

Rare Plant Inventory

Golden Gate National Recreation Area

Final Report

January 2004

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Introduction

This report contains species accounts of each rare plant species known to occur within Golden Gate National Recreation Area (GGNRA) and the San Francisco Water District (SFWD). The species contained in this report are recognized in the California Native Plant Society's Inventory of Rare and Endangered Plants of California, 6th edition. Each species account includes information on rare plant status, nomenclature, biological history, abundance and distribution within GGNRA and the SFWD, potential threats to the population, inventory and monitoring results for the years 1998 – 2003, recommendations on ways to manage or monitor these plant populations, and population location maps.

There are a total of 33 known rare plant species totaling 200 populations of concern in GGNRA and the SFWD (these numbers do not include plants occurring on the Presidio).

Monitoring of rare plant populations in 2003 was moderate in scope. In 2003, only nine of the 33 rare plant species occurring on GGNRA lands were monitored and no monitoring was conducted on SFWD. Those species monitored by park location are listed in the Table 1.

Park Location	Species	No. of populations monitored	No. of new populations in 2003
Giacomini/Martinelli Wetland	<i>Castilleja ambigua</i> ssp. <i>humboldtensis</i>	8	1
Giacomini/Martinelli Wetland; Bollinas Lagoon	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	6	2
Nicasio Ridge	<i>Castilleja ambigua</i> ssp. <i>neglecta</i>	1	1
	<i>Ceanothus species nova</i>	1	0
	<i>Fritillary liliaceae</i>	1	0
	<i>Hesperolinon congestum</i>	5	0
	<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	5	2
Olema Valley	<i>Fritillaria affinis</i> var. <i>tristulis</i>	1	0
Fort Funston	<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	3	0
Sweeney Ridge	<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	1	0
Totals		32	6

Those species and populations to be monitored in 2003 were determined by two decisions made at the end of the 2002 monitoring season. In order to begin gathering trend data on fluctuations in population size between years it was decided that all newly documented populations be monitored for at least three consecutive years. Those species monitored in 2003 at Giacomini, Olema Valley, Bollinas Lagoon, Sweeney Ridge and Fort Funston were all species that had new populations documented but for which there are not several consecutive years of census data. The second decision made was that once all populations had a minimum of three consecutive years of census data, they would be placed on a scheduled monitoring interval. Thus, if a species was on a two

year interval and it had last been monitored in 2001 than 2003 was the next year to be monitored. All of the species occurring on Nicasio Ridge fell into this category.

In addition to the monitoring of known rare plant populations in 2003, several new populations were found in the course of monitoring (see Table 1) and during directed searches for new populations. As the second year of a four-year inventory program, GGNRA lands that had not been previously surveyed or deemed under surveyed were searched to look for new rare plant populations. A detailed report of areas surveyed and species found is contained in the report titled Rare Plant Inventory, 2003. A total of 15 areas were surveyed resulting in 13 new populations being documented. All new populations documented in 2003 are included in the "Inventory/Monitoring 2003" section found in each species account. A synopsis of all years of monitoring data collected for each species between 1998 and 2003 is found in each species account and in a comprehensive table in Appendix IV.

Rare Plant Monitoring, 2004

In 2002 and 2003 the rare plant monitoring program has been in an interim phase between intensive annual monitoring of all rare plant populations and the development of a new monitoring program which will include both individual species monitoring and plant community monitoring. All rare species occur in communities in association with other species. Expanding the monitoring program to include community information will provide valuable data on how the populations of rare species change in relation to changes in abundance of other species within the community. Resource managers are in the beginning planning stages of designing new monitoring protocols for both individual species and different plant communities. Though a table detailing "Monitoring to be completed in 2004" has been included in Appendix III, the information contained therein may very well become obsolete by the start of the 2004 monitoring season as the design of new monitoring protocols for both individual species and different plant communities evolve. It has, however, been included to provide a synopsis of management recommendations pertinent to each park location and habitat type and suggested monitoring intervals.

***Acanthomintha duttonii* (Abrams) Jokerst**
San Mateo thornmint

Rarity Status

Federal Listing: Federally Listed, **ENDANGERED**

State Listing: State Listed, **ENDANGERED**

CNPS List: 1B / R-E-D Code: 3-3-3

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Comments: Synonym = *Acanthomintha obovata* Jeps. ssp. *duttonii* Abrams (not accepted)

Population Locations: San Francisco Watershed District

Life History

Flowering Time: April-June



Range: This plant is endemic to California. According to the CNPS Rare Plant Inventory, this species is known from only two existing populations. Other historic populations no longer exist.

Characteristics (derived from The Jepson Manual Hickman (1993)):

Acanthomintha duttonii is a small (<20cm), unbranched annual mint with 0 to few hairs. The plant has a terminal inflorescence and a white, bilabiate corolla. The anthers are pink-red with cream-colored pollen. The upper stamens are fertile (some *Acanthomintha* species have sterile upper stamens). *A. duttonii* is restricted to a few moist seeps in serpentinite grasslands.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is known from only a single occurrence in the San Francisco Watershed District. It is located in what is called the 'I-280 triangle'. This site is on the west side of I-280 and just south of Edgewood county road. The last documented sighting of *Acanthomintha duttonii* was in 1991. Approximately 50 individuals were observed in 1991. The mapped sites indicate potential habitat in the area.

Threats

Roads in the area have dissected this population. Changes in the water table may have had an adverse effect on the plant.

Monitoring Results: 1998 – 2003

Location	Species	Pop. Number	1998	1999	2000	2001	2002	2003
SFWD	<i>Acanthomintha duttonii</i>	1	no survey	0	0	0	no survey	no survey

No surveys were conducted on water district lands in 2003. The last documented occurrence of this species was in 1991. Directed surveys were conducted in 1999, 2000 and 2001 but no individuals were found.

Management Recommendations

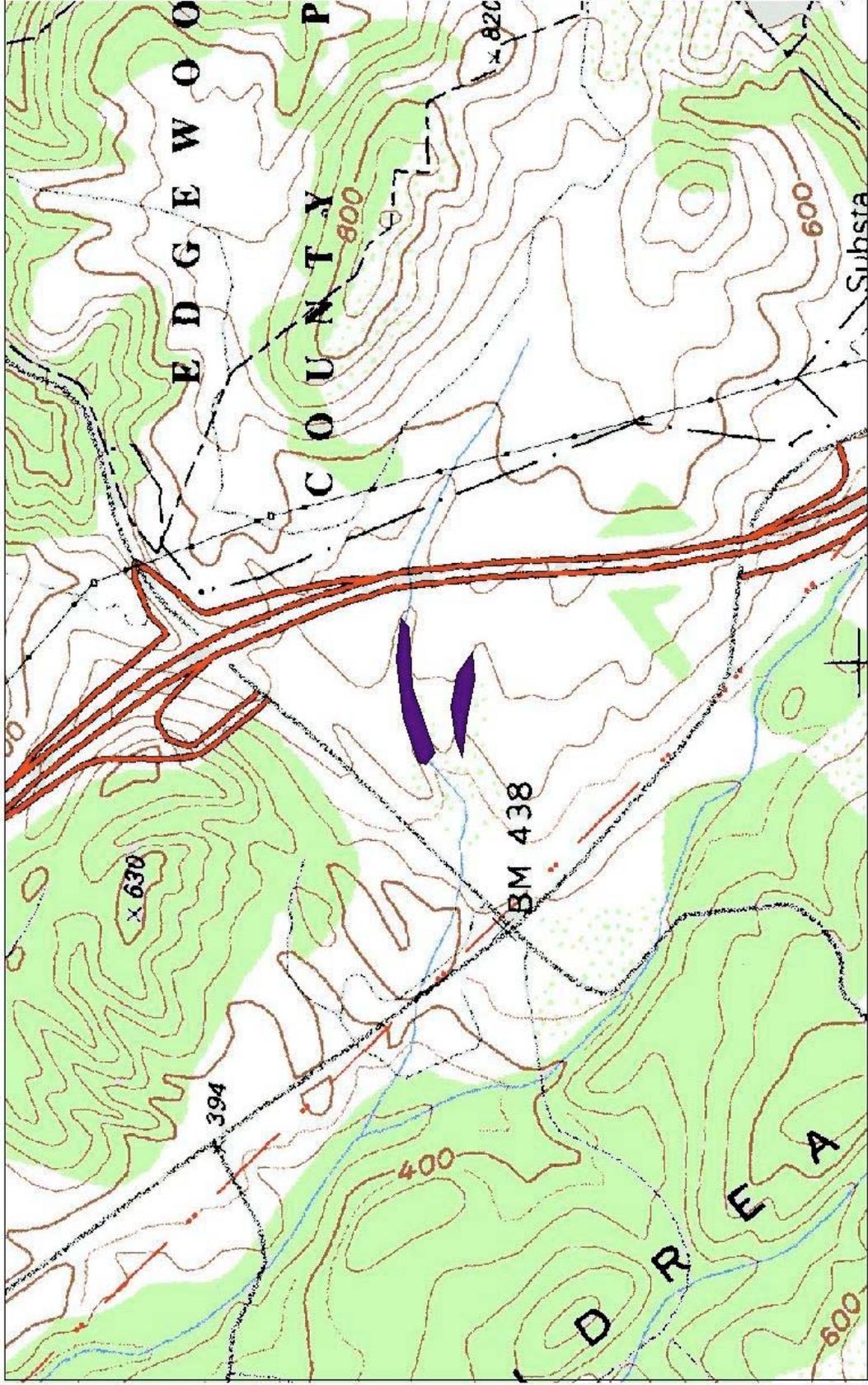
Directed searches for this plant should continue in 2004. It is recommended that a final survey be conducted in 2004 before determining that the population has been extirpated. Surveys should be conducted once a month from March to June.

The only known extant population of *Acanthomintha duttonii* occurs in Edgewood County Park. The possibility of propagating this species from seeds from this population should be discussed with SFWD staff and CNPS San Mateo personnel.

Recommended Monitoring Interval

If a population is found, yearly monitoring should occur for three consecutive years. If the population is deemed to be stable, monitor every two years.

This is a priority species in 2004.



Acanthomintha duttonii

San Francisco Watershed District
'I-280 Triangle'
Woodside Quadrangle

***Arabis blepharophylla* Hook & Arn.**

Coast Rock Cress

Rarity Status

Federal Listing: Not Listed
 State Listing: Not Listed
 CNPS List: 4 / R-E-D 1-1-3

Nomenclature

The Jepson Manual: accepted
CNPS: accepted

Population Locations: Marin Headlands,
 Sweeney Ridge, San Francisco
 Watershed District, Milagra Ridge

Life History

Flowering Time: February-April



Range: This plant is endemic to California. There are documented populations in Contra Costa, Marin, Santa Cruz, San Francisco, San Mateo and Sonoma Counties.

Characteristics:

Coast Rock Cress is a perennial mustard, 5 to 20 cm tall, with rose to purple flowers. These flowers have four widely spoon-shaped petals, and are arranged in a raceme on the top of stems. It has a basal rosette of numerous oblanceolate to obovate leaves. Several unbranched stems can arise from a single rosette. Leaf margins can be smooth or slightly toothed and are hairy, whereas the surfaces of the leaves can have hair or be glabrous. Plants may have a few sessile leaves on the stems.

In the absence of flowers, the basal leaf rosette of *A. blepharophylla* can easily be confused with the basal rosette of rough cat's tongue (*Hypochaeris radicata*), a common weed that often grows in the same location as *A. blepharophylla*. The hairs on the leaves can distinguish the two species. *Arabis blepharophylla* basal leaves have coarse and distinctively forked or multi-branched (stellate) hairs. The basal leaves of *H. radicata* have simple hairs. When flowering, these two plants look very different.

According to The Jepson Manual, this species occurs on rocky outcrops and grassy slopes below 500 m elevation, and is 'uncommon'. It is associated with coastal prairie, mixed evergreen forest and northern coastal scrub plant communities and can occur on serpentinite. It is frequently observed on rocky outcroppings, cliff faces and road cuts the GGNRA.

Other *Arabis* species that occur in the GGNRA is *A. glabra*. *A. breweri*, *A. hirsuta*, and *A. holboelli* also occur within the S.F. Bay Area

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is locally abundant in the Marin Headlands, Sweeney Ridge and Milagra Ridge. One new population was documented at Pedro Point in 2003. There are scattered small populations on ridge tops in the San Francisco Watershed District.

Threats

No studies of specific factors imperiling this species were found. However, considering that its distribution is limited to the Bay Area, habitat loss to development is a justifiable concern. Invasive species as well as encroachment of shrub species into grasslands due to fire suppression might also threaten its habitat in areas protected from development.

Inventory/Monitoring conducted 2003

In 2003, inventory of GGNRA lands that had been deemed under surveyed in previous years were searched for new populations of *Arabis blepharophylla*. The areas searched included Wolf Ridge and Coyote Ridge within the Marin Headlands and Pedro Point in GGNRA south district. Six new small populations were found on Wolf and Coyote Ridges. One new population was found at Pedro Point. No monitoring of previously documented populations was conducted.

Monitoring Results: 1998 – 2003

Pop. Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
Marin Headlands	<i>Arabis blepharophylla</i>	# of populations by year	12	24	29	31	no survey	6
		Total no. of individuals all pops	4,774	9,446	3,062	2,810	no survey	208
Milagra		# of populations by year	2	3	5	9	no survey	no survey
		Total no. of individuals all pops	1,149	943	177	1,387	no survey	no survey
Pedro Point		# of populations by year	--	--	--	--	--	1
			0	0	0	0	0	Approx. 27
SFWD		# of populations by year	--	1	3	3	no survey	no survey
		Total no. of individuals all pops	--	234	2,334	1,683	no survey	no survey
Sweeney		1	176	158	27	535	no survey	no survey

Because of the large number of populations found in each park unit, rather than listing yearly census figures for each population, the total number of populations censused each year and the total number of individuals found in all populations has been given.

Censusing of populations in the five park units listed in the above table have found the species to be generally abundant with a wide distribution. Very low numbers obtained at Milagra in 2000 were likely due to the area being censused very late in the season. The higher numbers found in the Marin Headlands in 1998 and 1999 as compared with 2000 and 2001 are likely due to the sampling method used. In 1998 and 1999 individual flowering stalks rather than individual rosettes were counted.

Management Recommendations

Arabis blepharophylla, though considered rare because of its limited statewide distribution, is actually abundant within the coastal grasslands of GGNRA. Because of the numerous populations and the large number of individuals found within those populations, censusing of each population is very time consuming. Rather than yearly censusing of all populations, known populations should be visited every three years to verify that they are still extant. At that time, ocular estimates of relative abundance can be made (e.g. 1-25 individuals, 25-50 individuals). Surveys for and documentation of new populations should continue.

Recommended Monitoring Interval

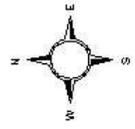
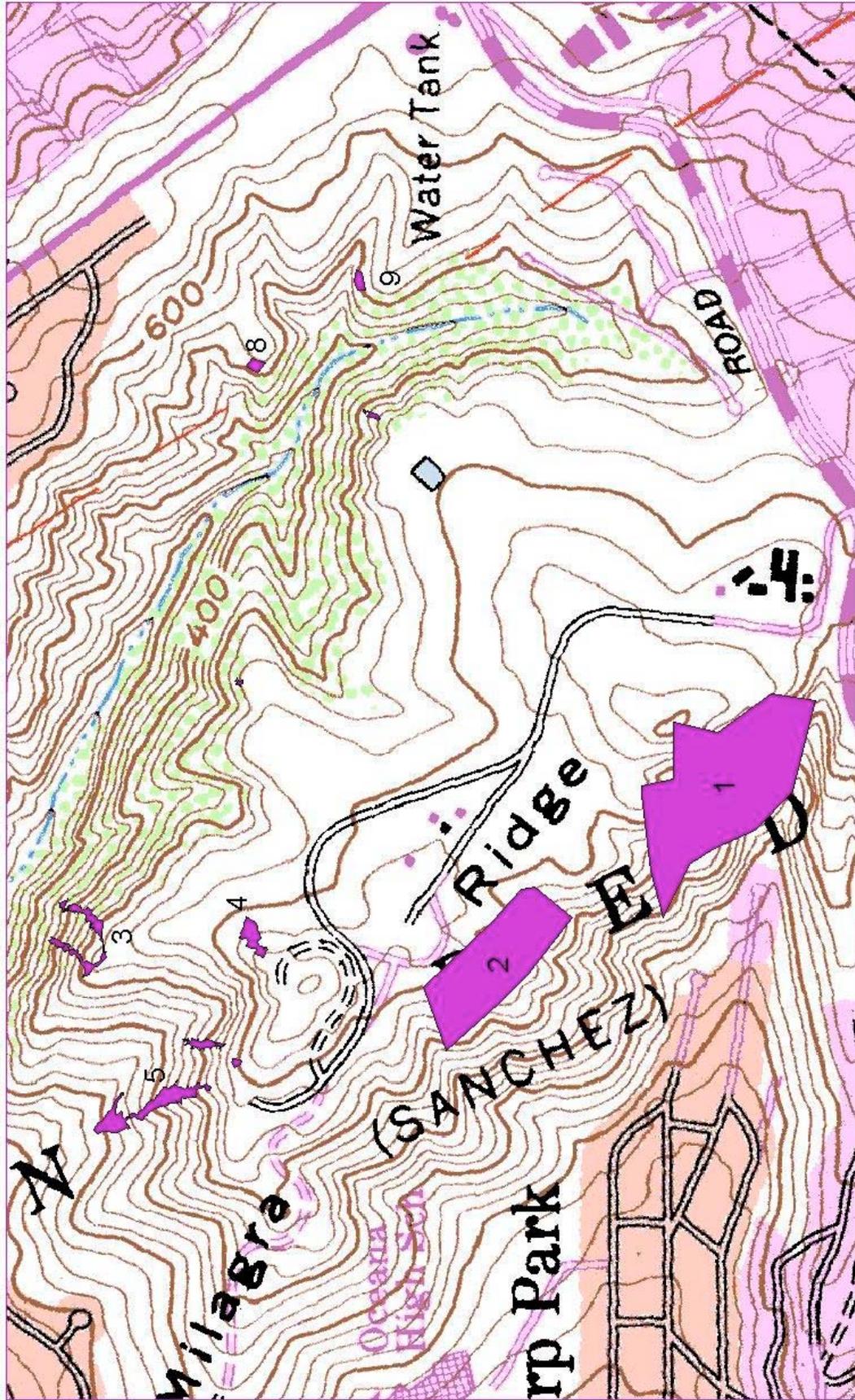
Every three years.



Arabis blepharophylla

Marin Headlands, 2003
Point Bonita and San Francisco North Quadrangles

Arbl_03.shp



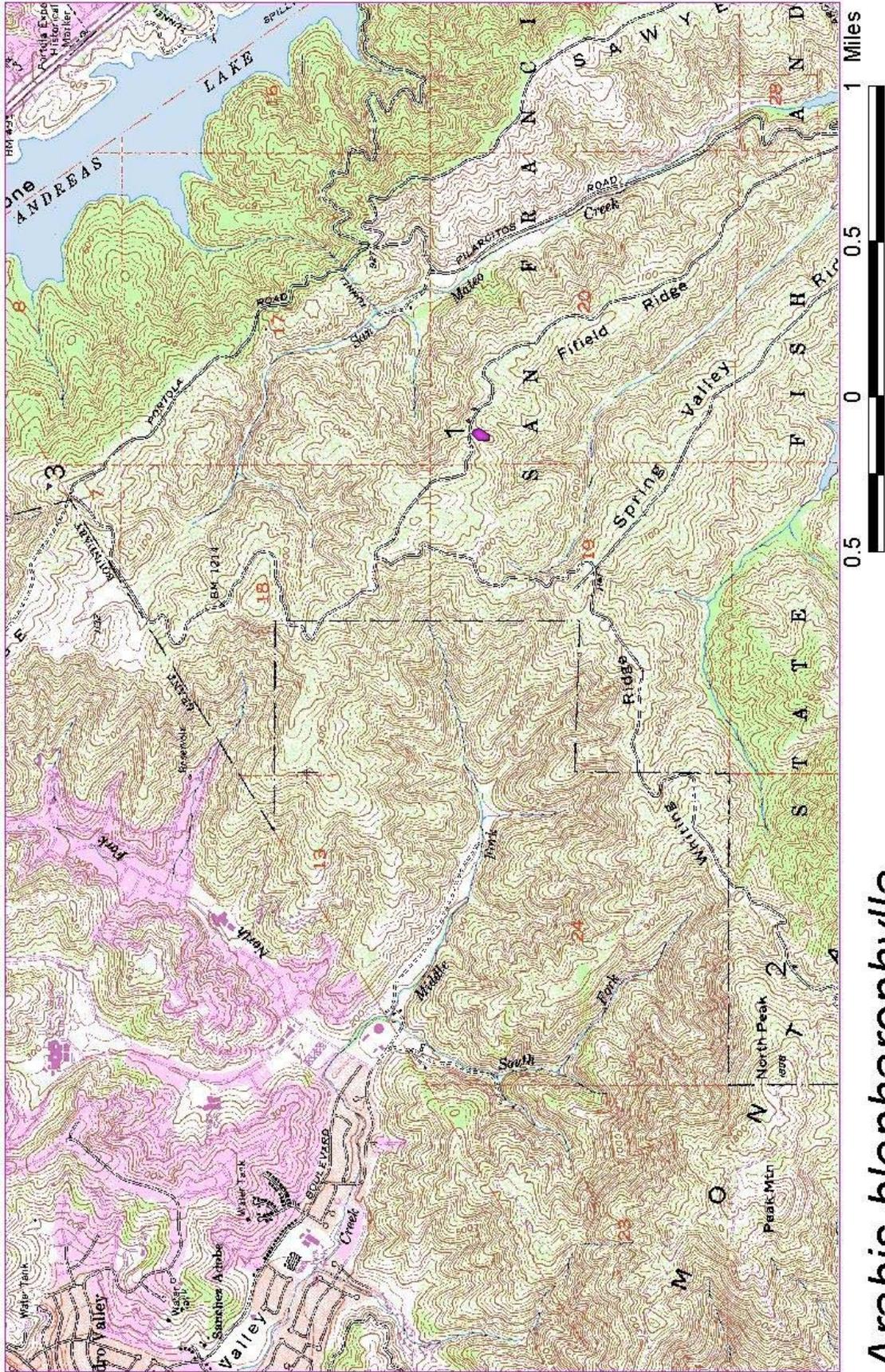
Arabis blepharophylla

Milagra Ridge
San Francisco South Quadrangle



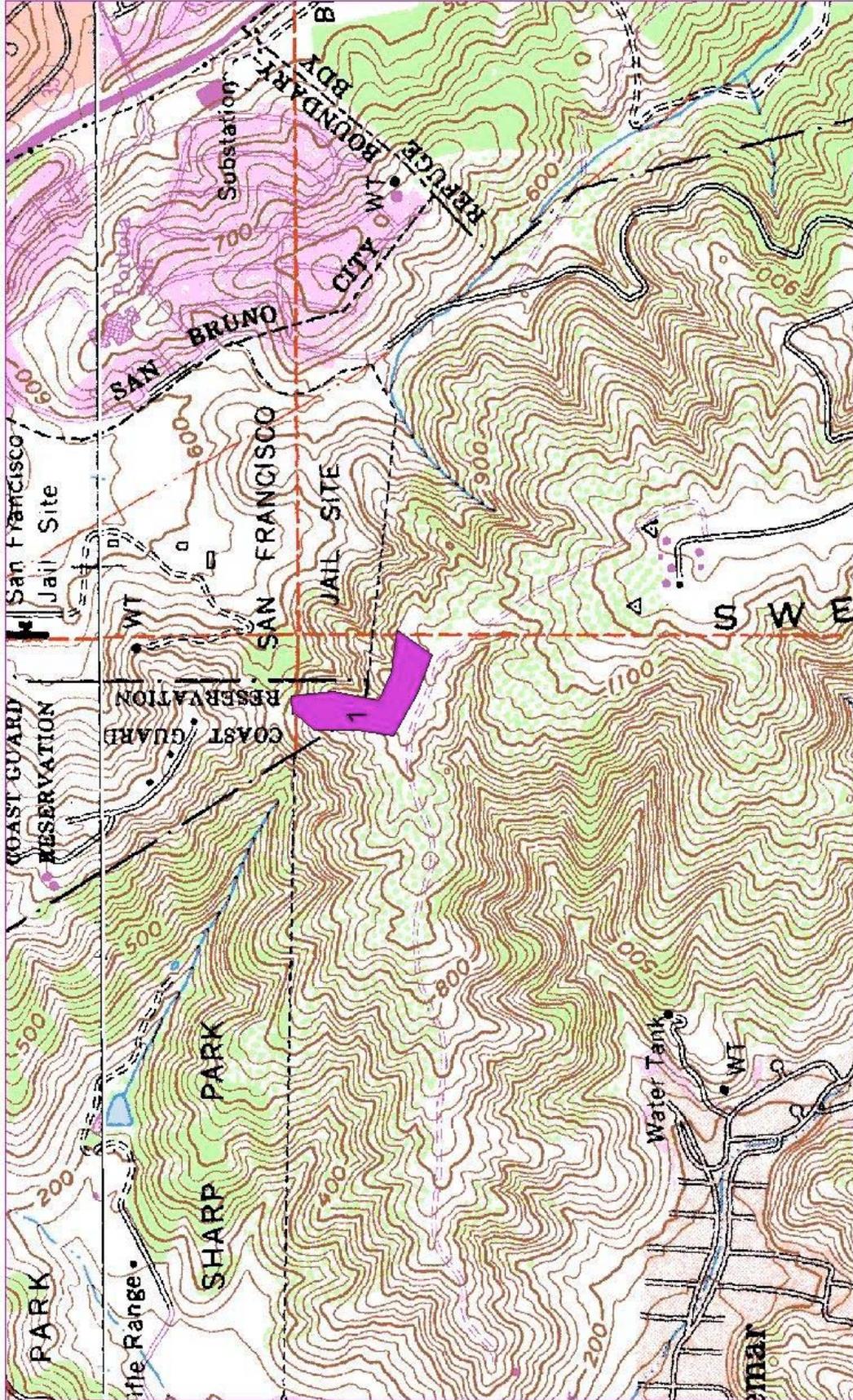
Arabis blepharophylla

Pedro Point, 2003
Montara Mountain Quadrangle



Arabis blepharophylla

San Francisco Watershed District
Montara Mountain Quadrangle



Arabis blepharophylla

Sweeney Ridge
San Francisco South Quadrangle

***Arctostaphylos hookeri* G. Don ssp. *montana* (Eastw.) P. Wells**
 Tamalpais manzanita

Rarity Status

Federal Listing: C2-Threat and/or distribution data are insufficient to support Federal listing.

State Listing: None

CNPS List 1B / R-E-D Code: 3-1-3

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Life History

Flowering Time: February-April

Range: Known from fewer than twenty occurrences in Marin County.

Characteristics

Arctostaphylos hookeri ssp. *montana* is restricted to rocky serpentinite outcrops. The species is generally low growing and lacks a burl at the base of the main stem. *Arctostaphylos glandulosa* also occurs in the same sites as *A. hookeri* ssp. *montana*. *A. glandulosa* can be distinguished by the presence of a large burl at the base of mature plants. The twigs and inflorescence axis of *A. hookeri* ssp. *montana* are densely tomentose while twigs and inflorescence of *A. glandulosa* are bristly glandular. The general habit of *A. glandulosa* is larger than *A. hookeri* ssp. *montana* as well. While *A. glandulosa* is present on serpentinite, it is not restricted to the serpentinite like *A. hookeri* ssp. *montana*.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

The populations that GGNRA monitors are on the Mill Valley Air Force Base (MVAFB) near the West Peak of Mt. Tamalpais. This site is surrounded by Mt. Tamalpais State Park. Although the populations that are surveyed extend beyond the boundaries of the MVAFB, only the plants that occur on the base are censused. Other populations are present on nearby serpentinite outcrops on Mt. Tamalpais.

Threats

Centaurea solstitialis (yellow starthistle) and other introduced species are present within the populations. It is unclear what the impacts of these invasives are at this time. Fire suppression may be allowing encroachment of Douglas fir and other tree and shrub species to encroach into the open serpentinite chaparral sites.



Monitoring Results: 1998 – 2003

Location	Species	Pop. Num	1998	1999	2000	2001	2002	2003
MVAFB	ARHOMO	1	925	973	820	596	photopoints	no survey
		2	--	--	306	624	photopoints	no survey
		3	--	--	--	--	79	no survey

No monitoring of this species was conducted in 2003.

This species grows singly as scattered individuals or in large continuous clumps. It is within these large clusters of shrubs that individuals are difficult to determine. The decrease in number of plants counted between 2000 and 2001 in population 1 is likely due to differences in determining individual plants rather than an actual decline in number of individuals. If there had been a significant decline in number of individuals as suggested by the drop in numbers, a large number of dead shrubs would have been counted. In 2002, no large stands of dead individuals were found. The larger number of individuals found in population 2 in 2001 is also likely due to differences in determining individuals. This species does not readily propagate in the absence of fire on the harsh serpentine substrate on which it grows so it does not seem likely that over 300 new plants established themselves between 2000 and 2001.

From the areas mapped in both 2002 and 2001, it appears that the same areas were surveyed, however with the current censusing method used, where monitoring boundaries are not defined, it is easy for different surveyors to miss whole areas of plants or to include new areas.

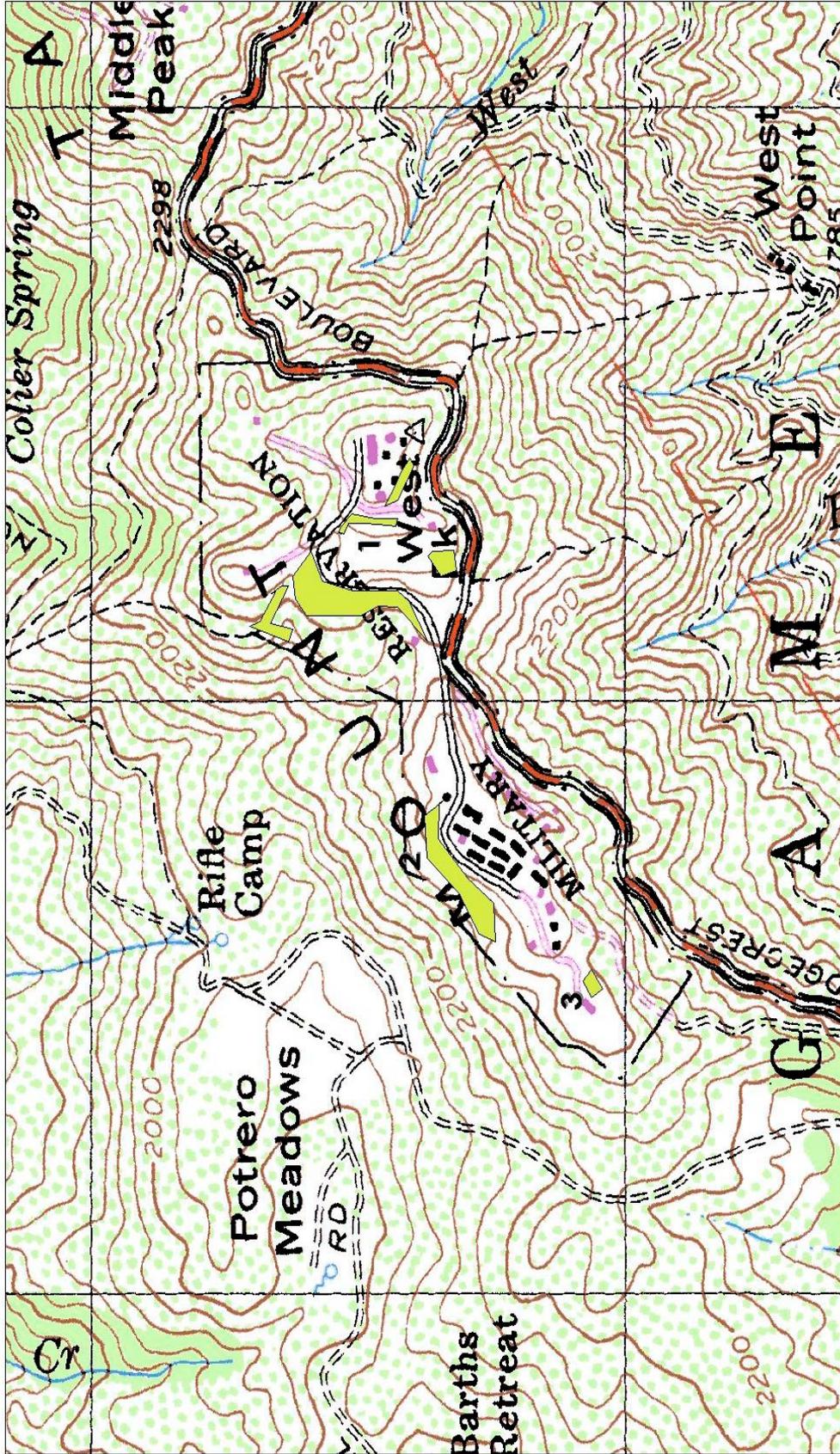
Management Recommendations

Removal of yellow star thistle in this area may help the status of several rare plant species that reside in the area.

The difficulty in determining individuals makes collecting census data on this species prone to inaccuracy. Establishing line transects would allow for the gathering of absolute cover data for individual species as well as relative cover data for all species occurring within this community. A series of transects distributed across these populations would provide data on changes in cover of both native and non-native species.

Recommended Monitoring Interval

Every three years



Arcrostaphylos hookeri ssp. montana

Mill Valley Air Force Base, 2002
San Rafael Quadrangle

***Arctostaphylos montaraensis* Roof**

Montara manzanita

Rarity Status

Federal Listing: None

State Listing: None

CNPS List 1B / R-E-D Code: 3-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Life History

Flowering Time: January-March

Range

According to CNPS, this plant is known from fewer than ten occurrences in San Mateo County.

Characteristics

Arctostaphylos montaraensis is an erect shrub (1-2 m) and is lacking a burl at the base of the stem. The leaf bases are deeply lobed and clasp the stem. The spherical fruits are sticky-glandular.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Approximately 160 acres of *Arctostaphylos montaraensis* on the eastern slopes of Montara Mountain have been mapped in the San Francisco Watershed. Where it occurs, *A. montaraensis* is a major component of the coastal scrubland.

Threats

Between 2000 and 2001 large parts of these populations were bulldozed for fire breaks on the slopes of Montara Mountain. Due to the large size of the populations of concern, the fire lines do not greatly impact the short-term vigor of these populations. However, these disturbances could facilitate the introduction of noxious weeds into the populations. During the 2001 survey, while many other shrub species were observed resprouting and germinating within the bulldozed areas, no resprouting stumps or new seedlings of *A. montaraensis* were seen.

Monitoring Results: 1998 – 2003

Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
SFWD	ARMO	1	--	Pop. surveyed, not censused	Pop. surveyed, not censused	Pop. surveyed, not censused	No survey	No survey
		2	--	Pop. surveyed, not censused	Pop. surveyed, not censused	Pop. surveyed, not censused	No survey	No survey

Surveys conducted between 1999 and 2001 report that other than areas where the populations have been bisected by roads or bulldozed for fire breaks, both populations are intact, healthy stands of maritime chaparral.

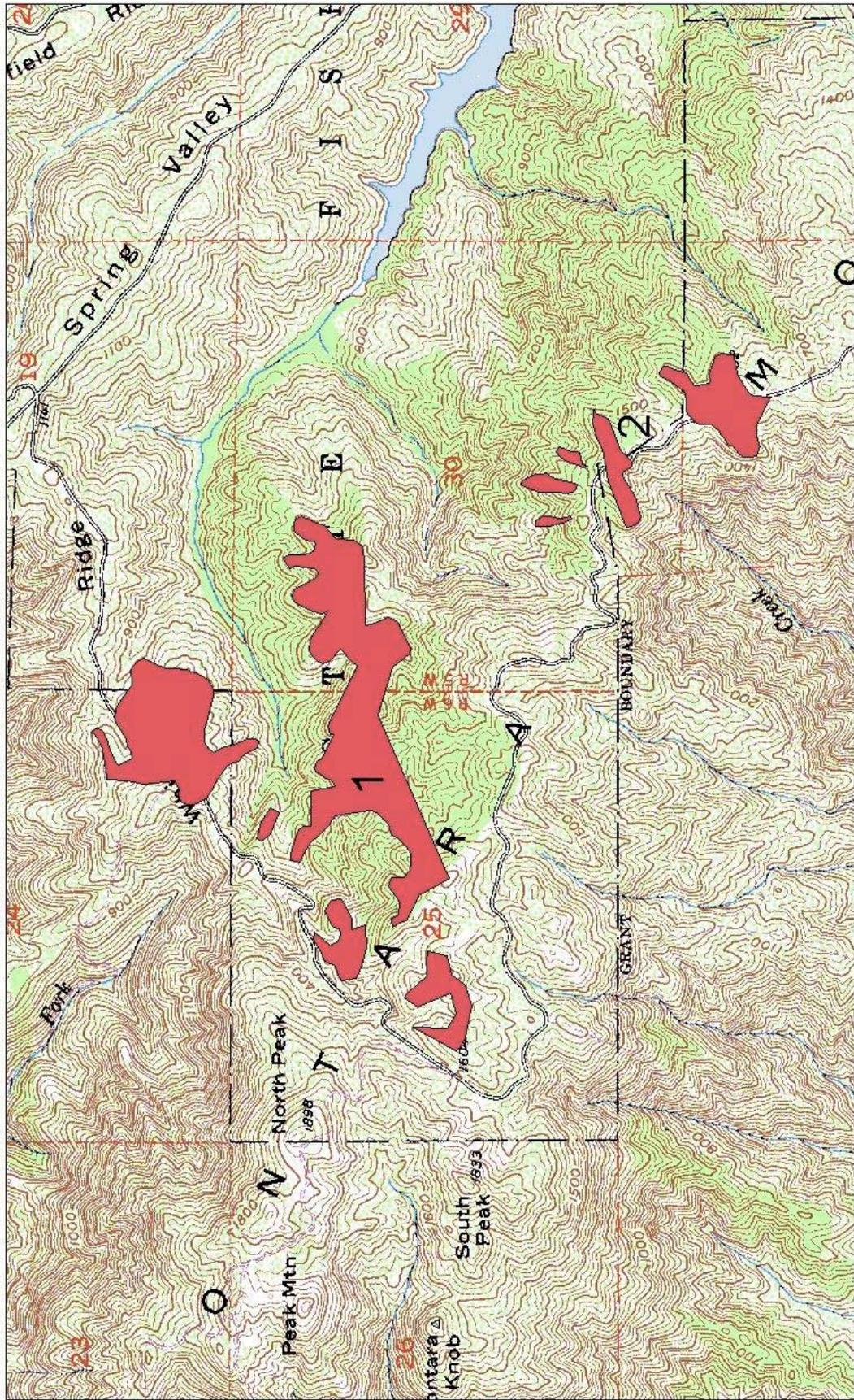
Management Recommendations

Bulldozed sites should be monitored for new populations of invasive plants. In particular, *Conium maculatum* (poison hemlock), *Cirsium vulgare* (bull thistle), and *Cortaderia* sp. (pampas grass). Early detection and eradication of invasive plants will be the most cost-effective means to manage these populations.

Establishment of photopoints could be used to document the current extent of these two populations and the extent of invasive species along roads and fire breaks.

Recommended Monitoring Interval

Every three years to document the health of the populations of *Arctostaphylos*. If this is considered a high priority site, yearly monitoring and removal of exotics should occur.



Arctostaphylos montaraensis
San Francisco Watershed District
Montara Mountain Quadrangle

***Arctostaphylos virgata* Eastw.**

Marin manzanita

Rarity Status

Federal Listing: C3c- Too widespread and/or not threatened

State Listing: None

CNPS List: 1B / R-E-D Code: 2-2-3

NomenclatureThe Jepson Manual: AcceptedCNPS: Accepted**GGNRA Population Locations:** Bolinas Ridge**Life History**Flowering Time: January-MarchRange: This species is endemic to Marin County in California. According to CNPS, it is known from fewer than twenty occurrences.Characteristics:

Arctostaphylos virgata is an evergreen shrub that is usually 2-5 meters tall. The species has no burl at the base and has narrowly oblong-ovate to oblong lanceolate leaves. The inflorescence is dense and has 0-1 branches. The fruit is 10-15 mm wide and is glandular. *Arctostaphylos virgata* occurs with two other manzanita species along Bolinas Ridge-*A. glandulosa* s.l. and *A. nummularia*. *A. virgata* can be distinguished from *A. glandulosa* by its lack of a burl. *A. glandulosa* has an obvious burl at the base of the bole. *A. virgata* tends to be slightly taller than *A. glandulosa*. Like *A. virgata*, *A. nummularia* has no bole. However it has rounder leaves and tends to have a smaller habit (1-2m). The fruits of *A. nummularia* are very distinctly cylindrical in shape. *A. virgata* and *A. glandulosa* have spherical fruits more typical of manzanitas.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Known populations of *A. virgata* in GGNRA occur along Bolinas Ridge. The mapped areas are restricted to the margins of the fire roads. However, it is likely that the populations extend beyond the mapped areas.

