
INITIAL STUDY/NEGATIVE DECLARATION

**WALKER CREEK RANCH DISTAFF THISTLE
CONTROL PROJECT**

Prepared for:

**Marin County Office of Education
1111 Las Gallinas Avenue
San Rafael, CA 94903**

Prepared by:

**Grassetti Environmental Consulting
7008 Bristol Drive
Berkeley, CA 94705**

(This page intentionally blank)

TABLE OF CONTENTS

Section	Page No.
ENVIRONMENTAL DETERMINATION	II
I. INTRODUCTION	1
II. PROJECT DESCRIPTION	3
III. INITIAL STUDY CHECKLIST	12
I. AESTHETICS	12
II. AGRICULTURAL AND FORESTRY RESOURCES	15
III. AIR QUALITY	17
IV. BIOLOGICAL RESOURCES	22
V. CULTURAL RESOURCES	39
VI. ENERGY	40
VII. GEOLOGY AND SOILS	41
VIII. GREENHOUSE GAS EMISSIONS	44
IX. HAZARDS AND HAZARDOUS MATERIALS	46
X. HYDROLOGY AND WATER QUALITY	56
XI. LAND USE AND PLANNING	62
XII. MINERAL RESOURCES	63
XIII. NOISE	64
XIV. POPULATION AND HOUSING	68
XV. PUBLIC SERVICES	69
XVI. RECREATION	71
XVII. TRANSPORTATION/TRAFFIC	72
XVIII. TRIBAL CULTURAL RESOURCES	74
XIX. UTILITIES AND SERVICE SYSTEMS	75
XX. WILDFIRE HAZARDS	76
IV. MANDATORY FINDINGS OF SIGNIFICANCE	78
V. REFERENCES	80
VI. REPORT PREPARERS	83
APPENDICES	

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practice
CARB	California Air Resources Board
FEMA	Federal Emergency Management Agency
CO	carbon monoxide
CO ₂ E	carbon dioxide equivalent
GHG	greenhouse gas
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NWIC	Northwest Information Center
OHP	State Office of Historic Preservation
O ₃	ozone
PM ₁₀	particulate matter less than 10 microns
PM _{2.5}	particulate matter less than 2.5 microns
RWQCB	Regional Water Quality Control Board
SCH	State Clearinghouse
SFBAAB	San Francisco Bay Area Air Basin
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SO _x	sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
TAC	toxic air contaminant
VOC	volatile organic compound

ENVIRONMENTAL DETERMINATION

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED: The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages

	Aesthetics		Greenhouse Gas Emissions		Public Services
	Agricultural and Forestry Resources		Hazards and Hazardous Materials		Recreation
	Air Quality		Hydrology/Water Quality		Transportation/ Traffic
	Biological Resources		Land Use/Planning		Tribal Cultural Resources
	Cultural Resources		Mineral Resources		Utilities/Service Systems
	Energy		Noise		Wildfire Hazards
	Geology/Soils		Population/Housing		Mandatory Findings of Significance

DETERMINATION: On the basis of this initial evaluation:

I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	X
I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	
I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	
I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	
I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.	

Patrick McLaughlin

Date

I. INTRODUCTION

This Initial Study/ Negative Declaration (IS/ND) has been prepared by the Marin County Office of Education (MCOE), 1111 Las Gallinas Avenue, San Rafael, CA 949034, pursuant to the California Environmental Quality Act (Public Resources Code Sections 21000 et seq.), CEQA Guidelines (Title 14, Section 15000 et seq. of the California Code of Regulations). It provides documentation to support the conclusion that the proposed Distaff Thistle Control Project (“the Project”), as proposed with minimization and avoidance measures, would not cause a potentially significant impact to the physical environment. The proposed site is located at the MCOE’s Walker Creek Ranch facility in a rural area of northern Marin County.

This IS/ND describes the location of the project site, the project sponsor’s objectives, and the details of the proposed Project. The Environmental Checklist Form included as Appendix G of the CEQA Guidelines serves as the basis for the environmental evaluation contained in the IS/ND. The Checklist Form examines the specific potential Project-level physical environmental impacts that may result from the construction and operation of the proposed new and expanded facilities onsite.

The MCOE will serve as the “lead agency” (the public agency that has the principal responsibility for carrying out and/or approving a Project) for the proposed project. The governing board of the MCOE is responsible for ensuring that the environmental review and documentation meet the requirements of CEQA. The draft IS/ND is subject to review and comment by responsible agencies and the public during a statutory public review period (30 days). Any necessary revisions will be incorporated in the Final IS/ND.

The Draft Initial Study will be circulated for a 30-day public and agency review period. Should the MCOE approve the Project, it will file a “Notice of Determination” for posting by the County Clerk and the State Clearinghouse. The filing of the notice and its posting starts a 30- day statute of limitations on court challenges to the CEQA review of the Project.

Organization of the IS

This document is organized into the following sections:

SECTION I – INTRODUCTION: Provides background information about the Project name, location, sponsor, and the date this Initial Study was completed.

SECTION II – PROJECT DESCRIPTION: Includes project background and detailed description of the proposed project.

SECTION III – INITIAL STUDY CHECKLIST AND DISCUSSION: Reviews the proposed project and states whether the Project would have potentially significant environmental effects.

SECTION IV – MANDATORY FINDINGS OF SIGNIFICANCE: States whether environmental effects associated with development of the proposed project are significant, and what, if any, added environmental documentation may be required.

SECTION V – REFERENCES: Identifies source materials that have been consulted in the preparation of the IS.

SECTION IV – REPORT PREPARERS: Identifies the firms and individuals preparing the IS.

APPENDICES: Includes technical reports and the Comments and Responses Addendum (in Final IS).

II. PROJECT DESCRIPTION

Project Name:	Walker Ranch Distaff Thistle Control Project
Project Location:	1700 Marshall Petaluma Road Petaluma, CA 94952
Project Applicant and Lead Agency Contact:	Mr. Patrick McLaughlin Ranch Manager/Outdoor School Principal 1700 Marshall Petaluma Road Petaluma, CA 94952 (415) 491-6601
General Plan Designation:	Marin Countywide Plan, Agriculture
Zoning:	Marin County Zoning Ordinance, ARP-60 Agriculture Residential Planned
Project Approvals:	MCOE approval of Project and funding
Date Initial Study Completed:	November 9, 2021

PROJECT DESCRIPTION

Project Location

The project site is located in a rural, unincorporated, agricultural/open space area in the north-central portion of Marin County, about 4 miles east of the town of Marshall. (See Figure 1). The Project is proposed on approximately 402 acres on the MCOE's Walker Creek Ranch property, at 1700 Marshall Petaluma Road. Local access to the site is via Marshall Petaluma Road from Highway 1 to the west and Redhill Road (in Novato) to the east.

Existing Conditions and Land Uses on the Site

The proposed Walker Creek Ranch Distaff Thistle Control Project ("Proposed Project" or "Project") would be implemented on a number of sites with thistle infestations on Walker Creek Ranch property, on both sides of Walker Creek (See Figure 2). The MCOE's Walker Creek Ranch is a 1700-acre property that includes large areas of open space and grazing lands that are used for outdoor education and recreation, as well as a conference/retreat center near Walker Creek, with four lodges and 13 cabins. The facility also has a network of hiking trails and a school garden. It hosts outdoor education programs for Marin County children, as well as weddings, retreats, and other events. The proposed project would be on about 402 acres of the ranch, primarily on grass and weed covered hillsides away from the developed portions of the site.

Walker Creek flows through the site in a generally east-west direction, and is bordered by a strip of riparian vegetation. The larger south-facing slopes primarily encompass grassland habitats that are dominated by introduced grasses and forbs—though scattered native plants are present as well. The larger drainages support denser vegetation, particularly shrublands and woodlands. The north-facing slopes are tree and shrub covered, except for cleared areas, which are grass and weed covered. Most of the proposed treatment areas are on the grassy slopes to the north and west of the main conference/retreat center, with a few sites across the creek to the south. A comprehensive botanical resources report provides additional details (see Biological Resources section).

Surrounding Land Uses

Surrounding land uses are also ranches (primarily for cattle grazing) and other undeveloped open space. The ranches adjacent to the site have ranch house complexes (see Figure 3). The nearest off-site ranch house complexes to the proposed treatment areas are about 550



Figure 1
Project Location

Source: Marin Convention & Visitors Bureau

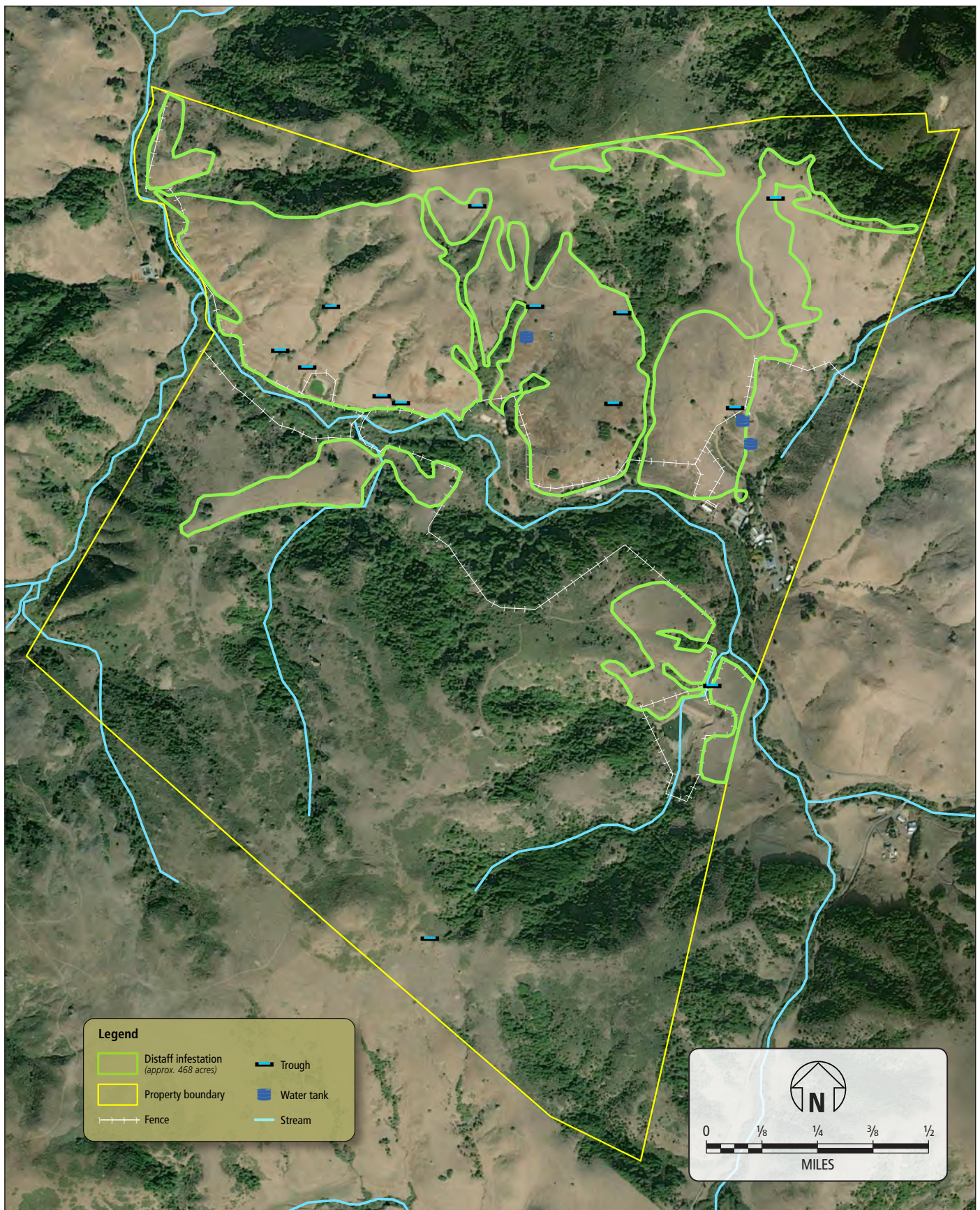


Figure 2
Woolly Distaff Thistle Treatment Planning Map

Source: Marin Agricultural Land Trust



Figure 3
Walker Ranch Developed Area and Nearby Residences

Source: TomTom Maps and Vollmar Natural Lands Consulting

feet to the northwest of the site and about 1,900 feet southeast of the nearest treatment area. There are no residential or commercial areas in the Project vicinity.

Proposed Project Objectives and Activities

Project Objectives

Woolly distaff thistle is classified as a “highly invasive” noxious weed by the California Invasive Plant Council (Cal-IPC) Inventory. It is highly competitive with cereal crops and desirable rangeland species, and dense populations can develop. In addition, the spiny foliage and flowerheads can injure the eyes and mouths of grazing livestock. The MCOE is proposing to remove the dense stands of this weed on the Walker Creek Ranch property to improve grazing, prevent spread of the weed to other nearby lands, and to restore native habitat values to the site.

Herbicide Application

The proposed project involves aerial (helicopter) and manual (backpack and side-by-side boom on ATV) application of herbicides to approximately 402 acres of grasslands (see Figure 2). The aerial spraying would occur over a one-to-three-day period during the late winter/spring growing season for the thistle, typically between January and April. The project would include the following measures to protect sensitive resources and receptors:

- 100-foot buffers would be placed surrounding all streams, water courses, water stock ponds, and other sensitive areas. These areas would be flagged or painted with high-visibility markings. No aerial spraying would occur in these buffer areas; instead, areas within the buffers would be treated using backpack sprayers and/or side-by-side sprayers mounted on ATVs.
- The helicopter spraying would be greater than 600 feet from any residence or occupied building.
- No children or other visitors would be allowed on the property during or within 24 hours after aerial spraying activities. Children and visitors would not be allowed in areas of ground spraying for 24 hours after spraying, assuming dry conditions (if wet, then 24 hours after end of precipitation).
- No spraying would occur on days with winds over 10 miles per hour.
- Adjacent land-owners would be notified of aerial spraying at least two weeks before the spraying occurs.
- Will work directly with ranchers who runs cattle on property to create a plan to relocate cattle during spraying.

- Workers involved in treatment would be trained to recognize San Francisco gumplant and aquatic resources, and be briefed on the importance of avoiding.

After the initial spraying, aerial and manual treatment may be repeated annually for 3-5 years, with manual maintenance spraying to continue annually as needed. All treatments would continue to occur in the late winter-early spring period. Future treatment would be subject to the same safety and application measures/limitations as for the original spray.

Herbicide Mix

The thistle control would be implemented by application of a solution of Milestone herbicide, mixed with a small amount of Hasten EA. Milestone contains the active ingredient aminopyralid which is a Group 4 growth regulator herbicide that provides an effective tool for managing difficult-to-control weeds using reduced application rates. Milestone herbicide is intended for invasive weed control across a wide variety of use sites. It does so with little-to-no damage to grasses, forbs or other key members of the native plant community, allowing native habitats to be restored.

Hasten EA is an ethylated seed oil adjuvant that includes a surfactant to adhere the herbicide to the plant and assists with penetration of the herbicide into the target plants. Crosshair is a modified vegetable oil with amine salts of organic acids and organic acids that assists spray dropping. Milestone, Crosshair, and Hasten EA are more fully discussed in the Hazards and Hazardous Materials section of this IS.

The project would apply 7 ounces of Milestone herbicide, 6.4 ounces of Hasten EA (adjuvant), and 1.75 ounces/acre of Crosshair (in-place deposition agent) per acre mixed with water. The Milestone, Hasten-EA, and Crosshair components would constitute about 12% of the overall spray, with the rest of the spray mix being water. Fence-lines, buffer strips, sensitive areas and areas under trees may be subsequently hand-sprayed (backpack sprayer) or sprayed with side-by-side booms from an ATV with the same herbicide mix.

Staging Areas

The project staging area would be at a large ball field, adjacent to the parking lot at the ranch complex.

Equipment Use

Equipment used would be limited to a helicopter, manual backpack spray tank, and possibly a boom sprayer attached to the rear of an ATVs. The helicopter would be based at the ranch

for the duration of the spray period, and would land at the staging area for refilling of its spray tank and servicing of its spray system.

Revegetation

Revegetation would occur naturally, possibly augmented by application of native grasses seed mix if necessary, though the reduction in distaff thistle is likely to result in a net increase in native plant species.

Workers

There would be 10-18 workers onsite (including facility staff and helicopter crew) on an average day during treatment activities. It is possible that facility staff may be reduced during spray periods because the facility would be closed to the public at those times. In addition, remaining staff would be indoors and at least 600 feet from spray areas when helicopter spraying occurs.

Additional Best Management Practices and Safety Measures

Staff would work indoors during the application by helicopter. Out of an abundance of caution staff would continue to work indoors for the remainder of the day and wear N95 masks as a precaution when walking outdoors and/or between buildings. Ranchers moving cattle also would be required to wear N95 masks.

Schedule and Timing

Helicopter use would be for up to 3 days, with another 14 days of manual application after the aerial treatment. Treatment would be repeated for 3-5 years, with manual spraying annually as needed. Thistle control spraying would occur during the late winter and early spring months, depending on thistle growth periods and weather conditions. Typical aerial application hours would be 7:00 am to 4:30 pm, any day of the week.

Land Use Entitlements and other Agency Approvals

MCOE Approvals. The MCOE is a state agency with independent discretionary authority over the site's land use. The MCOE would take approval actions for the project at a noticed Marin County Board of Education Meeting.

Other Local Approvals. Because the project is proposed on MCOE property, it is exempt from County of Marin land use regulations. However, spray activities would require approval from the Marin County Agricultural Commission.

State Water Quality Control Board Permit Compliance. The State Water Quality Control Board regulates spray applications of certain herbicides with respect to water quality. The Project would be required to comply with General NPDES Permit for Biological and Residual Pesticide Discharges from Spray Applications via a Notice of Intent to the Regional Water Quality Control Board.

Williamson Act Compliance. There are no lands under Williamson Act contract at the site.

III. INITIAL STUDY CHECKLIST

The initial study checklist recommended by the CEQA Guidelines is used to describe the potential impacts of the proposed Project on the physical environment.

I. Aesthetics

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?			X	
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?				X

Background

The project site affords views of a variety of natural features and pastoral landscapes including grassy hillsides, riparian lined water courses, tree- and shrub- covered hillsides, and rock outcrops. In the lower areas of the site, the riparian corridor of Walker Creek, the conference center, lodges, cabins, and ranch buildings dominate the landscape. Views of the site are provided in Figures 4-8, below.



Figure 4: View of Ranch Complex looking West



Figure 5: View of Site Looking Southwest from Northeast Corner of the Site



Figure 6: View of Pond to the South of the Ranch Complex



Figure 7: View of Site Slopes and Rock Outcrops



Figure 8: View of Walker Creek Riparian Corridor

Discussion

- a, b) There are no designated scenic highways with views of the site, which is in an isolated location off of a relatively lightly traveled rural road. Although there are rock outcroppings, trees, and potentially historic buildings on to the project site, the proposed removal of large areas of thistle via aerial spraying would not affect any of those aesthetic features. Therefore, the project would have **no impact** on scenic vistas or scenic resources. The project would result in large browned areas for part of the rainy season, which would otherwise be green. This effect would be visible for one or two seasons, but would not constitute a significant adverse impact because these hills appear brown during much of the year in any case, and other green vegetation would emerge to take the place of the thistles in the next rainy season.
- c) As shown in Figures 4-8, the project site is within a rural area. As described in items a and b, above, the project would temporarily change views of large areas of the site from Walker Creek Road and possibly from Marshall Petaluma Road from green to brown for one rainy season. This impact is considered **less than significant**. The Project is not in an urban area and would not conflict with any of the Marin Countywide Plan's visual quality policies. It would have no long-term effects on the visual landscape, as the

removed thistles would be replaced by other grasses and vegetation. Therefore, the project would have **no impact** on visual-quality-related plans or policies.

- d) The project would not include any lighting. Therefore, no light and glare impacts would occur.

II. Agricultural and Forestry Resources

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non- agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				X

Discussion

a-e) The project site is designated, ARP-60 (Agriculture Residential Planned) in Marin County Zoning Ordinance, and Agricultural in the Countywide General Plan. The Project site is in grazing use. The thistles proposed for removal are harmful to livestock, therefore their removal would not adversely affect agricultural use of the site. Treatment would occur when no livestock are present in the treatment areas. The site is under Williamson Act contract.

No forested lands would be treated as part of the project, because the thistles grow in open grassy areas. The project would not result in the conversion of farmland or forestland to

non-agricultural uses. For these reasons, there would be **no impact** on agricultural and forestry resources.

III. Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Result in a cumulatively considerable net increase of any criteria for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?			X	
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

Background

This air quality analysis is consistent with the methods described in the Bay Area Air Quality Management District (BAAQMD) *CEQA Air Quality Guidelines* (updated in May 2017).¹ This air quality analysis includes a review of air pollutant emissions such as carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOC) as reactive organic gases (ROG), particulate matter less than 10 micrometers (coarse or PM₁₀), and particulate matter less than 2.5 micrometers (fine or PM_{2.5}).

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, stability, and air temperature, in combination with local surface topography (i.e., geographic features such as mountains,

¹ The Air District's June 2010 adopted thresholds of significance were challenged in a lawsuit. Although the BAAQMD's adoption of significance thresholds for air quality analysis has been subject to judicial actions, the lead agency has determined that BAAQMD's Revised Draft Options and Justification Report (October 2009) provide substantial evidence to support the BAAQMD recommended thresholds. Therefore, the lead agency has determined the BAAQMD recommended thresholds are appropriate for use in this analysis.

valleys, and San Francisco Bay), determine the effect of air pollutant emissions on local air quality. The project site is located within the San Francisco Bay Area Air Basin (Air Basin). The Air Basin is characterized by complex terrain which distorts normal wind flow patterns, consisting of coastal mountain ranges, inland valleys, and bays. Prevailing winds throughout the county are generally from the northwest, with wind speeds highest along the west coast. Annual rainfall in the hills is generally higher than in most parts of the Bay Area, averaging 37 to 49 inches. The majority of rainfall across the County occurs November through March.

The BAAQMD maintains a network of monitoring stations within the Air Basin that monitor air quality and compliance with applicable ambient standards. The nearest BAAQMD air monitoring station is the Sebastopol air monitoring station approximately 16 miles north of the project site. Table AQ-1 summarizes the most recent available three years of data (2016 through 2018) from the Sebastopol air monitoring station. The state and national 8-hour ozone standard was exceeded once in 2017. The national PM_{2.5} standard was exceeded four times in 2017 and 13 times in 2018 due to wildfires. No other state or national air quality standards were exceeded during the three-year period. The Bay Area is currently designated “nonattainment” for state and national (1-hour and 8-hour) ozone standards, for the state PM₁₀ standards, and for state and national (annual average and 24-hour) PM_{2.5} standards. The Bay Area is designated “attainment” or “unclassifiable” with respect to the other ambient air quality standards (BAAQMD, 2019b).

Discussion

- a) The applicable air quality plan for the project is the BAAQMD’s 2017 Clean Air Plan: Spare the Air, Cool the Climate (2017 CAP) (adopted in April 2017), which provides a roadmap for BAAQMD’s efforts over the next few years to reduce air pollution and protect public health and the global climate. The consistency of the project with this regional plan is primarily a question of the consistency with the population/employment assumptions utilized in developing the 2017 CAP, which were based on projections from the Association of Bay Area Governments (ABAG). The project is consistent with the CAP and does not support any population growth through the construction of new residences or development. As a result, the project is consistent with the current growth projections in the 2017 CAP (BAAQMD, 2017a).

As presented in the subsequent impact discussions, the project would not result in new long-term emissions and short-term emissions would be less than significant; therefore, the project would support the primary goals of the 2017 CAP. There are no 2017 CAP control measures applicable to the project and the project would not disrupt or hinder implementation of control measures. Therefore, this impact would be **less than significant**.

Table AQ-1: Air Quality Data Summary (2016 – 2018)

Pollutant	Monitoring Data by Year			
	Standard ^a	2016	2017	2018
Ozone				
Highest 1 Hour Average (ppm) ^b	0.09	0.073	0.087	0.071
Days over State Standard		0	0	0
Highest 8 Hour Average (ppm) ^b	0.070	0.064	0.071	0.053
Days over National Standard		0	1	0
Highest 8 Hour Average (ppm) ^b	0.070	0.064	0.071	0.053
Days over State Standard		0	1	0
Nitrogen Dioxide				
Highest 1 Hour Average (ppm) ^b	0.180	0.032	0.035	0.065
Days over State Standard		0	0	0
Annual Average (µg/m ³) ^b	0.030/0.05 3	0.004	0.008	0.004
Carbon Monoxide				
Highest 1 Hour Average (ppm) ^b	9.0	1.6	2.1	1.4
Days over State Standard		0	0	0
Highest 8 Hour Average (ppm) ^b	20	1.0	1.6	1.3
Days over State Standard		0	0	0
Particulate Matter (PM_{2.5})				
Highest 24 Hour Average (µg/m ³) ^b	35	18.7	81.8	175.3
Days over National Standard		0	4	13
State Annual Average (µg/m ³) ^b	12	4.6	8.1	8.3
NOTES: Values in bold are in excess of at least one applicable standard. a) Generally, state standards and national standards are not to be exceeded more than once per year. b) ppm = parts per million; µg/m ³ = micrograms per cubic meter. c) PM ₁₀ is not measured every day of the year. Number of estimated days over the standard is based on 365 days per year. SOURCE: BAAQMD, 2019b.				

- b) The project would result in short-term criteria pollutant emissions during a 15-day period in 2021 and would be repeated annually as needed. One day of aerial application using a light/medium lift helicopter would occur per year followed by 14 days of ground application using ATVs and backpack spraying. Approximately 10-18 workers would be required on an average day during treatment activities.

The BAAQMD *CEQA Air Quality Guidelines* recommend quantification of short-term exhaust emissions and comparison of those emissions to significance thresholds. Emissions were quantified using CARB's EMFAC and OFFROAD models as well as guidance from United States EPA. Air quality calculation details and emission estimates are included in **Appendix A**.

Table AQ-2 provides the estimated short-term emissions that would be associated with the project and compares those emissions to the BAAQMD's thresholds for average daily exhaust emissions. All pollutants would be below the BAAQMD significance thresholds.

Table AQ-2: Estimated Average Daily Exhaust Emissions (pounds/day)

Construction Year	ROG	NO _x	PM10	PM2.5	CO
2021	10.04	21.6	0.19	0.18	12
<i>BAAQMD Significance Threshold</i>	<i>54</i>	<i>54</i>	<i>82</i>	<i>54</i>	<i>--</i>
Threshold Exceeded?	No	No	No	No	--

Source: RCH Group, 2020.

Based on BAAQMD guidance, a project's emissions would have a significant cumulative impact if a project would exceed the significance thresholds. As presented above, short-term emissions associated with the project would be below the BAAQMD significance thresholds and would be less than significant. Therefore, project would not be cumulatively considerable, and this impact would be **less than significant**.

- c) The significance of impacts to sensitive receptors is dependent on the chance of contracting cancer from exposure to Toxic Air Contaminants (TACs) such as DPM or of having adverse health effects from exposure to non-carcinogenic TACs. A project is considered to be significant if the incremental cancer risk at a receptor exceeds 10 in a million. Health risk is evaluated for sensitive receptors within a 1,000-foot radius of a project's impact area. The nearest off-site ranch house complexes to the proposed treatment areas are approximately 550 feet to the northwest of the project site.

The Office of Environmental Health Hazard Assessment (OEHHA) does not recommend assessing cancer risk for projects lasting two months or less (OEHHA,

2015). Since the project consists of 15 days per year, health impacts would be less than significant. Furthermore, the majority of activities would be greater than 1,000 feet from sensitive receptors. The project would not result in any long-term or chronic exposure to substantial pollution concentrations. Therefore, this impact would be **less than significant**.

- d) The project would not include activities that generate substantial odors that could affect a substantial number of people and project duration is limited to 15 days per year. Therefore, this impact would be **less than significant**.

IV. Biological Resources

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?			X	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

Background

The study area is in northern central Marin County, within the outer Coast Ranges geomorphic province of northern California. The site is approximately six miles due east of the Pacific Ocean coastline at the Point Reyes National Seashore, and as such is subject to coastal weather patterns and geologic processes. In turn, the plant communities are reflective of the maritime weather and coastal sediments.

The proposed treatment area is incised by a network of seasonal and ephemeral streams that convey water to Walker Creek. Walker Creek is a perennial stream (SFEI 2015) that flows roughly east to west through the center of the site, eventually discharging into Tomales Bay. Elevations within the site range from approximately 128 to 974 feet above sea level (USGS 1997), with the lowest elevation occurring along the property's western edge at Walker Creek, and the highest elevations occurring along the hill tops at both the northern and southern edges of the property. Though the valley bottom is fairly flat near Walker Creek's floodplain, the adjacent hillslopes are generally steep. Small to large rock outcrops are present throughout the study area, and soils are derived from sandstone, shale, granite, or volcanic rocks.

A botanical evaluation of the site was conducted with field surveys occurring in the Spring and Summer of 2021 (Vollmar Natural Lands Consulting [VNLC] 2021). The habitat descriptions and special-status plants discussions below are based on that study.

Habitats

The study area is within the outer Coast Range Province of California and is mapped within the Jepson Manual's San Francisco Bay Area (SnFrB) floristic Subregion (Baldwin et al. 2012). The SnFrB Subregion is defined as encompassing a notable diversity of vegetation types, from very wet redwood forest to dry oak/pine woodland and chaparral. Being close to the coast, the study area is on the mesic (i.e., moist) side of this diversity in habitats. Dominant habitats on the site may be classified using the California Native Plant Society's system (CNPS 2020) as Valley and Foothill Grasslands, Cismontane Woodland, Coastal Scrub, and Riparian Woodland. Man-made stock ponds form a much more limited but biologically important habitat type. These habitats are described in detail below.

Valley and Foothill Grassland. Covering nearly 88 percent of the study area, grasslands are by far the most widespread plant community. The habitat is most prevalent along ridge tops and south-facing hillslopes, where deeper soils receive maximal solar radiation. A majority of the onsite grasslands are typical of those found throughout Mediterranean California, with a dominance of introduced grasses and forbs but with localized stands of native species. The

entire property is grazed by cattle, though grazing is concentrated within the grasslands. Grazing generally has the beneficial effect of reducing the competitive advantage of the introduced grasses, but may also facilitate the encroachment of the distaff (which also benefits from reduced competition from grasses). The most common grass species observed during the 2021 botanical surveys include wild oat (*Avena barbata*), soft chess (*Bromus hordeaceus*), and Italian rye grass (*Festuca perennis*). All of these are introduced species and are interspersed with non-native forbs such as hairy cat's ear (*Hypochaeris radicata*), Mediterranean lineseed (*Bellardia trixago*), English plantain (*Plantago lanceolata*), and a variety of introduced and native clovers (*Trifolium* spp.). As the primary target for habitat management, distaff is also quite widespread, forming small incipient stands to extensive multi-acre stands. The density of distaff varies substantially, from very sparse (primarily along ridges in the southern portion of the study area) to very dense (primarily in northern-central portions of the study area).

