIES NAME	COMMON NAME	California Invasive Plant Council Rank (Cal-IPC 2019)*	California Department of Food and Agriculture Noxious Weed List (CDFA 2019)**
<i>Hordeum murinum</i> subsp. <i>leporinum</i>	hare barley	Moderate	---
<i>Hypochaeris glabra</i>	smooth cat's ear	Limited	---
<i>Hypochaeris radicata</i>	rough cat's ear	Moderate	---
<i>Lythrum hyssopifolia</i>	hyssop loostripe	Limited	---
<i>Medicago polymorpha</i>	burclover	Limited	---
<i>Mentha pulegium</i>	pennyroyal	Moderate	---
<i>Olea europaea</i>	olive	Limited	---
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	Limited	---
<i>Silybum marianum</i>	milk-thistle	Limited	---
<i>Rumex acetosella</i>	sheep sorrel	Moderate	---
<i>Torilis arvensis</i>	hedge parsley	Moderate	---
<i>Trifolium hirtum</i>	rose clover	Moderate	---

*Cal-IPC Weed Ranking Definitions:

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate: These species have substantial and apparent - but generally not severe - ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic (Cal-IPC 2019).

** Species considered a noxious weed by CDFA are listed on the California Noxious Weed List (CDFA 2019).

4.4.1 WEEDS OF CONCERN ON SITE

Barbed goatgrass (*Aegilops triuncialis**), tocalote (*Centaurea melitensis**), yellow star thistle (*Centaurea solstitialis**), and medusahead grass (*Elymus caput-medusae**) are weeds found on site that have the potential to cause significant impacts to native plant populations and are of particular concern to rare plant populations. Below is a brief description of these species and their general locations within the study area.

Barbed goatgrass (*Aegilops triuncialis*)

General Information

Barbed goatgrass is a winter annual in the grass family (Poaceae) with spikes that resemble those of winter wheat. This species is native to Mediterranean Europe and western Asia. Barbed goatgrass flowers from May to August and stays green in the summer after other annual grasses have turned yellow. The spikelet and its associated node and rachis is called a joint. Intact joints can persist on dried grass and disarticulated joints may remain on the ground. Barbed goatgrass inhabits dry, disturbed sites, fields, pastures, and roadsides but can also invade undisturbed grasslands and oak woodlands. It tolerates serpentine and hard, shallow, dry, gravelly soils (DiTomaso and Healy 2007).

Relevant Life History Traits

Barbed goatgrass reproduces by seeds. Spikes and joints fall near parent plants or disperse to greater

distances with water, human activities, vehicle tires, wind, and by ingestion or clinging to livestock (DiTomaso and Healy 2007).

Occurrence within the Study Area

Barbed goatgrass was observed in the road next to serpentine grassland where it could spread into adjacent natural habitat supporting two special status plant species (Marin western flax and Tiburon buckwheat). Due to the potential threat posed by this species, it is recommended as a target for control on site.

Tocalote (*Centaurea melitensis*)

General Information

Tocalote is an annual and occasionally a biennial in the sunflower family (Asteraceae). This species is called Malta starthistle outside of California. It is native to southern Europe. It is generally less prevalent than yellow starthistle statewide. Tocalote inhabits open disturbed sites, open hillsides, grassland, rangeland, open woodlands, fields, pastures, roadsides, wasteplaces, and cultivated fields (DiTomaso and Healy 2007).

Relevant Life History Traits

Tocalote reproduces by seed. Seed production is highly variable. Seeds fall near the parent plant and are dispersed short distances with wind and to greater distances with human activities, animals, water, mud, and soil movement. Most seeds germinate after the first fall rains. Plants exist as basal rosettes through winter and early spring until flower stems develop in late spring or early summer (DiTomaso and Healy 2007).

Occurrence within the Study Area

Tocalote was observed scattered throughout non-native grassland and in scrub patches. Field observations indicate that although this species is not dominant in the grasslands it does threaten the integrity of Native Grasslands in the study area. Due to the potential threat posed by this species, it is recommended as a target for control on site.

Yellow Star Thistle (*Centaurea solstitialis*)

General Information

Yellow star thistle is a winter annual and occasionally a biennial in the sunflower family (Asteraceae). Plants are highly competitive and typically develop dense, impenetrable stands that displace desirable vegetation in natural areas, rangelands, roadside, and other places. Yellow star thistle is considered one of the most serious rangeland weeds in the western United States. Yellow star thistle contains an unidentified compound that causes chewing disease in horses. Yellow star thistle inhabits open disturbed sites, open hillsides, grassland, rangeland, open woodlands, fields, pastures, roadsides, waste places, and cultivated fields (DiTomaso and Healy 2007).

Relevant Life History Traits

Yellow star thistle reproduces by seed. Seed head production is highly variable and depends on a variety of factors including soil moisture and competition. Seeds fall near the parent plant and are dispersed short distances with wind, and to greater distances with human activities, animals, water, mud, and soil movement. Large flushes of seeds typically germinate after the first fall rains, but smaller germination flushes can occur in winters and early spring. Shaded conditions reduce flower production and root growth. Plants exist as basal rosettes through winter and early spring until flower stems develop in late spring or early summer (DiTomaso and Healy 2007).

Occurrence within the Study Area

Yellow star thistle was observed scattered in non-native grassland and along the access road. Field observations indicate that this species is not dominant in the grasslands and may be a recent invader in the study area. Due to the potential threat posed by this species to Native Grasslands, it is recommended as a target for control on site.