Threats

According to CNPS, *A. virgata* is threatened by fire suppression. Comments from previous years' reports mention the presence of introduced species in the area of *Genista monspessulana* (French broom) and *Centaurea solstitialis* (yellow starthistle).

Monitoring Results: 1998 – 2003

Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
Bolinas	ARVI	1	--	Surveyed; not censused	Surveyed; not censused	No survey	No survey	No survey

Surveys conducted between 1999 and 2001 have resulted in the mapping of this species in various sites located along the length of Bolinas Ridge fire road and along trails that

lead off of Bolinas Ridge. The density of the brush in this region makes it extremely difficult to survey within the interior of the brush, therefore, it is not possible to document the complete extent of this species.

Management Recommendations

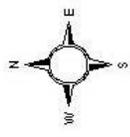
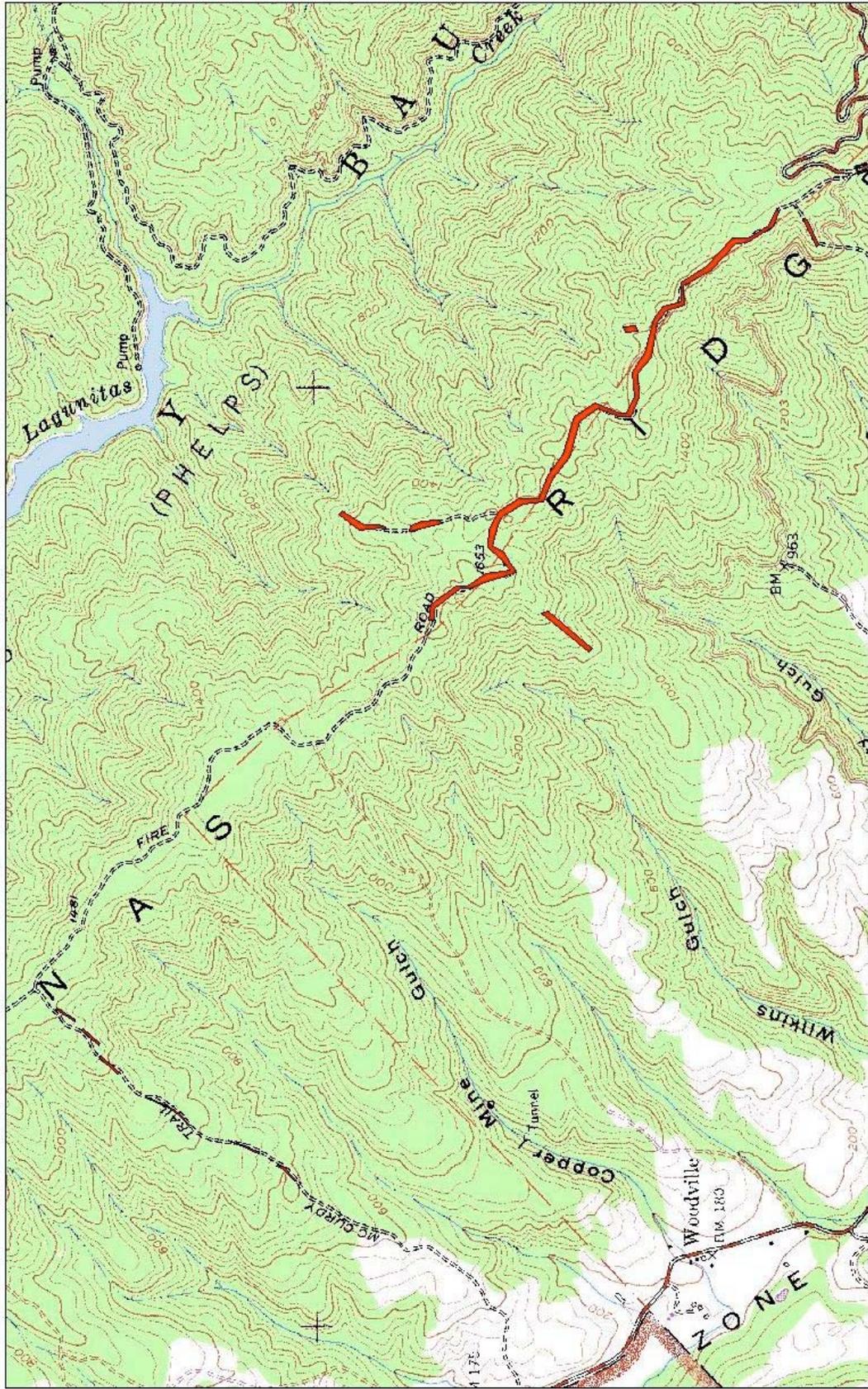
GGNRA Fire managers should be made aware of the potential decline of this species due to fire suppression and include this area in any future fire management plans. This species along with *Ceanothus gloriosus* var. *exaltatus* and *C. masonii* have limited shade tolerance and depend on fire to trigger reproduction, so long-term fire suppression will cause problems unless alternative methods of maintaining chaparral habitat and inducing reproduction are found.

Monitor the threat from introduced species of concern. In particular, watch for species known to persist in chaparral communities.

If any trail maintenance or prescribed fire preparation is to occur, flagging of individual shrubs may be needed in order to avoid cutting those plants that occur directly on trails or roads.

Recommended Monitoring Interval

Every three years to document that individual plants continue to persist.



Arctostaphylos virgata

Bolinas Ridge
Bolinas Quadrangle

***Calamagrostis ophitidis* (J. Howell) Nygren**
Serpentine reed grass

Rarity Status

Federal Listing: Not listed

State Listing: Not listed

CNPS List: 4 / R-E-D Code: 1-1-3

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Population Locations: Mill Valley Air Force Base

Life History

Flowering Time: April-June. Inflorescences with intact flowers can be found as late as August.



Range: This grass is restricted to serpentine soils and is endemic to California. It is found in a variety of habitats including grassland, chaparral, and forest. On the MVAFB it is found on serpentine barrens, and among sparse scrub and forest.

C. ophitidis is locally common on Mt. Tamalpais on serpentine.

Characteristics

C. ophitidis is a densely tufted bunchgrass 60 cm-1m high, generally with inrolled leaves and a compact, branched inflorescence. No other similar grasses were observed at the MVAFB. The only other frequently occurring large bunchgrass noted was *Elymus glaucus*. Positive identification was made using a microscope.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Two populations at MVAFB.

Threats

These populations do not appear to be under immediate threat. However, native forest species appear to be regenerating well and may be expanding at the site due to fire suppression and could reduce suitable habitat for *C. ophitidis*. Invasive non-native species are also present at MVAFB.

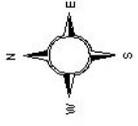
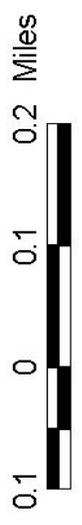
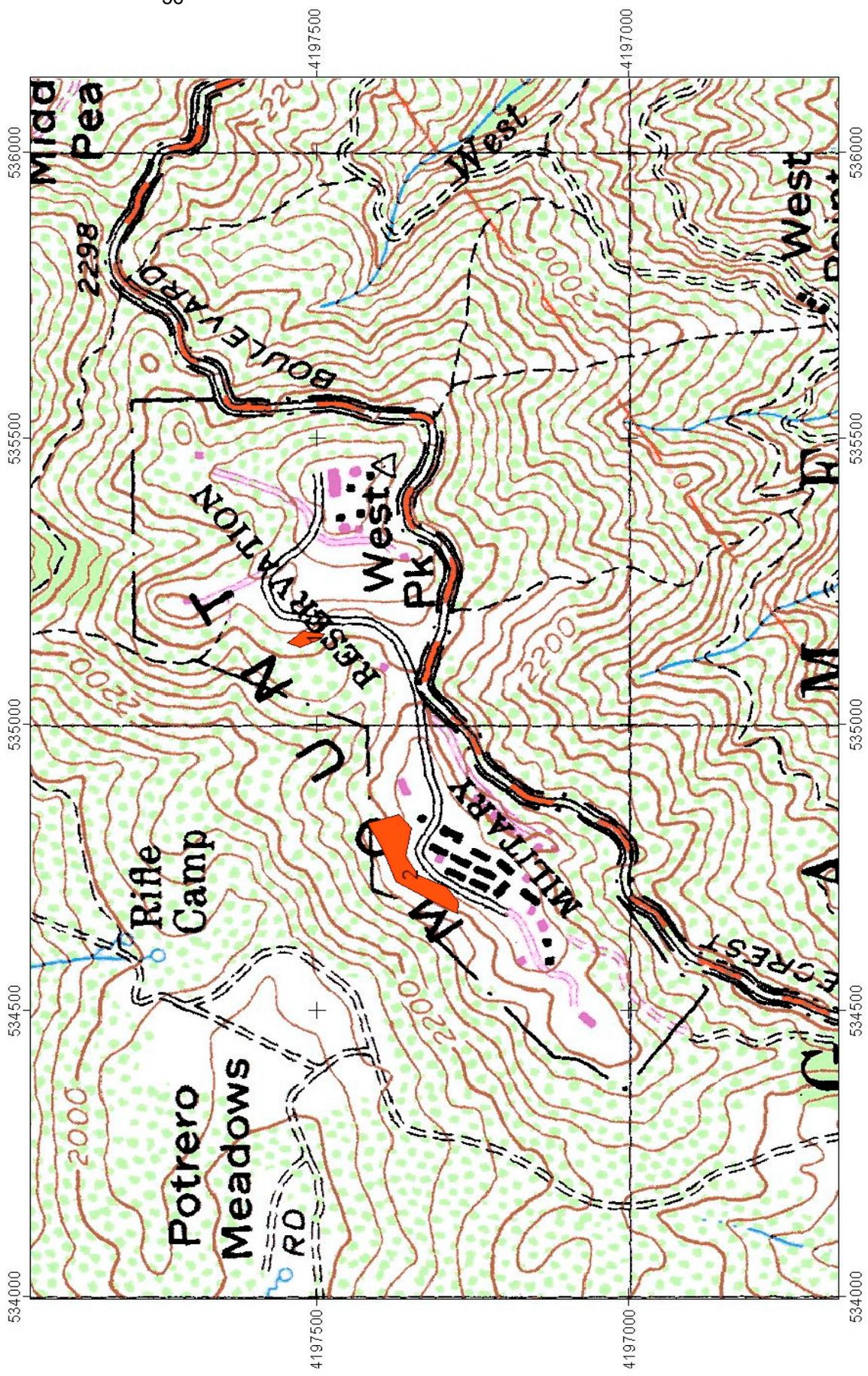
2003 Inventory/Monitoring Results: *Calamagrostis ophitidis* was included in the inventory for the first time in 2002. Populations were mapped but not censused. No additional inventory or monitoring of this species was conducted in 2003.

Management Recommendations

No immediate action needed, but in the long term, forest species and invasive weeds may need to be controlled. Establishing line transects would capture absolute cover data for individual species and relative cover data for all species occurring within this community.

Recommended Monitoring Interval

Every three years



Calamagrostis ophitidis

2002 Inventory/Monitoring Report

Mill Valley Air Force Base
San Rafael Quadrangle

***Calochortus umbellatus* A.W. Wood**
Oakland star-tulip

Rarity Status

Federal Listing: Not listed

State Listing: Not listed

CNPS List: 4 / R-E-D Code: 1-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted



Population Locations: Nicasio Ridge (private land), Mill Valley Air Force Base, Muir Woods (Four Corners), San Francisco Watershed District

Life History

Flowering Time: March-May

Range: This plant is endemic to California and is documented in Alameda, Contra Costa, Marin, Santa Clara, Santa Cruz and San Mateo counties.

Characteristics:

This perennial lily has a bulb and a white or pale pink, bell-shaped flower. The flowers have three petals that are often purple-spotted near the nectaries, and are mostly hairless. The petals have a distinct glandular area on the lower half, and the sepals are narrower than the petals. Stems are 8 to 20 cm long (usually not erect) and usually branched. Each branch can carry up to six flowers. The single basal leaf (20-40 cm) is linear, and is longer than the one born on the stem. Fruits are nodding and winged, and seeds are irregular and dark brown. Flowers are needed to key this plant from the family or genus level.

The Star-tulip can easily be distinguished from *C. albus* (white globe lily or fairy lantern), which also occurs in the GGNRA. The Star-tulip's flower is erect whereas that of the globe lily is nodding. The Globe Lily flower is also generally closed at the tip rather than open.

Star-tulip can be distinguished from other lilies by its single basal leaf, which is often blue-tinged, and does not have a wavy margin.

This species occurs in open chaparral or woodlands, generally on serpentinite soils. Serpentinite substrates typically have high levels of magnesium, chromium, and nickel and low levels of calcium and nitrogen. *C. umbellatus* is associated with chaparral, valley grassland, yellow pine forest, and mixed evergreen forest plant communities. On Nicasio Ridge, it is found on the edges of bay-laurel forests as well as on grassy serpentinite substrate.

Numerous other members of this genus occur in the S.F. Bay Area.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Calochortus umbellatus occurs in the serpentinite soils of the Mill Valley Air Force Base. It is reported as occurring in the serpentinite grasslands on the east shore of the Crystal Springs Reservoir in the San Francisco Watershed district. It also occurs

on Nicasio Ridge, although the entire population occurs on private lands east of the GGNRA boundary line. A new population was documented on non-serpentine soils, near the “Four Corners” intersection on Panoramic Highway.

Threats

Habitat loss due to development and disturbances including invasive species may have a negative effect on *C. umbellatus* populations. Competition may be the dominant force keeping serpentine-endemic plants from occurring on neighboring, non-serpentine soils (Kruckeberg, 1950). Invasive species known to colonize serpentine substrates (*Cortaderia* sp.) should thus be of concern. Effects of grazing on this species are unknown.

Inventory/Monitoring Results 2003

One new population of *C. umbellatus* was documented in 2003 near the intersection known as “Four Corners” on Panoramic Highway. Though GGNRA lands on Nicasio Ridge were surveyed no populations were found.

Monitoring Results: 1998 - 2003

Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
Four Corners	CAUM	1	--	--	--	--	--	Approx. 470
MVAFB		1	102	1,162	1,851	1,177	1,276	No survey
		2	197	251	998	720	369	No survey
		3	--	--	--	117	758	No survey
Nicasio – on private land		1	710	826	1,151	349	No survey	No survey
SFWD		1	--	--	surveyed; not censused	0	No survey	No Survey

Despite large differences in numbers between years, it appears that the populations on Mill Valley Air Force Base are stable. The large increase in number of plants between 1998 and 1999 on MVAFB is due to larger areas being surveyed.

The Nicasio Ridge population listed above occurs on private land. Following the 2001 monitoring season, the decision was made to discontinue monitoring any populations occurring on private land.

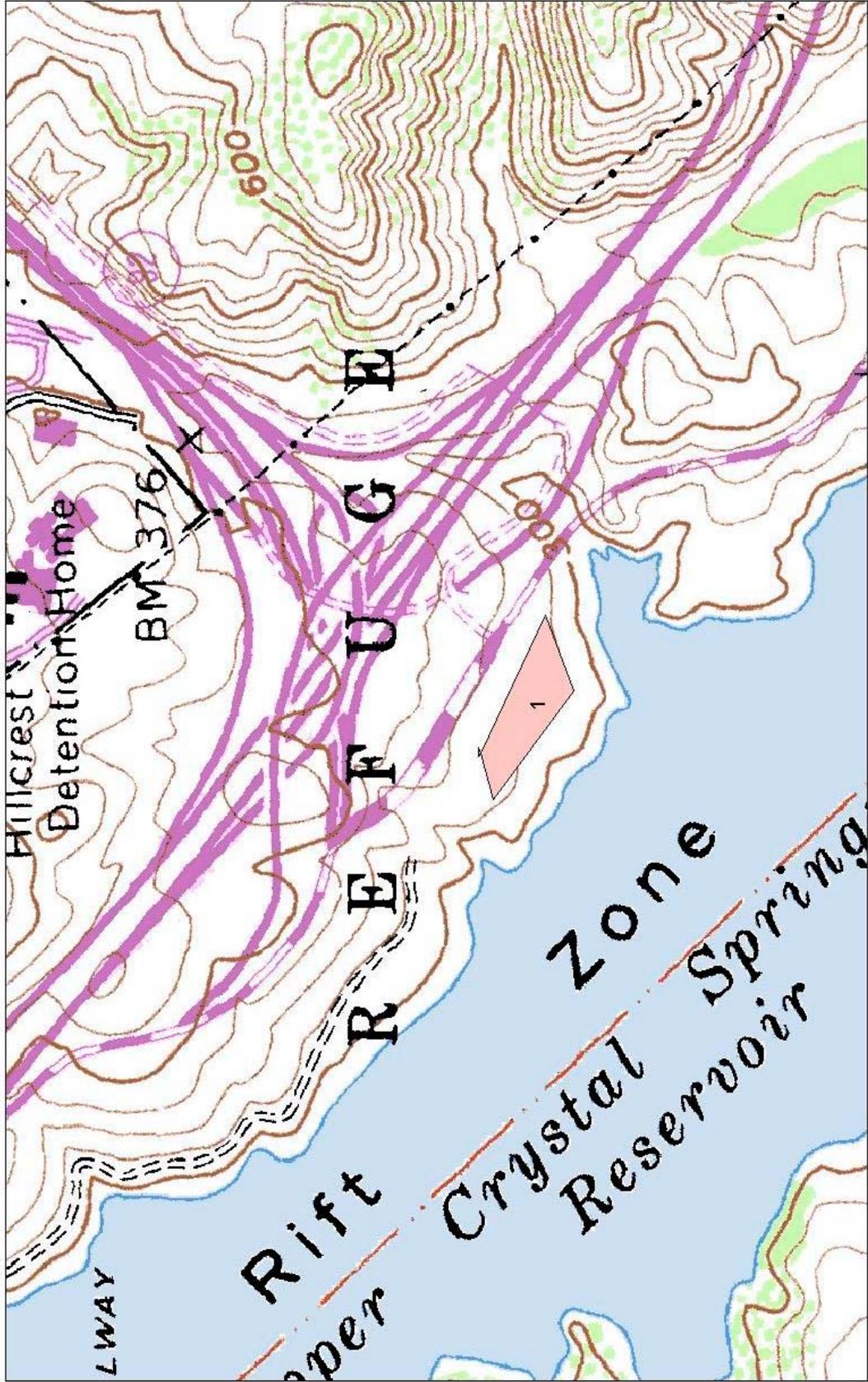
Management Recommendations

The population that occurs on Nicasio Ridge should not be censused without permission of the landowner. A meeting should be arranged with the ranchers, Point Reyes staff and GGNRA staff to make the ranchers aware of the rare plant species which occur on their land.

The Mill Valley AFB site has several rare species and should be monitored closely for invasive species and changes in stand structure due to fire suppression. Establishing line transects would allow for the gathering of absolute cover data for individual species as well as relative cover data for all species occurring within these communities. A series of transects distributed across these populations would provide data on changes in cover of both native and non-native species.

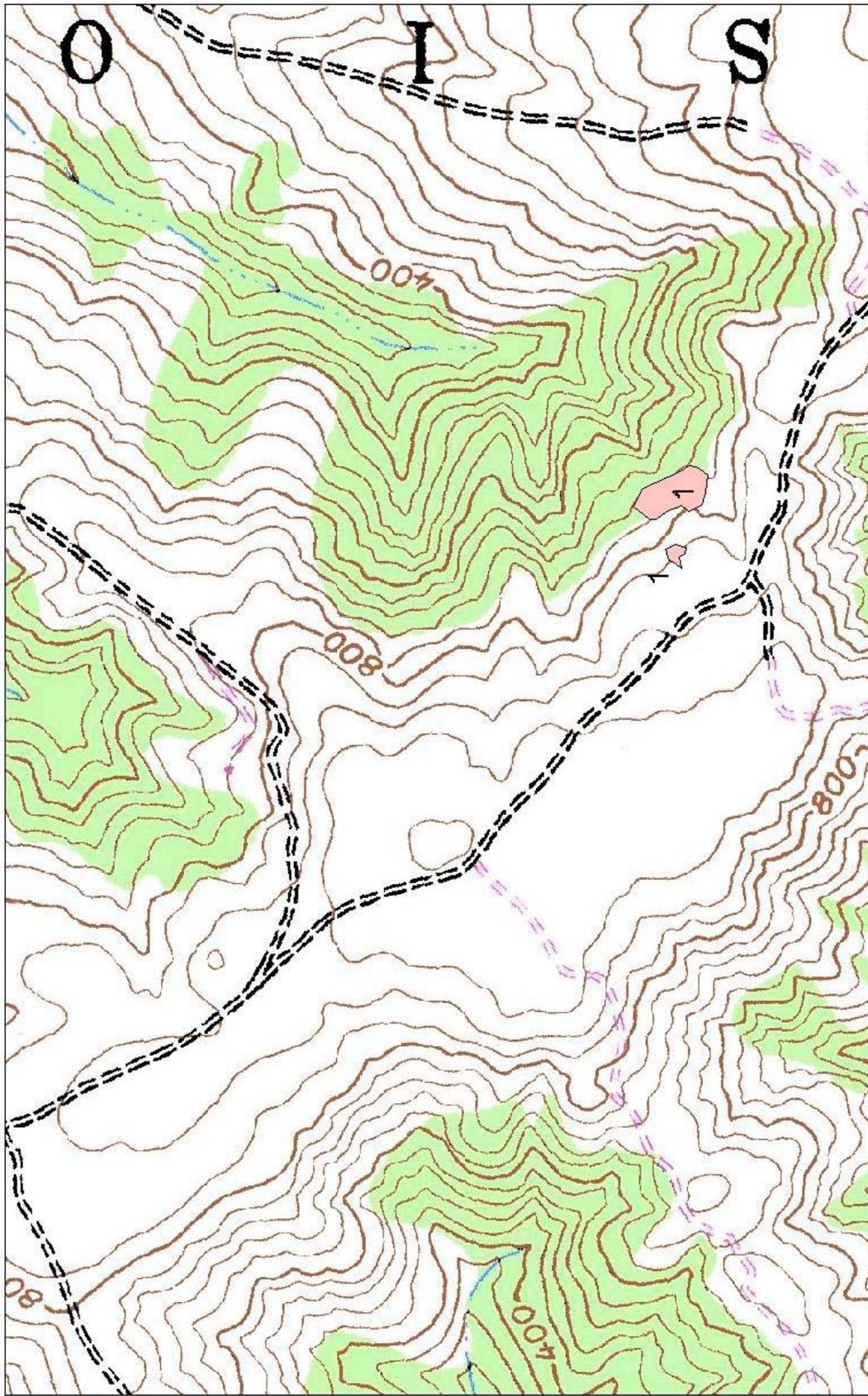
Directed surveys in the SFWD should be attempted every few weeks from the end of February until the end of March.

Recommended Monitoring Interval: Every two years



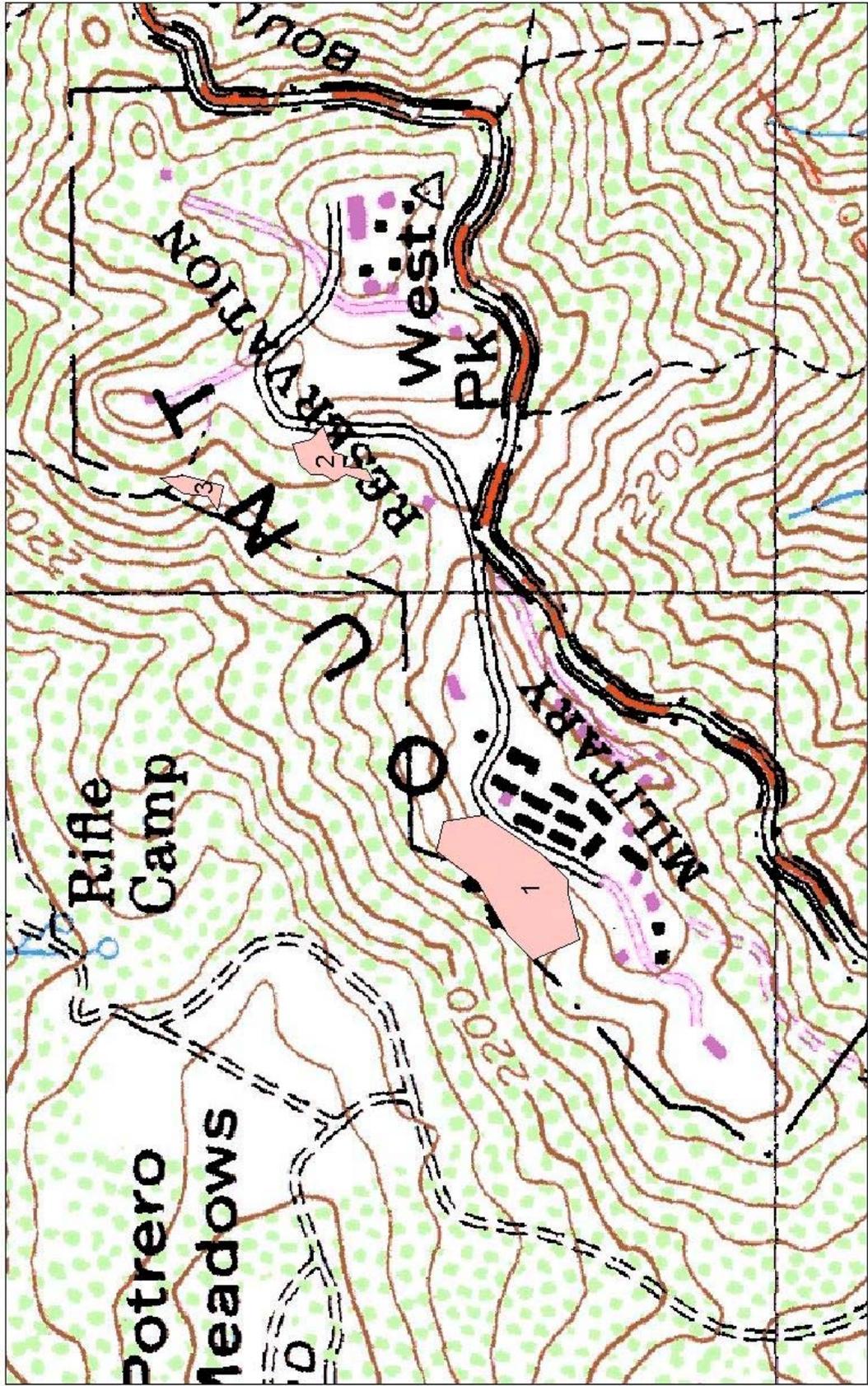
Calochortus umbellatus

San Francisco Watershed District
Woodside Quadrangle



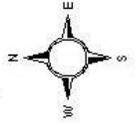
Calochortus umbellatus

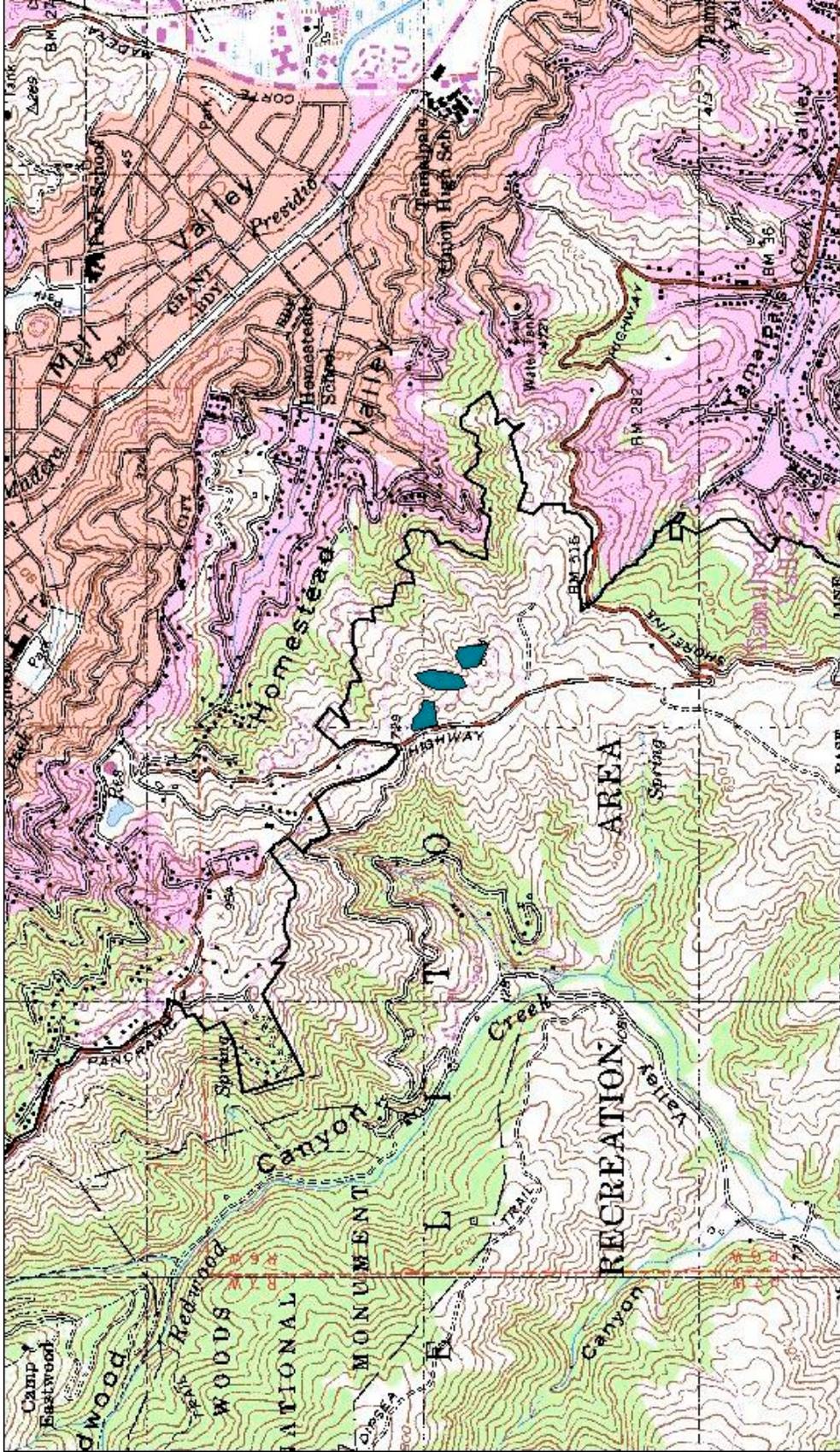
Nicasio Ridge
San Geronimo Quadrangle



Calochortus umbellatus

Mill Valley Air Force Base
San Rafael Quadrangle





Calochortus umbellatus

Four Corners (Muir Woods) 2003
San Rafael Quadrangle

***Castilleja affinis* Hook & Arn. ssp. *neglecta* (E.M. Zeile) Chuang & Heckard**

Tiburon indian paintbrush

Rarity Status

Federal Listing: ENDANGERED

State Listing: Threatened

CNPS List: 1B / R-E-D Code: 3-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Population Locations: Nicasio Ridge

Life History

Flowering Time: April-June



Range: *Castilleja affinis* ssp. *neglecta* is endemic to California, and occurs in Alameda, Marin, Napa, and Santa Clara counties.

Characteristics: The Tiburon Indian Paintbrush is a perennial herb with yellow or salmon colored flowers in a spike. *Castilleja affinis* ssp. *neglecta* has sessile flowers arising from the base of leaves. Petals are fused, with an upper beak and a reduced lower lip. Plants are bristly and green to purple tinged. Several stems 15-60 cm tall can arise from a single plant, which can also send out short axillary shoots. Leaves are simple, sessile, alternate, generally lanceolate, and can be lobed.

The Tiburon indian paintbrush grows on open, grassy serpentinite at elevations below 300m.

Other species of this genus occurring in the GGNRA are: *C. densiflora*, *C. exserta*, *C. latifolia*, *C. subinclusa*, *C. whightii*. Many other *Castilleja* species occur in the S.F. Bay Area.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

The only known population known to occur on GGNRA lands is found on Nicasio Ridge. The population is mapped as being bisected by the park boundary line. In 2001, all individuals of this plant were observed on private lands. In 2003, several individuals were found occurring on GGNRA lands.

Threats

With limited distribution and a very specific habitat, the endangered Tiburon indian paintbrush is highly vulnerable to habitat loss. On Nicasio Ridge it grows specifically in openings between *Ceanothus* spp. shrubs, and thus this population could be impacted by any changes in this distinct niche, whether from grazing, invasion by exotic species capable of growing on serpentinite, or increased growth density of the *Ceanothus* spp.

On both the GGNRA land and the private lands, the population is subject to cattle grazing. It is unknown what the impacts of cattle grazing are at this time.

Inventory/monitoring conducted 2003

GGNRA lands on Nicasio ridge were surveyed in 2003. A few scattered individuals were found growing amidst a stand of *Ceanothus species nova*.

Monitoring Results: 1998 – 2003

Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
Nicasio	CAAFNE	1	--	--	--	--	No survey	4
Nicasio-on private land		1a	100	41	84	68	No survey	No survey

Note that population 1a listed above occurs on private lands. At the conclusion of the 2001 monitoring season it was decided that no more censusing would be conducted on private land.

Management Recommendations

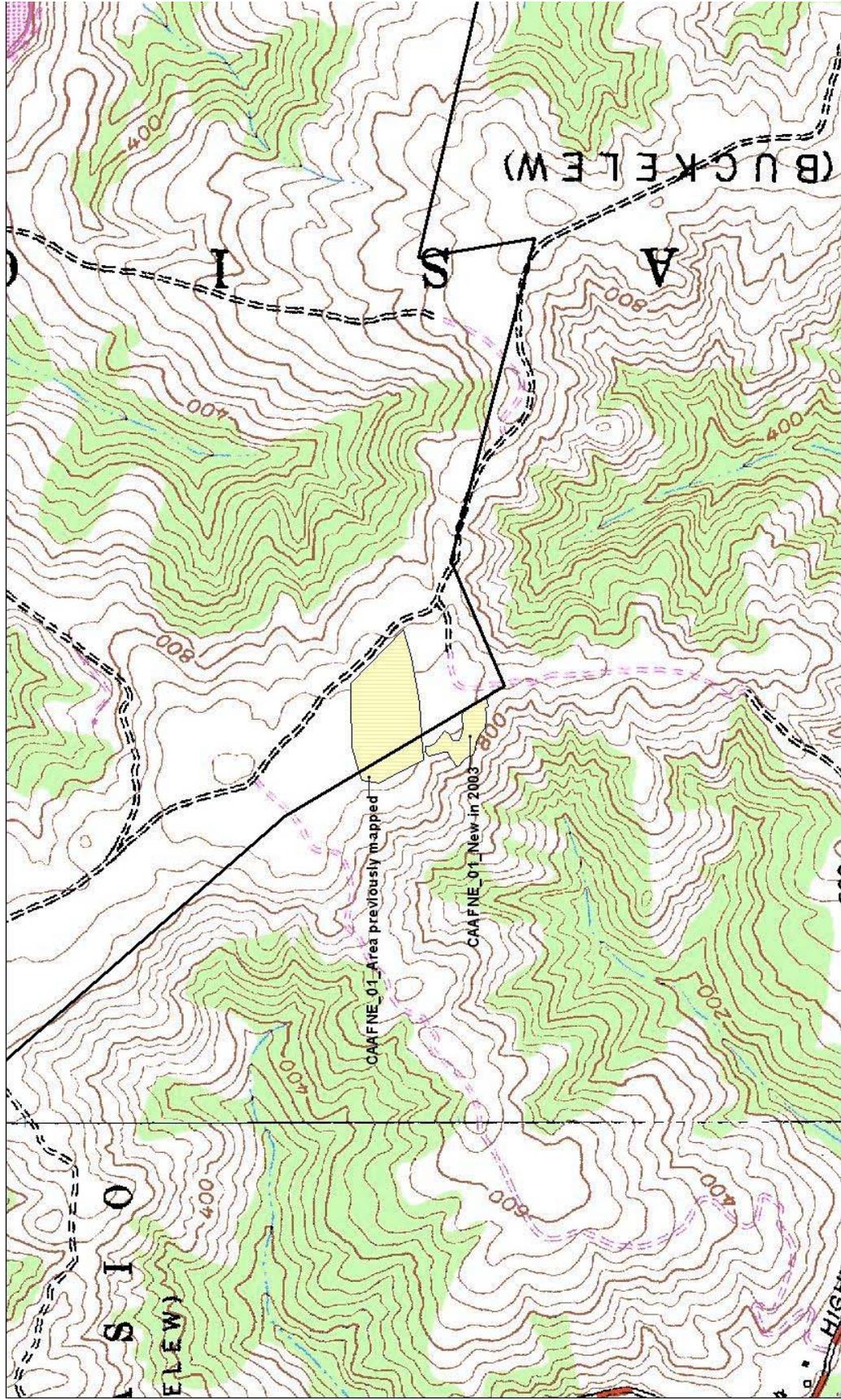
Since it appears that most, if not all of this population occurs on private lands, no further surveys should be done on the private lands without permission of the landowner. A meeting should be arranged with the ranchers, Point Reyes staff and GGNRA staff to make the ranchers aware of the rare plant species which occur on their land. The population found on GGNRA lands should be revisited for three consecutive years to document changes in population abundance then placed on a monitoring schedule of every two years.

Six rare plant species occur on Nicasio Ridge. Ideally, a monitoring method would be adopted that can capture information on all six species but only require examining a sub-sample of the entire population. Long term monitoring would also be valuable for gathering information on the effects of cattle grazing. This area has been grazed for many years and yet the rare plant species still persist

Establishing photopoints would help to supplement any quantitative data collected. A visual overview of the site would document gross vegetation changes over time.

Recommended Monitoring Interval

Every two years



Castilleja affinis ssp. neglecta

Nicasio Ridge, 2003
San Geronimo and Inverness Quadrangles

Goga-pol.shp
leg-bndy
Caafne_03.shp

***Castilleja ambigua* Hook. & Arn. ssp. *humboldtiensis* (Keck)
Chuang & Heckard
Humboldt Bay owl's clover**

Rarity Status

Federal Listing: None
State Listing: None
CNPS List: 1B / R-E-D Code: 2-2-3

Nomenclature

The Jepson Manual: accepted
CNPS: accepted

Population Locations: GGNRA Northern District

Life History

Flowering Time: April-August

Range: This plant is endemic to California and is documented in Humboldt, Mendocino and Marin Counties.



Characteristics: *Castilleja ambigua* ssp. *humboldtiensis* is an annual salt marsh species. This fleshy plant is smaller than 30cm and has a rose-pink inflorescence. It can be distinguished from the more common variety *ambigua* by its obvious fleshy stems and leaves. The variety *ambigua* is not fleshy.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is known from a single location in the Martinelli Ranch/Giacomini wetland. Thousands of individuals were reported occurring within that population.

Threats

The site is open to cattle grazing. Evidence of grazing was documented in 2001.

Monitoring conducted 2003

All populations occurring on the Martinelli/Giacomini wetland were censused in 2003. The populations appear to be flourishing based on the number of individuals found in each population.

