BOTANICAL RESOURCE SURVEY REPORT

BOWMAN CANYON ROAD & TRAIL PLAN – MARIN COUNTY PARKS, MOUNT BURDELL PRESERVE

MARIN COUNTY, CALIFORNIA

NOVEMBER 2023

Prepared for

MARIN COUNTY PARKS
PRESERVATION · RECREATION

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Section 1. INTRODUCTION

At the request of Marin County Parks (MCP), Nomad Ecology, LLC (Nomad) conducted protocol-level surveys for sensitive botanical resources[1] in the Bowman Canyon Road & Trail Plan study area in unincorporated northeastern Marin County, California. This study area includes a 25-foot buffer on approximately 6.67 miles of fire roads and trails that will either be decommissioned or constructed as a part of the road and trail plan, as well as a 69-acre woodland that supports a large population of Franciscan onion (*Allium peninsulare* var. *franciscanum*; CRPR 1B.2) where both trail decommissioning and construction are planned. The combined 96.96-acre study area lies within MCP's Mount Burdell Preserve and is located west of Highway 101, northeast of Stafford Lake, and northwest of the town of San Marin (Figures 1 and 2). The study area lies within the San Francisco Bay Area subregion of the California Floristic Province (Baldwin et al. 2012).

In 2019, Nomad conducted baseline protocol-level botanical surveys in Bowman Canyon (Nomad Ecology 2019). The 2019 study area overlaps with the southwestern and northeastern portion of the 2023 study area and encompassed a large portion of land located south of the 69-acre woodland described above, as well as a large portion of the serpentine slopes located east of the 69-acre woodland described above.

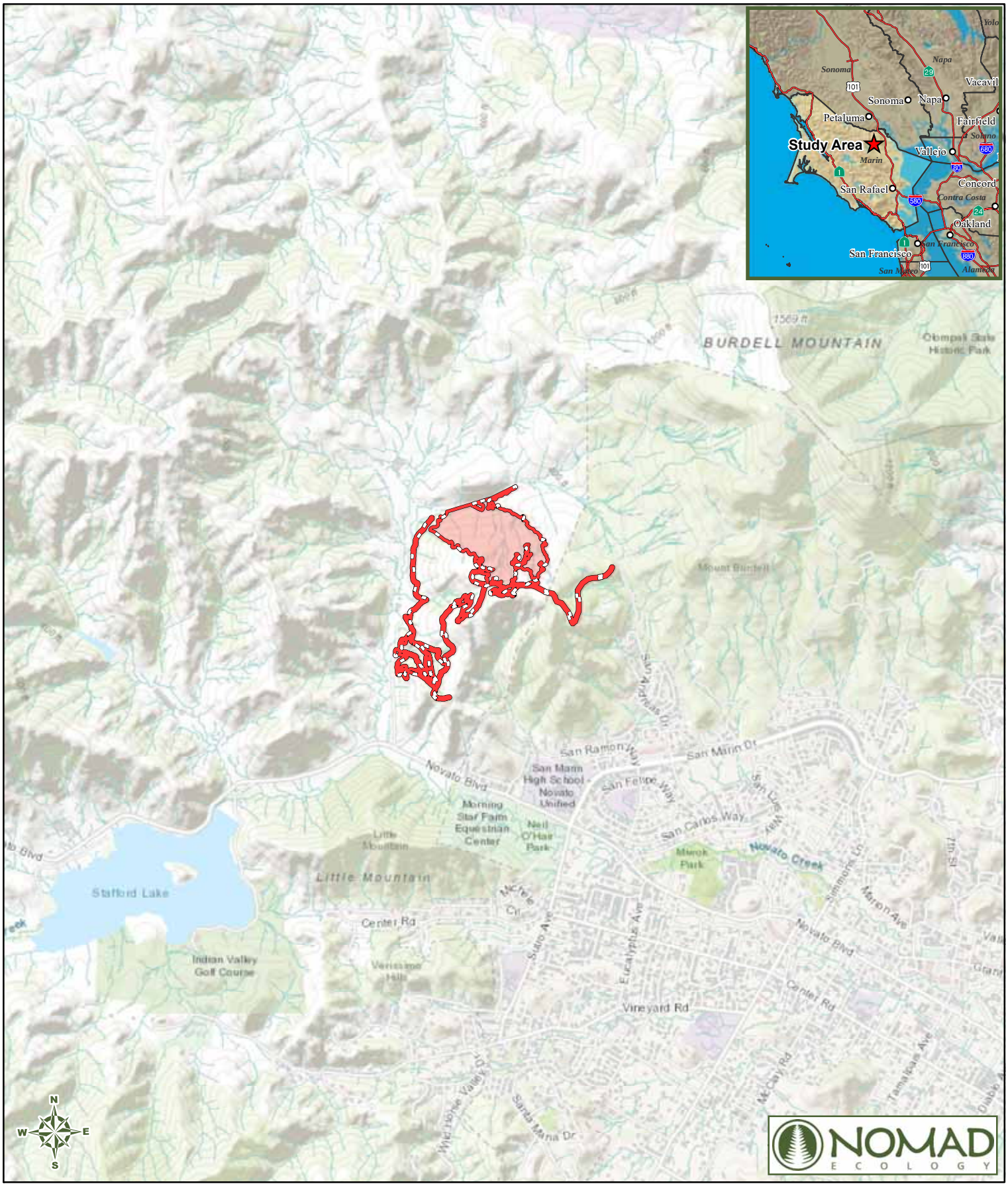
1.1. PURPOSE OF THE REPORT

The purpose of this Botanical Resource Survey Report is to present the results of protocol-level botanical surveys that targeted 12 special status plant species[2] and 34 sensitive natural communities considered to have the potential to occur within the study area. Protocol-level botanical surveys were conducted within the study area by Nomad botanists in March, April, May, July, and September of 2023. 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 invasive plant species of concern; (7) a comprehensive list of all vascular plants observed; and (8) maps that identify the soil types, geological units, vegetation communities, and 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*.



December 2023

Botanical Resources Survey Report

Legend
Study Area

Figure 1

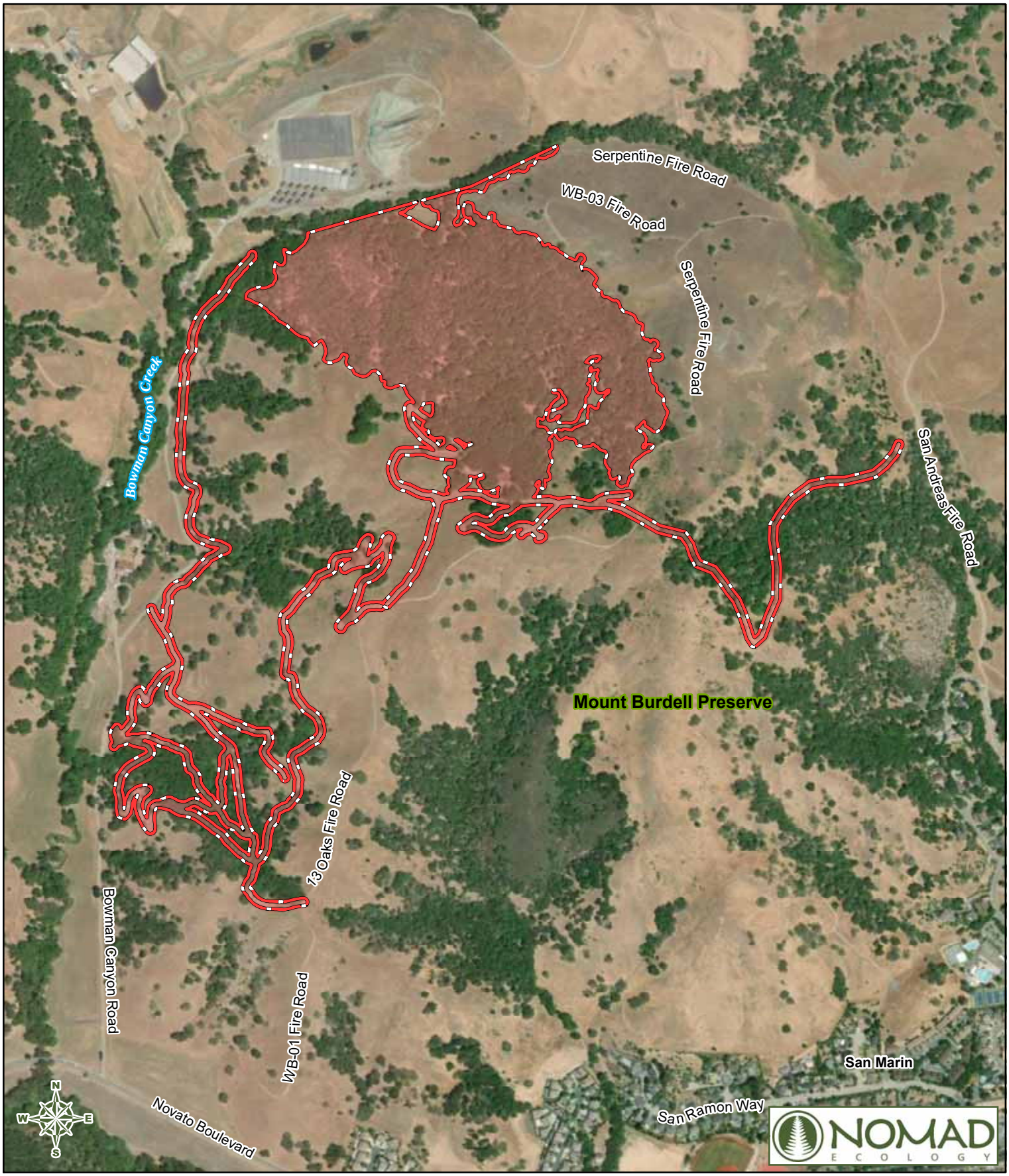
Location of Study Area

Bowman Canyon Road & Trail Plan
Marin County Parks

1:36,000
0 1,500 3,000
Feet

Sources: ESRI, MCP

Marin County, California



December 2023 Botanical Resources Survey Report

Legend
Study Area

1:10,000
0 400 800
Feet

Figure 2
Aerial Image of the Study Area
Bowman Canyon Road & Trail Plan
Marin County Parks

Sources: ESRI, MCP

Marin County, California

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 2023)

California Department of Fish and Wildlife (CDFW):

- California Natural Community List, the Vegetation Classification and Mapping Program (CDFW 2023a)
- California Natural Diversity Database (CNDDB) Query for the Cotati, Glen Ellen, Novato, Petaluma, Petaluma Point, Petaluma River, San Geronimo, Sears Point, and Sonoma 7.5-minute USGS quadrangles (CDFW 2023b)
- Special Vascular Plants, Bryophytes, Lichens List (CDFW 2023c)
- State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2023d)

Other Sources:

- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2023a)
- Consortium of California Herbaria One (CCH1) (CCH1 2023)
- Consortium of California Herbaria Two (CCH2) (CCH2 2023)
- The Ecological Subregions of California (USDA 1997)
- The Jepson eFlora (JFP 2023)
- The Jepson Manual: Vascular Plants of California (Baldwin et al. 2012)
- A Manual of California Vegetation (Sawyer et al. 2009, CNPS 2023b)
- Marin Flora: An Illustrated Manual of the Flowering Plants, Ferns, and Conifers of Marin County, California (Howell et al. 2006)
- Draft Locally Rare Plant List for Marin County (Smith 2023)
- Botanical Resource Survey Report – Bowman Canyon Baseline Surveys and Habitat Assessments, Marin County, California. (Nomad Ecology 2019)
- Technical Memorandum – Vegetation Management Zone (VMZ) Review for Marin County Open Space District's Bowman Canyon Preserve, Marin County, California (Nomad Ecology 2023)

Botanical taxonomy and nomenclature conform to *The Jepson Manual* (Baldwin et al. 2012) with the exception of updates posted on the Jepson eFlora (JFP 2023) website. Common names of plant species are derived from the Calflora Database (Calflora 2023). Taxonomy and nomenclature for special status plant species conform to the *Inventory of Rare and Endangered Plants of California* (CNPS 2023a) and *Special Vascular Plants, Bryophytes and Lichens List* (CDFW 2023c).

Vegetation communities described herein conform to A Manual of California Vegetation (MCV) (Sawyer et al. 2009, CNPS 2023b) and the Marin Countywide Fine Scale Vegetation Map (Parks Conservancy 2021). Wetland and deepwater habitat classifications conform to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 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 rarity, endangerment, and distribution of natural communities are evaluated using a nature serve rarity ranking calculator through CDFW and CNPS collaboration. Natural communities with state ranks of S1[3], S2[4], and S3[5], which, are considered Sensitive Natural Communities and to be addressed in the environmental review processes of CEQA and its equivalents (CDFW 2023a). Outside of state ranking designations, the regulatory framework that protects other natural communities that may be considered sensitive are 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.

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 of Rare and Endangered Plants of California (CNPS 2023a).

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 Plants of California (CNPS 2023a). The rarity ranking contained in the CNPS inventory is endorsed by the CDFW and effectively serves as CDFW's California Rare Plant Rank (CRPR) rarity ranking (CDFW 2023c, d). The following identifies the definitions of the CNPS California Rare Plant Ranks:

- Rank 1A: Plants presumed to be extinct in California;

[3] S1 = Critically imperiled; at very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

[4] S2 = Imperiled; at high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

[5] S3 = Vulnerable; at moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

- 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 2001a; CDFW 2009), 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, rare plants, 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 draft list of locally rare plants of Marin County, which is utilized in this report (Smith 2023).

2.3. Identification of Target Species and Natural Communities

The identification of target species and sensitive natural communities for this protocol-level survey effort is based on a background review of available databases and literature (USFWS 1999, 2014, 2023; CDFW 2023a, b, c, d; CNPS 2023a; CCH1 2023; CCH2 2023; 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 12 special status plant species, out of 81 known from the region, plus 34 sensitive natural communities had the potential to occur within the study area based on the presence of suitable habitat.

One of the 12 target species, Marin western flax (*Hesperolinon congestum*), is listed as federally and state threatened, and all 12 target species have conservation status from the California Native Plant Society (CNPS 2023a). The species in Table 1 were considered target species for the purposes of these protocol-level rare plant surveys.

Table 1. Target Species

Species Name	Common Name	Status[1]
Federal/State Listed and California Rare Plant Rank Species		
Hesperolinon congestum	Marin western flax	FT, ST, 1B.1
California Rare Plant Rank Species (Rank 1 & 2)		
Allium peninsulare var. *franciscanum*	Franciscan onion	1B.2
Amorpha californica var. *napensis*	Napa false indigo	1B.2
Eriogonum luteolum var. *caninum*	Tiburon buckwheat	1B.2
Fritillaria liliacea	fragrant fritillary	1B.2
Hemizonia congesta subsp. *congesta*	congested-headed hayfield tarplant	1B.2
Streptanthus anomalus	Mount Burdell jewelflower	1B.1
California Rare Plant Rank Species (Rank 3 & 4)		
Erigeron biolettii	streamside daisy	3
Leptosiphon aureus	bristly leptosiphon	4.2
Lessingia hololeuca	woolly-headed lessingia	3
Micropus amphibolus	Mt. Diablo cottonweed	3.2
Ranunculus lobbii	Lobb's aquatic buttercup	4.2

[1]**Explanation of Status Codes**
Federal Codes
FT Federally Threatened
State Codes
ST State Threatened
California Rare Plant Rank codes:
1B Rare, Threatened, or Endangered in California and elsewhere
2B Rare, Threatened, or Endangered in California, but are more common elsewhere
3 More information is needed - Review list
4 Plants of limited distribution - Watch list
California Rare Plant Rank 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 / moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

A total of 34 sensitive natural communities were identified as targets based on a map-based search of MCV (Sawyer et al. 2009; CNPS 2023b) online (Table 2).

Table 2. Target Sensitive Natural Communities

Common Name	Scientific Name*	Lifeform	Status[1]
Bigleaf maple forest and woodland	*Acer macrophyllum*	Tree	S3
Box-elder forest and woodland	*Acer negundo*	Tree	S3
California buckeye groves	*Aesculus californica*	Tree	S3
Onion - twistflower - dwarf-flax serpentinite rock outcrop	*Allium* spp. - *Streptanthus* spp. - *Hesperolinon* spp. Serpentinite	Herb	S2S3
Hoary, common, and Stanford manzanita chaparral	*Arctostaphylos* (*canescens, manzanita, stanfordiana*)	Shrub	S3
California brome - blue wildrye prairie	*Bromus carinatus* - *Elymus glaucus*	Herb	S3
White-root beds	*Carex barbarae*	Herb	S2?

Common Name	Scientific Name*	Lifeform	Status[1]
Torrent sedge patches	*Carex nudata*	Herb	S3
Slough sedge - Water-parsley - Small-fruited bulrush marsh	*Carex obnupta - Oenanthe sarmentosa - Scirpus microcarpus*	Herb	S3
Hazelnut scrub	*Corylus cornuta* var. *californica*	Shrub	S2?
Coastal tufted hair grass - Meadow barley - California oatgrass meadow	*Deschampsia cespitosa - Hordeum brachyantherum - Danthonia californica*	Herb	S3
Bush monkeyflower scrub	*Diplacus aurantiacus*	Shrub	S3?
Field horsetail - scouringrush horsetail - variegated scouringrush wet meadow	*Equisetum* (*arvense, variegatum, hyemale*)	Herb	S3S4
Idaho fescue - California oatgrass grassland	*Festuca idahoensis - Danthonia californica*	Herb	S3
Northwest manna grass marshes	*Glyceria x occidentalis*	Herb	S3?
Goldenaster patches	*Heterotheca* (*oregona, sessiliflora*)	Herb	S3
Quillwort beds	*Isoetes* (*bolanderi, echinospora, howellii, nuttallii, occidentalis*)	Herb	S3?
Soft and western rush - Sedge marshes	*Juncus* (*effusus, patens*) - *Carex* (*pansa, praegracilis*)	Herb	S3S4
Iris-leaf rush seeps	*Juncus* (*oxymeris, xiphioides*)	Herb	S2?
Smooth goldfields vernal pool bottoms	*Lasthenia glaberrima*	Herb	S2
Ashy ryegrass - Creeping wildrye turfs	*Leymus cinereus - Leymus triticoides*	Herb	S3
Common monkey flower seeps	*Mimulus* (*guttatus*)	Herb	S3?
Needle grass - Melic grass grassland	*Nassella* spp. - *Melica* spp.	Herb	S3S4
Tanoak forest	*Notholithocarpus densiflorus*	Tree	S3.2
Douglas fir - tanoak forest and woodland	*Pseudotsuga menziesii - Notholithocarpus densiflorus*	Tree	S3
Oregon white oak woodland and forest	*Quercus garryana* (*tree*)	Tree	S3
Valley oak woodland and forest	*Quercus lobata*	Tree	S3
Canyon live oak - Interior live oak chaparral	*Quercus wislizeni - Quercus chrysolepis* (*shrub*)	Tree	S3S4
Goodding's willow - red willow riparian woodland and forest	*Salix gooddingii - Salix laevigata*	Tree	S3
Shining willow groves	*Salix lucida* subsp. *lasiandra*	Tree	S3.2
Small-fruited bulrush marsh	*Scirpus microcarpus*	Herb	S2
Bushy spikemoss mats	*Selaginella* (*bigelovii, wallacei*)	Herb	S3
White-tip clover swales	*Trifolium variegatum*	Herb	S3?
California bay forest and woodland	*Umbellularia californica*	Tree	S3

*Latin names conform to those used by MCV Online (CNPS 2023b) which do not follow current taxonomy in all cases.

[1]Explanation of Status Codes

State Codes

- S2 Imperiled
- S3 Vulnerable
- S4 Apparently Secure
- ? 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

2.4. Personnel and Field Investigation

Protocol-level rare plant surveys were conducted by Nomad senior botanists Adam Chasey (AC) and Shannon Still (SS), and Nomad botanist Cody Ender (CE). These surveys were conducted during the

months of March, April, May, July, and September of 2023. Table 3 details the dates, survey targets, and personnel for these studies. This report was prepared by Mr. Chasey.