Native wildflowers were observed scattered throughout the grasslands, including hayfield tarweed (*Hemizonia congesta* ssp. *lutescens*), soap plant (*Chlorogalum pomeridianum*), blue eyed grass (*Sisyrinchium bellum*), and lupine species (*Lupinus* spp.). Along the lower and more northern and eastern slopes there are smaller areas of grassland that feature a slightly different assemblage of species. Many dominant grasses and forbs in these areas are more indicative of lower solar radiation and/or finer textured moist soils. Plant species noted in this more mesic habitat include Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), English plantain, spreading rush (*Juncus patens*), western rush (*J. occidentalis*), Douglas' iris (*Iris douglasiana*), and California oatgrass (*Danthonia californica*). The wettest of these micro-habitats feature saturated soils that support Meadow and Seep habitat, a more distinct habitat that is described below. Some of these species are constituents of what is often classified as Coastal Prairie habitat, a coastal herbaceous plant community that typically has a high component of native, moisture-loving plant species. In fact, there are a few localized areas of "classic" Coastal Prairie, but they were generally found to be below the MMU. Distaff infestations were observed to be generally more limited in such mesic habitats.

Another microhabitat within the onsite grasslands is formed around large rock outcrops, which are scattered throughout the study area. Within the grasslands, these rocky "islands" support a unique assemblage of plants such as poison oak (*Toxicodendron diversilobum*), coast sage (*Artemisia californica*), oceanspray (*Holodiscus discolor*), canyon dudleya (*Dudleya cymosa*), California poppies (*Eschscholzia californica*), and several grass species that do not commonly occur elsewhere. A few of the largest outcrops also support tree species, primarily California bay (*Umbellularia californica*) and, less commonly, coast live oak (*Quercus agrifolia*) and California buckeye (*Aesculus californica*). Distaff is generally sparse or absent on the rock outcrops as it generally prefers deeper soil.

Within the larger Valley and Foothill Grassland are stands of native grass species. Some of these are associated with the localized Coastal Prairie as described above, but there are also larger stands that form a mappable community. As indicated previously, while stands of native grass are considered to form sensitive plant communities, grass species are not susceptible to impacts of the Milestone herbicide. The most common native grasses are purple needle grass (*Stipa pulchra*) and bearded wild rye (*Elymus triticoides*), both of which form “S3” and “G3” sensitive plant communities as recognized in the MCV, as long as they constitute at least 10 percent or 50 percent relative cover among herbs, respectively. This was found to be the case within these representative plant communities observed in the study area. Associated herbs observed growing with these two dominant native grass species include slender wild oat, English plantain, rough cat’s ear, and Italian thistle (*Carduus pycnocephalus*). In several areas, distaff was also found to be commonly associated with the native grasses, in part because the grasses are susceptible to over-grazing, but areas with large populations of distaff tend to be avoided by cattle.

Cismontane Woodland. Accounting for 7.8 acres, or just under two percent of the study area, this habitat type occurs along north and east-facing slopes and valleys in the study area, as well as around the largest rock outcrops. Though it is present within the study area, distaff is generally sparse to absent in the habitat, as it does not occur within more shaded habitats. Cismontane Woodland is a broadly defined plant community that is characterized by a wide variety of broadleaf trees, both deciduous and evergreen. Within the study area the woodlands are primarily composed of evergreen California bay and coast live oak, along with occasional individuals or small stands of the deciduous California buckeye. Along the margins of the seasonal streams that flow down the slopes, there are small stands of riparian tree species, primarily in the form of arroyo willow (*Salix lasiolepis*). The underlying shrub/vine stratum throughout the study area consists of beaked hazelnut, blue elderberry (*Sambucus nigra* ssp. *caerulea*), California blackberry (*Rubus ursinus*), and the ubiquitous poison oak. Common herbaceous understory plants observed include such shade-tolerant species as sword fern (*Polystichum munitum*), wood fern (*Dryopteris arguta*), starry false lily of the valley (*Maianthemum stellatum*), yerba buena, and sweet bedstraw (*Galium triflorum*).

It should be noted that stands of California bay technically form an MCV-designated sensitive plant community (S3 and G4), and this species is the most common tree within and surrounding the study area. However, this habitat is very widespread in Marin County as well as in many counties in the Coastal Ranges. According to Dr. Todd Keeler-Wolf (pers. comm.), this species “is likely more common than collected data suggest, and may not form a sensitive plant community.” For the purposes of this analysis in this report, stands of California bay are not recognized as a sensitive plant community.

Coastal Scrub. Coastal Scrub forms a transitional habitat between Valley and Foothill Grassland and Cismontane Woodland (see below). The areas that the community occupies are less exposed than the grasslands, but more exposed than the woodlands, primarily along steeper north and east-facing slopes and within broad south-facing swales. The total acreage of this community within the study area is approximately 39 acres, amounting to 9.8 percent of the study area. A majority of the Coastal Scrub within the study area is dominated by coyote brush (*Baccharis pilularis*), poison oak, California blackberry, and bush monkeyflower (*Diplacus aurantiacus*). Scattered emergent trees are present in the form of California bay and Coast live oak. A few areas of Coastal Scrub supported a number of additional shrub species that are typically more associated with moister conditions, often along the highest ridge tops (where fog is more prevalent) and within larger and/or more shaded drainages. Examples of such additional species include blueblossom (*Ceanothus thyrsiflorus*), beaked hazelnut (*Corylus cornuta*), upright snowberry (*Symphoricarpos albus*), oceanspray, and twinberry (*Lonicera involucrata*). The understory beneath the shrubs was found to be generally sparse as a result of the generally dense overstory, with a low cover of common cow parsnip (*Heracleum maximum*), lady's tobacco (*Pseudognaphalium californicum*), yerba buena (*Clinopodium douglasii*), common velvetgrass (*Holcus lanatus*), cutleaf geranium (*Geranium dissectum*), and scarlet pimpernel (*Lysimachia arvensis*).

Meadow and Seep. Scattered throughout the grasslands are wetlands that support a notable diversity of plant species which thrive in damp soils and sunny conditions. These habitats form where water percolating through the soil is redirected toward surface slopes by rock or indurated (hardened) soils. Most of the onsite features are seeps, where soils are very moist to saturated but water does not typically flow, though a few springs are present as well, where water flows perennially or at least throughout much of the wet season. Meadow and Seep habitat occupies approximately 2 acres of the study area, which is just over 0.5 percent of the area. Most of the springs and seeps occur along slopes of central and northern portions of the study area. The most conspicuous plant species are rushes, in particular Pacific rush (*Juncus effusus*), but also iris-leaved rush (*J. xiphioides*), bog rush (*J. hesperius*), and Bolander's rush (*J. bolanderi*). Associated sedges observed include tall flatsedge (*Cyperus eragrostis*), dense sedge (*Carex densa*), foothill sedge (*C. tumulicola*), and low bulrush (*Isolepis cernua*). Commonly occurring forbs include a mix of native and introduced species, such as the native seep monkeyflower (*Erythranthe guttata*), willowherb (*Epilobium ciliatum*), and chaffweed (*Lysimachia minima*). Introduced grasses and forbs include prickly sow-thistle (*Sonchus asper*), common velvetgrass, hyssop loosestrife (*Lythrum hyssopifolium*), and pennyroyal (*Mentha pulegium*). Many of these species are also present as small patches along the drainages that flow down the hill slopes, especially those that are in turn fed by smaller drainages and/or those with gentler slopes.

Man-made Pond. Natural hydrology within and surrounding the study area is augmented by four constructed ponds, one of which is within the study area, two of which are immediately adjacent, and one of which is nearby, but not within 100 feet of the study area (Figure 5). The ponds consist of three stock ponds and an agricultural treatment pond, the latter of which occurs inside the study area, covering just under one acre. The three stock ponds are widely spread across the site, in order to provide water to cattle along the hill slopes. There are two ponds in the southern half of the site and one in the northern half. All four of the ponds are deep and hold water all year long. Vegetation is generally limited to the margins of the ponds, though some floating vegetation was observed closer to the centers of the ponds. The agricultural pond is notably devoid of vegetation except along its upper edges. Where present, plant species occurring along the margins of the ponds include scattered willow trees (*Salix* spp.), pale spike rush (*Eleocharis macrostachya*), pennyroyal, hyssop loosestrife, Italian rye grass, and rushes (*Juncus* spp.). The largest pond near the southeastern edge of the property, which given its size may be more appropriately described as a reservoir, supports stands of broadleaf cattail (*Typha latifolia*). Aquatic floating species include common water weed (*Elodea canadensis*) and pondweed (*Potamogeton nodosus*).

Potential Special-Status Species

Special-Status Plants

San Francisco Gumplant. One special-status plant was documented during the on-site botanical surveys, namely San Francisco gumplant (*Grindelia hirsutula*). The San Francisco gumplant is a perennial herb in the sunflower family (Asteraceae) that grows from 2 to 15 decimeters (approximately 8 to 59 inches) and features bright yellow flowers. The flowers are listed as blooming from April to June, though the species was in peak flowering phase during the July field surveys. The species is listed as occurring on sandy, clay, or serpentine slopes or roadsides at elevations ranging from sea level to 1,700 meters (5,577 feet) (Baldwin et al. 2012). It has been documented from the Transverse Ranges north along the Coastal Ranges to far northern California, as well as in the Central Valley, but as small and/or very sporadic populations.

The San Francisco gumplant is designated by the California Native Plant Society (CNPS) as CRPR 3.2, indicating that it “needs review—plants about which more information is needed...Nearly all of the plants constituting CRPR 3 are taxonomically problematic, yet if taxonomically valid would demonstrably qualify for rank 1B or 2B.” The “0.2” indicates that a given taxon is “moderately threatened in California” (CNPS 2021). The general consensus on the San Francisco gumplant is that it exhibits a range of morphological characteristics and thus may not represent a distinct species, though this is disputed by some experts. In fact, the nomenclature itself remains in dispute, as it is referred to by the CNPS as *Grindelia hirsutula*

var. *maritima*. This report uses the Jepson Herbarium name (i.e., lacking the variety) because that organization is responsible for official taxonomic nomenclature in California. In addition, the specimens observed in the study area clearly fit the description provided in the Jepson Manual (Baldwin et al. 2012). There is currently a request for funding to conduct more detailed analysis on the taxon at the Jepson Herbarium (Baldwin per. comm.). In any case, per the CNPS, this report assumes that the taxon is rare and threatened until proven otherwise, and protection measures are provided in Section 6 below.

Three populations of San Francisco gumplant were identified in the study area, in the northern and southeastern portions of the study area (Figure 5). One population had only two plants, while the other two had ranges of either 50 to 100 or 20 to 50 (both were on the larger side of the population range). The total area occupied by the three populations is approximately 0.45 acre. All three populations were found along notably steep, south-facing slopes that feature shallow clay to clay-loam soils. All populations were along transitions between Coastal Scrub and Valley and Foothill Grassland habitats, with associated plant species including purple needle grass, English plantain, slender wild oat, and false brome (*Brachypodium distachyon*). Except for the purple needle grass, all of these most common associates are introduced and invasive, and represent potential threats to the San Francisco gumplant. In addition to these herbs, there were scattered shrub species surrounding the populations, especially coyote brush, poison oak, and coast sage.

Potential for Other Special-Status Plants. In addition to San Francisco gumplant, the study area provides habitat types that have potential to support numerous other special-status plant species. Based on suitable habitat as well as the presence of documented occurrences in the region, a total of eight additional special-status plants have fairly high potential to occur in the study area. Based on the presence of suitable habitat alone, many additional species could occur in the study area, but many are not documented in the vicinity of the study area. Among the listed habitat types, plants associated with the following types are considered to have potential to occur: Valley and Foothill Grassland, Coastal Scrub, Cismontane Woodland, Riparian Woodland, Coastal Prairie, and Meadow and Seep. Aside from San Francisco gumplant, none of these were documented during protocol-level botanical resource surveys in the study area.

As noted in Section 4.2, weather conditions were sub-optimal for annual plant species growth and persistence. However, onsite botanical surveys, as well as status surveys, surveys at other project sites in the region, and communication with other botanists working in the region, suggested that special-status annual plants did successfully germinate and flower, though in many cases in a stunted manner. A particular effort was made to document the status of rare annual plants with potential to occur within the study area, to ensure that they would be in bloom and thus identifiable if present in the area. The two special-status annual species most

likely to occur in the study area are bent-flowered fiddleneck (*Amsinckia lunaris*) and hayfield tarplant (*Hemizonia congest* ssp. *congesta*), both of which are ranked as CRPR 1B.2, and both of which are highly susceptible to the effects of Milestone. Hayfield tarplant was observed by VNLC in 2021 at a site in the general vicinity of the study area in southern Sonoma County. Bent-flowered fiddleneck was observed by Doreen Smith in western Marin County in April of 2021 (Smith pers. comm.). Ms. Smith is a recognized rare plant expert in Marin County. In addition, though it is a perennial species, an effort was made to determine the bloom status of Baker's larkspur (*Delphinium bakeri*), which is the only state or federally listed rare plant with high potential to occur in the study area. A documented population of this species that is located on public property near the study area was confirmed as blooming during the March survey for this project.

Discussion

- a) The project goal is to eradicate extensive stands of distaff from Walker Creek Ranch. Milestone and its active ingredient are formulated to target distaff and other thistle species, though the compounds can also impact other plant species as well, as described below. Available research indicates that Milestone is unlikely to have significant detrimental impacts to animals. Although studies have not been conducted on all taxonomic groups of animals (such as reptiles), existing studies indicate little to no adverse impact from Milestone on animals. Additionally, as described in the Hazards and Hazardous Materials section of this document, the adjuvant used with Milestone, Hasten-EA, is a modified vegetable oil concentrate. As a non-toxic substance, it is unlikely to have significant impacts to plants or animals. Therefore, this substance is not addressed further in this document. Note that the potential effects of Milestone on aquatic resources is analyzed by proxy with respect to potential impacts on aquatic animals and plants. Impacts to plants and animals are addressed in detail below.

There are no studies that suggest any of the sensitive habitats or special-status animals known or with potential to occur in the study area would be adversely impacted by Milestone. Nevertheless, not all species or groups have been thoroughly studied, so the application of Milestone should be carried out in a careful manner in order to avoid incidental adverse effects. Proposed BMPs are provided in the Project Description section.

The project includes Best Management Practices (BMPs) to avoid impacts to nearby non-infested or sparsely infested grasslands and aquatic habitats. These include:

- **Buffers for Sensitive Habitats:** The Project would include 100-foot buffers from all streams, water courses, and water stock ponds to avoid potential environmental impacts. Treatment of distaff within 100 feet of all aquatic habitats will be carried

out using manual methods (e.g., pulling and/or the use of weed whippers) and/or by means of side-by-side sprayers mounted on ATVs;

- **Use in Favorable Weather Conditions:** Milestone would not be applied during periods of intense rainfall to soils saturated with water or paved surfaces (concrete or asphalt) in order to eliminate risk of potential runoff. Application also would not occur when winds are predicted to exceed 10 miles/hour;

Plants

The Biological Resources Appendix (Appendix B), presents a comprehensive list of special-status plants documented in the vicinity of the study area. The table includes a column that indicates sensitivity to the Milestone herbicide, based on the best available data. Note that all dicotyledon plants (see below) are ranked as “Moderate” unless their family was listed as a target weed species on the Milestone product label (DowAgsciences 2017). Monocotyledons are ranked as “Low,” though plants in the Alliaceae or Liliaceae families are ranked as “Moderate” based on a 2005 EPA study (EPA 2005).

Table BIO-1, below, summarizes potential toxicity of the herbicide to various plant groups that may be present on the site.

As detailed below, plants associated with grassland habitats are most likely to be adversely impacted by the application of Milestone. As Table 2 in the Biological Resources Appendix shows, there are five special-status grassland-associated plants known from the vicinity of the study area, and many others from the greater region that occur in grasslands. Among these are several taxa that belong to groups listed on the Milestone label as potential target plants, as discussed above. The listed plants and related plants are presumed to be adversely impacted by Milestone and are therefore listed as “High” in the sensitivity column in Table BIO-1. The impact to such plants would be significant in the absence of mitigation measures.

Monocotyledon Plants. Milestone is a selective herbicide that is substantially less toxic to monocots (e.g., grasses, sedges, rushes, lilies, and orchids) than to dicots (most broadleaf plants). Most monocots such as grasses have no sensitivity to the aminopyralid active ingredient, and no adverse effects are expected after appropriate use. However, testing revealed that onions (*Allium* species and relatives) are one of the select groups of monocots that are sensitive to aminopyralid (EPA, 2005).

Table BIO-1 Summary of Milestone Risk Assessment for Plant Groups

Plant Type	Group	Risk of Non-target Adverse Effects*
Terrestrial Vascular	Monocotyledons	Moderate
	Dicotyledons	High
Aquatic Vascular	Algae	Moderate
	Macrophytes	Low
Non-Vascular	Algae (as representative)	Low

*Presumed based on data from best available data from studies on representative taxa

There is moderate risk of incidental adverse effects from Milestone on special-status monocots because it could impact fragrant fritillary, which has been documented adjacent to the study area, but was not observed in the treatment study area. The fragrant fritillary is a bulbiferous perennial herb endemic to the coastal regions near the San Francisco Bay that is categorized as rank 1B.2 in the CRPR. The species is therefore subject to protection and regulation under CEQA. Although there has been no laboratory or field testing to determine the sensitivity of this species to aminopyralid there is a presumed risk due to this species' (Order *Liliales*) close relationship to the onion (Order *Asparagales*), which has been shown to be sensitive to the herbicide. Therefore, if such plants are present in the Milestone application area, the herbicide could result in adverse effects to fragrant fritillary as well as more common relatives (e.g., common fritillaries and *Allium* species). No occurrences of fragrant fritillary were observed within the study area, so impacts to this species would not be significant.

Dicotyledon Plants. Because aminopyralid is broadly toxic to dicot plant species, there is a high risk of adverse effects to non-target dicot species. For the least tolerant species soil exposure levels above 0.0048 pounds per acre and foliar exposure levels above 0.0032 ounces per acre have been shown to produce adverse effects. In tolerant species the upper threshold is 1.76 ounces per acre for both soil and foliar exposure (Durkin 2007). Sensitive groups of dicots include thistles and members of the Asterids such as nightshades and sunflowers. The project would apply 3 to 5 ounces of Milestone herbicide per acre, which would likely result in exposure levels above the sensitive soil and foliar levels indicated above.

Several special-status plants with potential to occur in the study area could be adversely impacted by contact with the Milestone herbicide. A member of the Asterids, the bent-flowered fiddleneck is a rare annual herb with a CRPR rank of 1B.2 that is documented from the vicinity of the study area and has potential to occur on the site. Members of the *Amsinckia* genus are known to be sensitive to aminopyralid (DiTomaso et al. 2013) and in fact the

common fiddleneck (*A. intermedia*) is listed on the Milestone and Milestone VM label as a “weed that can be effectively controlled by the use of aminopyralid” (Dow AgroSciences 2017, DowAgroSciences 2009). Another plant group listed on the Milestone label is the buttercup family (Ranunculaceae), which includes Baker’s larkspur, a species that has potential to occur in the study area that is listed as endangered at both the federal and state level. In addition, there are several special-status species of the sunflower family (Asteraceae, included in the Asterid clade) with potential to occur in the study area, as shown on Table 2 in the Biological Resources appendix. The special-status sunflower family taxa with the greatest potential to occur in the study area are pale-yellow hayfield tarplant (CRPR 1B.2) and marsh microseris (CRPR 1B.2). Therefore, if such plants are present in the Milestone application area, the herbicide could result in adverse effects to the above species as well as more common relatives (e.g., more common members of the sunflower and borage/fiddleneck groups). Occurrences of San Francisco gumplant were documented within the study area, and these could be impacted by Milestone if precautions are not taken to avoid them. None of the other special-status Asterid plants were found within the study area, and so impacts to these species would not be significant.

Aquatic Plants. Toxicity data on aquatic plants is limited to a single study on duckweed (*Lemna gibba*), a monocot. Duckweed was not found to be particularly sensitive to aminopyralid as would be expected given its low toxicity to monocots. The lack of testing for aquatic dicots is a significant limitation to the risk assessment for aquatic macrophytes. In the absence of avoidance and minimization measures (as are planned for the project to avoid aquatic habitats) aquatic plants could be adversely impacted by herbicide application. The impacts to aquatic plant species are expected to be **less than significant**.

Algae (non-vascular plants). Aminopyralid has been shown to be slightly toxic to aquatic algae and is presumed to have similar effects to other non-vascular plants, such as moss. This slight sensitivity was measured by a decrease in biomass following a long-term exposure to high concentrations of aminopyralid. A 10 percent decrease in biomass was observed at 3.1 mg/L of aminopyralid over a 120-hour exposure period but this decrease did not scale up significantly at higher concentrations (Durkin 2007). A qualitative risk assessment conducted for the U.S. Forest Service concluded that the overall hazard quotients for this group fall below the level of concern based on the concentrations necessary to elicit a response and the transitory nature of aminopyralids in aquatic environments.

It should be noted that there are no special-status algae with potential to occur in the study area, and algae would generally be limited to onsite aquatic habitats. Impacts to any taxa of algae would be less than significant with planned avoidance and minimization measures.

Special Status Animals

Among the special-status animals and plants with potential to occur in the study area, those associated with grassland habitats and/or with aquatic habitats would be of most concern with respect to potential adverse impacts from the application of the Milestone herbicide. As noted above, all of the major distaff thistle infestations are within the Valley and Foothill Grassland habitat. Since all of the onsite stock ponds are within or adjacent to the grasslands, Milestone could come into contact these habitats if not applied with caution. Milestone could also end up in Walker Creek and its tributaries since these streams are situated at the lowest relative elevations on the landscape—any runoff of water down the hill slopes could translocate the herbicides into the streams.

Among the aquatic species, those of particular concern are the special-status amphibians, especially California Red-legged Frog (CRF) and Foothill Yellow-legged Frog (FYF), both of which have potential to occur in the study area and utilize grasslands as well as aquatic habitats. Two of the three stock ponds provide medium to high quality breeding habitat for CRF, and Walker Creek provides breeding and/or dispersal habitat for both CRF and FYF. The treatment pond provides low quality breeding habitat for CRF, as it is mostly unvegetated and features rather poor water quality (as evidenced by high algal cover, suggesting eutrophication). The reservoir at the southeast of the site, which supports American bullfrogs (*Lithobates catesbeiana*) and populations of fish (species unknown) has low to no potential to support CRF breeding, since these other animals prey upon and compete with CRF. Again, evidence suggests these adverse impacts to these amphibians and likely all other animals would be **less than significant**, with proposed BMPs.

The Biological Resources Appendix (Appendix B) lists potential sensitive animal species in the project area and their sensitivity to milestone. There are 23 animals with potential to occur in the study area, based on habitat suitability and known occurrences in the vicinity. As detailed below, studies of Milestone's impacts on animals suggest that adverse effects are generally negligible. Nevertheless, it is possible that adverse impacts to plants could have indirect impacts upon animals that rely on those plants (Durkin, 2007). The only special-status animal species known to depend directly upon plants that could be impacted by Milestone is western bumblebee (*Vespericola marinensis*), which is known to rely on host plants that include groups that are sensitive to the Milestone herbicide (e.g., thistles in the *Cirsium* and *Centaurea* genera). If such host plants are eliminated by Milestone, reduced food sources for the bumblebee could reduce their habitats. However, given the mobility of bumblebees, the impacts would be **less than significant**.

Table BIO-2, below, summarizes the general toxicity of the Milestone herbicide to various animal groups. Potential effects of the herbicide to each of these groups is discussed in detail below.

Table BIO-2. Summary of Milestone Risk Assessment for Animals

Habitat	Group	Risk of Adverse Effects*
Terrestrial	Mammals	Low
	Birds	Low
	Reptiles	No available data
	Invertebrates	Low
Aquatic	Fish	Low
	Amphibians	Low
	Reptiles	Low
	Invertebrates	Low

*Presumed based on available evidence

Mammals. Laboratory studies suggest that there is no practical risk of adverse effects to large or small terrestrial mammals due to direct or indirect exposure to aminopyralid (Durkin 2007, Bureau of Land Management 2015). Possible sources of exposure include direct exposure from spraying or indirect exposure from ingesting contaminated food or water sources. Based on available information, impacts to special-status and common mammal species are expected to be **less than significant**.

Birds. There is no indication that any adverse effects will result from direct or indirect exposure to aminopyralid by birds at practical application levels. Laboratory studies include gavage studies, acute dietary studies, and reproductive studies on bobwhite quail (*Colinus virginianus*) and mallard ducks (*Anas platyrhynchos*). However, chronic exposure and field studies investigating the long-term or secondary effects from aminopyralid have not yet been conducted. In any case, impacts from one-time herbicide applications during the winter season are expected to be **less than significant** to bird species.

Terrestrial reptiles. No laboratory or field studies have been conducted to determine potential adverse effects of aminopyralid on reptiles. However, the herbicide application would occur during wintertime, when most reptiles are not active, such that impacts to reptiles are expected to be **less than significant**.

Terrestrial invertebrates. Laboratory studies indicate that aminopyralid is practically non-toxic to the narrow range of invertebrate species for which studies have been conducted.

Studies have focused on the European honey bee (*Apis mellifera*) and earthworms (*Lumbricus* spp.) (ibid). For both study species scenarios of exposure at recommended application rates yielded hazard quotients far below levels of concern. Based on this information, direct impacts to western bumblebee and other invertebrates would be less than significant. Potential indirect impacts are described above. It should be acknowledged that the species involved in these studies represent a very small proportion of the total number of species included in this group.

Fish. Based on toxicity studies and worst-case exposure scenarios there is no evidence to support that aminopyralid has any adverse effects on fish (Durkin 2007). Impacts are expected to be **less than significant**.

Amphibians. Research on the effects of aminopyralid on amphibians are limited to just one study on the northern leopard frog (*Lithobates pipiens*) larvae. Results from this study revealed no mortality or sublethal effects after a 96-hour exposure to a 95.2 milligrams a.e./liter average concentration of aminopyralid (Durkin 2007).

The risk of adverse non-target effects on this group are especially important to this project since the federally threatened California red-legged frog (CRF) (*Rana draytonii*) has been documented on site (CDFW 2020). The California red-legged frog and the northern leopard frog are two closely related species both belonging to the family Ranidae. Because of the close relationship between the two species it can be safely assumed that the conclusions based off the single study on northern leopard frogs can also be applied to the California red-legged frogs. The foothill yellow-legged frog (FYF) (*Rana boylei*) is less closely related, but is likely affected to the same low degree. Therefore impacts from the project are likely to be **less than significant**, especially given avoidance and minimization measures for applying near aquatic habitats.

Aquatic reptiles. No laboratory or field studies have been conducted to determine potential adverse effects of aminopyralid on reptiles. This group may be of particular concern to the project as northwestern pond turtles (*Emys marmorata*) have been documented on the property within the reservoir near the central eastern edge of the property as well as along Walker Creek. However, the herbicide application would occur during wintertime, when this species is inactive, and project measures to avoid aquatic habitats would result in **less than significant** impacts to the species.

Aquatic invertebrates. Laboratory experiments suggest there is no practical risk of adverse effects due to exposure to aminopyralid in aquatic insects. The laboratory studies used to reach this conclusion included acute and long-term toxicity studies in a small but relatively diverse group of aquatic invertebrates such as *Daphnia magna*, Midges (*Chironomus riparius*) and Mysid shrimp (*Americamysis bahia*) (ibid). The only special-status aquatic invertebrate with

potential to occur in the study area (though with low potential), is California freshwater shrimp (*Syncaris pacifica*). Project measures to avoid aquatic habitats would result in **less than significant** impacts to this and other aquatic invertebrates.

- b) The proposed buffers from riparian areas, as well as the avoidance of spraying in windy conditions, would minimize the potential impacts of the proposed project on riparian vegetation of Walker Creek and its tributaries, as well as vegetation surrounding pond areas. Therefore this impact would be **less than significant**.
- c) The proposed buffers from wetland areas, as well as the avoidance of spraying in windy or rainy conditions, would minimize the potential impacts of the proposed project on wetland habitats of Walker Creek and its tributaries, as well as vegetation surrounding pond areas. Therefore this impact would be **less than significant**.
- d) The project would remove thistles, which would be replaced by native vegetation. Therefore it would not have any potential to interfere with movement or migration of any animal species, and **no impact** would occur.
- e) The proposed project would comply with Marin Countywide Plan policies with respect to biological resources, as follows:

BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors. Protect sensitive biological resources, wetlands, migratory species of the

Pacific flyway, and wildlife movement corridors through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continued acquisition and management of open space lands that provide for permanent protection of important natural habitats.

Compliance. The project herbicide application would include buffers and BMPs to avoid affecting protected wetlands, special status species habitats, and other important habitats. As discussed above, the project would have no potential to affect migration corridors.

BIO-1.3 Protect Woodlands, Forests, and Tree Resources. Protect large native trees, trees with historical importance; oak woodlands; healthy and safe eucalyptus groves that support colonies of monarch butterflies, colonial nesting birds, or known raptor sites; and forest habitats. Prevent the untimely removal of trees

through implementation of standards in the Development Code and the Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas. See also Policy SV-1.7.

Compliance. The project herbicide application would avoid large trees, woodlands, and forest resources.

BIO-1.6 Control Spread of Invasive Exotic Plants. Prohibit use of invasive species in required landscaping as part of the discretionary review of proposed development. Work with landowners, landscapers, the Marin County Open Space District, nurseries, and the multi-agency Weed Management Area to remove and prevent the spread of highly invasive and noxious weeds. Invasive plants are those plants listed in the State's Noxious Weed List, the California Invasive Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California," and other priority species identified by the agricultural commissioner and California Department of Agriculture. Species of particular concern include the following: barbed goatgrass (*Aegilops triuncialis*), giant reed (*Arundo donax*), Italian thistle (*Carduus pycnocephalus*), distaff thistle (*Carthamus lanatus*), purple starthistle (*Centaurea calcitrapa*), yellow starthistle (*Centaurea solstitialis*), pampas grass (*Cortaderia selloana*), Scotch broom (*Cytisus scoparius*), Cape ivy (*Delairea odorata*), oblong spurge (*Euphorbia oblongata*), fennel (*Foeniculum vulgare*), French broom (*Genista monspessulana*), salt-water cord grass (*Spartina alternifolia*), Spanish broom (*Spartium junceum*), medusahead (*Taeniatherum caput-medusae*), gorse (*Ulex europaeus*), and periwinkle (*Vinca major*), among others.