Monitoring Results: 1998 – 2003

Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
Martinelli/Giacomini	CAAMHU	1	--	--	--	No survey	No survey	0
		2				No survey	No survey	787
		3				No survey	No survey	approx 15,000
		4				No survey	No survey	10
		5				No survey	No survey	100
		6				No survey	No survey	144
		7				No survey	No survey	approx. 1,000
		8				>1,000	No survey	approx. 10,000

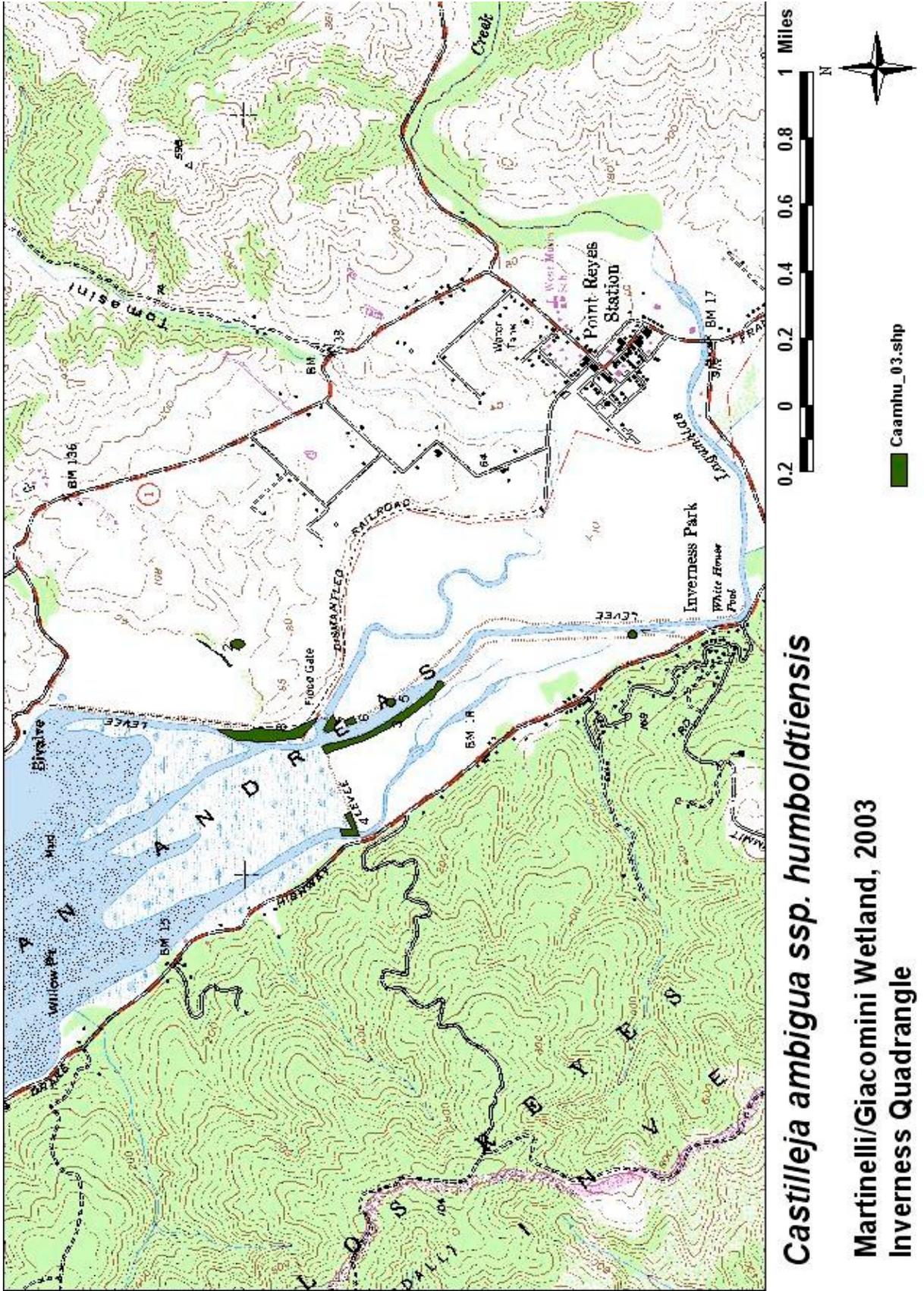
This species was first recorded as occurring at this site in 2001. This species is widespread throughout the marsh and was very abundant in 2003. Continued monitoring of this population will help to document fluctuations in species abundance between years.

Management Recommendations

Monitoring the population for three consecutive years to obtain fluctuations in population density between years.

Recommended Monitoring Interval

Yearly for the next three years in order to document species presence and abundance. If the population appears stable, monitor every two years



Castilleja ambigua ssp. humboldtiensis

**Martinelli/Giacomini Wetland, 2003
Inverness Quadrangle**

***Ceanothus gloriosus* J. Howell var. *exaltatus* J. Howell**
 Glory brush

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 4 / R-E-D Code: 1-1-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Population Locations: Bolinas Ridge

Life History

Flowering Time: March-May



Range: *Ceanothus gloriosus* var. *exaltatus* is endemic to California. There are documented occurrences in Sonoma, Marin and Mendocino counties.

Characteristics: *C. gloriosus* var. *exaltatus* is an evergreen shrub generally smaller than 2 meters in height. The leaves are thick and evergreen with dentate margins and are opposite on the stem. *C. gloriosus* var. *exaltatus* can be distinguished from *Ceanothus masonii* by the mature leaf size; the leaves of *C. gloriosus* var. *exaltatus* are 1.5 to 4 cm long while the leaves of *C. masonii* are 0.6-1.8 cm long. Both species have blue to purple flowers. Both species occur in the same area. *C. gloriosus* is a chaparral species.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This species occurs atop Bolinas Ridge.

Threats

Fire suppression may have an adverse effect on the vigor of this population.

Other tree and shrub species may be encroaching on the population. There is some adverse effect from maintenance of the fire roads and trails although it is doubtful that this has any major consequence on the overall health of the population.

Monitoring Results: 1998 – 2003

Location	Species	Pop. Num.	1998	1999	2000	2001	2002	2003
Bolinas Rdg-Fire Rd.	CEGLEX	1	4	37	Surveyed; not censused	No survey	No survey	No survey
Bolinas Rdg-McCurdy Tr.		1a	6	4	Surveyed; not censused	No survey	No survey	No survey
Bolinas Ridge-Bourne Tr.		2	--	--	--	--	1	No survey

No monitoring of this species was conducted in 2003.

Surveys conducted between 1998 and 2001 have resulted in the mapping of this species in various sites located along the length of Bolinas Ridge fire road and along trails that

lead off of Bolinas Ridge. The density of the brush in this region makes it extremely difficult to survey within the interior of the brush, therefore, it is not possible to document the complete extent of this species.

Management Recommendations

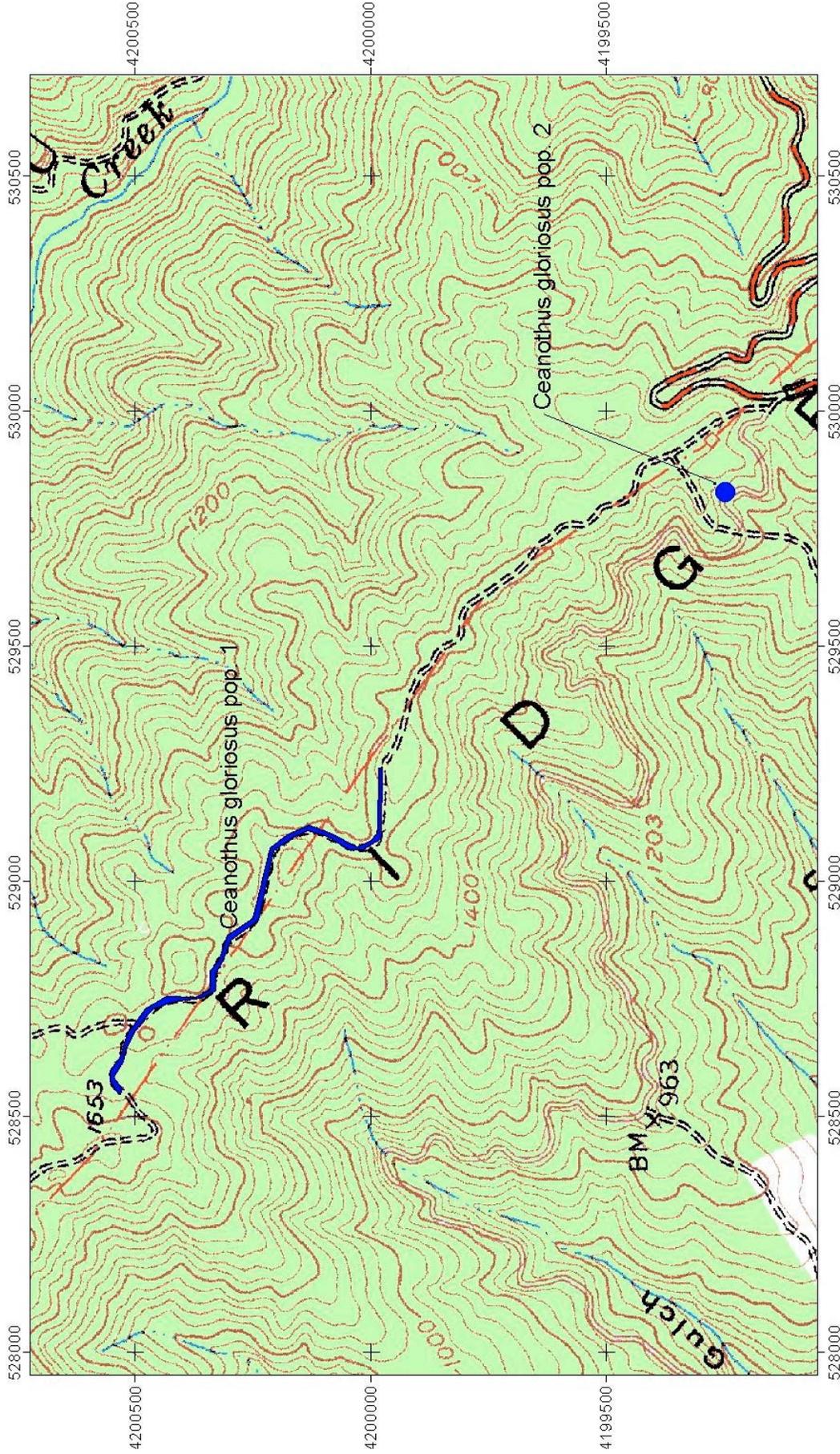
If the population site burns, the area should be intensively studied to observe how *Ceanothus gloriosus* var. *exaltatus*, *C. masonii* and *Arctostaphylos virgata* respond to fire. These species have limited shade tolerance and depend on fire to trigger reproduction, so long-term fire suppression will cause problems unless alternative methods of maintaining chaparral habitat and inducing reproduction are found. This would be an excellent subject for a research project.

Continue to monitor every three years to insure that existing individuals persist.

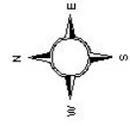
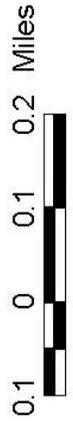
Collect voucher specimens of those individuals identified as this species at peak blooming period for comparison with *C. masonii*.

Recommended Monitoring Interval

Every three years



Ceanothus gloriosus var. exaltatus



2002 Inventory/Monitoring Report

Bolinas Ridge
Bolinas Quadrangle

***Ceanothus masonii* McMinn**

Mason's ceanothus

Rarity Status

Federal Listing: None

State Listing: Rare

CNPS List: 1B / R-E-D Code: 3-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

****NOTE:** This species may undergo a taxonomic revision lumping it with *Ceanothus gloriosus*. See Appendix VII for a full description of this possible taxonomic revision.**

Population Locations: Bolinas Ridge

Life History

Flowering Time: March-May

Range: *Ceanothus masonii* is endemic to California. According to CNPS Inventory of Rare and Endangered Vascular Plants, 6th edition, this species has only about five documented populations.

Characteristics: *C. masonii* is a chaparral species. It is an evergreen shrub that is generally shorter than 2 meters in height. The leaves are thick and evergreen with dentate margins and are opposite along the stem. *C. masonii* can be distinguished from *Ceanothus gloriosus* var. *exaltatus* by the mature leaf size; the leaves of *C. gloriosus* var. *exaltatus* are 1.5 to 4 cm long while the leaves of *C. masonii* are 0.6-1.8 cm long. Both species have deep blue to purple flowers.

A related species, *C. cuneatus*, occurs with *C. masonii*. *C. cuneatus* bears white or pale flowers. Since *Ceanothus* spp. frequently hybridize, surveying during the flowering season is recommended by Dr. Parker to confirm the presence of *C. masonii* individuals by their purple flowers.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This species is documented in chaparral along fire roads and trails atop Bolinas Ridge.

Threats

An illegal trail on Bolinas ridge cuts through population 3. Some plants have probably been killed as a result. Fire suppression has an adverse effect on *C. masonii*. Other tree and shrub species may be encroaching on the population.

Monitoring Conducted 2003

Two new populations documented in 2002 were revisited in the spring of 2003 to collect voucher specimens in order to make a final determination whether indeed the plants are *C. masonii*. These voucher specimens were sent to a *Ceanothus* expert who found that the specimens did not seem to fit any one taxon. As of this writing a conclusive determination of the species of these plants is still pending. A completed description of the species identification status is included in Appendix VII.

Monitoring Results 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Bolinas Ridge/Fire Road	CEMA	1	83	91	Surveyed; not censused	No survey	No survey	No survey
Bolinas Ridge/McCurdy		1a	0*	1	Surveyed; not censused	No survey	No survey	No survey
Bolinas Ridge		2	--	--	--	--	Surveyed; not censused	Surveyed; not censused
Bolinas Ridge		3	--	--	--	--	Surveyed; not censused	Surveyed; not censused

* All individuals identified as *Ceanothus gloriatus* var. *exaltatus*.

Surveys conducted between 1999 and 2001 have resulted in the mapping of this species in various sites located along the length of Bolinas Ridge fire road and along trails that lead off of Bolinas Ridge. The density of the brush in this region makes it extremely difficult to survey within the interior of the brush, therefore, it is not possible to document the complete extent of this species.

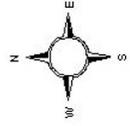
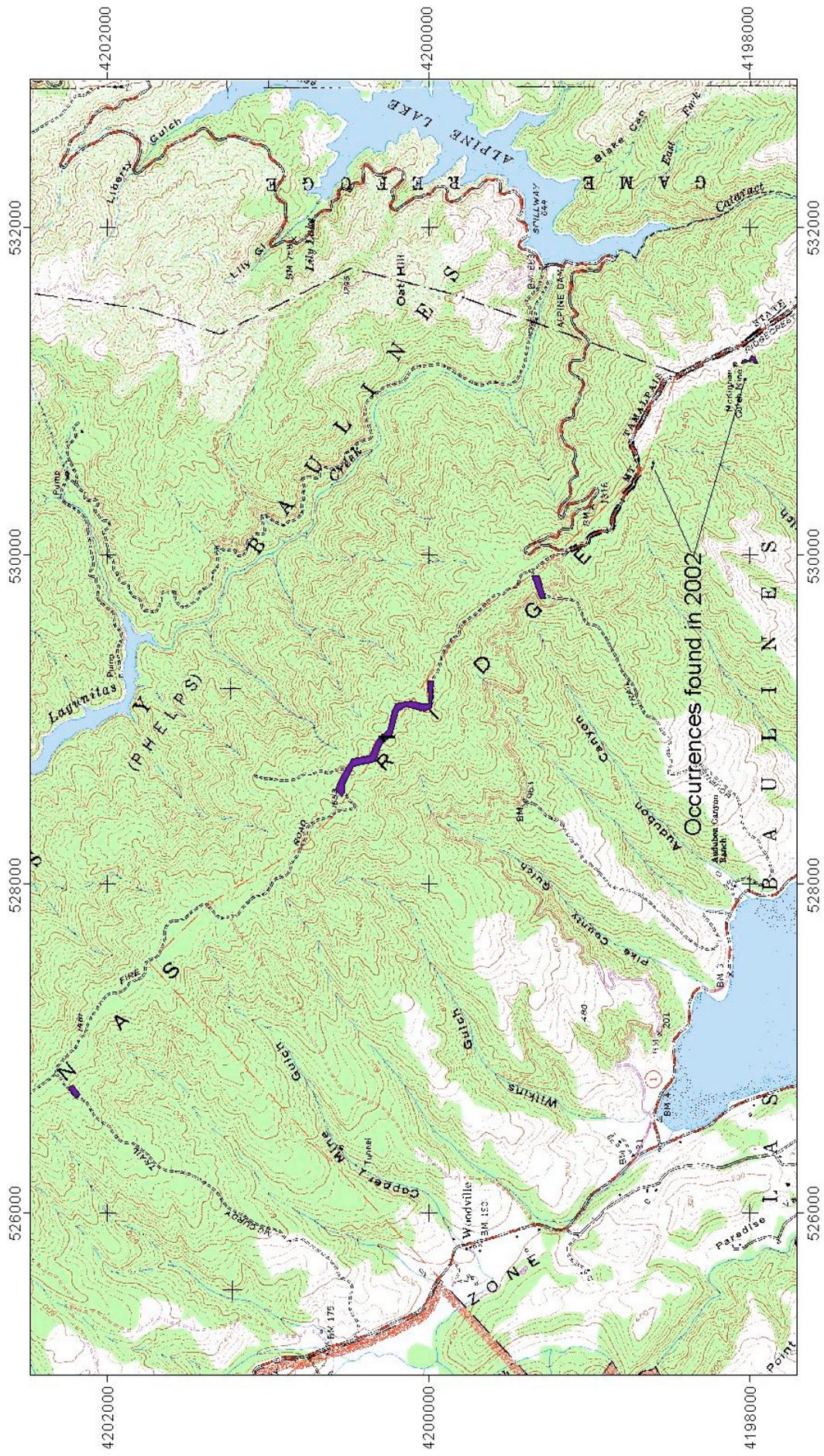
As noted above, the two populations documented in 2002 are still awaiting a final species determination.

Management recommendations

No changes in management approach should be undertaken until the status of the species and populations becomes clearer. Populations currently confirmed as *C. masonii* should continue to be monitored every three years. Management of the new potential populations depends on the response of Dr. Wilken; if he determines that the plants belong to a special-status taxon, they should be monitored in the same way as other *Ceanothus* populations. If he determines they do not merit special status, they can be removed from the inventory. Until the status of these plants is determined, the populations should be checked every three years to verify their continued presence but there is no need for full monitoring.

Recommended Monitoring Interval

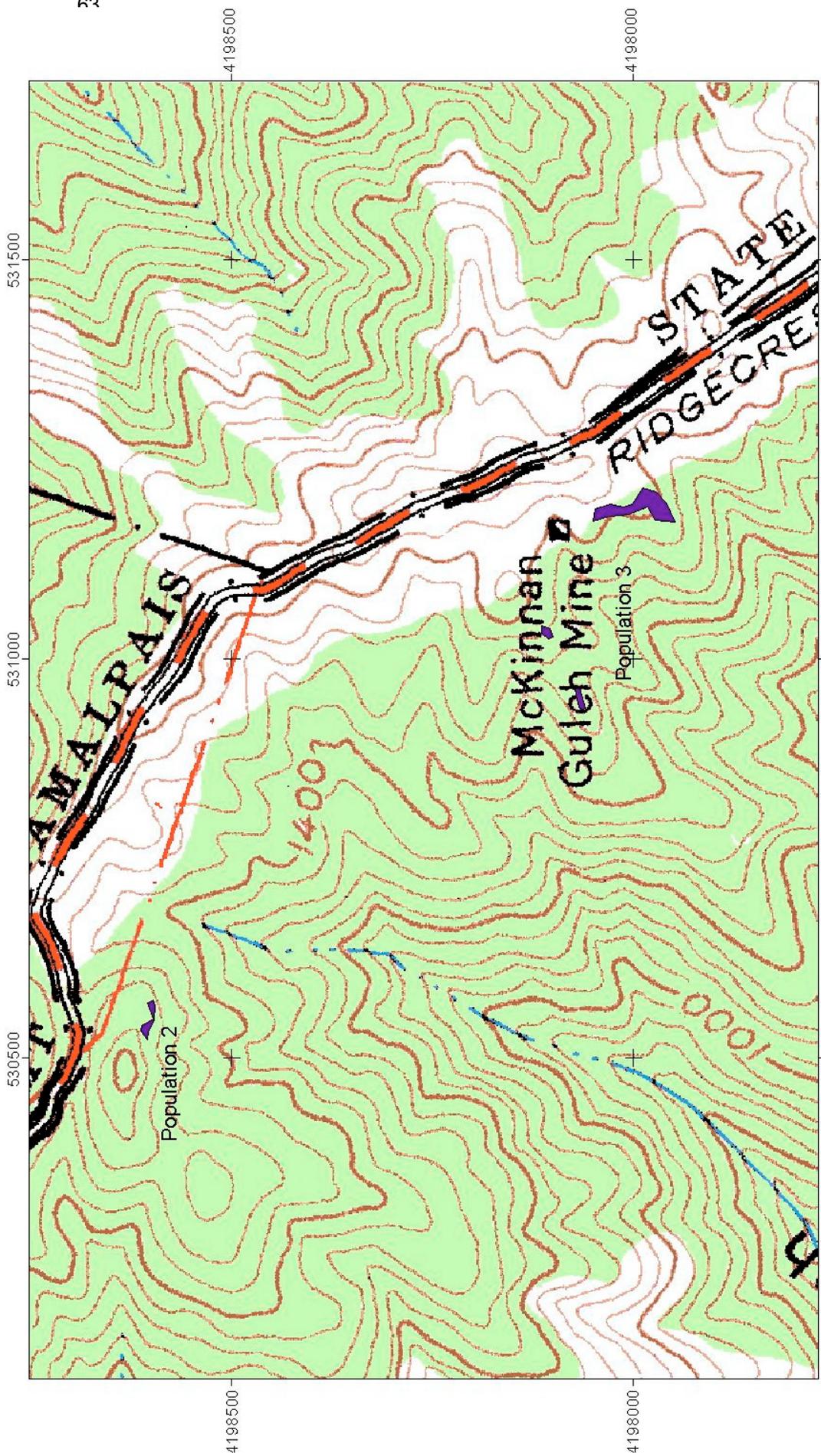
Every three years



Ceanothus masonii

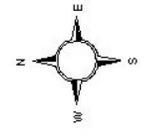
2002 Inventory/Monitoring Report

Bolinas Ridge
Bolinas Quadrangle



Ceanothus masonii
populations found in 2002

South Bolinas Ridge
 Bolinas Quadrangle



Ceanothus sp. nova

Rarity Status

Federal Listing: None

State Listing: None

CNPS: None

Nomenclature

The Jepson Manual: not accepted

CNPS: not accepted

Comments: This species has not been formally described.



Population Locations: Nicasio Ridge

Life History

Flowering Time: March-April

Range: One documented occurrence in Marin County, California.

Characteristics: This plant has yet to be formally described. Tom Parker at San Francisco State University was contacted in 2002 and he confirmed that he intends to describe it as a new taxon; however no time frame has been given as yet. There are no other *Ceanothus* species atop Nicasio Ridge to confuse with this species. It is growing on serpentinite substrate amidst grassland species.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is found in one site atop Nicasio Ridge. Much of the population extends onto private land east of GGNRA land.

Threats

No changes in site status were observed during a site visit in 2003. In 2003, the site appeared to be in excellent condition with very few introduced species of concern. Defoliation from a tussock moth species has been documented in previous years' reports and is visible in photos taken of the site. Cows graze both the GGNRA and private land.

Monitoring conducted 2003

In 2003, one new stand was added to the mapped population. This population was observed during a site visit and the new polygon was delineated using aerial ortho-photo quads. Distribution of this species is readily visible in these photos.

Photopoints were established in order to provide points from which changes in canopy cover overtime can be documented. Despite some large patches of defoliated plants, the stands appeared in good condition with numerous native grasses and forbs present including two other special status plant species: *Castilleja affinis* ssp. *neglecta* and *Streptanthus glandulosus* ssp. *pulchellus*.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Nicasio	CENO	1	Surveyed; not censused	Surveyed; not censused	61% live 39% dead	Surveyed; not censused	No survey	Surveyed; not censused

During the 1998 and 1999 surveys, mapping of the boundaries of this species was largely completed. One stand not previously mapped was added in 2003. The area covered by this species is very large making the censusing of individuals unfeasible. In 2000, a sampling protocol was developed to measure percent cover and the ratio of live to dead within the population (see 2000 year-end report for methods). This method has not been repeated. Photopoints were established in 2003 as a minimum method of documenting changes in canopy cover overtime.

Management Recommendations

A considerable portion of this population occurs on private land. A meeting should be arranged with the ranchers, Point Reyes staff and GGNRA staff to make the ranchers aware of the rare plant species which occur on their land.

Maintain contact with Tom Parker at SFSU to determine the status of the species description.

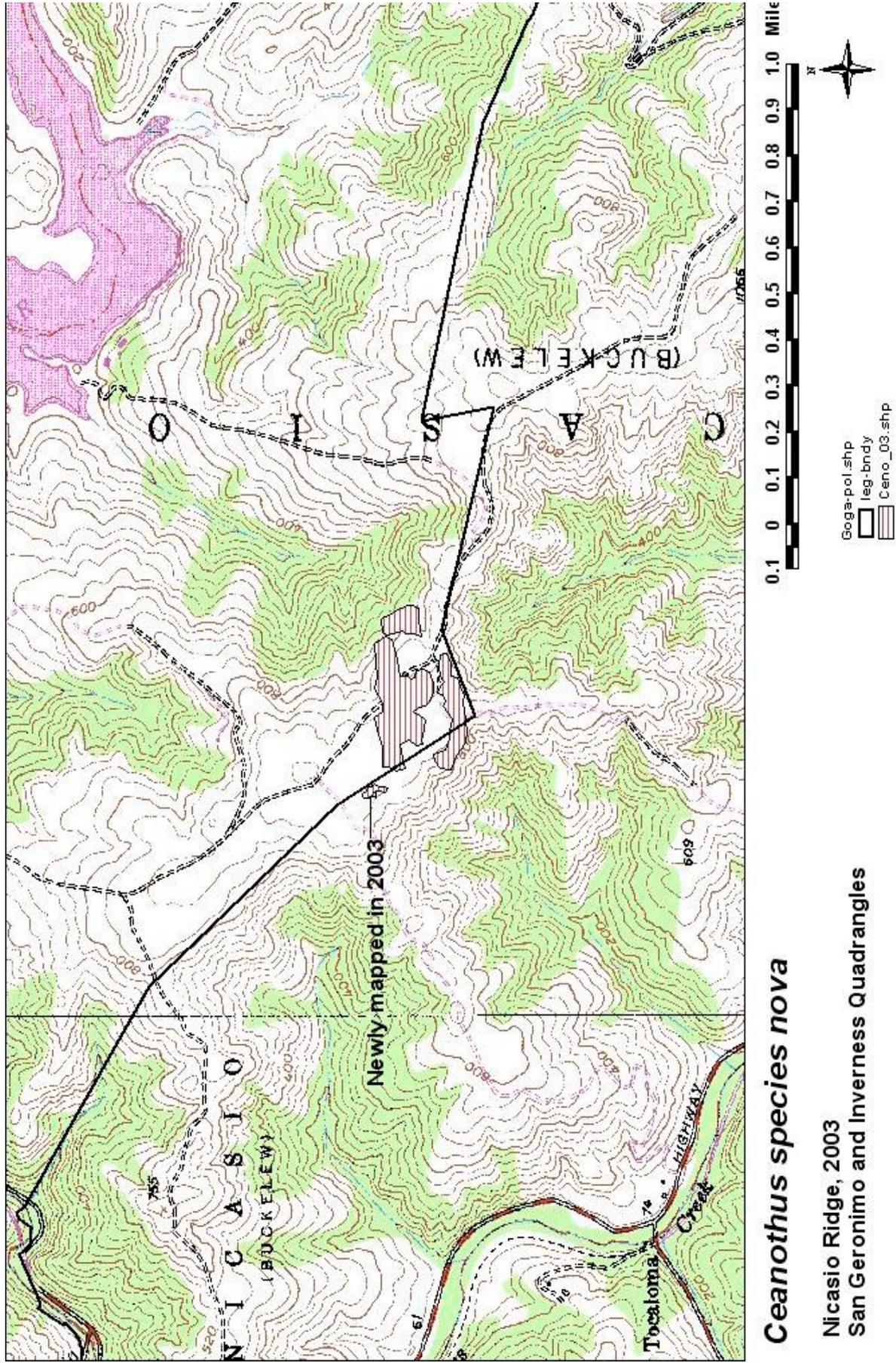
Some method of monitoring dieback due to Tussock moth infestation should be conducted every two years. At minimum, retaking of photos from established photopoints should be done to document changes in brush cover overtime.

The sampling method used in 2000 should be evaluated to see if another method is perhaps less time consuming but would provide the same information. A series of line transects may be an easier method to obtain data on percent cover by species and live to dead ratio. Nicasio Ridge is host to six rare plant species. Ideally, a monitoring method would be adopted that can capture information on all six species but only require examining a sub-sample of the entire population.

Long term monitoring would also be valuable for gathering information on the effects of cattle grazing. This area has been grazed for many years and yet the rare plant species still persist.

Recommended Monitoring Interval

Every two years



Ceanothus species nova

Nicasio Ridge, 2003

San Geronimo and Inverness Quadrangles

Chorizanthe cuspidata* S. Watson var. *cuspidata

San Francisco Bay spineflower

Rarity Status

Federal Listing: None

State: C2 - Threat and/or distribution data are insufficient to support federal listing.

CNPS List: 1B / R-E-D Code: 2-2-3

Nomenclature

The Jepson Manual: not accepted

CNPS: accepted

Comments: Varieties of this species are not recognized in The Jepson Manual.



Population Location(s): Fort Funston

Life History

Flowering Time: April-July

Range: *Chorizanthe cuspidata* var. *cuspidata* is endemic to California. There are documented occurrences in Alameda, Marin, Santa Clara, San Francisco, San Mateo and Sonoma counties.

Characteristics:

C. cuspidata var. *cuspidata* is a small, annual prostrate herb. The tiny flowers have six hairy perianth lobes. There are six bracts subtending the inflorescence, each with a hooked awn at the tip. *C. cuspidata* var. *villosa* has woolier heads and is documented to occur from Point Reyes to Bodega Bay. Although there are other similar looking *Chorizanthe* species in the bay area, no other members of the genus were seen on the dunes at Fort Funston.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is locally abundant in the sheltered depressions on the more stable interior dunes throughout Fort Funston. It appears to be well adapted to disturbance as it is often observed growing directly in use trails that cut through dense stands of iceplant (*Carpobrotus* sp.).

Threats

Populations of *Chorizanthe cuspidata* var. *cuspidata* at Fort Funston appear to be stable despite heavy visitor use and a rich array of introduced species. Although it is moderately successful in high use areas, it does appear to be thriving in sites that are closed to public use for a few years (Population 7) and have had iceplant and other invasive plant species removed.

Monitoring conducted 2003 Survey

Three populations were censused in 2003: populations 5, 6, 11. These were the same populations censused in 2002.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Ft Funston	CHCUCU	1	1,117	146	1432	3,660	surveyed; no census	No survey
		2	588	167	398	910	surveyed; no census	No survey
		3	--	surveyed; not census	2149	820	surveyed; no census	No survey
		4	2029	968	2481	750	surveyed; no census	No survey
		5	403	75	268	470	503	225
		6	--	--	218	510	605	600
		7	--	approx. 1,500	surveyed; not census	>20,000	surveyed; no census	No survey
		8	209	75	327	112	surveyed; no census	No survey
		9	--	--	442	1,450	surveyed; no census	No survey
		10	--	--	655	no survey	surveyed; no census	No survey
		11	--	--	--	--	5,088	1,000

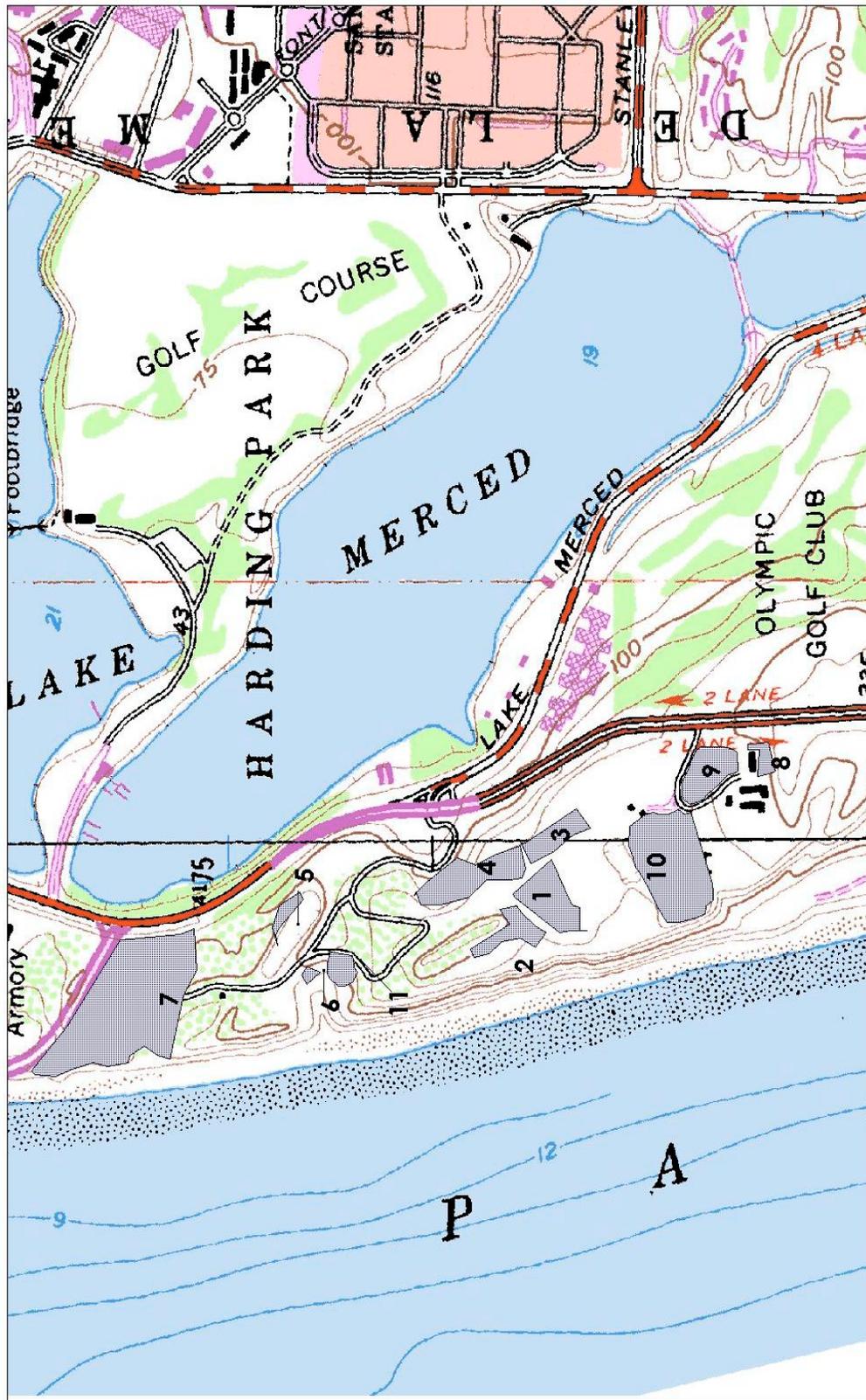
The above numbers do not show a consistent trend towards increase or decrease. The very low numbers obtained in 1999 as compared with 1998 are likely due to sampling being conducted late in the year. This is an annual species, so annual census figures are expected to fluctuate depending on yearly rainfall. In general the species is very abundant and widespread. It appears to persist in areas highly infested with ice plant and annual grasses and to germinate from the seed bank following removal of exotics.

Management Recommendations

The ubiquitousness of this species make censusing a daunting task. Sampling rather than censusing is recommended for this species. Sampling in restored versus un-restored areas would provide information on how well the species persists in treated versus untreated areas. Establishing a systematic monitoring method would be a means to study the impacts of humans, dogs and invasive species on this plant and to contrast the changes in species abundance based on the impact to which this species is exposed.

Recommended Monitoring Interval

Every two years



Chorizanthe cuspidata* var. *cuspidata

Fort Funston 2002, populations 1-11
San Francisco South Quadrangle

***Cirsium andrewsii* A. Gray**
Franciscan thistle

Rarity Status

Federal Listing: None

State Listing: None

CNPS List 1B / RED: 2-2-3

Comments: CNPS upgraded *Cirsium andrewsii* from list 4 in the 5th inventory to list 1B in the 6th edition.

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Life History

Range

Cirsium andrewsii is endemic to California. Populations are documented in Marin, San Francisco, San Mateo and Sonoma counties.

Characteristics

Cirsium andrewsii is a biennial or short lived perennial thistle. Like many thistle species, *C. andrewsii* appears in the first year as a vegetative rosette. In subsequent years individuals bolt, flower and die. Flowering individuals can grow up to two meters tall with numerous flowering heads. In the Marin Headlands, the invasive *Cirsium vulgare* and native *C. brevistylum* grow in the same habitat as *C. andrewsii*. In wet seeps both of these species can become large and branched, sometimes superficially resembling *C. andrewsii*.

C. vulgare can be distinguished by the rough feel of the leaf upper surfaces, due to a covering of small stiff hairs. The upper leaf surfaces of *C. andrewsii* are cobwebby when young, becoming glabrous; they lack bristles. The stem of *C. vulgare* is spiny winged while the stem of *C. andrewsii* is wingless.

The rosettes of *C. andrewsii* are large, with leaves up to 75cm long; those of *C. brevistylum* are smaller with leaves to 25cm; the upper leaves of *C. brevistylum* are thin with weak spines less than 10mm, while the upper leaves of *C. andrewsii* are thick and more clearly clasping with spines up to 15mm. There are also differences in the flowers and stem hairs of the two species.

Abundance and Distribution in The Golden Gate National Recreation Area and The San Francisco Watershed

Cirsium andrewsii occurs in seeps and drainages within the Marin Headlands. The populations found in Tennessee Valley bring the total in this area to 16. Drainages in Green Gulch, elsewhere between Tennessee Valley and the Fairfax-Bolinas Road, and at Sweeney Ridge were also searched, but no more populations were found.

C. andrewsii also occurs in the Presidio.

Threats

Vegetation in seeps in Tennessee Valley appeared generally in good condition with low levels of non-native species. Some seeps in Rodeo and Gerbode valley have higher



levels of non-native species; for instance *Conium maculatum* (poison hemlock) has been seen growing in dense stands within the population and habitat of *C. andrewsii*

Changes in the water table may have adverse affects on the health of populations. Some of the populations have fire roads and trails directly above or below them. Repairs and/or changes to the roads and trails, as well as the culverts near populations could raise or lower water tables.

Inventory/Monitoring Results 2003

Two new populations were documented in 2003. One population was found in Rodeo Valley in the Marin Headlands and a second population was found in Tennessee Valley behind the native plant nursery. No monitoring of previously known populations was conducted in 2003.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Marin Headlands	CIAN	1	*	388	298	245	photopoints	No survey
		2	--	95	54	22	photopoints	No survey
		3	--	187	112	63	photopoints	No survey
		4	--	166	40	33	photopoints	No survey
		5	--	13	19	9	photopoints	No survey
		6	--	37	19	22	photopoints	No survey
		7	--	10	8	8	photopoints	No survey
		8	--	6	9	3	photopoints	No survey
		9	--	22	21	11	photopoints	No survey
		10	--	0	not surveyed	not surveyed	photopoints	No survey
		11	--	--	64	42	photopoints	No survey
		12	--	--	--	--	1	No survey
		13	--	--	--	--	19	No survey
		14	--	--	--	--	11	No survey
		15	--	--	--	--	4	No survey
		16	--	--	--	--	46	No survey
		17	--	--	--	--	--	145
		18	--	--	--	--	--	1

* Population sampled not relocated in subsequent years.

Although both rosettes and flowering individuals were recorded during the census counts, only the number of flowering individuals are recorded above. As noted in the 2000 report, in some populations, numbers remain very consistent year to year while others fluctuate. The most serious threats to these populations appears to be the spread of invasive species such as *Conium maculatum* and *Festuca arundinacea* that can come to dominate sites.

Management Recommendations

The impact of introduced species on *Cirsium andrewsii* is unknown at this time. Closer monitoring of *Conium maculatum*, *Dipsacus fullonum* and *Cirsium vulgare* within the populations may help in identifying changes in *Cirsium andrewsii* populations.

Establishing a standardized method to gather quantitative information on other species (both native and non-native) would aid in assessing how the density of this species fluctuates in relation to changes in cover and density of other species within the communities in which this species occurs.

Maintenance workers that may be working on culverts, roads and trails near populations should be alerted to the presence of *C. andrewsii*. Extra care should be taken in ensuring water tables stay more or less the same in these sites.

Recommended Monitoring Interval: Every three years



Cirsium andrewsii

Marin Headlands, 2003
Point Bonita and San Francisco North Quadrangles

Cian_03.shp

Cirsium fontinale* E. Greene var. *fontinale

Fountain thistle

RarityFederal Listing: **ENDANGERED**State Listing: **ENDANGERED**

CNPS List: 1B / R-E-D Code: 3-3-3

NomenclatureThe Jepson Manual: AcceptedCNPS: Accepted**Population Locations:** San Francisco Watershed District**Life History**Flowering Time: June-OctoberRange

Cirsium fontinale var. *fontinale* is endemic to California. According to the CalFlora database, populations are restricted to a few scattered sites in San Mateo County and three documented populations in San Luis Obispo County. CNPS reports populations only occurring in San Mateo County.

Flowering Time: June-OctoberCharacteristics

Cirsium fontinale var. *fontinale* is a perennial thistle. Like many thistle species, *C. fontinale* var. *fontinale* appears in its first year as a small, vegetative rosette and the following year bolts and flowers. The plant's nodding flower heads and glandular leaves easily identifies flowering individuals of this distinctive and regal species. Other varieties of this species do not occur in the same locations. The first-year rosettes can be distinguished from *Cirsium vulgare* by the lack of bristles (stiff hairs) on the leaf surfaces. Both species have spiny leaf margins.