Table 3. 2023 Survey Effort Details for Target Plant Species

Survey Timing		Target(s)	Personnel
Month	Days		
March	7, 8, 9	*Fritillaria liliacea*	AC, CE
April	5, 6, 7	*Micropus amphibolus* *Ranunculus lobbii*	AC, CE
May	4, 5, 8	*Allium peninsulare* var. *franciscanum* *Hesperolinon congestum* *Leptosiphon aureus* *Streptanthus anomalus*	AC, CE
July	24, 25, 26	*Amorpha californica* var. *napensis* *Erigeron biolettii* *Eriogonum luteolum* var. *caninum* *Hemizonia congesta* subsp. *congesta*	AC, CE
September	18, 19	*Lessingia hololeuca*	AC, SS

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 and invasive plant species. All surveys generally began at 7:30am and concluded at approximately 3:00pm 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. All surveys were conducted on foot and started at the southwestern end of the area, progressing in a generally counterclockwise fashion through the study area. The linear portions of the study area were surveyed by walking two abreast along fire roads or proposed alignments, while the 69-acre woodland was surveyed by walking transects up to 10 meters apart depending on the topography or subject plant community. 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).

MCP concurrently conducted surveys along portions of Serpentine Fire Road and WB-03 Fire Road ("MCP in-house survey area") located outside of the study area. During the months of March, April, July, and September, it was unclear if MCP staff were available to conduct these surveys, therefore they were surveyed by Nomad botanists. Special status plant data collected by Nomad botanists in the MCP in-house survey area are included in this report, however information regarding soils, geology, and vegetation communities of the MCP in-house survey area are not discussed.

Botanical surveys were conducted in accordance with the California Native Plant Society's *Botanical Survey Guidelines* (CNPS 2001a), California Department of Fish and Wildlife's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2009), 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 and sensitive natural communities, were collected using Backcountry Navigator Pro or Gaia GPS on Android or Apple devices. Data points were collected for each aforementioned feature. The boundaries of these occurrences were only recorded as polygons if the occurrence was larger than a 20-foot radius. These data were then transferred to a desktop computer Geographic Information System (GIS) platform operating ESRI ArcGIS 10.7 for compiling all data from individual botanists and populating attribute tables.

2.5.1 VEGETATION MAPPING

Vegetation communities were characterized and mapped based on *A Manual of California Vegetation* (Sawyer et al. 2009). Vegetation polygons are based on the Marin Countywide Fine Scale Vegetation Map and the results of Nomad's Vegetation Management Zone (VMZ) Review for Marin County Open Space District's Bowman Canyon Preserve, Marin County, California (Nomad Ecology 2023). These polygons were adjusted as necessary based on data collected during 2023 field surveys.

2.5.2 SPECIAL STATUS SPECIES OCCURRENCES

In the event special status plant populations were encountered, they were recorded using California Natural Diversity Database Field Survey Forms (Appendix B). A GPS data point was recorded for each occurrence[6]. Populations of target species recorded as a part of this study are identified by a seven- to ten-character alphanumeric code that is derived from the first three letters of the *Genus* and *Species* name (and *Subspecies* if applicable) plus a population number. For example, a population of Franciscan onion (*Allium peninsulare* var. *franciscanum*) would be given the code Allpenfra1. Each subsequent new population would be sequentially numbered (e.g. Allpenfra2, Allpenfra3, etc.).

2.5.3 HERBARIUM VOUCHERS

Where feasible, a voucher collection of an individual from a population of special status species was 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 ten 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 4 depicts the details of reference population observations and provides an optimal survey window in 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 1 and 2 Databases (CCH1 2023; CCH2 2023). 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.

[6] Per the CNDDB an occurrence (also referred to as population) is a single occurrence or a series of colonies within one-quarter mile of each other (CDFW 2020). If individuals or colonies are greater than a distance of 0.25-mile apart, they are treated as separate occurrences (populations).

Table 4. Reference Population Observation Details

Species Name / Common Name	Date Visited	Location	CNDDB Occurrence (Y/N)	Present (Y/N)	# of Individuals	Timeframe to Conduct Survey
California Rare Plant Rank Species						
Allium peninsulare var. *franciscanum* Franciscan onion	5/16/2023	Edgewood Preserve, San Mateo County	Yes (EONDX #94483)	Yes	100's	3 weeks
Amorpha californica var. *napensis* Napa false indigo	6/3/2023	Olompali State Park, Marin County	Yes (EONDX #45288, 123799)	Yes	15	6 weeks
Eriogonum luteolum var. *caninum* Tiburon buckwheat	6/14/2023	Mount Tamalpais State Park, Marin County	Yes (EONDX #71287)	Yes	100's	6 weeks
Erigeron bioletti streamside daisy	7/26/2023	Mount Burdell Preserve, Marin County	NA	Yes	30	4 weeks
Fritillaria liliacea fragrant fritillary	3/15/2023	SFPUC Pulgas Ridge, San Mateo County	Yes (EONDX #13989)	Yes	100's	6 weeks
Leptosiphon aureus bristly leptosiphon	5/21/2023	White Hill Preserve, Marin County	NA	Yes	100's	3 weeks
Lessingia hololeuca woolly-headed lessingia	9/19/2023	Mill Valley, Marin County	NA	Yes	50	4 weeks
Micropus amphibolus Mount Diablo cottonweed	4/5/2023	Mount Burdell Preserve, Marin County	NA	Yes	100's	6 weeks
Ranunculus lobbii Lobb's aquatic buttercup	4/5/2023	Mount Burdell Preserve, Marin County	NA	Yes	1,000's	3 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 2023; CCH2 2023). 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 5. Congested headed hayfield tarplant (*Hemizonia congesta* subsp. *congesta*) has a peak bloom period in June-July, while Marin western flax has a peak bloom period in May. Both peak bloom periods match the months during which botanical surveys were conducted. Mount Burdell jewelflower (*Streptanthus anomalus*) is a recently described species and CCH does not currently have data sufficient to populate Table 5, but this species is known to have peak bloom period in May and similarly matches the months during which botanical surveys were conducted.

Table 5. 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
Federal/State Listed and California Rare Plant Rank Species												
Hesperolinon congestum Marin western flax	5%	0%	0%	3%	**48%**	28%	8%	5%	2%	2%	0%	0%
California Rare Plant Rank Species												
Hemizonia congesta subsp. *congesta* congested-headed hayfield tarplant	2%	0%	0%	2%	17%	**24%**	**24%**	12%	10%	8%	2%	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 or identifiable vegetative material corresponding to the March, April, May, July, and September 2023 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 CNDDB 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 with regard to annuals, can vary depending on sample timing and duration. In the vegetation descriptions below, the phrases “in part” or “among others” are 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 MCP. Changes to the study area may warrant further analysis.

Section 3. ENVIRONMENTAL SETTING

3.1. SETTING

The 96.96-acre study area is located in unincorporated northeastern Marin County, California. It is approximately 1 mile northwest of the town of San Marin, 1 mile northeast of Stafford Lake, and 1.2 miles southwest of Mount Burdell peak. 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 and appears on the Petaluma River (34852) 7.5-minute USGS topographic quadrangle.

3.1.1 REGIONAL SETTING

A Manual of California Vegetation (MCV) (Sawyer et al. 2009) defines the currently recognized method of vegetation classification and mapping in California, which is accepted by CNPS and CDFW. This methodology is used to determine the rarity and endangerment of California vegetation types that can result in a sensitive natural communities designation for specific vegetation types. The *Ecological Subregions of California* (USDA 1997) provide the boundaries used in Sawyer et al. (2009) and is the basis for describing regional variation in California alliance descriptions in the MCV. The study area is located in the Marin Hills and Valleys subsection of the Northern California Coast Section (USDA 1997). This subsection is described in detail below.

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. 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.

3.1.2 LOCAL SETTING

The study area is located northwest of the town of San Marin and northeast of Stafford Lake in unincorporated northeastern Marin County (Figure 1). It is accessed via two trailheads on Bowman Canyon Road of Novato Boulevard. It is in the recent Bowman Addition parcels of MCP's Mount Burdell Preserve which represented a western expansion of the preserve boundaries. It lies southwest of Olompali State Park, north of MCP's Little Mountain Preserve and the city of Novato's O'Hair Park, and northwest of North Marin County Water District's Stafford Lake watershed.

No fires greater than 10 acres have been recorded on the property since 1878 (beginning of record keeping), based on Cal Fire (2022) fire perimeter data. No evidence of recent fire was observed within the study area during the 2023 site visits.

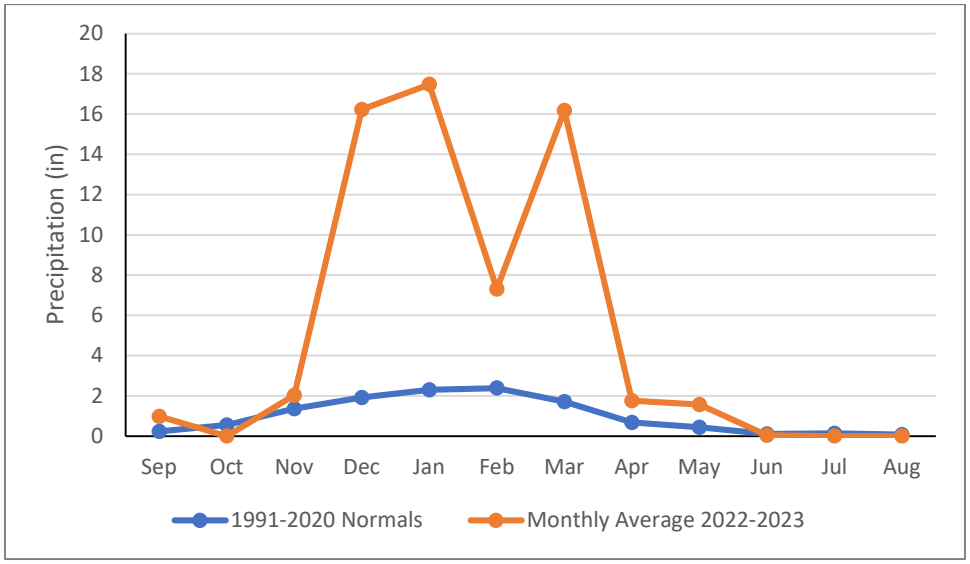
Topography

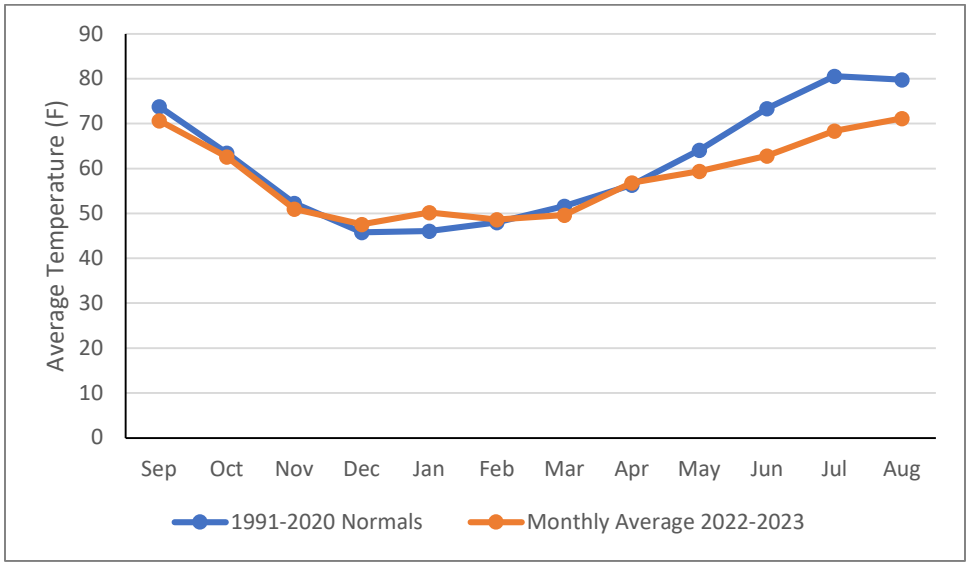
The study area lies on the generally west-, north-, and east-facing slopes of the southwestern foothills of Mount Burdell. The western portion of the study area is comprised of a network of fire roads and proposed trail alignments on the gentle to steep west-facing slopes east of Bowman Canyon Creek. The larger polygon at the northern end of the study area occupies generally north-facing, moderate to steep slopes above an unnamed, spring-fed tributary to Bowman Canyon Creek. A handful of small to moderate sized, north-south oriented, incised drainages punctuate this slope. This slope abruptly levels out at the extreme northern end of the study area which is relatively flat just above the unnamed tributary. The eastern portion of the study area is comprised of a single proposed trail alignment which meanders along the gentle to moderate generally east-facing slopes before its terminus at the Dwarf Oak Trail. Elevations within the study area range from approximately 200 feet (61 meters) along Bowman Canyon Road to approximately 960 feet (293 meters) near the junction of 13 Oaks Fire Road and Serpentine Fire Road.

Climate

Figure 3 shows total precipitation (inches) and average monthly temperature (F) from September 2022 to August 2023 compared to 30-year Normals from 1991-2020. Weather data was collected from the Kentfield NOAA weather station, which is the closest station collecting relevant data (NOAA 2023). Precipitation received during the 2022-23 period was significantly greater than 30-year Normals from December 2022 to March 2023 due to a series of large storm systems impacting the area. Precipitation received in December 2022 was 14.31 inches above 30-year Normals, January 2023 was 15.19 inches above, and March 2023 was 14.47 inches above. For the water year as a whole, data shows the area received 51.72 inches of precipitation above 30-year Normals, a more than 400% increase. Temperature ranges during the 2022-23 period were generally similar to 30-year Normals with slightly lower-than-average temperatures for 8 months of the year.

Figure 3. Local Precipitation and Temperature Against 30-Year Normals





Geology and Soils

A total of five geology mapping units (Blake et al. 2000; Figure 4) and a total of seven soil mapping units (USDA 2023; Figure 5) are located within the study area. These geology and soil mapping units and their represented acreage in the study area are shown in Tables 6 and 7. The symbol column in these tables refers to the abbreviation for these mapping units used in the geologic map and soil survey. The underlying geology in the study area is mostly comprised of Cretaceous and Jurassic Metamorphic rocks throughout with small amounts of Jurassic Metagreenstone and Quaternary Alluvium in the southwestern portion, Quaternary Landslide deposits in the eastern-most portion, and Jurassic Serpentinite in the northern-most portion (Blake et al. 2000). The majority of soils in the study area are of the Tocaloma-McMullin complex which are shallow to moderately deep soils that are well to somewhat excessively drained and formed in material weathered from sandstone, shale, basic igneous, and metamorphic rocks (USDA 2023). Moderate amounts of soils from the Saurin-Bonnydoon complex are present in the central portion of the study area.

These are shallow to moderately deep soils that are well to somewhat excessively drained and formed in material weathered from sandstone and shale. Henneke stony clay loam and Montara soils (present in Bonnydoon-Gilroy-Typic-Argixerolls) are shallow, well-drained soils that formed in material weathered from serpentine rocks, which drives edaphic conditions that heavily influence plant composition. These soils are present in the western and northeastern portions of the study area.

Table 6. Geology Units in the Study Area

SYMBOL	GEOLOGY MAPPING UNIT	ACREAGE
Qal	Alluvium (Quaternary)	1.59
Qls	Landslide deposits (Quaternary)	1.60
Jfmgs	Metagreenstone (Jurassic)	0.85
KJfm	Metamorphic rocks (Cretaceous and Jurassic)	92.30
sp	Serpentinite (Jurassic)	0.61
	Total	**96.96**

Table 7. Soil Mapping Units in the Study Area

SYMBOL	SOIL MAPPING UNIT	ACREAGE
101	Ballard gravelly loam, 2 to 9 percent slopes	0.09
105	Blucher-Cole complex, 2 to 5 percent slopes	0.64
108	Bonnydoon-Gilroy-Typic-Argixerolls, 50 to 75 percent slopes	7.40
129	Henneke stony clay loam, 15 to 50 percent slopes	2.65
164	Saurin-Bonnydoon complex, 50 to 75 percent slopes	16.50
179	Tocaloma-McMullin complex, 30 to 50 percent slopes	2.55
180	Tocaloma-McMullin complex, 50 to 75 slopes	67.13
	Total	**96.96**

Hydrology Characteristics

Hydrology onsite is influenced by precipitation, surface water runoff, geologic stratigraphy, topography, soil permeability, and plant cover. No blue line creeks pass through the study area. A series of generally north-south oriented ravines drain the large north-facing slope in the northern portion of the study, the westernmost of which is the most defined. These ravines carried flow through the May surveys but were dry by July. An unnamed tributary to Bowman Canyon Creek is located just north of the study area and flows in a westerly direction before draining into Bowman Canyon Creek along Bowman Canyon Road northwest of the study area. Bowman Canyon Creek is located just west of the study area and flows in a southerly direction before draining into Novato Creek on the south side of Novato Boulevard. Novato Creek flows east along Novato Boulevard, ultimately draining into San Pablo Bay just south of the Highway 37 Petaluma River bridge. One depression was observed in the study area near the abandoned quarry along the western-most proposed trail alignment where pooled water was observed during early season visits but dried up as the year progressed. While unique in plant composition, this feature did not qualify as a vernal pool nor did it meet the size requirement for inclusion as a sensitive natural community. Additionally, one mappable freshwater seep was observed in California annual and perennial grassland in the southwestern portion of the study area.

Land-Use

The study area lies entirely within MCP's Mount Burdell Preserve and within a larger network of protected open space, rural and suburban residential areas, and undeveloped privately owned land. During the 2023 field visits, cattle were observed grazing within the study area, though no other agricultural practices were observed. The private property immediately north of the study area houses a moderately sized solar panel field and an abandoned quarry. An abandoned quarry lies within the preserve but just outside of the study area along Bowman Canyon Road and minor debris and garbage were observed at this location during field visits. Trails and ranch/fire roads within the study area appear generally well-used and a number of improved social trails were observed in the larger wooded polygon in the northern portion of the study area. Trails within the Mount Burdell Preserve connect to Olompali State Park and O'Hair Park and can be accessed along Bowman Canyon Road and from the neighborhoods along the southern boundary of the preserve.