Medusahead (*Elymus caput-medusae*)

General Information

Medusahead is an ascending to erect winter annual in the grass family (Poaceae). Medusahead is a noxious rangeland weed. Dense stands displace desirable vegetation and wildlife and lower livestock carrying capacity on rangeland. Medusahead matures at least 2-4 weeks later in the season than most other annual grasses and is highly visible from a distance after other annual grasses turn brown. Medusahead contains silica, which makes it unpalatable to livestock except during the early growth stages. The stiff awns and hard florets can injure the eyes, nostrils, and mouths of grazing animals. Senesced plants form a dense layer of thatch that takes 2 or more years to decompose. The thatch layer greatly reduces seed germination of other species and creates fuel for wildfires. It is native to Europe. It inhabits disturbed sites, grassland, rangeland, openings in chaparral, oak woodlands, and rarely, agronomic fields. Grows best on clay soils or where deep soil moisture is available late in the growing season (DiTomaso and Healy 2007).

Relevant Life History Traits

Medusahead reproduces by seed. Seed production is usually prolific. Seeds disperse locally with wind and water and to greater distances with human activities, soil movement, mud, and by clinging to machinery, tires, shoes, clothing, and to animals. Germination is typically rapid. Most seeds germinate in fall after the first rains but some seeds remain dormant and germinate in the winter or spring. Seeds can germinate in very high densities under low moisture conditions (DiTomaso and Healy 2007).

Occurrence within the Study Area

Medusahead was observed scattered in the non-native grassland. Field observations indicate that this species is not dominant in the grasslands and may be a recent invader in the study area. Due to the potential threat posed by this species to Native Grasslands and its ability to invade serpentine habitats, it is recommended as a target for control on site.

Section 5. SUMMARY

5.1. SUMMARY

The following table summarizes the results associated with the protocol-level botanical surveys for the Bowman Canyon baseline surveys and habitat assessment.

Table 17. Summary of Sensitive Communities and Special status Plants within the Study Area

SPECIES NAME/ COMMON NAME	STATUS ¹	NUMBER OF OCCURRENCES	NUMBER OF INDIVIDUALS	LOCATION IN THE STUDY AREA
<u>SENSITIVE NATURAL COMMUNITIES</u>				
<i>Baccharis pilularis</i> / <i>Stipa pulchra</i> Association	S3	N/A	N/A	On northern end of the study area.
<i>Juncus xiphioides</i> Herbaceous Alliance Iris-leaf rush seeps	S2?	N/A	N/A	In seeps feeding into the two unnamed streams and in pond on western end of the study area.
<i>Quercus lobata</i> Woodland Alliance Valley Oak Woodland	S3	N/A	N/A	On either side of the ridge, on the margins of California Bay Forest and Coast Live Oak Woodland.
<i>Quercus agrifolia</i> – <i>Umbellularia californica</i> Woodland Alliance Coast Live Oak – Bay Woodland	G3	N/A	N/A	On either side of the ridge, on the margins of California Bay Forest.
Seasonal Wetland	---	N/A	N/A	In seeps feeding into the two unnamed streams and in pond on western end of the study area.
<i>Stipa pulchra</i> Herbaceous Alliance	S3?	N/A	N/A	Scattered in Non-native Grassland on either side of the ridge.
<i>Stipa pulchra</i> Herbaceous Alliance (on serpentine)	S3?	N/A	N/A	On northern end of the study area.
<u>SPECIAL STATUS PLANTS</u>				
FEDERAL/STATE LISTED SPECIES				
<i>Hesperolinon congestum</i> Marin western flax	FT, ST, 1B.1	1	920	In serpentine grassland on northern end of the study area.
CALIFORNIA RARE PLANT RANK SPECIES				
<i>Allium peninsulare</i> var. <i>franciscanum</i>	1B.2	1		In California Bay Forest on eastern end of the study area.
<i>Amorpha californica</i> var. <i>napensis</i> Napa false indigo	1B.2	1	246	On margins of California Bay Forest and Chamise Chaparral on eastern end of the study area.
<i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	1B.2	1	2,8550	In serpentine grassland on northern end of the study area
<i>Ranunculus lobbii</i> Lobb's aquatic buttercup	4.2	1	50	In pond on western end of the study area.

¹Explanation of State and Federal Listing Codes

Subnational Conservation Status Ranks (Nature Serve 2019):

- S2 "Imperiled"
- S3 "Vulnerable"
- G3

Federal listing codes:

FT Federally listed as Threatened

California listing codes:

ST State listed as Threatened

California Native Plant Society codes:

- 1B Rare or Endangered in California and elsewhere
 - 4 Plants of limited distribution – Watch list
- California Native Plant Society threat codes:
- .1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
 - .2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

Section 6. REFERENCES

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APPENDIX A PLANT SPECIES OBSERVED ON SITE