Abundance and Distribution within and around the Golden Gate National Recreation area and the San Francisco Watershed

A few scattered, small populations of *Cirsium fontinale* var. *fontinale* occur in seeps and drainages that run through the serpentinite grasslands on the east side of Crystal Springs Reservoir in the San Francisco Watershed District. The populations occur on both sides of I-280. One small population is located further south near Edgewood County Park in the 'I-280 triangle'. Six populations are documented in the San Francisco Watershed. No other populations are known to occur on GGNRA lands.

Threats

Introduced species do pose a distinct threat to the vigor of these populations. Many of the populations are adjacent to major roads and highways and are therefore going to be under constant threat from introduced species. *Cortaderia* sp. (pampas grass) poses a significant threat to several of the *Cirsium fontinale* var. *fontinale* populations. Some of the *Cortaderia* populations show signs of recent control efforts. Other introduced species of concern that could have an adverse affect on *C. fontinale* var. *fontinale* populations are *Cirsium vulgare* (bull thistle) and *Dipsacus fullonum* (teasel). Several

large patches of *Centaurea solstitialis* (yellow starthistle) have been observed adjacent to the populations.

It is likely that changes in the water table would have adverse affects on the health of populations. Some of the populations have roads and trails directly above or below them. Repairs and/or changes to the roads and trails, as well as the culverts near populations could raise or lower water tables.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	Site condition	1998	1999	2000	2001	2002	2003	
SFWD	CIFOFO	1	Fair-Good	--	,264	1,800	1,809	No survey	No survey	
		2	Poor-Fair	--	942	473	539	No survey	No survey	
		4	Good	--	65	7	No survey	No survey	No survey	
		5	Poor-Fair	--	1,258	1,334	708	No survey	No survey	
		7	Fair-Good	--	812	430	575	No survey	No survey	
		8	Excellent	--	87	82	183	No survey	No survey	

This is one of the rarest of the rare plant species occurring within GGNRA and SFWD being listed as 'endangered' at both the federal and state levels. The populations appear to be maintaining themselves despite threats from exotic species (particularly *Cortaderia*) and mowing. In 2000, surveyors reported that the population 4 was subject to mowing and that a fence that had been constructed around the population had fallen. Population 4 occurs in the same grassland area as *Pentachaeta bellidiflora* and where *Acanthomintha duttonii* was last reported.

It should be noted that both vegetative rosettes and flowering individuals were counted in the censusing of these populations and both are included in the above totals.

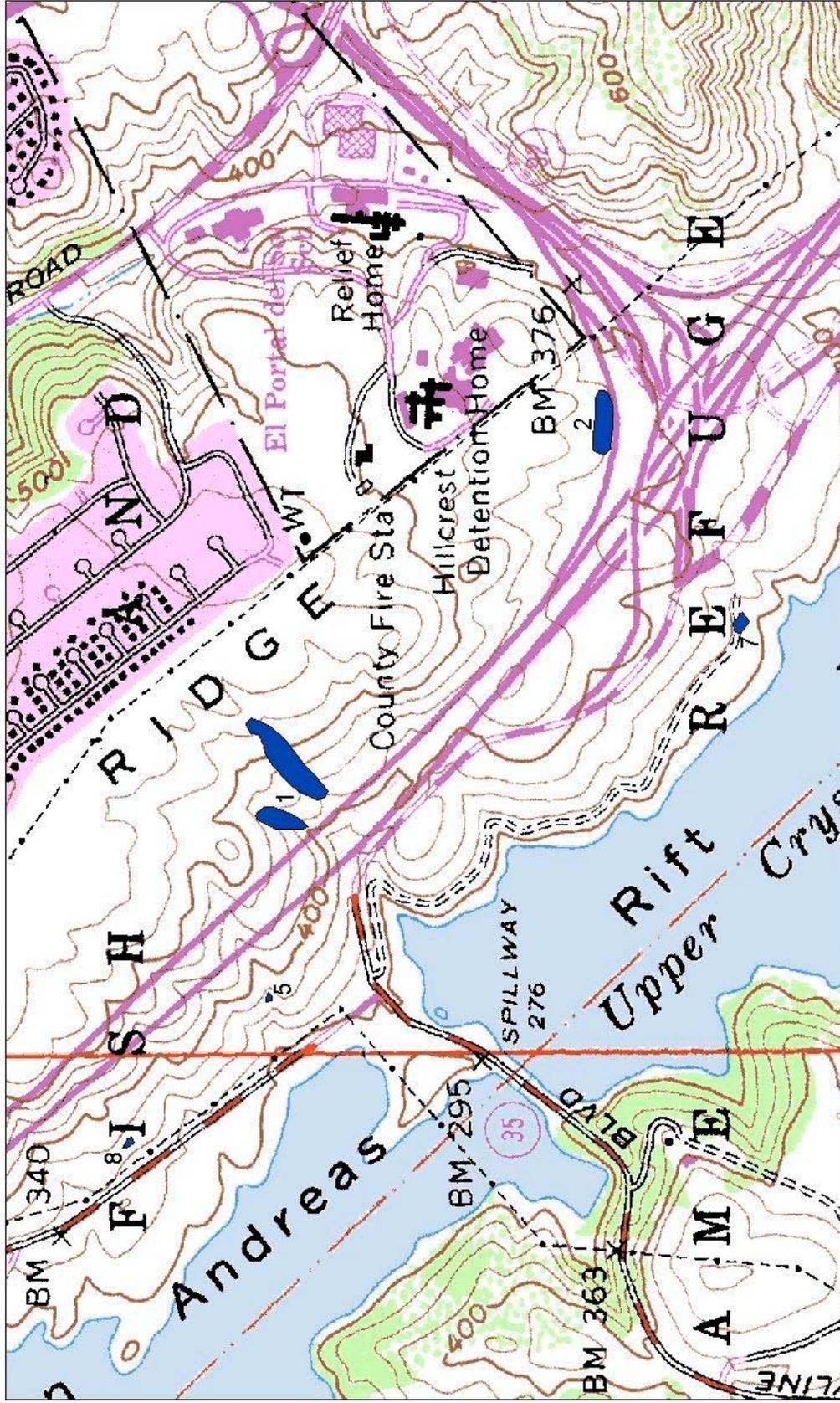
Management Recommendations

Efforts to extirpate *Cortaderia* sp. should continue. Maintenance workers improving or repairing culverts, roads or trails near populations should be alerted to the presence of *C. fontinale* var. *fontinale*. Extra care should be taken in maintaining water table levels within these populations.

Photopoints may be established to monitor current locations of the populations and the extent of non-native species, particularly *Cortaderia*.

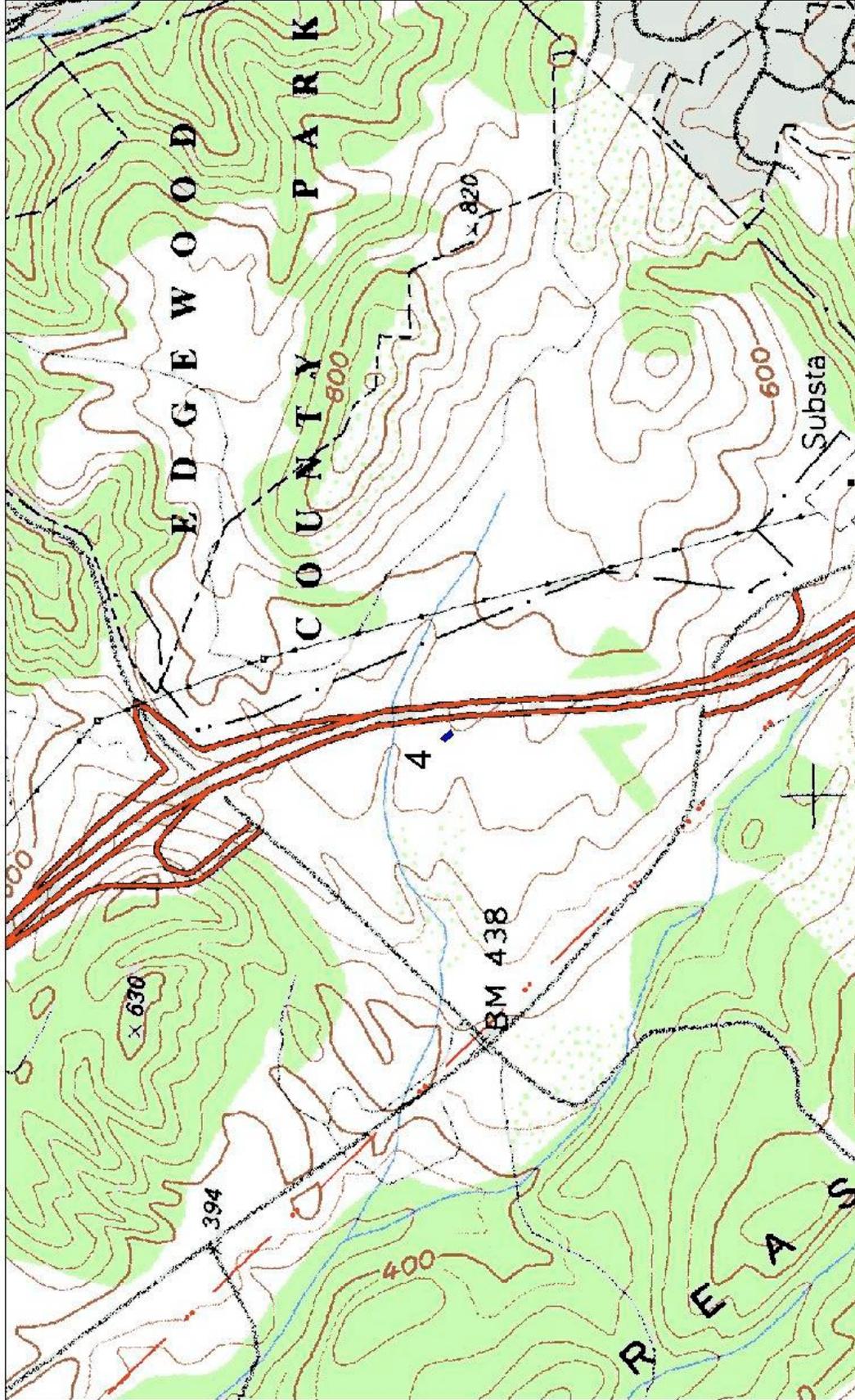
Recommended Monitoring Interval

Yearly to assess population health and to monitor invasive species.



Cirsium fontinale var. *fontinale*

San Francisco Watershed District
Populations near Crystal Springs Reservoir
San Mateo Quadrangle



Cirsium fontinale* var. *fontinale

"I-280 Triangle"
near Edgewood County Park
Woodside Quadrangle

***Cordylanthus maritimus* Benth. ssp. *palustris* (Behr) Chuang & Heckard**

Point Reyes bird's-beak

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 2-2-2

Nomenclature

The Jepson Manual: accepted

CNPS: accepted



Population Locations: Bolinas Lagoon, Giacomini/Martinelli Wetland

Life History

Flowering Time: June-October

Range: This plant is endemic to the pacific coast of North America.

Characteristics: This plant is an annual herb that occurs in coastal salt marshes. The plants are grey-green in color with calyx lobes shallowly three-lobed. Stamens are 4 with 2 smaller and 2 larger. Salt crystals are usually visible on stems and leaves.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Four small populations have been documented on the Martinelli Ranch/Giacomini wetland on GGNRA northern lands. Two small populations have been documented at Bolinas Lagoon. The populations found in 2002 and 2003 are the only recently noted occurrences on the east side of Bolinas Lagoon, although populations have been found farther west in the Lagoon.

Threats

Carpobrotus edulis (Ice Plant) occurs within 10 feet of population 1 at Bolinas Lagoon. Parts of the east shore of Bolinas Lagoon are very heavily invaded by other non-native species. The populations on the Giacomini/Martinelli wetland occur in intact marshland.

Inventory/Monitoring Conducted 2003:

Due to the high rainfall in the winter of 2002, the entire length of Bolinas Lagoon occurring with GGNRA boundaries was resurveyed in 2003. The result of this survey was the finding of second population on east shore of Bolinas Lagoon in 2003. All populations occurring on Martinelli/Giacomini wetland were censused for the first time in 2003.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Bolinás Lagoon	COMAPA	1	--	--	--	--	3	25
		2	-	--	--	--	--	18
Giacomini/Martinelli		1	--	--	--	approx. 250	No survey	1,507
		2	--	--	--	--	No survey	203
		3				--	No survey	3,010
		4				--	No survey	2,493

Population 1 at Bolinas Lagoon though still small showed a pleasant increase in number of individuals in 2003.

The Giacomini populations though small in area, are numerous in number of individuals.

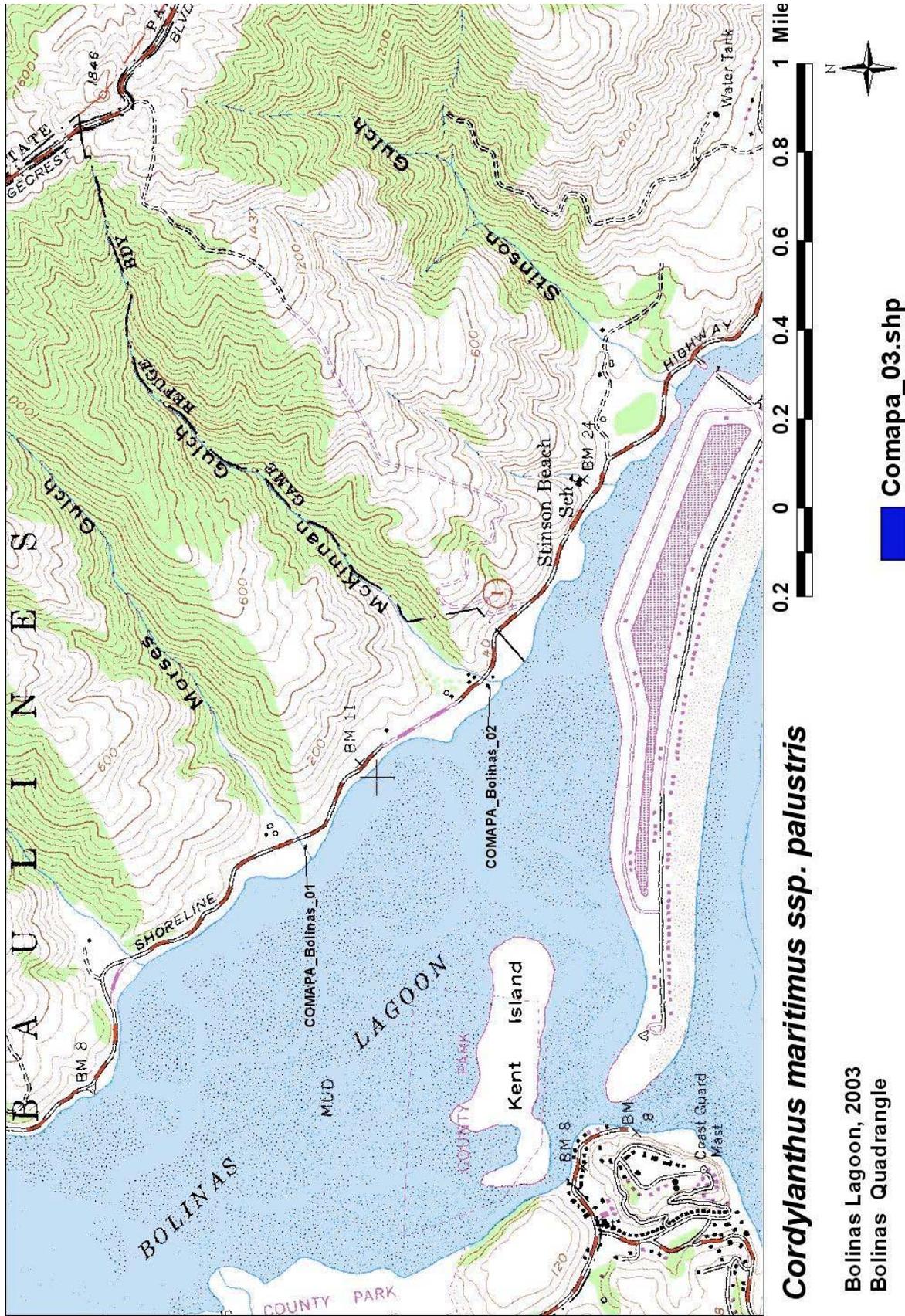
Each of these populations will be monitored for three consecutive years in order to obtain data on fluctuations in population numbers year to year. According to the 1994 Rare Plant Management Guidelines this plant's appearance seems to be related to the amount of precipitation; it appears in wetter years but is not seen in dry ones. 2003 was a high rainfall year and may account for the high census figures obtained in 2003

Management Recommendations

Revisit sites in future years to monitor these populations and threats from invasive species.

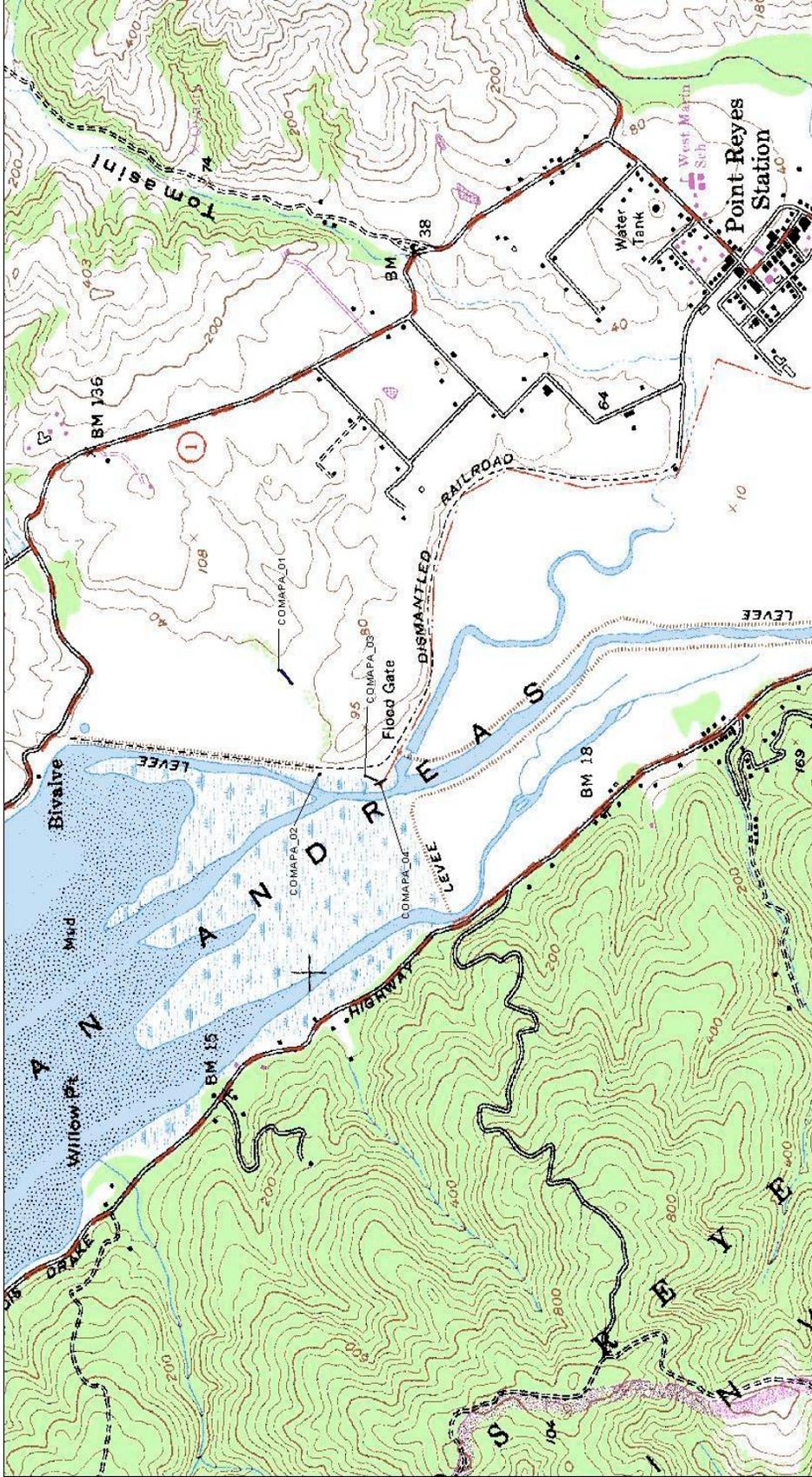
Recommended Monitoring Interval

Yearly for three years to document fluctuations in population size between years. If population appears to be stable, monitor every three years.



Cordylanthus maritimus ssp. palustris

Bolinas Lagoon, 2003
Bolinas Quadrangle



Cordylanthus maritimus ssp. palustris

Martinelli Ranch/Giacomini Wetland, 2003
Inverness Quadrangle

Comapa_03.shp

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 Miles



***Dirca occidentalis* A. Gray**
Western leatherwood

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 2-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Population Locations: Devils Gulch,
San Francisco Watershed District



Life History

Flowering Time: January-April

Range: *Dirca occidentalis* is endemic to California.

Characteristics:

This precocious deciduous shrub has a bright yellow calyx that appears before the plant leafs out very early in the spring. When flowering, *D. occidentalis* has unmistakable drooping flowers in clumps of two to three along a naked stem. Once *D. occidentalis* has leafed out, it blends in well and bears an uncanny resemblance to oso berry (*Oemleria cerasiformis*), which seems to frequently grow in association with *D. occidentalis*. Oso berry has white flowers that occur with the leaves. *Dirca occidentalis* can grow in a number of habitats. It grows beneath an oak forest canopy in GGNRA. In the SFWD it grows as an associate of the coastal scrub on mid-slopes and ridge tops as well as in stream drainages.

Abundance and Distribution within and around the Golden Gate National Recreation Area and San Francisco Watershed District

Several populations are documented in the San Francisco Watershed District and one population is documented in the GGNRA northern lands along the Devils Gulch Road. It is likely more extensive than the maps would suggest as it easily missed in surveys later in the season.

Threats

Road maintenance and firebreaks may have some adverse effects on the population. *Dirca occidentalis* was observed sprouting from a cut stump that had been bulldozed the previous year for a firebreak in the SFWD.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Devil's Gulch	DIOC	1	80	not found*	approx. 50	68	No survey	No survey
SFWD		1	--	not found*	--	15	No survey	No survey
		2	--	not found*	--	5	No survey	No survey
		3	--	not found*	--	10	No survey	No survey

* surveys conducted too late in season to identify plant

On both GGNRA lands and SFWD lands, the populations of this species appear to be thriving. Within SFWD lands, the known extent of the population has greatly increased beginning with surveys conducted in 2000. In 2001, surveyors noted that it is likely that this species is even more widespread than currently mapped.

In 2000, surveyors reported the population in Devil's Gulch to be in excellent condition and no new disturbances or threats were noted in 2001.

Management Recommendations

More exhaustive surveys should be conducted in early February in the SFWD to determine the abundance and distribution of this plant.

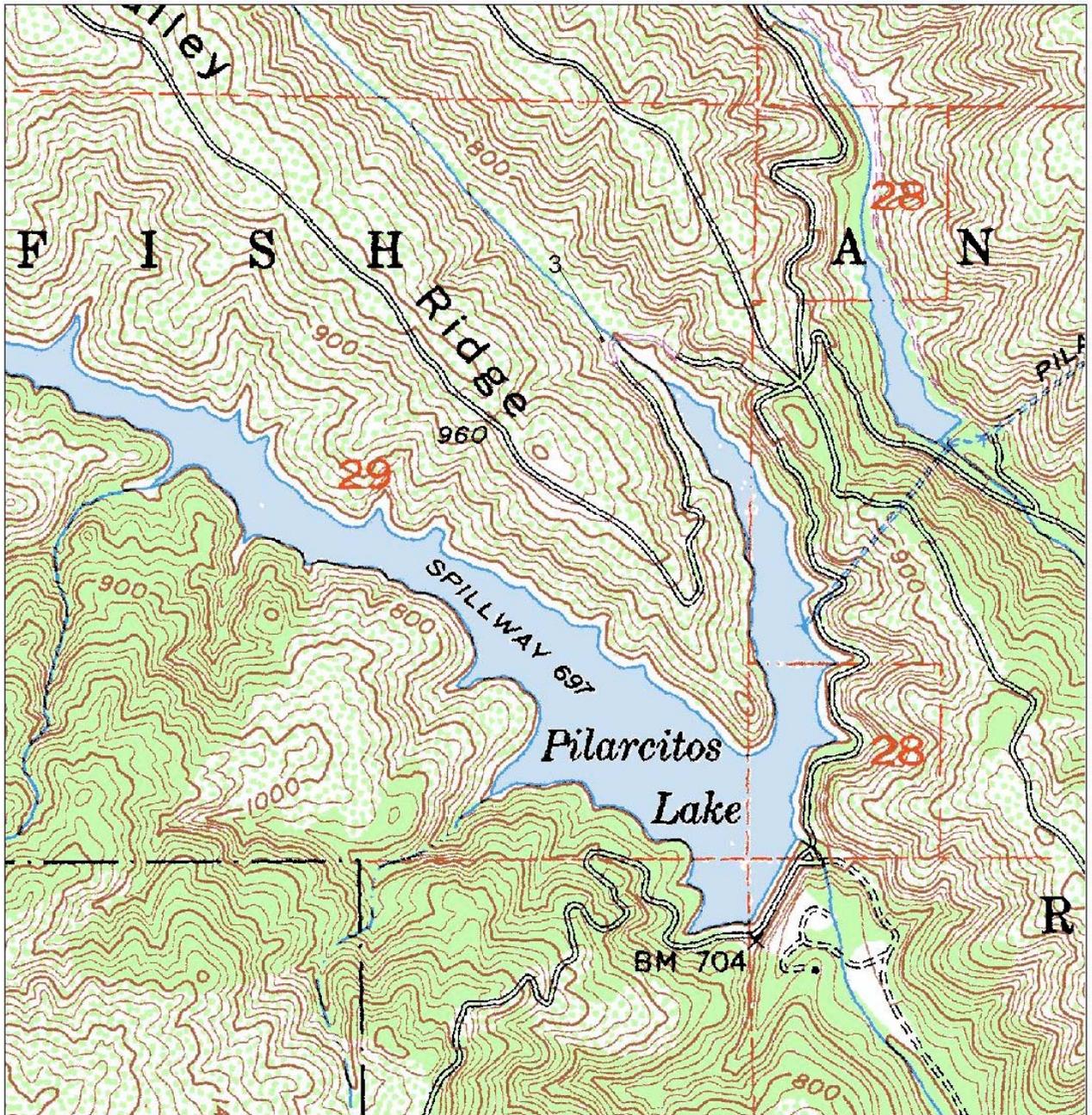
Recommended Monitoring Interval

Every three years to monitor health of the populations.



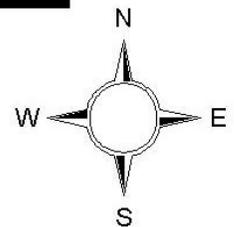
Dirca occidentalis with fruits

Dirca occidentalis

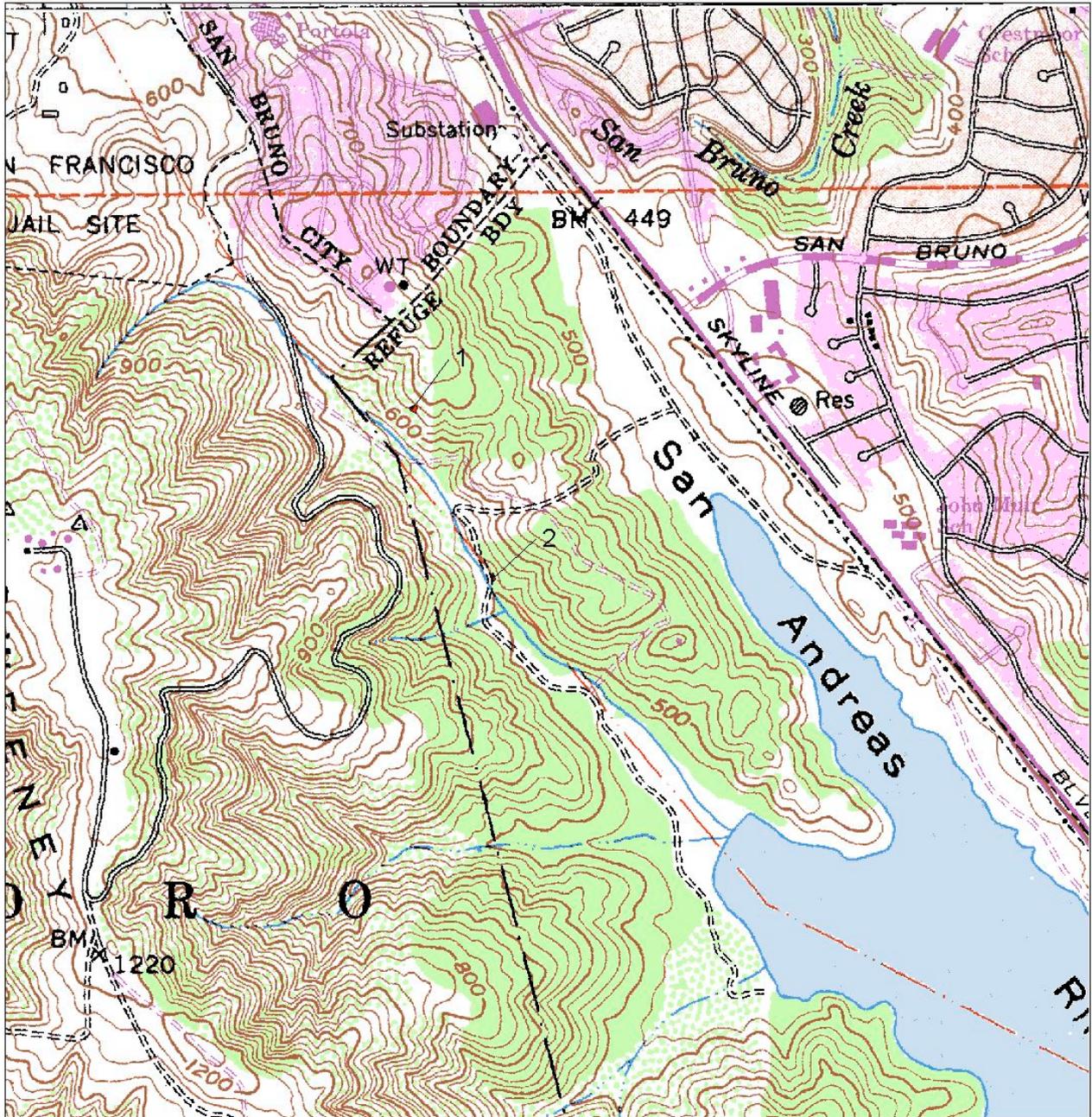


San Francisco Watershed District
Montara Mountain Quadrangle

0.1 0 0.1 0.2 Miles

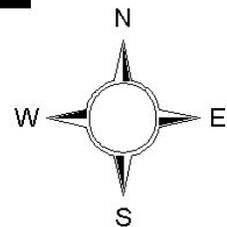


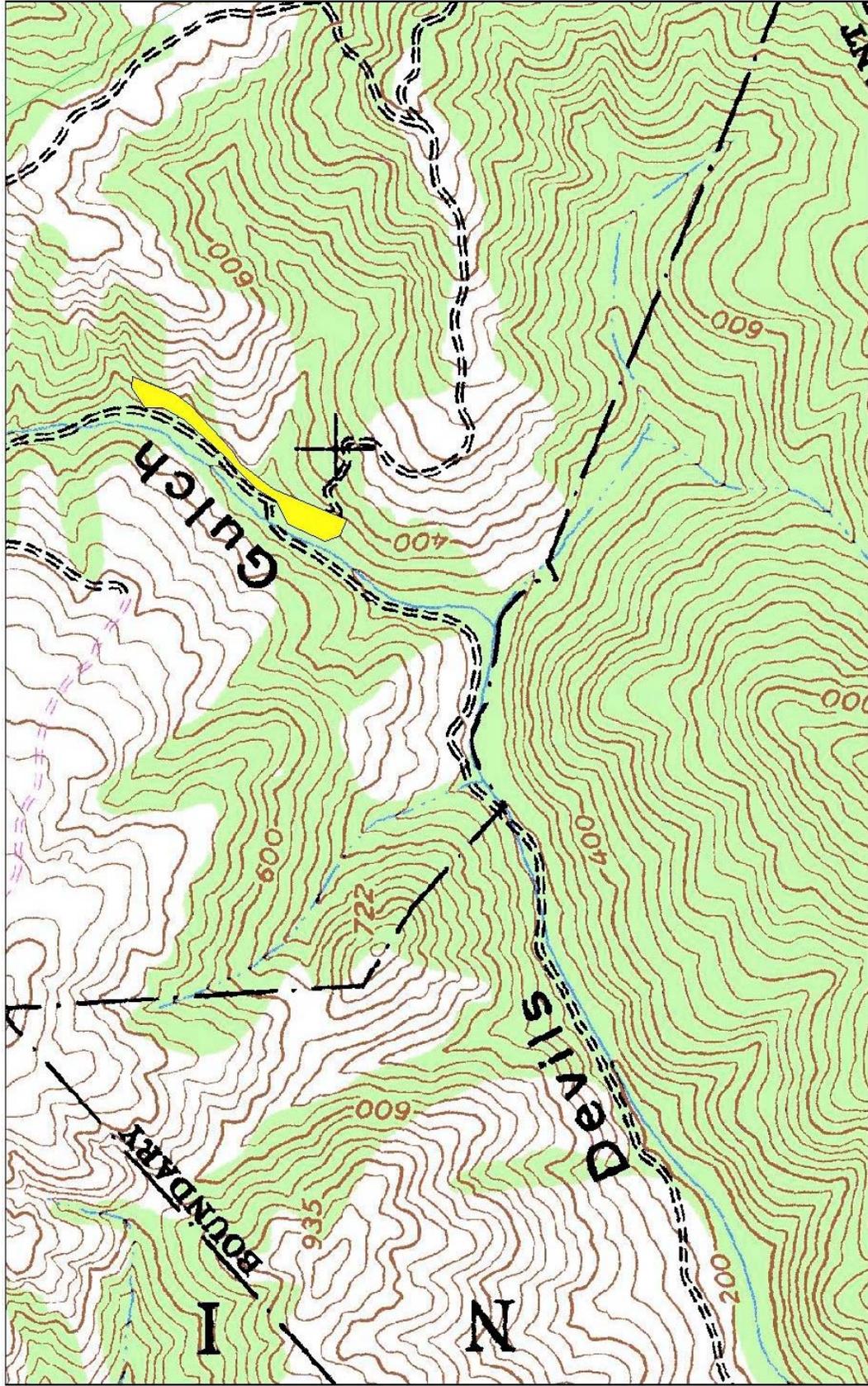
Dirca occidentalis



San Francisco Watershed District
Montara Mountain Quadrangle

0.1 0 0.1 0.2 Miles





Dirca occidentalis

Devil's Gulch
San Geronimo Quadrangle

***Elymus californicus* (Bol.) Gould**
California bottle-brush grass

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 4 / R-E-D Code: 1-1-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted



Population Locations: Muir Woods, Oakwood Valley, GGNRA Northern lands, SFWD

Life History

Flowering Time: May-August or later

Range: This plant is endemic to California. There are documented occurrences in Marin, Santa Cruz, Monterey, San Mateo and Sonoma counties. Within those counties there are numerous occurrences. It appears that this plant is locally common although restricted in its overall distribution.

Characteristics: This showy bunchgrass has a distinctive, somewhat drooping inflorescence and can grow up to 2 meters tall. It is unique in the genus *Elymus* in California in that its flower spikelets lack glumes. It is generally found in or at the edge of forest gaps. It is most often found in mature Douglas-fir forests but also occurs in the GGNRA in *Umbellularia californica* (Bay) forest and in plantations of *Pinus radiata* (Monterey Pine) and *Sequoiadendron giganteum* (Giant Sequoia),

The species often occurs with the common *Elymus glaucus*, and can be confused with it unless the spikelets are carefully examined.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This species is locally common on the moist western slopes of Bolinas Ridge, in the SFWD, in Muir Woods and in Oakwood valley. On GGNRA northern lands, it occurs in mixed evergreen forest in the Lagunitas Creek drainage off of Sir Francis Drake Highway.

Threats

The species seems so abundant that few immediate threats are apparent. Perennial grasses such as *Phalaris aquatica* (Harding Grass) can be found near some stands, however, and may in time take over portions of the habitat.

Inventory/Monitoring conducted 2003

A survey was conducted to document a population recorded as occurring "... on the Middle Green Gulch trail ... under a *Myrica californica* and *Lonicera involucrata*." However, this population was not found. It is recommended that a second search for this population be made in 2004.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Bolinás Lagoon	ELCA	1	--	--	--	--	101	No survey
		2	--	--	--	--	770	No survey
		3	--	--	--	--	112	No survey
		4	--	--	--	--	310	No survey
Muir Woods		all	approx. 1485	No survey	710	No survey	No survey	No survey
Oakwood Valley		1	--	--	--	--	260	No survey
SFWD		1	--	Surveyed; not censused	Surveyed; not censused	Surveyed; not censused	No survey	No survey
Lagunitas Crk		1	--	--	--	206	No survey	No survey
Cross Marin		2	--	--	--	69	No survey	No survey

Due to the wide spread occurrence and numerous individuals found, mapping of population boundaries rather than individual census counts are acceptable for this species. The numbers listed above are rough estimates of the size of these populations.

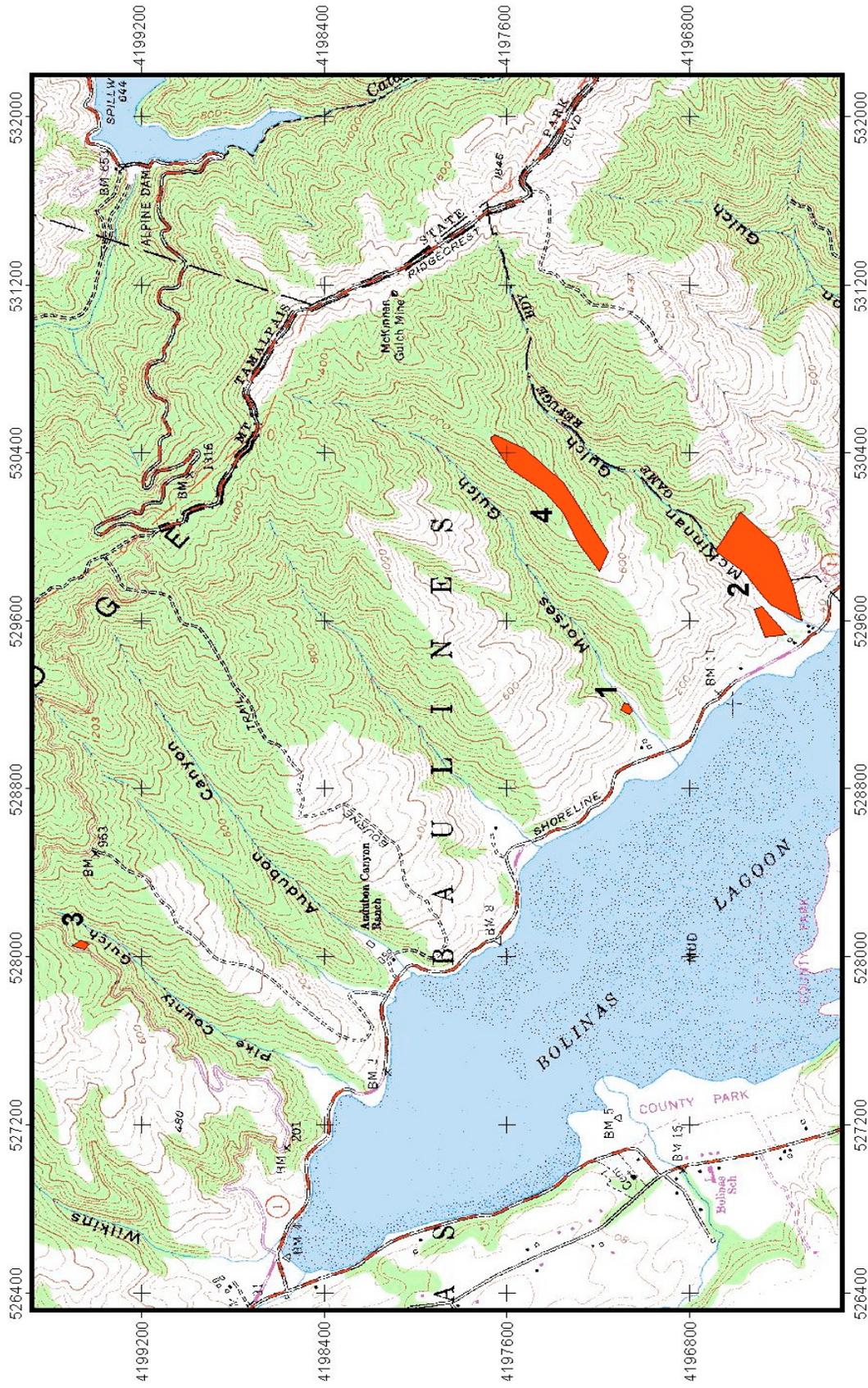
Management Recommendations

This is not a priority species. Populations should be briefly revisited every three years to monitor threats from invasive species.