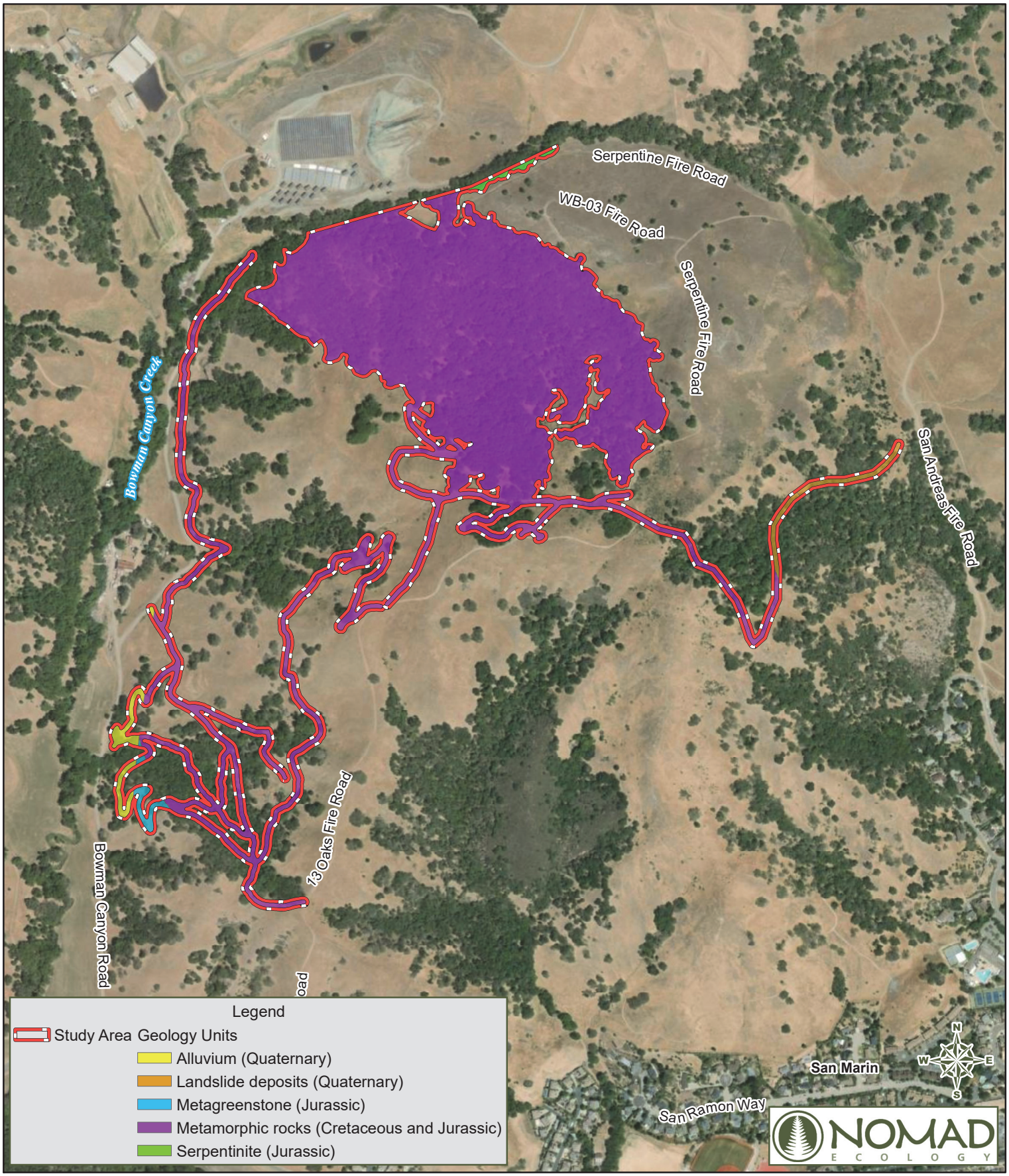


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Figure 4

GeologyUnits in the Study Area

Bowman Canyon Road & Trail Plan
Marin County Parks

Sources: ESRI, Blake et al.

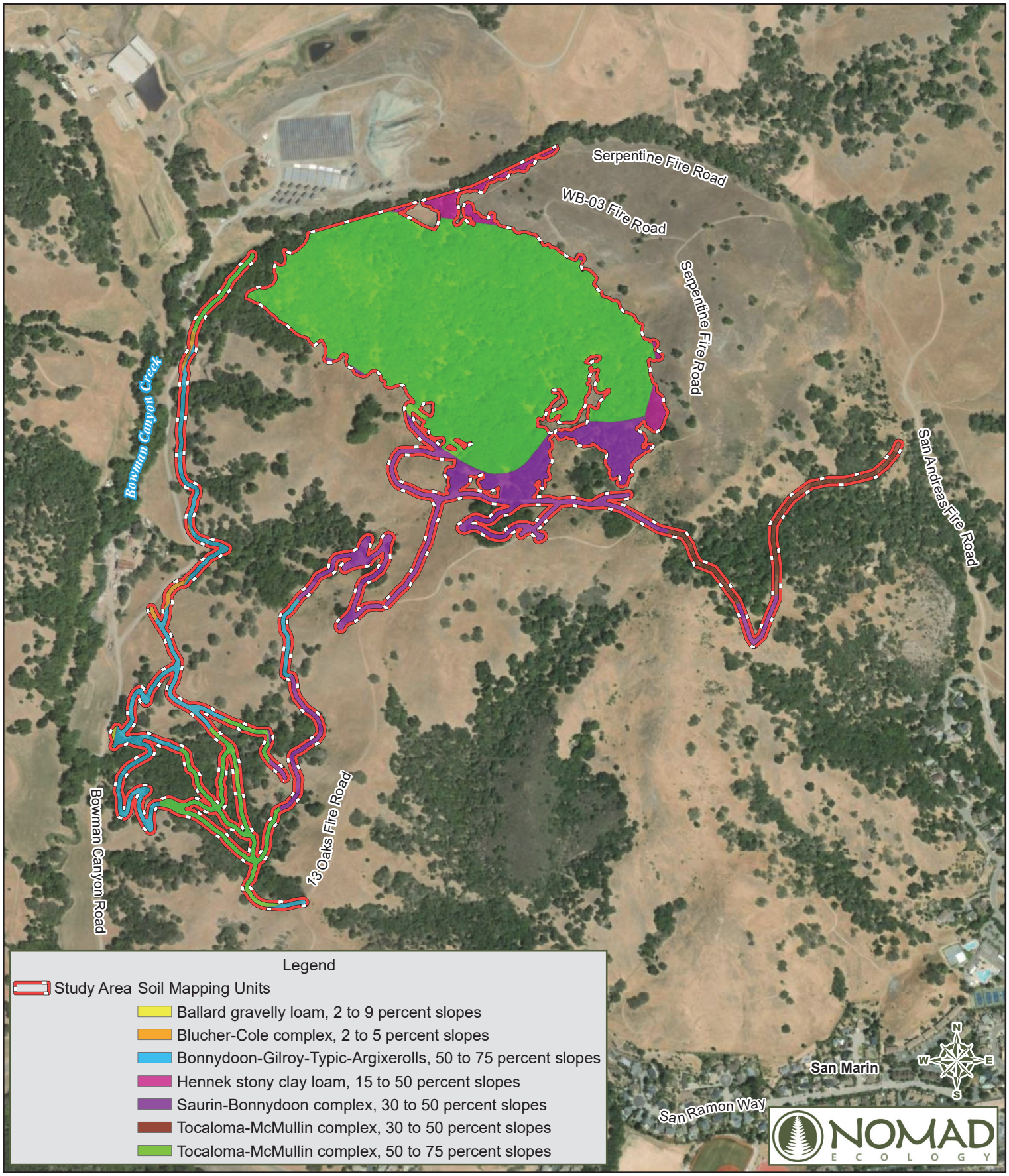

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Figure 5

Soil Mapping Units in the Study Area

Bowman Canyon Road & Trail Plan
Marin County Parks

Sources: ESRI, USDA

3.2. VEGETATION COMMUNITIES

This subsection describes vegetation within the study area utilizing the Marin County Fine Scale Vegetation Map (Parks Conservancy 2021). This map utilizes vegetation classes drawn from the standardized National Vegetation Classification (NVC), an 8-level hierarchy system based on physiognomy, biogeography, and floristics (USNVC 2022) which aligns with the California Manual of California Vegetation (MCV). The Marin County Fine Scale Vegetation Map provides a detailed community level description for the natural communities present within the study area (Table 8).

These vegetation communities are described below. The barren and sparsely vegetated land cover type is mapped sporadically and only where ranch/dirt roads are dominant and vegetation characteristics associated with surrounding vegetation communities are absent and, as such, is not discussed below. Table 8 shows the acreages by vegetation communities and Figure 6 depicts the distribution of these communities within the study area.

Table 9 relates vegetation types from the Marin County Fine Scale Vegetation Map to other commonly used vegetation classification systems including *CNPS Inventory of Rare and Endangered Plants of California* (CNPS 2023a), and *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The codes used in Table 9 reflect those associated with the *California Natural Communities List* (CDFW 2023a) which follows the MCV (Sawyer et al. 2009, CNPS 2023b).

Table 8. Vegetation Communities in the Study Area

VEGETATION COMMUNITY*	ACREAGE
Upland Herbaceous Dominated Vegetation Types	
Bromus carinatus – Elymus glaucus Herbaceous Alliance (California Brome – Blue Wildrye Prairie) (41.131.01) S3	0.13
California Annual and Perennial Grassland Macrogroup (California Annual and Perennial Grassland)	10.19
Micropus californicus Provisional Herbaceous Association (Cottonweed Patches) (44.108.21) S2	Point Data
Nasella (*Stipa*) *pulchra* Herbaceous Alliance (Purple Needlegrass Grassland) (41.150.04) S3S4	2.33
Shrub Dominated Vegetation Types	
Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	0.17
Baccharis pilularis – Nasella (*Stipa*) *pulchra* Shrubland Association (Coyote Brush – Purple Needlegrass Scrub) (32.060.21) S3	0.23
Woodland and Forest Vegetation Types	
Quercus agrifolia Woodland & Forest Alliance (Coast Live Oak Woodland) (71.060.00)	5.45
Quercus agrifolia – Umbellularia californica Woodland & Forest Association (Coast Live Oak – California Bay Woodland & Forest) (71.060.048) S3	38.71
Quercus garryana Forest & Woodland Alliance (Oregon White Oak Woodland & Forest) (71.030.00) S3	8.80
Quercus kelloggii Forest & Woodland Alliance (California Black Oak Forest & Woodland) (71.010.00)	2.58
Quercus lobata Woodland Alliance (Valley Oak Woodland & Forest) (71.045.00) S3	0.86
Umbellularia californica Forest & Woodland Alliance (California Bay Forest & Woodland) (74.100.00) S3	28.78
Wetland Vegetation Types	

VEGETATION COMMUNITY*	ACREAGE
Freshwater Seeps (Not Described)	Point Data
Other	
Barren and Sparsely Vegetated (Not Described)	0.72
Total:	**96.96**

*Latin names conform to those used by MCV (Sawyer et al. 2009, CNPS 2023b) which do not follow current taxonomy in all cases.

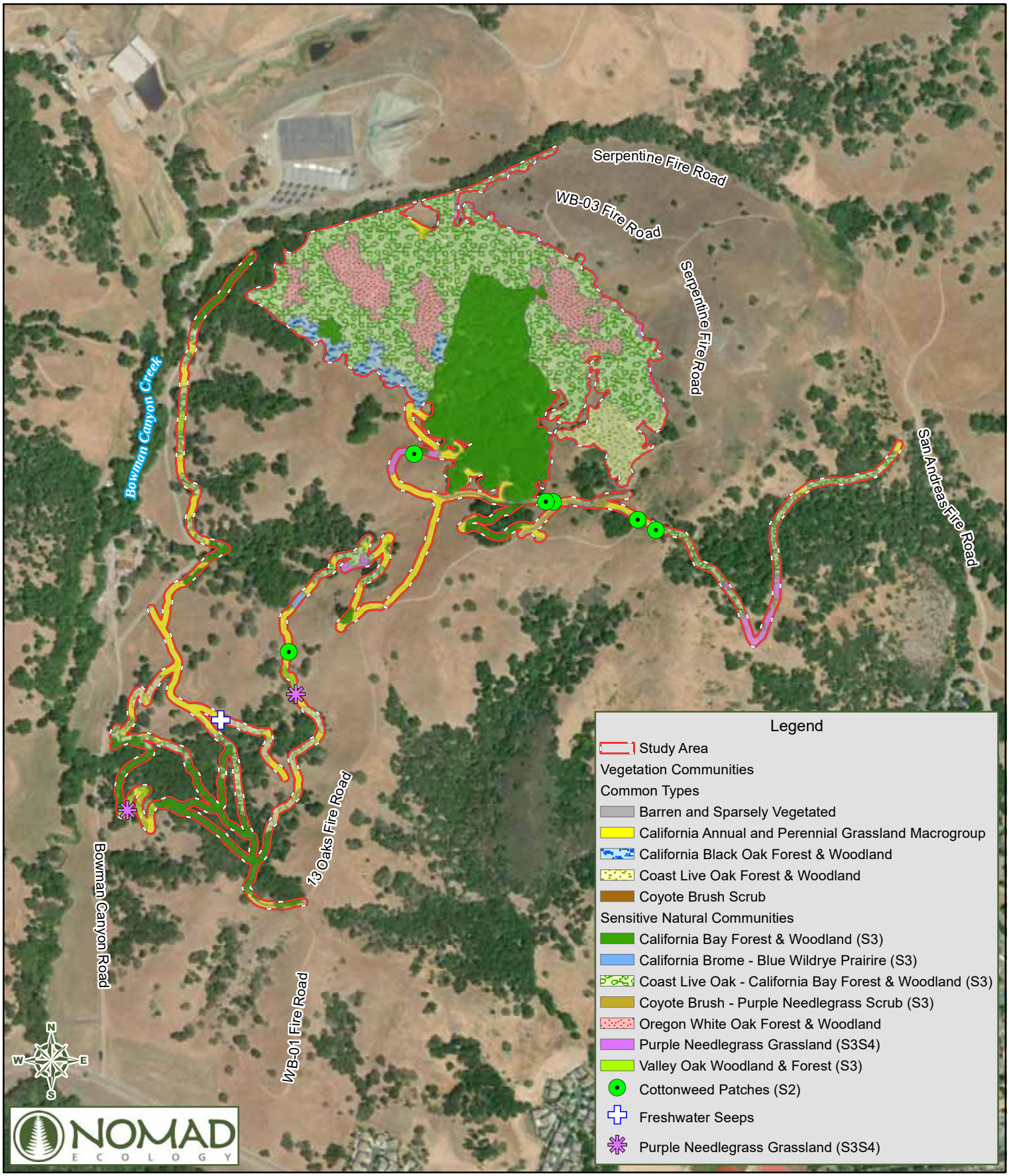

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Figure 6

Vegetation Communities in the Study Area

Bowman Canyon Road & Trail Plan
Marin County Parks

Sources: ESRI, Nomad Ecology

Table 9. Vegetation Community Classification Systems Comparison

Vegetation Community Classification Systems		
Marin County Fine Scale Vegetation Map[7]	CNPS Inventory[8]	Wetlands & Deepwater Habitats[9]
Upland Herbaceous Dominated Vegetation Types		
Bromus carinatus – Elymus glaucus Herbaceous Alliance (California Brome – Blue Wildrye Prairie) (41.131.01) S3	Valley and Foothill Grassland	Upland
California Annual and Perennial Grassland Macrogroup (California Annual and Perennial Grassland)	Valley and Foothill Grassland	Upland
Micropus californicus Provisional Herbaceous Association (Cottonweed Patches) (44.108.21) S2	Valley and Foothill Grassland	Upland
Nasella (*Stipa*) *pulchra* Herbaceous Alliance (Purple Needlegrass Grassland) (41.150.04) S3S4	Valley and Foothill Grassland	Upland
Shrub Dominated Vegetation Types		
Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	Coastal Scrub	Upland
Baccharis pilularis – Nasella (*Stipa*) *pulchra* Shrubland Association (Coyote Brush – Purple Needlegrass Scrub) (32.060.21) S3	Coastal Scrub	Upland
Woodland and Forest Vegetation Types		
Quercus agrifolia Woodland & Forest Alliance (Coast Live Oak Woodland) (71.060.00)	Broadleaved Upland Forest Cismontane Woodland	Upland
Quercus agrifolia – Umbellularia californica Woodland & Forest Association (Coast Live Oak – California Bay Woodland & Forest) (71.060.048) S3	Broadleaved Upland Forest Cismontane Woodland Riparian Forest	Upland
Quercus garryana Forest & Woodland Alliance (Oregon White Oak Woodland & Forest) (71.030.00) S3	Broadleaved Upland Forest Cismontane Woodland	Upland
Quercus kelloggii Forest & Woodland Alliance (California Black Oak Forest & Woodland) (71.010.00)	Broadleaved Upland Forest Cismontane Woodland	Upland

[7] Marin County Fine Scale Vegetation Map (Parks Conservancy 2021), United States National Vegetation Classification (USNVC 2021), A Manual of California Vegetation (Sawyer *et al*. 2009, CNPS 2023b), and California Natural Community List (CDFW 2023a)

[8] CNPS Inventory of Rare and Endangered Plants of California Habitat Types (CNPS 2001b)

[9] Classification of Wetlands & Deepwater Habitats of the U.S. (Cowardin et al. 1979)

VEGETATION COMMUNITY CLASSIFICATION SYSTEMS		
MARIN COUNTY FINE SCALE VEGETATION MAP[7]	**CNPS INVENTORY[8]**	**WETLANDS & DEEPWATER HABITATS[9]**
Quercus lobata Woodland Alliance (Valley Oak Woodland & Forest) (71.045.00) S3	Broadleaved Upland Forest Cismontane Woodland	Upland
Umbellularia californica Forest & Woodland Alliance (California Bay Forest & Woodland) (74.100.00) S3	Broadleaved Upland Forest Cismontane Woodland Riparian Forest	Upland
WETLAND HERBACEOUS VEGETATION TYPES		
Freshwater Seeps (Not Described)	Meadows and Seeps	Palustrine Non-Persistent Emergent Wetland
OTHER		
Barren and Sparsely Vegetated (Not Described)	NA	Upland

3.2.1 UPLAND HERBACEOUS VEGETATION TYPES

***Bromus carinatus – Elymus glaucus* Herbaceous Alliance (California Brome – Blue Wildrye Prairie)**

As described by Sawyer *et al.* (2009) this alliance is characterized by California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), and/or bracken fern (*Pteridium aquilinum* subsp. *pubescens*) being dominant or co-dominant in the herbaceous layer with other forbs and grasses present including yarrow (*Achillea millefolium*), bigflower agoseris (*Agoseris grandiflora*), scarlet pimpernel (*Lysimachia arvensis**), slender oats (*Avena barbata**), ripgut brome (*Bromus diandrus**), soft chess (*Bromus hordeaceus**), wild carrot (*Daucus pusillus*), brome fescue (*Festuca bromoides**), foxtail fescue (*Festuca myuros**), cut-leaf geranium (*Geranium dissectum**), California buttercup (*Ranunculus californicus* var. *californicus*), and blue-eyed grass (*Sisyrinchium bellum*), among others. Emergent shrubs may be present at low cover, including poison oak (*Toxicodendron diversilobum*). Herbaceous species reach heights of 3.3 feet (1 meter) and cover is open to continuous. The shrub layer is sparse to open. Membership rules dictate California brome, blue wildrye, and/or bracken fern comprise greater than 30% relative cover in the herbaceous layer. This alliance occurs on basins, terraces, dry floodplains, steep mesic slopes, and forest openings at elevation between 33 and 5,249 feet (10 and 1,600 meters).

Late season photo of California brome – blue wildrye prairie showing prevalence of bracken fern.
Photo date: September 19, 2023.

California brome – blue wildrye prairie was limited to a single polygon along the proposed trail alignment in the western portion of the study area. It was observed on steep northwest-facing slopes upslope from California bay forest & woodland and within a larger matrix of California annual and perennial grassland. It was dominated in the herbaceous layer by California brome (*Bromus sitchensis* var. *carinatus*), bracken fern, and blue wildrye with other forbs present including coyote mint (*Monardella villosa* subsp. *villosa*), yarrow, California saxifrage (*Micranthes californica*), lady's mantle (*Aphanes occidentalis*),dogtail grass (*Cynosurus echinatus**), purple sanicle (*Sanicula bipinnatifida*), tomcat clover (*Trifolium willdenovii*), slender phlox (*Microsteris gracilis*), slender oats*, harvest brodiaea (*Brodiaea elegans* subsp. *elegans*), and

* denotes species that are not native to California

California skullcap (*Scutellaria californica*), among others. Overall, this community had a high level of native integrity. No shrub or tree cover was observed in this community.

California Annual and Perennial Grassland Macrogroup (California Annual and Perennial Grassland)

This macrogroup includes relictual native perennial grasslands, native annual grasslands, and native annual forb meadows of California (USNVC 2022). Characteristic traits include a dominance by native cool-season bunchgrasses including blue wildrye, California fescue (*Festuca californica*), California melic (*Melica californica*), foothill needlegrass (*Stipa lepida*), and purple needlegrass (*S. pulchra*). Native annual species include fiddleneck (*Amsinckia* spp.), poppy (*Eschscholzia* spp.), lupine (*Lupinus* spp.), popcorn flower (*Plagiobothrys nothofulvus*), and Eastwood fescue (*Festuca microstachys*), among others, are also present. Generally, these occurrences have high native species richness, although many now have a significant abundance of non-native species. Herbs are generally less than 6.6 feet (2 meters) in height. Once more widespread, this macrogroup is now limited to small relictual, remnant, and restored stands best represented on xeric to mesic ultramafic sites where non-native annual grasses are less adapted. This macrogroup occurs on bluff, valley, and foothill locations on all topographic locations on soils that range from well-drained and fine textured with high clay content to more shallow and rocky soils. It occurs at elevations below 5,577 feet (1,700 meters).