Compliance: The project is intended specifically to control the spread of invasive, non-native distaff thistle on and from the site.

BIO-1.7 Remove Invasive Exotic Plants. Require the removal of invasive exotic species, to the extent feasible, when considering applicable measures in discretionary permit approvals for development projects unrelated to agriculture, and include monitoring to prevent re-establishment in managed areas.

Compliance: The project would remove invasive, non-native distaff thistle from the site.

BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials. Encourage the use of integrated pest management and organic practices to manage pests with the least possible hazard to the environment. Restrict the use of

insecticides, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or such use is authorized pursuant to a permit issued by the agricultural commissioner. Encourage nontoxic strategies for pest control, such as habitat management using physical and biological controls, as an alternative to chemical treatment, and allow use of toxic chemical substances only after other approaches have been tried and determined unsuccessful. Continue to implement the Integrated Pest Management ordinance for county-related operations.

Compliance: The project is proposing to use a relatively non-toxic (to animal species) herbicide and includes buffers from sensitive habitats. Use of the herbicide would be subject to approval by the County Agricultural Commissioner. Given the size of the treatment area, non-chemical measures are infeasible due to cost as well as a greater likelihood of impacting non-target native and special-status species (e.g., from weed-whipping).

- f) The project area is not under any HCP or NCCP. Therefore the proposed project would have **no impact** with respect to these conservation plans.

V. Cultural Resources

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?				X
c) Disturb any human remains, including those interred outside of dedicated cemeteries?				X

Discussion

a, b, c) The project proposes no ground disturbing activities. Thistle control would be primarily by aerial spraying, with some minor hand spraying. Any vehicular travel would be on existing ranch roads. Therefore, the project would not have the potential to affect historic or prehistoric resources, or disturb any human remains. **No impact** would occur.

VI. Energy

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				X

Discussion

- a) The project would require consumption of petroleum fuels (gas, diesel and aviation fuel) for a 15-day period in 2021 and would be repeated annually as needed. Based on standard fuel consumption data consistent with the project's air quality and GHG emissions estimates, the project would require approximately 716 gallons of diesel fuel for ATVs, 856 gallons of gasoline for worker automobiles, and 548 gallons of aviation fuel for the helicopter per year. The project would not result in wasteful, inefficient, or unnecessary consumption of energy, because it would involve the minimum flights necessary to control the invasive thistle. Therefore, this impact would be **less than significant**.
- b) The project would not involve any construction or otherwise affect plans for renewable energy or energy conservation. Therefore, **no impact** would occur.

VII. Geology and Soils

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				X

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?				X
f) Directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature?				X

Background

According to the County's Geo Hub Landslide map, the site slopes south of the creek have few landslides, while those north of the creek have many landslides. That site also shows the low areas along the creek as subject to liquefaction hazards (<https://gisopendata.marincounty.org/datasets/MarinCounty::liquefaction?geometry=-123.093%2C38.123%2C-122.558%2C38.218>). There are no mapped active faults crossing the site. The main trace of the San Andreas Fault runs beneath Tomales Bay, about 4 miles west of the site. There are no tsunami or seiche hazards on the site on the site because of its distance from the Bay and ocean (16 miles inland from the Bay).

Discussion

- a)
 - i. Based on available published geologic information, the project site is not located within an Alquist Priolo Earthquake Fault Zone. The potential for fault rupture on the side is therefore considered to be low and **no impact** would occur.
 - ii. The site would be subject to very strong ground shaking in the event of a major earthquake on any of the regional fault zones. However, the proposed project does not propose any construction, so **no impact** would occur from ground shaking.
 - iii. As discussed above, the areas of the site near Walker Creek are mapped as subject to liquefaction hazards. However, the Project would not involve any construction or other activities that may affect liquefaction hazards. Therefore, **no impact** would occur.

- iv. The hillsides on the site are subject to landslide hazards. The project would kill areas of thistle, however the roots would remain for the remainder of the season, therefore landslide hazards would not be increased. In the longer term (after the first season) other seasonal grasses and weeds would replace the thistles, resulting in minimal adverse effects on landsliding on the site. Therefore this impact would be **less than significant**.
- b) The site includes steep slopes that would be susceptible to erosion. As discussed above, the proposed thistle control would not physically remove the thistles from the hillside, so erosion would in the first season after treatment not be significantly increased. In the longer term, the thistles would be replaced with other grasses and weeds, therefore this impact would be **less than significant**.
- c) Please see response to item a) iii, above. **No impact** would occur.
- d) While expansive soils may occur on the site, the proposed project does not involve any construction activities or new structures or infrastructure. Therefore **no impact** would occur from these expansive soils.
- e) The project involves vegetation control; no buildings would be constructed or modified. Therefore, **no impact** would occur with respect to adequacy of site soils for septic systems.
- f) Because the project involves vegetation control and does not involve any ground disturbing activities, **no impact** would occur to paleontological resources.

VIII. Greenhouse Gas Emissions

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

Background

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHG) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG has been implicated as the driving force for global climate change. The primary GHG are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), ozone, and water vapor.

While the presence of the primary GHG in the atmosphere are naturally occurring, CO₂, CH₄, and N₂O are also emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. Other GHG include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

CO₂ is the reference gas for climate change because it is the predominant GHG emitted. The effect that each of the aforementioned gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO₂. CH₄ and N₂O are substantially more potent GHG than CO₂, with GWP of 25 and 310 times that of CO₂, respectively.

In emissions inventories, GHG emissions are typically reported in terms of pounds or metric tons of CO₂ equivalents (CO₂e). CO₂e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH₄ and N₂O have much higher GWP than CO₂, CO₂ is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO₂e.

There is international scientific consensus that human-caused increases in GHG have and will continue to contribute to global warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity (CalEPA, 2006).

In 2012, estimated GHG emissions generated by community activities in Marin County's unincorporated areas were approximately 477,000 metric tons of CO₂e or per capita emissions of approximately 7.1 metric tons of CO₂e for the 67,000 residents in the unincorporated areas. This is a 15 percent decrease from estimated 1990 emissions, which were 561,851 metric tons of CO₂e. This amount is equivalent to the annual GHG emissions generated by approximately 100,000 passenger vehicles. Of these total emissions, On-Road transportation and building energy use are the largest sources of emissions (35 percent each). The third largest source is agriculture (23 percent), followed by off-road equipment (4 percent), solid waste treatment (2 percent), wastewater treatment (1 percent), and water conveyance (0.2 percent) (County of Marin, 2015).

Discussion

- a) The project would result in short-term criteria pollutant emissions during a 15-day period in 2021 and would be repeated annually as needed. One day of aerial application using a light/medium lift helicopter would occur per year followed by 14 days of ground application using ATVs and backpack spraying. Approximately 10-18 workers would be required on an average day during treatment activities.

Project emissions were compared to BAAQMD's bright-line threshold for operations, which is 1,100 metric tons of CO₂e per year. GHG emissions calculation details and emission estimates are included in Appendix A. The project would generate approximately 20 metric tons of CO₂e per year, which is below the significance threshold of 1,100 metric tons of CO₂e per year. Therefore, GHG emissions impacts would be less than significant.

- b) The project would not conflict with State regulations for reducing GHG emissions. The project would also not conflict with goals and policies contained in the Marin Countywide Plan and Climate Action Plan. Therefore, this impact would be less than significant.

IX. Hazards and Hazardous Materials

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				X

Background

The California Department of Toxic Substances Control (DTSC) defines a hazardous material as: “a substance or combination of substances that, because of its quantity, concentration or physical, chemical, or infectious characteristics, may either: 1) cause, or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating illness; or 2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, disposed of, or otherwise managed.” Hazardous materials are generally classified based on the presence of one or more of the following four properties: toxicity, ignitability, corrosivity and reactivity.

Regulations governing the use, management, handling, transportation and disposal of hazardous materials and waste are administered by federal, state and local governmental agencies. Federal regulations governing hazardous materials and waste include the Resource Conservation, and Recovery Act of 1976 (RCRA); the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA); and the Superfund Amendments and Re-authorization Act of 1986 (SARA). The California DTSC maintains a hazardous waste and substances site list, also known as the “Cortese List.” Walker Creek Ranch is not on the Cortese List.

The Department of Pesticide Regulation (DPR) is the state agency that regulates pesticide use in California, as well as the licensing and certification of pest control businesses. DPR identifies pesticides as substances or mixtures of substances that are intended for preventing, destroying, repelling or mitigating any pest. The term “pesticide” applies to herbicides, fungicides, antimicrobials, and various other substances used to control pests. The active ingredient is the chemical or substance component of a pesticide product that can kill, repel, attract, mitigate or control a pest of the chemical that acts as a plant growth regulator, desiccant or nitrogen stabilizer.² Under state and federal law, a pesticide is any substance intended to control, destroy, repel, or otherwise mitigate a pest. According to DPR, a *pest* is considered any organism that causes damage or economic loss, or transmits any disease. Pests can be insects or animals, unwanted plants (weeds) or organisms that cause diseases in plants. Before conducting any work, pest control businesses must register their license with the respective county agricultural commissioner’s office in the county the business intends to perform pest control.

The Marin County Department of Agriculture/Weights and Measures oversees the use of pesticides in Marin County. The agency helps ensure that pesticides are handled and stored properly, and commercial applicators are properly trained and licensed. According to the agency, “pesticide” is a general term that includes herbicides (including those used for weed

² Department of Pesticide Regulation. *A Guide to Pesticide Regulation in California, 2017 Update*.

control). The agency ensures that commercial herbicide users are trained and licensed to conduct their work safely, investigate pesticide related complaints, and conduct inspections of locations where herbicides are being stored including (i.e. homes, roads, and farms). The proposed project's pest controlling material (Milestone) is an herbicide. Hasten-EA is an agricultural adjuvant (additive) that would be used as a surfactant³ and has been approved to be mixed with herbicides for weed control. Crosshair is another additive that would be used to control spray drift and droplet size.

The project would apply 7.0 ounces of Milestone herbicide, 6.4 ounces of Hasten EA (adjuvant), and 1.75 ounces/acre of Crosshair (in-place deposition agent) per acre mixed with water. The Milestone and Hasten-EA components would each constitute 2.5% of the overall spray, Crosshair would constitute less than 1% of the mix, and the rest of the herbicide mix would be water.

This assessment evaluates the application of a Specialty Herbicide (Milestone) and an agricultural adjuvant (Hasten-EA). RCH group (RCH) reviewed Milestone, Hasten-EA, and Crosshair product labels^{4,5,6} product labels, material safety data sheets (MSDS) and Best Management Practices (BMPs) for these products. RCH also contacted a Corteva Agriscience product expert (Marin County territory manager) to discuss proper application of Milestone⁷. Corteva Agriscience is a coalition of agricultural companies that include DowAgroscience and their respective products.

Milestone Herbicide

The specialty herbicide Milestone would be used to exterminate the woolly distaff thistle. Milestone is produced by DOW AgroSciences LLC. The active ingredient in this substance is aminopyralid⁸. This specialty herbicide is used for control of annual and perennial broadleaf weeds, including invasive and noxious weeds, certain annual grasses and certain woody plants and vines. It can be used on rangeland, permanent grass pastures (including grasses grown for hay), conservation reserve program (CRP) acres, non-cropland areas (i.e. airports, barrow ditches, communication transmission lines, electric power and utility rights-of-way, fencerows, gravel pits, industrial sites, military sites, mining and drilling areas, oil and gas pads, non-irrigation ditch banks, parking lots, petroleum tank farms, pipelines, roadsides,

³ A surfactant is a substance such as a detergent that, when added to a liquid, reduces its surface tension, thereby increasing its spreading and wetting properties.

⁴ DowAgrosciences. Milestone Specialty Herbicide Specimen Label (Revised 2-27-2018).

⁵ Wilbur-Ellis, Hasten-EA Modified Vegetable Oil Concentrate Specimen Label.

⁶ Wilbur-Ellis, Crosshair Deposition and Drift Management Agent Specimen Label

⁷ Beau, Miller, 2019. Territory Manager for Marin County, Corteva Agriscience product expert, Telephone conversation with Luis Rosas, RCH Group, on November 14, 2019.

⁸ Acid equivalent: 2-pyridine carboxylic acid, 4-amino-3, 6-dichloro-2-pyridinecarboxylic acid

railroads, storage areas, dry storm water retention areas, substations, and unimproved rough turf grasses). It also may be used in natural areas in open space (i.e. campgrounds, parks, prairie management, trailheads and trails, recreation areas, wildlife openings, and wildlife habitat and management areas).

Health Hazards. Milestone presents minor health hazards to humans and domestic animals. The improper use of this product can cause moderate skin/eye irritation. Applicators and other handlers are required to use the proper personal protective equipment (PPE). Milestone does not contain any listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels that would require a warning under California Proposition 65. Additionally, Milestone is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.⁹

Environmental Hazards. Milestone should not be applied directly to water, to areas where surface water is present or to intertidal areas below the mean high-water mark. The use of Milestone where the soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.¹⁰ Runoff of Milestone can occur during periods of intense rainfall, to soils saturated with water, surfaces paved with materials such as asphalt or concrete or soils through which rainfall will not readily penetrate. Proper use rate provided in the specimen label would avoid runoff.¹¹

Milestone was reviewed and registered under the Reduced Risk Pesticide Initiative of the USEPA. This program determined the Milestone must carry a “Caution” signal on each product label and that use of the product does not require a special license for purchase. The USEPA found Milestone to be practically non-toxic to non-target animals at the registered application rates.¹² Milestone does little-to-no damage to grasses, forbs or other key members of the native plant community, allowing native habitats to be restored. Compared to alternative herbicides, Milestone is less likely to affect both terrestrial and aquatic plants when applied properly.¹³

Hasten-EA Adjuvant

Hasten-EA is produced by Wilbur-Ellis Company LLC. Hasten-EA is an agricultural adjuvant that would be added to the herbicide mix as a surfactant that would adhere to

⁹ DowAgriSciences. Milestone Herbicide Safety Data Sheet, 5/26/2015

¹⁰ DowAgrosciences. Milestone Specialty Herbicide Specimen Label (Revised 2-27-2018).

¹¹ DowAgrosciences. Milestone Specialty Herbicide Specimen Label (Revised 2-27-2018).

¹² United States Office of Prevention, Pesticides Environmental Protection and Toxic Substances Agency, *Pesticide Fact Sheet: Aminopyralid*, August 10, 2005.

¹³ United States Office of Prevention, Pesticides Environmental Protection and Toxic Substances Agency, *Pesticide Fact Sheet: Aminopyralid*, August 10, 2005.

Milestone and assist with penetration of the herbicide into target plants. The active ingredient in this substance is ethylated seed oil¹⁴. According to its label, Hasten-EA may be used with pesticides applied to commercially grown crops, vegetation management, aquatic environment, rangelands, and turf and ornamentals. Hasten EA may be applied by air or ground. There are no known recommended restrictions when using Hasten-EA as an adjuvant and no hazard statements that meet the criteria for hazard classification.¹⁵

Health Hazards. Hasten-EA presents minor health hazards to humans. The improper use of this product can cause moderate eye irritation.¹⁶ If swallowed, it is expected to be a low ingestion hazard. There are no adverse effects from skin and inhalation contact. Applicators and other handlers are required to use the proper personal protective equipment (PPE) since Hasten-EA would be used as an herbicide mixture containing Milestone.¹⁷ Hasten-EA does not contain any listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels that would require a warning under California Proposition 65.¹⁸

Environmental Hazards. Hasten-EA is not classified as environmentally hazardous.¹⁹ However, this does not exclude the possibility that substantial spills may have a harmful or damaging effect on the environment. No adverse environmental effect (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) is expected from Hasten-EA.

Crosshair Deposition and Drift Management Agent

Crosshair is produced by Wilbur-Ellis Company LLC. It is a deposition and drift management agent that would be added to the herbicide mix that would aid in the spray being deposited as intended on the plants. It reduced the number of spray droplet fines and creates a more uniform droplet size, which results in enhanced deposition and coverage of the herbicide spray. The active ingredients in this substance are modified vegetable oil, amine salts of organic acids, and organic acid²⁰. According to its label, Crosshair may be used with pesticides applied to agriculture, forestry, golf course, industrial, on-crop, roadside, turf, and ornamentals²¹. Crosshair may be applied by air or ground. There are no known recommended

¹⁴ Polyoxyalkylene fatty ester (100% by weight)

¹⁵ Wilbur-Ellis. Hasten-EA Safety Data Sheet, (revised 09-26-2017).

¹⁶ Wilbur-Ellis. Hasten-EA Safety Data Sheet, (revised 09-26-2017).

¹⁷ DowAgrosciences. Milestone Specialty Herbicide Specimen Label (Revised 2-27-2018).

¹⁸ Wilbur-Ellis. Hasten-EA Safety Data Sheet, (revised 09-26-2017).

¹⁹ Wilbur-Ellis. Hasten-EA Safety Data Sheet, (revised 09-26-2017)

²⁰ Wilbur-Ellis. Crosshair Safety Data Sheet, (revised 09-26-2017).

²¹ Wilbur-Ellis, Crosshair Deposition and Drift Management Agent Specimen Label

restrictions when using Crosshair per label requirements, and no hazard statements that meet the criteria for hazard classification (allergic skin reactions are the only listed hazard).²²

Discussion

- a, b) The herbicide mix would be used to manage the target species of woolly distaff thistle along with other unwanted vegetation. The Project would involve handling, transporting, applying, and disposing of the herbicide mix and would follow the recommended storage, disposal and application rate methods. The staging area would be at a large ball field, adjacent to the parking lot at the ranch complex. Best Management Practices (BMPs) would be required for transport, use, disposal, and accident conditions during the aerial spraying and ground spraying. BMPs would include applicable County of Marin Department of Agriculture, Weights & Measures Pesticide Enforcement requirements²³. These BMPs would include proper herbicide storage and transportation and proper employee safety and training pursuant to 3 CCR § 6724. BMPs also would include implementation of the Worker Protection Standard, 40 CFR part 170²⁴ that contains requirements for the protection of agricultural workers, training requirements, and PPE standards. Application of the herbicide mix would occur during the late winter or early spring. About 10-18 workers would be onsite (including facility staff and helicopter crew) on an average day during treatment activities. Facility staff may be reduced during spray periods, and the facility would be closed to the public at those times.

Regulatory Compliance. The Project would be required to adhere to California Code of Regulations for Pest Control Operations Handler Training 3 CCR § 6724²⁵. This code ensures employees who handle pesticides have been properly trained in worker safety, application methods and accident prevention activities. Additionally, the project would need to comply with the Marin County Department of Agriculture, Weights & Measures' Pesticide Enforcement regulations. These include Pesticide Notification Requirements and Pesticide Use Reports that are required to be filed the month following the application. Marin County Department of Agriculture, Weights & Measures would also require the Handler Safety Training Record (pursuant to 3 CCR § 6724) to be completed by the all employees that would be applying the

²² Wilbur-Ellis. Crosshair Safety Data Sheet, (revised 09-26-2017).

²³ Marin County Department of Agriculture, Weights and Measures. Pesticide Enforcement. <https://www.marincounty.org/depts/ag/pesticides-enforcement> (accessed 8/7/2020)

²⁴ United States Environmental Protection Agency (USEPA). *Agricultural worker Protection Standard 40 CFR Parts 156 & 170 Interpretive Policy*, 2019.

²⁵ California Code of Regulations. Title 3 Food and Agriculture, Division 6 Pesticides and Pest Control Operations. Chapter 3 Pest control Operations, Subchapter 3 Pesticide Worker Safety, 6724 Handler Training, 2019.

herbicide. This training record covers label requirements, safety requirements, hazards of the pesticides, and proper first aid for signs and symptoms of overexposure.

Application Strategies

Aerial Application (Helicopter). Typical aerial application hours would be 7:00 am to 4:30 pm. Aerial application use would be for up to three days a year. The project would follow BMPs for aerial broadcast application. The herbicide mix would be applied via helicopter. The helicopter would be trucked to the site and based at the ranch headquarters area for the duration of the spray period. It would land at the staging area for refilling of its spray tank and servicing of its spray system. The herbicide mix would be applied as a coarse low-pressure spray to uniformly cover the target foliage. Due to the potential risk of water contamination from Milestone, the project would include 100-foot buffers from all streams, water courses, water stock ponds, and any other potentially sensitive areas. Staff would work indoors for the entire day during the application by helicopter, and would wear N95 respirator masks as a precaution when walking between buildings. Ranchers moving cattle also would be required to wear N95 masks.

Ground Application. Ground application (backpack spraying and potential ATV use for spraying) would occur for up to 14 days following the 1-3 days of aerial application, annually for 3-5 years, with annual ground application thereafter. The project would follow BMPs for ground broadcast application. Ground broadcast would apply the herbicide mix via a spray through use of backpacks and possibly an ATV with a boom sprayer attached. Spray volume would be sufficient to uniformly cover the thistle. Guests would not be allowed in areas of spraying during spraying and for a minimum of 24 hours after spraying.

Potential Hazards for Walker Creek Ranch and Nearby Residences

Population Hazards. The use of the herbicide mix would be limited to the proposed application sites throughout the property. The main concern is the people (i.e. visitors and staff) that would be exposed to nearby application sites. To address this concern, no visitors would be allowed in areas of spraying during or for 24 hours after spraying activities (assuming dry conditions; if wet, 24 hours after end of precipitation). Workers onsite on aerial application days would be required to wear N95 respirator masks to avoid any potential health hazards when walking between buildings. These practices would avoid any potential health impacts, to visitors and workers. The application of the herbicide mix would be limited to areas greater than 550 feet from

any residence or occupied building, both on- and off-site. The application sites would remain undisturbed for at least 3 days to allow proper uptake of Milestone by the targeted weeds. Therefore, herbicide hazards to workers, visitors and residences near the Walker Creek Ranch would be **less than significant**.

Environmental Hazards. Milestone's chemical properties have potential to result in groundwater contamination where soils are permeable. It is not permissible to use Milestone inside banks or bottoms of irrigation ditches (either dry or containing water) or other channels that carry water for irrigation or domestic uses. Milestone would not be applied directly to water, intertidal areas or near a cistern. It is permissible to apply Milestone to treat non-irrigation ditch banks, seasonally dry wetlands (i.e., flood plains, deltas, marshes, swamps or bogs) and transitional areas between upland and lowland sites. As a BMP, Milestone would not be applied during periods of intense rainfall to soils saturated with water or paved surfaces (concrete or asphalt) in order to eliminate risk of potential runoff. Milestone would not be applied to existing troughs on the proposed spray sites. The Project would include 100-foot buffers from all streams, water courses, and water stock ponds to avoid potential environmental impacts. Therefore, environmental hazards from herbicide application would be **less than significant**.

Spray Drift Impacts. BMPs and proper application techniques would be used to avoid airborne movement of the herbicide mix to off-target sites. Drift could potentially lead to environmental contamination. To mitigate potential drift the project would follow all BMPs and instructions for ground and aerial application. Aerial application would occur on a single day during the growing season for Distaff thistle. The application would occur when equipment and weather conditions are favorable, and only when the winds do not exceed 10 miles per hour. This would avoid potential drift into non-targeted areas. BMPs for ground application of the herbicide mix would include keeping the boom as low as possible, keeping spray pressures at the Milestone manufacturer's specified minimum pressures to provide coarse spray droplets and spraying when wind velocity is low. The application height would be at the lowest possible height from treatment sites as long as aircraft safety protocol is followed. Applications at low height above the ground would help reduce exposure of droplets to evaporation and wind.

Because the Project would be required to comply with all federal, state and local regulations/permitting requirements, proper control strategies (ground and aerial) and use of accepted BMPs, any potential impacts relating to creating a hazard to the public or the environment through the transport, use, disposal, or accidental release of hazardous materials would be **less-than-significant**.

- c) The Project operates as an outdoor school including education programs for Marin County children. This includes space that is used for outdoor education and recreation, as well as a school garden. Children are typically present at the property for 4- to 5-day overnight education programs. The project would only apply the herbicide mix to areas that are infested with distaff thistle and would not emit or dispose of hazardous materials or substances in classroom or garden areas, or near the creek. No students would be allowed in areas of spraying during or for 24 hours after spraying activities (aerial and ground, assuming dry conditions; if wet, 24 hours after end of precipitation).

As described above, Milestone has been approved for weed control and poses minor health hazards to humans. Hasten-EA and Crosshair have been approved as an adjuvant and drift management agent, respectively, in an herbicide mix and pose minor health hazards to humans. To avoid potential minor health impacts, no children or other visitors would be allowed in areas of spraying during or for 24 hours days after spraying activities (aerial and ground; assuming dry conditions; if wet, 24 hours after end of precipitation). The project would follow all BMPs for application timing, techniques, and health hazard mitigations. Therefore, potential impacts would be **less-than-significant**.

- d) The project site is not on the Cortese List of hazardous sites. The DTSC and State Water Resources Control Board compiles and updates lists of hazardous material sites pursuant to Government Code Section 65962.5. The site is also not included on the databases maintained by the DTSC (Envirostor)²⁶ and the State Water Resources Control Board (Geotracker)²⁷ (DTSC, 2019 and SWRCB, 2019). Therefore, the project would have **no impact** from known hazardous materials sites.
- e) The project is not located within an airport land use plan and is not within two miles of a public airport. Therefore, the project would have **no impact** on airports.
- f) The project would not interfere with emergency response plans or evacuation plans. The project would not impede or require diversion of rescue vehicles or evacuation traffic in the event of a life-threatening emergency. Therefore, the project would have **no impact**.

²⁶ Department of Toxic Substances Control (DTSC), *DTSC's Envirostor Database*, Accessed July 20, 2020 at: <https://www.envirostor.dtsc.ca.gov/public/>

²⁷ State Water Resources Control Board (SWRCB), *Geotracker*, Accessed July 20, 2020 at: <https://geotracker.waterboards.ca.gov/>

- g)** The application of the herbicide mix would only occur in late winter and early spring months, which would be well outside of the wildfire season. Application would occur when the weather and moisture is preferable and with favorable wind conditions (not exceeding 10 miles per hour). The project would not have the potential to expose people or structures to risk of loss, injury or death involving wildland fires. Therefore, the project would have **no impact** on wildfires.

X. Hydrology and Water Quality

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: <ul style="list-style-type: none"> i) result in substantial erosion or siltation on- or off-site; ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv) impede or redirect flood flows? 				X
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?				X
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				X

Discussion

a, e) The Clean Water Act (CWA), at section 301(a), broadly prohibits the discharge of any pollutant to waters of the United States, except in compliance with an NPDES permit. Biological and residual pesticides* discharged into surface waters constitute pollutants within the meaning of the CWA even if the discharge complies with the registration requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The discharge of biological and residual pesticides to surface waters from spray applications for pest control throughout the State of California may pose a threat to existing and potential beneficial uses of waters of the United States if not properly controlled and regulated. Therefore, the State of California Water Quality Control Board (Board) has determined that coverage under an NPDES permit is required. The Board adopted Water Quality Order No. 2011-0004-DWQ, General Permit No. Cag 990007 to regulate these pollutants. Included under this General Permit are herbicides containing aminopyralid, the active ingredient in Milestone, which is the herbicide proposed for thistle control under this Project. Therefore the Project would need to comply with requirements of that Permit, and complete a Notice of Intent and accompanying Pesticide Application Plan (PAP) for the Project's proposed herbicide use²⁸. The PAP would include but not be limited to the following elements:

1. Description of any surface waters within and near the application area;
2. Discussion of the factors influencing the decision to select pesticide spray applications for pest control;
3. Pesticide products or types of pesticides expected to be used and if known their degradation byproducts, the method in which they are applied, and if applicable, the adjuvants and surfactants used;
4. Description of the application area* and the target area in the system;
5. Other control methods used (alternatives) and their limitations;
6. How much product is needed and how this amount was determined;
7. Representative monitoring locations* and the justification for selecting these locations;
8. Off-target Drift Management Plan, including the following:
 - a) Procedures used when applying pesticides;
 - b) Procedures used when off-target drift is anticipated due to the nature of the application and environmental conditions;
 - c) Procedures used when off-target drift is not anticipated, but does occur; and

²⁸ https://www.waterboards.ca.gov/water_issues/programs/npdes/pesticides/docs/sprayapplication/2011-0004-dwq/spray_noi.pdf

- d) Site record sheet.
- 9. If applicable, describe details of the buffer zone that will be used to prevent off-target spray drift*;
- 10. Description of implementation of all reasonable alternatives to limit amount of biological and residual pesticide discharge;
- 11. Evaluation of available BMPs to determine if there are feasible alternatives to the selected pesticide application Project that could reduce potential water quality impacts;
- 12. Description of site-specific BMPs to be implemented. The BMPs shall include, at the minimum:
 - e) measures to prevent pesticide spill;
 - f) measures to ensure that only a minimum and consistent amount of pesticide is used in all applications;
 - g) a plan to educate Discharger's staff and pesticide applicator on any potential adverse effects from the pesticide application;
 - h) descriptions of specific BMPs for each spray mode, e.g. aerial spray, truck spray, hand spray, etc.;
 - i) descriptions of specific BMPs for each pesticide products to be used; and
 - j) descriptions of specific BMPs for each type of environmental settings, i.e., agricultural, urban, and wetland.
- 13. Identification of the Problem. Prior to the first pesticide application covered under this General Permit that will result in a discharge of biological and residual pesticides to waters of the US, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, the Discharger must do the following for each pest management area:
 - a) If applicable, establish densities for pest populations to serve as action threshold(s) for implementing pest management strategies;
 - b) Identify each target pest species to develop species-specific pest management strategies based on developmental and behavioral considerations for each species;
 - c) Identify known breeding areas for source reduction, larval control program, and habitat management; and
 - d) Analyze existing surveillance data to identify new or unidentified sources of each pest problem as well as areas that have recurring pest problems.
- 14. Examination of the Possible Alternatives. Dischargers should examine the alternatives to pesticide use to reduce the need for applying pesticide. Such methods include:

- a) Evaluating the following management options, in which the impact to water quality, impact to non-target organisms, pesticide resistance, feasibility, and cost effectiveness should be considered:

- No action
- Prevention
- Mechanical or physical methods
- Cultural methods
- Biological control agents
- Pesticides

If there are no alternatives to pesticides, Dischargers shall use the least amount of pesticide necessary to control the pest.