Continue inventories for possible new populations. This information will provide further information on this species distribution within Marin and San Mateo counties.

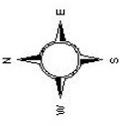
Recommended Monitoring Interval

Every three years.



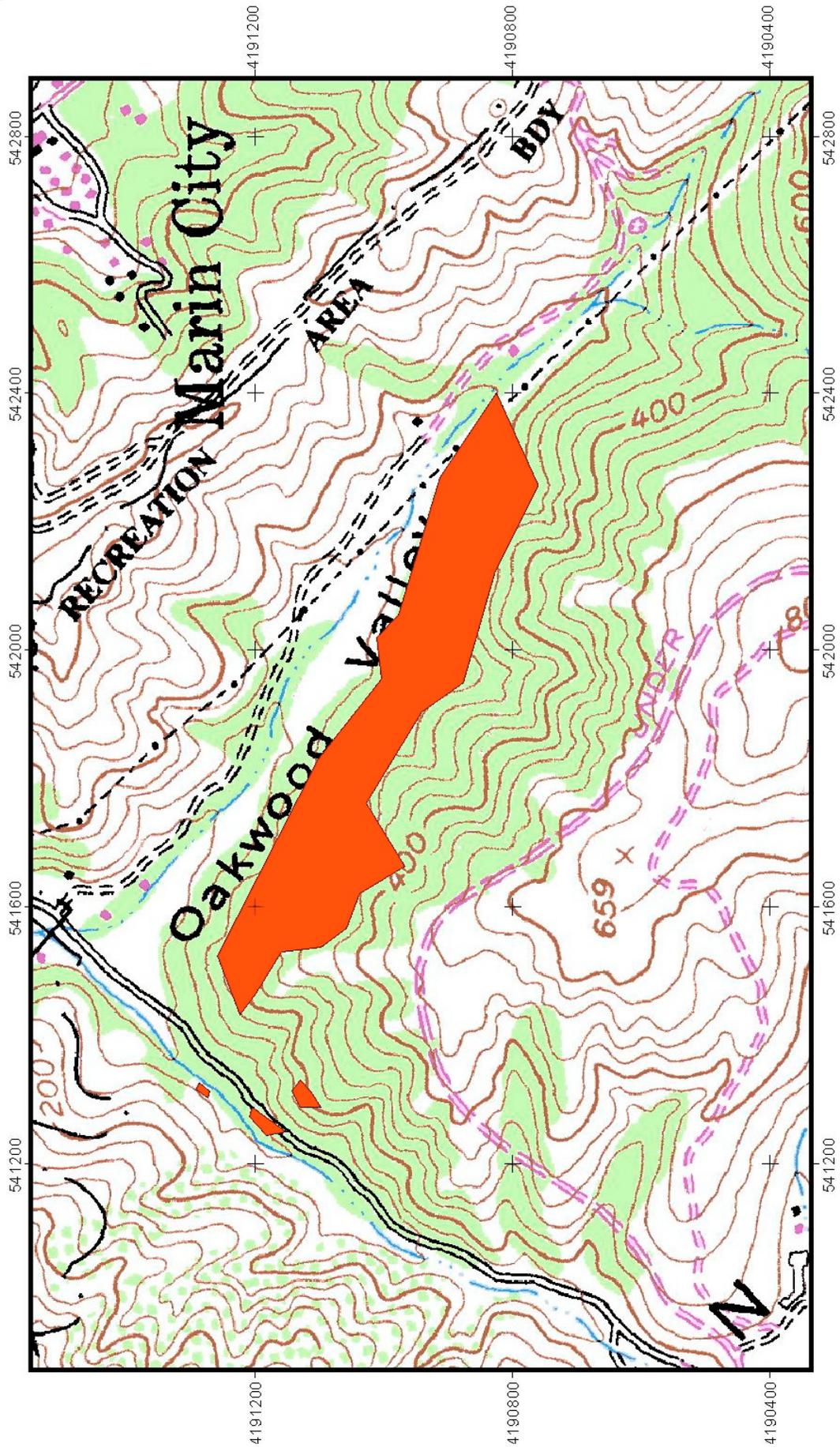
Elymus californicus
Bolinas Ridge/Lagoon Area

Bolinas Quadrangle

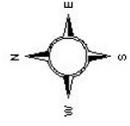


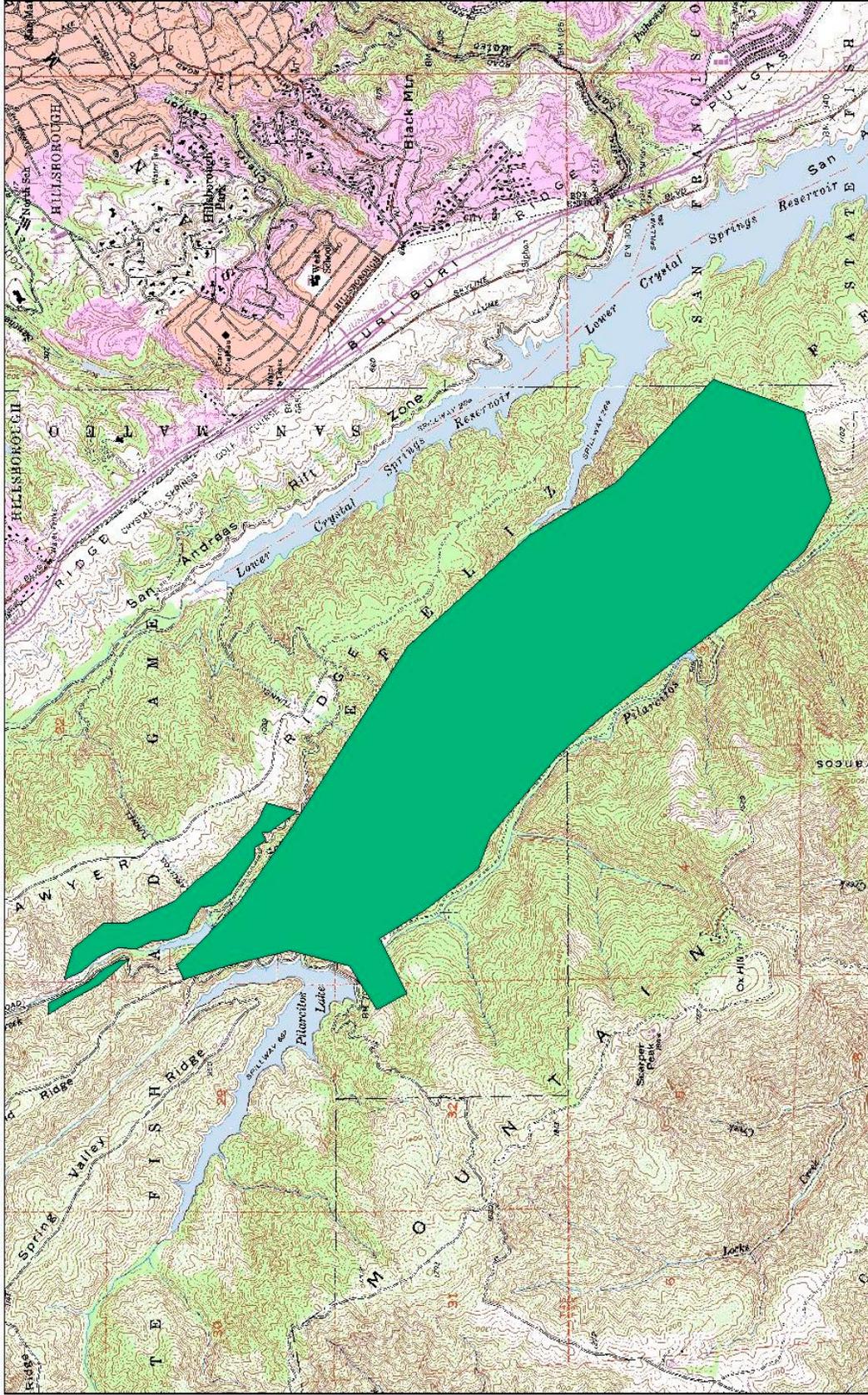
2002 Inventory/Monitoring Report

to insert MUWO map

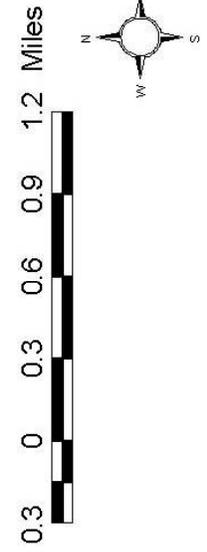


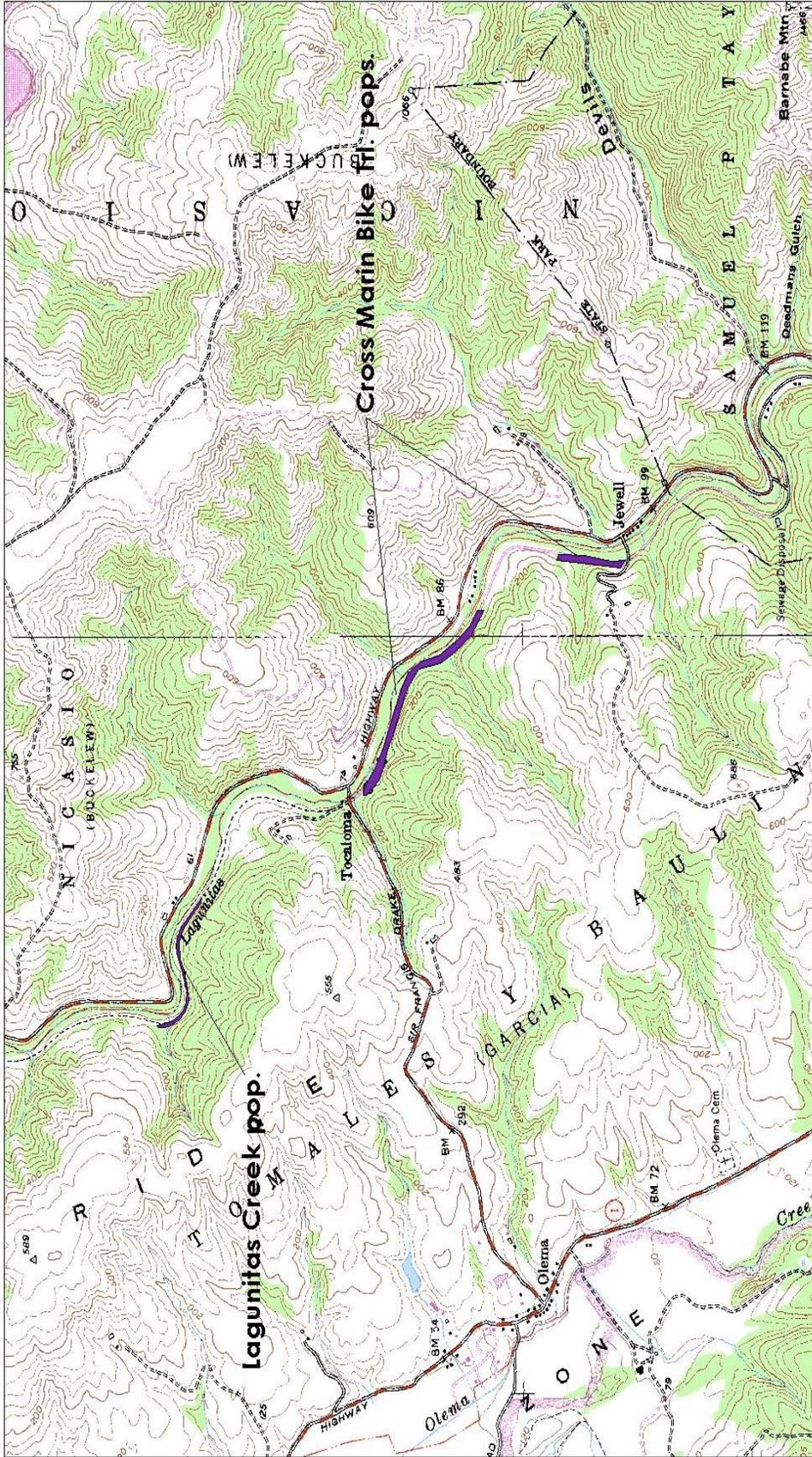
Elymus californicus
Oakwood Valley





Elymus californicus
San Francisco Watershed District
Montara Mountain and
Woodside Quadrangle





Elymus californicus

**Lagunitas Creek/Cross Marin Bike Trail, 2001
Inverness/San Geronimo Quadrangles**

Elca_01.shp



(*Eriogonum luteolum* E. Greene var. *caninum* (E. Greene) Rev.)

Tiburon buckwheat

****pending positive identification******Rarity Status**

Federal Listing: C3c – Too widespread and/or not threatened

State Listing: None

CNPS List: 3 / R-E-D Code: ?-2-3

NomenclatureThe Jepson Manual: acceptedCNPS: accepted**Population Locations:** Mill Valley Air Force Base**Life History**Flowering Time: June-Sept

Range: This plant is endemic to California and is documented in numerous counties in and around the San Francisco bay area. It is possible that many of these populations have been misidentified and the actual range of this subspecies is much smaller.

Characteristics:

This small annual buckwheat has showy red flowers and little or no cauline leaves. It is very difficult to distinguish between the two varieties of this species. *Eriogonum luteolum* var. *luteolum* is common in California. Both varieties grow in the same habitat of open serpentinite chaparral.

The two varieties differ in the following characters:

<i>E. luteolum</i> var. <i>caninum</i>	<i>E. luteolum</i> var. <i>luteolum</i>
1. Involucre appearing terminal	1. Most involucre appearing lateral
2. Inflorescence \pm repeatedly forked (or \pm evenly branched); or umbel-like	2. Inflorescence cyme-like, \pm unevenly branched
3. Flowering branches w/short branchlets usually of a single internode; involucre in axils and terminal	3. Flowering branches elongate, virgate, bearing involucre at the nodes; the lateral ones appressed

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

The only documented population is at Mill Valley Air Force Base on Mt. Tamalpais.

Threats

The presence of introduced species and encroachment of native tree and shrub species due to fire suppression may be a concern.

Species determination

During the 2001 survey, the surveyor questioned whether or not the species observed was actually *E. luteolum* var. *caninum* or the more common variety *E. luteolum* var.

luteolum. In 2002, a voucher collection was made and taken to California Academy of Sciences to compare with specimens in the herbarium. The specimens have been mounted and are housed in the herbarium cabinets in Building 1061, Fort Cronkhite.

The strongest character I found to differentiate the two varieties was the number of lateral inflorescences. The specimens collected have generally two lateral inflorescences between the axial and terminal inflorescence. The specimens of *E. luteolum* var. *luteolum* viewed from the Academy collection had numerous lateral inflorescences. This character is visible in the photo of *E. luteolum* var. *luteolum* at the end of this entry. Contrast the number of lateral inflorescences in the photo below with the specimens collected.

In order for a final determination of variety can be made, the vouchers collected should be verified by another qualified botanist. This could be a botanist among GGNRA staff or an outside expert.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
MVAFB	ERLUC A	1	17	31	33	587	Surveyed; no census	No survey
		2	--	--	--	346	Surveyed; no census	No survey

The low numbers recorded in 1998 through 2000 as compared with those in 2001 are due to a smaller area being surveyed and the surveys being conducted too early in the year. Surveys conducted in 1998 through 2000 were conducted mid-May to mid-June when most plants are still in the rosette stage. The survey conducted in 2001 was conducted in late June when plants are in full bloom. The site was last visited in 2002 in order to collect voucher specimens. The plant was found to be quite abundant in both the east and west populations.

Management Recommendations

In order for a final determination to be made as to the identification of variety, the vouchers collected should be verified by another qualified botanist. This population should not be reported to CNPS or NDDDB until a positive determination has been made.

This species has a Federal listing of 3c and its rarity is undetermined by CNPS. Therefore, though positive identification should be made, this species may not warrant continued intensive monitoring. Establishing line transects would allow for the gathering of absolute cover data for individual species as well as relative cover data for all species occurring within this community. A series of transects distributed across these populations would provide data on changes in cover of both native and non-native species.



Eriogonum luteolum var. *luteolum*

***Eriophyllum latilobum* Rydb.**
San Mateo wooly sunflower

Rarity

Federal Listing: **ENDANGERED**

State Listing: **ENDANGERED**

CNPS List: 1B / R-E-D Code: 3-3-3

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted



Life History

Flowering Time: May-June

Range

Eriophyllum latilobum is endemic to California and, according to CNPS, is restricted to only one extant population. According to the CalFlora Occurrence Database, there are a few other reported occurrences in San Mateo, Napa and San Bernardino counties.

Characteristics

E. latilobum is a subshrub in the family Asteraceae. It has bright yellow ligules and light green stems and leaves. *E. latilobum* is easily confused with *Eriophyllum confertiflorum* var. *confertiflorum*. The inflorescence of *E. c.* var. *confertiflorum* is much denser than that of *E. latilobum*. The phyllaries of *E. confertiflorum* var. *confertiflorum* are strongly overlapping whereas the phyllaries of *E. latilobum* are only slightly overlapping. The ligules of *E. c.* var. *confertiflorum* are generally shorter (2-5mm) than the ligules of *E. latilobum* (5-10mm).

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

There is only one known population in the San Francisco Watershed. Scattered clumps occur along the Crystal Springs Road. The population is adjacent to the road and generally grows on or adjacent to partly shaded road cuts.

Threats

The first site visit in 2001 occurred on May 18. The survey revealed a stable population of approximate 190 individuals along the Crystal Springs Road. A subsequent visit on June 1, 2001 showed that much of the population had been mowed. Perennial mowing of the population could have a negative long-term effect on this population. Other road management practices such as herbicide application or mechanical grading could have serious negative effects of the population and possible extinction of a federally endangered species.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
SFWD	ERLA	1	--	443	surveyed; not censused	189	No survey	No survey

With only two years of actual census data it is difficult to say whether the population is declining as might be suggested by the above data. Since the plant occurs in an area which is regularly mowed, mowing may be having a deleterious effect on this population.

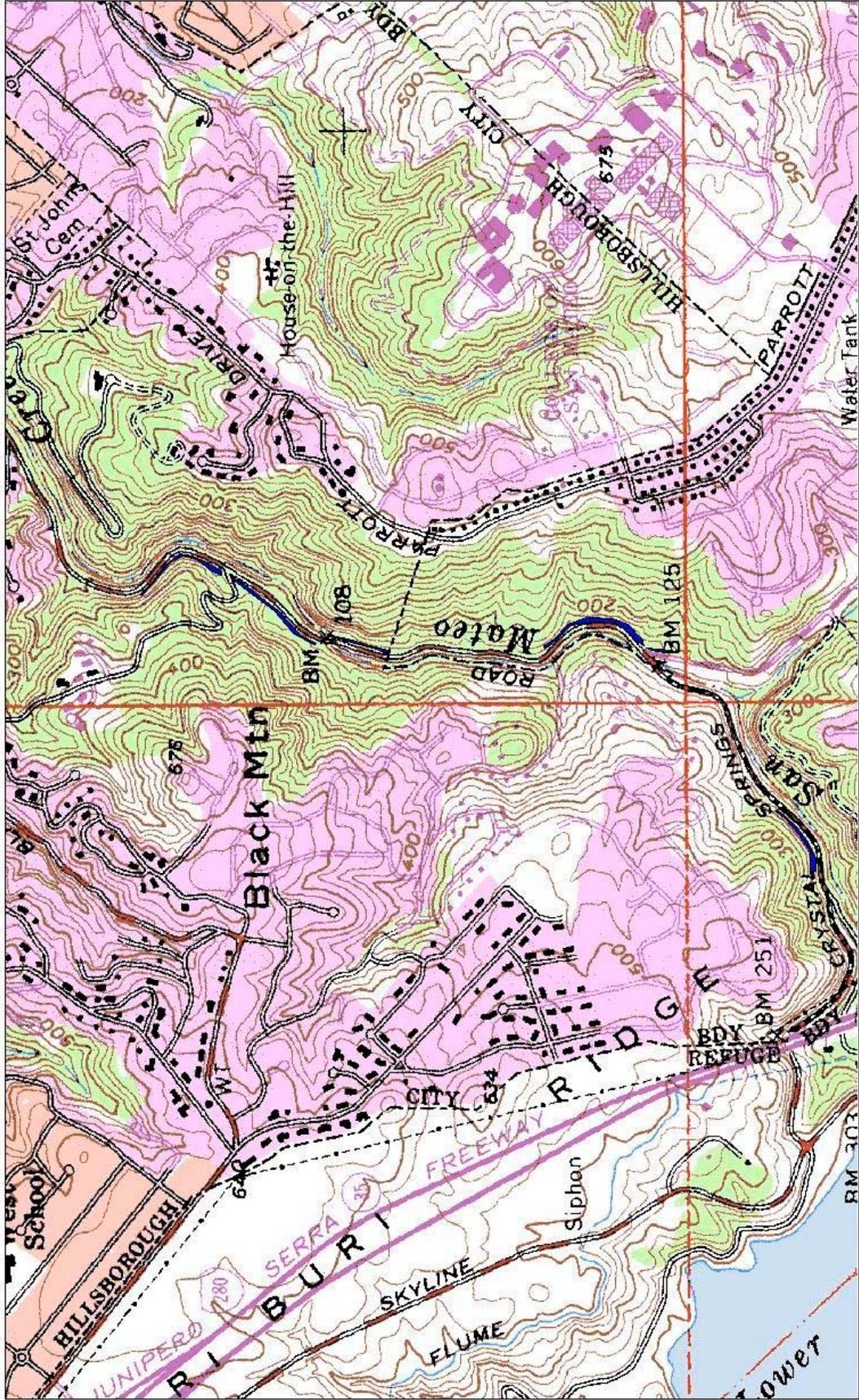
Management Recommendations

Considering the extreme rarity of *Eriophyllum latilobum*, it is highly recommended that a change in maintenance practices occur for this section of road. Managers could wait until plants have gone to seed before mowing, or preferably, avoid entirely the dense clumps of the species. County and city officials should be alerted to the presence of this very rare plant.

Recommended monitoring interval

Yearly to document presence and abundance of the population.

This is priority species in 2004



Eriophyllum latilobum

Crystal Springs Road
San Mateo Quadrangle

***Erysimum franciscanum* Rossbach**
San Francisco wallflower

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 4 / R-E-D Code: 1-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

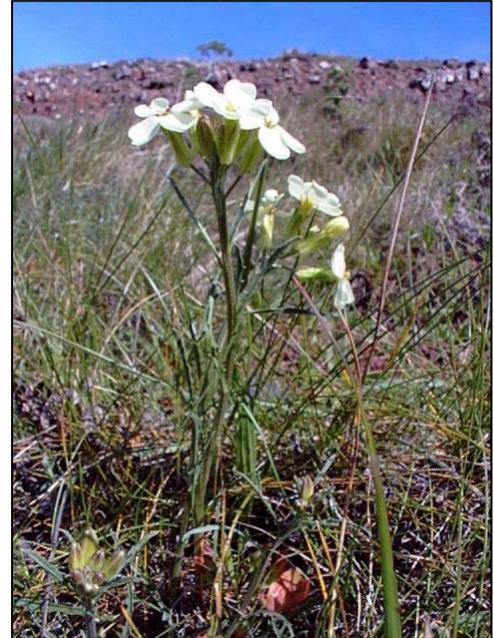
Population Locations: The Marin Headlands, Sweeney Ridge, Fort Funston, Pedro Point, and the San Francisco Watershed District

Life History

Flowering Time: March-June

Range:

This species is endemic to California. It occurs in Marin, Santa Cruz, San Francisco, San Mateo and Sonoma counties. Literature cites this species in Sierra County as well, although there is no reported voucher specimens from that county.



Characteristics:

The San Francisco wallflower is a short-lived perennial herb with cream to yellow colored flowers. Like other mustards, its bisexual flowers are 4-petaled and cross-shaped, with four long and two short stamens. It can have several stems that can be branched and grow up to 50 cm tall. Plants are often woody at the base, with more flexible stems at the top. Its basal leaves are linear, often tapered to the petiole, generally toothed and with appressed, branched hairs. Fruits are narrow siliques, often crowded and strongly ascending. Fleshy coastal plants have sometimes been separated into the variation *crassifolium*.

The San Francisco wallflower can be distinguished from the more common *Erysimum capitatum* (western wallflower) by the mature fruit and mature seed shape. The San Francisco wallflower has a flat fruit, while the mature fruit of the western wallflower is generally four sided. The seed of the San Francisco wallflower is winged at the tip as well as along one or both sides. The western wallflower has a seed that is not winged or winged only at the tip. The petal color of both species is highly variable.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Within the GGNRA, it is found in the Marin Headlands, Fort Funston, Sweeney Ridge, Milagra Ridge, Pedro Point and in the S.F. Watershed District. The San Francisco wallflower occurs below 500m in elevation on serpentinite outcrops, granite cliffs, and on coastal dunes. It is associated with coastal strand, valley grassland and northern coast scrub plant communities. *E. franciscanum* is likely more extensive than presently mapped in the San Francisco Watershed District.

Threats

Erysimum franciscanum appears to thrive along road cuts and trails, which suggests that it might also respond negatively to the expansion of dense scrub due to fire suppression. Exotic shrubs like French broom (*Genista monspessulana*) and perennial grasses such as Harding grass (*Phalaris aquatica*) could similarly threaten the wallflower.

Inventory/Monitoring conducted 2003

Several areas were surveyed in 2003 to search for new populations of *Erysimum franciscanum*. One new population was found on the coastal bluffs above Muir Beach and second at Pedro Point. No monitoring was conducted of previously known populations.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Ft Funston	ERFR	6	--	--	--	17	No survey	No survey
		7	--	--	--	5	No survey	No survey
Marin Headlands		1	575	112	298	No survey	No survey	No survey
		2	989	325	498	447	No survey	No survey
		3	403	117	80	87	No survey	No survey
		4	56	9	13	0	No survey	No survey
		5	29	9	2	46	No survey	No survey
		6	--	--	6	7	No survey	No survey
		7	--	--	1	not found, location is uncertain	No survey	No survey
Muir Beach		1	--	--	--	--	--	17
Milagra		1	2222*	95	156	755	No survey	No survey
		2	--	15	78	740	No survey	No survey
		3	--	10	7	9	No survey	No survey
Pedro Point		1	--	--	--	--	--	105
SFWD		1	--	20	1	0	No survey	No survey
		2	--	10	0	0	No survey	No survey
		3	--	--	--	13	No survey	No survey
		4	--	--	5	36	No survey	No survey
		5	--	--	20	88	No survey	No survey
		6	--	--	260	246	No survey	No survey
		7	--	--	12	24	No survey	No survey
		8	--	--	407	241	No survey	No survey
		9	--	--	5	16	No survey	No survey
		10	--	--	--	2,473	No survey	No survey
		11	>200	1186	2390	1,823	No survey	No survey
		12	--	--	--	103	No survey	No survey
		13	--	--	--	46	No survey	No survey
Sweeney		1	not found	488	176	327	No survey	No survey

*number is total of all three Milagra populations

Like *Arabis blepharophylla*, *Erysimum franciscanum* is a locally abundant species. Yearly fluctuations in abundance do occur. The 1999 counts were much lower than in 1998 in both the Marin Headlands and on Milagra Ridge. Surveyors in 1999 noted the difference in counts and that they had sampled earlier than in 1998, however, subsequent site visits did not reveal larger number of plants. Note that several populations have gone from as large as 56 individuals to 0 (MAHE #4). These sites should be revisited in subsequent years to see if individuals reappear. Counts from Fort Funston for 1998 and 1999 have been omitted from the above table. These numbers contain counts of out plantings and consequently were dramatically higher than the 2001 counts (see data sheets in *Erysimum* folder).

Management Recommendations

Continue to census this population every three years. Monitor for the presence of introduced species of concern. Continue to survey for new populations. Survey those sites which were previously populated but where recent surveys have reported zero individuals.

Recommended Monitoring Interval

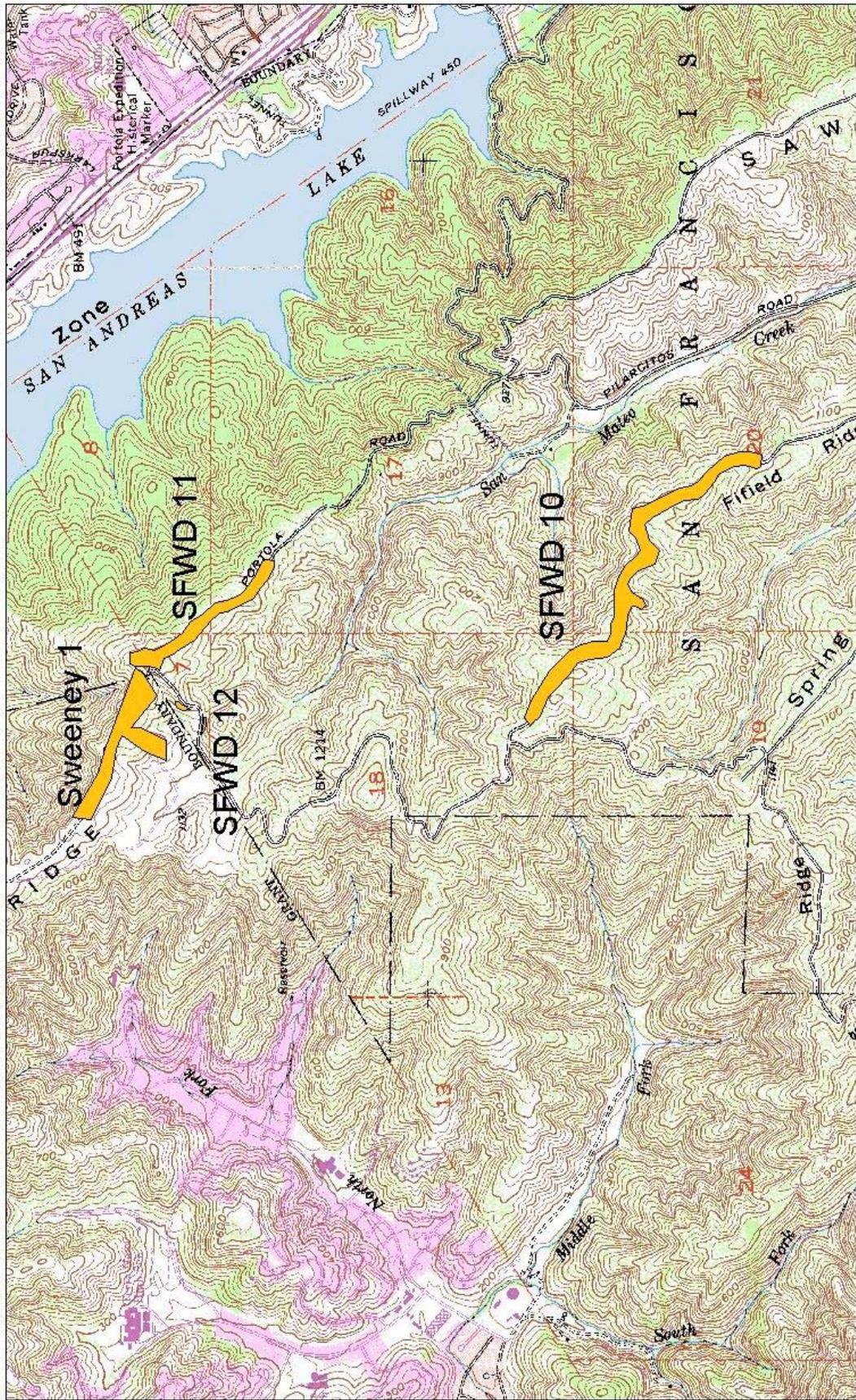
Every three years



Erysimum franciscanum

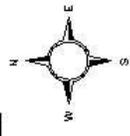
Pedro Point, 2003
Montara Mountain Quadrangle

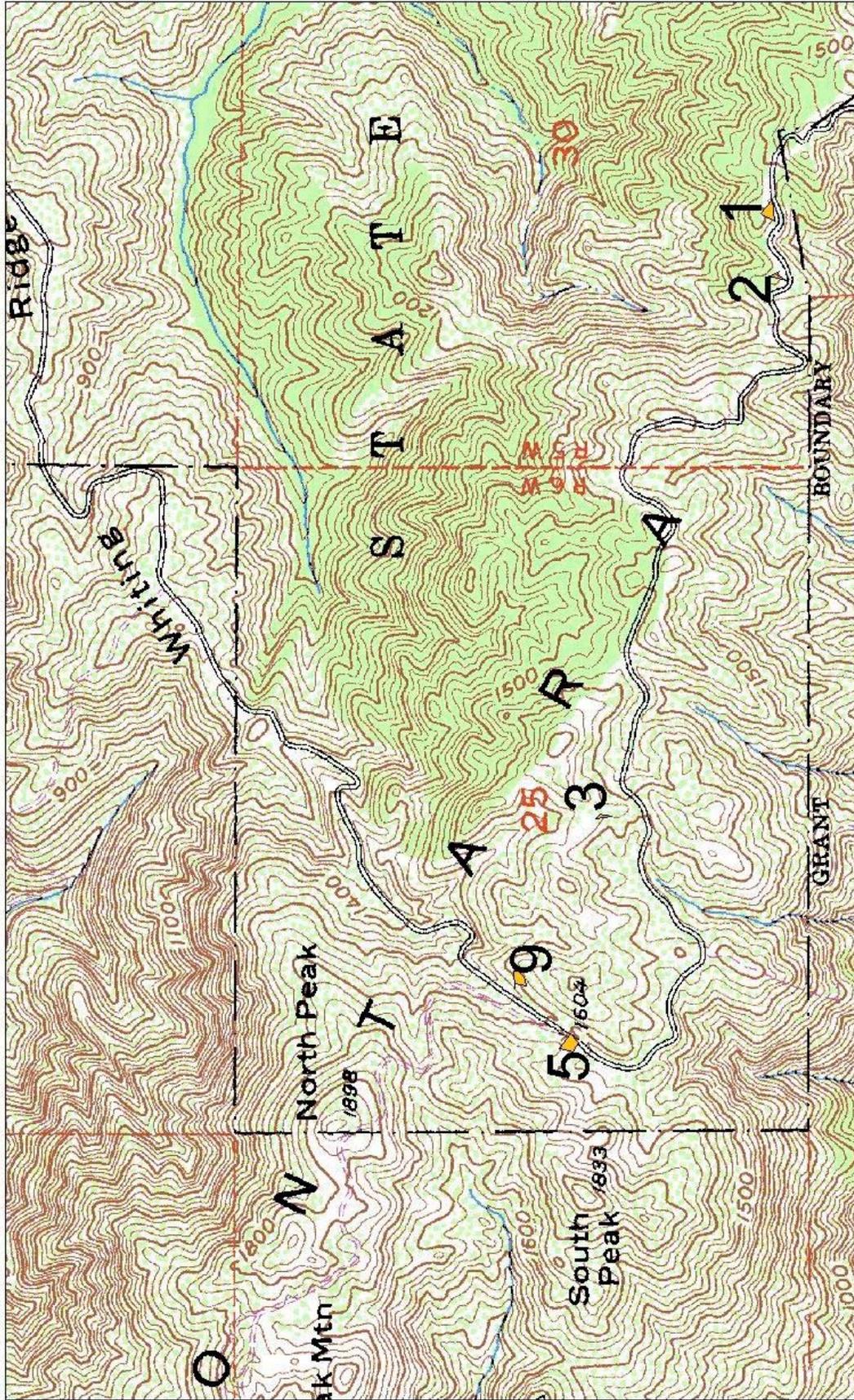
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Erysimum franciscanum

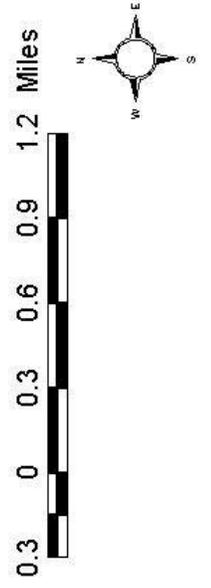
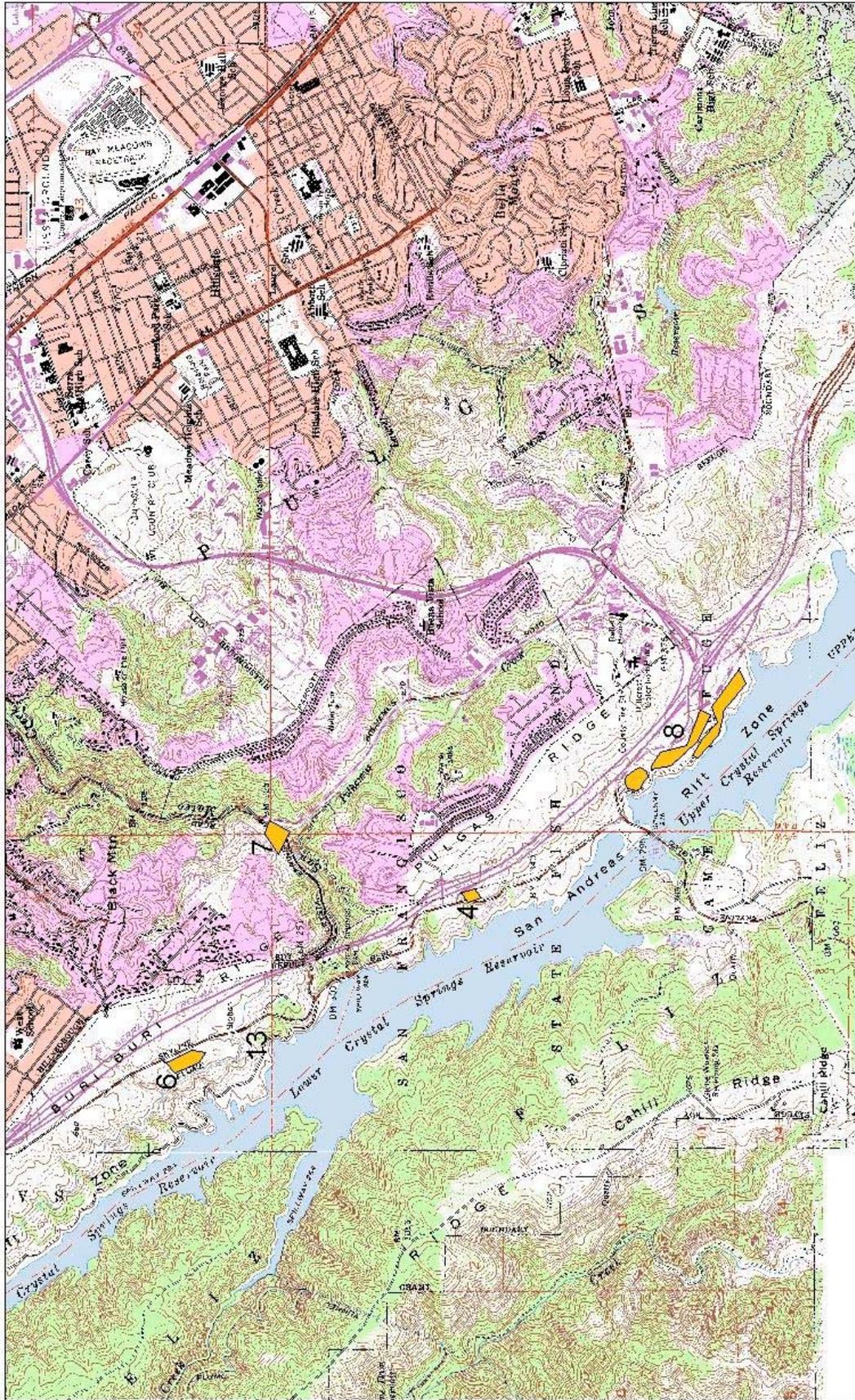
Sweeney Ridge and SFWD North
Montara Mountain Quadrangle