California annual and perennial grassland in the western portion of the study area with emergent coyote brush present. Photo date: March 7, 2023.

California annual and perennial grassland in the study area with California buttercup visible in foreground.
Photo date: May 5, 2023.

Late season California annual and perennial grassland showing dominant hayfield tarweed.
Photo date: September 19, 2023.

California annual and perennial grassland is widespread and common in the non-wooded portions of the study area, accounting for more than 10% of total acreage. It was observed on all slopes and aspects. Many areas of California annual and perennial grassland were slightly to moderately disturbed and had high cover of non-native species including ripgut brome*, slender oats*, wild oats (*Avena fatua**), false brome (*Brachypodium distachyon**), soft chess*, dogtail grass*, rough cat's ear (*Hypochaeris radicata**), smooth cat's ear (*Hypochaeris glabra**), nit grass (*Phleoides gastridium**), Italian ryegrass (*Festuca perennis**), long-beaked filaree (*Erodium botrys**), yellow star thistle (*Centaurea solstitialis**), Italian thistle (*Carduus pycnocephalus* subsp. *pycnocephalus**), field madder (*Sherardia arvensis**) rose clover (*Trifolium hirtum**), brome fescue*, hedge parsley (*Torilis arvensis**), and shepherd's needle (*Scandix pectens-veneris**), among others. However, many areas retained a moderate to high level of native integrity with

significant cover of California brome, purple needlegrass, shining peppergrass (*Lepidium nitidum*), hayfield tarweed (*Hemizonia congesta* subsp. *lutescens*), few-flowered evax (*Hesperevax sparsiflora* var. *sparsiflora*), foothill needlegrass, California poppy (*Eschscholzia californica*), Kellog's yampah (*Perideridia kelloggii*), lady's mantle, native clovers (*Trifolium* spp.), Muehlenberg's centaury (*Zeltnera muehlenbergii*), California buttercup, one-sided bluegrass (*Poa secunda* subsp. *secunda*), blue-eyed grass, dwarf plantain (*Plantago erecta*), and California melic, among others. Emergent shrubs and *Quercus* spp. saplings were also observed within this community.

***Micropus californicus* Provisional Herbaceous Association (Cottonweed Patches)**

This association is described by Sawyer et al. (2009) with slender cottonweed (*Micropus californicus*) being characteristically present in the herbaceous layer with a variety of other native and non-native herbaceous species. Shrub and tree cover are absent and herbaceous cover is open to continuous. Herbs reach heights of 23.6 inches (60 centimeters). Membership rules dictate that slender cottonweed comprise greater than 30% relative cover individually in the herbaceous layer, or greater than 50% relative cover collectively with other native herbaceous species. It occurs on ridges and slopes of all aspects on shallow loams and clays, especially on volcanic and serpentine substrates. Elevations range from 279 to 3,773 feet (85 to 1,150 meters).

Cottonweed patches on west-facing slopes in the western portion of the study area.
Photo date: April 5, 2023

Within the study area, cottonweed patches were observed at six locations where they are represented by point data. They were observed in California annual and perennial grassland and purple needlegrass grassland, on north- and west-facing slopes and often on thin or compacted soils. It shares many of the same herbaceous species with California annual and perennial grassland, but with high relative cover of slender cottonweed (*Micropus californicus* subsp. *californicus*). No trees or shrubs were observed within this community, however it was observed adjacent to coyote brush (*Baccharis pilularis* subsp. *consanguinea*) patches and/or individuals at a number of locations.

***Stipa* (*Nassella*) *pulchra* Herbaceous Alliance (Purple Needlegrass Grassland)**

This alliance is described in Sawyer et al. (2009) with purple needlegrass as dominant or characteristically present in the herbaceous layer with other perennial grasses and herbs. Emergent trees and shrubs may be present at low cover. Herbs are generally less than 3.3 feet (1 meters) in height and cover is open to

continuous. According to membership rules for grasslands to be classified as purple needlegrass grassland, purple needlegrass must be characteristically present in the herbaceous layer with at least 2% absolute cover or have a clear presence in the stand with greater than 5% absolute cover in the herbaceous layer. Habitat for this vegetation community in California includes all topographic locations at elevations below 5,577 feet (1,700 meters). Soils may be deep with high clay content, loamy, sandy, or silty and derived from mudstone, sandstone, or serpentine parent material.

Purple needlegrass grassland on slopes in the study area.
Photo date: April 5, 2023

Purple needlegrass grassland in the eastern portion of the study area.
Photo date: May 8, 2023

Purple needlegrass grassland is present in the study area in small to large patches in the western, central, and eastern portions of the study area along proposed trail alignments, and in a more contiguous manner in the serpentine Henneke stony clay loam soils and just outside the canopy line of the large wooded slope in the northern portion of the study area. It was observed on all slopes and aspects. Where observed in a more

contiguous manner, this community was widespread although only small portions were located within the study area boundary. Where observed off of serpentine soils, this species was dominated by purple needlegrass with smaller amounts of Idaho fescue (*Festuca idahoensis*), blue wildrye, California melic, one-sided blue grass, valley tassels (*Castilleja attenuata*), cottonweed, dove lupine (*Lupinus bicolor*), slender phlox, woodland star (*Lithophragma affine*), California buttercup, native clovers, tall annual willow-herb (*Epilobium brachycarpum*), wild carrot, dogtail grass*, false brome*, dwarf plantain, white plectritis (*Plectritis macrocera*), and tomcat clover, among others. Where observed on serpentine soils, vegetative cover was generally lower with purple needlegrass dominant and other native forbs present including dwarf plantain, few-flowered evax, smooth chickweed (*Stellaria nitens*), coyote mint, shining peppergrass, dwarf athysanus (*Athysanus pusillus*), coffee fern (*Pellaea andromedifolia*), Douglas's sandwort (*Sabulina douglasii*), few-flowered collinsia (*Collinsia sparsiflora* var. *sparsiflora*), California goldbanner (*Thermopsis californica* var. *californica*), cream cups (*Platystemon californicus*), lady's mantle, minute willow herb (*Epilobium minutum*), Spanish clover (*Acmispon americanus* var. *americanus*), hayfield tarweed, and big squirrel tail (*Elymus multisetus*), among others. Both on and off serpentine soils, this community was observed with high to very high levels of native integrity.

3.2.2 Shrub Dominated Vegetation Types

***Baccharis pilularis* Shrubland Alliance (Coyote Brush Scrub)**

This alliance is described in Sawyer et al. (2009) with coyote brush being dominant or co-dominant in the shrub canopy with other native shrubs including California sage (*Artemisia californica*), bush monkeyflower (*Diplacus aurantiacus*), oceanspray (*Holodiscus discolor* var. *discolor*), California blackberry (*Rubus ursinus*), and poison oak. Emergent trees may be present at low cover including coast live oak (*Quercus agrifolia* var. *agrifolia*) or California bay (*Umbellularia californica*). The shrub canopy is less than 9.8 feet (3 meters) tall and of variable cover. The membership rules for this alliance require coyote brush be greater than 50% absolute cover in the shrub layer or greater than 15% shrub cover over a grassy understory. 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 between 0 to 4,921 feet (0 to 1,500 meters) in elevation. Soils include a broad range of types from sandy to relatively clayey.

Coyote brush scrub near the central portion of the study area.
Photo date: March 7, 2023

Within the study area, coyote brush scrub was observed in small patches on north-facing slopes near the junction of 13 Oaks Fire Road and Serpentine Fire Road. These areas were characterized by a dominance in the continuous shrub layer by coyote brush with small amounts of bush monkeyflower, oso berry (*Oemleria cerasiformis*), and poison oak present. The herbaceous layer was thick to sparse and largely confined to the borders. Species observed included bee plant (*Scrophularia californica*), ladies tobacco (*Pseudognaphalium californicum*), Pacific sanicle, California acaena (*Acaena californica*), sheep sorrel (*Rumex acetosella**), blue-eyed grass, brome fescue*, slender cottonweed, and mugwort (*Artemisia douglasiana*), among others. No emergent trees were observed.

***Baccharis pilularis – Nasella* (*Stipa*) *pulchra* Shrubland Association (Coyote Brush – Purple Needlegrass Scrub)**

This association shares many characteristics with coyote brush scrub although it is characterized by a more open shrub canopy and a characteristic presence in the herbaceous layer of purple needlegrass. Habitat for this alliance is ridges and upper slopes of all aspects on fractured rock outcrops, including limestone and marble and rarely flooded rocky alluvium between 328 and 7,874 feet (100 to 2,400 meters). Soils are often shallow, rocky, and well drained (Sawyer et al. 2009).

Coyote brush – purple needlegrass scrub is limited in extent in the study area and occurs on north- and northeast-facing slopes along the proposed trail alignment in the eastern portion of the study area and in the vicinity of the junction of 13 Oaks Fire Road and Serpentine Fire Road. It was dominated in the shrub layer by coyote brush with a more open canopy than observed in coyote brush scrub. The herbaceous layer was similar in composition to that found in coyote brush scrub but was thicker and characterized by a presence of purple needlegrass in the grassy understory. No emergent trees were observed in the community.

3.2.3 WOODLAND AND FOREST VEGETATION TYPES

***Quercus agrifolia* Woodland & Forest Alliance (Coast Live Oak Woodland & Forest)**

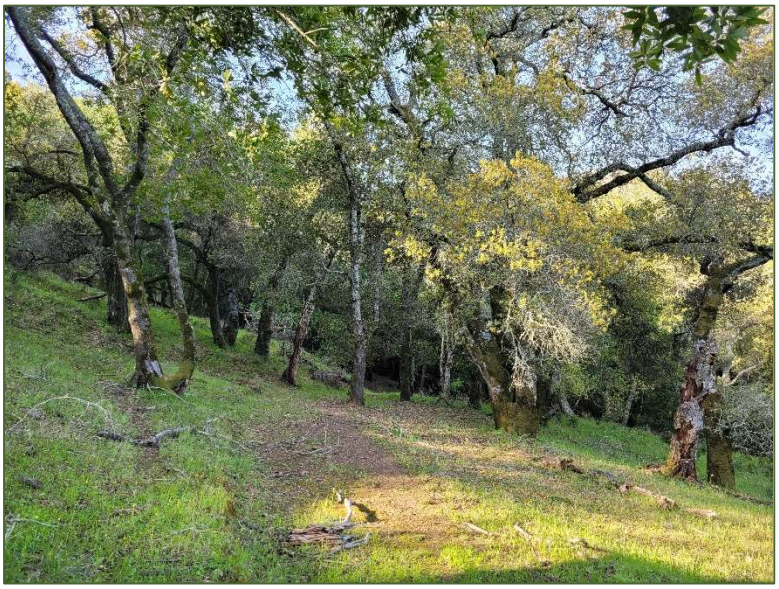
This alliance is described with coast live oak being dominant or co-dominant in the tree canopy and occurring with other native broadleaved trees (Sawyer et al. 2009). Trees are less than 98 feet (30 meters) tall and the canopy is open to continuous. The shrub layer is sparse to intermittent and the 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 and if present, California bay must be below 33% relative cover. 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 below 3,937 feet (1,200 meters) in elevation.

Coast live oak woodland & forest adjacent to California annual and perennial grassland in the study area.
Photo date: May 4, 2023

Coast live oak was observed in a patchy manner in the southwestern portion of the study area where the proposed trail alignment passes through larger stands of coast live oak and in the southeastern portion of the large wooded slope in the northern portion of the study area. It was observed on north- and west-facing slopes. It was dominated in the tree canopy by coast live oak and had smaller amounts of California bay, toyon (*Heteromeles arbutifolia*), California buckeye (*Aesculus californica*), California black oak (*Quercus kelloggii*), and Oregon oak (*Quercus garryana* var. *garryana*). The shrub layer was sparse in this community, comprised of scattered snowberry (*Symphoricarpos albus* subsp. *laevigata*), creeping snowberry (*Symphoricarpos mollis*), oceanspray, California blackberry, and poison oak. The herbaceous layer varied from thick and grassy to more open. Herbaceous species observed include rough hedge nettle, wood fern, climbing bedstraw (*Galium porrigens* var. *porrigens*), pacific pea (*Lathyrus vestitus* var. *vestitus*), gold back fern (*Pentagramma triangularis*), milk maids (*Cardamine californica*), canyon nemophila, sweet cicely (*Osmorhiza berteroi*), false lily of the valley (*Maianthemum stellatum*), Torrey's melic grass (*Melica torreyana*), wood rush (*Luzula comosa* var. *comosa*), Italian thistle*, and false brome*, among others.

Quercus agrifolia – Umbellularia californica Woodland & Forest Association (Coast Live Oak – California Bay Woodland & Forest)

This alliance is described by Sawyer et al. (2009) with coast live oak and California bay being co-dominant in the tree canopy and occurring with other native broadleaved trees. Trees are less than 98 feet (30 meters) tall and 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 and California bay be greater than 33% relative cover. 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 below 3,937 feet (1,200 meters) in elevation.



Coast live oak – California bay woodland & forest on north-facing slopes in the study area.
Photo date: April 5, 2023

Coast live oak – California bay woodland & forest in the study area with a more robust herbaceous layer.
Photo date: May 8, 2023

Coast live oak – California bay woodland & forest is widespread and common in the study area, comprising large swaths of the wooded north-facing slope in the northern portion of the study area. It was characterized by coast live oak and California bay as co-dominants in a continuous tree canopy with smaller amounts of California buckeye, Oregon oak, toyon, and California black oak present. The shrub layer was generally sparse with scattered individuals or small patches of shrubs. Shrubby species observed include snowberry (*Symphoricarpos albus* subsp. *laevigata*), creeping snowberry (*Symphoricarpos mollis*), oceanspray, California blackberry, oso berry, California honeysuckle (*Lonicera hispidula*), and poison oak individuals. The herbaceous layer varied from absent to continuous. Certain areas where thick with Italian thistle*, California fescue, false brome*, ripgut brome*, Kellogg's tauschia (*Tauschia kelloggii*), sweet cicely, California bedstraw (*Galium californicum* var. *californicum*), ground iris (*Iris macrosiphon*), milk maids,

shooting stars (*Primula hendersonii*, woodland brome (*Bromus laevipes*), California strawberry (*Fragaria vesca*), giant trillium (*Trillium chloropetalum*), and hound's tongue (*Adelina grandis*), among others, while other areas had very low vegetative cover consisting of sword fern (*Polystichum munitum*), wood fern, and Torrey's melic grass, among others.

Quercus garryana Forest & Woodland Alliance (Oregon White Oak Woodland & Forest)

This alliance is described with Oregon white oak dominant or co-dominant in the tree canopy with California black oak and California bay in the tree layer (Sawyer et al. 2009). Trees are less than 98.4 feet (30 meters) tall and the canopy is open to continuous or savanna-like. The shrub layer is usually open, and the herbaceous layer is open to intermittent and mostly grassy. Membership rules dictate Oregon white oak comprise greater than 30% relative cover in the tree canopy. This alliance occurs on raised stream benches, terraces, slopes, and ridges of all aspects at elevations ranging from 199 to 5,906 feet (60 to 1,800 meters).

Oregon oak woodland & forest in the study area.
Photo date: March 8, 2023

Oregon white oak woodland and forest is present in the study area as four discrete polygons on the north-facing wood slopes in the northern portion of the study area. Where observed it was almost entirely dominated by Oregon oak in an open tree canopy with smaller amounts of California bay, California black oak, and coast live oak scattered throughout. The shrub layer was absent and the herbaceous layer was generally thick. Herbaceous species observed in the understory include California fescue, California bedstraw, sweet cicely, hedge parsley*, knotted hedge parsley (*Torilis nodosa**), ground iris, chickweed (*Stellaria media**), false brome*, ripgut brome*, blue wildrye, canyon nemophila, Torrey's melic grass, mouse-ear chickweed (*Cerastium glomeratum**), California buttercup, Ithuriel's spear (*Triteleia laxa*), soap plant, and American vetch (*Vicia americana* subsp. *americana*), among others. During later season surveys, Italian thistle* was observed to be thick and continuous in parts of this community.

Quercus kelloggii Forest & Woodland Alliance (California Black Oak Forest & Woodland)

This alliance is described with California black oak dominant or co-dominant in the tree canopy with toyon, coast live oak, Oregon oak, and California bay in the tree layer (Sawyer et al. 2009). Trees are less than 131.2 feet (40 meters) tall and the canopy is open to continuous or savanna-like. The shrub layer is open to intermittent, and the herbaceous layer is sparse or grassy. Membership rules dictate California black oak comprise greater than 50% relative cover in the tree canopy. This alliance occurs on all aspects and

topographic settings on moderately to excessively drained soils at elevations ranging from 199 to 8,202 feet (60 to 2,500 meters).

California black oak woodland & forest in the study area.
Photo date: April 6, 2023

California black oak forest and woodland is mapped as three discrete polygons in the southwestern part of the north-facing wooded slope in the northern portion of the study area. Where observed it was dominated by large California black oak with a very open tree canopy and scattered California bay, coast live oak, and Oregon oak present at low cover. The shrub layer was generally absent, consisting of low cover of oso berry, oceanspray, and California blackberry where present. The herbaceous layer was continuous and grassy, consisting of false brome*, California fescue, slender oats*, wild oats*, ground iris, miner's lettuce, California buttercup, Italian thistle*, yarrow, blue dicks (*Dipterostemon capitatus* subsp. *capitatus*), wood rush, mugwort, bee plant, bull thistle (*Cirsium vulgare**), harvest brodiaea, and bedstraw (*Galium aparine*), among others.

Quercus lobata **Woodland Alliance (Valley Oak Woodland & Forest)**

This alliance is described with valley oak (*Quercus lobata*) being dominant or co-dominant in the tree canopy and occurring with other native broadleaved trees including oaks (*Quercus* spp.), willows (*Salix* spp.), and other trees (Sawyer et al. 2009). Trees are less than 98.4 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 comprise 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.

Valley oak woodland & forest along a proposed trail alignment in the study area.
Photo date: March 7, 2023

Valley oak woodland and forest is mapped in three locations on west-facing slopes along proposed trail alignments in the western and southwestern portions of the study area. Where present, it is dominated by valley oak in the tree layer with an open canopy. The shrub layer is very sparse to absent and the herbaceous layer is grassy and continuous. Herbaceous species observed in this community include slender oats*, false brome* ripgut brome*, California melic, California buttercup, miner's lettuce, soap plant, rough hedge nettle, ground iris, knotted hedge parsley*, rough cat's ear*, sheep sorrel*, purple needlegrass, and soft chess*, among others.

***Umbellularia californica* Forest & Woodland Alliance (California Bay Forest & Woodland)**

This alliance is described with California bay as dominant or co-dominant in the tree or tall shrub canopy with other native trees including California buckeye and/or coast live oak (Sawyer et al. 2009). Trees are less than 82 feet (25 meters) in height, occasionally reaching 98 feet (30 meters) and the canopy ranges from intermittent to continuous. 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 50% relative cover in the overstory or greater than 30% relative cover when growing with white alder or interior live oak and with conifers less than 30% relative cover. Habitat for this alliance is alluvial benches, streamsides, valley bottoms, coastal bluffs, inland ridges, steep north-facing slopes, and rocky outcrops on shallow to deep, sandy to clay loam soils below 3,937 feet (1,200 meters) in elevation.

California bay forest & woodland on an ephemeral drainage on north-facing slopes in the study area.
Photo date: May 8, 2023

California bay forest & woodland with sparse understory in the study area.
Photo date: September 19, 2023

California bay forest & woodland is mapped in large polygons on the north-facing slope in the northern portion of the study area and in the wooded areas in the southwestern portion. It is characterized by a dominance in the tree canopy by California bay with smaller amounts of coast live oak, California buckeye, and toyon. The shrub layer was sparse, consisting of snowberry, oceanspray, poison oak, and oso berry where present. The herbaceous layer was similarly sparse in this community, consisting of California maidenhair fern (*Adiantum jordanii*), sword fern, wood fern, giant trillium, drops of gold, sweet-scented bedstraw (*Galium triflorum*), hillside star (*Lithophragma heterophyllum*), goldback fern, and canyon nemophila, among others.