- b) Using the least intrusive method of pesticide application.
- c) Applying a decision matrix concept to the choice of the most appropriate formulation.

15. Correct Use of Pesticides

Dischargers must ensure that all reasonable precautions are taken to prevent off-target spray drift. Reasonable precautions include using the right spraying techniques and equipment, taking account of weather conditions and the need to protect the environment.

- a) Consider Buffer Zone

When spraying near water with certain pesticides, it might be necessary to leave an unsprayed area at the margin to prevent spray drifting out of the target area. This unsprayed area is called a buffer zone. The size of the margin is dependent upon the type of sprayer used, e.g. aerial application will require a larger buffer zone than ground application.

- b) Prevent Off-Target Spray Drift

Users of pesticides must ensure that all reasonable precautions are taken to prevent off-target spray drift. A combination of factors may affect off-target spray drift, including wind velocity at spray nozzle height, stability of the local atmospheric conditions, wrong nozzles or pressure choice affecting spray quality, vehicle speed, boom height, poor equipment maintenance, and incorrect equipment setting.

It is important that the appropriate environmental or conservation agency is contacted before spraying, in case there are particularly susceptible areas that the spray operator is not aware of. The following should be considered to avoid off-target spray drift:

- i. Check the weather forecast before starting the spray application;
 - ii. Do not spray if the wind direction and speed would cause spray to drift onto sensitive areas;
 - iii. If applicable, release the pesticide as close as possible to the target;
 - iv. Check spray angles and adjust height accordingly; and
 - v. Use the lowest effective rates of application.
- c) All errors in application and spills are reported to the proper authority.
 - d) Staff training in the proper application of pesticides and handling of spills.
16. Specify a website where public notices, required in Section VIII.B, may be found.

Milestone's chemical properties have potential to result in groundwater contamination where soils are permeable. It is not permissible to use Milestone inside banks or bottoms of irrigation ditches (either dry or containing water) or other channels that carry water for irrigation or domestic uses. Milestone would not be applied directly to water, intertidal areas or near a cistern. It is permissible to apply Milestone to treat non-irrigation ditch banks, seasonally dry wetlands (i.e., flood plains, deltas, marshes, swamps or bogs) and transitional areas between upland and lowland sites. As a BMP, Milestone would not be applied during periods of intense rainfall to soils saturated with water or paved surfaces (concrete or asphalt) in order to eliminate risk of potential runoff. Milestone would not be applied to existing troughs on the proposed spray sites. The Project would include 100-foot buffers from all streams, water courses, and water stock ponds to avoid potential environmental impacts. In addition, implementation of the General NPDES Permit for Biological and Residual Pesticide Discharges from Spray Applications, including the PAP requirements listed above, would reduce the water quality impacts described above to a **less-than-significant** level.

- b) The project would not use or otherwise interfere with groundwater use or supply. Therefore, the proposed project would not contribute to depletion of groundwater supplies and **no impact** would occur to groundwater. Similarly, the project would not affect any groundwater management plan.
- c, d) Portions of the site near Walker Creek are mapped as being located in a 100-year flood plain. The site is well inland and not in a mapped dam failure inundation zone. Therefore, the project would not impede flood waters nor increase flood hazards from

shoes sources. The project would not result in new impervious surfaces being created. Drainage would not be altered by the project.

Seiches and tsunamis are seismically induced large waves of water. Because of the distance of the site from any large water body and the elevation of the site well above sea level, there is no potential for a tsunami to affect this part of Marin County.

Based on the above, the project would have **no impact** on flood-related water quality hazards.

XI. Land Use and Planning

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X

Discussion

- a) The proposed project would be located on existing open space/agricultural lands and would not affect the use of those lands or adjacent lands outside of the few days/year when spraying would occur. Therefore it would not have the potential to create substantial conflicts between uses or divide an established community. There would be **no impact**.
- b) The Project site is designated Agriculture in the Marin Countywide Plan, and zoned ARP-60 Agriculture Residential Planned in the Marin County Zoning Ordinance. The proposed use that would support agricultural use of the property by removing weeds that are noxious to livestock, and is therefore consistent with the General Plan and Zoning designations. The project would have **no impact** on plan conformance.
- c) The project site is not located within the boundaries of a habitat conservation plan or a natural community conservation plan; therefore, the project would not conflict with any habitat plans and there would be **no impact**.

XII. Mineral Resources

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

Discussion

- a, b)** The project site an agricultural area and is not identified in the Marin Countywide Plan or designated by the State of California as a site containing mineral resources that would be of local, regional, or statewide importance²⁹. The site also is outside of any areas designated by the State Mining and Geology Board as containing regionally significant aggregate resources (used in concrete). The project site does not contain any known mineral deposits or active mineral extraction operations. The removal of the invasive thistle would not alter any potential future mineral resource use of the property. Therefore, there would be **no impact** to mineral resources.

²⁹ [ftp://ftp.consrv.ca.gov/pub/smgb/2018/January-11-2018/RBM%200111-15B-1%20No.%20SF%20Bay%20Designation%20Report%20No.17.pdf](http://ftp.consrv.ca.gov/pub/smgb/2018/January-11-2018/RBM%200111-15B-1%20No.%20SF%20Bay%20Designation%20Report%20No.17.pdf)

XIII. Noise

Would the Project result in:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a Project within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?				X

Background

Noise Descriptors

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound pressure level has become the most common descriptor used to characterize the “loudness” of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Decibels are measured using different scales, and it has been found that A-weighting of sound levels best reflects the human ear’s reduced sensitivity to low frequencies, and correlates well with human perceptions of the annoying aspects of noise (referred to as “dBA”). Table Noise-1 identifies decibel levels for common noise sources.

Regulatory Framework

The Noise Section (3.10) of the Built Environment Element of the Marin Countywide Plan

(Marin County, 2007)³⁰ contains policies and programs intended to maintain appropriate noise levels and protect noise-sensitive land uses in the County. Due to the nature of the Project, which is eradication of invasive weeds on a large property, the only substantial noise impact would be from the helicopter used for aerial spraying.

Table Noise-1: Typical Noise Levels

Noise Level	Outdoor Activity	Indoor Activity
90+	Gas mower at 3 ft., jet flyover at 1,000 ft.	Rock band
80–90	Diesel truck at 50 ft.	Loud television at 3 ft.
70–80	Gas lawn mower at 100 ft., noisy urban area	Garbage disposal at 3 ft., vacuum at 10 ft.
60–70	Commercial area	Normal speech at 3 ft.
40–60	Quiet urban daytime, traffic at 300 ft.	Large business office, dishwasher next room
20–40	Quiet rural, suburban nighttime	Concert hall (background), library, bedroom at night
10–20		Broadcast / recording studio
0	Lowest threshold of human hearing	Lowest threshold of human hearing

Source: Modified from Caltrans Technical Noise Supplement (Caltrans, 2013)³¹

Existing Noise Sources and Levels

To quantify existing ambient noise levels, RCH group conducted short-term (10-minute) noise measurements at the Project site. Short-term 5-minute measurements ranged from 49 to 53 dBA. Noise measurements are summarized in table Noise-2. The site is a large, remote property and is an extremely quiet area.

Existing Sensitive Receptors

Noise sensitive receptors (uses associated with indoor and/or outdoor activities that may be subject to stress and/or significant interference from noise) typically include residential dwellings, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. The nearest off-site ranch house complexes to the proposed Distaff thistle treatment areas are approximately 550 feet to the northwest of the site and approximately 1,900 feet southeast.

³⁰ Marin County, 2007. *Marin Countywide Plan*. Community Development Agency – Planning Division.

³¹ California Department of Transportation (Caltrans), 2013. Technical Noise Supplement. September 2013.

Table Noise-2: Existing Noise Measurements

Location	Time Period- June 17 th , 2020	Noise Levels (dB)	Noise Sources
Site 1: Observatory	12:32 P.M. – 12:42 P.M.	5-min Leq's: 53, 51	Wind 55 dB, birds, plane overhead 50 dB, horns in background 45 dB
Site 2: Parking lot near main building	1:03 P.M. – 1:13 P.M.	5-min Leq's: 49, 49	Rustling leaves 50 dB, birds, wind, blower in distance 46 dB

Source: RCH Group, 2020

Discussion

- a) Noise sources associated with project operations would be a light/medium lift helicopter for aerial application of the herbicide mix and ATVs for ground application of the herbicide mix. The use of a helicopter would be restricted to the hours of 7:00 A.M. to 4:30 P.M., weekdays only. Ground application would occur for 14 days following aerial application. Due to the remote location of the project and distance from the nearest off-site receptors (550 and 1,900 feet), there would be minimal noise effects from ATVs for ground application of the herbicide mix. ATVs are used regularly at the Project site for various activities.

The project would have an ongoing maintenance program that would include aerial spraying one day a year. No classes or non-staff persons would occupy the facility at these times. The helicopter would be staged at the Project site for the aerial spraying. There is an identified staging area (ball park adjacent to ranch complex) that would be used by the helicopter to touch down to refill the spray tank and service the spray system. The main cause of noise from a helicopter is the rotors, especially when a helicopter hovers over a prolonged period over a single location. Helicopter noise increases with airspeed and in high-rate climbs and sharp turns. A doubling of height or distance reduces the noise level by 6 to 7 dB, and if the height or distance is increased by a factor of three, the maximum noise level is decreased by approximately 10 dB³². Table Noise-3 provides the maximum noise level for light/medium lift helicopters at a distance of 550 and 1,900 feet (the distance to the two nearest off-site sensitive receptors).

Table Noise-3: Typical Helicopter Noise Levels

Helicopter Type	Lmax (600 feet)	Lmax (2,000 feet)
Light/Medium Lift	65 dB	52 dB

Source: FAA, 2004³³³² Helicopter Association International, 2007. *Fly Neighborly Guide*. 2007³³ Federal Aviation Administration, 2004. *Nonmilitary Helicopter Urban Noise Study*.

Use of a helicopter would occur one day a year. The helicopter would not hover over any one area for long periods of time. There would be no visitors allowed on the property on aerial application days or for 3 days after the aerial spraying. Noise from the helicopter would generate temporary noise on aerial spray days that could cause potential annoyance to staff members onsite and the nearest adjacent sensitive receptors. Helicopter use would be limited to the hours of 7:30 A.M. to 4:30 P.M., weekdays only. The project would not generate any off-site noise after aerial/ground spraying is complete. Ground spraying with backpacks or ATVs would not generate substantial noise. The MCOE proposes to notify all nearby residents and on-site Walker Creek Ranch staff members regarding the schedule and reasons for helicopter aerial spraying at least one week before aerial spraying commences. This would ensure that temporary noise impacts from helicopter use would result in a **less-than-significant impact**.

- b) Groundborne vibrations are generally caused by heavy construction equipment doing earthwork (i.e., bulldozers, piledrivers and blasting). Helicopter cause airborne vibrations but not substantial groundborne vibrations that could damage structures. Based on the nature of Project, groundborne vibration impacts would be **less than significant**.
- c) The project site is not located within the vicinity of an area covered by an airport land use plan. The project site is not within two miles of a public airport or public use airport. Therefore, there would be **no impact**.

XIV. Population and Housing

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

Discussion

- a) The project would not directly increase population growth because there is no housing component and would not indirectly increase housing (through increased demand) because the Project would not, in itself, generate any new demand. No new permanent jobs would be generated by the Project and the Project would be of short duration. Therefore, the Project would not induce new development on the site or nearby lands, and **no impact** would occur.
- b) The project site is an outdoor center and agricultural and recreational open space land. The proposed Project would not displace existing housing or people, so there would be **no impact**.

XV. Public Services

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Fire protection?			X	
b) Police protection?				X
c) Schools?				X
d) Parks?				X
e) Other public facilities?				X

Discussion

- a) The Marin County Fire Department (MCFD) provides fire protection and emergency medical services for the Project site. The MCFD station nearest to the site is the Tomales Station, at 599 Dillon Beach Road in Tomales, approximately 3 miles northwest of the site. Additionally, the TRACEN Petaluma Fire Department, at the Coast Guard Training Center in Two Rock, provides fire service to the Project area. That station is about 1.5 miles from the site. Implementation of the project would not result in an increased demand for fire protection services because it would remove vegetation from the site, which would eventually be replaced by grasses with similar flammability as the thistles to be removed. The project would not require the provision of or need for new or physically altered facilities to continue to serve the project site. As a result, the project would not result in a substantial adverse physical impact nor would it substantially affect response times for fire services. The project's impact related to the provision of fire services would be **less than significant**.
- b) The Marin County Sheriff's Department (MCSO) provides police protection services for the project site. The MCSO currently provides police protection to the project area and would continue to provide service regardless of project implementation. The project would not have any potential to affect the need for police services. Full emergency access to the site would continue to be provided. **No impact** would occur.

- c) The proposed thistle control project would not increase the population or otherwise increase demands for school services. Spraying would occur only when the site is not in use as an educational facility. Therefore, the project would have **no impact** on schools.
- d) As described above, the proposed project would not result in an increase in residents and therefore, would not increase demand for any parks facilities. Use of the property for outdoor recreation would be eliminated during spray days, however these would be very small in number. For this reason, the project would be expected to have **no impact** on recreational facilities
- e) No other public facilities would be required by the proposed project. Therefore, there would be **no impact** to other facilities.

XVI. Recreation

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that physical deterioration of the facility would occur or be accelerated?				X
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

Discussion

- a) As described in response to question d) under Public Services, above, the project would have a minimal impact on parks and other recreational facilities (limited to a few spray days per year). No physical deterioration of the facility would occur or be accelerated. Therefore **no impact** to recreational facilities would occur.
- b) The project is a vegetation control program on thistle-infested hillsides. It would not construct or expand any recreational facilities. Therefore, **no impact** would occur.

XVII. Transportation/Traffic

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit roadways, pedestrian and bicycle facilities?				X
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?				X
c) Substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
d) Result in inadequate emergency access?				X
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

Discussion

- a, b, d) The project would rely primarily on aerial spraying of the site by helicopter. Some ground spraying may also be required, generating a few vehicle trips per day on the lightly traveled rural roads accessing the site. Therefore, no Project traffic and safety impacts would occur and there would be **no impact**.
- c) Helicopter spraying would involve a single helicopter that would be trucked to the site and operate from the laydown area. Removal of thistles from the site would not otherwise have any potential to affect air traffic. Therefore, it would have a **less-than-significant impact** on air traffic patterns.

- e) The proposed thistle control program would not affect roadways or otherwise have any potential to alter emergency access to the site and surrounding area. No impacts would be **less than significant**.
- f) The project would be limited to thistle control on grassy hillsides and therefore have no effect on existing bus, bicycle and pedestrian access, therefore it would not conflict with any adopted plans, policies, or programs that address alternative transportation, and there would be **no impact**.

XVIII. Tribal Cultural Resources

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the Project cause a significant adverse change in the significance of a tribal cultural resource defined in Public Resource Code Section 21074 as either a site, feature, place cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or				X
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.				X

Discussion

- a) i., ii. The project proposes control of a non-native, invasive thistle, primarily via aerial spraying. No ground disturbance would occur as part of the project, therefore there is no potential for any impacts on Tribal Cultural Resources to occur.

XIX. Utilities and Service Systems

Would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?				X
b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?				X
c) Result in a determination by the waste water treatment provider, which serves or may serve the Project that it has adequate capacity to serve the Project's Projected demand in addition to the provider's existing commitments?				X
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?				X
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				X

Discussion

a, b, c) The project would generate any wastewater and would require minimal water supplies (fewer than 100 gallons, total, for herbicide mix). Therefore it would have **no impact** to water or wastewater services.

d, e) The project would not generate any solid wastes. Thistles would remain on the site after treatment and there would be **no impact** on solid waste.

XX. Wildfire Hazards

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:

Environmental Issue	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				X
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?			X	
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				X
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?			X	

Background

California PRC 4201 - 4204 and Govt. Code 51175-89 direct the California Department of Forestry and Fire Protection (CAL FIRE) to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), define the application of various mitigation strategies to reduce risk associated with wildland fires. CAL FIRE is remapping Fire Hazard Severity Zones (FHSZ) for State Responsibility Areas (SRA) and Very High Fire Hazard Severity Zones (VHFHSZ) in Local Responsibility Areas (LRA) to provide updated map zones, based on new data, science, and technology. This specific dataset provides DRAFT boundaries for Very High FHSZs within LRA lands. Since these zones were the result of a model that considers influence of fire behavior and embers from adjacent lands, zones for SRA and FRA lands are included to assist in understanding the hazard zoning on LRA lands. The Project site and

surrounding area are classified as having a “Moderate” fire hazard class in these maps³⁴. The project site is not within a mapped Urban Wildlands Interface area³⁵.

The Marin County Fire Department (MCFD) provides fire protection and emergency medical services for the Project site. The MCFD station nearest to the site is the Tomales Station, at 599 Dillon Beach Road in Tomales, approximately 3 miles northwest of the site. Additionally, the TRACEN Petaluma Fire Department, at the Coast Guard Training Center in Two Rock, provides fire service to the Project area. That station is about 1.5 miles from the site. The Project would not require the provision of or need for new or physically altered facilities to continue to serve the Project site.

Discussion

a, b, c, d) The project would treat about 390 acres of grass and weed-covered hillsides to control invasive thistles. This treatment may result in “browning” of these areas earlier than surrounding areas. This would result in a minor increase in fire hazards, however, because the entire hillsides brown up every summer, and the project-induced browning would be in the Spring and, limited to one or two control seasons, the actual change in fire hazard would be slight. In the long term, implementation of the project would not result in an increased demand for fire protection services because it would remove vegetation from the site, which would eventually be replaced by grasses with similar flammability as the thistles to be removed. Vegetation removal would slightly increase the risk of slope instability until new vegetations becomes established. Therefore, the project would have a **less-than-significant impact** with respect to wildfire hazards, associated hazards, and equipment/infrastructure needs.

³⁴ <https://gisopendata.marincounty.org/datasets/MarinCounty::fire-hazard-severity-zone>

³⁵ <https://gisopendata.marincounty.org/datasets/MarinCounty::urban-wildland-interface?geometry=-123.068%2C38.097%2C-122.533%2C38.191>

IV. MANDATORY FINDINGS OF SIGNIFICANCE

Environmental Issue	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant	No Impact
a) Does the Project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of an endangered, rare or threatened species or eliminate important examples of the major periods of California history or prehistory?			X	
b) Does the Project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects)?				X
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

Discussion

- a) As described in the Biological Resources section of this IS, with implementation of measures proposed as part of the project, no potentially significant biological resource impacts are anticipated. The site is not likely to contain any known historic resources or prehistoric resources, as discussed above in Section V. Cultural Resources. Therefore impacts to these resources would be a **less than significant**.
- b) The proposed project would not result in cumulative impacts that could be cumulatively considerable and potentially affect the general public and the

environment. According to data obtained from the Marin County website, there are no pending or recently approved projects that could contribute to cumulative conditions. In addition, because the Project would not generate any ongoing daily trips it would not contribute to any cumulative noise, or air quality in the study area or region. Therefore, **no cumulative impacts** would occur.

- c) The proposed project would not increase long-term air pollutant emissions and greenhouse gasses because it would not add any net new workers outside of the brief treatment periods. The project's noise impacts and hazards to human health and safety would be **less than significant**, as described in this Initial Study.

V. REFERENCES

Baldwin, Bruce, Douglas H. Goldman, David J. Keil, Robert Patterson, and Thomas J. Rosatti. 2012. *The Jepson Manual: Vascular*

Bay Area Air Quality Management District (BAAQMD), 2019a. *In Your Community – Marin County*, April 14. <http://www.baaqmd.gov/about-the-air-district/in-your-community/marin-county>

Bay Area Air Quality Management District (BAAQMD), 2017b. *Bay Area Air Quality District CEQA Air Quality Guidelines*, May. http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

BAAQMD. *Spare the Air, Cool the Climate*. April 2017. http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en

Bay Area Air Quality Management District (BAAQMD), 2019b. *Air Quality Summary Reports*, March 24. <http://www.baaqmd.gov/about-air-quality/air-quality-summaries>

Bureau of Land Management (BLM). 2015. *Aminopyralid Ecological Risk Assessment Final*. (AECOM Project No. 6018.6154). U.S. Department of the Interior-Bureau of Land Management. Available online (as of 08/2020) at: https://eplanning.blm.gov/public_projects/nepa/70301/94286/113789/Aminopyralid_Ecological_Risk_Assessment.pdf

California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Database (CNDDB) (July updates). California Department of Fish and Wildlife.

California Environmental Protection Agency (CalEPA), 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March. https://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF

California Department of Toxic Substances Control, https://www.envirostor.dtsc.ca.gov/public/map/?global_id=43990007. Accessed August 15, 2019

California Native Plant Society (CNPS). 2020. CNPS's Electronic Inventory of Rare and Endangered Plants of California (eighth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society, Sacramento, CA. Website available (as of 08/2020) at: <http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi>

County of Marin, 2015. *Marin County Climate Action Plan*, July.

https://www.marincounty.org/-/media/files/departments/cd/planning/sustainability/climate-and-adaptation/full-cap-2015/marincapupdate_final_20150731.pdf?la=en

DiTomaso, J. M.; G. B. Kyser, S.R Oneto, R.G. Wilson; S.B. Orloff; L.W. Anderson, S.D. Wright, J.A. Roncoroni, T.L. Miller, T.S. Prather, C. Ransom, K.G. Beck, C. Duncan, K.A. Wilson, J.J. Mann. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544 pp.

Dow AgroSciences. 2017. "Specimen Label of Milestone Specialty Herbicide".

Dow AgroSciences. 2009. "Specimen Label of Milestone VM Specialty Herbicide".

Durkin, Patrick C. 2007. *Aminopyralid- Human Health and Ecological Risk Assessment* (Report No. SERA TR-052-04-04a). U.S. Department of Agriculture /Forest Service and National Park Service. Available online (as of 08/2020) at:
https://www.fs.fed.us/foresthealth/pesticide/pdfs/062807_Aminopyralid.pdf

Environmental Protection Agency. 2005. *Pesticide Fact Sheet*.

Available online (as of 08/2020) at:

<https://nepis.epa.gov/Exe/ZyNET.exe/P100BIFF.txt?ZyActionD=ZyDocument&Client=EP A&Index=2000%20Thru%202005&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C00THRU05%5CTXT%5C00000028%5CP100BIFF.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=20&ZyEntry=1&slide>

Federal Emergency Management Agency (FEMA). *Flood Hazard Map Panel No.*

06085C0382H, effective on 05/18/2009, accessed July 10, 2019.

Office of Environmental Health Hazard Assessment (OEHHA). *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*. February 2015.

<https://oehha.ca.gov/media/downloads/crn/2015guidancemanual.pdf>

PRISM Climate Group (PRISM). 2020. GIS isobar data developed by PRISM. Oregon State University, Corvallis. Available online (as of 08/2020) at:

<http://www.prism.oregonstate.edu/explorer/>

San Francisco Estuary Institute (SFEI). 2015. Bay Area Aquatic Resources (BAARI) GIS database stream network data.

US Army Corps of Engineers (ACOE). 2008. *Interim regional supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*. ERDC/EL TR-06-16.

U.S. Department of Agriculture Soil Conservation Service (USDA). 2020. Web Soil Survey Website. Available online (as of 08/2020) at:
<http://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx>

U.S. Geological Survey (USGS). 1997. Ten-meter Digital Elevation Model (DEM)

VI. REPORT PREPARERS

Marin County Office of Education

Patrick McLaughlin, Ranch Manager/ Outdoor School Principal
Kris Jacobsen, Ranch Maintenance Supervisor
Luke McCann, Regulatory Consultant

Grassetti Environmental Consulting

Richard Grassetti, Principal
Richard Denney, Graphics

The RCH Group (Air Quality, GHG, Noise, and Health/Safety)

Paul Miller, Principal
Luis Rosa, Technical Specialist

Vollmar Natural Lands Consulting (Biological Resources)

Jake Schweitzer, Biologist

APPENDIX A: AIR QUALITY APPENDIX

Appendix A

Supporting Air Quality, GHG Emissions and Energy Calculations

Marin Distaff Thistle Criteria Pollutant, GHG Emissions and Energy Calculations

Manual Application (14 days)	Quantity	Days in Use	Hours Per Day	Horsepower	Load Factor	VOC	Emission Factors (g-hp/hr)					Emissions Total Annual (pounds)								
							Nox	CO	PM10	PM2.5	CO2	VOC	Nox	CO	PM10	PM2.5	CO2			
ATV (2013 Yamaha Rhino 700)		5	14	10	40	0.57	3.85	8.43	107.2	0.06	0.055	456	135.1812	295.9942	3764.006	2.10672	1.93116	16011.072		
Source: EPA, Exhaust Emission Factors for Nonroad Engine Modeling: Spark-Ignition, Report NR-010e, EPA-420-R-05-019, Table 6, page 8, December 2005																				
Source: OFFROAD2007 uses a PM2.5/PM10 ratio = 0.92																				

Aerial Application (1 day)	Quantity	Days in Use	Hours Per Day	Fuel Use per hour (lbs)	Aviation Fuel (lbs/gal)	VOC	Nox	CO	PM10	PM2.5	CO2	VOC	Nox	CO	PM10	PM2.5	CO2	
Bell 407 (650 HP/ 1 engine)	1	1	10	328.545	6		1.4553	2.4255	1.8081	0.07056	0.064915	1,003.35	14.553	24.255	18.081	0.7056	0.649152	10033.5
Source: Guidance on the Determination of Helicopter Emissions, Edition 2, December 2015.																		
Source: USEPA, Emissions Factors for GHG Inventories, April 2014.																		
Emission Factors (g-mile)													Emissions Total Annual (pounds)					

Worker Trips (15 days)	Quantity	Days in Use	Trips per Day	Miles per Trip	VOC	Nox	CO	PM10	PM2.5	CO2	VOC	Nox	CO	PM10	PM2.5	CO2	
Light Duty Automobiles	18	15	2	20		0.034304	0.153116	5.469712	0.003824	0.003516	707.3955	0.815063	3.638036	129.9604	0.09085824	0.08354016	16807.71708
Source: EMFAC2017 Web Database																	

Average Daily Emissions	VOC	Nox	CO	PM10	PM2.5
Pounds per Day	10.03661754	21.59247974	260.8031838	0.193545216	0.177590144

Annual GHG Emissions	ATVs	Fuel Usage	Motor Vehicles	Helicopter
Metric Tons of CO2e	Helicopter	ATVs		
	Workers			
		7.262494171	7.623846006	54.7575
		4.551115332	8.91	gal per hour
		7.623846006	kg/CO2/gal	10 hours
		19.43745551	715.5166671	547.575
			gals Diesel	gals aviation fuel



Energy Information Administration Voluntary Reporting of Greenhouse Gases Program, [https://www.eia.gov/environment/pdfpages/0608s\(2009\)index.php](https://www.eia.gov/environment/pdfpages/0608s(2009)index.php)

APPENDIX B: BOTANICAL RESOURCES ASSESSMENT



BAY AREA OFFICE
1720 Solano Avenue
Berkeley, CA 94707
Phone: (510) 559-9603
Fax: (510) 559-9605
www.vollmarconsulting.com

2021 BOTANICAL RESOURCES SURVEY REPORT

WALKER CREEK RANCH DISTAFF THISTLE CONTROL PROJECT



Marin County, California

Prepared for:
Marin County Office of Education
1111 Las Gallinas Avenue,
San Rafael, CA 94903
Contact: Patrick McLaughlin
415/491-6601

Prepared by:
Vollmar Natural Lands Consulting
1720 Solano Avenue
Berkeley, CA 94707
Contact: Jake Schweitzer
510/559-9603

October 2021

TABLE OF CONTENTS

1.0 INTRODUCTION	2
2.0 TARGETED BOTANICAL RESOURCES	5
3.0 METHODS	5
3.1 PRELIMINARY REVIEW AND FIELD PREPARATION.....	5
3.2 FIELD SURVEYS	5
3.3 REMOTE MAPPING	7
4.0 ENVIRONMENTAL SETTING.....	8
4.1 REGIONAL SETTING.....	8
4.2 CLIMATE	8
4.3 GEOLOGY AND SOILS	9
5.0 RESULTS.....	10
5.1 SUMMARY OF KEY FINDINGS	10
5.2 PLANT COMMUNITIES	13
5.3 SPECIAL-STATUS PLANTS	16
6.0 RECOMMENDATIONS	18
7.0 REFERENCES.....	20

FIGURES AND TABLES:

Figure 1. Regional Vicinity Map	3
Figure 2. USGS Topographic Map.....	4
Figure 3. Regional Special-Status Plants	6
Figure 4. Distribution of Woolly Distaff Thistle.....	11
Figure 5. Plant Communities Map	12

Table 1. Characteristics of Soil Units Mapped within the Study Area	8
--	----------

APPENDICES:

Appendix A. Representative Photographs of the Study Area	
Appendix B. List of Vascular Special-status Plant Taxa Documented in the Vicinity of the Study Area	
Appendix C. Mapped Soil Units and Parent Materials	
Appendix D. Special-Status Vascular Plant Taxa Documented in the Vicinity of the Study Area	

1.0 INTRODUCTION

This document presents the methods and results for botanical resource surveys conducted in support of the Walker Creek Ranch Distaff Thistle Control Project (project). The project study area encompasses 402 acres of Walker Creek Ranch, which is located in northern central Marin County, California (**Figure 1**). The botanical resource surveys were conducted by botanists from Vollmar Natural Lands Consulting (VNLC) on behalf of the Marin County Office of Education, which owns the approximately 1,700-acre property. The surveys were conducted for the purpose of compiling botanical information for areas that will be treated with herbicides to reduce the cover and spread of woolly distaff thistle (distaff) (*Carthamus lanatus*), a highly invasive weed that has spread throughout grassland habitats on the property. The surveys included focused surveys for special-status plant species as well as for sensitive habitats. The surveys were scheduled to coincide with the early spring, peak spring, and summer botanical seasons for the region, during the blooming periods of special-status plants with potential to occur in the study area. One special-status plant species was observed within the study area, along with sensitive wetland and native grassland habitats.