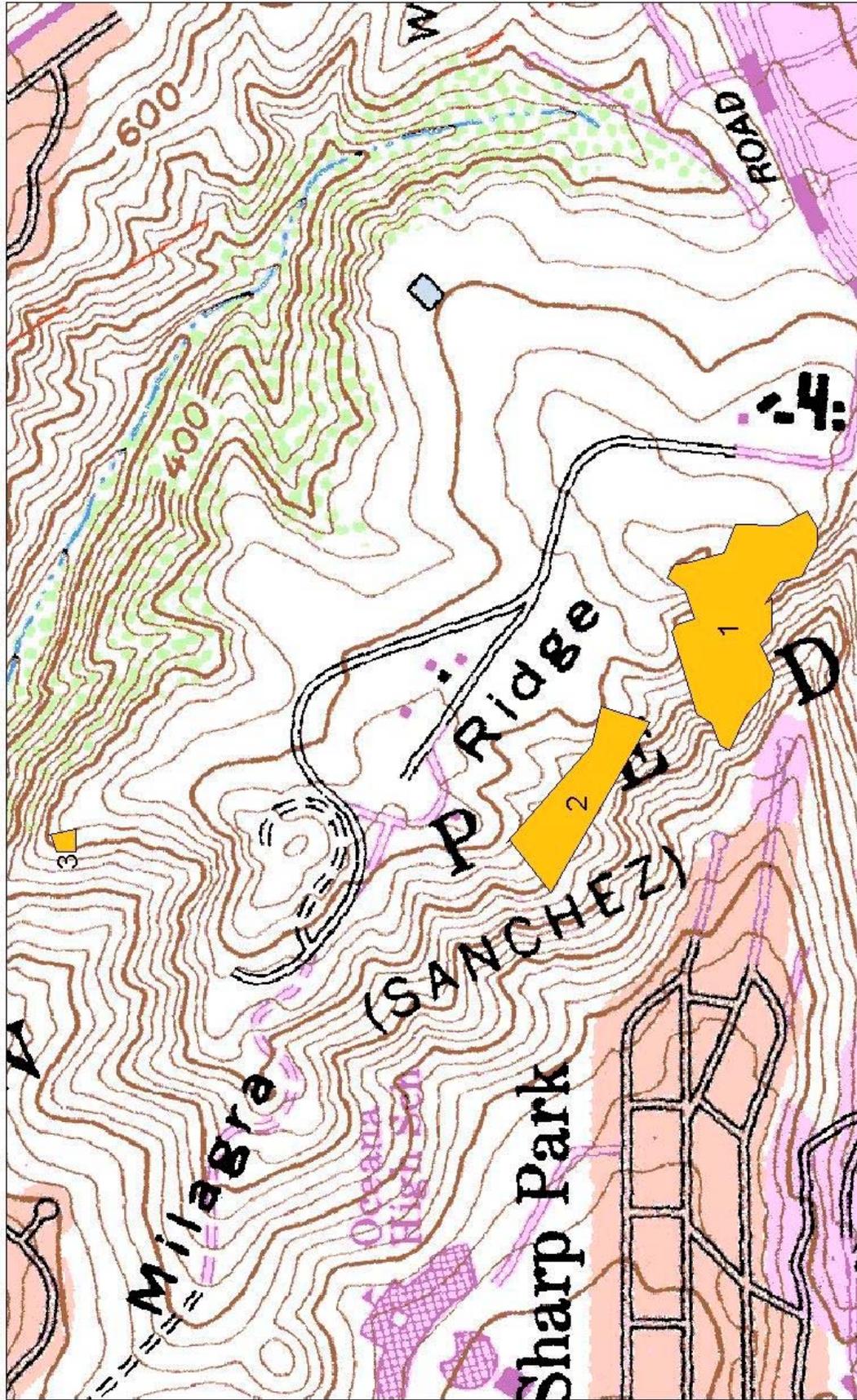


Erysimum franciscanum

San Francisco Watershed District
Montara Mountain Quadrangle

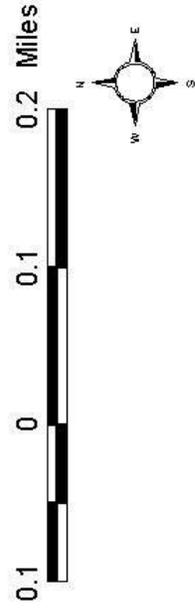


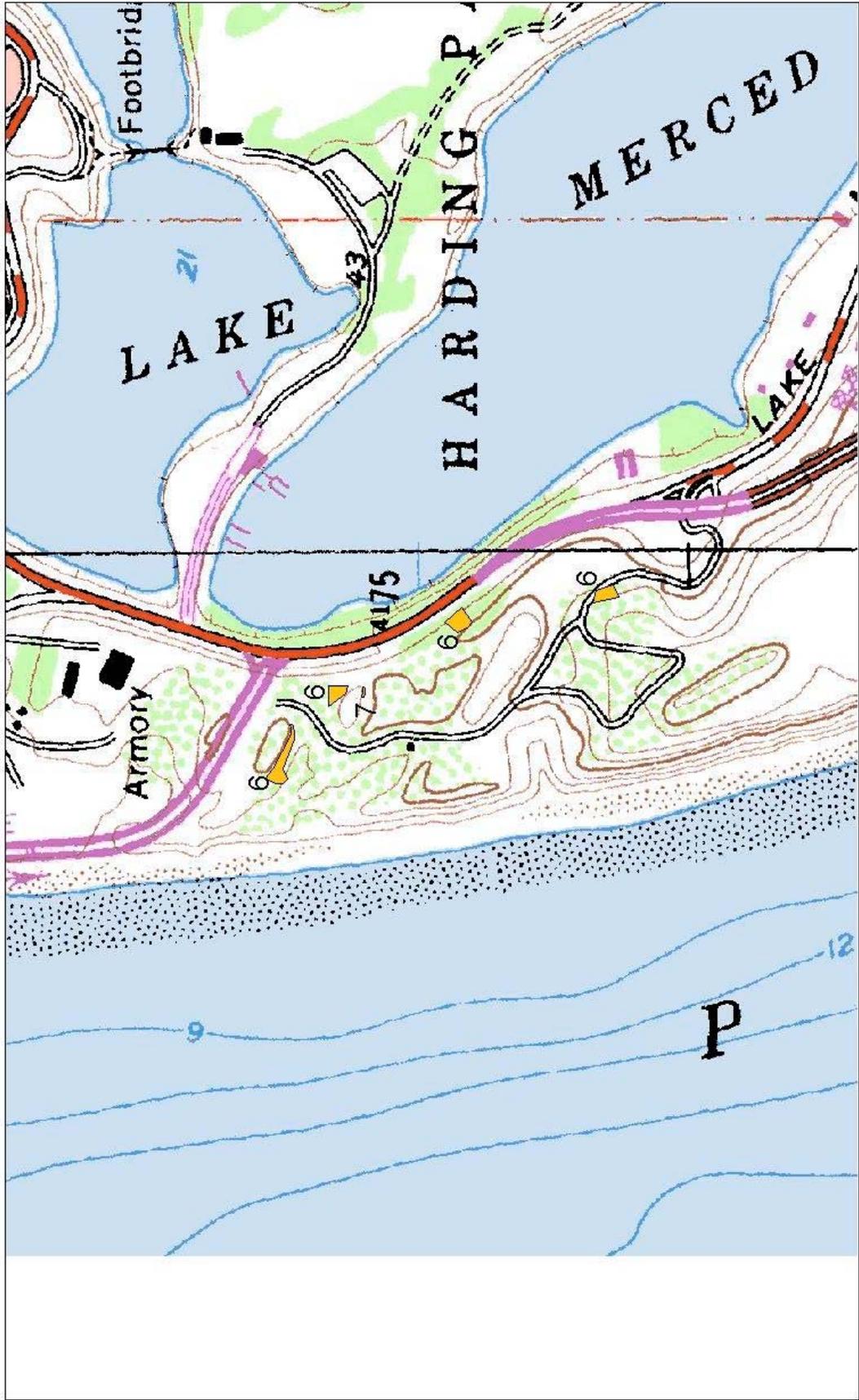
Erysimum franciscanum
San Francisco Watershed District
San Mateo Quadrangle



Erysimum franciscanum

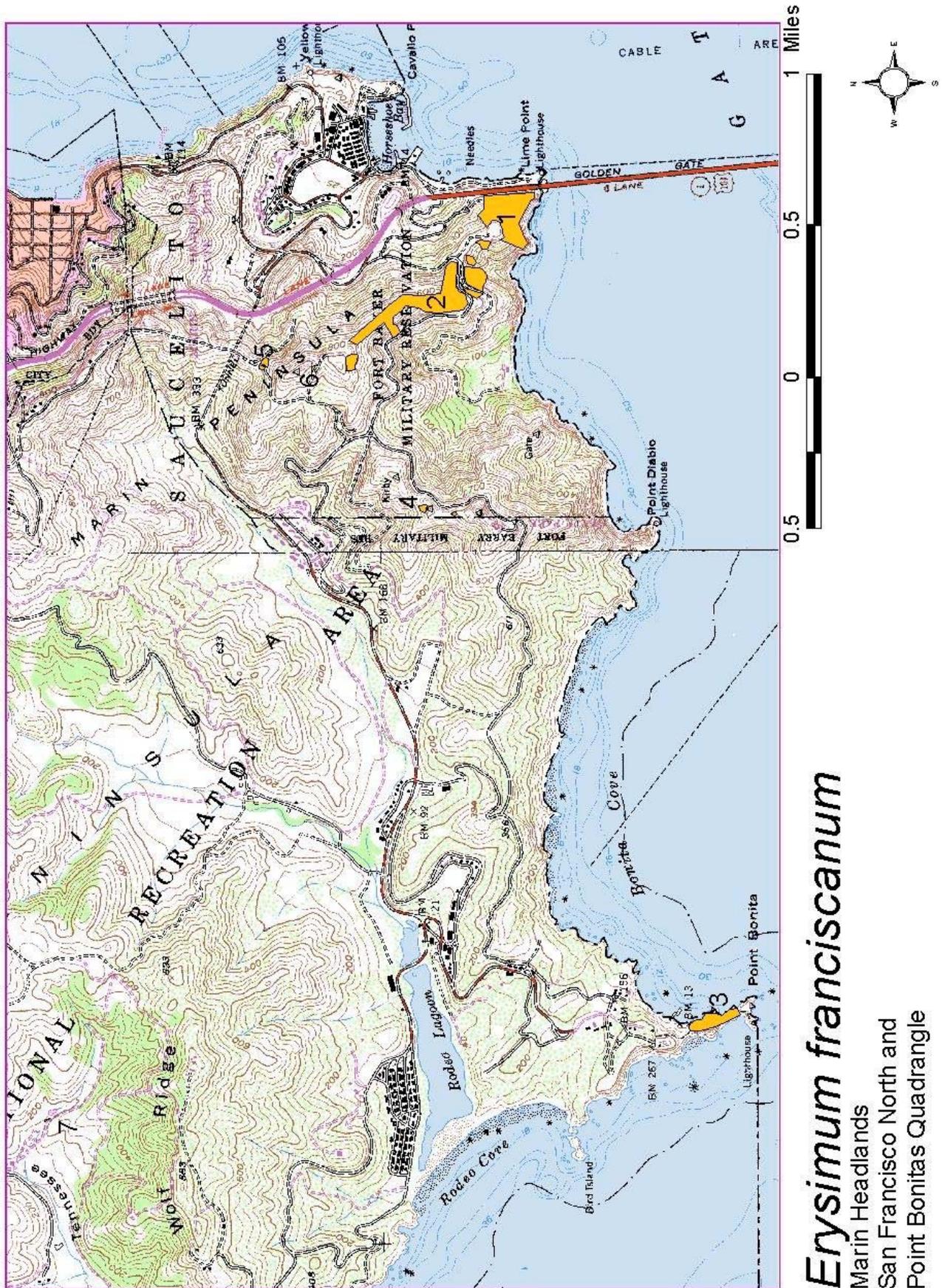
Milagra Ridge
San Francisco South Quadrangle





Erysimum franciscanum

Fort Funston
San Francisco South Quadrangle



Erysimum franciscanum

Marin Headlands
San Francisco North and
Point Bonitas Quadrangle



0.1 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 Miles



Erfr_03.shp

Erysimum franciscanum

Muir Beach, 2003
San Rafael Quadrangle

***Fritillaria affinis* Pursh var. *tristulis* (A.L. Grant) B. Ness**

Marin checker lily

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 3-3-3

NomenclatureThe Jepson Manual: AcceptedCNPS: Not accepted; see *F. lanceolata* var. *tristulis*,**Population Locations:** GGNRA Northern District – Giacomini lease near Randall House, Olema Valley**Life History**Flowering Time: February-AprilRange: This plant is endemic to California. Ten populations have been documented in Marin County.

Characteristics: *Fritillaria affinis* var. *tristulis* is a perennial bulbiferous plant with nodding dark, brownish purple flowers. It is most easily distinguished from the more common var. *affinis* by the petal color. The var. *affinis* has clearly mottled petal pattern, while the var. *tristulis* has petals that are scarcely mottled. It is difficult to distinguish between these two varieties.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

A single population was discovered in 2001 in the GGNRA northern lands. This population grows at the margins of grasslands and Douglas fir forest.

Threats

This site is exposed to cattle grazing. It is not known what impact this has on this diminutive population.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Randall House	FRAFTR	1	--	--	--	3	No survey	1

A revisit of the site in 2003, found only 1 individual. The survey was conducted somewhat late for this species and only one individual was found in fruit. The site should be revisited earlier in the spring in 2004 to census this population.

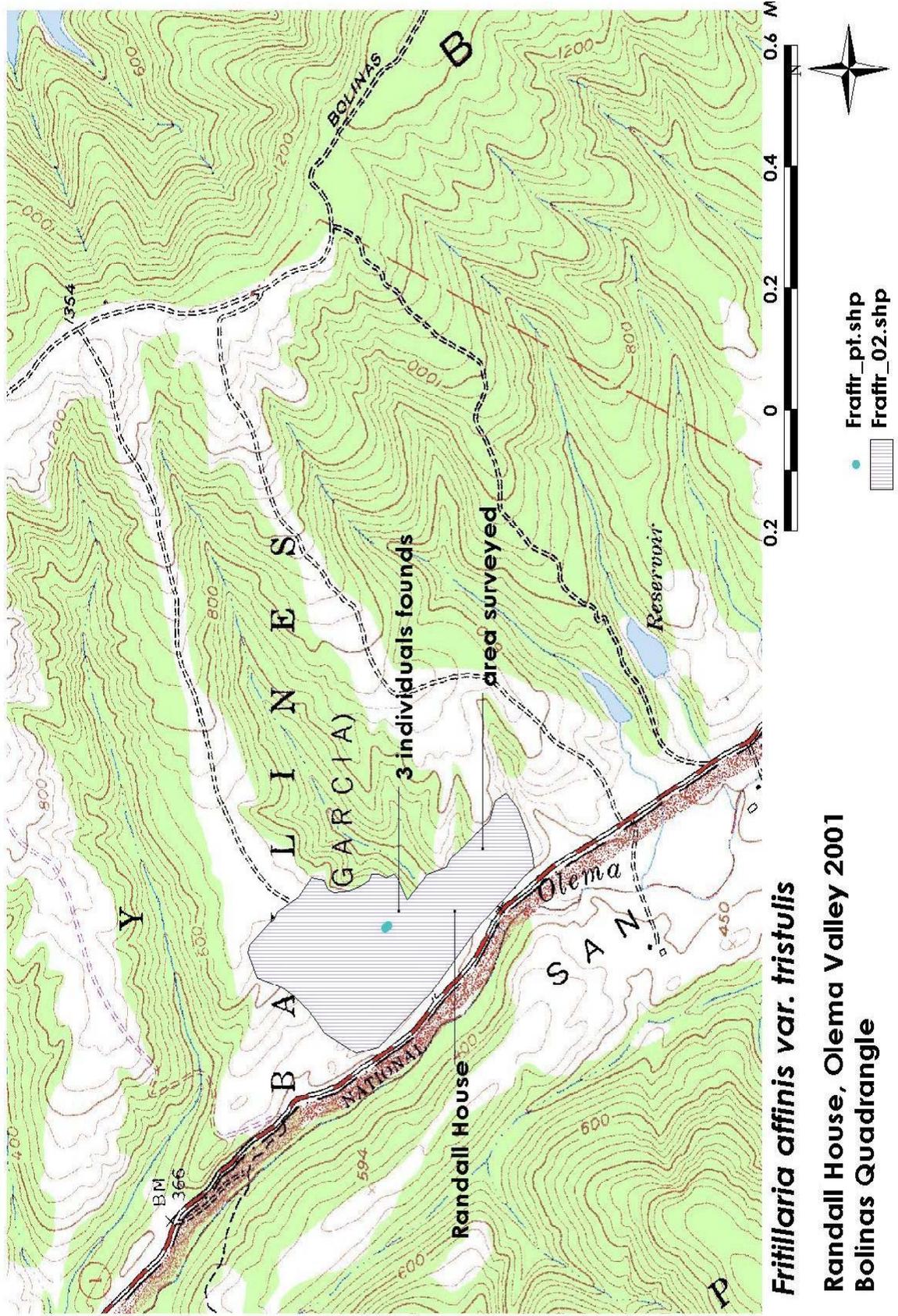
Management Recommendations

A re-survey of the Randall house site should be conducted in order to document number of individuals. Similar habitats within Olema Valley should be inventoried to potentially document other populations.



Recommended Monitoring Interval

Yearly for three years in order to document species abundance between years. If the population appears stable, monitor every two years



Fritillaria affinis* var. *tristulis

**Randall House, Olema Valley 2001
Bolinas Quadrangle**

***Fritillaria liliacea* Lindl.**

Fragrant fritillary, Fragrant mission bells

Rarity Status

Federal Listing: C2-Threat and/or distribution data are insufficient to support federal listing

State Listing: not listed

CNPS List: 1B / R-E-D Code: 2-2-3

CommentsCNPS RED code was changed from 1-2-3 in CNPS Inventory of Rare and Endangered Vascular Plants 5th edition to 2-2-3 in the 6th edition.**Nomenclature**The Jepson Manual: acceptedCNPS: accepted**Population Locations:** Nicasio Ridge, San Francisco Watershed District**Life History**Flowering Time: February-AprilRange: This species is endemic to California. It occurs in Alameda, Contra Costa, Monterey, Marin, San Benito, Santa Clara, San Francisco, San Mateo, Siskiyou, Solano and Sonoma counties. There is citation by botanical literature, although no voucher specimen, from San Benito county as well.Characteristics:

The fragrant fritillary is a perennial bulb with nodding white, cup-shaped flowers. Its single stem can bear several flowers and is 10 to 35 cm tall. Flowers have six petal-like perianth segments. The petals have purplish to greenish nectaries that are at least one half the petal length. The styles are conspicuously branched. Flowers can have a sweet scent or no smell. Sessile, linear to ovate leaves are arranged alternately at the base.

Fragrant fritillary can be easily distinguished from *F. affinis* (Checker Lily), which also occurs in the GGNRA, by the flower color. The checker lily has brownish purple mottled flowers. The fragrant fritillary looks more similar to *F. agrestis* (Stinkbells), which has a distinctive unpleasant odor.

Flowers are often not present on this species, which seems to be favorite forage for animals. Once the flower has withered, its often reddish, unwinged fruit capsule can identify *F. liliacea*.

The fragrant fritillary occurs on open hills and fields near the coast at elevations below 200 meters. According to The Jepson Manual, it grows in heavy soils. Although at Nicasio Ridge it occurs in rocky outcroppings of shallow topsoil. It is associated with coastal prairie, valley grassland, and northern coastal scrub plant communities and can occur on serpentinite (CalFlora 2001).



Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Fritillaria liliacea occurs in the serpentinite grasslands of the San Francisco Watershed district east of Crystal Springs Reservoir and atop of Nicasio Ridge. The Nicasio Ridge population extends beyond the park boundaries onto private lands.

Threats

No literature on specific threats to this species was found. Grazing may possibly affect the regeneration of populations, although there is no evidence either way as to that effect. Competition from invasive species able to grow on serpentinite could injure populations, and loss of habitat due to other factors like development is of course a concern.

In 2001, over 95% of the individuals within the Nicasio Ridge population were reported to have had the inflorescences bitten off. Cows, horses and deer are present and abundant within the population.

Monitoring 2003

A portion of the Fritillary population was sampled in 2003. Following the method established in 1999, a sub-sample of the population was censused and those numbers used to extrapolate the number of individuals occurring in the entire population area occurring on GGNRA lands.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Nicasio	FRLI	1	Surveyed; not censused	46,109*	surveyed; not censused	40,000*	No survey	22,097**
SFWD		1	--	41	919	Surveyed; not censused	No survey	No survey
		2	--	--	--	Surveyed not censused	No survey	No survey

*these numbers include totals for entire FRIL population on both private and GGNRA lands.

** This number include total number of individuals on GGNRA land only

During the 1998 survey on Nicasio Ridge, mapping of the boundaries of this species was completed. The population was mapped on both private and GGNRA land. The area covered by this species is very large making the counting of individuals unfeasible. In 1999, a sampling method was designed to sub-sample a portion of the population and extrapolate to estimate species abundance for the entire population (see 1999 year-end report for methods). The above numbers for 1998 and 2001 were gathered by sampling on both private and GGNRA lands. It was decided at the conclusion of the 2001 monitoring season, that no future censusing would be conducted on private land. In 2003, the same sampling method was used but data was collected only from census grids falling on GGNRA land.

Despite heavy grazing impacts, this species remains abundant, however, the ability of the species to maintain itself may be affected by flowers being eaten before seed development. Very few individuals were observed in the SFWD populations in 2001 which is probably due to the area being surveyed one month later than in 2000.

Management Recommendations

A considerable portion of the Nicasio Ridge population occurs on private land. A meeting should be arranged with the ranchers, Point Reyes staff and GGNRA staff to make the ranchers aware of the rare plant species which occur on their land.

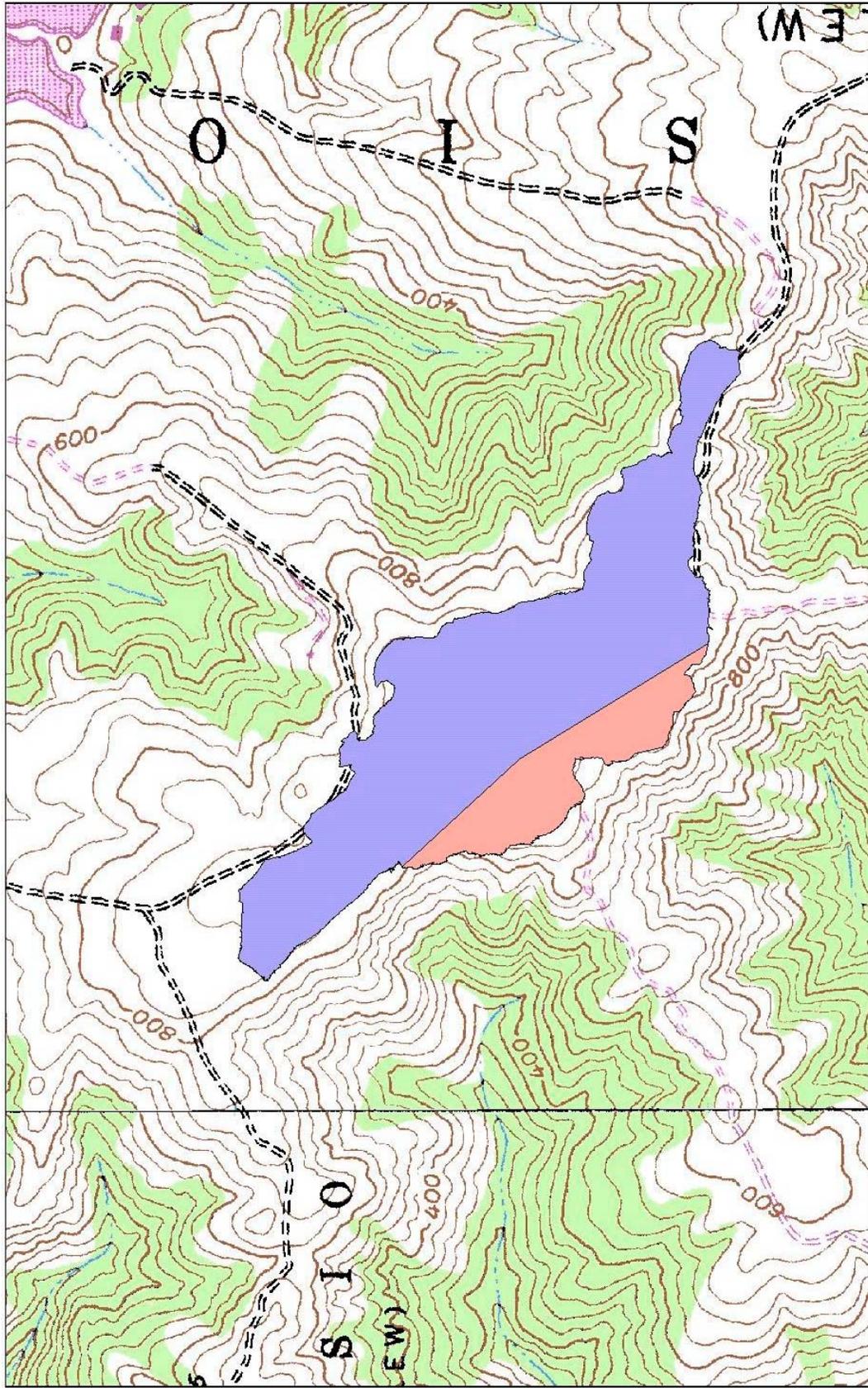
Continue monitoring every two years for changes in population composition. A considerable amount of time is taken to sub-sample these populations in order to obtain a rough estimate of the number of individuals. It is recommended using sampling methods that will be less time consuming. A number of small (1/10 ha) permanent plots could be established in areas of varying density and re-read at set intervals to determine changes in composition. Six rare plant species occur on Nicasio Ridge. Ideally a monitoring method would be adopted that would capture information on all six species.

Greater emphasis should be placed on grazing impacts and monitoring for invasive species on Nicasio Ridge. While there is no grazing at the sites in the San Francisco Watershed District, those populations should be monitored for invasive plants.

Establishing photopoints would help to supplement any quantitative data collected. A visual overview of the sites would document gross vegetation changes over time.

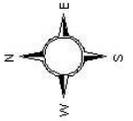
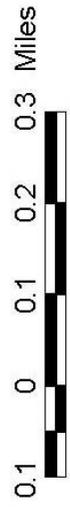
Recommended Monitoring Interval

Every two years

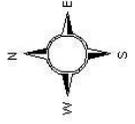
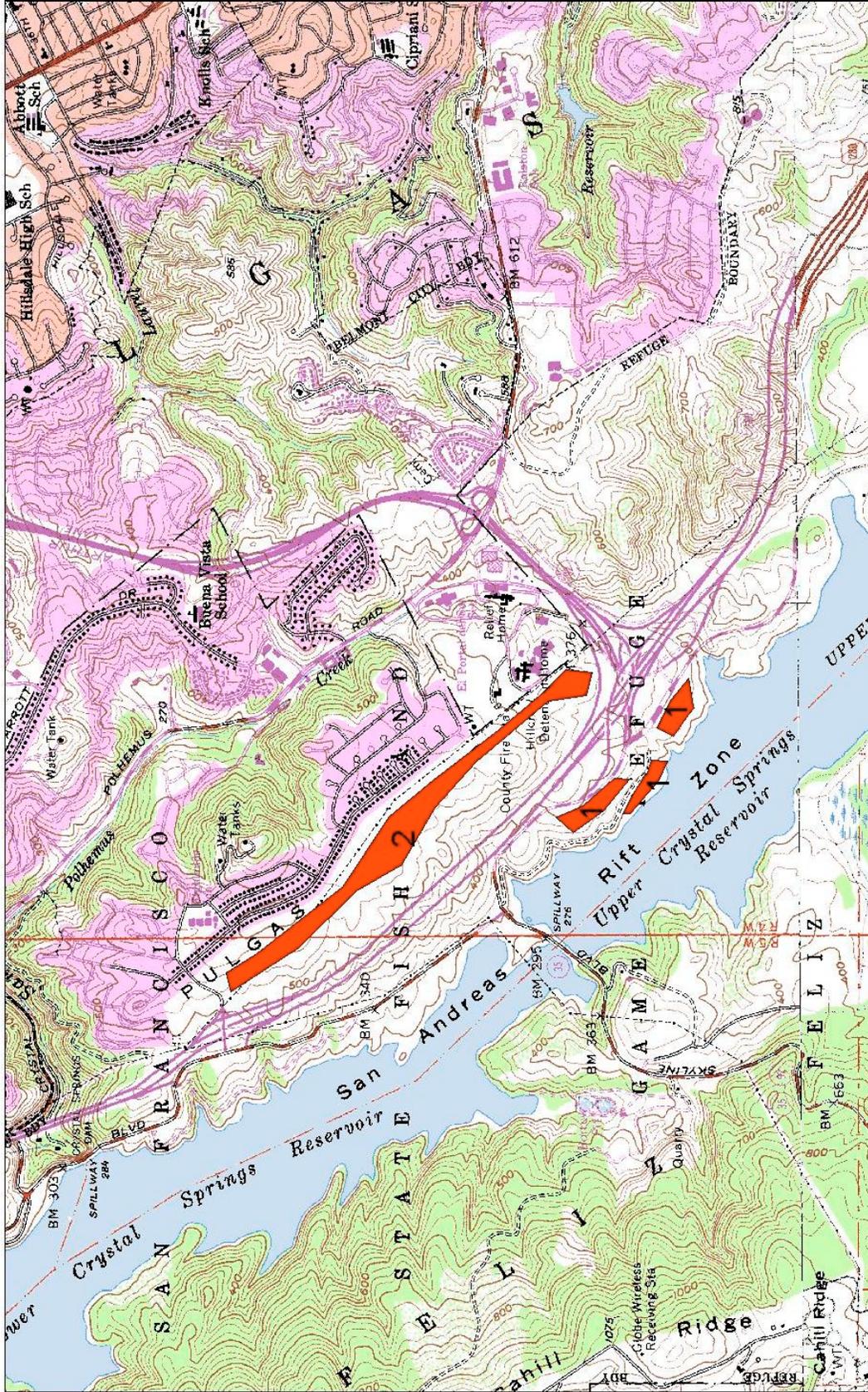


Fritillaria liliacea

Nicasio Ridge
San Geronimo Quadrangle



- F. liliacea* within GGNRA
- F. liliacea* on private lands



Fritillaria liliacea
San Francisco Watershed District
Woodside and San Mateo Quadrangle

***Hesperolinon congestum* (A. Gray) Small**

Marin dwarf flax

Rarity Status

Federal Listing: Threatened

State Listing: Threatened

CNPS List: 1B / R-E-D Code: 3-3-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Population Locations: Nicasio Ridge, San Francisco Watershed District

Life History

Flowering Time: April-July

Range: This plant is endemic to California. According to CNPS, there are fewer than twenty documented populations restricted to Marin, San Francisco and San Mateo counties.

Characteristics:

Hesperolinon congestum is a small annual plant with small, pinkish, five-petaled flowers. *H. congestum* can be confused with *Minuartia douglasii*, another small annual plant. *M. douglasii* has opposite leaves while *H. congestum* has alternate leaves. *M. douglasii* also has yellow-white petals and *H. congestum* has pink-white petals. *Hesperolinon californicum* is another member of the genus that can occur in the serpentinite grasslands. *H. californicum* has glabrous sepals while *H. congestum* has slightly hairy sepals. *Hesperolinon congestum* occurs in grasslands upon serpentinite substrate.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

There are scattered clumps along the western slope of Nicasio Ridge, and several populations in the serpentinite grasslands of the San Francisco Watershed District between Hwy. I-280 and the Crystal Springs Reservoir. Nicasio Ridge populations extend onto private land.

Threats

Introduced species in both sites are likely the greatest threat. In the San Francisco Watershed District, there are numerous introduced species of concern in and around the populations. *Centaurea solstitialis* is common in dense stands throughout the serpentinite grasslands and should be controlled. Other plants of concern in the area are: *Foeniculum vulgare*, *Carduus pycnocephalus*, and *Dipsaca fullonum*. The Nicasio Ridge has dense populations of *Scabiosa atropurpurea* growing on the serpentinite outcrops alongside *H. congestum*.

Monitoring conducted 2003:

All populations of *Hesperolinon* occurring on Nicasio ridge within the GGNRA boundary were censused in 2003. In all populations the plants were numerous. Rainfall was high

in 2003 and continued late into the spring which may account for the large number of plants found in 2003.

Monitoring Results: 1998-2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Nicasio	HECO	1	157	87	>2,000*	178	No survey	313
		2	56	0	surveyed, not censused	0	No survey	2,363
Nicasio – on private land		3	--	2**	740	No survey	No survey	No survey
Nicasio – on private land		4	--	--	285	No survey	No survey	No survey
		5	--	--	>200***	130	No survey	1,267
		6	--	--	>200***	182	No survey	891
		7	--	--	--	160	No survey	343
SFWD		1	--	not found	569	910	No survey	No survey
		2	--	not found	143	54	No survey	No survey
		3	--	--	210	320	No survey	No survey
		4	--	--	2486	160	No survey	No survey
		5	--	--	>5000	surveyed, not censused	No survey	No survey
		6	--	--	17	0	No survey	No survey

** too late in season for accurate census

*** ocular estimates

The above numbers do not show a consistent trend towards increase or decrease. This is an annual species, so annual census figures are expected to fluctuate depending on yearly rainfall. As stated in the 1994 Rare Plant Management Guidelines, "Climatic conditions influence the appearance of these plants and the period in which they flower." In several of the populations (SFWD #4), it can be seen that population numbers vary greatly between years.

Variations in population numbers can also be a factor of area surveyed. Since population boundaries are not marked, the size of the area surveyed may vary somewhat year to year. When comparing the above numbers between years, it is necessary to refer to population boundaries as mapped in Arcview for each year.

Management Recommendations

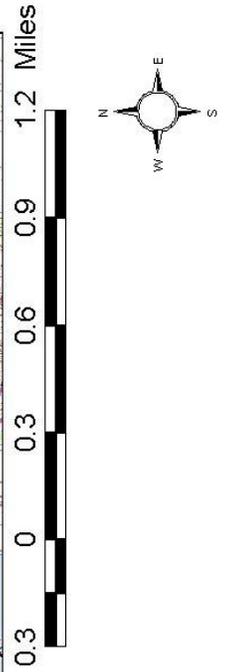
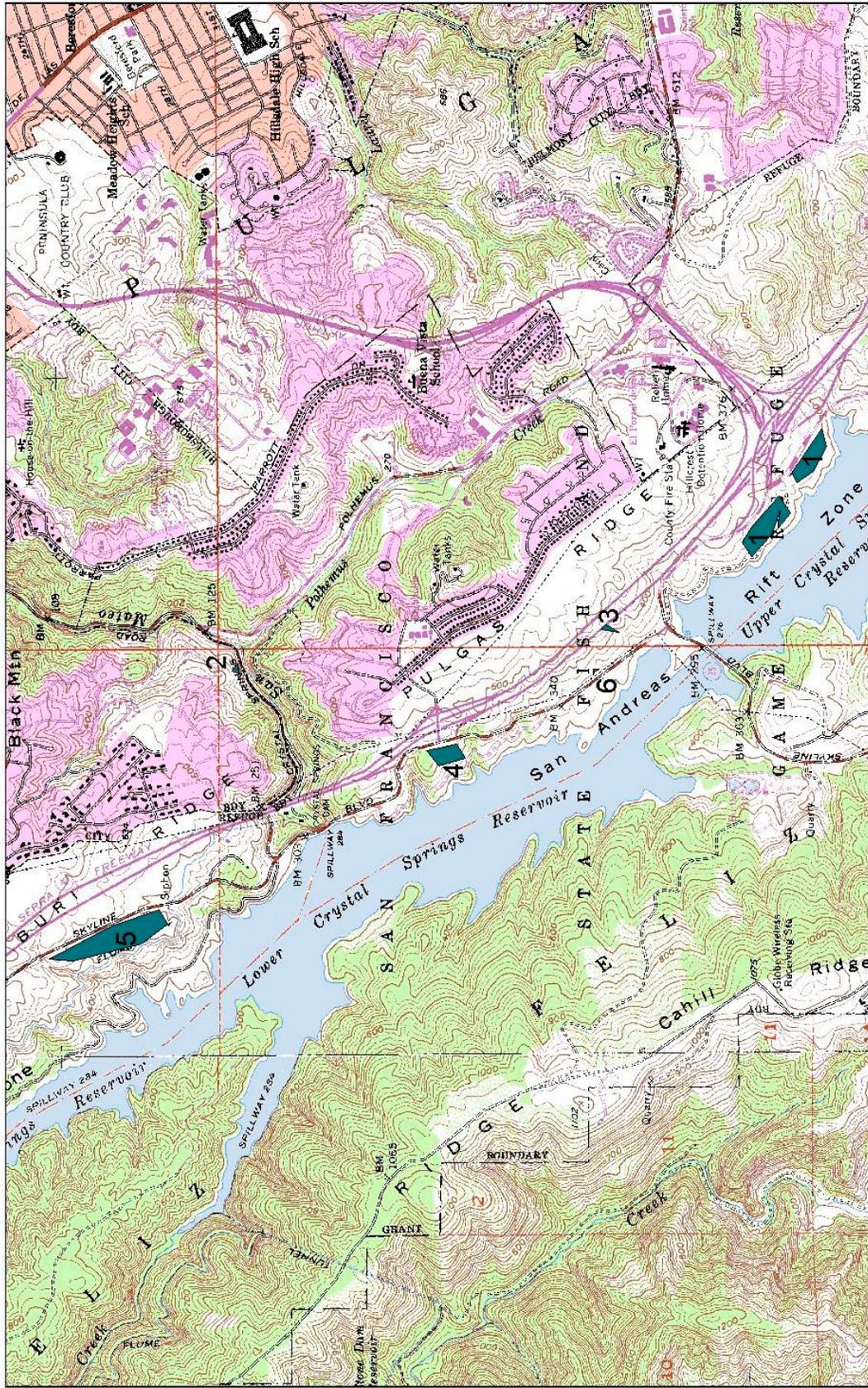
A considerable portion of the Nicasio Ridge population occurs on private land. A meeting should be arranged with the ranchers, Point Reyes staff and GGNRA staff to make the ranchers aware of the rare plant species which occur on their land.

Closer monitoring of introduced species of concern should be conducted in both sites. *Centaurea solstitialis* should be eradicated from the serpentinite grasslands in the San Francisco Watershed to prevent the potential extirpation of several rare species in the area. *H. congestum* occurs with several other rare plant species in two unique serpentinite grassland communities. Rather than collecting census data on a single rare species, a standardized sampling method should be utilized to gather cover and density data for both native and non-native species. By having quantitative information on both native and non-native species, information would be gained on how the cover and density of native and non-native species change in relation to each other.

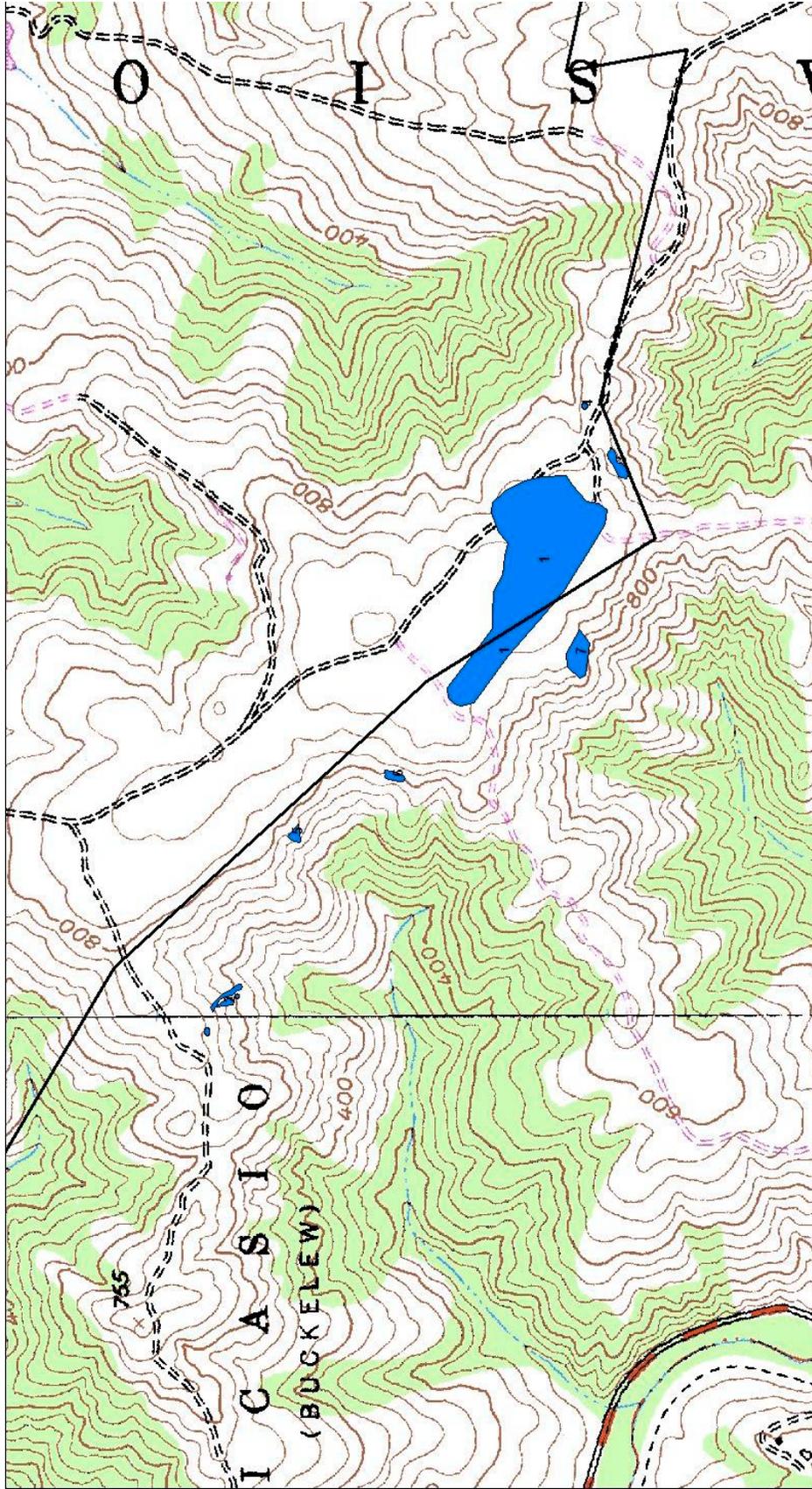
On Nicasio Ridge, long term monitoring would also be valuable for gathering information on the effects of cattle grazing. This area has been grazed for many years and yet the rare plant species still persist.