3.2.4 WETLAND VEGETATION TYPES

Freshwater Seeps

While not described or mapped in the Marin County Fine Scale Vegetation map, freshwater seeps are present in areas that receive perennial moisture input through groundwater seepage and are distinct and localized mesic communities within larger matrices of upland areas. They are generally dominated by species adapted to waterlogged or seasonally flooded substrates and often qualify as seasonal or permanent wetlands.

Freshwater seep during late season surveys with senesced common spikerush and *Juncus* spp., hayfield tarweed, and rutted tire tracks.
Photo date: September 18, 2023

Within the study area, one freshwater seep was mapped on southwest-facing slopes along the Band-Tailed Fire Road in the southwestern portion of the study area. It was observed within a larger California annual and perennial grassland and was characterized by distinct species composition and mesic soils through the first three surveys although it was dry during July and September surveys. There was no tree or shrub layer present. Characteristic herbaceous species include common spikerush (*Eleocharis macrostachya*), rabbitsfoot grass (*Polypogon monspeliensis**), Mediterranean barley (*Hordeum marinum* subsp. *gussoneanum**), tall flatsedge (*Cyperus eragrostis*), Italian wildrye*, strawberry clover (*Trifolium fragiferum**), and juncus (*Juncus* spp.), among others. As this seep dried out during late season surveys, stinkwort (*Dittrichia graveolens**), hayfield tarweed, and yellow star thistle* became more prevalent.

Section 4. RESULTS

During this study, a total of 324 plant species were observed within the study area. Of these species, 230 (approximately 71%) are considered native species and 94 (approximately 29%) are considered non-native species that have an origin outside of California. Generally, native species comprised higher cover and abundance than non-native plant species within serpentine, scrub, native herbaceous, California bay forest & woodland, and California black oak forest & woodland communities. While California annual and perennial grassland and other forest & woodland communities had areas of moderate to high native integrity, these communities were also observed to have areas of high non-native species cover. A complete list of plant species observed within the study area is presented in Appendix A.

4.1. SENSITIVE NATURAL COMMUNITIES

During the 2023 surveys, a total of eight sensitive natural communities currently recognized by CDFW (2023a) were observed within the study area. Although not considered a sensitive natural community by CDFW, freshwater seeps are included here as they may be considered potentially jurisdictional wetland features. These communities and their acreages appear in Table 10 and their locations in the study area are depicted in Figure 6.

Table 10. Sensitive Natural Communities in the Study Area

VEGETATION TYPE	CONSERVATION STATUS RANK	ACREAGE (OR POINT LOCATION)
UPLAND HERBACEOUS DOMINATED VEGETATION TYPES		
Bromus carinatus – Elymus glaucus Herbaceous Alliance (California Brome – Blue Wildrye Prairie)	S3	0.13
Micropus californicus Provisional Herbaceous Association (Cottonweed Patches)	S2	Point Data
Nasella (*Stipa*) *pulchra* Herbaceous Alliance (Purple Needlegrass Grassland)	S3S4	2.33
SHRUB DOMINATED VEGETATION TYPES		
Baccharis pilularis – Nasella (*Stipa*) *pulchra* Shrubland Association (Coyote Brush – Purple Needlegrass Scrub)	S3	0.23
WOODLAND DOMINATED VEGETATION TYPES		
Quercus agrifolia – Umbellularia californica Woodland & Forest Association (Coast Live Oak – California Bay Woodland & Forest)	S3	38.71
Quercus garryana Forest & Woodland Alliance (Oregon White Oak Woodland & Forest)	S3	8.80
Quercus lobata Woodland Alliance (Valley Oak Woodland & Forest)	S3	0.86
Umbellularia californica Forest & Woodland Alliance (California Bay Forest & Woodland)	S3	26.78
WETLAND HERBACEOUS VEGETATION TYPES		
Freshwater Seeps	---	Point Data
	Total	**77.84**

[1]**Explanation of Status Codes**
State Codes

S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
? 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

Cottonweed patches are considered high inventory priority as they have a Conservation Status Rank of S2 (CDFW 2023a). 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 2023). Cottonweed patches are present within California annual and perennial grassland and purple needlegrass grassland throughout the study area.

Seven sensitive natural communities within the study area have a Subnational Conservation Status Rank of S3 including California brome – blue wildrye prairie, coyote brush – purple needlegrass scrub, coast live oak – California bay forest & woodland, Oregon white oak woodland & forest, valley oak woodland & forest, and California bay forest & woodland. Additionally, purple needlegrass grassland has a Conservation Status Rank of S3S4, which would be rounded to the more imperiled rank, S3, in NatureServe's rounded ranks (CDFW 2023a, NatureServe 2023). Rounded ranks convert conservation status ranks that span multiple ranks into a single value that is easier to interpret. California brome – blue wildrye prairie is limited to a single polygon along the proposed trail alignment in the western portion of the study area. Coyote brush – purple needlegrass scrub occurs along the proposed trail alignment in the eastern portion of the study area and near the junction of 13 Oaks Fire Road and Serpentine Fire Road. Coast live oak – California bay forest & woodland and California bay forest & woodland occur throughout the study area. Oregon white oak woodland & forest is restricted to the north-facing wood slope in the northern portion of the study area, and valley oak woodland & forest is found in the western and southwestern portions of the study area.

Although not considered a sensitive natural community by CDFW (2023a), freshwater seeps are treated as sensitive natural communities as they may be considered potentially jurisdictional wetland features. One freshwater seep was mapped along Band-Tailed Fire Road in the generally southwestern portion of the study area.

4.2. SPECIAL STATUS PLANTS

Based on a review of available databases and literature (USFWS 1999, 2014, 2023; CDFW 2023b, c, d; CNPS 2023a; Baldwin et al. 2012), familiarity with the regional flora, and presence of specific vegetation types, a total of 12 special status plant species were determined to be targets of the 2023 protocol-level rare plant surveys. Surveys for these 12 targets were conducted during the appropriate periods in 2023. A summary of the survey results is presented in Table 11 and locations of observed special status plant species appear in Figure 7.

Table 11. Occurrence Summary of Special Status Plants in the Study Area

SPECIES NAME	COMMON NAME	STATUS[1]	SURVEY RESULTS
FEDERAL/STATE LISTED AND CALIFORNIA RARE PLANT RANK SPECIES			
Hesperolinon congestum	Marin western flax	FT, ST, 1B.1	Present
CALIFORNIA RARE PLANT RANK SPECIES (RANK 1 & 2)			
Allium peninsulare var. *franciscanum*	Franciscan onion	1B.2	Present
Amorpha californica var. *napensis*	Napa false indigo	1B.2	Present
Eriogonum luteolum var. *caninum*	Tiburon buckwheat	1B.2	Present
Fritillaria liliacea	fragrant fritillary	1B.2	Not Observed

Species Name	Common Name	Status[1]	Survey Results
Hemizonia congesta subsp. *congesta*	congested-headed hayfield tarplant	1B.2	Not Observed
Streptanthus anomalus	Mount Burdell jewelflower	1B.1	Not Observed
California Rare Plant Rank Species (Rank 3 & 4)			
Erigeron biolettii	streamside daisy	3	Not Observed
Leptosiphon aureus	bristly leptosiphon	4.2	Not Observed
Lessingia hololeuca	woolly-headed lessingia	3	Not Observed
Micropus amphibolus	Mt. Diablo cottonweed	3.2	Not Observed
Ranunculus lobbii	Lobb's aquatic buttercup	4.2	Not Observed

[1]**Explanation of Status Codes**
Federal Codes
FT Federally Threatened
State Codes
ST State Threatened
California Rare Plant Rank codes:
1B Rare, Threatened, or Endangered in California and elsewhere
2B Rare, Threatened, or Endangered in California, but are more common elsewhere
3 More information is needed - Review list
4 Plants of limited distribution - Watch list
California Rare Plant Rank 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 / moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

4.2.1 Federal- and/or State-Listed and California Rare Plant Species

Based on review of available databases and literature, familiarity with local flora, on-site habitat suitability, and results of protocol-level surveys, one federal- and/or state-listed special status plant species was observed within the study area: Marin western flax.

Marin Western Flax (*Hesperolinon congestum*)

Status, Distribution and Habitat Requirements

Marin western flax [*Hesperolinon congestum* (A. Gray) Small[11]] 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 2023a). Marin western-flax is an erect herbaceous annual in the flax family (Linaceae). The type locality[12] for this species is from an 1863 Bolander collection in Marin County, California (Small 1907). The etymology of *Hesperolinon* is from the Greek words 'hesperos' meaning western and 'linos', meaning flax (McDill in JFP 2023).

Marin western flax grows to about 2 to 5.9 inches (5 to 15 centimeters) tall and is generally branched throughout (McDill in JFP 2023). It has well developed stipule glands with red exudate and linear leaves that are more or less glabrous. 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. Marin western flax is differentiated from other species in the genus

[11] In botanical literature scientific names are followed immediately by the name of or the abbreviation for the publishing author(s) who validated the name. A scientific name is not strictly complete without the name(s) of the validating author(s) attached. Plant species that appear in this report that have regulatory significance are referred to by their binomial scientific name and author for nomenclatural relevance.

[12] A type locality is the geographical location where the type specimen, which is used to describe a species for the first time, was originally found.

by its dense inflorescence of rose to pink flowers and its hairy sepals. This species flowers from April to July (CNPS 2023a).

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 2023a). It is a California endemic that is recorded as being distributed in Marin, San Mateo, and San Francisco counties.

Occurrence Data and Habitat Characteristics

Although not yet incorporated into CNDDB data, Nomad reported on a population of Marin western flax along Serpentine Fire Road and the adjacent serpentine slopes in 2019 (Nomad Ecology 2019). This population consisted of 920 individuals, overlaps partially with the MCP in-house survey area on Serpentine Fire Road, and is associated with occurrence EONDX #91970, described below. The nearest CNDDB occurrence (EONDX #91970) is a nonspecific location southwest of Burdell Mountain, mapped approximately 0.01 miles southeast of the study area (CDFW 2023b). This occurrence is based on a 2012 USFWS report and does not contain a population estimate, although occurrence information notes plants were observed in 2009.

During surveys on May 5 and July 26, 2023, a single population of Marin western flax was recorded within the study area and the MCP in-house survey area (Figure 7, Table 12). Population Hescon1 was observed in purple needlegrass grassland on serpentine soils at the northern-most portion of the study area. A total of 231 individuals are represented by this occurrence as determined by direct population county. This population will merge and be associated with the Marin western flax population reported on by Nomad in 2019, which in turn is associated with occurrence EONDX #91970.

Table 12. Marin Western Flax Populations Recorded in 2023

Population Number	General Location	Existing CNDDB Population	Number of Individuals
Hescon1	Purple needlegrass grassland on serpentine soils in northern portion of study area	Yes (EONDX #91970)	231

Population Hescon1 is comprised of scattered plants observed in purple needlegrass grassland on north-facing slopes at the northern-most end of the study area and along Serpentine Fire Road and WB-03 Fire Road at elevations between approximately 300 and 640 feet (91 and 195 meters). Occupied soils are Henneke stony clay loam and the underlying geology consists of Jurassic serpentinite (Blake et al. 2000, USDA 2023). There was no tree or shrub layer in the occupied areas although leather oak (*Quercus durata* var. *durata*), California bay, and mountain mahogany (*Cercocarpus betuloides* var. *betuloides*) were present in the vicinity. The herbaceous layer was sparse to continuous and grassy and had an overall high level of native integrity. Associated species include purple needlegrass, naked-stem buckwheat (*Eriogonum nudum* var. *auriculatum*), common madia (*Madia elegans*), dwarf plantain, wire weed (*Rigiopappus leptocladus*), few-flowered evax, smooth chickweed, Tiburon buckwheat, coyote mint, dwarf athysanus, coffee fern, Douglas's sandwort, lady's mantle, minute willow herb, Spanish clover, and big squirrel tail, among others. A majority of Hescon1 was observed within the MCP in-house survey area.

Marin western flax individual in Hescon1.
Photo date: July 26, 2023

Marin western flax inflorescence as observed in Hemcon1.
Photo date: July 26, 2023

Marin western flax occupied habitat along Serpentine Fire Road (Hescon1).
Photo date: July 26, 2023

Threats and Management Considerations

The CNPS Inventory of Rare and Endangered Plants of California and USFWS indicate Marin western flax is threatened by residential and recreational development, non-native plants, foot traffic, and potentially hydrological alterations (CNPS 2023a; USFWS 2011). Within the study area, threats observed included road and trail maintenance/decommissioning, impacts from non-native plants, and cattle trampling. Management considerations should include avoidance of occupied areas during road maintenance and road decommissioning activities.

4.2.2 California Rare Plant Rank Species

Based on review of available databases and literature, familiarity with local flora, on-site habitat suitability, and results of protocol-level surveys, three California Rare Plant Rank species were observed within the study area: Franciscan onion, Napa false indigo, and Tiburon buckwheat. A brief description of these species, 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 2023a). 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 the genus *Allium* is from the Latin word meaning 'garlic' (McNeal in JFP 2023).

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 in JFP 2023). 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. It differs from the more common *A. p.* var. *peninsulare* in range, having curved leaves, slightly smaller flowers, and an unlobed stigma. This species blooms from May to June, although sometimes as early as April (CNPS 2023a).

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 2023a). It is a California endemic that is recorded as occurring in Mendocino, Napa, Santa Clara, San Mateo, and Sonoma counties.

Occurrence Data and Habitat Characteristics

Although not yet incorporated into CNDDB data, MCP has recorded a population of Franciscan onion in the wooded north-facing slopes in the northern portion of the study area. There is no population count associated with this record. 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 (CDFW 2023b). This occurrence is based on an 1880 Congdon collection. Although not yet incorporated into CNDDB data, Nomad reported on a population of Franciscan onion approximately 0.2 miles south of the study area in 2019 (Nomad Ecology 2019). This population consisted of 129 individuals in woodland understory on fairly steep, west to northwest-facing slopes.

During surveys on May 5 and 8, 2023, two populations of Franciscan onion were observed within the study area (Figure 7, Table 13). One observed population (Allpenfra1) was comprised of multiple colonies in the wooded north-facing slopes in the northern portion of the study area. A total of 2,208 individuals are represented by this occurrence as determined by direct count. The second population (Allpenfra2) consists of a single colony along the proposed trail alignment in the southwestern portion of the study area. A total of 114 individuals are represented by this occurrence as determined by direct count. Both populations reported here will represent new CNDDB occurrences.

Table 13. Franciscan Onion Populations Recorded in 2023

Population Number	General Location	Existing CNDDB Population	Number of Individuals
Allpenfra1	Wooded slopes in northern portion of study area	No	2,208
Allpenfra2	Proposed trail alignment in southwestern portion of study area	No	114
		Total	**2,322**

Population Allpenfra1 is comprised of twelve colonies in the understory of coast live oak forest & woodland, coast live oak – California bay forest & woodland, Oregon oak forest & woodland, and California black oak forest & woodland on north-facing slopes at elevations between approximately 320 and 800 feet (98 and 244 meters). Occupied soils are of the Tocaloma-McMullin complex and the underlying geology consists of Cretaceous and Jurassic metamorphic rocks (Blake et al. 2000, USDA 2023). The tree canopy ranged from open and patchy to fairly continuous and was dominated by coast live oak, California bay, Oregon oak, and California black oak. The shrub layer was absent to very sparse and comprised of creeping snowberry, oceanspray, and poison oak. The herbaceous layer was generally continuous and comprised of slender oats, Italian thistle*, hedge parsley*, Italian ryegrass*, soap plant, cut-leaf geranium*, smaller common vetch, California fescue, canyon nemophila, hillside star, false brome*, ripgut brome*, hedge nettle, drops of gold, wood fern, Kellogg's tauschia, Pacific sanicle, miner's lettuce, and bedstraw, among others.

Population Allpenfra2 is comprised of a single colony observed in the understory of California bay forest & woodland on north-facing slopes at elevations between approximately 350 to 390 feet (107 to 119 meters). Occupied soils are of the Tocaloma-McMullin complex and Bonnydoon-Gilroy-Typic-Argixerolls and the underlying geology consists of Cretaceous and Jurassic metamorphic rocks and Jurassic Metagreenstone (Blake et al. 2000, USDA 2023). The tree canopy was fairly open and dominated by California bay with small amounts of California black oak present. The shrub layer was absent. The

herbaceous layer was continuous, fairly thick, and comprised of slender oats*, Italian thistle*, Italian ryegrass*, hedge parsley*, hedge nettle, and rattlesnake grass*, among others.

Franciscan onion inflorescence as observed in Allpenfra1.
Photo date: May 5, 2023

Franciscan onion individual amongst Italian thistle* in Allpenfra1.
Photo date: May 5, 2023

Franciscan onion occupied habitat (Allpenfra1) with grassy herbaceous layer.
Photo date: July 25, 2023

Threats and Management Considerations

The CNPS Inventory of Rare and Endangered Plants of California indicates that this species is threatened by development, foot traffic, non-native plants, and trail maintenance (CNPS 2023a). Within the study area, Allpenfra1 is potentially threatened by non-native plant impacts (Italian thistle*) and impacts from grazing cattle although no impacts from cattle were observed. Allpenfra2 is threatened by trail construction, non-native plant impacts, and potentially impacts from grazing cattle although no impacts from cattle were observed. Management considerations should include control of Italian thistle* in occupied areas of the understory of forest & woodland vegetation communities and potential rerouting of proposed trails to avoid impacts on Allpenfra2.

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

Status, Distribution and Habitat Requirements

Napa false indigo [*Amorpha californica* var. *napensis* Jeps.] 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 2023a). It is an unarmed shrub in the pea family (Fabaceae). The type locality is a 1916 W.L. Jepson collection from Moore Creek near Howell Mount in Napa County (Tropicos 2023). The etymology of *Amorpha* is from the Greek word for 'deformed,' due to the single petaled flower (Boyd & Isley in JFP 2023).

Napa false indigo is an erect, ± glabrous, gland dotted species with odd once-pinnate leaves, bristle-like stipules, and a terminal spike-like raceme of single-petaled ± purple flowers (Boyd & Isley in JFP 2023). It is differentiated from other species of *Amorpha* by the presence of prickle-like glands on the main leaf axis as well as its ± glabrous nature and length of the longest calyx lobe. Napa false indigo blooms from April to July (CNPS 2023a).

This species occurs in chaparral, cismontane woodland, and openings of broadleafed upland forest at elevations of 165 to 6,560 feet (50 to 2,000 meters) (CNPS 2023a). It is a California endemic that is recorded as occurring in Lake, Marin, Napa, and Sonoma Counties.

Occurrence Data and Habitat Characteristics

One previously known record of Napa false indigo overlaps with the study area (CDFW 2023b). CNDDB occurrence EONDX #123797 is a specific record located along the southwestern edge of the large wooded area in the northern portion of the study area. It was last updated in 2022 and is based on coordinates provided by Macchia. CNDDB occurrence EONDX #123796 is a specific record located on wooded, west to northwest-facing slopes approximately 0.16 miles southeast of the study area. It is based on 2019 Nomad data and 2021-2022 MCP data. This population consists of 524 plants in multiple colonies.

During surveys on July 25, 2023, the above-mentioned Napa false indigo population (EONDX #123797) was observed (Amocalnap1) and population attributes were updated (Figure 7, Table 14). A total of seven individuals are represented by this occurrence, as determined by direct population count.