The 402-acre study area consists of nine separate areas where distaff has been documented. These areas would be treated with Milestone herbicide, mixed with an equal amount of Hasten EA (a modified vegetable oil concentrate used as a surfactant to maximize effective treatment) and a small amount of Crosshair (also a modified vegetable oil concentrate used as a spray deposition and drift management agent). The solution would be applied by helicopter over the largest infestations, and by side-by-side vehicle and manual treatment within the more localized sensitive habitats. Milestone contains the active ingredient aminopyralid which is a Group 4 growth regulator herbicide that provides an effective tool for managing difficult-to-control invasive weeds using reduced application rates. The herbicide is known to be effective for invasive weed control while causing little-to-no damage to grasses and most forb species, allowing native habitats to be restored. Milestone is not known to adversely impact animals at normal usage, but could cause harm to non-target plant species.

The study area is located in a rural region of Marin County, approximately three air miles from the unincorporated community of Marshall, CA. The site is mapped on the Point Reyes Northeast U.S. Geological Survey 7½ minute topographic quadrangle. The majority of the study area is mapped within the SoulaJule (Vasquez) land grant, and the remainder is mapped on the following public land survey designations: Township 04N, Range 09W, Sections 13, 14, 23, 24, and 26 (**Figure 2**). Walker Creek Ranch is accessed from State Highway 1 by heading east from Marshall on Marshall Petaluma Road, continuing six miles, and turning left at the gated property access road. From Highway 101, the property is accessed by exiting on Delong Avenue, continuing west on Novato Boulevard, then turning right (north) on Pt. Reyes Petaluma Road, then turning left (west) on Hicks Valley Road, then turning south on Marshall Petaluma Road, and finally turning right at the same gated property access road noted above.

The study area consists primarily of open grassland habitats, which are most susceptible to colonization by distaff. The grasslands are managed by means of cattle grazing. The study area also encompasses localized areas of what may be broadly defined as coastal scrub and oak woodland, which border the grasslands, as well as micro-habitats in the form of small spring and seep wetlands and relatively large rock outcrops that are scattered throughout the property. Aside



FIGURE 1
Regional Vicinity Map
 Walker Creek Ranch
 Distaff Thistle Control Project
 Marin County, California

- River or Stream
- Highway
- Major Road
- County Boundary
- Study Area (Distaff Treatment Area) (402 ac.)
- Walker Creek Ranch Property Boundary
- Water Body
- Urbanized Area



1:316,800
 (1 inch = 5 miles, at letter layout)

5 2.5 0 5 Km

5 2.5 0 5 Miles

Data Sources: Sonoma County, 2013 | TIGER, 2012
 USGS, Various | GAP, 1998 | DWR, 2001
 GIS/Cartography by: Jake Schweitzer, Oct. 2021
 Map File: Vicinity_448_A-P_2021-1005.mxd



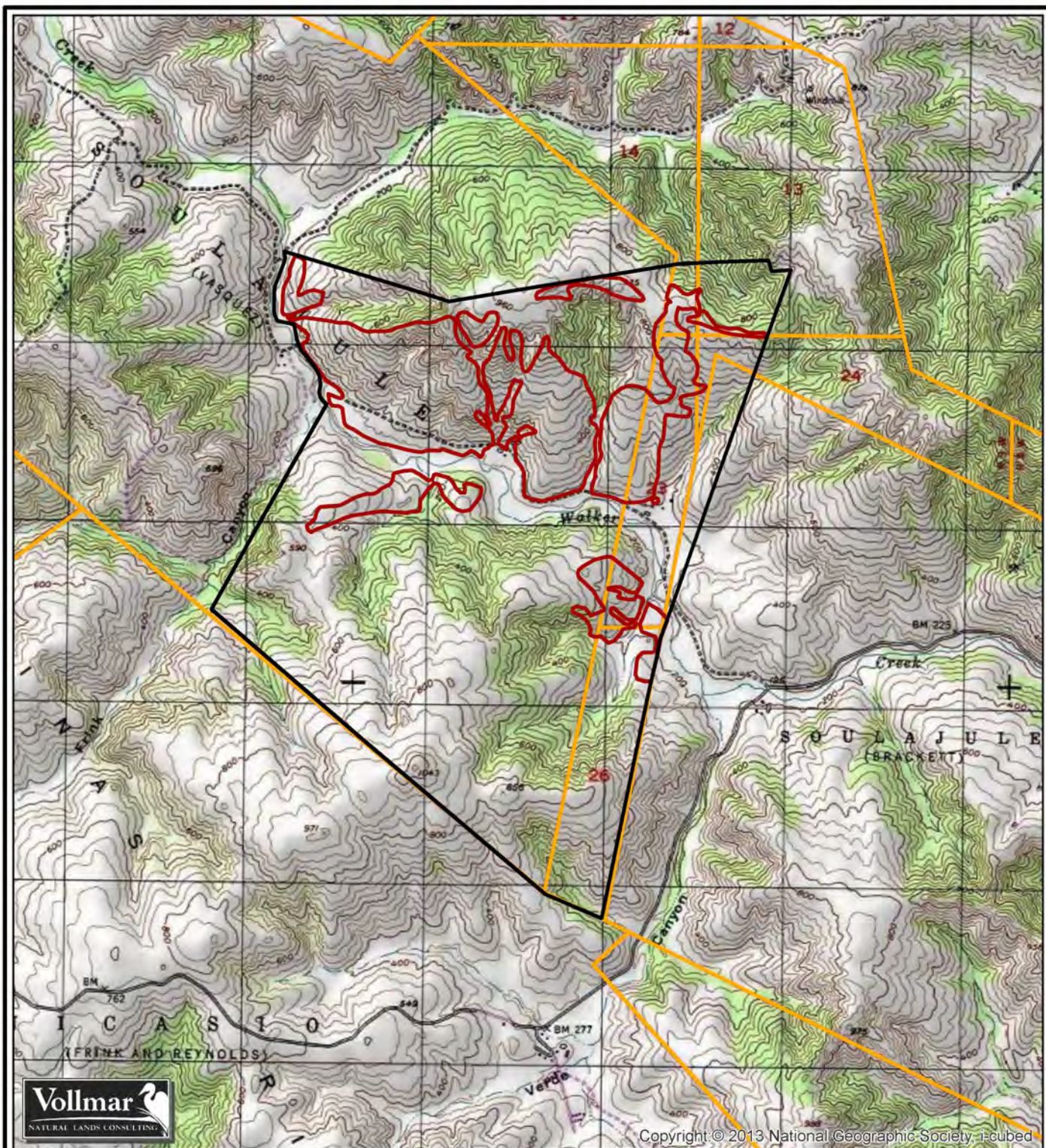


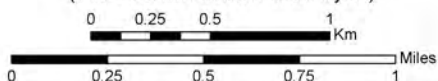
FIGURE 2
USGS Topographic Map
Walker Creek Ranch
Distaff Thistle Control Project
Marin County, California

Legend

- Study Area (Distaff Treatment Area)(402 ac.)
- Walker Creek Ranch Property Boundary



1:31,680
(1 in. = 0.5 mile at letter-sized layout)



Data Sources: Sonoma County, 2013 | TIGER, 2012
USGS, Various | GAP, 1998 | DWR, 2001
GIS/Cartography by: Jake Schweitzer, Oct. 2021
Map File: DRG_448_A-P_2021-1011.mxd



from serving as a working cattle ranch, the property is managed as an open space preserve that provides outdoor education for children within Marin County's public school system, as well as other community events. Infrastructure within the property includes dormitories, classrooms, and recreational facilities.

2.0 TARGETED BOTANICAL RESOURCES

For the purposes of this report, special-status plants include federal and/or California state listed species and species of concern as well as species designated as California Rare Plant Rank (CRPR) taxa by the California Native Plant Society (CNPS), including taxa of all ranks.

Sensitive habitats were also targeted as part of the botanical study. Sensitive plant communities include those designated as such by the California Department of Fish and Wildlife (CDFW), either in the List of California Sensitive Natural Communities (2018) or as alliances classified in the Manual of California Vegetation (MCV) (Sawyer et al. 2009). Alliances designated as global or state rank ("G" or "S", respectively) 1, 2, or 3 in the MCV are considered "rare or threatened" at the global and/or state level, and are therefore considered sensitive. In addition, wetland and riparian habitats are considered sensitive and are regulated by environmental regulatory agencies.

3.0 METHODS

3.1 Preliminary Review and Field Preparation

A map and a list of special-status plants documented in the vicinity of the study area were compiled prior to conducting field surveys, in order to identify special-status taxa with potential to occur on the site. The map, presented as **Figure 3** below, was compiled from the most recent spatial data within the California Natural Diversity Database (CNDDB), as available from the CDFW (2021). The list was compiled from a quadrangle search using the CNPS's online "Inventory of Rare and Endangered Plants" (CNPS 2021). Specifically, the search centered on the Point Reyes Northeast quadrangle and included the Petaluma, Inverness, and San Geronimo quadrangles. This yielded a total of 71 special-status plant taxa that have been documented in the vicinity of the study area. The list provides information pertaining to the special-status plants, including taxonomic status, preferred habitat, elevation range, blooming period, and a determination of the presence of suitable habitat for each plant in the study area. This information guided the development of the field survey schedule and strategies for those special-status plants with potential to occur in the study area. The list of special-status plant taxa documented in the vicinity is available as **Appendix B**. The surveys were scheduled to coincide with the blooming periods of all special-status plants for which potentially suitable habitats occur in the study area. The blooming status for some special-status plant species was confirmed by other botanical surveys conducted in the greater vicinity, and also by communication with other botanists in the region. A particular effort was made to document the presence and blooming status of annual species with potential to be adversely impacted by the Milestone herbicide.

3.2 Field Surveys

The botanical field surveys were conducted in the study area by Jake Schweitzer, Senior Botanist with VNLC. Mr. Schweitzer was assisted by Ivy Poisson and Rachel Miller, both Staff Botanists with VNLC. The 2021 surveys were conducted on the following dates: March 16 and 17, April 21 and 22, and July 17 and 18. The field surveys conformed to the CNPS 'Intuitive Controlled'

method, whereby the entire study area was investigated, though areas with higher potential to support special-status or otherwise unique plants were surveyed with greater intensity (e.g., rock outcrops, wetlands, areas of shallow soils, and transitional habitats). All plant taxa present were recorded according to the lowest taxonomic level (i.e., species, subspecies, or variety as applicable) and dominant species and general habitat conditions were noted throughout the study area. The entire study area was traversed on foot, and global positioning systems (GPS) points were recorded at regular intervals in order to document the generally observed density of distaff.

Project maps and GPS background files depicting the project boundaries, soil unit boundaries, and other features were used to navigate throughout the study area. Field manuals, particularly the “Jepson Manual” (Baldwin et al. 2012), “Marin Flora” (Howell et. al. 2007), and “Plants of the San Francisco Bay Region” (Beidleman and Kozloff 2014) were used to confirm the taxonomy of some plant taxa as necessary.

Within each habitat type, the most prevalent plant species from each stratum (tree, shrub/sapling/vine, and herb) were recorded in order of dominance into professional GPS units (Trimble GeoXH 6000 and 7x units) and iPads, with an effort to classify the habitat types according to the CNPS classification system (2001). The general locations and extents of sensitive habitats were also recorded as GPS points. The locations and population ranges of invasive plants other than distaff were also recorded on an opportunistic basis, in order to identify areas of potential management concerns. The documentation of invasive plants focused on highly invasive plant species and species with potential to cause significant detrimental impacts to natural habitats within the study area. Representative photographs were taken of onsite plant communities and general habitat conditions (**Appendix A**).

3.3 Remote Mapping

Subsequent to completing the field surveys, habitat GPS data mapped within the study area (as described above) were overlaid onto aerial imagery and topographic data using ArcGIS software. The GPS data and digital photos recorded during the field surveys were used to accurately classify habitat types and boundaries with respect to their signatures on the aerial imagery, as well as to map the extent and density of distaff. Two sets of aerial photos from two different timeframes were used in the analysis, including Digital Globe 0.5-meter resolution color photography from November of 2020, and National Aerial Imagery Program (NAIP) 0.6-meter resolution true color and near color infrared (CIR) photography from June of 2018. Each photo set provided distinct advantages. Since the Digital Globe imagery is provided via ArcGIS software, it was the primary imagery used to digitize habitat polygons. The NAIP imagery allows for analysis of vegetation cover using the infrared spectral value. Using the CIR imagery, the cover and type of vegetation is easier to discern. A minimum mapping unit (MMU) of approximately 0.1 acre was employed in the plant community mapping, based on the confidence level of field data as well as the quality of the available aerial imagery for the study area. The MMU was reduced for sensitive habitats, including seeps, springs, and ponds. While the locations of native grasslands were recorded, the habitat boundaries were not recorded, neither in the field nor remotely, because native grasses would not be impacted by the Milestone herbicide. The density of distaff was mapped using points recorded in the field, which had been coded as distaff occurring as the following cover densities “High,” “Medium,” “Low,” and “Very Low to None.” The study area was divided into 1-acre grid cells, and each grid cell was either coded

according to any GPS points that were recorded within the cell, or based on extrapolation or interpolation from the nearest GPS points. Approximately 600 GPS points were recorded to document the cover of distaff throughout the study area.

In order to ensure consistency in the use of aerial imagery and digitized lines for the plant community mapping, the boundaries were digitized at a scale of 1:1,200. As each newly identified feature was digitized, the polygon was coded according to habitat type. As noted above, the habitat type coding corresponds to the CNPS habitat type classification (2001).

4.0 Environmental Setting

4.1 Regional Setting

The study area is in northern central Marin County, within the outer Coast Ranges geomorphic province of northern California. The site is approximately six air miles due east of the Pacific Ocean coastline at the Point Reyes National Seashore, and as such is subject to coastal weather patterns and geologic processes. In turn, the plant communities are reflective of the maritime weather and coastal sediments.

The study area is incised by a network of seasonal and ephemeral drainages that convey water to Walker Creek, which in turn discharges into Tomales Bay (**Figure 1**). Walker Creek is a perennial stream (SFEI 2015) that flows roughly east to west through the center of Walker Creek Ranch. Elevations within the site range from approximately 128 to 974 feet (128 to 297 meters) above sea level (USGS 1997), with the lowest elevation occurring along the property's western edge at Walker Creek, and the highest elevations occurring along the hill tops at the northern edges of the property. Though the study area along the valley bottom is nearly flat, the adjacent hillslopes are generally steep, in some areas approaching 129 percent slope (51 degrees) (USGS 1997). The mean slope for the entire study area is 32 percent (17 degrees). Small to large rock outcrops are present throughout the study area, and soils are derived from sandstone, shale, granite, or volcanic rocks.

4.2 Climate

The climate of the study area and surrounding vicinity is classified as "Mediterranean," which is characterized by cool, wet winters and warm, dry summers as well as high inter- and intra-annual variability in precipitation. Approximately 98 percent of precipitation measured in the region occurs during the "wet season," from October to May. The area receives an average of 41.5 inches of precipitation on an annual basis, and features an average temperature of 57 degrees Fahrenheit (PRISM 2021). However, because the study area is significantly influenced by coastal maritime weather patterns, considerable moisture is available as fog through the "dry" summer season. In turn, the moisture serves to moderate temperatures, maintaining a relatively cool summer temperature with minimal fluctuations. The highest average monthly temperature is in July and August, with an average of 65.5 degrees, and the coldest month is January, with an average of 47.7 degrees (PRISM 2021).

The study area experienced lower than average rainfall during the 2020-2021 wet season, with precipitation amounting to 13.6 inches compared to a seasonal average of 40.7 inches—33 percent of normal. Moreover, every month of the wet season received below-average

precipitation, with October and May being especially dry. However, at least two to three inches of precipitation occurred during the months of December through March, which is the most important timeframe for the germination and flowering of annual plant species. Additionally, the precipitation occurred at semi-regular intervals, as “shots” of rain. Presumably as a result of this regular interval, the flowering of plants appeared to be fairly typical, though many species did appear to senesce earlier than normal as a result of dry conditions in April and May. With respect to temperature, the wet season average of 53.3 degrees slightly lower than normal, amounting to 99.5 percent of the 53.5 average. Despite the drought, cloud cover appeared to be higher than average, from an anecdotal perspective.

4.3 Geology and Soils

Geology

A single geologic complex—the Franciscan Complex—is mapped over the entire study area (Blake et al. 2000). Rocks from the Franciscan Complex are primarily the result of sediments from submarine fans and igneous (volcanic) rocks associated with oceanic crust. The rocks were amalgamated in transit to a subduction zone (where the Pacific Plate was forced under the North American Plate upon contact), where the sediments were ground up and often metamorphosed at great depths during the Mesozoic era (Sloan 2006). The Complex is dominated by sandstone and shale rocks (often in the form of the grayish greywacke sandstone), as well as sporadic outcrops of radiolarian chert as well as igneous, limestone, and intrusive ophiolitic rocks. While rocks generally consist of marine sediments, most of the sediments are originally derived from materials deposited in marine fans resulting from turbidity currents (the marine equivalent of landslides, possibly caused by earthquakes) from the North American Plate’s edge (Sloan 2006). About 80 percent of the Complex consists of greywacke sandstone and shale, mostly from turbidity currents. Thus, though Franciscan rocks are highly deformed from being thrust deep into the subduction zone, occasionally forming metamorphic rocks such as schist and gneiss, a majority of Franciscan Complex rocks are sedimentary and consist primarily of continental minerals and elements. All of the exposed rock within the study area are either sedimentary—including highly indurated chert—or volcanic.

Soil Units

Excluding units that make up less than one percent of the study area, as well as subunits based solely on slope, the study area is comprised of nine soil units. These include the Blucher-Cole complex, Bonnydoon gravelly loam, Los Osos-Bonnydoon complex, Olompali loam, Saurin-Bonnydoon complex, Yorkville clay loam, and Yorkville-rock outcrop complex (USDA 2021). These units are mapped in **Appendix C** along with the parent material from which they are derived. **Table 1** below presents characteristics of the soil units that are significant for botanical resources. As expected given that only one primary geologic complex occurs in the area, nearly all of the soil units are derived from similar materials, namely sedimentary sandstone and/or shale. The one exception is Olompali loam, which is derived from igneous and metamorphic rocks as well as sedimentary rocks. Moreover, all of the soils feature textures of loam or modified loam (USDA 2021). Localized areas of higher clay or sand were noted in the vicinity of wetlands and around rock outcrops, respectively. All of the units are also rated as well drained or moderately well drained, with the exception of the Blucher-Cole complex and Olompali loam, which are rated as somewhat poorly drained. Many of the wetlands documented within the study

area are within these latter two units. Finally, all of the soils feature a pH value that indicates they are slightly acidic to neutral, ranging from 6.1 to 7.0.

TABLE 1. Characteristics of Soil Units Mapped within the Study Area

Soil Unit Name and Percent of Study Area ¹	Parent Material	Surface Texture ²	pH ²	Organic Matter ²
Blucher-Cole complex (1.1%)	Alluvium derived from sedimentary rock	Silt loam	7.0	1.68% ³
Bonnydoon gravelly loam (10.9%)	Marine deposits	Gravelly loam	6.5	2.00%
Los Osos-Bonnydoon complex (36.9%)	Alluvium derived from sedimentary rock	Loam	5.6	2.42%, 2.11%
Olompali loam (3.2%)	Marine deposits	Loam	6.2	1.40%
Saurin-Bonnydoon complex (22.4%)	Alluvium	Clay loam	6.1	1.22%
Yorkville clay loam (24.1%)	Shale	Clay loam	7.0, 7.2	1.18%, 1.03%

Source: U.S. Department of Agriculture Natural Resources Conservation Service, SoilWeb website, 2019. Excludes slope descriptors.

1. The remaining 1.48% of the study area consists of four soil units that are all very localized.

2. Dominant condition. Values for pH and organic matter correspond to the top 24 inches.

3. Depending upon erosive value of unit.

4. See also **Appendix C** (map figure)

5.0 RESULTS

5.1 Summary of Key Findings

A total of 290 plant taxa were identified within the 402-acre study area during the 2021 field surveys, one of which is designated as special-status (see **Section 5.3** and **Appendix D**). Of all plant taxa identified within the study area, 194 (67%) are native to California, while 96 (33%) are introduced and naturalized in the state. Among the introduced plant species, 39 (14% of all taxa) are considered invasive by the California Invasive Plant Council (Cal-IPC 2021), including five species that are rated as “High,” 20 that are rated as “Moderate,” and 15 that are rated as “Limited.” The primary target species for this project, woolly distaff, is rated as “High” by the Cal-IPC, despite the fact that its range in California is fairly limited. This is because in western Marin County, as well as in western Sonoma, San Mateo, and San Luis Obispo Counties, it is a significant weed that continues to expand, and which causes serious problems for rangeland management. It out-competes native plants and its relatively tall stature, combined with its very sharp spines, make it highly disruptive for livestock grazing. It causes injury to mouths and feet of livestock (Cal-IPC 2021). As shown on **Figure 4** below, the cover of distaff varies throughout the study area—the project goal is to eradicate or at least greatly reduce the cover of the species wherever it has been documented, including small and incipient stands. It is worth noting that the other three species rated as High within the study area are quite localized. In general, the distaff cover is reduced by the following variables: very steep slopes (e.g., those above approximately 30 percent), shallow soils (which often are the result of slope, and including rock outcrops and surrounding areas), areas of significant shade, areas of very moist or saturated soils, areas that are under-grazed (because grasses are more dominant).

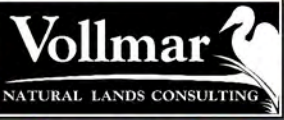
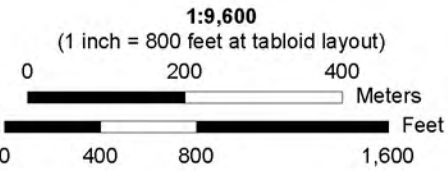
The other four species rated as High within the study area are quite localized. These include yellow star-thistle (*Centaurea solstitialis*), fennel (*Foeniculum vulgare*), Himalayan blackberry (*Rubus armeniacus*), and medusahead (*Elymus caput-medusae*). French broom (*Genista monspessulana*), which is also a High species, was not observed in the study area, but two stands were mapped immediately adjacent to the site. These species as well as several Cal-IPC “Moderate” species are mapped on **Figure 4** and also **Figure 5**.

FIGURE 4
Distribution of Woolly Distaff Thistle

Walker Creek Ranch
Distaff Thistle Control Project
Marin County, California

- Legend**
- San Francisco Gum Plant Occurrence
 - Native Grassland*
 - Large Rock Outcrop (≥50x50')
 - Walker Creek
 - Drainage with Wetlands Present
 - Meadow and Seep
 - Pond
 - 100-Foot Buffer Around Sensitive Botanical Resource
 - Walker Creek Ranch Property Boundary
 - Study Area (Distaff Treatment Area)

*Primarily purple needlegrass with bearded wild rye and other native species as associates.



- Invasive Weed (other than distaff)*
 - Density of Woolly Distaff Thistle****
 - High
 - Medium
 - Low
 - Very Low to None
- * Including the most noxious species and incipient stands.
Number in label is population range
**Extrapolated/interpolated along 1-acre grid

Data Sources: Vollmar Natural Lands Consulting, 2021
Marin County Schools, 2019 | Marin County, 2018
USDA SSURGO Data | ESRI Aerial Imagery, 2019
GIS/Cartography by: Jake Schweitzer, Oct. 2021
Map File: Distaff_448_B-L_2021-1011.mxd

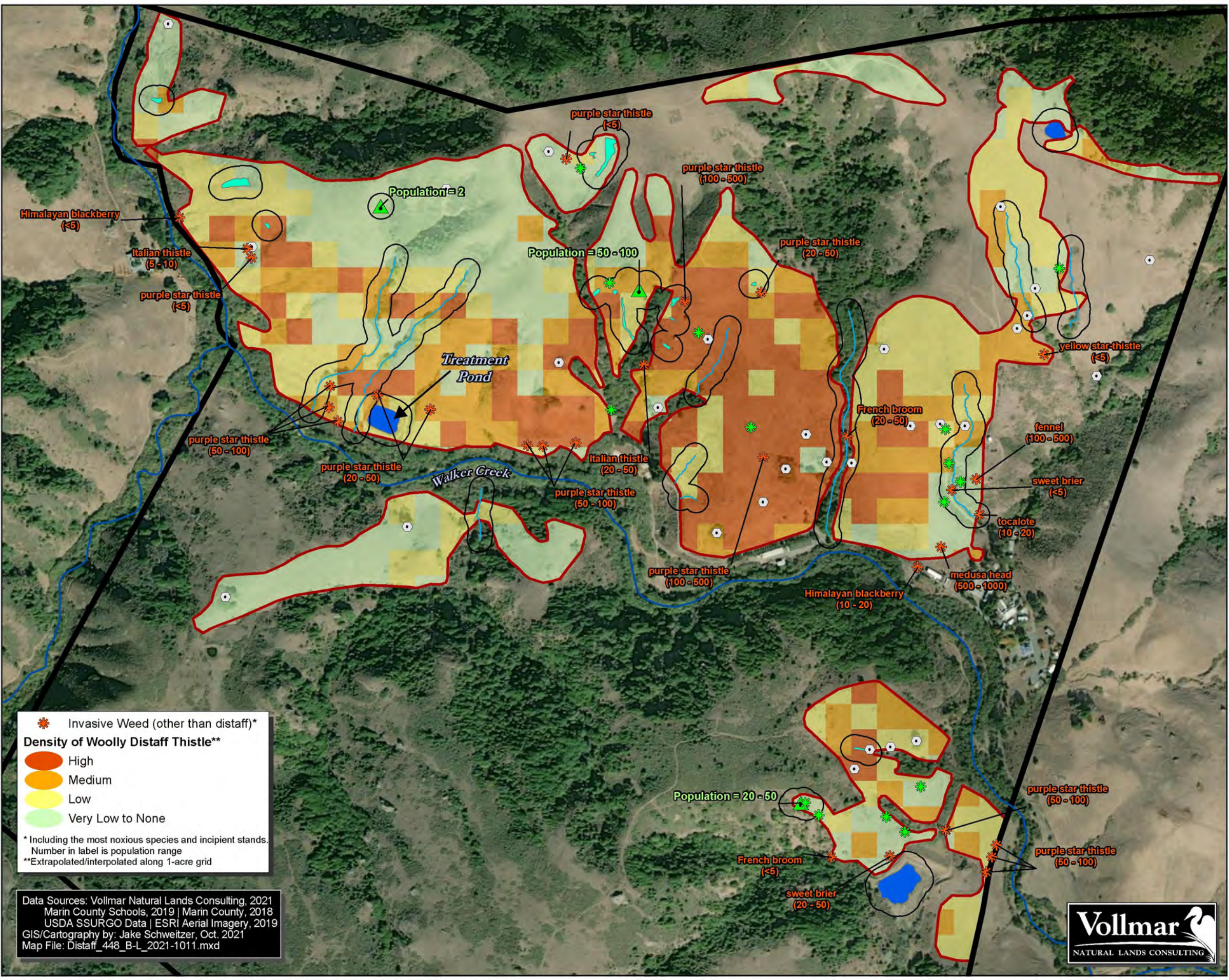
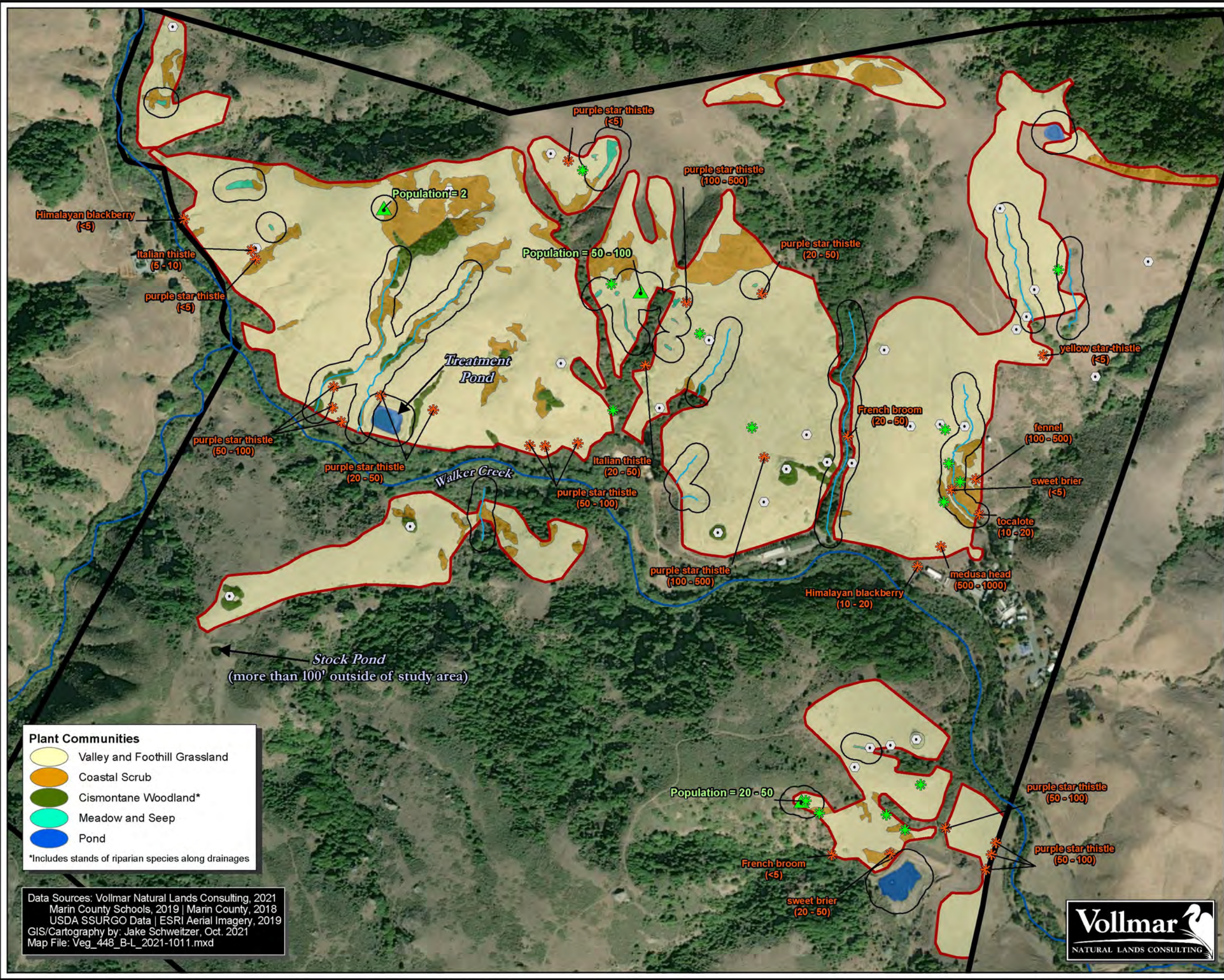


FIGURE 5
Plant Communities
 Walker Creek Ranch
 Distaff Thistle Control Project
 Marin County, California

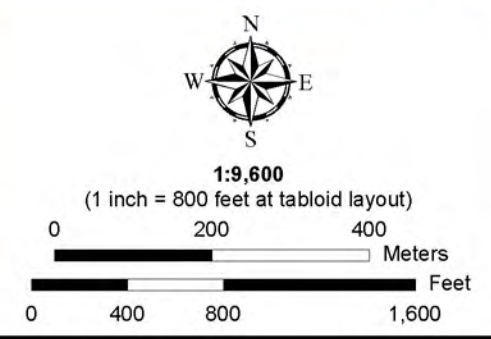


- Legend**
- ▲ San Francisco Gum Plant Occurrence
 - ★ Invasive Weed (other than distaff)
 - ★ Native Grassland**
 - Large Rock Outcrop (≥50x50')
 - Walker Creek
 - Drainage with Wetlands Present
 - 100-Foot Buffer Around Sensitive Botanical Resource
 - Walker Creek Ranch Property Boundary
 - Study Area (Distaff Treatment Area)
- * Including the most noxious species and incipient stands.
 Number in label is population range
- **Primarily purple needlegrass with bearded wild rye and other native species as associates.