BOWMAN CANYON PLANT LIST

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
FERNS					
Dryopteridaceae – Wood Fern Family					
<i>Dryopteris arguta</i>	wood fern	Native	---	---	---
Polypodiaceae – Polypody Family					
<i>Polypodium glycyrrhiza</i>	licorice fern	Native	HB	---	---
Pteridaceae – Brake Family					
<i>Adiantum jordanii</i>	California maidenhair fern	Native	---	---	---
<i>Pellaea andromedifolia</i>	coffee fern	Native	---	---	---
<i>Pellaea mucronata</i> var. <i>mucronata</i>	bird's foot fern	Native	---	---	---
<i>Pentagramma triangularis</i> subsp. <i>triangularis</i>	gold back fern	Native	---	---	---
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern	Native	---	---	---
MAGNOLIIDS					
Lauraceae – Laurel Family					
<i>Umbellularia californica</i>	California bay	Native	---	---	---
EUDICOTS					
Adoxaceae – Muskroot Family					
<i>Sambucus nigra</i> subsp. <i>caerulea</i>	blue elderberry	Native	---	---	---
Anacardiaceae – Sumac or Cashew Family					
<i>Toxicodendron diversilobum</i>	poison oak	Native	---	---	---
Apiaceae – Carrot Family					
<i>Anthriscus caucalis</i>	burchevril	Non-Native	---	---	---
<i>Daucus pusillus</i>	wild carrot	Native	---	---	---
<i>Lomatium macrocarpum</i>	bigseed biscuitroot	Native	---	---	---
<i>Lomatium utriculatum</i>	common lomatium	Native	---	---	---
<i>Osmorhiza berteroi</i>	sweet cicely	Native	---	---	---
<i>Perideridia kelloggii</i>	Kellogg's yampah	Native	---	---	---
<i>Sanicula bipinnata</i>	poison sanicle	Native	---	---	---
<i>Sanicula bipinnatifida</i>	purple sanicle	Native	---	---	---
<i>Sanicula crassicaulis</i>	Pacific sanicle	Native	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
<i>Sanicula tuberosa</i>	tuberous sanicle	Native	---	---	---
<i>Scandix pecten-veneris</i>	Sheperd's needle	Non-Native	---	---	---
<i>Tauschia kelloggii</i>	Kellogg's tauschia	Native	---	---	---
<i>Torilis arvensis</i>	hedge parsley	Non-Native	---	Moderate	---
<i>Torilis nodosa</i>	knotted-hedge parsley	Non-Native	---	---	---
Asteraceae – Sunflower Family					
<i>Achillea millefolium</i>	yarrow	Native	---	---	---
<i>Achyraea mollis</i>	blow-wives	Native	---	---	---
<i>Agoseris grandiflora</i> var. <i>grandiflora</i>	bigflower agoseris	Native	---	---	---
<i>Agoseris heterophylla</i> var. <i>heterophylla</i>	annual agoseris	Native	---	---	---
<i>Artemisia californica</i>	California sagebrush	Native	---	---	---
<i>Artemisia douglasiana</i>	mugwort	Native	---	---	---
<i>Baccharis pilularis</i> subsp. <i>consanguinea</i>	coyote brush	Native	---	---	---
<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i>	Italian thistle	Non-Native	---	Moderate	On List
<i>Centaurea melitensis</i>	totalote	Non-Native	---	Moderate	---
<i>Centaurea solstitialis</i>	yellow star thistle	Non-Native	---	High	On List
<i>Cirsium occidentale</i> var. <i>venustum</i>	venus thistle	Native	---	---	---
<i>Eurybia radulina</i>	roughleaf aster	Native	---	---	---
<i>Gamochaeta ustulata</i>	featherweed	Native	---	---	---
<i>Hemizonia congesta</i> subsp. <i>lutescens</i>	hayfield tarweed	Native	---	---	---
<i>Hesperis sparsiflora</i> var. <i>sparsiflora</i>	few-flowered evax	Native	---	---	---
<i>Hypochaeris glabra</i>	smooth cat's ear	Non-Native	---	Limited	---
<i>Hypochaeris radicata</i>	rough cat's ear	Non-Native	---	Moderate	---
<i>Lactuca saligna</i>	willowleaf lettuce	Non-Native	---	---	---
<i>Lactuca serriola</i>	prickly lettuce	Non-Native	---	---	---
<i>Lasthenia gracilis</i>	needle goldfields	Native	---	---	---
<i>Logfia filaginoides</i>	California filago	Native	---	---	---
<i>Logfia gallica</i>	narrowleaf cottonrose	Non-Native	---	---	---
<i>Madia elegans</i>	common madia	Native	---	---	---
<i>Madia exigua</i>	small tarweed	Native	---	---	---
<i>Madia gracilis</i>	slender tarweed	Native	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
<i>Micropus californicus</i> var. <i>californicus</i>	slender cottonweed	Native	---	---	---
<i>Micropus californicus</i> var. <i>subvestitus</i>	slender cottonweed	Native	---	---	---
<i>Microseris douglasii</i> subsp. <i>douglasii</i>	silver puffs	Native	---	---	---
<i>Pseudognaphalium californicum</i>	ladies tobacco	Native	---	---	---
<i>Psilocarphus tenellus</i>	slender woolly marbles	Native	---	---	---
<i>Rigiopappus leptocladus</i>	wire weed	Native	---	---	---
<i>Senecio aronicoides</i>	rayless ragwort	Native	---	---	---
<i>Senecio vulgaris</i>	groundsel	Non-Native	---	---	---
<i>Silybum marianum</i>	milk-thistle	Non-Native	---	Limited	---
<i>Soliva sessilis</i>	common soliva	Non-Native	---	---	---
<i>Sonchus oleraceus</i>	common sowthistle	Non-Native	---	---	---
<i>Uropappus lindleyi</i>	silverpuffs	Native	---	---	---
<i>Wyethia angustifolia</i>	narrowleaf mule ears	Native	---	---	---
Boraginaceae – Borage or Waterleaf Family					
<i>Amsinckia intermedia</i>	common fiddleneck	Native	---	---	---
<i>Cryptantha flaccida</i>	pale cryptantha	Native	---	---	---
<i>Cynoglossum grande</i>	hound's tongue	Native	---	---	---
<i>Nemophila heterophylla</i>	canyon nemophila	Native	---	---	---
<i>Plagiobothrys nothofulvus</i>	popcorn flower	Native	---	---	---
Brassicaceae – Mustard Family					
<i>Athysanus pusillus</i>	common sandweed	Native	---	---	---
<i>Cardamine californica</i>	milk maids	Native	---	---	---
<i>Cardamine oligosperma</i>	bitter cress	Native	---	---	---
<i>Caulanthus lasiophyllus</i>	California mustard	Native	---	---	---
<i>Lepidium nitidum</i>	shining peppergrass	Native	---	---	---
<i>Thysanocarpus curvipes</i> var. <i>curvipes</i>	fringepod	Native	---	---	---
<i>Thysanocarpus laciniatus</i>	fringe pod	Native	---	---	---
Caprifoliaceae – Honeysuckle Family					
<i>Lonicera hispidula</i>	California honeysuckle	Native	---	---	---
<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	snowberry	Native	---	---	---
<i>Symphoricarpos mollis</i>	creeping snowberry	Native	---	---	---
Caryophyllaceae – Pink Family					