Table 14. Napa False Indigo Populations Recorded in 2023

Population Number	General Location	Existing CNDDB Population	Number of Individuals
Amocalnap1	Southwestern edge of wooded area in northern portion of study area	Yes (EONDX #123797)	7

Population Amocalnap1 consists of a small patch of seven individuals growing in the understory of a large coast live oak – California bay forest & woodland. It was comprised of four mature, fruiting individuals and three immature individuals with no fruit or senesced inflorescences present. It was observed on moderately steep north-facing slopes at approximately 623 feet (190 meters) in elevation. Occupied soils are of the Tocaloma-McMullin complex and the underlying geology consists of Cretaceous and Jurassic metamorphic rocks (Blake et al. 2000, USDA 2023). The tree canopy was patchy and comprised of co-dominant coast live oak and California bay with scattered Oregon oak. The shrub layer was sparse to absent in the immediate area and comprised of poison oak and creeping snowberry. The herbaceous layer was continuous, thick, and comprised of Italian thistle*, hedge nettle, *Vicia* spp., and senesced annual grasses including ripgut brome*, dogtail grass*, and slender oats*, among others.

Napa false indigo occupied habitat (Amocalnap1) showing thick herbaceous layer of mostly senesced plants.
Photo date: July 25, 2023

Fruit observed on mature Napa false indigo in Amocalnap1.
Photo date: July 25, 2023

Leaves and single inflorescence of mature Napa false indigo in Amocalnap1.
Photo date: July 25, 2023

Threats and Management Considerations

The CNPS Inventory of Rare and Endangered Plants of California indicates that this species is threatened by development and habitat alteration, and potentially threatened by road maintenance (CNPS 2023a). Threats noted during 2023 surveys include alteration of occupied habitat by non-native plant species and potential impacts from grazing cattle, although no evidence of grazing was observed on plants. Management considerations should include control of Italian thistle* in the occupied area of the coast live oak – California bay forest & woodland community.

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 2023a). It 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 the genus *Eriogonum* is Greek for woolly knees, referring to the hairy nodes of the first named species in the genus (Reveal and Rosatti in JFP 2023).

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. The inflorescences measure 1.2 to 11.8 inches (3 to 30 cm), with sessile involucres 0.12 to 0.16 inches (3 to 4 mm) in length. The flowers of this taxon are 0.06 to 0.10 inches (1.5 to 2.5 mm) and colored white to rose. It has glabrous fruits that are 0.055 to 0.063 inches (1.4 to 1.6 mm). 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 2023a). Tiburon buckwheat typically flowers from May to September.

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 2023a). It is a California endemic that is reported as occurring in Alameda, Contra Costa, and Marin counties. It may have occurred in Sonoma County but is presumed extirpated if once present.

Occurrence Data and Habitat Characteristics

Although not yet incorporated into CNDDB data, Nomad reported on a population of Tiburon buckwheat in the serpentine grasslands east of Serpentine Fire Road in 2019 (Nomad Ecology 2019). This population consisted of approximately 28,550 individuals as determined by visual estimate. This population lies just outside the MCP in-house survey area and is associated with occurrence EONDX #94377, described below. The nearest CNDDB occurrence (EONDX #94377) is a nonspecific location mapped in the "central-north part of the preserve" approximately 0.17 miles east of the study area (CDFW 2023b). This occurrence contains no population estimates and is based on three separate herbarium collections from Mount Burdell, all with vague locality information.

During surveys on July 25 and 26, 2023, a single population of Tiburon buckwheat (Erilutcan1) was recorded within the study area and the MCP in-house survey area (Figure 7, Table 15). Population Erilutcan1 consists of multiple colonies made up of scattered plants and small patches in purple needlegrass grassland on serpentine soils at the northern-most portion of the study area. A total of 646 individuals are represented by this occurrence as determined by direct population county. This population will merge and be associated with the Tiburon buckwheat population reported on by Nomad in 2019, which in turn is associated with occurrence EONDX #94377. The morphology exhibited by some of the individuals in this population appeared to be intermediate between *E. l.* var. *luteolum* and *E. l.* var. *caninum* as indicated in the CNPS Inventory of Rare and Endangered Plants of California (CNPS 2023a). However, this population is treated here as *E. l.* var. *caninum* for conservation and stewardship purposes.

Table 15. Tiburon Buckwheat Populations Recorded in 2023

Population Number	General Location	Existing CNDDB Population	Number of Individuals
Erilutcan1	Purple needlegrass grassland on serpentine soils in northern portion of study area	Yes (EONDX #94377)	646

Population Erilutcan1 is comprised of scattered plants and small patches in purple needlegrass grassland at the northern-most end of the study area and along Serpentine Fire Road and WB-03 Fire Road on north- and north-northwest-facing slopes at elevations between approximately 320 and 560 feet (98 and 171 meters). Occupied soils are Henneke stony clay loam and Tocaloma-McMullin complex, and the underlying geology consists of Jurassic serpentinite and Quaternary alluvium (Blake et al. 2000, USDA 2023). There was no tree or shrub layer in the occupied areas although leather oak, California bay, and mountain mahogany were present in the vicinity and individuals near the coast live oak – California bay forest & woodland were very close to the canopy line of this community. The herbaceous layer was sparse to continuous and grassy and had an overall high level of native integrity. Associated species include purple needlegrass, Marin western flax, naked-stem buckwheat, common madia, dwarf plantain, wire weed, few-flowered evax, smooth chickweed, Tiburon buckwheat, coyote mint, dwarf athysanus, coffee fern, Douglas's sandwort, lady's mantle, minute willow herb, and Spanish clover, among others. A majority of Erilutcan1 was observed within the MCP in-house survey area.

Tiburon buckwheat inflorescence observed in Erilutcan1.
Photo date: July 26, 2023

Tiburon buckwheat inflorescence in Erilutcan1.
Photo date: July 26, 2023

Tiburon buckwheat (Erilutcan1) occupied area along WB-03 Fire Road.
Photo date: July 26, 2023

Threats and Management Considerations

The CNPS Inventory of Rare and Endangered Plants of California indicates Tiburon buckwheat is threatened by development, foot traffic, and non-native plants (CNPS 2023a). Within the study area, threats observed included road and trail maintenance/decommissioning, impacts from non-native plants, and cattle

trampling. Management considerations should include avoidance of occupied areas during road maintenance and road decommissioning activities.

4.2.3 LOCALLY RARE PLANT RANK 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 2001a). These species are not regarded as special status species by the USFWS or CDFW and are therefore not tracked by these agencies. Local floristic expert Doreen Smith has developed a preliminary draft list of locally rare plants of Marin County, which is utilized in this report (Smith 2023).

Based on the results of the 2023 surveys a total of 8 locally rare plant species were observed within the study area. Locally rare species are noted in the plant list (Appendix A) and Table 16 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 16. Locally Rare Plant Species Observed in the Study Area

SCIENTIFIC NAME	COMMON NAME	GENERAL LOCATIONS
Clarkia gracilis subsp. *sonomensis*	Sonoma clarkia	Purple needlegrass grassland in northeastern portion of study area
Corallorhiza striata	hooded coralroot	Forest & woodland understory on large wooded slope in northern portion of study area
Erigeron foliosus var. *franciscensis*	Franciscan erigeron	California brome – blue wildrye prairie and adjacent California annual and perennial grassland along proposed trail alignment in western portion of study area
Heterocodon rariflorum	heterocodon	Purple needlegrass grassland near northeastern corner of study area
Lagophylla ramosissima	hare's ear	Purple needlegrass grassland near northeastern corner of study area
Logfia filaginoides	California filago	Purple needlegrass grassland near northeastern corner of study area
Phoradendron leucarpum subsp. *tomentosum*	oak mistletoe	Parasitizing *Quercus* spp. in forest & woodland and purple needlegrass grassland in northeastern portion of study area
Piperia elongata	denseflowered rein orchid	Understory of forest & woodland on large wooded slope in northern portion of study area and along proposed trail alignment in eastern portion of study area

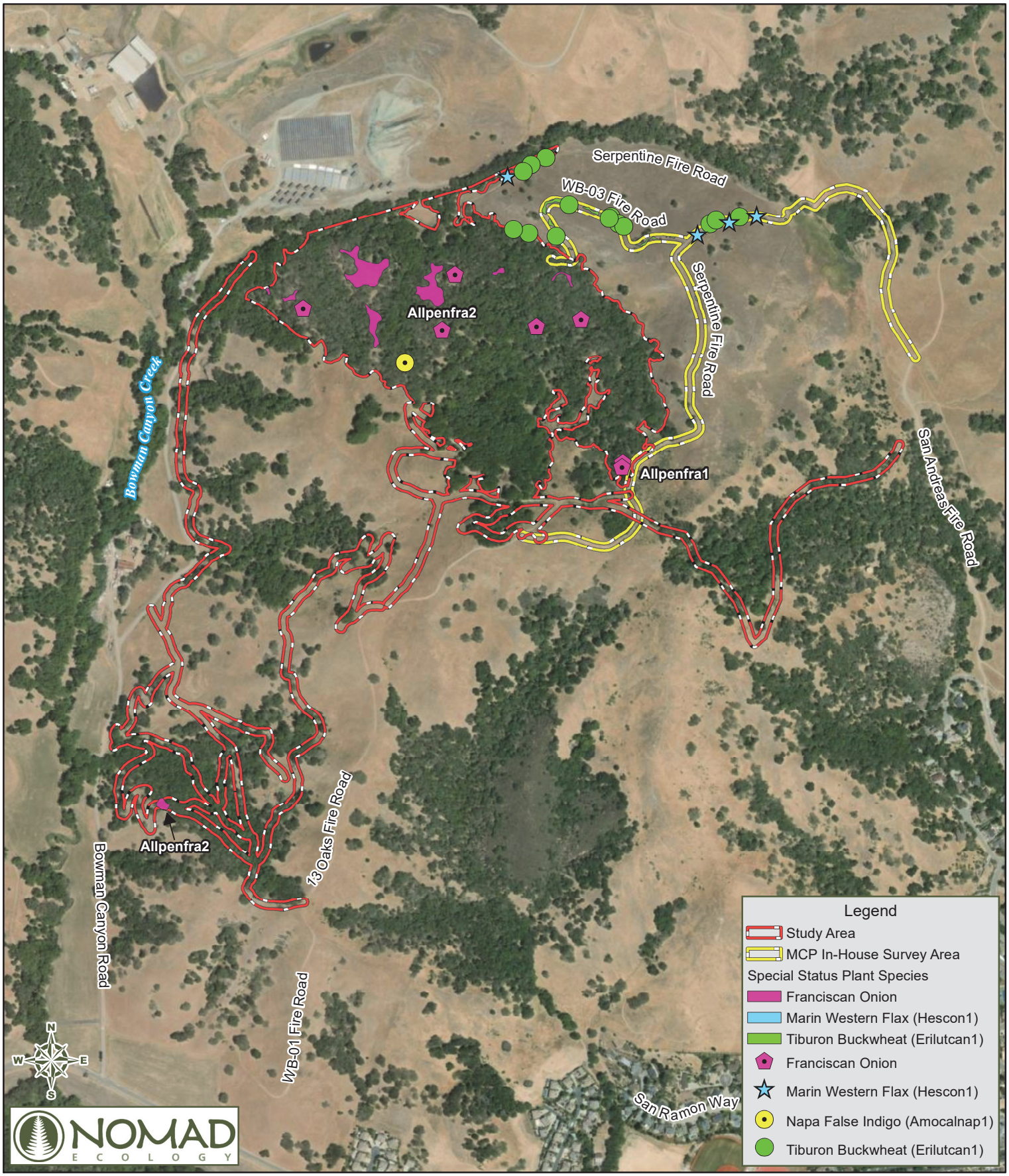


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Figure 7

Special Status Plant Species in the Study Area

Bowman Canyon Road & Trail Plan
Marin County Parks

Sources: ESRI, Nomad Ecology

4.3. NOXIOUS/INVASIVE WEEDS

During the course of this study, 94 (approximately 29%) 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 in California 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 2023) and the California Invasive Plant Council (Cal-IPC 2023) 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 36 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 (Table 17).

The following discussion only includes the species that were dominant on the landscape in a specific area, pose a potential threat to sensitive botanical resources, or have the potential to spread within the study area. These species are referred to as noxious/invasive plants of concern (Table 17). 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 enough of a threat to sensitive botanical resources to warrant discussion here.

Table 17. Non-Native Species with Elevated Threat Rankings Observed in the Study Area

SPECIES NAME	COMMON NAME	California Invasive Plant Council Rank (Cal-IPC 2023)*	California Department of Food and Agriculture Noxious Weed List (CDFA 2023)**
NOXIOUS/INVASIVE PLANTS OF CONCERN			
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Moderate	On List
Centaurea solstitialis	yellow star thistle	High	On List
Genista monspessulana	French broom	High	On List
Rubus armeniacus	Himalayan blackberry	High	---
OTHER NON-NATIVE SPECIES WITH ELEVATED RANKINGS			
Avena barbata	slender oats	Moderate	---
Avena fatua	wild oats	Moderate	---
Brachypodium distachyon	false brome	Moderate	---
Brassica nigra	black mustard	Moderate	---
Briza maxima	rattlesnake grass	Limited	---
Bromus diandrus	ripgut brome	Moderate	---
Bromus hordeaceus	soft chess	Limited	---
Bromus rubens	foxtail chess	High	---
Centaurea melitensis	tocalote	Moderate	On List
Cirsium vulgare	bull thistle	Moderate	On List
Cotoneaster franchetii	cotoneaster	Moderate	---
Cynosurus echinatus	dogtail grass	Moderate	---
Dactylis glomerata	orchard grass	Limited	---

Species Name	Common Name	California Invasive Plant Council Rank (Cal-IPC 2023)*	California Department of Food and Agriculture Noxious Weed List (CDFA 2023)**
Dittrichia graveolens	stinkwort	Moderate	---
Ehrharta erecta	panic veldt grass	Moderate	---
Erodium cicutarium	red-stemmed filaree	Limited	---
Festuca myuros	foxtail fescue	Moderate	---
Festuca perennis	Italian ryegrass	Moderate	---
Geranium dissectum	cut-leaf geranium	Moderate	---
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	Moderate	---
Hordeum murinum subsp. *leporinum*	hare barley	Moderate	---
Hypochaeris glabra	smooth cat's ear	Limited	---
Hypochaeris radicata	rough cat's ear	Moderate	---
Lythrum hyssopifolia	hyssop loostrife	Moderate	---
Medicago polymorpha	burclover	Limited	---
Mentha pulegium	pennyroyal	Moderate	---
Olea europaea	olive	Limited	---
Plantago lanceolata	English plantain	Limited	---
Polypogon monspeliensis	rabbitsfoot grass	Limited	---
Rumex acetosella	sheep sorrel	Moderate	---
Torilis arvensis	hedge parsley	Moderate	---
Trifolium hirtum	rose clover	Limited	---

*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 2023).

** Species considered a noxious weed by CDFA are listed on the California Noxious Weed List (CDFA 2023).

4.3.1 Weeds of Concern On Site

Italian thistle*, yellow star thistle*, French broom (*Genista monspessulana**), and Himalayan blackberry (*Rubus armeniacus**) are weeds found on site that are high priority invasive plants for mapping and treatment. Below is a brief description of these species and their general locations within the study area.

Italian Thistle (*Carduus pycnocephalus* subsp. *pycnocephalus*)

General Information
Italian thistle is a winter annual, sometimes biennial, in the sunflower family (Asteraceae). Italian thistle is native to the Mediterranean region. It colonizes disturbed open sites, roadsides, pastures, annual grasslands, and waste areas and inhabits sandy to clay soils (DiTomaso and Healy 2007). In general, thistles compete

poorly with healthy, established grasses and other vegetation. It can carry grass fires into tree canopies. Disturbances such as fires, overgrazing, or trampling can create prime sites for thistle colonization (DiTomaso and Healy 2007).

Relevant Life History Traits
Italian thistle reproduces only by seed. Most disk seeds are wind-dispersed and can travel several hundred feet. Disk seeds also have a thin gummy coating, which allows them to attach to animals and machinery. The germination rate is high, and germination typically takes place in the fall. Ray seeds generally remain in the flower head until they drop. These seeds can persist in the soil for up to 10 years. Italian thistle overwinters as a rosette. Flowering can be continuous until soil moisture is depleted (Cal-IPC 2023).

Threats to Sensitive Habitats or Special Status Plants
Italian thistle* was observed throughout the study area, generally in small patches in the understory of forest & woodland communities. However, on the north-facing wooded slope in the northern portion of the study area, this species was prevalent and formed large, thick patches in the Franciscan onion occupied understory of coast live oak – California bay forest & woodland, coast live oak forest & woodland, and Oregon white oak forest & woodland. Even though Italian thistle* was observed at its thickest after Franciscan onion had set seed in these areas, it poses a moderate threat to Allpenfra1 through habitat degradation and impacts the integrity of sensitive natural communities in this portion of the study area. Due to the current and potential threat posed by this species, it is recommended as a target for control in sensitive natural communities and in Franciscan onion occupied areas.

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. Yellow star thistle is considered one of the most serious rangeland weeds in the western United States. It 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 by wind and greater distances by 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 winter 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).

Threats to Sensitive Habitats or Special Status Plants
Yellow star thistle was observed at low cover in grassland communities and grassy openings throughout the study area. It was observed to be thicker and more widespread in California annual and perennial grassland in the southwestern portion of the study area. While not posing an immediate threat to sensitive

natural resources, this species is recommended as a target for control due to the potential for it to spread to nearby sensitive natural communities.

French Broom (*Genista monspessulana*)

General Information

French broom is a perennial shrub in the pea family (Fabaceae) that is native to the Mediterranean region and Azores Islands. It inhabits grasslands, shrublands, oak woodlands, forest margins, coastal habitats, riparian corridors and disturbed sites such as roadsides, pasture, burned areas, or cleared forests. This species grows rapidly and forms dense stands that most wildlife find impenetrable and unpalatable. Dense stems inhibit regeneration of most other plant species, and the accumulation of woody biomass creates a fire hazard (DiTomaso and Healy 2007).

Relevant Life History Traits

French broom reproduces by seed. Pods typically burst apart ejecting seeds a short distance from the parent plant. Seeds can disperse to greater distances with water, soil movement, vehicle tires, human activities, and animals. Seeds are hard-coated and long-lived under field conditions. French broom can also resprout from the crown when cut above (DiTomaso and Healy 2007).

Threats to Sensitive Habitats or Special Status Plants

Scattered French broom* individuals were observed in the understory and edges of forest & woodland communities throughout the study area, although never in high quantity or cover. While not immediately posing a threat to sensitive natural resources, this species is recommended as a target for control due to the potential for it to spread and significantly impact sensitive natural communities and populations of special status plant species.

Himalayan Blackberry (Rubus armeniacus)

General Information

Himalayan blackberry is a mounded, climbing, and trailing shrub in the rose family (Rosaceae). Himalayan blackberry is a vigorous cultivar introduced from Eurasia and is the most common non-native bramble invading natural areas in California. It inhabits disturbed moist open sites, roadsides, fencerows, fields, canal and ditch banks, and riparian areas in many plant communities. It tolerates periodic flooding with brackish water (DiTomaso and Healy 2007).

Relevant Life History Traits

Himalayan blackberry reproduces by seed, root sprouts, and stem tip rooting. New shoots can grow from buds on the roots. Under favorable conditions, root fragments of root-sprouting species may develop into new plants. Fruits typically disperse to greater distances with animals, especially birds. Seeds without the flesh may also disperse with water and soil movement. Seed germination occurs mainly in spring (DiTomaso and Healy 2007).

Threats to Sensitive Habitats or Special Status Plants

Himalayan blackberry individuals and small patches were observed in more riparian and mesic areas in the understory of forest & woodland communities in the northern portion of the study area. It does not immediately pose a threat to sensitive natural resources. However, due to the potential for this species to spread and become problematic in riparian areas in and adjacent to the study area, it is recommended as a target for control.

Section 5. SUMMARY

5.1. SUMMARY

A total of eight sensitive natural communities and one freshwater seep were observed in the study area. Four special status plant species and eight locally rare plant species were observed during 2023 surveys in the study area. Table 18 summarizes the results associated with the protocol-level botanical surveys for the Bowman Canyon Road & Trail Plan study area.