- Plant Communities**
- Valley and Foothill Grassland
 - Coastal Scrub
 - Cismontane Woodland*
 - Meadow and Seep
 - Pond
- *Includes stands of riparian species along drainages

Data Sources: Vollmar Natural Lands Consulting, 2021
 Marin County Schools, 2019 | Marin County, 2018
 USDA SSURGO Data | ESRI Aerial Imagery, 2019
 GIS/Cartography by: Jake Schweitzer, Oct. 2021
 Map File: Veg_448_B-L_2021-1011.mxd



The total number of plant taxa is relatively high for the size of the study area and limited number of habitat types. However, a large percentage of the taxa were identified within habitats and microhabitats that account for a small portion of the study area, including the rock outcrops, wetlands, and stands of woodland and shrubland habitats.

Plant communities documented within the study area include the following, in order of extent: Valley and Foothill Grassland, Coastal Scrub, Cismontane Woodland (including more limited riparian woodland), and Meadow and Seep (freshwater wetlands) (see **Figure 5**). The Freshwater Wetland habitat may be considered a micro-habitat within the larger grasslands. Also within the grasslands are rock outcrops, some of which are quite large—several are 100 feet or more in diameter. These were not mapped as distinct plant communities because they are nevertheless much smaller than the MMU and do not represent a sensitive plant community type.

Representative photographs of each habitat are included in **Appendix A**. **Appendix D** presents a list of all vascular plant taxa identified within the study area during the 2021 field surveys, and provides information pertaining to each plant’s status with respect to origin, Cal-IPC invasive rank, and other taxonomic information.

5.2 Plant Communities

The study area is within the outer Coast Range Province of California and is mapped within the Jepson Manual’s San Francisco Bay Area (SnFrB) floristic Subregion (Baldwin et al. 2012). The SnFrB Subregion is defined as encompassing a notable diversity of vegetation types, from very wet redwood forest to dry oak/pine woodland and chaparral. Being close to the coast, the study area is on the mesic (i.e., moist) side of this diversity in habitats. Dominant habitats on the site may be classified using the California Native Plant Society’s system (CNPS 2020) as Valley and Foothill Grassland as well as Coastal Scrub. In addition, there are localized areas of Cismontane Woodland along with Meadow and Seep. Man-made ponds form a much more limited but biologically important habitat type. These habitats are described in detail below.

Valley and Foothill Grassland

Covering nearly 88 percent of the study area, grasslands are by far the most widespread plant community. This is not surprising given that distaff thrives most in this community. The habitat is most prevalent along ridge tops and south-facing hillslopes, where deeper soils receive maximal solar radiation. A majority of the onsite grasslands are typical of those found throughout Mediterranean California, with a dominance of introduced grasses and forbs but with localized stands of native species. The entire property is grazed by cattle, though grazing is concentrated within the grasslands. Grazing generally has the beneficial effect of reducing the competitive advantage of the introduced grasses, but may also facilitate the encroachment of the distaff (which also benefits from reduced competition from grasses). The most common grass species observed during the 2021 botanical surveys include wild oat (*Avena barbata*), soft chess (*Bromus hordeaceus*), and Italian rye grass (*Festuca perennis*). All of these are introduced species and are interspersed with non-native forbs such as hairy cat’s ear (*Hypochaeris radicata*), Mediterranean lineseed (*Bellardia trixago*), English plantain (*Plantago lanceolata*), and a variety of introduced and native clovers (*Trifolium* spp.). As the primary target for habitat management, distaff is also quite widespread, forming small incipient stands to extensive multi-acre stands

(**Figure 4**). The density of distaff varies substantially, from very sparse (primarily along ridges in the southern portion of the study area) to very dense (primarily in northern-central portions of the study area).

Native wildflowers were observed scattered throughout the grasslands, including hayfield tarweed (*Hemizonia congesta* ssp. *lutescens*), soap plant (*Chlorogalum pomeridianum*), blue eyed grass (*Sisyrinchium bellum*), and lupine species (*Lupinus* spp.). Along the lower and more northern and eastern slopes there are smaller areas of grassland that feature a slightly different assemblage of species. Many dominant grasses and forbs in these areas are more indicative of lower solar radiation and/or finer textured moist soils. Plant species noted in this more mesic habitat include Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), English plantain, spreading rush (*Juncus patens*), western rush (*J. occidentalis*), Douglas' iris (*Iris douglasiana*), and California oatgrass (*Danthonia californica*). The wettest of these micro-habitats feature saturated soils that support Meadow and Seep habitat, a more distinct habitat that is described below. Some of these species are constituents of what is often classified as Coastal Prairie habitat, a coastal herbaceous plant community that typically has a high component of native, moisture-loving plant species. In fact, there are a few localized areas of “classic” Coastal Prairie, but they were generally found to be below the MMU. Distaff infestations were observed to be generally more limited in such mesic habitats.

Another microhabitat within the onsite grasslands is formed around large rock outcrops, which are scattered throughout the study area (**Figure 4** and **Figure 5**). Within the grasslands, these rocky “islands” support a unique assemblage of plants such as poison oak (*Toxicodendron diversilobum*), coast sage (*Artemisia californica*), oceanspray (*Holodiscus discolor*), canyon dudleya (*Dudleya cymosa*), California poppies (*Eschscholzia californica*), and several grass species that do not commonly occur elsewhere. A few of the largest outcrops also support tree species, primarily California bay (*Umbellularia californica*) and, less commonly, coast live oak (*Quercus agrifolia*) and California buckeye (*Aesculus californica*). Distaff is generally sparse or absent on the rock outcrops as it generally prefers deeper soil.

Within the larger Valley and Foothill Grassland are stands of native grass species. Some of these are associated with the localized Coastal Prairie as described above, but there are also larger stands that form a mappable community. These are shown on **Figure 4** and **Figure 5** above as points rather than polygons—as indicated previously, while stands of native grass are considered to form sensitive plant communities, grass species are not susceptible to impacts of the Milestone herbicide. The most common native grasses are purple needle grass (*Stipa pulchra*) and bearded wild rye (*Elymus triticoides*), both of which form “S3” and “G3” sensitive plant communities as recognized in the MCV, as long as they constitute at least 10 percent or 50 percent relative cover among herbs, respectively. This was found to be the case within these representative plant communities observed in the study area. Associated herbs observed growing with these two dominant native grass species include slender wild oat, English plantain, rough cat's ear, and Italian thistle (*Carduus pycnocephalus*). In several areas, distaff was also found to be commonly associated with the native grasses, in part because the grasses are susceptible to over-grazing, but areas with large populations of distaff tend to be avoided by cattle.

Coastal Scrub

Coastal Scrub forms a transitional habitat between Valley and Foothill Grassland and Cismontane Woodland (see below). The areas that the community occupies are less exposed than the grasslands, but more exposed than the woodlands, primarily along steeper north and east-facing slopes and within broad south-facing swales. The total acreage of this community within the study area is approximately 39 acres, amounting to 9.8 percent of the study area. A majority of the Coastal Scrub within the study area is dominated by coyote brush (*Baccharis pilularis*), poison oak, California blackberry, and bush monkeyflower (*Diplacus aurantiacus*). Scattered emergent trees are present in the form of California bay and Coast live oak. A few areas of Coastal Scrub supported a number of additional shrub species that are typically more associated with moister conditions, often along the highest ridge tops (where fog is more prevalent) and within larger and/or more shaded drainages. Examples of such additional species include blueblossom (*Ceanothus thyrsiflorus*), beaked hazelnut (*Corylus cornuta*), upright snowberry (*Symphoricarpos albus*), oceanspray, and twinberry (*Lonicera involucrata*). The understory beneath the shrubs was found to be generally sparse as a result of the generally dense overstory, with a low cover of common cow parsnip (*Heracleum maximum*), lady's tobacco (*Pseudognaphalium californicum*), yerba buena (*Clinopodium douglasii*), common velvetgrass (*Holcus lanatus*), cutleaf geranium (*Geranium dissectum*), and scarlet pimpernel (*Lysimachia arvensis*).

Cismontane Woodland

Accounting for 7.8 acres, or just under two percent of the study area, this habitat type occurs along north and east-facing slopes and valleys in the study area, as well as around the largest rock outcrops. Though it is present within the study area, distaff is generally sparse to absent in the habitat, as it does not occur within more shaded habitats. Cismontane Woodland is a broadly defined plant community that is characterized by a wide variety of broadleaf trees, both deciduous and evergreen. Within the study area the woodlands are primarily composed of evergreen California bay and coast live oak, along with occasional individuals or small stands of the deciduous California buckeye. Along the margins of the seasonal streams that flow down the slopes, there are small stands of riparian tree species, primarily in the form of arroyo willow (*Salix lasiolepis*). The underlying shrub/vine stratum throughout the study area consists of beaked hazelnut, blue elderberry (*Sambucus nigra* ssp. *caerulea*), California blackberry (*Rubus ursinus*), and the ubiquitous poison oak. Common herbaceous understory plants observed include such shade-tolerant species as sword fern (*Polystichum munitum*), wood fern (*Dryopteris arguta*), starry false lily of the valley (*Maianthemum stellatum*), yerba buena, and sweet bedstraw (*Galium triflorum*).

It should be noted that stands of California bay technically form an MCV-designated sensitive plant community (S3 and G4), and this species is the most common tree within and surrounding the study area. However, this habitat is very widespread in Marin County as well as in many counties in the Coastal Ranges. According to Dr. Todd Keeler-Wolf (pers. comm.), this species “is likely more common than collected data suggest, and may not form a sensitive plant community.” For the purposes of this analysis in this report, stands of California bay are not recognized as a sensitive plant community.

Meadow and Seep

Scattered throughout the grasslands are wetlands that support a notable diversity of plant species which thrive in damp soils and sunny conditions. These habitats form where water percolating through the soil is redirected toward surface slopes by rock or indurated (hardened) soils. Most of the onsite features are seeps, where soils are very moist to saturated but water does not typically flow, though a few springs are present as well, where water flows perennially or at least throughout much of the wet season. Meadow and Seep habitat occupies approximately 2 acres of the study area, which is just over 0.5 percent of the area. Most of the springs and seeps occur along slopes of central and northern portions of the study area. The most conspicuous plant species are rushes, in particular Pacific rush (*Juncus effusus*), but also iris-leaved rush (*J. xiphioides*), bog rush (*J. hesperius*), and Bolander's rush (*J. bolanderi*). Associated sedges observed include tall flatsedge (*Cyperus eragrostis*), dense sedge (*Carex densa*), foothill sedge (*C. tumulicola*), and low bulrush (*Isolepis cernua*). Commonly occurring forbs include a mix of native and introduced species, such as the native seep monkeyflower (*Erythranthe guttata*), willowherb (*Epilobium ciliatum*), and chaffweed (*Lysimachia minima*). Introduced grasses and forbs include prickly sow-thistle (*Sonchus asper*), common velvetgrass, hyssop loosestrife (*Lythrum hyssopifolium*), and pennyroyal (*Mentha pulegium*). Many of these species are also present as small patches along the drainages that flow down the hill slopes, especially those that are in turn fed by smaller drainages and/or those with more gentle slopes. These drainages are classified as "Drainage with Wetlands Present" on **Figure 5**.

Man-made Pond

Natural hydrology within and surrounding the study area is augmented by four constructed ponds, one of which is within the study area, two of which are immediately adjacent, and one of which is nearby, but not within 100 feet of the study area (**Figure 5**). The ponds consist of three stock ponds and an agricultural treatment pond, the latter of which occurs inside the study area, covering just under one acre. The three stock ponds are widely spread across the site, in order to provide water to cattle along the hill slopes. There are two ponds in the southern half of the site and one in the northern half. All four of the ponds are deep and hold water all year long. Vegetation is generally limited to the margins of the ponds, though some floating vegetation was observed closer to the centers of the ponds. The agricultural pond is notably devoid of vegetation except along its upper edges. Where present, plant species occurring along the margins of the ponds include scattered willow trees (*Salix* spp.), pale spike rush (*Eleocharis macrostachya*), pennyroyal, hyssop loosestrife, Italian rye grass, and rushes (*Juncus* spp.). The largest pond near the southeastern edge of the property, which given its size may be more appropriately described as a reservoir, supports stands of broadleaf cattail (*Typha latifolia*). Aquatic floating species include common water weed (*Elodea canadensis*) and pondweed (*Potamogeton nodosus*).

5.3 Special-Status Plants

San Francisco Gumplant

One special-status plant was documented during the on-site botanical surveys, namely San Francisco gumplant (*Grindelia hirsutula*). The San Francisco gumplant is a perennial herb in the sunflower family (Asteraceae) that grows from 2 to 15 decimeters (approximately 8 to 59 inches) and features bright yellow flowers. The flowers are listed as blooming from April to June, though the species was in peak flowering phase during the July field surveys. The species is

listed as occurring on sandy, clay, or serpentine slopes or roadsides at elevations ranging from sea level to 1,700 meters (5,577 feet) (Baldwin et al. 2012). It has been documented from the Transverse Ranges north along the Coastal Ranges to far northern California, as well as in the Central Valley, but as small and/or very sporadic populations.

The San Francisco gumplant is designated by the California Native Plant Society (CNPS) as CRPR 3.2, indicating that it “needs review—plants about which more information is needed...Nearly all of the plants constituting CRPR 3 are taxonomically problematic, yet if taxonomically valid would demonstrably qualify for rank 1B or 2B.” The “0.2” indicates that a given taxon is “moderately threatened in California” (CNPS 2021). The general consensus on the San Francisco gumplant is that it exhibits a range of morphological characteristics and thus may not represent a distinct species, though this is disputed by some experts. In fact, the nomenclature itself remains in dispute, as it is referred to by the CNPS as *Grindelia hirsutula* var. *maritima*. This report uses the Jepson Herbarium name (i.e., lacking the variety) because that organization is responsible for official taxonomic nomenclature in California. In addition, the specimens observed in the study area clearly fit the description provided in the Jepson Manual (Baldwin et al. 2012). There is currently a request for funding to conduct more detailed analysis on the taxon at the Jepson Herbarium (Baldwin per. comm.). In any case, per the CNPS, this report assumes that the taxon is rare and threatened until proven otherwise, and protection measures are provided in **Section 6** below.

Three populations of San Francisco gumplant were identified in the study area, in the northern and southeastern portions of the study area (**Figure 5**). One population had only two plants, while the other two had ranges of either 50 to 100 or 20 to 50 (both were on the larger side of the population range). The total area occupied by the three populations is approximately 0.45 acre. All three populations were found along notably steep, south-facing slopes that feature shallow clay to clay-loam soils. All populations were along transitions between Coastal Scrub and Valley and Foothill Grassland habitats, with associated plant species including purple needle grass, English plantain, slender wild oat, and false brome (*Brachypodium distachyon*). Except for the purple needle grass, all of these most common associates are introduced and invasive, and represent potential threats to the San Francisco gumplant. In addition to these herbs, there were scattered shrub species surrounding the populations, especially coyote brush, poison oak, and coast sage.

Potential for Other Special-Status Plants

In addition to San Francisco gumplant, the study area provides habitat types that have potential to support numerous other special-status plant species. Based on suitable habitat as well as the presence of documented occurrences in the region, a total of eight additional special-status plants have fairly high potential to occur in the study area. Based on the presence of suitable habitat alone, many additional species could occur in the study area, but many are not documented in the vicinity of the study area. **Appendix B** presents a list of special-status vascular plants known to occur in the larger vicinity. The table in the appendix presents information pertaining to individual plant listing status, habitat preferences, blooming period, and the potential to occur in the study area. The table also lists each taxon’s susceptibility to adverse impacts of Milestone. The taxa are considered to have potential to occur if they are known from the vicinity (i.e., within approximately five air miles), are known to occur within the elevation range of the study

area, and occur within habitats documented within the study area. Among the listed habitat types, plants associated with the following types are considered to have potential to occur: Valley and Foothill Grassland, Coastal Scrub, Cismontane Woodland, Riparian Woodland, Coastal Prairie, and Meadow and Seep. Aside from San Francisco gumplant, none of these were documented during protocol-level botanical resource surveys in the study area.

As noted in **Section 4.2**, weather conditions were sub-optimal for annual plant species growth and persistence. However, onsite botanical surveys, as well as status surveys, surveys at other project sites in the region, and communication with other botanists working in the region, suggested that special-status annual plants did successfully germinate and flower, though in many cases in a stunted manner. A particular effort was made to document the status of rare annual plants with potential to occur within the study area, to ensure that they would be in bloom and thus identifiable if present in the area. The two special-status annual species most likely to occur in the study area are bent-flowered fiddleneck (*Amsinckia lunaris*) and hayfield tarplant (*Hemizonia congest* ssp. *congesta*), both of which are ranked as CRPR 1B.2, and both of which are highly susceptible to the effects of Milestone. Hayfield tarplant was observed by VNLC in 2021 at a site in the general vicinity of the study area in southern Sonoma County. Bent-flowered fiddleneck was observed by Doreen Smith in western Marin County in April of 2021 (Smith pers. comm.). Ms. Smith is a recognized rare plant expert in Marin County. In addition, though it is a perennial species, an effort was made to determine the bloom status of Baker's larkspur (*Delphinium bakeri*), which is the only state or federally listed rare plant with high potential to occur in the study area. A documented population of this species that is located on public property near the study area was confirmed as blooming during the March survey for this project.

6.0 RECOMMENDATIONS

The purpose of this project is to eliminate or control the highly invasive woolly distaff thistle, in order to improve habitat conditions on Walker Creek Ranch. However, it is the mission and duty of the landowner to protect biological resources that could be incidentally impacted by the use of herbicides to treat the distaff. The application of the Milestone herbicide and its active ingredient (aminopyralid) and surfactants (modified vegetable oil) are not expected to adversely impact animals, at least not with the proposed label-consistent usage rates. Moreover, Milestone is designed specifically to target plants in the thistle group. However, it is known to affect a number of other dicotyledon (dicot) plants as well as a few monocotyledon (monocot) plants. Among dicots, the Asterid group is considered to be particularly vulnerable.

The special-status San Francisco gumplant is included within the Asterid group, and could therefore be impacted by contact with the Milestone solution. It is therefore recommended that no aerial spraying occur near populations of this species. Because aerial spraying can result in drift, it is advisable to establish 100-foot buffers around the gumplant populations (see **Figure 4** and **Figure 5**), and to prevent aerial spraying from occurring within the buffers. The buffer areas should be marked with brightly colored flagging and/or water-based marking paint to ensure visibility to the helicopter crew, and also provided as GPS boundaries to the crew. Areas within the buffers should be treated manually using backpack sprayers and/or using a side-by-side sprayer (e.g., using ATVs), in order to carefully avoid accidentally spraying the gumplants. In addition, the herbicide application should only be carried out when wind speeds are 10 miles per hour or less. Finally, workers involved in the manual application should be trained to identify the species—it is a perennial species, so should be visible and identifiable throughout the year.

The same precautions that apply to San Francisco gumplant populations should be applied to aquatic habitats, including ponds, springs and seeps (Meadow and Seep habitat), and streams that encompass wetland habitat (**Figure 4** and **Figure 5**). As shown on the two map figures, buffers of 100 feet have been delineated around the two ponds that are immediately adjacent to the study area, since the buffers extend into the study area. While aquatic wildlife and plants are not expected to be adversely impacted by the Milestone solution under normal use, it is advisable to take such precautions to protect such sensitive habitats—an accident involving the solution storage tank could result in environmentally damaging consequences. It should also be noted that few if any distaff were found occurring within these habitats (depending on the saturation level of soils), such that high-volume application would be unnecessary.

7.0 REFERENCES

- Baldwin, Bruce, Douglas H. Goldman, David J. Keil, Robert Patterson, and Thomas J. Rosatti. 2012. The Jepson Manual: Vascular Plants of California. University of California Press, Berkeley, California.
- Baldwin, Bruce. 2021. Personal communication. Email exchange with VNLC's Jake Schweitzer regarding the status of *Grindelia hirsutula*. Dr. Baldwin is the foremost expert on family Asteraceae (which includes *Grindelia hirsutula*).
- Beidleman, Linda H. and Eugene N. Kozloff. 2014. Plants of the San Francisco Bay Region, Third Edition. University of California Press, Berkeley, California
- Blake, M.C., R.W. Graymer, and D.L., Jones. 2000. Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California. Based on U.S. Geological Survey open file report MF-2337.
- Calflora Website. 2021. Plant database website available (as of 10/2021) at: <http://www.calflora.org/species/index.html>
- California Department of Fish and Wildlife (CDFW). 2021. California Natural Diversity Database (CNDDB) (March updates). California Department of Fish and Wildlife.
- California Invasive Plant Council (Cal-IPC). 2021. California Invasive Plant Inventory Database. Website available (as of 10/2021) at: <http://www.cal-ipc.org/ip/inventory/index.php#inventory>
- California Department of Fish and Wildlife (CDFW). 2021. California Sensitive Natural Communities List. Available online (as of 10/2021) at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline>
- California Department of Fish and Wildlife (CDFW). 2018. California Sensitive Natural Communities List. Available online (as of 10/2021) at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline>
- California Native Plant Society (CNPS). 2021. CNPS's Electronic Inventory of Rare and Endangered Plants of California (eighth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society, Sacramento, CA. Website available (as of 10/2021) at: <http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi>
- California Native Plant Society (CNPS). 2001. Inventory of Rare and Endangered Plants – 7th Edition Interface. Habitat Types Page. Available online (as of 10/2021) at: <http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi/Html?item=56-59.htm>

- Howell, J.T., F. Almeda, W. Follette W., and C. Best. 2007. *Marin Flora – An Illustrated Manual of the Flowering Plants, Ferns, and Confers of Marin County, California*. California Academy of Sciences and California Native Plant Society, Marin Chapter.
- Jepson Flora Project (eds.) (Jepson eFlora). 2021. The Jepson Herbarium. Available online (as of 10/2021) at: <http://ucjeps.berkeley.edu/eflora/>
- Keeler-Wolf, Todd. 2013. Personal Communication. Conversation with Jake Schweitzer of Vollmar Natural Lands Consulting in September 2013, regarding CNPS vegetation classification and sensitive plant communities. Dr. Keeler-Wolf is the former State Vegetation Ecologist for the California Department of Fish and Wildlife.
- PRISM Climate Group (PRISM). 2021. Data from PRISM website. Oregon State University, Corvallis. Website available (as of 10/2021) at: <http://www.prism.oregonstate.edu/>
- Sawyer, John O., Todd Keeler-Wolf, and Julie M. Evans. 2009. *A Manual of California Vegetation (MCV)*, Second Edition. California Native Plant Society Press.
- Sloan, Doris. 2006. *Geology of the San Francisco Bay Region*. University of California Press.
- Smith, Doreen. 2021. Personal communication. Email exchange between Ms. Smith and VNLC's Jake Schweitzer regarding the bloom status of special-status plant species in the vicinity of the study area.
- U.S. Army Corps of Engineers (ACOE). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*. U.S. Army Corps of Engineers.
- U.S. Department of Agriculture Soil Conservation Service (USDA-NRCS). 2021. Web Soil Survey Website. Available (as of 10/2021) at: <http://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx>
- U.S. Geological Survey (USGS). 1997. *Ten-meter Digital Elevation Model (DEM) 1:24,000 quadrangles*.

APPENDIX A:

**Representative Photographs of the Study Area
(March, April, and July, 2021)**

APPENDIX A. Representative Photographs of the Study Area



High density (left) and low density (right) of woolly distaff thistle. Central-eastern portion of the study area.



**Medium density woolly distaff thistle
Central portion of the study area**

APPENDIX A. Representative Photographs of the Study Area



Close-up of woolly distaff thistle



**Large rock outcrop with few woolly distaff thistles
Central portion of the study area**

APPENDIX A. Representative Photographs of the Study Area



**Native grassland with purple needle grass
Northern portion of the study area**



**Wildflowers at grassland/shrubland interface
Southwestern portion of the study area**

APPENDIX A. Representative Photographs of the Study Area



**Coastal Scrub habitat.
Northwestern portion of the study area**



**Representative Cismontane Woodland occurring within swales
Western portion of the study area**

APPENDIX A. Representative Photographs of the Study Area



**View from within Cismontane Woodland
Northeastern portion of the study area**



**Meadow and Seep habitat
Northwestern portion of the study area**

APPENDIX A. Representative Photographs of the Study Area



**Small seasonal wetland within drainage
Central portion of the study area**



**Agricultural treatment pond with Emergent Marsh
Southwestern portion of the study area**

APPENDIX A. Representative Photographs of the Study Area



**San Francisco gumplant
Northern-central portion of the study area**



**Habitat of San Francisco gumplant
Northern-central portion of the study area**

APPENDIX B:

**List of Special-Status Plant Taxa Documented
in the Vicinity of the Study Area
(CNPS Quadrangle Search)**

APPENDIX B. Special-status Plants Documented in the Vicinity of the Walker Creek Ranch Distaff Thistle Treatment Study Area, Marin County, California. Compiled by VNLC in 2021

Note: Taxa with higher potential to occur in the study area are shaded in gray. Taxa selected from the following USGS 7.5' Quadrangles: Point Reyes NE, Petaluma, Inverness, and San Geronimo.