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	C DFA RATING
<i>Cerastium glomeratum</i>	mouse-ear chickweed	Non-Native	---	---	---
<i>Minuartia douglasii</i>	Douglas' sandwort	Native	---	---	---
<i>Silene gallica</i>	windmill pink	Non-Native	HB	---	---
<i>Spergularia rubra</i>	sandspurrey	Non-Native	---	---	---
<i>Stellaria media</i>	common chickweed	Non-Native	---	---	---
<i>Stellaria nitens</i>	smooth chickweed	Native	---	---	---
Crassulaceae – Stonecrop Family					
<i>Crassula connata</i>	pygmyweed	Native	---	---	---
<i>Dudleya cymosa</i> subsp. <i>cymosa</i>	canyon liveforever	Native	---	---	---
Euphorbiaceae – Spurge Family					
<i>Croton setiger</i>	turkey mullein	Native	---	---	---
<i>Euphorbia spathulata</i>	warty spurge	Native	---	---	---
Fabaceae – Pea Family					
<i>Acmispon wrangelianus</i>	calf lotus	Native	---	---	---
<i>Amorpha californica</i> var. <i>napensis</i> (CRPR 1B.2)	Napa false indigo	Native	---	---	---
<i>Astragalus gambelianus</i>	Gambel's dwarf milk vetch	Native	---	---	---
<i>Lotus corniculatus</i>	birdfoot trefoil	Non-Native	---	---	---
<i>Lupinus bicolor</i>	dove lupine	Native	---	---	---
<i>Medicago polymorpha</i>	burclover	Non-Native	---	Limited	---
<i>Rupertia physodes</i>	California tea	Native	---	---	---
<i>Trifolium albopurpureum</i>	branched Indian clover	Native	---	---	---
<i>Trifolium bifidum</i> var. <i>decipiens</i>	pinhole clover	Native	---	---	---
<i>Trifolium ciliolatum</i>	tree clover	Native	---	---	---
<i>Trifolium depauperatum</i> var. <i>truncatum</i>	dwarf sac clover	Native	---	---	---
<i>Trifolium dubium</i>	shamrock clover	Non-Native	---	---	---
<i>Trifolium fragiferum</i>	strawberry clover	Non-Native	---	---	---
<i>Trifolium glomeratum</i>	clustered clover	Non-Native	---	---	---
<i>Trifolium hirtum</i>	rose clover	Non-Native	---	Moderate	---
<i>Trifolium microcephalum</i>	hairy clover	Native	---	---	---
<i>Trifolium microdon</i>	thimble clover	Native	---	---	---
<i>Trifolium subterraneum</i>	subterranean clover	Non-Native	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
<i>Trifolium variegatum</i> var. <i>variegatum</i>	variegated clover	Native	---	---	---
<i>Trifolium willdenovii</i>	tomcat clover	Native	---	---	---
<i>Vicia americana</i> subsp. <i>americana</i>	American vetch	Native	---	---	---
<i>Vicia sativa</i> subsp. <i>nigra</i>	spring vetch	Non-Native	---	---	---
<i>Vicia sativa</i> subsp. <i>sativa</i>	spring vetch	Non-Native	---	---	---
<i>Vicia villosa</i> subsp. <i>villosa</i>	woolly vetch	Non-Native	---	---	---
Fagaceae – Oak Family					
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	coast live oak	Native	---	---	---
<i>Quercus chrysolepis</i>	canyon live oak	Native	---	---	---
<i>Quercus durata</i> var. <i>durata</i>	leather oak	Native	---	---	---
<i>Quercus kelloggii</i>	black oak	Native	---	---	---
<i>Quercus lobata</i>	valley oak	Native	---	---	---
Gentianaceae – Gentian Family					
<i>Cicendia quadrangularis</i>	common microcalis	Native	---	---	---
<i>Zeltnera muehlenbergii</i>	Muhlenberg's centaury	Native	---	---	---
Geraniaceae – Geranium Family					
<i>Erodium botrys</i>	long-beaked filaree	Non-Native	---	---	---
<i>Erodium cicutarium</i>	red-stemmed filaree	Non-Native	---	Limited	---
<i>Erodium moschatum</i>	white-stem filaree	Non-Native	---	---	---
<i>Geranium dissectum</i>	cut-leaf geranium	Non-Native	---	Moderate	---
<i>Geranium molle</i>	dovefoot geranium	Non-Native	---	---	---
Grossulariaceae – Gooseberry Family					
<i>Ribes californicum</i> var. <i>californicum</i>	California gooseberry	Native	---	---	---
Lamiaceae – Mint Family					
<i>Mentha pulegium</i>	pennyroyal	Non-Native	---	Moderate	---
<i>Monardella villosa</i> subsp. <i>villosa</i>	coyote mint	Native	---	---	---
<i>Pogogyne serpylloides</i>	thymeleaf mesa mint	Native	---	---	---
<i>Scutellaria californica</i>	California skullcap	Native	---	---	---
<i>Scutellaria tuberosa</i>	common skullcap	Native	---	---	---
<i>Stachys rigida</i> var. <i>quercetorum</i>	hedge nettle	Native	---	---	---
Linaceae – Flax Family					
<i>Hesperolinon congestum</i> (FT, ST, CRPR 1B.1)	Marin western flax	Native	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
Lythraceae – Loosestrife Family					
<i>Lythrum hyssopifolia</i>	hyssop loosestrife	Non-Native	---	Limited	---
Malvaceae – Mallow Family					
<i>Sidalcea malviflora</i> subsp. <i>laciniata</i>	checkermallow	Native	---	---	---
Montiaceae – Miner's Lettuce Family					
<i>Calandrinia menziesii</i>	red maids	Native	---	---	---
<i>Claytonia exigua</i> subsp. <i>exigua</i>	little spring beauty	Native	---	---	---
<i>Claytonia parviflora</i> subsp. <i>parviflora</i>	narrow leaved miner's lettuce	Native	---	---	---
<i>Claytonia perfoliata</i> subsp. <i>perfoliata</i>	miner's lettuce	Native	---	---	---
Myrsinaceae – Myrsine Family					
<i>Lysimachia arvensis</i>	scarlet pimpernel	Non-Native	---	---	---
Oleaceae – Olive Family					
<i>Olea europaea</i>	olive	Non-Native	---	Limited	---