Table 18. Summary of Sensitive Communities and Special Status Plants In the Study Area

SPECIES NAME/ COMMON NAME	STATUS[1]	NUMBER OF OCCURRENCES	NUMBER OF INDIVIDUALS	LOCATION IN THE STUDY AREA
SENSITIVE NATURAL COMMUNITIES				
Baccharis pilularis – Nasella (*Stipa*) *pulchra* Shrubland Association	S3	3	N/A	Near junction of 13 Oaks Fire Road and Serpentine Fire Road
Bromus carinatus – Elymus glaucus Herbaceous Alliance	S3	1	N/A	Along proposed trail alignment in western portion of study area
Freshwater Seeps	N/A	1	N/A	California annual and perennial grassland in southwestern portion of study area
Micropus californicus Provisional Herbaceous Association	S2	6	N/A	Grassland habitats throughout study area
Nasella (*Stipa*) *pulchra* Herbaceous Alliance	S3S4	9	N/A	Throughout non-wooded portions of study area
Quercus agrifolia – Umbellularia californica Woodland & Forest Association	S3	5	N/A	Throughout wooded portions of study area
Quercus garryana Forest & Woodland Alliance	S3	4	N/A	Wooded slope in northern portion of study area
Quercus lobata Woodland Alliance	S3	3	N/A	Western and southwestern portions of study area
Umbellularia californica Forest & Woodland Alliance	S3	6	N/A	Throughout wooded portions of study area
SPECIAL STATUS PLANTS				
FEDERAL/STATE LISTED AND CALIFORNIA RARE PLANT RANK SPECIES				
Hesperolinon congestum Marin western flax	FT, ST, 1B.2	1	231	Purple needlegrass grassland on serpentine soils in northern portion of study area and MCP in-house survey area
CALIFORNIA RARE PLANT RANK SPECIES				
Allium peninsulare var. *franscanum* Franciscan onion	1B.2	2	2,322	Forest & woodland communities on north-facing slopes in northern and southwestern portions of study area
Amorpha californica var. *napensis* Napa false indigo	1B.2	1	7	Coast live oak – California bay forest & woodland in northern portion of study area
Eriogonum luteolum var. *caninum* Tiburon buckwheat	1B.2	1	646	Purple needlegrass grassland on serpentine soils in northern portion of study area and MCP in-house survey area
LOCALLY RARE PLANT SPECIES				

Species Name/ Common Name	Status[1]	Number of Occurrences	Number of Individuals	Location in the Study Area
Clarkia gracilis subsp. *sonomensis* Sonoma clarkia	On List	1	NA	Purple needlegrass grassland in northeastern portion of study area
Corallorhiza striata hooded coralroot	On List	1	NA	Forest & woodland understory on large wooded slope in northern portion of study area
Erigeron foliosus var. *franscanum* Franciscan erigeron	On List	1	NA	California brome – blue wildrye prairie and adjacent California annual and perennial grassland along proposed trail alignment in western portion of study area
Heterocodon rariflorum heterocodon	On List	1	NA	Purple needlegrass grassland near northeastern corner of study area
Lagophylla ramossissima hare's ear	On List	1	NA	Purple needlegrass grassland in northeastern portion of study area
Logfia filaginoides California filago	On List	1	NA	Purple needlegrass grassland in northeastern portion of study area
Phoradendron leucarpum subsp. *tomentosum* oak mistletoe	On List	1	NA	Parasitizing *Quercus* spp. in forest & woodland and purple needlegrass grassland in northeastern portion of study area
Piperia elongata denseflowered rein orchid	On List	2	NA	Understory of forest & woodland on large wooded slope in northern portion of study area and along proposed trail alignment in eastern portion of study area

[1]**Explanation of Status Codes**
Federal Codes
FT Federally Threatened
State Codes
ST State Threatened
California Rare Plant Rank codes:
1B Rare, Threatened, or Endangered in California and elsewhere
2B Rare, Threatened, or Endangered in California, but are more common elsewhere
3 More information is needed - Review list
4 Plants of limited distribution - Watch list
California Rare Plant Rank 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 / moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Section 6. REFERENCES

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APPENDIX A PLANT SPECIES OBSERVED ON SITE

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
FERNS						
Blechnaceae – Deer Fern Family						
Woodwardia fimbriata	giant chain fern	Native	---	---	---	---
Dryopteridaceae – Wood Fern Family						
Dryopteris arguta	wood fern	Native	---	---	---	---
Polystichum munitum	swordfern	Native	---	---	---	---
Equisetaceae – Horsetail Family						
Equisetum telmateia subsp. *braunii*	giant horsetail	Native	---	---	---	---
Polypodiaceae – Polypody Family						
Polypodium californicum	California polypody	Native	---	---	---	---
Polypodium calirhiza	licorice fern	Native	---	---	---	---
Pteridaceae – Brake Family						
Adiantum jordanii	California maidenhair fern	Native	---	---	---	---
Pellaea andromedifolia	coffee fern	Native	---	---	---	---
Pentagramma triangularis	gold back fern	Native	---	---	---	---
Pteridium aquilinum var. *pubescens*	bracken fern	Native	---	---	---	---
Woodsiaceae – Cliff Fern Family						
Athyrium filix-femina var. *cyclosorum*	lady fern	Native	---	---	---	---
Cystopteris fragilis	fragile fern	Native	---	---	---	---
MAGNOLIIDS						
Lauraceae – Laurel Family						
Umbellularia californica	California bay	Native	---	---	---	---
EUDICOTS						
Anacardiaceae – Sumac or Cashew Family						
Toxicodendron diversilobum	poison oak	Native	---	---	---	---
Apiaceae – Carrot Family						
Daucus pusillus	wild carrot	Native	---	---	---	---
Lomatium californicum	California lomatium	Native	---	---	---	---
Lomatium macrocarpum	bigseed biscuitroot	Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Lomatium utriculatum	common lomatium	Native	---	---	---	---
Osmorhiza berteroi	sweet cicely	Native	---	---	---	---
Perideridia kelloggii	Kellogg's yampah	Native	---	---	---	---
Sanicula bipinnatifida	purple sanicle	Native	---	---	---	---
Sanicula crassicaulis	Pacific sanicle	Native	---	---	---	---
Sanicula laciniata	coast sanicle	Native	---	---	---	---
Sanicula tuberosa	tuberous sanicle	Native	---	---	---	---
Scandix pecten-veneris	Sheperd's needle	Non-Native	---	---	---	---
Tauschia kelloggii	Kellogg's tauschia	Native	---	---	---	---
Torilis arvensis	hedge parsley	Non-Native	---	---	Moderate	---
Torilis nodosa	knotted-hedge parsley	Non-Native	---	---	---	---
Yabea microcarpa	California hedge parsely	Native	---	---	---	---
Asteraceae – Sunflower Family						
Achillea millefolium	yarrow	Native	---	---	---	---
Achyrachaena mollis	blow-wives	Native	---	---	---	---
Agoseris grandiflora var. *grandiflora*	bigflower agoseris	Native	---	---	---	---
Agoseris heterophylla var. *heterophylla*	annual agoseris	Native	---	---	---	---
Artemisia douglasiana	mugwort	Native	---	---	---	---
Baccharis pilularis subsp. *consanguinea*	coyote brush	Native	---	---	---	---
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Non-Native	---	---	Moderate	On List
Centaurea melitensis	tocalote	Non-Native	---	---	Moderate	On List
Centaurea solstitialis	yellow star thistle	Non-Native	---	---	High	On List
Cirsium remotifolium var. *odontolepis*	pacsific fringed thistle	Native	---	---	---	---
Cirsium vulgare	bull thistle	Non-Native	---	---	Moderate	On List
Dittrichia graveolens	stinkwort	Non-Native	---	---	Moderate	---
Erigeron foliosus var. *franciscensis*	Franciscan erigeron	Native	---	X	---	---
Eurybia radulina	roughleaf aster	Native	---	---	---	---
Filago pyramidata var. *pyramidata*	broadleaf cottonrose	Non-Native	---	---	---	---
Gamochaeta ustulata	featherweed	Native	---	---	---	---
Gnaphalium palustre	lowland cudweed	Native	---	---	---	---
Hedypnois rhagadioloide	crete weed	Non-Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Hemizonia congesta subsp. *lutescens*	hayfield tarweed	Native	---	---	---	---
Hesperevax sparsiflora var. *sparsiflora*	few-flowered evax	Native	---	---	---	---
Hypochaeris glabra	smooth cat's ear	Non-Native	---	---	Limited	---
Hypochaeris radicata	rough cat's ear	Non-Native	---	---	Moderate	---
Lactuca saligna	willowleaf lettuce	Non-Native	---	---	---	---
Lactuca serriola	prickly lettuce	Non-Native	---	---	---	---
Lagophylla ramosissima	hare's ear	Native	---	X	---	---
Lasthenia gracilis	needle goldfields	Native	---	---	---	---
Layia gaillardioides	woodland layia	Native	---	---	---	---
Leontodon saxatilis subsp. *saxatilis*	hawkbit	Non-Native	---	---	---	---
Logfia filaginoides	California filago	Native	---	X	---	---
Logfia gallica	narrowleaf cottonrose	Non-Native	---	---	---	---
Madia elegans	common madia	Native	---	---	---	---
Madia exigua	small tarweed	Native	---	---	---	---
Madia gracilis	slender tarweed	Native	---	---	---	---
Madia sativa	coast tarweed	Native	---	---	---	---
Micropus californicus var. *californicus*	slender cottonweed	Native	---	---	---	---
Pseudognaphalium beneolens	fragrant everlasting	Native	---	---	---	---
Pseudognaphalium californicum	ladies tobacco	Native	---	---	---	---
Pseudognaphalium luteoalbum	cudweed	Non-Native	---	---	---	---
Pseudognaphalium microcephalum	white everlasting	Native	---	---	---	---
Psilocarphus tenellus	slender woolly marbles	Native	---	---	---	---
Rigiopappus leptocladus	wire weed	Native	---	---	---	---
Senecio aronicoides	rayless ragwort	Native	---	---	---	---
Senecio vulgaris	groundsel	Non-Native	---	---	---	---
Soliva sessilis	common soliva	Non-Native	---	---	---	---
Sonchus asper subsp. *asper*	prickly sowthistle	Non-Native	---	---	---	---
Sonchus oleraceus	common sowthistle	Non-Native	---	---	---	---
Uropappus lindleyi	silverpuffs	Native	---	---	---	---
Wyethia angustifolia	narrowleaf mule ears	Native	---	---	---	---
Wyethia glabra	mule ears	Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Boraginaceae – Borage or Waterleaf Family						
Adelinia grandis	hound's tongue	Native	---	---	---	---
Amsinckia intermedia	common fiddleneck	Native	---	---	---	---
Amsinckia menziesii	ranchers fireweed	Native	---	---	---	---
Cryptantha flaccida	flaccid cryptantha	Native	---	---	---	---
Plagiobothrys nothofulvus	popcorn flower	Native	---	---	---	---
Brassicaceae – Mustard Family						
Athysanus pusillus	dwarf athysanus	Native	---	---	---	---
Brassica nigra	black mustard	Non-Native	---	---	Moderate	---
Cardamine californica	milk maids	Native	---	---	---	---
Cardamine oligosperma	bitter cress	Native	---	---	---	---
Caulanthus lasiophyllus	California mustard	Native	---	---	---	---
Lepidium nitidum	shining peppergrass	Native	---	---	---	---
Thysanocarpus curvipes var. *curvipes*	fringepod	Native	---	---	---	---
Thysanocarpus curvipes var. *elegans*	fringepod	Native	---	---	---	---
Thysanocarpus laciniatus	narrow leafed lace pod	Native	---	---	---	---
Campanulaceae – Bellflower Family						
Githopsis specularioides	Venus looking glass	Native	---	---	---	---
Heterocodon rariflorum	heterocodon	Native	---	X	---	---
Caprifoliaceae – Honeysuckle Family						
Lonicera hispidula	California honeysuckle	Native	---	---	---	---
Symphoricarpos albus var. *laevigatus*	snowberry	Native	---	---	---	---
Symphoricarpos mollis	creeping snowberry	Native	---	---	---	---
Caryophyllaceae – Pink Family						
Cerastium glomeratum	mouse-ear chickweed	Non-Native	---	---	---	---
Sabulina douglasii	Douglas's sandwort	Native	---	---	---	---
Sagina apetala	annual pearlwort	Native	---	---	---	---
Silene gallica	windmill pink	Non-Native	---	---	---	---
Spergularia rubra	sandspurrey	Non-Native	---	---	---	---
Stellaria media	common chickweed	Non-Native	---	---	---	---
Stellaria nitens	smooth chickweed	Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Convolvulaceae – Morning-Glory Family						
Calystegia purpurata subsp. *purpurata*	purple western morning glory	Native	---	---	---	---
Calystegia subacaulis subsp. *subacaulis*	hill morning glory	Native	---	---	---	---
Crassulaceae – Stonecrop Family						
Crassula connata	pygmyweed	Native	---	---	---	---
Crassula tillaea	moss pygmyweed	Non-Native	---	---	---	---
Cucurbitaceae – Gourd Family						
Marah fabacea	California man-root	Native	---	---	---	---
Ericaceae – Heath Family						
Arctostaphylos manzanita subsp. *manzanita*	common manzanita	Native	---	---	---	---
Euphorbiaceae – Spurge Family						
Croton setiger	turkey mullein	Native	---	---	---	---
Euphorbia spathulata	warty spurge	Native	---	---	---	---
Fabaceae – Pea Family						
Acmispon americanus var. *americanus*	Spanish clover	Native	---	---	---	---
Acmispon parviflorus	hill lotus	Native	---	---	---	---
Acmispon wrangelianus	calf lotus	Native	---	---	---	---
Amorpha californica var. *napensis* (CRPR 1B.2)	Napa false indigo	Native	---	---	---	---
Astragalus gambelianus	Gambel's dwarf milk vetch	Native	---	---	---	---
Genista monspessulana	French broom	Non-Native	---	---	High	On List
Lathyrus vestitus var. *vestitus*	pacific pea	Native	---	---	---	---
Lupinus bicolor	dove lupine	Native	---	---	---	---
Medicago arabica	spotted clover	Non-Native	---	---	---	---
Medicago polymorpha	burclover	Non-Native	---	---	Limited	---
Thermopsis californica var. *californica*	California goldenbanner	Native	---	---	---	---
Trifolium albopurpureum	rancheria clover	Native	---	---	---	---
Trifolium bifidum var. *decipiens*	pinhole clover	Native	---	---	---	---
Trifolium campestre	hop clover	Non-Native	---	---	---	---
Trifolium ciliolatum	tree clover	Native	---	---	---	---
Trifolium depauperatum var. *amplectens*	pale sack clover	Native	---	---	---	---
Trifolium depauperatum var. *truncatum*	dwarf sac clover	Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Trifolium dubium	shamrock clover	Non-Native	---	---	---	---
Trifolium fragiferum	strawberry clover	Non-Native	---	---	---	---
Trifolium glomeratum	clustered clover	Non-Native	---	---	---	---
Trifolium gracilentum	pinpoint clover	Native	---	---	---	---
Trifolium hirtum	rose clover	Non-Native	---	---	Limited	---
Trifolium microcephalum	hairy clover	Native	---	---	---	---
Trifolium microdon	thimble clover	Native	---	---	---	---
Trifolium striatum	knotted clover	Non-Native	---	---	---	---
Trifolium subterraneum	subterraneum clover	Non-Native	---	---	---	---
Trifolium tomentosum	woolly clover	Non-Native	---	---	---	---
Trifolium willdenovii	tomcat clover	Native	---	---	---	---
Vicia americana subsp. *americana*	American vetch	Native	---	---	---	---
Vicia benghalensis	purple vetch	Non-Native	---	---	---	---
Vicia sativa subsp. *nigra*	smaller common vetch	Non-Native	---	---	---	---
Vicia sativa subsp. *sativa*	spring vetch	Non-Native	---	---	---	---
Vicia villosa subsp. *varia*	smooth vetch	Non-Native	---	---	---	---
Vicia villosa subsp. *villosa*	woolly vetch	Non-Native	---	---	---	---
Fagaceae – Oak Family						
Quercus agrifolia var. *agrifolia*	coast live oak	Native	---	---	---	---
Quercus durata var. *durata*	leather oak	Native	---	---	---	---
Quercus garryana var. *garryana*	Oregon oak	Native	---	---	---	---
Quercus kelloggii	black oak	Native	---	---	---	---
Quercus lobata	valley oak	Native	---	---	---	---
Gentianaceae – Gentian Family						
Centaurium tenuiflorum	slender centaury	Non-Native	---	---	---	---
Cicendia quadrangularis	common microcalis	Native	---	---	---	---
Zeltnera muehlenbergii	Muehlenberg's centaury	Native	---	---	---	---
Geraniaceae – Geranium Family						
Erodium botrys	long-beaked filaree	Non-Native	---	---	---	---
Erodium brachycarpum	foothill filaree	Non-Native	---	---	---	---
Erodium cicutarium	red-stemmed filaree	Non-Native	---	---	Limited	---
Erodium moschatum	white-stem filaree	Non-Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Geranium dissectum	cut-leaf geranium	Non-Native	---	---	Moderate	---
Geranium molle	dovefoot geranium	Non-Native	---	---	---	---
Geranium purpureum	geranium	Non-Native	---	---	---	---
Geranium robertianum	Robert's geranium	Non-Native	---	---	---	---
Grossulariaceae – Gooseberry Family						
Ribes californicum var. *californicum*	California gooseberry	Native	---	---	---	---
Hydrophyllaceae – Waterleaf Family						
Nemophila heterophylla	canyon nemophila	Native	---	---	---	---
Nemophila menziesii var. *atomaria*	baby blue eyes	Native	---	---	---	---
Lamiaceae – Mint Family						
Mentha pulegium	pennyroyal	Non-Native	---	---	Moderate	---
Monardella villosa subsp. *villosa*	coyote mint	Native	---	---	---	---
Scutellaria californica	California skullcap	Native	---	---	---	---
Stachys rigida var. *quercetorum*	hedge nettle	Native	---	---	---	---
Linaceae – Flax Family						
Hesperolinon congestum (FT, ST, CRPR 1B.1)	Marin western flax	Native	---	---	---	---
Lythraceae – Loosestrife Family						
Lythrum hyssopifolia	hyssop loostrife	Non-Native	---	---	Moderate	---
Malvaceae – Mallow Family						
Sidalcea malviflora subsp. *laciniata*	checkermallow	Native	---	---	---	---
Montiaceae – Miner's Lettuce Family						
Calandrinia menziesii	red maids	Native	---	---	---	---
Claytonia exigua subsp. *exigua*	viridis	Native	---	---	---	---
Claytonia parviflora subsp. *parviflora*	narrow leavedminer's lettuce	Native	---	---	---	---
Claytonia perfoliata subsp. *perfoliata*	miner's lettuce	Native	---	---	---	---
Montia fontana	water blinks	Native	---	---	---	---
Myrsinaceae – Myrsine Family						
Lysimachia arvensis	scarlet pimpernel	Non-Native	---	---	---	---
Oleaceae – Olive Family						
Olea europaea	olive	Non-Native	---	---	Limited	---
Onagraceae – Evening Primrose Family						