Establishing photopoints would help to supplement any quantitative data collected. A visual overview of the site would document gross vegetation changes over time.

Recommended Monitoring Interval: Every two years



Hesperolinon congestum
San Francisco Watershed District
San Mateo Quadrangle



Hesperolinon congestum

Nicasio Ridge, 2003

Inverness and San Geronimo Quadrangles

0.1 0 0.1 0.2 0.3 0.4 0.5 Miles



- Google.ppt.shp
- Map.ppt.shp
- Map.ppt.lyr
- Map.ppt.mxd
- Map.ppt.shp

***Lessingia arachnoidea* E. Greene**
Crystal Springs lessingia

Rarity

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 3-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Life History

Flowering Time: July-October



Range

This plant is known to only occur in the vicinity of Crystal Springs Reservoir in San Mateo County. Unconfirmed reports of populations from Sonoma County need further verification.

Characteristics

This late summer annual in the family Asteraceae has small dense heads of purple, bilateral disk flowers. *Lessingia arachnoidea* is easily observed amidst the yellow, withered remains of the erstwhile verdant grasslands. The phyllaries of *L. arachnoidea* are slightly tomentose and the entire plant is glandless. The basal leaves have generally withered at the time of flowering. No other species of *Lessingia* were seen growing in the area although *Epilobium foliolosum*, a purple-flowered summer annual was present and could be confused from a distance.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is locally abundant in the serpentinite grasslands on the east side of Crystal Springs on San Francisco Watershed lands. It is restricted to well-developed soils on serpentinite substrate.

Threats

Many introduced plants of concern occur within the *L. arachnoidea* populations of the SFWD. Large, dense stands of Yellow starthistle (*Centaurea solstitialis*) have been observed within the serpentinite grasslands and appear to be displacing *Lessingia arachnoidea*. The serpentinite grasslands around the crystal springs reservoir are surrounded and bisected by many roads. These disturbances will be a constant seed source for invasive species. This poses a difficult challenge for resource managers who desire to return the unique serpentinite grassland to pristine conditions.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
SFWD	LEAR	1	--	--	surveyed; not censused	1,500	No survey	No survey
		2	--	--	surveyed; not censused	50,000	No survey	No survey
		3	--	--	surveyed; not censused	5,000	No survey	No survey
		4	--	--	surveyed; not censused	170,000	No survey	No survey

In 2000, mapping of the known occurrences was completed. 2001 was the first year that this species was censused. The number of individuals recorded for each population were ocular estimates rather than actual tallies. The abundant numbers indicate that sampling rather than censusing may be a better method to determine changes in species abundance over time.

Management Recommendations

Yellow starthistle removal in the serpentinite grasslands of the SFWD should be a high priority in invasive plant control in the area. Other introduced species of concern should also be removed or closely monitored.

This species occurs with several other rare plant species in a unique serpentinite grassland community. Rather than collecting census data on a single rare species, a standardized sampling method should be utilized to gather cover and density data for both native and non-native species. By having quantitative information on both native and non-native species, information would be gained on how the cover and density of native and non-native species change in relation to each other.

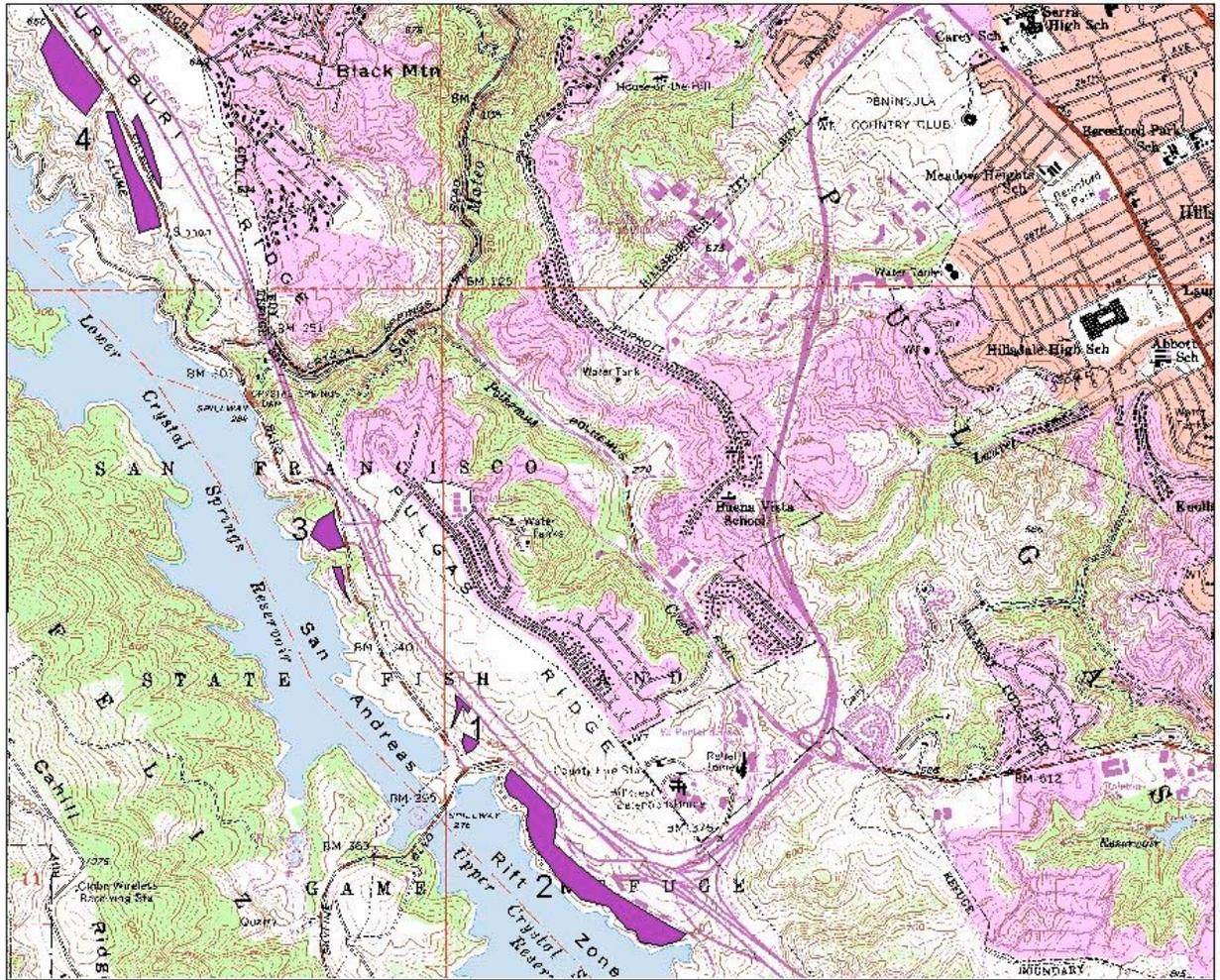
Photopoints could be established to supplement quantitative data collected to monitor changes in *Lessingia* and other rare plant populations and the effect of invasive species on the abundance of these rare species.

Recommended Monitoring Interval

Every year for three years to gain information on fluctuations in population size. If population is stable, monitor every two years.



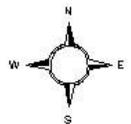
L. arachnoidea and C. solstitialis



Lessingia arachnoidea

San Francisco Watershed District
San Mateo Quadrangle

0.4 0 0.4 0.8 Miles



***Linanthus ambiguus* (Rattan) E. Greene**
Serpentine Linanthus

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 4 / R-E-D Code: 1-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted



Population Locations: SFWD ('I-280 Triangle')

Life History

Flowering Time: March June

Range: This plant is endemic to California and documented in nine counties within the California Floristic Province.

Characteristics: This small annual linanthus is smaller than 20 cm and has a solitary inflorescence (many California linanthus species have head-like inflorescences). The corolla lobes are yellow with a pink base. The tube and throat are violet and purple. The corolla has a hairy band inside near the throat. *Linanthus liniflorus* is a more common species in the serpentinite grasslands of the SFWD than *L. ambiguus*. *L. liniflorus* has hairy filaments and white flowers while *L. ambiguus* has no hairs on the filament.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is documented in one population in the serpentinite grasslands of the SFWD within the 'I-280 Triangle'. It is possible that there are other populations in the northern grasslands as well, although it has not been observed.

Threats

Introduced species and fragmentation of the habitat.

Monitoring Results: 1998 - 2003

Linanthus ambiguus was first observed in the serpentinite grasslands of the SFWD in 2001. The population was not mapped nor was a census conducted. This population is documented in the CalFlora database, but it is new to the GGNRA rare plant project.

Management Recommendations

This plant should be mapped and censused in 2004.

Recommended Monitoring interval

Every year for three years. If population is stable, than every two years.

***Linanthus rosaceus* Greene**

Rose Linanthus

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 3-3-3

NomenclatureThe Jepson Manual: Not in Jepson manualCNPS: Listed in online 6th InventoryComments: Originally described as a separate species nearly 100 years ago, but subsequently absorbed into *L. androsaceus*. Resurrected in 2001 as a separate species (Battaglia & Patterson, Madrono 48:2, 62-78).**Population Locations**: Mori Point, outside the NPS managed-area boundary**Life History**Flowering Time: April-JuneRange: This plant is endemic to California. According to CNPS data, the only recently verified *L. rosaceus* populations are at Mori Point and in the Point Reyes area. The species previously occurred more widely. It is thought to have been extirpated throughout most of its range.Characteristics

This is a small annual herb somewhat similar to other species of the genus. According to the Battaglia & Patterson paper, the species differs from *L. androsaceus* by its spatulate, more or less fleshy leaf lobes, and by its corolla lobes. In *L. rosaceus* the lobes are generally 6-8 mm long and rounded, in *L. androsaceus* they are generally >8mm long and often terminate in a small point. A key differentiating *L. rosaceus* from other close relatives is included in the paper. A copy of the paper is included with the stored rare plant data sheets for this species.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant is known only from a single population on north-facing coastal bluffs at Mori Point. The population appears to lie just south of the NPS managed-area boundary. The population was located in 2002, but its size could not be determined because it was not possible to survey during the blooming season. In 1999, when discovered, the population was estimated to measure 30m X 20m and to comprise about 500 individuals.

Threats

Development has been proposed immediately south of Mori Point. The area near the population already experiences heavy recreational use, with social trails passing nearby. This population could be negatively affected by foot or bicycle traffic which could damage or kill the small annual plants. *Carpobrotus edulis* (Ice plant) is present on the bluffs, though none was seen near the population.

2003 Monitoring Results: *Linanthus rosaceus* was added to the GGNRA Special Status plant list in 2002. 2003 was the first year that a census was conducted.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Mori Pt.	LIRO	1	--	--	--	--	--	>500

2003 was the first year that a census was conducted on this population, therefore, no trend information is yet available for this species.

Management Recommendations

None at this time.

Recommended Monitoring Interval

Monitor consecutively for three years in order to obtain information on fluctuation in population size between years. If population appears to be stable, monitor every two years.



Linanthus rosaceus

Mori Point, 2003
Montara Mountain Quadrangle

 Liro_03.shp

***Lupinus arboreus* Sims var. *eximius* (Burt Davy) C.P. Smith**
San Mateo tree lupine

Rarity Status

Federal Listing: C2- Threat and/or distribution data are insufficient to support federal listing

State Listing: None

CNPS List: 3 / R-E-D Code: 2-2-3



Comments: CNPS Rare plant inventory fifth ed. mentions moving this species to list 1B. It is still a List 3 plant in the sixth edition.

Nomenclature

The Jepson Manual: Not accepted

CNPS: Not accepted

Comments: This species is listed as '*Lupinus eximius* Davy' by CNPS. The Jepson Manual mention *L. arboreus* var. *eximius* in the description comments of *L. arboreus* Sims, but it is not formally recognized as a variety.

Population Locations: SFWD

Life History

Flowering Time: April-July

Range: This plant is endemic to California. According to CNPS, it is known from San Mateo County and Sonoma County. Sonoma county plants need taxonomic verification. The CalFlora occurrence database documents populations in Point Reyes National Seashore in Marin County and scattered populations in Monterey County. As this plant is difficult to identify, many of these occurrences may have been misidentified. The original description of *L. eximius* describes its location as 'restricted to the ridge of Lake Pillarcitos' in the SFWD.

Characteristics:

This variety of *L. arboreus* is very difficult to distinguish from other varieties of *L. arboreus*.

According to the original description, *L. arboreus* var. *eximius* is hairier than other varieties of *L. arboreus* and is described as having fragrant flowers with blue wings and a yellow banner. The more common form of *L. arboreus* in the San Francisco area has all yellow flowers or less frequently, all blue flowers.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

One small population is mapped in the San Francisco Watershed District. It may be more extensive than the map suggests.

Threats

The mapped population occurs adjacent to a limited use fire road in the SFWD. It is subject to disturbance from road maintenance and from the introduction of invasive species that are disturbance dependant. Many non-natives occur within the population.

San Francisco Watershed District is effectively managing the area to protect the population from being unintentionally graded or mowed.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
SFWD	LUAREX	1	--	28	28	24	No survey	No survey

Comparing the census figures for 1999 – 2001, the population, though small in numbers appears to be stable.

Management Recommendations

Monitor for noxious weeds within and adjacent to the population. Continue to protect the site from further disturbance. Point Reyes staff was notified following the 2001 survey season about the potential population in Point Reyes to determine if that population is valid. Consult publications to determine if any new taxonomic work has determined the validity of *L. eximius* as a valid variety of *L. arboreus*.

Recommended Monitoring Interval

Every three years.

***Malacothamnus fasciculatus* (Torrey & A. Gray) E. Greene var. *arcuatus* (Greene) Greene**

Arcuate bush-mallow

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 2-2-3

Comments: This species was upgraded from List 4 in CNPS Rare Plant Inventory 5th edition to list 1B in the 6th edition.



Nomenclature

The Jepson Manual: Not Accepted

CNPS: Not Accepted

Comments: Listed as *Malacothamnus arcuatus* in the CNPS Inventory. Mentioned in Jepson in the *Malacothamnus fasciculatus* species description but it is not officially recognized. For a good description of *M. arcuatus*, see [A California Flora and Supplement](#), Munz, P.A., 1959, p. 126.

Population Locations: Sweeney Ridge

Life History

Flowering Time: April-July

Range: *Malacothamnus fasciculatus* var. *arcuatus* is endemic to California and is documented to occur in Santa Clara, Santa Cruz and San Mateo county.

Characteristics:

Malacothamnus fasciculatus var. *arcuatus* is a shrub/sub-shrub with a woody base. It is very difficult to distinguish from other varieties of *M. fasciculatus*. According to [A California Flora and Supplement](#) (Munz 1959), it can be distinguished from *M. fasciculatus* by the hairs on the stem. On *M. f. arcuatus*, the stems are 'densely white tomentose' and on *M. fasciculatus*, the stems are 'covered with short, soft tomentum'.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

This plant was last observed growing along Sweeney Ridge more than ten years ago. There are no other documented occurrences in GGNRA or in SFWD. It is documented in Edgewood County Park, in San Mateo County.

Threats

This plant may not be present, or present in very small numbers due to lack of fire. Seeds of plants belonging to the family Malvaceae can lie dormant for decades before germinating after fire. This variety may respond vigorously to fire.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Sweeney	MAFAAR	1	--	0	0	0	no survey	No survey

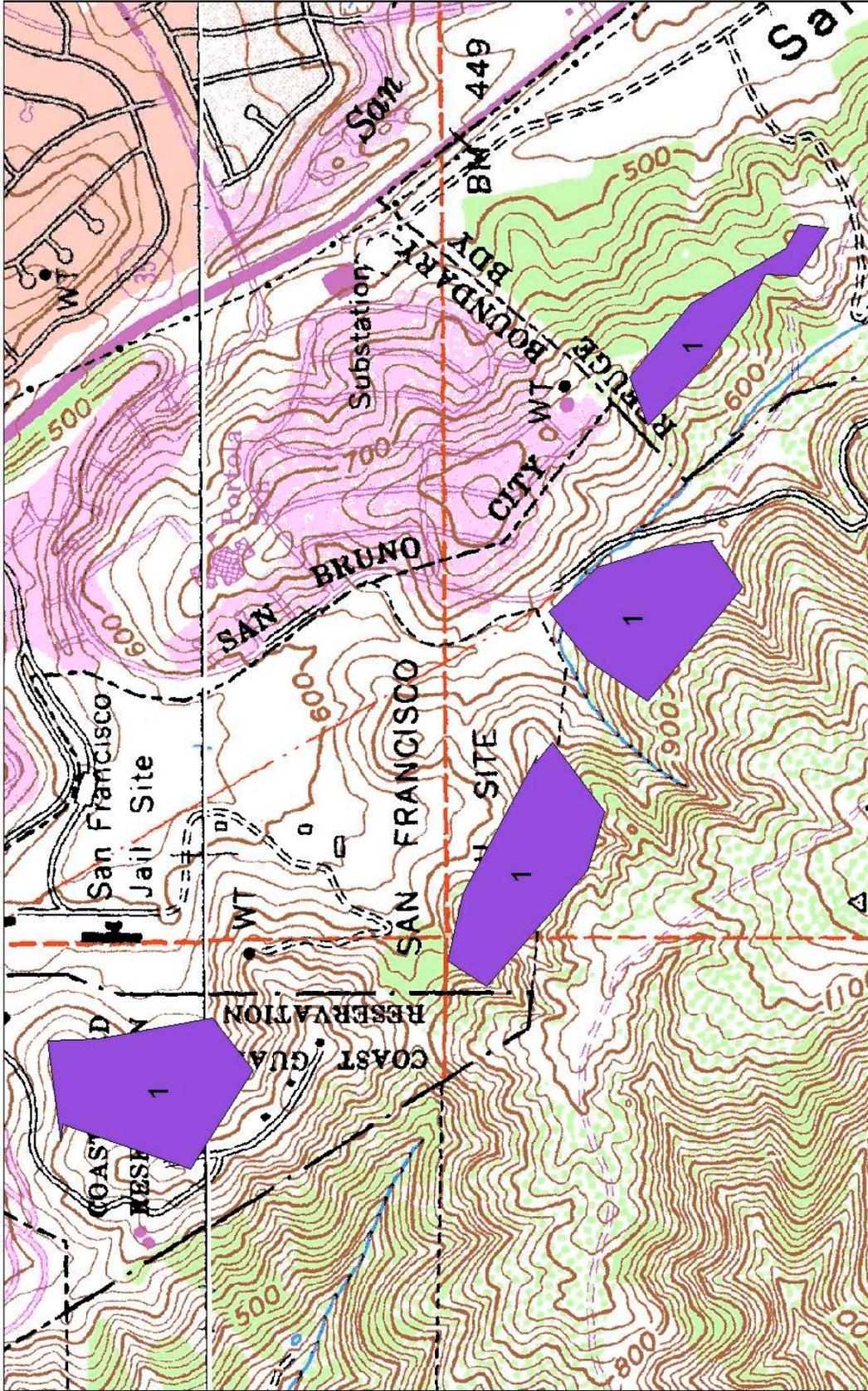
Surveys conducted in 1999 – 2001 found no individuals. The last reported sighting of this species was in the late 1980s by Toni Correlli of CNPS. This species may be a fire dependent species. A healthy population occurs in Edgewood County park in an area that has burned in recent years.

Management Recommendations

If the site burns, it is recommend that the site be surveyed the following year. It should be easy to walk around the area and readily spotted. If observed in high numbers, a good collection should be made and sent to a taxonomic expert. Until the site burns, continued surveys do not seem necessary. Several surveys in the last ten years have resulted in no plants observed. If no plants are found for three subsequent years following a fire, then I recommend removing this from the GGNRA list of rare plants.

Recommended Monitoring Interval

None, until the site burns. Postburn, recommended monitoring interval is one, two, five and ten years postburn.



Malacothamnus fasciculatus var. *arcuatus*

Sweeney Ridge
San Francisco South and
Montara Mountain Quadrangle

***Pentachaeta bellidiflora* E. Greene**
White-rayed pentachaeta

Rarity Status

Federal Listing: **ENDANGERED**

State Listing: **ENDANGERED**

CNPS List: 1B / R-E-D Code: 3-3-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

Life History

Flowering Time: March-May



Range

This plant is endemic to California. According to CNPS, this plant is known from only one fragmented population bisected by I-280. In Marin Flora, this plant is listed as "...occurring in grassy slopes on the edge of woods or brush. Rare but locally common." It is listed as known from Corte Madera, Larkspur and Marin City with Corte Madera being the type location. The Marin populations have apparently all been lost to development.

Characteristics

Pentachaeta bellidiflora is a small, pulchritudinous composite with conspicuous daisy-like flower heads. When flowering, it clearly stands out from the other plant species. The population on SFWD lands is restricted to the serpentinite grasslands. *Pentachaeta exilis* ssp. *aeolica* is another white-rayed pentachaeta that can occur in the San Francisco Bay Area. *P. bellidiflora* has a greater number of ray flowers (7-16) per head than *P. e.* ssp. *aeolica* (0-3). *P. bellidiflora* also has glabrous to short hairy peduncles, whereas *P. e.* ssp. *aeolica* has shaggy hairs on the peduncle. There are no reports of *P. exilis* ssp. *aeolica* occurring in the I-280 triangle.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

The population that is mapped and documented in the watershed is located in what has been called the I-280 triangle. The triangle is a patch of grassland on the west side of I-280 and on the south side of Edgewood Road.

A population was found listed in the NDDDB database as occurring on the slopes above Marin City. Though listed as extirpated the location was searched in 2002 and 2003. No individuals were found.

Threats

Numerous roads and trails dissected the SFWD population. During the last site visit in 2001, the site was not visited late in the year so it is not known whether *Centaurea solstitialis* (yellow starthistle) is present in the area. If present, yellow starthistle could pose a significant threat to this already fragmented population.

Inventory Results 2003:

One survey was conducted in March on the ridge west of Marin City to investigate a site that was listed in the Natural Diversity Data Base. The last sighting occurred in 1983 and the population was listed as extirpated. The site was re-surveyed in 2003 at an earlier date on the chance that it could have been missed in surveys conducted in 2002. The site no longer seems to be suitable habitat for this species since it is now covered with French broom and poison oak. In addition to the documented location, the length of the ridge was walked examining the grassland areas on both the east and west sides of the ridge but no individuals of *Pentachaeta bellidiflora* were found.

Monitoring Results: 1998 – 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
SFWD	PEBE	1	--	11,446,998	112,355,758	Surveyed; not censused	No survey	No survey
Marin City		--	--	--	--	--	0	0

The SFWD population of *Pentacheata* is very abundant and appears to be holding steady. Census data collected in 1982 by CNPS recorded population numbers in the millions. The population estimates were obtained by sub-sampling the area and extrapolating to the whole area. The sampling method used is detailed in the 1999 and 2000 year-end reports.

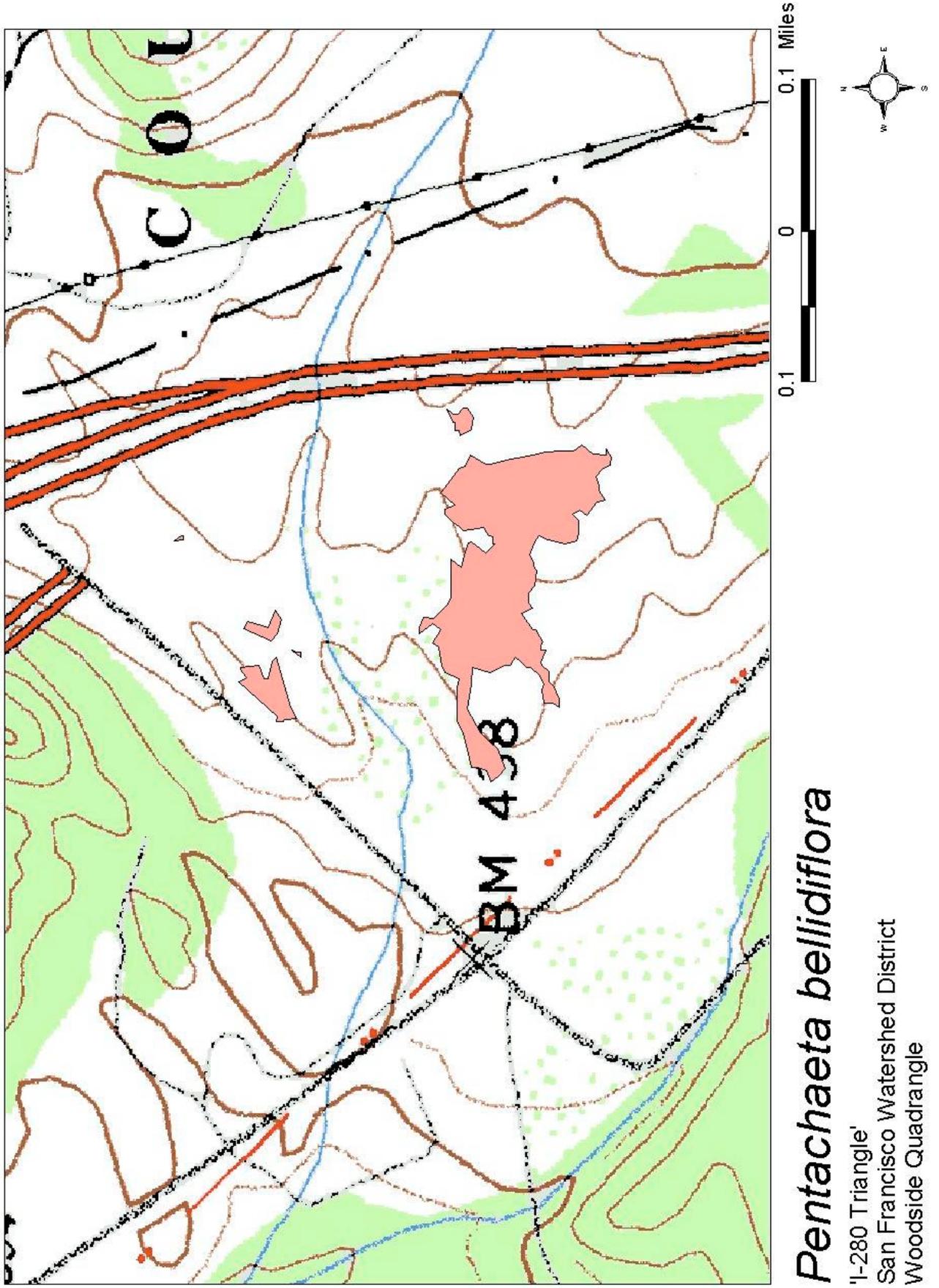
Management Recommendations

Directed searches for invasive plant species within the SFWD populaton should be conducted. Visit the site in August 2004 to check for the presence of yellow starthistle. If it is not present, annual targeted searches for yellow starthistle should be done. If it is discovered it should be immediately eradicated.

Expand the sampling method to include density and cover estimates for non-native species. Currently, the presence of non-native species is documented but no quantitative data is gathered. Gathering cover and density data for both native and non-native species would provide information on how the abundance of these species change in relation to one another.

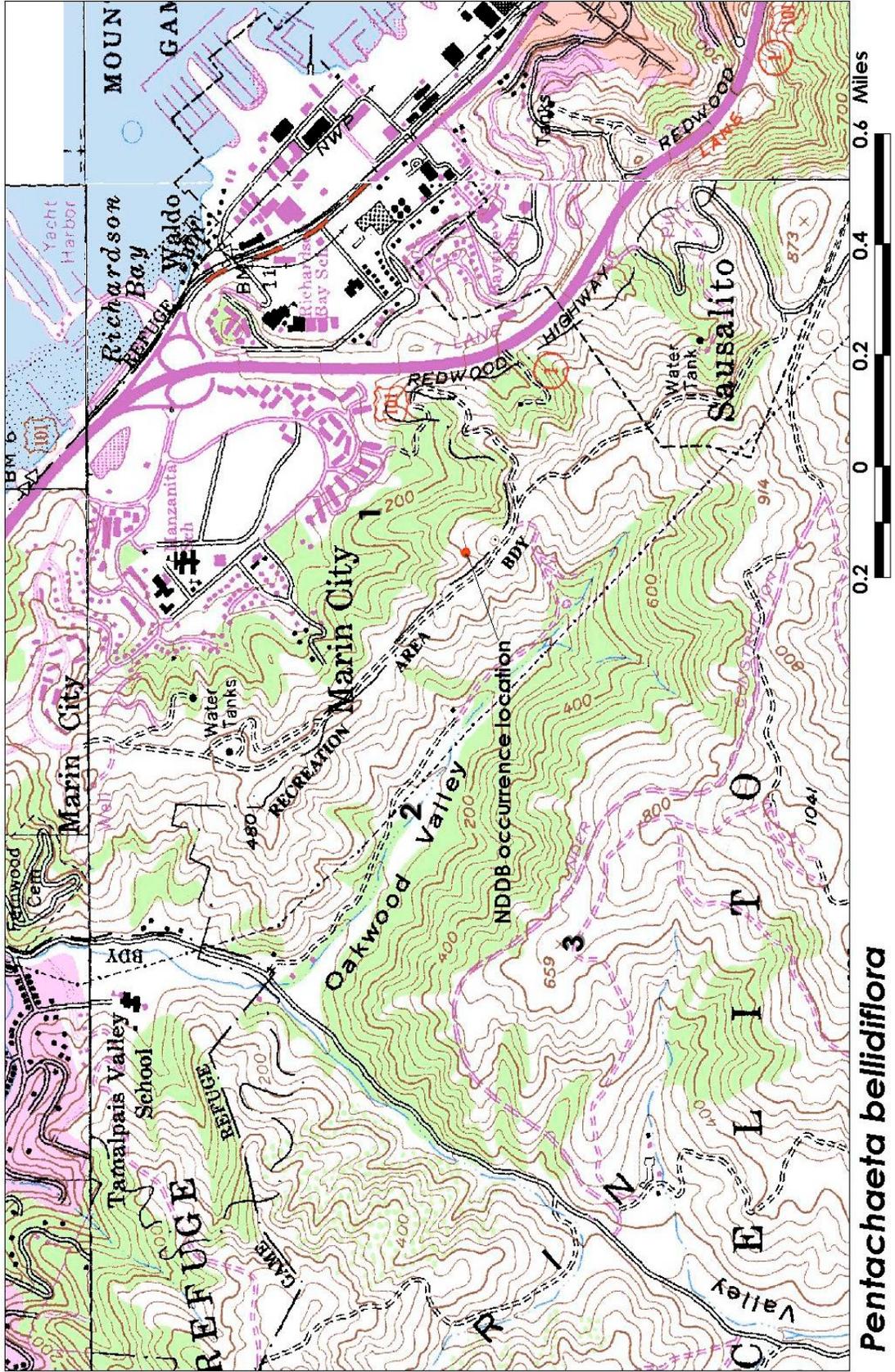
Recommended Monitoring Interval

Every three years



Pentachaeta bellidiflora

'I-280 Triangle'
San Francisco Watershed District
Woodside Quadrangle



Pentachaeta bellidiflora

Marin City Survey Area, 2002

Point Bonita/San Rafael Quadrangles

Plagiobothrys chorisianus* (Cham.) I.M. Johnston var. *chorisianus

Choris's popcornflower

Rarity Status

Federal Listing: None

State Listing: None

CNPS: List: 1B

R-E-D Code: 2-2-3

Comments: Moved from list 3 in CNPS 5th edition to list 1B in 6th edition



Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Population Locations:

Sweeney Ridge

Life History

Flowering Time: April-June

Range: This plant is endemic to California and is documented in Santa Cruz, San Mateo and San Francisco Counties.

Characteristics:

Proper identification of *Plagiobothrys chorisianus* var. *chorisianus* requires a mature fruit (nutlet). *P. chorisianus* var. *chorisianus* is an annual plant with opposite leaves near base of plant. The position of the nutlet scar is lateral or slightly oblique. The shape of the scar is linear. Nutlet scars are often wider than linear on other species in the genus *Plagiobothrys*. *P. chorisianus* var. *chorisianus* is distinguished from *P. chorisianus* var. *hickmanii* by several distinct characteristics. The lower leaves of *P. c.* var. *chorisianus* are generally fused and loosely sheathing the stems. The lower leaves of *P. c.* var. *hickmanii* are free and are only slightly sheathing the stems. The pedicels are longer than the calyx in *P. c.* var. *chorisianus* whereas the pedicel is shorter than the calyx in *P. c.* var. *hickmanii*.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

A single, small population has been previously mapped and documented on Sweeney Ridge just north of the boundary with the San Francisco Watershed District in the area known as the "South Meadow". No plants were found during surveys conducted in 2002.

A new population was documented in 2002 occurring along the Sweeney Ridge Trail north of the Nike missile site (see map for location).

Species determination

The voucher specimens collected from Sweeney Ridge were taken to California Academy of Sciences to compare with herbarium specimens. The following characteristics were used to verify the variety of the collected specimen.

<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	<i>Plagiobothrys chorisianus</i> var. <i>hickmanii</i>
1. habit trailing or erect (M.)	1. habit prostrate (M.)
2. lower lvs. conspicuously connate in pairs (M.)	2. without prominent basal sheathing of lf base (M.)
3. pedicel conspicuous, generally 2-10 mm (J.)	3. pedicels mostly shorter than calyx (M.)

M = from Munz; J = from Jepson

Though other characters are used to describe the varieties, these are the characters that were used to distinguish the two varieties and determine that the specimen collected is indeed *P. chorisianus* var. *chorisianus*. Based on the trailing habit of the plant and the length of the pedicels in relation to the length of the calyx, I believe the plant to be *P. chorisianus* var. *chorisianus*. The lower leaf pairs are connate but I would not say conspicuously so.

Threats

The site documented in 2002 occurs alongside the trail and several plants were found growing in the trail. *Leucanthemum vulgare* (Ox-eye daisy) occurs on the site. Any trail maintenance work to widen the trail could remove the population.

Monitoring conducted 2003:

The population occurring along the Sweeney Ridge Trail was revisited to census the population.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
Sweeney - S. Mdw	PLCHCH	1	0	no survey	no survey	no survey	0	No survey
Sweeney Ridge Tr.		2	--	--	--	--	approx. 35	93

Management Recommendations

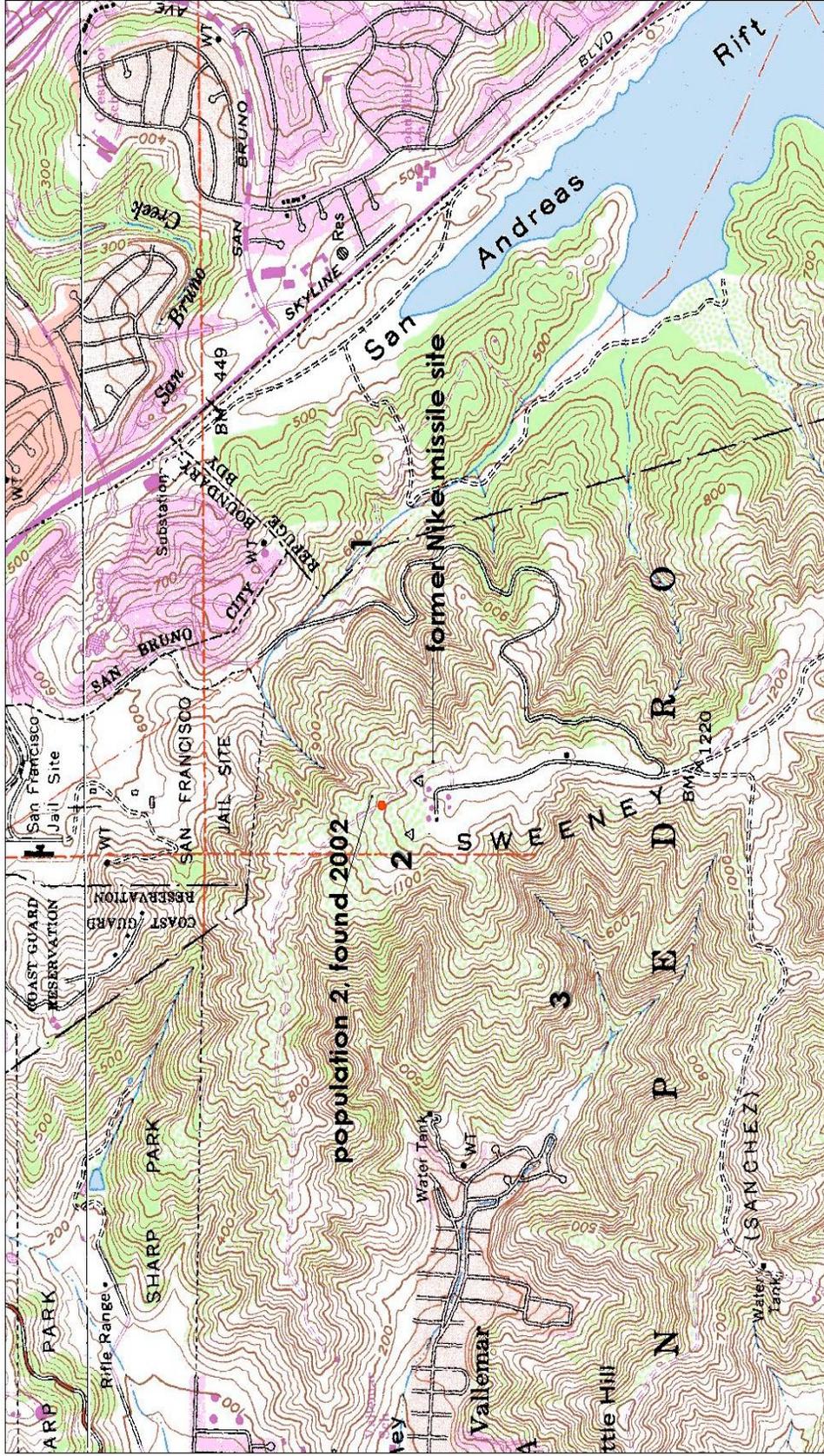
Revisit site to determine threats to and vigor of the population. Carefully remove Ox-eye daisy growing with the plants in late April or early May. At this time, the *Plagiobothrys* is in bloom and thus visible and the Ox-eye daisy is not yet in flower. This will prevent inadvertently pulling the *Plagiobothrys* and removing the Ox-eye daisy before it has a chance to flower and set seed.

Survey other reported sites and similar habitats for other populations. It appears the plant may grow well in moist areas. Population 2 is growing in what appears to be an old drainage ditch. While comparing the collected specimens with those in the Cal Academy herbarium, a specimen collected by John Thomas Howell on San Bruno Mountain in 1961 described the collection location as "... in a low wet depression along road". Continued surveys along the edges of the South Meadow may reveal new occurrences.

In order for a final determination to be made as to the identification of this plant, the vouchers should be verified by another qualified botanist. This could be a botanist among GGNRA staff or an outside expert. The specimens collected have been mounted and are housed in the herbarium cabinets in Building 1061, Fort Cronkhite.

Recommended Monitoring Interval

Monitor population yearly for three years in order to gather data on yearly fluctuations in abundance. If the population is stable, monitor every two years.