Onagraceae – Evening Primrose Family					
<i>Clarkia gracilis</i> subsp. <i>gracilis</i>	slender clarkia	Native	---	---	---
<i>Clarkia gracilis</i> subsp. <i>sonomensis</i>	Sonoma clarkia	Native	---	---	---
<i>Clarkia purpurea</i> subsp. <i>quadrivulnera</i>	wine cup clarkia	Native	---	---	---
<i>Epilobium brachycarpum</i>	tall annual willow-herb	Native	---	---	---
<i>Epilobium minutum</i>	minute willowherb	Native	---	---	---
<i>Taraxia ovata</i>	sun cup	Native	---	---	---
Orobanchaceae – Broomrape Family					
<i>Castilleja attenuata</i>	valley tassels	Native	---	---	---
<i>Castilleja densiflora</i> subsp. <i>densiflora</i>	dense flower owl's clover	Native	---	---	---
Papaveraceae – Poppy Family					
<i>Eschscholzia californica</i>	California poppy	Native	---	---	---
<i>Platystemon californicus</i>	cream cups	Native	---	---	---
Phrymaceae – Lopseed Family					
<i>Diplacus aurantiacus</i>	bush monkeyflower	Native	---	---	---
<i>Erythranthe guttata</i>	common yellow monkeyflower	Native	---	---	---
Plantaginaceae – Plantain Family					
<i>Collinsia heterophylla</i> var. <i>heterophylla</i>	Chinese houses	Native	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
<i>Collinsia sparsiflora</i> var. <i>sparsiflora</i>	hillside collinsia	Native	---	---	---
<i>Plantago coronopus</i>	buckhorn plantain	Non-Native	---	---	---
<i>Plantago erecta</i>	dwarf plantain	Native	---	---	---
Polemoniaceae – Phlox Family					
<i>Gilia capitata</i> subsp. <i>capitata</i>	bluehead gilia	Native	---	---	---
Polygalaceae – Milkwort Family					
<i>Polygala californica</i>	California milkwort	Native	---	---	---
Polygonaceae – Buckwheat Family					
<i>Eriogonum luteolum</i> var. <i>caninum</i> (CRPR 1B.2)	Tiburon buckwheat	Native	---	---	---
<i>Eriogonum nudum</i> var. <i>nudum</i>	nude buckwheat	Native	---	---	---
<i>Rumex acetosella</i>	sheep sorrel	Non-Native	---	Moderate	---
<i>Rumex pulcher</i>	fiddle dock	Non-Native	---	---	---
Primulaceae – Primrose Family					
<i>Primula hendersonii</i>	shooting stars	Native	---	---	---
Ranunculaceae – Buttercup Family					
<i>Clematis lasiantha</i>	chaparral clematis	Native	---	---	---
<i>Delphinium variegatum</i> subsp. <i>variegatum</i>	royal larkspur	Native	---	---	---
<i>Ranunculus californicus</i> var. <i>californicus</i>	California buttercup	Native	---	---	---
<i>Ranunculus lobbii</i>	Lobb's buttercup	Native	---	---	---
<i>Ranunculus muricatus</i>	spiny buttercup	Non-Native	---	---	---
Rhamnaceae – Buckthorn Family					
<i>Ceanothus</i> sp.	ceanothus	Native	---	---	---
<i>Rhamnus crocea</i>	redberry	Native	---	---	---
Rosaceae – Rose Family					
<i>Acaena pinnatifida</i> var. <i>californicum</i>	California acaena	Native	---	---	---
<i>Adenostoma fasciculatum</i> var. <i>fasciculatum</i>	chamise	Native	---	---	---
<i>Aphanes occidentalis</i>	Lady's mantle	Native	---	---	---
<i>Cercocarpus betuloides</i> var. <i>betuloides</i>	mountain mahogany	Native	---	---	---
<i>Drymocallis glandulosa</i> var. <i>glandulosa</i>	sticky cinquefoil	Native	---	---	---
<i>Heteromeles arbutifolia</i>	toyon	Native	---	---	---
<i>Holodiscus discolor</i> var. <i>discolor</i>	ocean spray	Native	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
Rubiaceae – Madder Family					
<i>Galium aparine</i>	bedstraw	Native	---	---	---
<i>Galium californicum</i> subsp. <i>californicum</i>	California bedstraw	Native	---	---	---
<i>Galium murale</i>	tiny bedstraw	Non-Native	---	---	---
<i>Galium porrigens</i> var. <i>porrigens</i>	climbing bedstraw	Native	---	---	---
<i>Sherardia arvensis</i>	field madder	Non-Native	---	---	---
Sapindaceae – Soapberry Family					
<i>Aesculus californica</i>	California buckeye	Native	---	---	---
Saxifragaceae – Saxifrage Family					
<i>Lithophragma affine</i>	woodland star	Native	---	---	---
<i>Micranthes californica</i>	California saxifrage	Native	---	---	---
Scrophulariaceae – Figwort Family					
<i>Scrophularia californica</i>	bee plant	Native	---	---	---
Solanaceae – Nightshade Family					
<i>Solanum nigrum</i>	black nightshade	Non-Native	---	---	---
Urticaceae – Nettle Family					
<i>Hesperocnide tenella</i>	western nettle	Native	---	---	---
<i>Urtica dioica</i> subsp. <i>holosericea</i>	hoary nettle	Native	---	---	---
Valerianaceae – Valerian Family					
<i>Plectritis ciliosa</i>	longspur seablush	Native	---	---	---
<i>Plectritis macrocera</i>	white plectritis	Native	---	---	---
Viscaceae – Mistletoe Family					
<i>Phoradendron leucarpum</i> subsp. <i>tomentosum</i>	oak mistletoe	Native	---	---	---
MONOCOTS					
Agavaceae – Agave Family					
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	soap plant	Native	---	---	---
Alismataceae – Water-Plantain Family					
<i>Alisma triviale</i>	western water plantain	Native	---	---	---
Alliaceae – Onion or Garlic Family					
<i>Allium peninsulare</i> var. <i>franciscanum</i> (CRPR 1B.2)	Franciscan onion	Native	AC	---	---
Cyperaceae – Sedge Family					