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Agrostis blasdalei</i> (Blasdale's bent grass)	--/--/1B.2	Coastal bluff scrub, coastal dunes, coastal prairie; 0-150 meters; May-Jul	Marginal habitat present. Occurs primarily in more coastal environments.	Low
<i>Allium peninsulare</i> var. <i>franciscanum</i> (Franciscan onion)	--/--/1B.2	Cismontane woodland, valley and foothill grassland; 52-305 meters; (Apr) May-Jun	Suitable habitat present, but not documented in the local vicinity of the study area.	Moderate
<i>Alopecurus aequalis</i> var. <i>sonomensis</i> (Sonoma alopecurus)	E/--/1B.1	Marshes and swamps (freshwater), riparian scrub; 5-365 meters; May-Jul	Suitable habitat present, but not documented in the local vicinity of the study area.	Low
<i>Amorpha californica</i> var. <i>napensis</i> (Napa false indigo)	--/--/1B.2	Broadleafed upland forest (openings), Chaparral, Cismontane woodland; 120-2,000 meters; Apr-Jul	Suitable habitat present, but not documented in the local vicinity of the study area.	High
<i>Amsinckia lunaris</i> (bent-flowered fiddleneck)	--/--/1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland; 3-500 meters; Mar-Jun	Suitable habitat present and documented immediately adjacent to the study area. Not observed during 2021 botanical surveys.	High
<i>Arabis blepharophylla</i> (coast rockcress)	--/--/4.3	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub; 3-1,100 meters; Feb-May	Suitable habitat present, but not documented in the local vicinity of the study area.	Moderate
<i>Arctostaphylos montana</i> ssp. <i>montana</i> (Mt. Tamalpais manzanita)	--/--/1B.3	Chaparral, Valley and foothill grassland/serpentine, rocky; 160-760 meters; Feb-Apr	Marginal habitat present. No serpentine within study area.	Moderate
<i>Arctostaphylos virgata</i> (Marin manzanita)	--/--/1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, North Coast coniferous forest/sandstone or granitic; 60-700 meters; Jan-Mar	No suitable habitat present. Not observed during 2021 botanical surveys.	Moderate
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i> (coastal marsh milk-vetch)	--/--/1B.2	Coastal dunes (mesic), Coastal scrub, Marshes and swamps (coastal salt, streamsides); 0-30 meters; (Apr) Jun-Oct	Marginal habitat present. Occurs primarily in more coastal environments and not documented in the local vicinity of the study area.	High
<i>Astragalus tener</i> var. <i>tener</i> (alkali milk-vetch)	--/--/1B.2	Playas, Valley and foothill grassland (adobe clay), Vernal pools, alkaline; 1-60 meters; Mar-Jun	Study area is above elevation range and taxon is not documented in the local vicinity of the study area.	High

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Calochortus umbellatus</i> (Oakland star-tulip)	--/--/4.2	Broadleaved upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland, often serpentinite; 100-700 meters; Mar-May	Marginal habitat present. No serpentinite within study area.	Moderate
<i>Campanula californica</i> (swamp harebell)	--/--/1B.2	Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps (freshwater), North Coast coniferous forest; 1-405 meters; Jun-Oct	Suitable habitat present and documented in the local vicinity of the study area. Not observed during 2021 botanical surveys.	Moderate
<i>Cardamine angulata</i> (seaside bittercress)	--/--/2B.2	Lower montane coniferous forest, North Coast coniferous forest; Wet areas, streambanks; 25-915 meters; (Jan) Mar-Jul	Suitable habitat present, but not documented in the local vicinity of the study area.	Moderate
<i>Carex lyngbyei</i> (Lyngbye's sedge)	--/--/2B.2	Marshes and swamps (brackish or freshwater); 0-10 meters; Apr-Aug	Study area is above elevation range and no suitable habitat present.	Low
<i>Castilleja affinis</i> var. <i>neglecta</i> (Tiburon paintbrush)	E/T/1B.2	Valley and foothill grassland (serpentinite); 60-400 meters; Apr-Jun	Marginal habitat present. No serpentinite within study area.	Moderate
<i>Castilleja ambigua</i> var. <i>ambigua</i> (johnny-nip)	--/--/4.2	Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps, Valley and foothill grassland, Vernal pools margins; 0-435 meters; Mar-Aug	Suitable habitat present, but not documented in the local vicinity of the study area.	Moderate
<i>Castilleja ambigua</i> var. <i>humboldtiensis</i> (Humboldt Bay owl's-clover)	--/--/1B.2	Marshes and swamps (coastal salt); 0-3 meters; Apr-Aug	Study area is above elevation range and no suitable habitat present.	Moderate
<i>Ceanothus decornutus</i> (Nicasio ceanothus)	--/--/1B.2	Chaparral (maritime); serpentinite, rocky, sometimes clay; 235-290 meters; Mar-May	Marginal habitat present. No serpentinite within study area.	Moderate
<i>Ceanothus gloriosus</i> var. <i>exaltatus</i> (glory brush)	--/--/4.3	Chaparral; 30-610 meters; Mar-Jun (Aug)	No suitable habitat present.	Moderate

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Ceanothus gloriosus</i> var. <i>gloriosus</i> (Point Reyes ceanothus)	--/--/4.3	Coastal bluff scrub, Closed-cone coniferous forest, Coastal dunes, Coastal scrub, sandy; 5-520 meters; Mar-May	Suitable habitat present but not documented in the local vicinity of the study area and sandy soils not common.	Moderate
<i>Ceanothus gloriosus</i> var. <i>porrectus</i> (Mt. Vision ceanothus)	--/--/1B.3	Closed-cone coniferous forest, Coastal prairie, Coastal scrub, Valley and foothill grassland; 25-305 meters; Feb-May	Suitable habitat present and documented in the local vicinity of the study area. Not observed during 2021 botanical surveys.	Moderate
<i>Ceanothus masonii</i> (Mason's ceanothus)	--/R/1B.2	Chaparral (openings, rocky, serpentinite); 228 - 500 meters; Mar-Apr	Marginal habitat present. No chaparral and no serpentinite within study area.	Moderate
<i>Chloropyron maritimum</i> ssp. <i>palustre</i> (Point Reyes bird's-beak)	--/--/1B.2	Marshes and swamps (coastal salt); 0-10 meters; June-Oct	No suitable habitat present.	Moderate
<i>Chorizanthe valida</i> (Sonoma spineflower)	E/E/1B.1	Coastal prairie (sandy); 10-305 meters; Jun-Aug	Marginal habitat present (limited coastal prairie and not notably sandy).	Moderate
<i>Cicuta maculata</i> var. <i>bolanderi</i> (Bolander's water-hemlock)	--/--/2B.1	Marshes and swamps Coastal, fresh or brackish water; 0-200 meters; Jul-Sep	Marginal habitat present—generally known from more coastal habitats.	High
<i>Cirsium andrewsii</i> (Franciscan thistle)	--/--/1B.2	Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub; mesic, sometimes serpentinite 0-150 meters; Mar-Jul	No suitable habitat present. Below elevation range.	High
<i>Cirsium hydrophilum</i> var. <i>vaseyi</i> (Mt. Tamalpais thistle)	--/--/1B.2	Broadleafed upland forest, Chaparral, Meadows and seeps; serpentinite seeps; 240-620 meters; May-Aug	Marginal habitat present and not documented in the local vicinity of the study area.	High
<i>Clarkia concinna</i> ssp. <i>raichei</i> (Raiche's red ribbons)	--/--/1B.1	Coastal bluff scrub; 0-100 meters; Apr-May	Study area is above elevation range and no suitable habitat present.	High
<i>Delphinium bakeri</i> (Baker's larkspur)	E/E/1B.1	Broadleafed upland forest, coastal scrub, valley and foothill grassland; 80-305 meters; Mar-May	Suitable habitat present and documented in the local vicinity of the study area. Not observed during 2021 botanical surveys.	High

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Delphinium luteum</i> (golden larkspur)	E/R/1B.1	Chaparral, Coastal prairie, Coastal scrub; rocky 0-100 meters; Mar-May	Study area is above elevation range.	High
<i>Dirca occidentalis</i> (western leatherwood)	--/--/1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland; mesic; 25-425 meters; Jan-Mar (Apr)	Suitable habitat present but not documented in the local vicinity of the study area. However, the habitat is high quality habitat. Not observed during 2021 botanical surveys.	Moderate
<i>Elymus californicus</i> (California bottle-brush grass)	--/--/4.3	Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest, Riparian woodland; 15-470 meters; May-Aug	Observed on the property just outside the study area during 2020 reconnaissance-level surveys. Not observed in the study area during 2021 botanical surveys.	Low
<i>Eriogonum luteolum</i> var. <i>caninum</i> (Tiburon buckwheat)	--/--/1B.2	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland/serpentine, sandy to gravelly; 0- 700 meters; May-Sep	Marginal habitat present. No serpentine.	High
<i>Erysimum concinnum</i> (bluff wallflower)	--/--/1B.2	Coastal bluff scrub, Coastal dunes, Coastal prairie; 0-185 meters; Feb-Jul	Suitable habitat present.	Moderate
<i>Fritillaria lanceolata</i> var. <i>tristulis</i> (Marin checker lily)	--/--/1B.1	Coastal bluff scrub, Coastal prairie, Coastal scrub; 15-150 meters; Feb-May	No suitable habitat present.	Moderate
<i>Fritillaria liliacea</i> (fragrant fritillary)	--/--/1B.2	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland/often serpentine; 3-410 meters; Feb-Apr	Marginal habitat present (no serpentine). Documented in the local vicinity of the study area.	Moderate
<i>Gilia capitata</i> ssp. <i>chamissonis</i> (blue coast gilia)	--/--/1B.1	Coastal dunes, Coastal scrub; 2-200 meters; Apr-Jul	Suitable habitat present but not documented in the local vicinity of the study area.	Moderate
<i>Gilia capitata</i> ssp. <i>tomentosa</i> (woolly-headed gilia)	--/--/1B.1	Coastal bluff scrub (rocky, outcrops); 15-155 meters; May- Jul	No suitable habitat present.	Moderate

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Grindelia hirsutula</i> var. <i>maritima</i> (San Francisco gumplant)	--/--/3.2	Coastal bluff scrub, Coastal scrub, Valley and foothill grassland/sandy or serpentinite; 15-400 meters; Jun-Sep	Observed. Three populations were observed in the study area during 2021 botanical surveys (see Figure 5).	High
<i>Hemizonia congesta</i> ssp. <i>congesta</i> (pale yellow hayfield tarplant)	--/--/1B.2	Valley and foothill grassland/sometimes roadsides; 20-560 meters; Apr-Nov	Suitable habitat present and documented in the local vicinity of the study area. Not observed during 2021 botanical surveys.	High
<i>Hesperervax sparsiflora</i> var. <i>brevifolia</i> (short-leaved evax)	--/--/1B.2	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie; 0-215 meters; Mar-Jun	Marginal habitat present. No serpentinite and not documented in the local vicinity of the study area.	High
<i>Hesperolinon congestum</i> (Marin western flax)	T/T/1B.1	Chaparral, Valley and foothill grassland/serpentinite; 5- 370 meters; Apr-Jul	Marginal habitat present. No serpentinite.	Moderate
<i>Heteranthera dubia</i> (water star-grass)	--/--/2B.2	Marshes and swamps (alkaline, still or slow-moving water); Requires a pH of 7 or higher, usually in slightly eutrophic waters; 30-1,495 meters; Jul-Oct	No suitable habitat present and not documented in the local vicinity of the study area.	Low
<i>Horkelia marinensis</i> (Point Reyes horkelia)	--/--/1B.2	Coastal dunes, Coastal prairie, Coastal scrub; sandy 5-755 meters; May-Sep	Marginal habitat present. Sandy soils not common and not documented in the local vicinity of the study area.	High
<i>Hosackia gracilis</i> (harlequin lotus)	--/--/4.2	Broadleafed upland forest, Coastal bluff scrub, Closed- cone coniferous forest, Cismontane woodland, Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps, North Coast coniferous forest, Valley and foothill grassland; wetlands, roadsides; 0-700 meters; Mar-Jul	Suitable habitat present but not documented in the local vicinity of the study area.	High
<i>Lasthenia californica</i> ssp. <i>macrantha</i> (perennial goldfields)	--/--/1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub; 5-520 meters; Jan-Nov	Suitable habitat present but not documented in the local vicinity of the study area.	High
<i>Layia carnosa</i> (beach layia)	E/E/1B.1	Coastal dunes, Coastal scrub (sandy); 0-60 meters; Mar-Jul	Study area is above elevation range and marginal habitat present.	High

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Leptosiphon acicularis</i> (bristly leptosiphon)	--/--/4.2	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland; 55-1,500 meters; Apr-Jul	Suitable habitat present but not documented in the local vicinity of the study area.	Moderate
<i>Lessingia hololeuca</i> (woolly-headed lessingia)	--/--/3	Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland/clay, serpentinite; 15-305 meters; Jun-Oct	Marginal habitat present. Mostly clay loam, and no serpentinite.	High
<i>Lessingia micradenia</i> var. <i>micradenia</i> (Tamalpais lessingia)	--/--/1B.2	Chaparral, Valley and foothill grassland/usually serpentinite, often roadsides; 100-500 meters; (Jun) Jul-Oct	Marginal habitat present. No serpentinite.	High
<i>Lilaeopsis masonii</i> (Mason's lilaeopsis)	--/R/1B.1	Marshes and swamps (brackish or freshwater), Riparian scrub; 0-10 meters; Apr-Nov	Study area is above elevation range.	Moderate
<i>Lilium maritimum</i> (coast lily)	--/--/1B.1	Broadleafed upland forest, Closed-cone coniferous forest, Coastal prairie, Coastal scrub, Marshes and swamps (freshwater), North Coast coniferous forest; sometimes roadside; 5-475 meters; May-Aug	Suitable habitat present but generally occurs in more coastal habitats.	Moderate
<i>Lilium pardalinum</i> ssp. <i>pitkinense</i> (Pitkin Marsh lily)	E/E/1B.1	Cismontane woodland, Meadows and seeps, Marshes and swamps (freshwater); mesic, sandy; 35-65 meters; Jun-Jul	Suitable habitat present but not documented in the local vicinity of the study area.	Moderate
<i>Microseris paludosa</i> (marsh microseris)	--/--/1B.2	Closed-cone coniferous forest, Cismontane woodland, Coastal scrub, Valley and foothill grassland; 5-300 meters; Apr-Jun (Jul)	Suitable habitat present and documented in the local vicinity of the study area. Not observed during 2021 botanical surveys.	High
<i>Monardella sinuata</i> ssp. <i>nigrescens</i> (northern curly-leaved monardella)	--/--/1B.2	Chaparral (SCR Co.), Coastal dunes, Coastal scrub, Lower montane coniferous forest (SCR Co., ponderosa pine sandhills); Sandy; 0-300 meters; (Apr) May-Jul	Marginal habitat present but generally occurs in more coastal habitats.	High
<i>Navarretia rosulata</i> (Marin County navarretia)	--/--/1B.2	Closed-cone coniferous forest, Chaparral/serpentinite, rocky; 200-635 meters; May-Jul	No suitable habitat present.	Moderate
<i>Phacelia insularis</i> var. <i>continentis</i> (North Coast phacelia)	--/--/1B.2	Coastal bluff scrub, Coastal dunes; sandy, sometimes rocky; 10-170 meters; Mar-May	No suitable habitat present.	High

Scientific Name (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Plagiobothrys mollis</i> var. <i>vestitus</i> (Petaluma popcornflower)	--/--/1A	Marshes and swamps (coastal salt), Valley and foothill grassland (mesic); 10-50 meters; Jun-Jul	Marginal habitat present. No serpentine. Considered locally extirpated by the MMWD.	High
<i>Pleuropogon hooverianus</i> (North Coast semaphore grass)	--/T/1B.1	Broadleafed upland forest, Meadows and seeps, North Coast coniferous forest/open areas, mesic; 10-670 meters; Apr-Jun	Suitable habitat present but not documented in the local vicinity of the study area.	Low
<i>Polygonum marinense</i> (Marin knotweed)	--/--/3.1	Marshes and swamps (coastal salt or brackish); 0 - 10 meters. (Apr) May-Aug (Oct)	Study area is above elevation range and no suitable habitat present.	High
<i>Ranunculus lobbii</i> (Lobb's aquatic buttercup)	--/--/4.2	Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools; mesic; 15-470 meters; Feb-May	Suitable habitat present but not documented in the local vicinity of the study area.	High
<i>Ribes victoris</i> (Victor's gooseberry)	--/--/4.3	Broadleafed upland forest, Chaparral; mesic, shady 100-750 meters; Mar-Apr	Suitable habitat present but not documented in the local vicinity of the study area.	Low
<i>Sagittaria sanfordii</i> (Sanford's arrowhead)	--/--/1B.2	Marshes and swamps (assorted shallow freshwater); 0-650 meters; May-Oct	Marginal habitat present. Not documented in the local vicinity of the study area.	Low
<i>Sidalcea calycosa</i> ssp. <i>rhizomata</i> (Point Reyes checkerbloom)	--/--/1B.2	Marshes and swamps (freshwater, near coast); 1 – 75 meters; Apr-Sep	Study area is above elevation range and marginal suitable habitat present.	Moderate
<i>Stebbinsoseris decipiens</i> (Santa Cruz microseris)	--/--/1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; open areas, sometimes serpentinite; 9 – 500 meters; Apr-May	Suitable habitat present and documented in the local vicinity of the study area.	High
<i>Streptanthus batrachopus</i> (Tamalpais jewel-flower)	--/--/1B.3	Closed-cone coniferous forest, Chaparral/serpentinite; 305- 650 meters; Apr-Jul	No suitable habitat present.	Moderate
<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i> (Mount Tamalpais bristly jewel-flower)	--/--/1B.2	Chaparral, Valley and foothill grassland/serpentinite; 150- 800 meters; May-Jul (Aug)	Marginal habitat present. No serpentinite.	Moderate

<i>Scientific Name</i> (Common Name)	Status Federal/ State/ CRPR ¹	Preferred Habitat; Elevation Range; Bloom Period ²	Quality of Preferred Habitat within Study Area ³	Milestone™ Sensitivity ⁴
<i>Trifolium amoenum</i> (two-fork clover)	FE/--/1B.1	Coastal bluff scrub, Valley and foothill grassland (sometimes serpentinite); 5-415 meters; Apr-Jun	Suitable habitat present but considered by the Marin Municipal Water District (pers. comm.) to be extirpated in the vicinity by the MMWD.	High
<i>Trifolium polyodon</i> (Pacific Grove clover)	--/R/1B.1	Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Valley and foothill grassland; mesic, sometimes granitic; 5-425 meters; Apr-Jun (Jul)	Suitable habitat present and documented in the local vicinity of the study area.	High
<i>Triphysaria floribunda</i> (San Francisco owl's-clover)	--/--/1B.2	Coastal prairie, Coastal scrub, Valley and foothill grassland; usually serpentinite; 10-160 meters; Apr-Jun	Marginal habitat present (no serpentinite). Not documented in the local vicinity of the study area.	Moderate
<i>Triquetrella californica</i> (coastal triquetrella)	--/--/1B.2	Coastal bluff scrub, Coastal scrub, soil; 10-100 meters; N/A	Study area is above elevation range and not documented in the local vicinity of the study area.	Low

1. Rarity Status Codes:

E = Federally or State listed as Endangered

T = Federally or State listed as Threatened

R = State listed as Rare

CRPR Codes

1A = CRPR List 1A: Plants presumed extinct in California.

1B.1 = CRPR List 1B.1: Plants rare, threatened or endangered in California and elsewhere; plant seriously threatened in California.

1B.2 = CRPR List 1B.2: Plants rare, threatened or endangered in California and elsewhere; plant fairly threatened in California.

1B.3 = CRPR List 1B.3: Plants rare, threatened or endangered in California and elsewhere; plant not very threatened in California.

2.1 = CRPR List 2.1: Plants rare, threatened or endangered in California, more common elsewhere; plant seriously threatened in California.

2.2 = CRPR List 2.2: Plants rare, threatened or endangered in California, more common elsewhere; plant fairly threatened in California.

2.3 = CRPR List 2.3: Plants rare, threatened or endangered in California, more common elsewhere; plant not very threatened in California.

3 = CRPR List 3: Plants in California which need more information-a review list.

3.1 = CRPR List 3.1: Plants in California which need more information-a review list; plant seriously threatened in California.

3.2 = CRPR List 3.2: Plants about which we need more information – a review list; plant fairly threatened in California.

2. Parentheses around blooming period months indicate occasional blooming period extensions. Habitat modifier "(descriptor)" pertains only to the habitat type immediately preceding"/ descriptor" pertains to *all* habitat

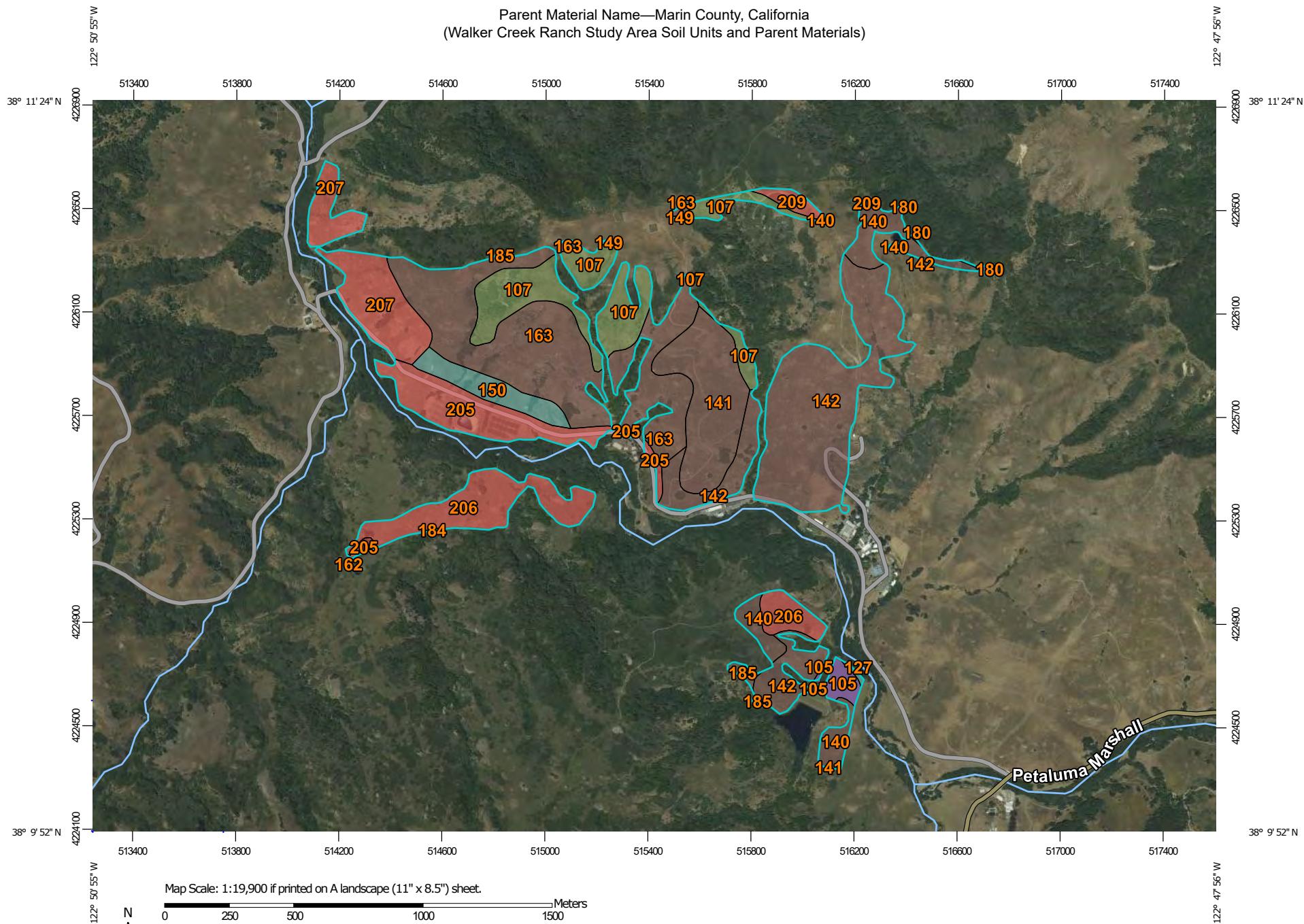
3. Onsite habitats include: Valley and Foothill Grassland (with localized components of Coastal Prairie), Cismontane Woodland (with components of Broadleaf Upland Forest), Coastal Scrub, Riparian Woodland, and Stock Ponds (minor components of freshwater wetland/marsh).

4. Milestone™ sensitivity based on 2005 EPA toxicological report on aminopyralids (EPA 2005). All dicot plants ranked as “Moderate” unless their family was listed as a target weed species on the Milestone™ product label (DowAgsciences 2017). Monocots in the Alliaceae or Liliaceae families ranked as “Moderate” based on 2005 EPA study (EPA 2005)—all other monocots are ranked as “Low” sensitivity.

APPENDIX C:

Mapped Soil Units and Parent Materials


Parent Material Name—Marin County, California
(Walker Creek Ranch Study Area Soil Units and Parent Materials)



Parent Material Name—Marin County, California
(Walker Creek Ranch Study Area Soil Units and Parent Materials)

MAP LEGEND

Area of Interest (AOI)




 Area of Interest (AOI)




Soils

Soil Rating Polygons







-  alluvium derived from igneous, metamorphic and sedimentary rock
-  alluvium derived from sandstone, granite, or shale
-  residuum weathered from sandstone and shale
-  residuum weathered from shale
-  residuum weathered from shale, or sandstone
-  Not rated or not available

Soil Rating Lines

-  alluvium derived from igneous, metamorphic and sedimentary rock
-  alluvium derived from sandstone, granite, or shale
-  residuum weathered from sandstone and shale

-  residuum weathered from shale
-  residuum weathered from shale, or sandstone
-  Not rated or not available





Soil Rating Points



-  alluvium derived from igneous, metamorphic and sedimentary rock
-  alluvium derived from sandstone, granite, or shale
-  residuum weathered from sandstone and shale
-  residuum weathered from shale
-  residuum weathered from shale, or sandstone
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads

-  Local Roads
- Background**
-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Marin County, California
Survey Area Data: Version 15, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2019—Jul 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Parent Material Name

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
105	Blucher-Cole complex, 2 to 5 percent slopes	alluvium derived from sandstone, granite, or shale	4.4	1.1%
107	Bonnydoon gravelly loam, 30 to 75 percent slopes	residuum weathered from shale, or sandstone	43.6	10.9%
127	Fluvents, channeled	alluvium derived from igneous, metamorphic and sedimentary rock	0.4	0.1%
140	Los Osos-Bonnydoon complex, 5 to 15 percent slopes	residuum weathered from sandstone and shale	17.0	4.2%
141	Los Osos-Bonnydoon complex, 15 to 30 percent slopes	residuum weathered from sandstone and shale	36.4	9.1%
142	Los Osos-Bonnydoon complex, 30 to 50 percent slopes	residuum weathered from sandstone and shale	94.7	23.6%
149	Olompali loam, 9 to 15 percent slopes	alluvium derived from igneous, metamorphic and sedimentary rock	0.4	0.1%
150	Olompali loam, 15 to 30 percent slopes	alluvium derived from igneous, metamorphic and sedimentary rock	12.6	3.1%
162	Saurin-Bonnydoon complex, 15 to 30 percent slopes	residuum weathered from sandstone and shale	0.0	0.0%
163	Saurin-Bonnydoon complex, 30 to 50 percent slopes	residuum weathered from sandstone and shale	89.9	22.4%
180	Tocaloma-McMullin complex, 50 to 75 slopes	residuum weathered from sandstone and shale	0.7	0.2%
184	Tocaloma-Saurin association, very steep	residuum weathered from sandstone and shale	0.1	0.0%
185	Tocaloma-Saurin association, extremely steep	residuum weathered from sandstone and shale	1.4	0.3%
205	Yorkville clay loam, 9 to 15 percent slopes	residuum weathered from shale	28.8	7.2%
206	Yorkville clay loam, 15 to 30 percent slopes	residuum weathered from shale	35.2	8.8%
207	Yorkville clay loam, 30 to 50 percent slopes	residuum weathered from shale	32.6	8.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
209	Yorkville-Rock outcrop complex, 15 to 30 percent slopes	residuum weathered from shale	3.8	0.9%
Totals for Area of Interest			401.9	100.0%

Description

Parent material name is a term for the general physical, chemical, and mineralogical composition of the unconsolidated material, mineral or organic, in which the soil forms. Mode of deposition and/or weathering may be implied by the name.

The soil surveyor uses parent material to develop a model used for soil mapping. Soil scientists and specialists in other disciplines use parent material to help interpret soil boundaries and project performance of the material below the soil. Many soil properties relate to parent material. Among these properties are proportions of sand, silt, and clay; chemical content; bulk density; structure; and the kinds and amounts of rock fragments. These properties affect interpretations and may be criteria used to separate soil series. Soil properties and landscape information may imply the kind of parent material.

For each soil in the database, one or more parent materials may be identified. One is marked as the representative or most commonly occurring. The representative parent material name is presented here.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

APPENDIX D:

List of All Vascular Plant Taxa Identified within the Study Area

APPENDIX D. Vascular Plant Taxa Identified within the Walker Creek Ranch Distaff Thistle Control Study Area. Compiled in 2021 by Vollmar Natural Lands Consulting for the Marin County School District.

Family Name	Scientific Name	Common Name	Origin	Status*
Adoxaceae (Muskroot Family)	<i>Sambucus nigra</i> ssp. <i>caerulea</i>	Blue Elderberry	Native	N/A
Agavaceae (Century-plant Family)	<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	Wavyleaf Soap Plant	Native	N/A
Anacardiaceae (Sumac Family)	<i>Toxicodendron diversilobum</i>	Western Poison Oak	Native	N/A
Apiaceae (Carrot Family)	<i>Anthriscus caucalis</i>	Bur-chervil	Naturalized	N/A
Apiaceae (Carrot Family)	<i>Conium maculatum</i>	Poison-hemlock	Naturalized	Moderate
Apiaceae (Carrot Family)	<i>Daucus pusillus</i>	American Wild Carrot	Native	N/A
Apiaceae (Carrot Family)	<i>Eryngium armatum</i>	Coastal Button Celery	Native	N/A
Apiaceae (Carrot Family)	<i>Foeniculum vulgare</i>	Fennel	Naturalized	High
Apiaceae (Carrot Family)	<i>Heracleum maximum</i>	Cow Parsnip, Giant Hogweed	Native	N/A
Apiaceae (Carrot Family)	<i>Lomatium californicum</i>	California Lomatium	Native	N/A
Apiaceae (Carrot Family)	<i>Lomatium utriculatum</i>	Common Lomatium	Native	N/A
Apiaceae (Carrot Family)	<i>Osmorhiza berteroi</i>	Sweetcicely	Native	N/A
Apiaceae (Carrot Family)	<i>Sanicula arctopoides</i>	Footsteps Of Spring, Yellow Mats	Native	N/A
Apiaceae (Carrot Family)	<i>Sanicula bipinnatifida</i>	Purple Sanicle, Shoe Buttons	Native	N/A
Apiaceae (Carrot Family)	<i>Sanicula crassicaulis</i>	Pacific Blacksnakeroot	Native	N/A
Apiaceae (Carrot Family)	<i>Scandix pecten-veneris</i>	Venus' Needle	Naturalized	N/A
Apiaceae (Carrot Family)	<i>Torilis arvensis</i>	Tall Sock-destroyer	Naturalized	Moderate