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Clarkia gracilis subsp. *sonomensis*	Sonoma clarkia	Native	---	X	---	---
Clarkia purpurea subsp. *quadrivulnera*	wine cup clarkia	Native	---	---	---	---
Epilobium brachycarpum	tall annual willow-herb	Native	---	---	---	---
Epilobium canum subsp. *canum*	California fuschia	Native	---	---	---	---
Epilobium minutum	minute willowherb	Native	---	---	---	---
Taraxia ovata	sun cup	Native	---	---	---	---
Orobanchaceae – Broomrape Family						
Castilleja attenuata	valley tassels	Native	---	---	---	---
Castilleja densiflora subsp. *densiflora*	dense flower owl's clover	Native	---	---	---	---
Triphysaria pusilla	dwarf owl's clover	Native	---	---	---	---
Papaveraceae – Poppy Family						
Eschscholzia californica	California poppy	Native	---	---	---	---
Platystemon californicus	cream cups	Native	---	---	---	---
Phrymaceae – Lopseed Family						
Diplacus aurantiacus	bush monkeyflower	Native	---	---	---	---
Erythranthe guttata	common yellow monkeyflower	Native	---	---	---	---
Erythranthe microphylla	small leaved monkeyflower	Native	---	---	---	---
Erythranthe nasuta	monkeyflower	Native	---	---	---	---
Plantaginaceae – Plantain Family						
Callitriche marginata	California water starwort	Native	---	---	---	---
Collinsia heterophylla var. *heterophylla*	Chinese houses	Native	---	---	---	---
Collinsia sparsiflora var. *collina*	hillside collinsia	Native	---	---	---	---
Collinsia sparsiflora var. *sparsiflora*	few-flowered collinsia	Native	---	---	---	---
Plantago coronopus	buckhorn plantain	Non-Native	---	---	---	---
Plantago erecta	dwarf plantain	Native	---	---	---	---
Plantago lanceolata	English plantain	Non-Native	---	---	Limited	---
Veronica peregrina subsp. *xalapensis*	purslane speedwell	Native	---	---	---	---
Polemoniaceae – Phlox Family						
Gilia capitata subsp. *capitata*	bluehead gilia	Native	---	---	---	---
Gilia clivorum	purplespot gilia	Native	---	---	---	---
Leptosiphon androsaceus	common leptosiphon	Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Microsteris gracilis	slender phlox	Native	---	---	---	---
Navarretia squarrosa	skunkweed	Native	---	---	---	---
Polygonaceae – Buckwheat Family						
Eriogonum luteolum var. *caninum* (CRPR 1B.2)	Tiburon buckwheat	Native	---	---	---	---
Eriogonum nudum var. *auriculatum*	naked-stem buckwheat	Native	---	---	---	---
Rumex acetosella	sheep sorrel	Non-Native	---	---	Moderate	---
Rumex crispus	curly dock	Non-Native	---	---	---	---
Rumex pulcher	fiddle dock	Non-Native	---	---	---	---
Primulaceae – Primrose Family						
Primula hendersonii	shooting stars	Native	---	---	---	---
Ranunculaceae – Buttercup Family						
Delphinium patens subsp. *patens*	spreading larkspur	Native	---	---	---	---
Ranunculus californicus var. *californicus*	California buttercup	Native	---	---	---	---
Ranunculus hebecarpus	delicate buttercup	Native	---	---	---	---
Ranunculus muricatus	spiny buttercup	Non-Native	---	---	---	---
Rhamnaceae – Buckthorn Family						
Frangula californica subsp. *californica*	coffeeberry	Native	---	---	---	---
Rosaceae – Rose Family						
Acaena californica	California acaena	Native	---	---	---	---
Aphanes occidentalis	Lady's mantle	Native	---	---	---	---
Cercocarpus betuloides var. *betuloides*	mountain mahogany	Native	---	---	---	---
Cotoneaster franchetii	Cotoneaster	Non-Native	---	---	Moderate	---
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	Native	---	---	---	---
Fragaria vesca	California strawberry	Native	---	---	---	---
Heteromeles arbutifolia	Toyon	Native	---	---	---	---
Holodiscus discolor var. *discolor*	ocean spray	Native	---	---	---	---
Oemleria cerasiformis	oso berry	Native	---	---	---	---
Rubus armeniacus	Himalayan blackberry	Non-Native	---	---	High	---
Rubus ursinus	California blackberry	Native	---	---	---	---
Rubiaceae – Madder Family						
Galium aparine	Bedstraw	Native	---	---	---	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Galium californicum subsp. *californicum*	California bedstraw	Native	---	---	---	---
Galium murale	tiny bedstraw	Non-Native	---	---	---	---
Galium parisiense	wall bedstraw	Non-Native	---	---	---	---
Galium porrigens var. *porrigens*	climbing bedstraw	Native	---	---	---	---
Galium triflorum	sweet-scented bedstraw	Native	---	---	---	---
Sherardia arvensis	field madder	Non-Native	---	---	---	---
Salicaceae – Willow Family						
Salix lasiolepis	arroyo willow	Native	---	---	---	---
Sapindaceae – Soapberry Family						
Aesculus californica	California buckeye	Native	---	---	---	---
Saxifragaceae – Saxifrage Family						
Lithophragma affine	woodland star	Native	---	---	---	---
Lithophragma heterophyllum	hillside star	Native	---	---	---	---
Micranthes californica	California saxifrage	Native	---	---	---	---
Scrophulariaceae – Figwort Family						
Scrophularia californica	bee plant	Native	---	---	---	---
Urticaceae – Nettle Family						
Hesperocnide tenella	western nettle	Native	---	---	---	---
Urtica dioica subsp. *holosericea*	hoary nettle	Native	---	---	---	---
Urtica urens	dwarf nettle	Non-Native	---	---	---	---
Valerianaceae – Valerian Family						
Plectritis ciliosa	longspur seablush	Native	---	---	---	---
Plectritis macrocera	white plectritis	Native	---	---	---	---
Viburnaceae – Muskroot Family						
Sambucus mexicana	blue elderberry	Native	---	---	---	---
Viscaceae – Mistletoe Family						
Phoradendron leucarpum subsp. *tomentosum*	oak mistletoe	Native	---	X	---	---
MONOCOTS						
Agavaceae – Agave Family						
Chlorogalum pomeridianum var. *pomeridianum*	soap plant	Native	---	---	---	---
Alliaceae – Onion or Garlic Family						

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Allium peninsulare var. *franciscanum* (CRPR 1B.2)	Franciscan onion	Native	---	---	---	---
Cyperaceae – Sedge Family						
Carex barbarae	whiteroot sedge	Native	---	---	---	---
Carex densa	dense sedge	Native	---	---	---	---
Carex praegracilis	field sedge	Native	---	---	---	---
Cyperus eragrostis	tall flatsedge	Native	---	---	---	---
Eleocharis macrostachya	common spikerush	Native	---	---	---	---
Iridaceae – Iris Family						
Iris douglasiana	Douglas iris	Native	---	---	---	---
Iris macrosiphon	ground iris	Native	---	---	---	---
Sisyrinchium bellum	blue-eyed grass	Native	---	---	---	---
Juncaceae – Rush Family						
Juncus balticus subsp. ater	Baltic rush	Native	---	---	---	---
Juncus bufonius var. *bufonius*	toad rush	Native	---	---	---	---
Juncus effusus subsp. *pacificus*	Pacific rush	Native	---	---	---	---
Juncus occidentalis	western rush	Native	---	---	---	---
Juncus patens	common rush	Native	---	---	---	---
Juncus xiphioides	iris-leaved rush	Native	---	---	---	---
Luzula comosa var. *comosa*	wood rush	Native	---	---	---	---
Juncaginaceae – Arrow-Grass Family						
Triglochin scilloides	flowering-quillwort	Native	---	---	---	---
Liliaceae – Lily Family						
Calochortus luteus	yellow mariposa lily	Native	---	---	---	---
Fritillaria affinis	checker lily	Native	---	---	---	---
Prosartes hookeri	drops of gold	Native	---	---	---	---
Melanthiaceae – False-Hellebore Family						
Trillium albidum	giant white wakerobin	Native	---	---	---	---
Trillium chloropetalum	giant trillium	Native	---	---	---	---
Orchidaceae – Orchid Family						
Corallorhiza striata	hooded coralroot	Native	---	X	---	---
Piperia elongata	denseflowered rein orchid	Native	---	X	---	---
Poaceae – Grass Family						

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Agrostis exarata	spike bentgrass	Native	---	---	---	---
Agrostis pallens	bentgrass	Native	---	---	---	---
Aira caryophyllea	silver hairgrass	Non-Native	---	---	---	---
Avena barbata	slender oats	Non-Native	---	---	Moderate	---
Avena fatua	wild oats	Non-Native	---	---	Moderate	---
Brachypodium distachyon	false brome	Non-Native	---	---	Moderate	---
Briza maxima	rattlesnake grass	Non-Native	---	---	Limited	---
Briza minor	little quaking grass	Non-Native	---	---	---	---
Bromus diandrus	ripgut brome	Non-Native	---	---	Moderate	---
Bromus hordeaceus	soft chess	Non-Native	---	---	Limited	---
Bromus laevipes	woodland brome	Native	---	---	---	---
Bromus madritensis	foxtail chess	Non-Native	---	---	---	---
Bromus racemosus	smooth brome	Non-Native	---	---	---	---
Bromus rubens	foxtail chess	Non-Native	---	---	High	---
Bromus sitchensis var. *carinatus*	California brome	Native	---	---	---	---
Bromus sterilis	poverty brome	Non-Native	---	---	---	---
Bromus vulgaris	common brome	Native	---	---	---	---
Crypsis schoenoides	swamp grass	Non-Native	---	---	---	---
Cynosurus echinatus	dogtail grass	Non-Native	---	---	Moderate	---
Dactylis glomerata	orchard grass	Non-Native	---	---	Limited	---
Danthonia californica	California oat grass	Native	---	---	---	---
Ehrharta erecta	panic veldt grass	Non-Native	---	---	Moderate	---
Elymus glaucus subsp. *glaucus*	blue wildrye	Native	---	---	---	---
Elymus multisetus	big squirreltail	Native	---	---	---	---
Festuca bromoides	brome fescue	Non-Native	---	---	---	---
Festuca californica	California fescue	Native	---	---	---	---
Festuca idahoensis	Idaho fescue	Native	---	---	---	---
Festuca microstachys	Eastwood fescue	Native	---	---	---	---
Festuca myuros	foxtail fescue	Non-Native	---	---	Moderate	---
Festuca perennis	Italian ryegrass	Non-Native	---	---	Moderate	---
Gastridium phleoides	nit grass	Non-Native	---	---	---	---
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	Non-Native	---	---	Moderate	---

Species Name	Common Name	Origin	Collection	Locally Rare	Cal-IPC Rating	CDFA Rating
Hordeum murinum subsp. *leporinum*	hare barley	Non-Native	---	---	Moderate	---
Koeleria macrantha	june grass	Native	---	---	---	---
Melica californica	California melic	Native	---	---	---	---
Melica geyeri	Geyer's oniongrass	Native	---	---	---	---
Melica torreyana	Torrey's melic grass	Native	---	---	---	---
Poa annua	annual bluegrass	Non-Native	---	---	---	---
Poa secunda subsp. *secunda*	one-sided bluegrass	Native	---	---	---	---
Polypogon interruptus	ditch beard grass	Non-Native	---	---	---	---
Polypogon monspeliensis	rabbitsfoot grass	Non-Native	---	---	Limited	---
Polypogon viridis	bentgrass	Non-Native	---	---	---	---
Stipa lepida	foothill needlegrass	Native	---	---	---	---
Stipa pulchra	purple needlegrass	Native	---	---	---	---
Ruscaceae – Butcher's-Broom Family						
Maianthemum stellatum	false lily of the valley	Native	---	---	---	---
Themidaceae – Brodiaea Family						
Brodiaea elegans subsp. *elegans*	harvest brodiaea	Native	---	---	---	---
Dichelostemma congestum	ookow	Native	---	---	---	---
Dipterostemon capitatus subsp. *capitatus*	blue dicks	Native	---	---	---	---
Triteleia hyacinthina	white brodiaea	Native	---	---	---	---
Triteleia laxa	Ithuriel's spear	Native	---	---	---	---

APPENDIX B CALIFORNIA NATURAL DIVERSITY DATABASE FIELD FORMS

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 05/05/2023

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Allium peninsulare var. franciscanum* *Allpenfra1*

Common Name: Franciscan onion

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 2208 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Nomad Ecology
Address: 822 Main Street
Martinez, CA 94553
E-mail Address: hbartosh@nomadecology.com
Phone: (925) 228-1027

Plant Information

Phenology:
70 % vegetative | 30 % flowering | 0 % 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)

Marin County Parks - Mount Burdell Preserve. Bowman Canyon parcel. Northwest of the town of San Marin and approximately 1.2 to 1.6 miles west-southwest of Burdell peak.

County: Marin Landowner / Mgr: Marin County Parks

Quad Name: Petaluma River Elevation: 320-800 feet

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: Samsung S23+

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** (●) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 38.137152, -122.617577

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):*

Multiple colonies in understory of Quercus agrifolia var. agrifolia oak woodland, Q. agrifolia var. agrifolia – Umbellularia californica woodland, Q. garryana woodland, and Q. kelloggii forest on north facing slopes. Absent to very sparse shrub layer of Symphoricarpos mollis, Holodiscus discolor var. discolor, and Toxicodendron diversilobum. Continuous herbaceous layer of Carduus pycnocephalus ssp. pycnocephalus, Torilis arvensis, Festuca californica, Tauschia kellogii, Chlorogalum pomeridianum subsp. pomeridianum, Vicia sativa subsp. nigra, and Nemophila heterophyla, among others.

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: Open space preserve, grazing, recreation (hiking, biking, horse riding)

Visible disturbances: Some cattle paths

Threats: Potentially non-native plants (Carduus pycnocephalus), potentially cattle impacts.

Comments: Excellent rating due to large populations numbers and few threats. Most occupied areas have high native integrity. No evidence of grazing observed on individuals.

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

- [X] Keyed (cite reference): TJM2
- [ ] 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	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[X]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@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): 05/08/2023

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Allium peninsulare var. franciscanum* *Allpenfra2*

Common Name: Franciscan onion

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 114 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Nomad Ecology
Address: 822 Main Street
Martinez, CA 94553
E-mail Address: hbartosh@nomadecology.com
Phone: (925) 228-1027

Plant Information

Phenology:
25 % vegetative | 75 % flowering | 0 % 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)

Marin County Parks - Mount Burdell Preserve. Bowman Canyon parcel. Northwest of the town of San Marin and approximately 2 miles southwest of Burdell peak.

County: Marin Landowner / Mgr: Marin County Parks

Quad Name: Petaluma River Elevation: 350-390 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: Samsung S23+

DATUM: NAD27 ( ) NAD83 ( ) WGS84 (●) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) *OR* Geographic (Latitude & Longitude) (●)

Coordinates: 38.12772, -122.62281

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):*

Understory of Umbellularia californica forest with scattered Quercus kelloggii on north-facing slopes. Shrub layer absent. Herbaceous layer thick and continuous, comprised of Avena barbata, Carduus pycnocephalus subsp. pycnocephalus, Festuca perennis, Torilis arvensis, Stacys rigida subsp. quercetorum, and Briza maxima, among others.

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: Open space preserve, grazing, recreation (hiking, biking, horse riding)

Visible disturbances: None

Threats: Low threat of non-native plants, potentially cattle impacts, potentially trail creation.

Comments: Excellent rating due to good population numbers and general lack of threats.

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

[X] Keyed (cite reference): TJM2
[ ] 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	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[X]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 07/25/2023

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Amorpha californica var. napensis* *Amocalnap1*

Common Name: Napa false indigo

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 7 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? 96 Yes, Occ. # ☐ No ☐ Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Nomad Ecology
Address: 822 Main Street
Martinez, CA 94553
E-mail Address: hbartosh@nomadecology.com
Phone: (925) 228-1027

Plant Information

Phenology:
90 % vegetative | 0 % flowering | 10 % 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)

Marin County Parks - Mount Burdell Preserve. Bowman Canyon parcel. Northwest of the town of San Marin and approximately 1.5 miles west-southwest of Burdell peak.

County: Marin Landowner / Mgr: Marin County Parks

Quad Name: Petaluma River Elevation: 623 feet

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: Samsung S23+

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** (●) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 38.13583, -122.61761

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):*

Growing in the understory of a large Quercus agrifolia var. agrifolia - Umbellularia californica woodland with scattered Quercus garryana var. garryana in canopy. Sparse to absent shrub layer of Toxicodendron diversilobum and Symphoricarpos mollis. Thick herbaceous layer of Carduus pycnocephalus subsp. pycnocephalus, Stachys rigida subsp. quercetorum, Vicia spp., Bromus diandrus, Cynosurus echinatus, and Avena barbata, among others.

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: Open space preserve, grazing, recreation (hiking, biking, horse riding)

Visible disturbances: None observed

Threats: Non-native plant impacts, potential grazing impacts

Comments: Good rating due to observed reproduction and good quality habitat. Non-native species in area may negatively impact habitat quality. No evidence of grazing observed on individuals.

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

☒ Keyed (cite reference): TJM2
☐ 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
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@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): 07/25/2023

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Eriogonul luteolum var. caninum* *Erilutcan1*

Common Name: Tiburon buckwheat

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 646 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Nomad Ecology
Address: 822 Main Street
Martinez, CA 94553
E-mail Address: hbartosh@nomadecology.com
Phone: (925) 228-1027

Plant Information

Phenology:
0 % vegetative | 90 % flowering | 10 % 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)

Marin County Parks - Mount Burdell Preserve. Bowman Canyon parcel. Northwest of the town of San Marin and approximately 0.95 to 1.27 miles west-southwest of Burdell peak.

County: Marin Landowner / Mgr: Marin County Parks

Quad Name: Petaluma River Elevation: 320 - 560 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: Samsung S23+

DATUM: NAD27 ( ) NAD83 ( ) WGS84 (●) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) *OR* Geographic (Latitude & Longitude) (●)

Coordinates: 38.13863, -122.61331

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):*

Stipa pulchra grassland on north- and NNW-facing slopes with rocky serpentine soils. No tree or shrub layer in occupied areas but Qercus durata var. durata, Umbellularia californica, and Cercocarpus betuloides var. betuloides in vicinity. Herbaceous layer sparse to continuous with high level of native integrity. Associated species include Stipa pulchra, Eriogonum nudum var. auriculatum, Madia elegans, Elymus multisetus, Plantago erecta, Hesperevax sparsiflora var. sparsiflora, Sabulina douglasii, Pellaea andromedifolia, Epilobium minutum, and Acmispon americanus var. americanus

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

Site Information

Overall site/occurrence quality/viability (site + population): (●) Excellent ( ) Good ( ) Fair ( ) Poor

Immediate AND surrounding land use: Open space preserve, grazing, recreation (hiking, biking, horse riding)

Visible disturbances: None

Threats: Cattle impacts, trampling, road maintenance/decommissioning, non-native plant impacts (low).

Comments: Excellent rating due to large populations numbers and low severity of threats. Most occupied areas have high native integrity. No evidence of grazing observed on individuals.

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

[X] Keyed (cite reference): TJM2
[ ] 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	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[X]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@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): 07/26/2023

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Hesperolinon congestum* *Hescon1*

Common Name: Marin western flax

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 231 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Nomad Ecology
Address: 822 Main Street
Martinez, CA 94553
E-mail Address: hbartosh@nomadecology.com
Phone: (925) 228-1027

Plant Information

Phenology:
0 % 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)

Marin County Parks - Mount Burdell Preserve. Bowman Canyon parcel. Northwest of the town of San Marin and approximately 1 to 1.25 miles west-southwest of Burdell peak.

County: Marin Landowner / Mgr: Marin County Parks

Quad Name: Petaluma River Elevation: 300-640 feet

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: Samsung S23+

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** (●) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 38.13820, -122.61174

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):*

Stipa pulchra grassland on north-facing slopes with rocky serpentine soils. No tree or shrub layer in occupied areas but Qercus durata var. durata, Umbellularia californica, and Cercocarpus betuloides var. betuloides in vicinity. Herbaceous layer sparse to continuous with high level of native integrity. Associated species include Stipa pulchra, Eriogonum nudum var. auriculatum, Madia elegans, Elymus multisetus, Plantago erecta, Hesperevax sparsiflora var. sparsiflora, Sabulina douglasii, Pellaea andromedifolia, Epilobium minutum, and Acmispon americanus var. americanus, among others.

Please fill out separate form for other rare taxa seen at this site. Eriogonum luteolum var. caninum

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

Immediate AND surrounding land use: Open space preserve, grazing, recreation (hiking, biking, horse riding)

Visible disturbances: None

Threats: Cattle impacts, trampling, road maintenance/decommissioning, non-native plant impacts (low).

Comments: Excellent rating due to large populations numbers and low severity of threats. Most occupied areas have high native integrity. No evidence of grazing observed on individuals.

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

[X] Keyed (cite reference): TJM2
[ ] 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	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[X]

May we obtain duplicates at our expense? (●) yes ( ) no