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
<i>Carex densa</i>	dense sedge	Native	---	---	---
<i>Carex praegracilis</i>	field sedge	Native	---	---	---
<i>Eleocharis macrostachya</i>	creeping spikerush	Native	---	---	---
Iridaceae – Iris Family					
<i>Iris douglasiana</i>	Douglas' iris	Native	---	---	---
<i>Iris macrosiphon</i>	ground iris	Native	---	---	---
<i>Sisyrinchium bellum</i>	blue-eyed grass	Native	---	---	---
Juncaceae – Rush Family					
<i>Juncus balticus</i> subsp. <i>ater</i>	Baltic rush	Native	---	---	---
<i>Juncus bufonius</i> var. <i>bufonius</i>	toad rush	Native	---	---	---
<i>Juncus patens</i>	common rush	Native	---	---	---
<i>Juncus xiphioides</i>	iris-leaved rush	Native	---	---	---
<i>Luzula comosa</i> var. <i>comosa</i>	wood rush	Native	---	---	---
Juncaginaceae – Arrow-Grass Family					
<i>Triglochin scilloides</i>	flowering quillwort	Native	---	---	---
Liliaceae – Lily Family					
<i>Calochortus luteus</i>	yellow mariposa lily	Native	---	---	---
<i>Fritillaria affinis</i>	checker lily	Native	---	---	---
<i>Prosartes hookeri</i>	drops of gold	Native	---	---	---
Orchidaceae – Orchid Family					
<i>Corallorhiza striata</i>	hooded coralroot	Native	---	---	---
Poaceae – Grass Family					
<i>Aegilops triuncialis</i>	barbed goatgrass	Non-Native	---	High	On List
<i>Aira caryophyllea</i>	silver hairgrass	Non-Native	---	---	---
<i>Avena barbata</i>	slender oats	Non-Native	---	Moderate	---
<i>Brachypodium distachyon</i>	false brome	Non-Native	---	Moderate	---
<i>Briza maxima</i>	rattlesnake grass	Non-Native	---	Limited	---
<i>Briza minor</i>	little quaking grass	Non-Native	---	---	---
<i>Bromus carinatus</i> var. <i>carinatus</i>	California brome	Native	---	---	---
<i>Bromus diandrus</i>	ripgut brome	Non-Native	---	Moderate	---
<i>Bromus hordeaceus</i>	soft chess	Non-Native	---	Limited	---
<i>Bromus madritensis</i> subsp. <i>rubens</i>	foxtail chess	Non-Native	---	High	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	CAL-IPC RATING	CDFA RATING
<i>Bromus racemosus</i>	smooth brome	Non-Native	---	---	---
<i>Crypsis schoenoides</i>	swamp grass	Non-Native	---	---	---
<i>Cynosurus echinatus</i>	dogtail grass	Non-Native	---	Moderate	---
<i>Elymus caput-medusae</i>	medusahead grass	Non-Native	---	High	On List
<i>Elymus ×hansenii</i>	blue wildrye hybrid	Native	---	---	---
<i>Elymus glaucus</i> subsp. <i>glaucus</i>	blue wildrye	Native	---	---	---
<i>Elymus multisetus</i>	big squirreltail	Native	---	---	---
<i>Festuca bromoides</i>	brome fescue	Non-Native	---	---	---
<i>Festuca idahoensis</i>	Idahoe fescue	Native	---	---	---
<i>Festuca microstachys</i>	small fescue	Native	---	---	---
<i>Gastridium phleoides</i>	nit grass	Non-Native	---	---	---
<i>Glyceria</i> sp.		Non-Native	---	---	---
<i>Hordeum marinum</i> subsp. <i>gussoneanum</i>	Mediterranean barley	Non-Native	---	Moderate	---
<i>Hordeum murinum</i> subsp. <i>leporinum</i>	hare barley	Non-Native	---	Moderate	---
<i>Melica californica</i>	California melic grass	Native	---	---	---
<i>Melica geyeri</i>	Geyer's oniongrass	Native	---	---	---
<i>Melica torreyana</i>	Torrey's melic grass	Native	---	---	---
<i>Poa annua</i>	annual bluegrass	Non-Native	---	---	---
<i>Poa secunda</i> subsp. <i>secunda</i>	one-sided bluegrass	Native	---	---	---
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	Non-Native	---	Limited	---
<i>Stipa lepida</i>	foothill needlegrass	Native	---	---	---
<i>Stipa pulchra</i>	purple needlegrass	Native	---	---	---
Themidaceae – Brodiaea Family					
<i>Brodiaea elegans</i> subsp. <i>elegans</i>	harvest brodiaea	Native	---	---	---
<i>Dichelostemma capitatum</i> subsp. <i>capitatum</i>	blue dicks	Native	---	---	---
<i>Dichelostemma congestum</i>	ookow	Native	---	---	---
<i>Triteleia laxa</i>	Ithuriel's spear	Native	---	---	---