Family Name	Scientific Name	Common Name	Origin	Status*
Asteraceae (Aster Family)	<i>Achillea millefolium</i>	Common Yarrow	Native	N/A
Asteraceae (Aster Family)	<i>Anaphalis margaritacea</i>	Western Pearly Everlasting	Native	N/A
Asteraceae (Aster Family)	<i>Artemisia californica</i>	California Sagebrush	Native	N/A
Asteraceae (Aster Family)	<i>Artemisia douglasiana</i>	Mugwort	Native	N/A
Asteraceae (Aster Family)	<i>Baccharis pilularis</i> ssp. <i>consanguinea</i>	Coyote Brush	Native	N/A
Asteraceae (Aster Family)	<i>Carduus pycnocephalus</i> ssp. <i>pycnocephalus</i>	Italian Thistle	Naturalized	Moderate
Asteraceae (Aster Family)	<i>Carthamus lanatus</i>	Woolly Distaff Thistle	Naturalized	High
Asteraceae (Aster Family)	<i>Centaurea calcitrapa</i>	Purple Star-thistle	Naturalized	Moderate
Asteraceae (Aster Family)	<i>Centaurea melitensis</i>	Tocalote	Naturalized	Moderate
Asteraceae (Aster Family)	<i>Centaurea solstitialis</i>	Yellow Star-thistle	Naturalized	High
Asteraceae (Aster Family)	<i>Cirsium occidentale</i> var. <i>venustum</i>	Venus Thistle	Native	N/A
Asteraceae (Aster Family)	<i>Cirsium vulgare</i>	Bull Thistle	Naturalized	Moderate
Asteraceae (Aster Family)	<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>	Golden Yarrow	Native	N/A
Asteraceae (Aster Family)	<i>Gamochaeta ustulata</i>	Featherweed	Native	N/A
Asteraceae (Aster Family)	<i>Gnaphalium palustre</i>	Western Marsh Cudweed	Native	N/A
Asteraceae (Aster Family)	<i>Grindelia hirsutula</i>	Hairy Gumweed	Native	N/A
Asteraceae (Aster Family)	<i>Hedypnois cretica</i>	Crete Weed	Naturalized	N/A
Asteraceae (Aster Family)	<i>Hemizonia congesta</i> ssp. <i>lutescens</i>	Hayfield Tarplant	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Asteraceae (Aster Family)	<i>Hesperevax sparsiflora</i> var. <i>sparsiflora</i>	Erect Dwarf-cudweed	Native	N/A
Asteraceae (Aster Family)	<i>Heterotheca sessiliflora</i> ssp. <i>bolanderi</i>	Golden Aster	Native	N/A
Asteraceae (Aster Family)	<i>Hypochaeris glabra</i>	Smooth Cat's-ear	Naturalized	Limited
Asteraceae (Aster Family)	<i>Hypochaeris radicata</i>	Rough Cat's-ear	Naturalized	Moderate
Asteraceae (Aster Family)	<i>Lactuca saligna</i>	Willowleaf Lettuce	Naturalized	N/A
Asteraceae (Aster Family)	<i>Leontodon saxatilis</i> ssp. <i>longirostris</i>	Hawkbit	Naturalized	N/A
Asteraceae (Aster Family)	<i>Logfia filaginoides</i>	California Cottonrose	Native	N/A
Asteraceae (Aster Family)	<i>Logfia gallica</i>	Daggerleaf Cottonrose	Naturalized	N/A
Asteraceae (Aster Family)	<i>Madia gracilis</i>	Slender Tarplant	Native	N/A
Asteraceae (Aster Family)	<i>Madia sativa</i>	Coast Tarweed	Native	N/A
Asteraceae (Aster Family)	<i>Matricaria discoidea</i>	Pineapple Weed, Rayless Chamomile	Native	N/A
Asteraceae (Aster Family)	<i>Micropus californicus</i>	Q-tips	Native	N/A
Asteraceae (Aster Family)	<i>Pseudognaphalium californicum</i>	Ladies' Tobacco	Native	N/A
Asteraceae (Aster Family)	<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed	Naturalized	N/A
Asteraceae (Aster Family)	<i>Psilocarphus tenellus</i>	Slender Woolly-marbles	Native	N/A
Asteraceae (Aster Family)	<i>Senecio aronicoides</i>	Rayless Ragwort	Native	N/A
Asteraceae (Aster Family)	<i>Silybum marianum</i>	Milk Thistle	Naturalized	Limited
Asteraceae (Aster Family)	<i>Solidago velutina</i>	Velvety Goldenrod	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Asteraceae (Aster Family)	<i>Soliva sessilis</i>	Field Burrweed	Naturalized	N/A
Asteraceae (Aster Family)	<i>Sonchus asper</i> ssp. <i>asper</i>	Prickly Sow Thistle	Naturalized	N/A
Asteraceae (Aster Family)	<i>Sonchus oleraceus</i>	Common Sow Thistle	Naturalized	N/A
Asteraceae (Aster Family)	<i>Symphyotrichum chilense</i>	Pacific Aster	Native	N/A
Asteraceae (Aster Family)	<i>Uropappus lindleyi</i>	Silver Puffs	Native	N/A
Asteraceae (Aster Family)	<i>Wyethia angustifolia</i>	California Compassplant	Native	N/A
Berberidaceae (Barberry Family)	<i>Berberis pinnata</i> ssp. <i>pinnata</i>	Coast Barberry	Native	N/A
Betulaceae (Birch Family)	<i>Corylus cornuta</i> ssp. <i>californica</i>	California Hazelnut	Native	N/A
Blechnaceae (Chain Fern Family)	<i>Woodwardia fimbriata</i>	Giant Chain Fern	Native	N/A
Boraginaceae (Borage Family)	<i>Amsinckia intermedia</i>	Common Fiddleneck	Native	N/A
Boraginaceae (Borage Family)	<i>Myosotis discolor</i>	Changing Forget-me-Not	Naturalized	N/A
Boraginaceae (Borage Family)	<i>Phacelia distans</i>	Distant Phacelia	Native	N/A
Boraginaceae (Borage Family)	<i>Phacelia imbricata</i> ssp. <i>imbricata</i>	Imbricate Phacelia	Native	N/A
Brassicaceae (Mustard Family)	<i>Athysanus pusillus</i>	Common Sandweed	Native	N/A
Brassicaceae (Mustard Family)	<i>Barbarea orthoceras</i>	American Yellowrocket	Native	N/A
Brassicaceae (Mustard Family)	<i>Capsella bursa-pastoris</i>	Shepherd's Purse	Naturalized	N/A
Brassicaceae (Mustard Family)	<i>Cardamine californica</i>	California toothwort; Milkmaids	Native	N/A
Brassicaceae (Mustard Family)	<i>Cardamine oligosperma</i>	Little Western Bittercress	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Brassicaceae (Mustard Family)	<i>Caulanthus lasiophyllus</i>	California Mustard	Native	N/A
Brassicaceae (Mustard Family)	<i>Hirschfeldia incana</i>	Mediterranean Mustard	Naturalized	Moderate
Brassicaceae (Mustard Family)	<i>Lepidium nitidum</i>	Shining Pepperweed	Native	N/A
Brassicaceae (Mustard Family)	<i>Nasturtium officinale</i>	Water Cress	Native	N/A
Brassicaceae (Mustard Family)	<i>Raphanus sativus</i>	Radish	Naturalized	Limited
Brassicaceae (Mustard Family)	<i>Sisymbrium officinale</i>	Hedge Mustard	Naturalized	N/A
Caprifoliaceae (Honeysuckle Family)	<i>Lonicera hispidula</i>	Pink Honeysuckle	Native	N/A
Caprifoliaceae (Honeysuckle Family)	<i>Lonicera involucrata</i>	Twinberry	Native	N/A
Caprifoliaceae (Honeysuckle Family)	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	Snowberry	Native	N/A
Caprifoliaceae (Honeysuckle Family)	<i>Symphoricarpos mollis</i>	Creeping Snowberry, Trip Vine	Native	N/A
Caryophyllaceae (Pink Family)	<i>Cerastium glomeratum</i>	Sticky Mouse-ear Chickweed	Naturalized	N/A
Caryophyllaceae (Pink Family)	<i>Paronychia franciscana</i>	San Francisco Nailwort	Naturalized	N/A
Caryophyllaceae (Pink Family)	<i>Silene gallica</i>	Small-flower Catchfly, Windmill Pink	Naturalized	N/A
Caryophyllaceae (Pink Family)	<i>Spergularia rubra</i>	Red Sand-spurrey	Naturalized	N/A
Caryophyllaceae (Pink Family)	<i>Stellaria media</i>	Common Chickweed	Naturalized	N/A
Convolvulaceae (Morning-glory Family)	<i>Calystegia purpurata</i> ssp. <i>purpurata</i>	Pacific False Bindweed	Native	N/A
Convolvulaceae (Morning-glory Family)	<i>Calystegia subacaulis</i> ssp. <i>subacaulis</i>	Hill Morning Glory	Native	N/A
Convolvulaceae (Morning-glory Family)	<i>Convolvulus arvensis</i>	Bindweed	Naturalized	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Crassulaceae (Stonecrop Family)	<i>Crassula connata</i>	Pygmy-weed	Native	N/A
Crassulaceae (Stonecrop Family)	<i>Dudleya cymosa</i> ssp. <i>cymosa</i>	Canyon Liveforever	Native	N/A
Cucurbitaceae (Cucumber Family)	<i>Marah fabacea</i>	California Man-root	Native	N/A
Cucurbitaceae (Cucumber Family)	<i>Marah oregana</i>	Coast Man-root	Native	N/A
Cupressaceae (Cypress Family)	<i>Juniperus occidentalis</i>	Western Juniper	Native	N/A
Cyperaceae (Sedge Family)	<i>Carex densa</i>	Dense Sedge	Native	N/A
Cyperaceae (Sedge Family)	<i>Carex hirtissima</i>	Fuzzy Sedge	Native	N/A
Cyperaceae (Sedge Family)	<i>Carex praeegracilis</i>	Black Creeper, Freeway Sedge	Native	N/A
Cyperaceae (Sedge Family)	<i>Carex tumulicola</i>	Foothill Sedge	Native	N/A
Cyperaceae (Sedge Family)	<i>Cyperus eragrostis</i>	Tall Flatsedge	Native	N/A
Cyperaceae (Sedge Family)	<i>Cyperus esculentus</i>	Yellow Nutsedge	Native	N/A
Cyperaceae (Sedge Family)	<i>Isolepis cernua</i>	Low Bulrush	Native	N/A
Dennstaedtiaceae (Bracken Fern Family)	<i>Pteridium aquilinum</i> var. <i>pubescens</i>	Hairy Brackenfern	Native	N/A
Dipsacaceae (Teasel Family)	<i>Dipsacus sativus</i>	Indian Teasel	Naturalized	Moderate
Dryopteridaceae (Wood Fern Family)	<i>Dryopteris arguta</i>	Coastal Woodfern	Native	N/A
Dryopteridaceae (Wood Fern Family)	<i>Polystichum munitum</i>	Western Sword Fern	Native	N/A
Equisetaceae (Horsetail Family)	<i>Equisetum telmateia</i> ssp. <i>braunii</i>	Giant Horsetail	Native	N/A
Ericaceae (Heath Family)	<i>Vaccinium ovatum</i>	California Huckleberry	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Euphorbiaceae (Spurge Family)	<i>Croton setigerus</i>	Turkey-mullein, Doveweed	Native	N/A
Fabaceae (Pea Family)	<i>Acmispon americanus</i> var. <i>americanus</i>	Spanish Lotus	Native	N/A
Fabaceae (Pea Family)	<i>Acmispon brachycarpus</i>	Short Podded Lotus	Native	N/A
Fabaceae (Pea Family)	<i>Acmispon glaber</i> var. <i>glaber</i>	Deerweed	Native	N/A
Fabaceae (Pea Family)	<i>Acmispon strigosus</i>	Strigose Lotus	Native	N/A
Fabaceae (Pea Family)	<i>Acmispon wrangelianus</i>	Chilean Trefoil	Native	N/A
Fabaceae (Pea Family)	<i>Astragalus gambelianus</i>	Gambel Milkvetch, Little Blue Loco	Native	N/A
Fabaceae (Pea Family)	<i>Lathyrus vestitus</i> var. <i>vestitus</i>	Hillside Pea	Native	N/A
Fabaceae (Pea Family)	<i>Lotus angustissimus</i>	Slender Bird's-foot Trefoil	Naturalized	N/A
Fabaceae (Pea Family)	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	Naturalized	N/A
Fabaceae (Pea Family)	<i>Lupinus albifrons</i> var. <i>collinus</i>	Silver Lupine	Native	N/A
Fabaceae (Pea Family)	<i>Lupinus albifrons</i> var. <i>douglasii</i>	Douglas' Silver Lupine	Native	N/A
Fabaceae (Pea Family)	<i>Lupinus bicolor</i>	Miniature Lupine	Native	N/A
Fabaceae (Pea Family)	<i>Lupinus microcarpus</i> var. <i>microcarpus</i>	Chick Lupine	Native	N/A
Fabaceae (Pea Family)	<i>Lupinus nanus</i>	Sky Lupine	Native	N/A
Fabaceae (Pea Family)	<i>Medicago polymorpha</i>	California Burclover	Naturalized	Limited
Fabaceae (Pea Family)	<i>Trifolium campestre</i>	Hop Clover	Naturalized	N/A
Fabaceae (Pea Family)	<i>Trifolium dubium</i>	Little Hop Clover	Naturalized	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Fabaceae (Pea Family)	<i>Trifolium fragiferum</i>	Strawberry Clover	Naturalized	N/A
Fabaceae (Pea Family)	<i>Trifolium fucatum</i>	Bull Clover	Native	N/A
Fabaceae (Pea Family)	<i>Trifolium hirtum</i>	Rose Clover	Naturalized	Limited
Fabaceae (Pea Family)	<i>Trifolium microcephalum</i>	Small-head Clover	Native	N/A
Fabaceae (Pea Family)	<i>Trifolium oliganthum</i>	Few-flowered Clover	Native	N/A
Fabaceae (Pea Family)	<i>Trifolium repens</i>	White Clover	Naturalized	N/A
Fabaceae (Pea Family)	<i>Trifolium subterraneum</i>	Subterranean Clover	Naturalized	N/A
Fabaceae (Pea Family)	<i>Trifolium willdenovii</i>	Tomcat Clover	Native	N/A
Fabaceae (Pea Family)	<i>Vicia americana</i> ssp. <i>americana</i>	American Vetch	Native	N/A
Fabaceae (Pea Family)	<i>Vicia sativa</i> ssp. <i>nigra</i>	Narrow-leaved Vetch	Naturalized	N/A
Fabaceae (Pea Family)	<i>Vicia sativa</i> ssp. <i>sativa</i>	Spring Vetch	Naturalized	N/A
Fabaceae (Pea Family)	<i>Vicia villosa</i> ssp. <i>varia</i>	Winter Vetch	Naturalized	N/A
Fagaceae (Beech Family)	<i>Quercus agrifolia</i> var. <i>agrifolia</i>	California Live Oak	Native	N/A
Garryaceae (Silk Tassel Family)	<i>Garrya elliptica</i>	Wavyleaf Silktassel	Native	N/A
Gentianaceae (Gentian Family)	<i>Centaurium tenuiflorum</i>	Slender Centaury	Naturalized	N/A
Gentianaceae (Gentian Family)	<i>Zeltnera muehlenbergii</i>	Monterey Centaury	Native	N/A
Geraniaceae (Geranium Family)	<i>Erodium botrys</i>	Longbeak Stork's Bill	Naturalized	N/A
Geraniaceae (Geranium Family)	<i>Erodium cicutarium</i>	Redstem Filaree	Naturalized	Limited

Family Name	Scientific Name	Common Name	Origin	Status*
Geraniaceae (Geranium Family)	<i>Erodium moschatum</i>	Greenstem Filaree	Naturalized	N/A
Geraniaceae (Geranium Family)	<i>Geranium dissectum</i>	Cutleaf Geranium	Naturalized	Limited
Geraniaceae (Geranium Family)	<i>Geranium molle</i>	Soft Cranesbill	Naturalized	N/A
Grossulariaceae (Currant Family)	<i>Ribes californicum</i> var. <i>californicum</i>	California Gooseberry	Native	N/A
Hypericaceae (St. John's Wort Family)	<i>Hypericum anagalloides</i>	Tinker's Penny	Native	N/A
Iridaceae (Iris Family)	<i>Iris douglasiana</i>	Douglas Iris	Native	N/A
Iridaceae (Iris Family)	<i>Iris macrosiphon</i>	Bowltube Iris	Native	N/A
Iridaceae (Iris Family)	<i>Romulea rosea</i> var. <i>australis</i>	Rosy Sandcrocus	Naturalized	N/A
Iridaceae (Iris Family)	<i>Sisyrinchium bellum</i>	Western Blue-eyed-grass	Native	N/A
Juncaceae (Rush Family)	<i>Juncus bolanderi</i>	Bolander's Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus bufonius</i> var. <i>occidentalis</i>	Western Toad Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus effusus</i> ssp. <i>pacificus</i>	Pacific Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus hesperius</i>	Coast Or Bog Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus mexicanus</i>	Mexican Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus occidentalis</i>	Western Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus patens</i>	Spreading Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus tenuis</i>	Poverty Or Slender Rush	Native	N/A
Juncaceae (Rush Family)	<i>Juncus xiphioides</i>	Iris-leaved Rush	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Juncaceae (Rush Family)	<i>Luzula comosa</i> var. <i>comosa</i>	Hairy Wood Rush	Native	N/A
Lamiaceae (Mint Family)	<i>Clinopodium douglasii</i>	Yerba Buena	Native	N/A
Lamiaceae (Mint Family)	<i>Mentha pulegium</i>	Pennyroyal	Naturalized	Moderate
Lamiaceae (Mint Family)	<i>Monardella villosa</i> ssp. <i>franciscana</i>	San Francisco Coyote Mint	Native	N/A
Lamiaceae (Mint Family)	<i>Monardella villosa</i> ssp. <i>villosa</i>	Coyote Mint	Native	N/A
Lamiaceae (Mint Family)	<i>Prunella vulgaris</i> var. <i>lanceolata</i>	Mountain Selfheal	Native	N/A
Lamiaceae (Mint Family)	<i>Prunella vulgaris</i> var. <i>vulgaris</i>	Selfheal	Naturalized	N/A
Lamiaceae (Mint Family)	<i>Stachys ajugoides</i>	Bugle Hedgenettle	Native	N/A
Lamiaceae (Mint Family)	<i>Stachys rigida</i> var. <i>quercetorum</i>	Rough Hedgenettle	Native	N/A
Lauraceae (Laurel Family)	<i>Umbellularia californica</i>	California Laurel	Native	N/A
Linaceae (Flax Family)	<i>Linum bienne</i>	Pale Flax	Naturalized	N/A
Lythraceae (Loosestrife Family)	<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife; Grass Poly; Hyssop Lythrum	Naturalized	Limited
Malvaceae (Mallow Family)	<i>Malva nicaeensis</i>	Bull Mallow	Naturalized	N/A
Malvaceae (Mallow Family)	<i>Sidalcea malviflora</i> ssp. <i>laciniata</i>	Geranium-leaved Checkerbloom	Native	N/A
Melanthiaceae (False-hellebore Family)	<i>Trillium ovatum</i>	Western Wakerobin	Native	N/A
Melanthiaceae (False-hellebore Family)	<i>Toxicoscordion fremontii</i>	Fremont's Star Lily	Native	N/A
Montiaceae (Miner's Lettuce Family)	<i>Calandrinia ciliata</i>	Red Maids	Native	N/A
Montiaceae (Miner's Lettuce Family)	<i>Claytonia perfoliata</i> ssp. <i>perfoliata</i>	Miner's Lettuce	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Myrsinaceae (Myrsine Family)	<i>Lysimachia arvensis</i>	Scarlet Pimpernel	Naturalized	N/A
Myrsinaceae (Myrsine Family)	<i>Lysimachia minima</i>	Chaffweed	Native	N/A
Onagraceae (Evening Primrose Family)	<i>Clarkia purpurea</i> ssp. <i>quadrivulnera</i>	Four-Spot	Native	N/A
Onagraceae (Evening Primrose Family)	<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	Fringed Willowherb	Native	N/A
Onagraceae (Evening Primrose Family)	<i>Epilobium densiflorum</i>	Denseflower Willowherb	Native	N/A
Onagraceae (Evening Primrose Family)	<i>Epilobium brachycarpum</i>	Willowherb	Native	N/A
Onagraceae (Evening Primrose Family)	<i>Taraxia ovata</i>	Suncups	Native	N/A
Orobanchaceae (Broom-rape Family)	<i>Bellardia trixago</i>	Mediterranean Linseed	Naturalized	Limited
Orobanchaceae (Broom-rape Family)	<i>Castilleja affinis</i> ssp. <i>affinis</i>	Coast Indian Paintbrush	Native	N/A
Orobanchaceae (Broom-rape Family)	<i>Castilleja densiflora</i> ssp. <i>densiflora</i>	Dense Flower Owl's Clover	Native	N/A
Orobanchaceae (Broom-rape Family)	<i>Castilleja subinclusa</i> ssp. <i>franciscana</i>	Franciscan Paintbrush	Native	N/A
Orobanchaceae (Broom-rape Family)	<i>Parentucellia latifolia</i>	Broadleaf Glandweed	Naturalized	N/A
Orobanchaceae (Broom-rape Family)	<i>Parentucellia viscosa</i>	Yellow Glandweed; Sticky Parentucellia	Naturalized	Limited
Orobanchaceae (Broom-rape Family)	<i>Triphysaria pusilla</i>	Dwarf Owl's-clover	Native	N/A
Oxalidaceae (Wood-Sorrel Family)	<i>Oxalis corniculata</i>	Creeping Woodsorrel	Naturalized	N/A
Papaveraceae (Poppy Family)	<i>Eschscholzia californica</i>	California Poppy	Native	N/A
Papaveraceae (Poppy Family)	<i>Platystemon californicus</i>	Cream Cups	Native	N/A
Phrymaceae (Lopseed Family)	<i>Diplacus aurantiacus</i>	Sticky Monkeyflower	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Phrymaceae (Lopseed Family)	<i>Erythranthe guttata</i>	Seep Monkeyflower	Native	N/A
Pinaceae (Pine Family)	<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir	Native	N/A
Plantaginaceae (Plantain Family)	<i>Kickxia elatine</i>	Sharpleaf Cancerwort	Naturalized	N/A
Plantaginaceae (Plantain Family)	<i>Plantago lanceolata</i>	English Plantain	Naturalized	Limited
Plantaginaceae (Plantain Family)	<i>Plantago major</i>	Common Plantain	Naturalized	N/A
Plantaginaceae (Plantain Family)	<i>Plantago subnuda</i>	Tall Coastal Plantain	Native	N/A
Plantaginaceae (Plantain Family)	<i>Veronica americana</i>	American Brooklime	Native	N/A
Poaceae (Grass Family)	<i>Agrostis exarata</i>	Spike Bent Grass	Native	N/A
Poaceae (Grass Family)	<i>Aira caryophyllea</i>	Silver Hair Grass	Naturalized	N/A
Poaceae (Grass Family)	<i>Aira elegans</i>	Elegant Hair Grass	Naturalized	N/A
Poaceae (Grass Family)	<i>Alopecurus pratensis</i>	Meadow Foxtail	Naturalized	N/A
Poaceae (Grass Family)	<i>Avena barbata</i>	Slender Wild Oat	Naturalized	Moderate
Poaceae (Grass Family)	<i>Brachypodium distachyon</i>	Annual False-brome; False Brome; Purple False Brome; Stif	Naturalized	Moderate
Poaceae (Grass Family)	<i>Briza maxima</i>	Rattlesnake Grass, Large Quaking Grass	Naturalized	Limited
Poaceae (Grass Family)	<i>Briza minor</i>	Annual Quaking Grass, Small Quaking Grass	Naturalized	N/A
Poaceae (Grass Family)	<i>Bromus carinatus</i> var. <i>carinatus</i>	California Brome	Native	N/A
Poaceae (Grass Family)	<i>Bromus diandrus</i>	Ripgut Brome	Naturalized	Moderate
Poaceae (Grass Family)	<i>Bromus hordeaceus</i>	Soft Chess	Naturalized	Limited

Family Name	Scientific Name	Common Name	Origin	Status*
Poaceae (Grass Family)	<i>Bromus laevipes</i>	Woodland Brome	Native	N/A
Poaceae (Grass Family)	<i>Cynodon dactylon</i>	Bermuda Grass	Naturalized	Moderate
Poaceae (Grass Family)	<i>Cynosurus echinatus</i>	Bristly Dogtail Grass	Naturalized	Moderate
Poaceae (Grass Family)	<i>Danthonia californica</i>	California Oat Grass	Native	N/A
Poaceae (Grass Family)	<i>Elymus caput-medusae</i>	Medusa Head	Naturalized	High
Poaceae (Grass Family)	<i>Elymus triticoides</i>	Beardless Wild Rye	Native	N/A
Poaceae (Grass Family)	<i>Festuca arundinacea</i>	Tall Fescue	Naturalized	Moderate
Poaceae (Grass Family)	<i>Festuca bromoides</i>	Brome Fescue	Naturalized	N/A
Poaceae (Grass Family)	<i>Festuca californica</i>	California Fescue	Native	N/A
Poaceae (Grass Family)	<i>Festuca perennis</i>	Rye Grass	Naturalized	Moderate
Poaceae (Grass Family)	<i>Gastridium phleoides</i>	Nit Grass	Naturalized	N/A
Poaceae (Grass Family)	<i>Glyceria leptostachya</i>	Narrow Manna Grass	Native	N/A
Poaceae (Grass Family)	<i>Holcus lanatus</i>	Common Velvet Grass	Naturalized	Moderate
Poaceae (Grass Family)	<i>Hordeum brachyantherum</i> ssp. <i>brachyantherum</i>	Meadow Barley	Native	N/A
Poaceae (Grass Family)	<i>Hordeum murinum</i> ssp. <i>leporinum</i>	Hare Barley	Naturalized	Moderate
Poaceae (Grass Family)	<i>Koeleria macrantha</i>	June Grass	Native	N/A
Poaceae (Grass Family)	<i>Melica californica</i>	California Melic	Native	N/A
Poaceae (Grass Family)	<i>Melica torreyana</i>	Torrey's Melic	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Poaceae (Grass Family)	<i>Phalaris aquatica</i>	Harding Grass	Naturalized	Moderate
Poaceae (Grass Family)	<i>Poa annua</i>	Annual Blue Grass	Naturalized	N/A
Poaceae (Grass Family)	<i>Poa secunda</i> ssp. <i>secunda</i>	One-sided Blue Grass	Native	N/A
Poaceae (Grass Family)	<i>Rytidosperma penicillatum</i>	Hairy Oat Grass, Poverty Grass	Naturalized	Limited
Poaceae (Grass Family)	<i>Polypogon monspeliensis</i>	Rabbitfoot Grass	Naturalized	Limited
Poaceae (Grass Family)	<i>Stipa pulchra</i>	Purple Needle Grass	Native	N/A
Polemoniaceae (Phlox Family)	<i>Navarretia squarrosa</i>	Skunkweed	Native	N/A
Polygalaceae (Milkwort Family)	<i>Polygala californica</i>	California Milkwort	Native	N/A
Polygonaceae (Buckwheat Family)	<i>Eriogonum nudum</i> var. <i>nudum</i>	Naked Wild Buckwheat	Native	N/A
Polygonaceae (Buckwheat Family)	<i>Pterostegia drymarioides</i>	Woodland Pterostegia	Native	N/A
Polygonaceae (Buckwheat Family)	<i>Rumex acetosella</i>	Sheep Sorrel	Naturalized	Moderate
Polygonaceae (Buckwheat Family)	<i>Rumex conglomeratus</i>	Clustered Dock	Naturalized	N/A
Polygonaceae (Buckwheat Family)	<i>Rumex pulcher</i>	Fiddle Dock	Naturalized	N/A
Polypodiaceae (Polypody Family)	<i>Polypodium californicum</i>	California Polypody	Native	N/A
Potamogetonaceae (Pondweed Family)	<i>Potamogeton Nodosus</i>	Alismatales	Native	N/A
Primulaceae (Primrose Family)	<i>Primula hendersonii</i>	Mosquito Bill(s), Sailor Caps	Native	N/A
Pteridaceae (Maidenhair Fern Family)	<i>Adiantum jordanii</i>	California Maidenhair	Native	N/A
Pteridaceae (Maidenhair Fern Family)	<i>Aspidotis californica</i>	California Lace Fern	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Pteridaceae (Maidenhair Fern Family)	<i>Pellaea andromedifolia</i>	Coffee Fern	Native	N/A
Pteridaceae (Maidenhair Fern Family)	<i>Pentagramma triangularis</i> ssp. <i>triangularis</i>	Goldback Fern	Native	N/A
Ranunculaceae (Buttercup Family)	<i>Delphinium nudicaule</i>	Red Or Orange Larkspur	Native	N/A
Ranunculaceae (Buttercup Family)	<i>Ranunculus californicus</i> var. <i>californicus</i>	California Buttercup	Native	N/A
Ranunculaceae (Buttercup Family)	<i>Ranunculus muricatus</i>	Spinyfruit Buttercup	Naturalized	N/A
Rhamnaceae (Buckthorn Family)	<i>Ceanothus thyrsiflorus</i>	Blueblossom	Native	N/A
Rhamnaceae (Buckthorn Family)	<i>Frangula californica</i> ssp. <i>californica</i>	California Coffeeberry	Native	N/A
Rhamnaceae (Buckthorn Family)	<i>Rhamnus crocea</i>	Spiny Redberry	Native	N/A
Rosaceae (Rose Family)	<i>Acaena pinnatifida</i> var. <i>californica</i>		Native	N/A
Rosaceae (Rose Family)	<i>Aphanes occidentalis</i>	Western Ladyös Mantle	Native	N/A
Rosaceae (Rose Family)	<i>Drymocallis glandulosa</i> var. <i>glandulosa</i>		Native	N/A
Rosaceae (Rose Family)	<i>Fragaria vesca</i>	Wood Strawberry	Native	N/A
Rosaceae (Rose Family)	<i>Heteromeles arbutifolia</i>	Toyon	Native	N/A
Rosaceae (Rose Family)	<i>Holodiscus discolor</i>	Oceanspray	Native	N/A
Rosaceae (Rose Family)	<i>Oemleria cerasiformis</i>	Indian Plum	Native	N/A
Rosaceae (Rose Family)	<i>Physocarpus capitatus</i>	Pacific Ninebark	Native	N/A
Rosaceae (Rose Family)	<i>Prunus emarginata</i>	Bitter Cherry	Native	N/A
Rosaceae (Rose Family)	<i>Rosa californica</i>	California Rose	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Rosaceae (Rose Family)	<i>Rosa eglanteria</i>	Sweet Brier	Naturalized	N/A
Rosaceae (Rose Family)	<i>Rosa gymnocarpa</i>	Wood Rose	Native	N/A
Rosaceae (Rose Family)	<i>Rubus armeniacus</i>	Himalayan blackberry	Naturalized	High
Rosaceae (Rose Family)	<i>Rubus ursinus</i>	California Blackberry	Native	N/A
Rubiaceae (Madder Family)	<i>Galium aparine</i>	Goose Grass	Native	N/A
Rubiaceae (Madder Family)	<i>Galium porrigens</i> var. <i>porrigens</i>	Graceful Bedstraw	Native	N/A
Rubiaceae (Madder Family)	<i>Galium triflorum</i>	Sweet-scented Bedstraw	Native	N/A
Rubiaceae (Madder Family)	<i>Sherardia arvensis</i>	Field Madder	Naturalized	N/A
Salicaceae (Willow Family)	<i>Salix laevigata</i>	Red Willow	Native	N/A
Salicaceae (Willow Family)	<i>Salix lasiolepis</i>	Arroyo Willow	Native	N/A
Salicaceae (Willow Family)	<i>Salix scouleriana</i>	Scouler's Willow	Native	N/A
Sapindaceae (Soapberry Family)	<i>Aesculus californica</i>	California Buckeye	Native	N/A
Saxifragaceae (Saxifrage Family)	<i>Lithophragma affine</i>	San Francisco Woodland-star	Native	N/A
Saxifragaceae (Saxifrage Family)	<i>Micranthes californica</i>	California Saxifrage	Native	N/A
Saxifragaceae (Saxifrage Family)	<i>Tellima grandiflora</i>	Bigflower Tellima	Native	N/A
Scrophulariaceae (Figwort Family)	<i>Scrophularia californica</i>	California Figwort	Native	N/A

Family Name	Scientific Name	Common Name	Origin	Status*
Themidaceae (Brodiaea Family)	<i>Brodiaea elegans</i> ssp. <i>elegans</i>	Harvest Brodiaea	Native	N/A
Themidaceae (Brodiaea Family)	<i>Dipterostemon capitatus</i>	Bluedicks	Native	N/A
Themidaceae (Brodiaea Family)	<i>Triteleia laxa</i>	Ithuriel's Spear, Common Triteleia	Native	N/A
Urticaceae (Nettle Family)	<i>Urtica urens</i>	Dwarf Nettle	Naturalized	N/A
Valerianaceae (Valerian Family)	<i>Plectritis macrocera</i>	Longhorn Plectritis	Native	N/A

*Ranking from California Invasive Plant Council, or California Native Plant Society (2021)

Note: Nomenclature corresponds to Jepson Manual, Second Edition (Baldwin et al. 2012) and Jepson Online Interchange (2021).

APPENDIX C: COMMENTS AND RESPONSES ADDENDUM
(to be included in Final IS)