APPENDIX B CALIFORNIA NATURAL DIVERSITY DATABASE FIELD FORMS



CALIFORNIA
NATIVE PLANT SOCIETY

Bowman

Email to:
treasurehunt@cnps.org
Mail to:
CNPS Rare Plant Program
2707 K Street, Suite 1
Sacramento, CA 95816

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ. No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 5/10/19

CNPS Rare Plant Treasure Hunt Field Survey Form

Scientific Name: <i>Allium peninsulare</i> var. <i>franciscanum</i>		Reporter: NomAD Ecology	
Common Name (optional):		Address: 822 Main Street Martinez, CA 94553	
Species Found? ☒ Yes ☐ No (If not found, please explain why in comments field)		E-mail Address: hbartsh@nomadecology.com	
Total No. Individuals: 164 Subsequent Visit? ☐ Yes ☒ No		Phone: 925-228-3027	
Is this an existing NDDB occurrence? ☐ Yes, Occ. # _____ ☒ No ☐ Unk.		CNPS Chapter:	
Collection? If yes: _____ Number _____ Herbarium _____		Team Name & Members:	
California Plant Rescue Seed Information Deposited at: _____ Rec. Future Col. Dates: _____ Fruit and Seed Notes (% fruit dehiscent, dehiscence notes, flagging required?, etc.): _____		Location Description: Parcel immediately west of Mt Burrell, NE of junction between Novato Blvd and unnamed road through Bowman Canyon.	
Est. # seeds per fruit _____ Est. # fruits col. per plant _____ # Plants Sampled (ideal min. 50) _____ Est. # Seeds Col. (ideal min. 2500) _____			
Location Information (please attach map, spreadsheet, AND/OR fill out your choice of coordinates, below)			
County: Marin Landowner / Mgr: Marin County Parks			
Quad Name: _____ Elevation: 700-500 meters/feet			
Source of Coordinates (GPS, Google Earth, camera, phone, topo. map & type): _____ GPS Make & Model: LG V20			
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ (NAD83 or WGS84 is preferred) Horizontal Accuracy: 4.6 meters/feet			
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒ (decimal degrees are preferred)			
Coordinates: 38.128666, -122.615424			
Habitat Description (plant communities, dominants, associates): In understory of Umbellularia cal / average age. var. age woodland on fairly steep wnw-facing slope. w/ weak serpentine influence. Associates include Toxicaria kellyi, Melicope toxicodendron diversilobum, Sanicula corymbosa, Anemone cal var. neptis.		Microhabitat Description (please circle or select all that apply): Exposure: sunny, open, edges, filtered, partial shade, full shade Slope: flat, gentle, steep, cliff Aspect: north, south, east, west Moisture: dry, mesic, moist, seep, wet, submerged to _____ m Topog: ridge, valley, canyon, trail, roadside, bank, ditch, swale Substrate: serpentinite, granitic, carbonate, gabbroic, volcanic, metamorphic, sandstone, shale, other: _____ Soil: sand, gravel, rock, scree, talus, clay, pumice, loam, alluvium Other:	
Please fill out separate forms for other rare taxa seen at this site.			
Site Information Overall site/occurrence quality/viability (site + population): ☒ Excellent ☐ Good ☐ Fair ☐ Poor			
Immediate AND surrounding land use: Preserve, land bank, grazing			
Visible disturbances: None			
Threats: None			
Comments: For fire trails, roads, etc. No signs of cattle damage. Good native integrity. Bud morphology not right for Allium peninsulare.			
Determination: (check one or more, and fill in blanks) ☐ Keyed (cite reference): _____ ☐ Compared with specimen at: _____ ☐ Compared with image from: _____ ☐ By another person (name): _____ ☐ Other: _____		Photographs: Submitted elsewhere? ☐ ☐ Plant ☐ CalPhotos (ID#): _____ ☐ Habitat ☐ Calflora (ID#): _____ ☐ Diagnostic feature ☐ Other: _____	
Donate photos to CNPS Rare Plant Image Collection? ☐ yes ☐ no			



CALIFORNIA
NATIVE PLANT SOCIETY

Bowman

Email to:
treasurehunt@cnps.org
Mail to:
CNPS Rare Plant Program
2707 K Street, Suite 1
Sacramento, CA 95816

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ. No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 05/10/2019

CNPS Rare Plant Treasure Hunt Field Survey Form

Scientific Name: *Amorpha californica* var. *nordensis*

Common Name (optional): Indigo bush

Species Found? ☒ Yes ☐ No (If not found, please explain why in comments field)

Total No. Individuals: 211 Subsequent Visit? ☐ Yes ☒ No

Is this an existing NDDDB occurrence? ☐ No ☒ Unk.

Collection? If yes: _____
Number _____ Herbarium _____

Phenology:

% vegetative: 5
% flowering: 90
% fruiting: 5

Reporter: NOMAD Ecology

Address: 822 Main Street
Martinez, CA 94553

E-mail Address: hbartor@nomadecology.com

Phone: 925-228-3027

CNPS Chapter: _____

Team Name & Members: _____

California Plant Rescue Seed Information

Deposited at: _____
Rec. Future Col. Dates: _____
Fruit and Seed Notes (% fruit dehiscent, dehiscence notes, flagging required?, etc.): _____

Est. # seeds per fruit: _____
Est. # fruits col. per plant: _____
Plants Sampled (ideal min. 50): _____
Est. # Seeds Col. (ideal min. 2500): _____

Location Description: Parcel immediately west of Mt. Burdell, NE of junction of Norato Blvd and Unnamed Road through Bowman Canyon.

Location Information (please attach map, spreadsheet, AND/OR fill out your choice of coordinates, below)

County: Marin Landowner / Mgr: Marin County Parks
Quad Name: _____ Elevation: 450 meters/feet
Source of Coordinates (GPS, Google Earth, camera, phone, topo. map & type): _____ GPS Make & Model: LG V20
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ (NAD83 or WGS84 is preferred) Horizontal Accuracy: _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒ (decimal degrees are preferred)
Coordinates: 38.129311, -122.614875

Habitat Description (plant communities, dominants, associates):

In understory of Umbellularia californica, Quercus agr. var. agr. woodland on WNW-facing slope (fairly steep) just beyond ecotone of woodland's Adenostoma fasc. var. fasc./Quercus dum. scrubland. Associates include Toxicodendron diversilobum, Melaleuca torreyana, Toxicodendron diversilobum, Sanicula crass., Diplazium acrostichum.

Please fill out separate forms for other rare taxa seen at this site.

Microhabitat Description (please circle or select all that apply):

Exposure: sunny, open, edges, filtered, partial shade, full shade
Slope: flat, gentle, steep cliff Aspect: north, south, east, west
Moisture: dry, mesic, moist, seep, wet, submerged to _____ m
Topog: ridge, valley, canyon, trail, roadside, bank, ditch, swale
Substrate: serpentinite, granitic, carbonate, gabbroic, volcanic, metamorphic, sandstone, shale, other: _____
Soil: sand, gravel, rock, scree, talus, clay, pumice, loam, alluvium
Other: _____

Site Information Overall site/occurrence quality/viability (site + population): ☒ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Land bank, preserve, grazing

Visible disturbances: None.

Threats: None

Comments: For fire trails, roads, etc. No signs of cattle damage. Good native integrity.

Determination: (check one or more, and fill in blanks)

☐ Keyed (cite reference): _____
☐ Compared with specimen at: _____
☐ Compared with image from: _____
☐ By another person (name): _____
☐ Other: _____

Photographs:

Submitted elsewhere? ☐ Plant ☐ CalPhotos (ID#): _____
☐ Habitat ☐ Calflora (ID#): _____
☐ Diagnostic feature ☐ Other: _____

Donate photos to CNPS Rare Plant Image Collection? ☐ yes ☐ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Eriogonum luteolum* var. *canadense*

Common Name: Tiburon buckwheat

Species Found? ☒ Yes ☐ No If not found, why? _____

Total No. Individuals: 28,550 Subsequent Visit? ☐ Yes ☐ No

Is this an existing NDDDB occurrence? ☐ No ☒ Unk. Yes, Occ. # _____

Collection? If yes: _____ Number _____ Museum / Herbarium _____

Reporter: Nomad Ecology

Address: 872 Main Street
Martinez CA 94553

E-mail Address: hmartosh@nomadecology.com

Phone: 905-228-3027

Plant Information

Phenology:

% vegetative 100 % flowering _____ % fruiting _____

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Bowman Canyon Preserve, east of Stafford Lake, north of Novato Blvd., and on boundary with Mt. Burdell.

County: Marin Landowner / Mgr: _____

Quad Name: _____ Elevation: 400 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Android Phone

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: 38.137753, -122.610194

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In serpentine grassland on a north facing slope with
Hesperis angusta, Luzula, Festuca penicillata, Elymus multisetus,
Stipa pulchra, cleome grasses

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☒ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Grazing & open space

Visible disturbances: none

Threats: Acritops trinivialis nearby along dirt road

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☐ yes ☐ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 6/20/19

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: Hesperian Congestum

Common Name: Marin western Flax

Species Found? ☒ Yes ☐ No If not found, why?

Total No. Individuals: 120 Subsequent Visit? ☐ Yes ☐ No

Is this an existing NDDDB occurrence? ☐ No ☒ Unk. Yes, Occ. # _____

Collection? If yes: _____ Number _____ Museum / Herbarium _____

Reporter: Normal Ecology

Address: 872 Main Street
Marina, CA 94553

E-mail Address: hbarb@normal ecology.com

Phone: 975-228-3027

Plant Information

Phenology:

% vegetative 70 % flowering 30 % fruiting _____

Animal Information

adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown _____
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Bowman Canyon Preserve, East of Stafford Lake, north of about 56th, on boundary with Mt. Burdell

County: Marin Landowner / Mgr: Marin County

Quad Name: _____ Elevation: 400 feet

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Android phone

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: 38.137753, -122.610194

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In serpentine grassland on a north facing slope with
Hesperian congesta subsp. luzulifolius, Festuca perennis, Elymus multisetus
Stipa pulchra, Clarkia gracilis.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☒ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Grazing and open space

Visible disturbances: none

Threats: Hesperian triuncialis nearby along road

Comments: _____

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☐ yes ☐ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 04/10/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Ranunculus lobbii*

Common Name: Lobb's buttercup.

Species Found? ☒ Yes ☐ No If not found, why?

Total No. Individuals: 50 Subsequent Visit? ☐ Yes ☒ No

Is this an existing NDDB occurrence? ☐ No ☒ Unk. Yes, Occ. #

Collection? If yes: no Number Museum / Herbarium

Reporter: Nomad Ecology

Address: 872 Marin Street
Martinez, CA 94553

E-mail Address: hbartosh@nomadecology.com

Phone: 925-228-3027

Plant Information

Phenology:
% vegetative 0 % flowering 50 % fruiting 50

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

East of Stafford Lake, North of Novato Blvd, on Bowman property, which borders Mt. Burdell to the southwest.

County: Marin Landowner / Mgr: Marin County

Quad Name: _____ Elevation: 340 feet

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): phone

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: Galaxy S9

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ☒ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐

Coordinates: 533246, 4220109

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In a small seep-fed artificial pond on the margin of live oak woodland in open grassland on west-facing slope. Pond dimensions are approx 60' x 30'. Ranunculus is growing on the west and downstream side of the pond. Growing with Glycyrrhiza, Eriogonum macrostachya, Ranunculus muricatus, Mentha pulegium, and Alisma.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Grazing and open space.

Visible disturbances: none

Threats: Potential for Glycyrrhiza to choke out native diversity. Earthen dam is eroded at outlet

Comments: and could become a problem in the future.

Good site quality for threats listed above.

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): TSM2
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☒
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☒ yes ☐ no