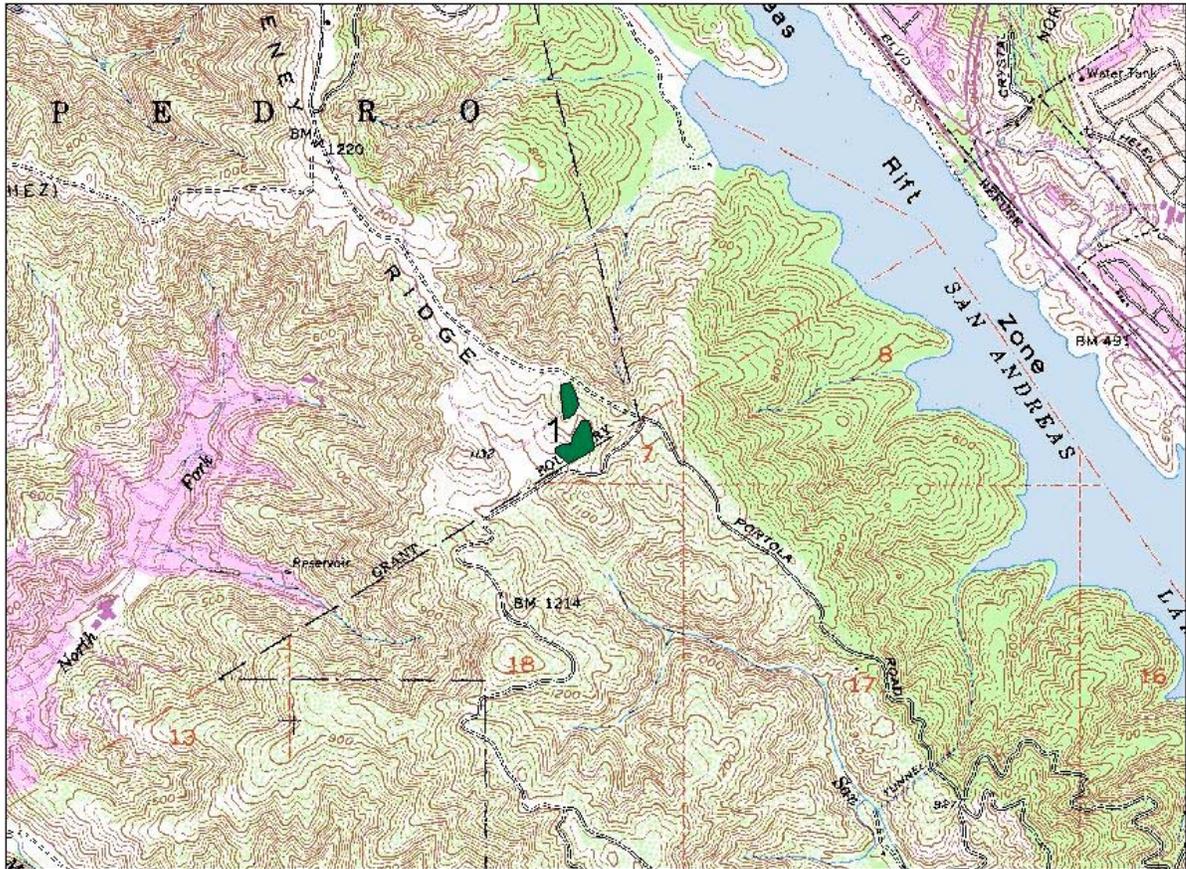


Plagiobothrys chorisianus var. chorisianus

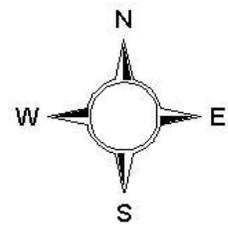
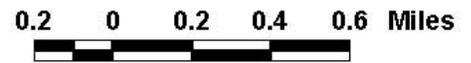
**Sweeney Ridge, 2002
Montara Mountain Quadrangle**

● Plchch_pt.shp

Plagiobothrys chorisianus var. *chorisianus*



Sweeney Ridge
Montara Mountain Quadrangle



***Stebbinsoseris decipiens* (Chambers) Chambers**

Santa Cruz microseris

Rarity Status

Federal Listing: C2-Threat and/or distribution data are insufficient to support federal listing.

State Listing: None

CNPS List: 1B / R-E-D Code: 2-2-3

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Population Locations: Stinson Beach, along Highway 1
Mill Valley Air Force Base, Mt. Tamalpais

Life History

Flowering Time: April-May

Range:

Stebbinsoseris decipiens is endemic to California. Within California, it is known to occur in Marin, Monterey and Santa Cruz counties. According to the CalFlora occurrence database, only three populations are documented in Marin County. Fewer than twenty occurrences are known throughout its range.

Characteristics:

Stebbinsoseris decipiens can be very difficult to distinguish from *Uropappus lindleyi*, *Stebbinsoseris heterocarpa* and several *Microseris* species. Specimens from the California Academy of Sciences herbarium of both species of *Stebbinsoseris* and of *Uropappus lindleyi* were viewed and the following characters observed.

Character	<i>Uropappus lindleyi</i>	<i>Stebbinsoseris decipiens</i>	<i>Stebbinsoseris heterocarpa</i>
1. pappus coloring	silvery white	tawny or tan to off-white	tawny or tan to off-white
2. achene color	black	tan	tan
3. achene width at junction of pappus	distinctly narrowed; almost beak-like	<i>not</i> tapered at pappus; width of achene uniform from base to tip	<i>slightly</i> tapered at pappus; slightly wider at base of achene than at pappus junction
4. ratio of achene length to pappus length	--	longer than pappus; visibly apparent without measurement	achenes only slightly longer than the pappus; ratio of achene length to pappus length is nearly equal
5. mid-vein on pappus scale	--	vein uniform in width from base to tip	vein widens at base
6. flower in bud	erect	nodding	nodding

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

A population has been recorded as occurring along Highway 1 near the junction with the Dipsea Trail. This population was last documented in 1985 and is believed to have been extirpated by road work.

A second population consisting of one individual was reported to have been found at MVAFB in 1999 (personal communication, K. Strathmann). Censuses conducted in 2001 on MVAFB appear to have misidentified *Uropappus lindleyii* as *Stebbinoseris decipiens*.

Inventory/Monitoring Results 2003

Both the Stinson Beach and the MVAFB sites were surveyed in April and May of 2003 but no individuals of *S. decipiens* were found at either site.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
MVAFB	STDE	1	--	--	0	0	0	0
		2	--	--	0	0	0	0
Stinson		1	No survey	0	No survey	0	0	0

In 1999, one individual of *Stebbinoseris decipiens* was found on MVAFB (personal communication with K. Strathmann). In the censuses conducted in 2000 and 2001 population numbers were in the 100s. Following the 2001 census it was recommended that a voucher collection be made to verify the identification of the species of *Stebbinoseris* occurring at MVAFB. Surveys in 2002 and 2003 to collect a voucher found no individuals of *Stebbinoseris*. After reviewing vouchers collected, photographs taken and talking with previous monitors, it is concluded that the individuals counted as *Stebbinoseris decipiens* in 2001 and 2002 were actually *Uropappus lindleyii*. Therefore, the census data for this species in 2001 and 2002 has been changed to zero individuals found. There is the possibility that some individuals included in the census counts were *Stebbinoseris decipiens*, however, based on subsequent surveys of the mapped populations conducted in 2002 and 2003 where no *S. decipiens* was found, it is concluded that the majority of plants counted had to have been *U. lindleyii*.

Management Recommendations

In order to verify the presence of *S. decipiens* on MVAFB, another search should be conducted in mid to late April 2004 and a voucher specimen collected (provided there is more than 1 individual!). I recommend looking for the plant in the area indicated on the attached map. The search should be conducted before noon since flowers of members of the chicory tribe tend to close as the day progresses.

The last several surveys of the Stinson Beach site have revealed no individuals. The last recorded occurrence was in 1985 by Terry Thomas then of GGNRA. It is possible that this population is extirpated. Future surveys to this site should include broader searches in the grasslands north and south of the road. When the plant was first collected at this site in 1955, the site was described as "plants growing out of a mat of moss." A search for locations fitting this description should be conducted. Additionally, other grassland areas occurring on serpentine rock outcrops along Highway 1 could be surveyed.

Recommended Monitoring Interval

MVAFB – None at this time pending species verification

Stinson Beach – None at this time pending locating new populations.



Uropappus lindleyi (formerly identified as *Stebbinoseris decipiens*) MVAFB, 04/01



Uropappus lindleyi (formerly identified as *Stebbinoseris decipiens*), MVAFB 04/01



Uropappus lindleyi, note achenes taper at tip



Uropappus lindleyi, note erect inflorescences in bud

Stebbinoseris decipiens – MVAFB

Need updated map



Stebbinsoserosis decipiens

Stinson Beach
San Rafael Quadrangle

***Streptanthus glandulosus* Hook. ssp. *pulchellus* (Greene)
Kruckeberg
Mount Tamalpais jewelflower**

Rarity Status

Federal Listing: C2-Threat and/or distribution data are insufficient to support federal listing.

State Listing: None

CNPS List: 1B / R-E-D Code: 3-2-3

Comments: R-E-D code changed from 3-1-3 to 3-2-3 in the CNPS Inventory 6th edition.

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

GGNRA Population Locations:

Nicasio Ridge

Mill Valley Air Force Base

Life History

Flowering Time: April-July

Range: *S. glandulosus* ssp. *pulchellus* is endemic to California and is known to occur only in Marin County.

Characteristics: This small annual plant is as pretty as its name suggests. Its bright purple, urn shaped calyx lobes can help distinguish this distinct plant. The petals are all more or less similar in color. The inflorescence is one-sided in *S. g.* ssp. *pulchellus*, whereas the inflorescence of *S. g.* ssp. *glandulosus* is not one-sided. These subspecies both have purple calyces.

Abundance and Distribution within and around the Golden Gate National Recreation area and San Francisco Watershed District

Populations are known to occur on serpentinite rock outcrops with thin soils and sparse herbaceous cover. There are several populations mapped on the west slopes of Nicasio ridge and below West Peak on Mt. Tamalpais on the Mill Valley Air Force Base.

Threats

Populations atop Nicasio Ridge are subject to cattle grazing atop Nicasio Ridge. It is not apparent how the presence of cows affects the vigor of these populations. On Nicasio Ridge, the introduced species *Scabiosa atropurpurea* is abundant in the same habitat as *Streptanthus glandulosus* ssp. *pulchellus*. This could have a negative effect on its abundance. In the Mill Valley AFB, several plants of concern, including yellow starthistle (*Centaurea solstitialis*) could also have an adverse effect on the vigor of the populations. Fire suppression may be allowing the encroachment of Douglas fir and other tree and shrub species to encroach into the open serpentinite chaparral sites.

Monitoring conducted 2003:

All previously documented populations on Nicasio Ridge were censused in 2003 and two new populations were found and censused.

Monitoring Results: 1998 - 2003

Location	Species Code	Pop. Num.	1998	1999	2000	2001	2002	2003
MVAFB	STGLPU	1	129	555	923	surveyed; not censused	2,491	No survey
		2	0	No survey	1,122	surveyed not censused	1,668	No Survey
Nicasio		1	1,088*	No survey; too late in season	1,368*	118*	No survey	256
		2	--	--	--	12	No survey	127
		3	--	--	--	53	No survey	469
		4	--	--	--	--	--	989
		5	--	--	--	--	--	120

*include counts on private land

Note that the census figures for 1998, 2000 and 2001 for Nicasio #1 include totals for populations on private and GGNRA land. Following the 2001, season it was decided to no longer census populations occurring on private land. In 2001, the census was conducted late in the year and may account for the low totals in 2001 as compared with 2003. In 2003, Nicasio #3 was surveyed in a larger area which would contribute to the higher numbers obtained in 2003 versus 2001 (see Arcview shape files for 2001 and 2003)

The populations at MVAFB were not censused in 2001 because it was too late in the season at the time the site visit was made. In 2002, two new survey areas were added to population 1 on MVAFB. A larger area surveyed is a likely factor contributing to the large increase in census counts between 2000 and 2002 in this population.

Management Recommendations

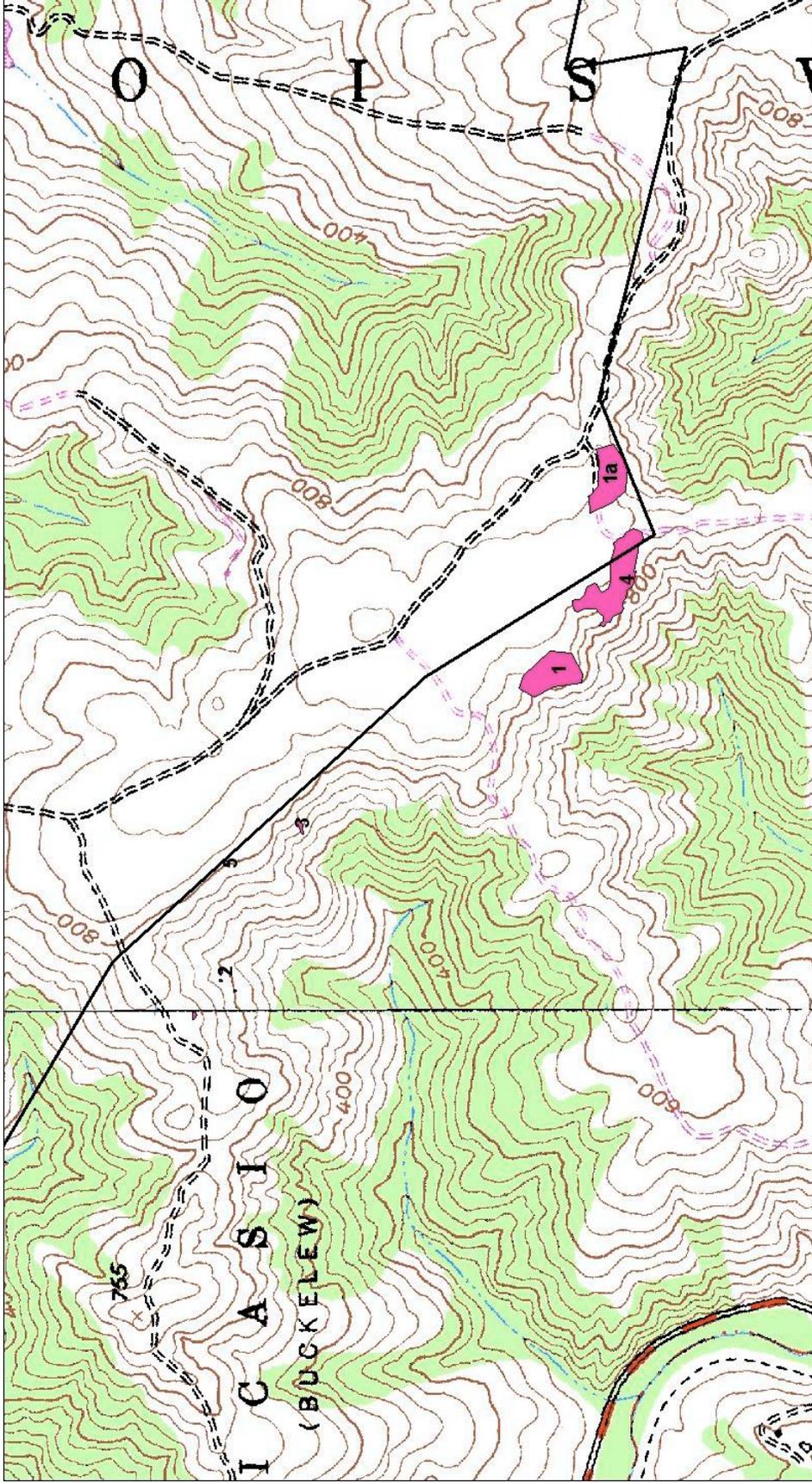
Removal of yellow starthistle in the MVAFB may help the long-term status of several rare plant species that reside in the area. It may be of interest to examine historical photos taken at the MVAFB to determine if significant tree or grass encroachment is occurring in the area.

Closely monitor the Nicasio ridge populations for potential negative impacts from cattle grazing and for introduced species of concern. Nicasio Ridge is host to six rare plant species. Ideally, a monitoring method would be adopted that can capture data on all six species but only require examining a sub-sample of the entire population.

The Mill Valley AFB site has several rare species and should be monitored closely for invasive species and changes in stand structure due to fire suppression. Establishing line transects would allow for the gathering of absolute cover data for individual species as well as relative cover data for all species occurring within this community. A series of transects distributed across these populations would provide data on changes in cover of both native and non-native species.

Recommended Monitoring Interval

Every three years



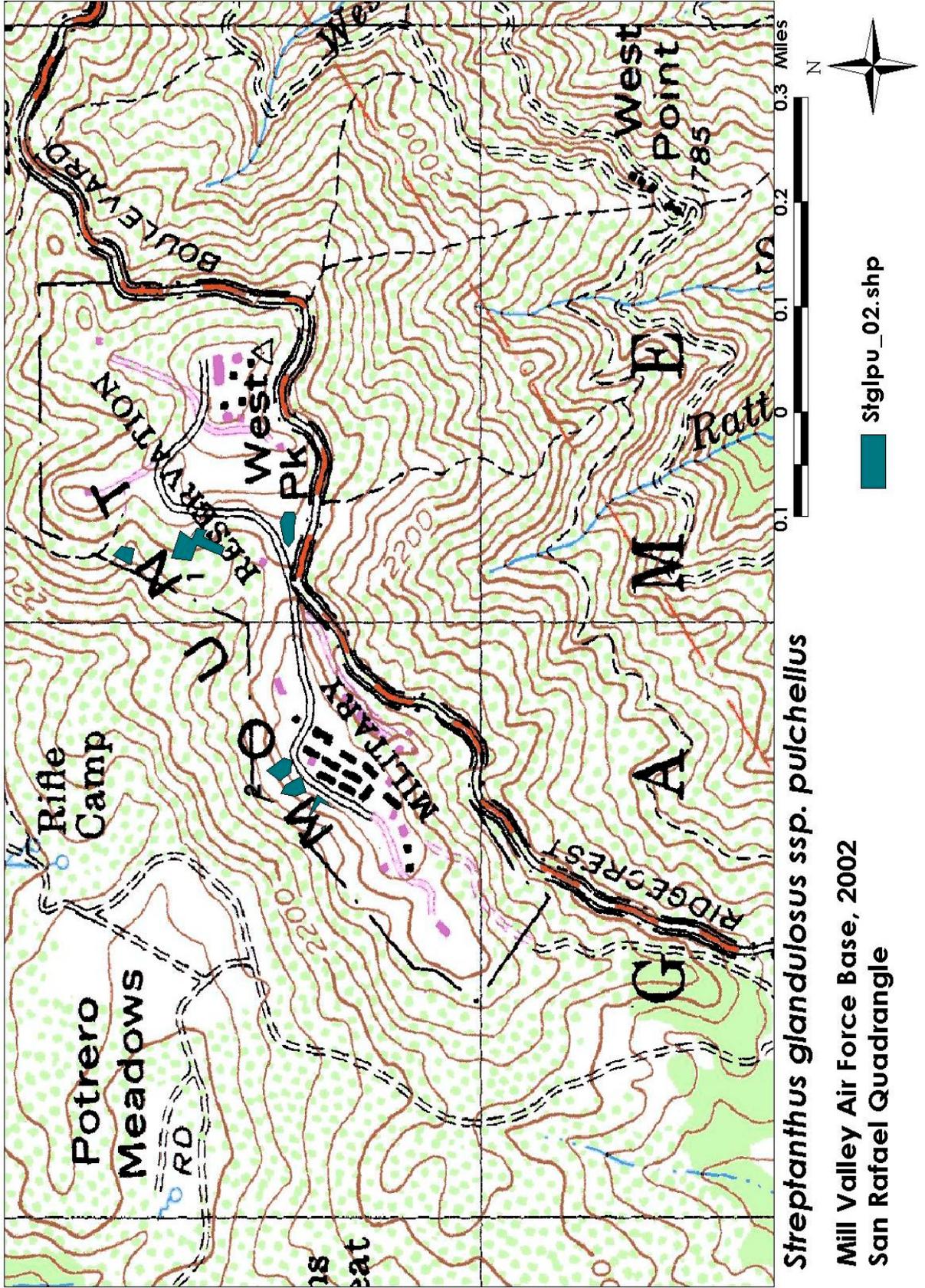
Streptanthus glandulosus ssp. pulchellus

**Nicasio Ridge, 2003
Inverness and San Geronimo Quadrangles**

0.1 0 0.1 0.2 0.3 0.4 0.5 Miles

0.1 0 0.1 0.2 0.3 0.4 0.5 Miles

coqg-pol.tnp
inverness
geronimo
nicasio
page_13.tnp



Streptanthus glandulosus ssp. pulchellus

Mill Valley Air Force Base, 2002
San Rafael Quadrangle

Appendix I: Species Tables

2004 Rare and Endangered Vascular Plant Species Golden Gate National Recreation Area and San Francisco Watershed District

Scientific Name	Common Name	State Status	Federal Status
<u>CNPS List 1B: Rare, Threatened or Endangered in California and Elsewhere</u>			
<i>Acanthomintha duttonii</i> (Abrams) Jokerst	San Mateo thornmint	ENDANGERED	ENDANGERED
<i>Arctostaphylos hookeri</i> G. Don ssp. <i>montana</i> (Eastw.) P. Wells	Tamalpais manzanita		
<i>Arctostaphylos montaraensis</i> Roof	Montara manzanita		
<i>Arctostaphylos virgata</i> Eastw.	Marin manzanita		
<i>Castilleja affinis</i> Hook & Arn. ssp. <i>neglecta</i> (E.M. Zeile) Chuang & Heckard	Tiburon indian paintbrush	Threatened	ENDANGERED
<i>Castilleja ambigua</i> Hook. & Arn. ssp. <i>humboldtiensis</i> (Keck) Chuang & Heckard	Humboldt bay owl's clover		
<i>Ceanothus masonii</i> McMinn	Mason's ceanothus	Rare	
<i>Chorizanthe cuspidata</i> S. Watson var. <i>cuspidata</i>	San Francisco Bay spineflower		
<i>Cirsium andrewsii</i> A. Gray	Franciscan thistle		
<i>Cirsium fontinale</i> E. Greene var. <i>fontinale</i>	fountain thistle	ENDANGERED	ENDANGERED
<i>Cordylanthus maritimus</i> Benth. ssp. <i>palustris</i> (Behr) Chuang & Heckard	Point Reyes bird's-beak		
<i>Dirca occidentalis</i> A. Gray	Western leatherwood		
<i>Eriophyllum latilobum</i> Rydb.	San Mateo wooly sunflower	ENDANGERED	ENDANGERED
<i>Fritillaria affinis</i> Pursh var. <i>tristulis</i> (A.L. Grant) B. Ness	Marin checker lily		
<i>Fritillaria liliacea</i> Lindley	fragrant fritillary		
<i>Hesperolinon congestum</i> (A. Gray) Small	Marin dwarf flax	Threatened	Threatened
<i>Lessingia arachnoidea</i> E. Greene	Crystal Springs lessingia		
<i>Linanthus rosaceus</i> Greene	Rose Linanthus		

Scientific Name	Common Name	State Status	Federal Status
<u>CNPS List 1B: Rare, Threatened or Endangered in California and Elsewhere (cont.)</u>			
<i>Malacothamnus fasciculatus</i> (Torrey & A. Gray) E. Greene var. <i>arcuatus</i> (E. Greene) E. Greene	Arcuate bush mallow		
<i>Pentachaeta bellidiflora</i> E. Greene	white-rayed pentachaeta	ENDANGERED	ENDANGERED
<i>Plagiobothrys chorisianus</i> (Cham.) I.M. Johnston var. <i>chorisianus</i> (<i>Stebbinsoseris decipiens</i> (Chambers) Chambers)	Choris's popcornflower Santa Cruz microseris		
<i>Streptanthus glandulosus</i> Hook. ssp. <i>pulchellus</i> (E. Greene) Kruckeb.	Mount Tamalpais jewelflower		
<u>CNPS List 3: Plants About Which We Need More Information</u>			
<i>Eriogonum luteolum</i> E. Greene var. <i>caninum</i> (E. Greene) Rev.	Tiburon buckwheat		
<i>Lupinus arboreus</i> Sims var. <i>eximus</i> (Burt Davy) C.P. Smith	Yellow bush lupine		
<u>CNPS List 4: Plants of Limited Distribution—A Watch List</u>			
<i>Arabis blepharophylla</i> Hook & Arn.	Coast rock cress		
<i>Calamagrostis ophitidis</i> (J. Howell) Nygre	Serpentine reed grass		
<i>Calochortus umbellatus</i> Alph. Wood	Oakland star-tulip		
<i>Ceanothus gloriosus</i> J. Howell var. <i>exaltatus</i> J. Howell	Glory brush		
<i>Elymus californicus</i> (Bolander) Gould	California bottlebrush grass		
<i>Erysimum franciscanum</i> Rossbach	San Francisco wallflower		
<i>Linanthus ambiguus</i> (Rattan) E. Greene	Serpentine linanthus		
<u>Not recognized in CNPS Inventory</u>			
<i>Ceanothus</i> sp. Nova			
<i>Tanacetum camphoratum</i> Less. (removed 2002)	Dune tansy		
<i>Gutierrezia californica</i> (DC.) Torrey & A. Gray (removed 2002)	California matchweed		

Appendix I: Species Tables

**2004 Rare and Endangered Vascular Plant Species
San Francisco Watershed District**

Scientific Name	Common Name	State Status	Federal Status
<u>CNPS List 1B: Rare, Threatened or Endangered in California and Elsewhere</u>			
<i>Acanthomintha duttonii</i> (Abrams) Jokerst	San Mateo thornmint	ENDANGERED	ENDANGERED
<i>Arctostaphylos montaraensis</i> Roof	Montara manzanita		
<i>Cirsium fontinale</i> E. Greene var. <i>fontinale</i>	Fountain thistle	ENDANGERED	ENDANGERED
<i>Dirca occidentalis</i> A. Gray	Western leatherwood		
<i>Eriophyllum latilobum</i> Rydb.	San Mateo wooly sunflower	ENDANGERED	ENDANGERED
<i>Fritillaria liliacea</i> Lindley	Fragrant fritillary		
<i>Hesperolinon congestum</i> (A. Gray) Small	Marin dwarf flax	Threatened	Threatened
<i>Lessingia arachnoidea</i> E. Greene	Crystal Springs lessingia		
<i>Linanthus rosaceus</i>	Rose Linanthus		
<i>Pentachaeta bellidiflora</i> E. Greene	White-rayed pentachaeta	ENDANGERED	ENDANGERED
<u>CNPS List 3: Plants About Which We Need More Information</u>			
<i>Lupinus arboreus</i> Sims var. <i>eximus</i> (Burt Davy) C.P. Smith	Yellow bush lupine		
<u>CNPS List 4: Plants of Limited Distribution—A Watch List</u>			
<i>Arabis blepharophylla</i> Hook & Arn.	Coast rock cress		
<i>Calochortus umbellatus</i> Alph. Wood	Oakland star-tulip		
<i>Elymus californicus</i> (Bolander) Gould	California bottlebrush grass		
<i>Erysimum franciscanum</i> Rossbach	San Francisco wallflower		
<i>Linanthus ambiguus</i> (Rattan) E. Greene	Serpentine linanthus		

Appendix I: Tables

**2004 Rare and Endangered Vascular Plant Species
Golden Gate National Recreation Area and San Francisco Watershed District
Arranged by Location**

Scientific Name**Common Name**Muir Woods*Elymus californicus* (Bolander) Gould

California bottlebrush grass

Muir Woods – Four Corners*Calochortus umbellatus* Alph. Wood

Oakland star-tulip

Oakwood Valley*Elymus californicus* (Bolander) Gould

California bottlebrush grass

Marin Headlands*Arabis blepharophylla* Hook & Arn.

Coast rock cress

Cirsium andrewsii A. Gray

Franciscan thistle

Erysimum franciscanum Rossbach

San Francisco wallflower

Gutierrezia californica (DC.) Torrey & A. Gray (**removed 2002**)

California matchweed

Fort Funston and Sutro Heights*Chorizanthe cuspidata* S. Watson var. *cuspidata*

San Francisco Bay spineflower

Erysimum franciscanum Rossbach

San Francisco wallflower

Tanacetum camphoratum Less. (**removed 2002**)

Dune Tansy

Sweeney and Milagra Ridge*Arabis blepharophylla* Hook & Arn.

Coast rock cress

Erysimum franciscanum Rossbach

San Francisco wallflower

Malacothamnus fasciculatus (Torrey & A. Gray) E. Greene

Arcuate bush mallow

var. *arcuatus* (E. Greene) E. Greene*Plagiobothrys chorisianus* (Cham.) I.M. Johnston var. *chorisianus*

Choris's popcornflower

Mori Point*Linanthus rosaceus*

Rose Linanthus

Pedro Point*Arabis blepharophylla* Hook & Arn.

Coast rock cress

Erysimum franciscanum Rossbach

San Francisco wallflower

Mill Valley Air Force Base*Arctostaphylos hookeri* G. Don ssp. *montana* (Eastw.) P. Wells

Tamalpais manzanita

Calamagrostis ophitidis

Serpentine Reed Grass

Calochortus umbellatus Alph. Wood

Oakland star-tulip

(Eriogonum luteolum E. Greene var. *caninum* (E. Greene) Rev.)

Tiburon buckwheat

(Stebbinsoseris decipiens (Chambers) Chambers)

Santa Cruz microseris

Streptanthus glandulosus Hook. ssp. *pulchellus* (E. Greene) Kruckeb.

Mount Tamalpais jewelflower

Nicasio Ridge*Calochortus umbellatus* Alph. Wood*Castilleja affinis* Hook & Arn.ssp. *neglecta* (E.M. Zeile) Chuang & Heckard*Ceanothus* sp. Nova*Fritillaria liliacea* Lindley*Hesperolinon congestum* (A. Gray) Small*Streptanthus glandulosus* Hook. ssp. *pulchellus* (E. Greene) Kruckeb.

Oakland star-tulip

Tiburon indian paintbrush

Fragrant fritillary

Marin dwarf flax

Mount Tamalpais jewelflower

Scientific Name**Common Name**GGNRA Northern District*Arctostaphylos virgata* Eastw.*Castilleja ambigua* Hook. & Arn.ssp. *humboldtensis* (Keck) Chuang & Heckard*Ceanothus gloriosus* J. Howell var. *exaltatus* J. Howell*Ceanothus masonii* McMinn*Cordylanthus maritimus* Benth. ssp. *palustris* (Behr) Chuang & Heckard*Dirca occidentalis* A. Gray*Fritillaria affinis* Pursh var. *tristulis* (A.L. Grant) B. Ness

Marin manzanita

Humboldt bay owl's clover

Glory brush

Mason's ceanothus

Point Reyes bird's-beak

western leatherwood

Marin checker lily

San Francisco Watershed District*Acanthomintha duttonii* (Abrams) Jokerst*Arabis blepharophylla* Hook & Arn.*Arctostaphylos montaraensis* Roof*Calochortus umbellatus* Alph. Wood*Cirsium fontinale* E. Greene var. *fontinale**Dirca occidentalis* A. Gray*Elymus californicus* (Bolander) Gould*Eriophyllum latilobum* Rydb.*Erysimum franciscanum* Rossbach*Fritillaria liliacea* Lindley*Hesperolinon congestum* (A. Gray) Small*Lessingia arachnoidea* E. Greene*Linanthus ambiguus* (Rattan) E. Greene*Lupinus arboreus* Sims var. *eximus* (Burt Davy) C.P. Smith*Pentachaeta bellidiflora* E. Greene

San Mateo thornmint

Coast rock cress

Montara manzanita

Oakland star-tulip

fountain thistle

Western leatherwood

California bottlebrush grass

San Mateo wooly sunflower

San Francisco wallflower

Fragrant fritillary

Marin dwarf flax

Crystal Springs lessingia

Serpentine linanthus

Yellow bush lupine

White-rayed pentachaeta

Appendix II: CNPS List and R-E-D definitions

CNPS Lists

- 1A: Plants Presumed Extinct in California
- 1B: Plants Rare, Threatened or Endangered in California and Elsewhere
- 2: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
- 3: Plants About Which We Need More Information--A Review List
- 4: Plants of Limited Distribution--A Watch List

CNPS R-E-D Code Definitions

Rarity (R)

- 1—Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time.
- 2—Distributed in a limited number of occurrences, occasionally more if each occurrence is small
- 3—Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported

Endangerment (E)

- 1—Not endangered
- 2—Endangered in a portion of its range
- 3—Endangered throughout its range

Distribution (D)

- 1—More or less widespread outside of California
- 2—Rare outside California
- 3—Endemic to California

Appendix III. Rare Plant Monitoring to be conducted in 2004 (by species)

Light type indicates those species/populations which do not require any monitoring in 2004.

Priority rating

HIGH – Given based on endangerment/threatened status or high priority for resolution in 2004

MED – Species not listed as endangered and or threatened; less critical if not monitored in 2004

LOW – not scheduled for monitoring in 2004

Monitoring interval notations

jt – Recommendation of Jeanne Taylor

R – Recommended interval in 1994 GGNRA Rare Plant Management Guidelines

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
HIGH	<i>Acanthomintha duttonii</i>	SFWD	<ul style="list-style-type: none"> Survey once a month Mar – Jun before determining extirpated 	<ul style="list-style-type: none"> Discuss with SFWD/CNPS possibility of repopulating with seed from Edgewood Park pop. 	Yearly (jt)	2004	no
				<ul style="list-style-type: none"> 			
MED	<i>Arabis blepharophylla</i>	MAHE/ Milagra/ Sweeney/ SFWD	none	<ul style="list-style-type: none"> Survey for general health of populations every three yrs.; revisit populations that have dropped to zero; ocular estimates adequate 	Every 3 years (R)	2004	no
HIGH	<i>Arabis blepharophylla</i>	Pedro Pt.	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> none at this time 	Yearly for 3 years; then every 3 years (R)	2004	no
LOW	<i>Arctostaphylos hookeri</i> ssp. <i>montana</i>	MVAFB	none	<ul style="list-style-type: none"> develop a sampling method for sampling serpentine chaparral community 	Every 3 years (jt)	2005	no
MED	<i>Arctostaphylos montaraensis</i>	Montara Mountain	none	<ul style="list-style-type: none"> discuss with SFWD whether exotics a priority for removal at this site; 	Every 3 years (jt)	2004	no

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
				<ul style="list-style-type: none"> establish photopoints to track exotic/native extent 			
MED	<i>Arctostaphylos virgata</i>	Bolinas Ridge	<ul style="list-style-type: none"> survey collect voucher specimen 	<ul style="list-style-type: none"> survey to ensure that all individuals continue to persist 	Every 3 years (jt)	2005	no
LOW	<i>Calamagrostis ophiditis</i>	MVAFB	none	<ul style="list-style-type: none"> develop a sampling method for sampling serpentine chaparral community 	Every 3 years (jt)	2005	yes
MED	<i>Calochortus umbellatus</i>	MUWO (Four Corners)	<ul style="list-style-type: none"> census 	<ul style="list-style-type: none"> none at this time 	Yearly for 3 years; then every two years (jt)	2004	no
LOW	<i>Calochortus umbellatus</i>	MVAFB	none	<ul style="list-style-type: none"> develop a sampling method for sampling serpentine chaparral community 	Every 3 years (jt)	2005	no
MED	<i>Calochortus umbellatus</i>	Nicasio Ridge	<ul style="list-style-type: none"> Survey for presence of population on NPS lands in course of monitoring of other species meet w/ranchers regarding rare plant populations 	<ul style="list-style-type: none"> develop a method for sampling serpentine brush/grassland community 	Yearly for 3 years; then every two years (jt)	2004	no
HIGH	<i>Calochortus umbellatus</i>	SFWD	<ul style="list-style-type: none"> survey between end of Feb and end of Mar to document and census population 	<ul style="list-style-type: none"> discuss exotic removal; serpentine grassland restoration with SFWD/CNPS 	see above	2004	no
HIGH	<i>Castilleja affinis</i> ssp. <i>neglecta</i>	Nicasio Ridge	<ul style="list-style-type: none"> census meet w/ranchers regarding rare plant populations 	<ul style="list-style-type: none"> develop a method for sampling serpentine brush/grassland community 	Yearly for 3 years; then every 2 years (jt)	2004	no
HIGH	<i>Castilleja ambigua</i>		<ul style="list-style-type: none"> census 	<ul style="list-style-type: none"> none at this time 	Yearly for 3	2004	no

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
	<i>ssp. humboldtiensis</i>	Martinelli/ Giacomini Ranch			years; then every two years (jt)		
MED	<i>Ceanothus glori- ous</i> var. <i>exaltatus</i>	Bolinas Ridge	<ul style="list-style-type: none"> non 	none at this time	Every 3 years (jt)	2004	no
MED	<i>Ceanothus masonii</i>	Bolinas Ridge	<ul style="list-style-type: none"> none 	none at this time	Every 3 years (R)	2004	no
LOW	<i>Ceanothus sp. nova</i>	Nicasio Ridge	<ul style="list-style-type: none"> assess level of tussock moth defoliation using photodocumentation meet w/ranchers regarding rare plant populations 	<ul style="list-style-type: none"> develop a new method for sampling serpentine brush/ grassland community; or refine previously used method 	Every 2 years (R)	2005	no
MED	<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	Fort Funston	<ul style="list-style-type: none"> Census populations 5, 6, 11; 	<ul style="list-style-type: none"> develop a method for sampling coastal dune community and/or to monitor restored vs. un-restored areas 	Every 2 years(R)	2004	no
MED	<i>Cirsium andrewsii</i>	MAHE/ Tennessee Valley	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> develop a method for measuring both exotic and native cover in interior seeps and drainages 	Every 3 years (R)	2004	no
HIGH	<i>Cirsium fontinale</i> var. <i>fontinale</i>	SFWD	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> discuss exotic removal; serpentine grassland restoration with SFWD/CNPS 	Every 2 years (jt)	2004	no
HIGH	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	Martinelli/ Giacomini Wetland	<ul style="list-style-type: none"> Census 	none at this time	Yearly for 3 years; if population stable (jt), then every 3 years (R)	2004	no
HIGH	<i>Cordylanthus maritimus</i> ssp.	Bolinas Lagoon	<ul style="list-style-type: none"> Census 	none at this time	Yearly for 3 years; if	2004	no

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
	<i>palustris</i>				population stable (jt), then every 3 years (R)		
MED	<i>Dirca occidentalis</i>	Devil's Gulch	<ul style="list-style-type: none"> Expand survey area during 2004 inventory in Devil's Gulch 	none at this time	Every 3 years (jt)	2004	no
MED	<i>Dirca occidentalis</i>	SFWD	<ul style="list-style-type: none"> Survey in early February to document abundance and distribution of plant in areas previously not surveyed 	none at this time	see above	2004	no
HIGH	<i>Elymus californicus</i>	Green Gulch	<ul style="list-style-type: none"> survey for reported population 	none at this time	Every 3 years (R)	2004	no
MED	<i>Elymus californicus</i>	MUWO	<ul style="list-style-type: none"> Survey to document health of and persistence of populations 	none at this time	Every 3 years (R)	2004	no
LOW	<i>Elymus californicus</i>	Bolinas Lagoon	none	none at this time	Every 3 years (R)	2005	no
LOW	<i>Elymus californicus</i>	Oakwood Valley	none	none at this time	Every 3 years (R)	2005	no
MED	<i>Elymus californicus</i>	SFWD	none	none at this time	Every 3 years (R)	2004	no
HIGH	<i>Eriogonum luteolum</i> var. <i>caninum</i>	MVAFB	<ul style="list-style-type: none"> voucher specimen identification needs verification by second individual 	<ul style="list-style-type: none"> develop a sampling method for sampling serpentine chaparral community 	Every 3 years (R)	2004 pending positive identification	yes
HIGH	<i>Eriophyllum latifolium</i>	SFWD	<ul style="list-style-type: none"> census talk with county of San Mateo & 	none at this time	yearly (jt)	2004	no

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
			SFWD re: changing mowing practices				
MED	<i>Erysimum franciscanum</i>	MAHE/ FOFU/ Milagra/ Sweeney/ SFWD	none	<ul style="list-style-type: none"> Survey for general health of populations every three yrs.; revisit populations that have dropped to zero; ocular estimates adequate 	Every 3 years (jt)	2004	no
MED	<i>Erysimum franciscanum</i>	PEPO	<ul style="list-style-type: none"> census 	<ul style="list-style-type: none"> Survey for general health of populations every three yrs.; revisit populations that have dropped to zero; ocular estimates adequate 	Yearly for 3 years; if stable every 3 years (jt)	2004	no
HIGH	<i>Fritillaria affinis</i> var. <i>tristulis</i>	Olema Valley (Randall House)	<ul style="list-style-type: none"> census expand survey area 	<ul style="list-style-type: none"> discuss with PORE/GOGA staff whether important to develop method for monitoring grazing impacts 	Yearly for 3 years; if stable every 2 years (jt)	2004	no
LOW	<i>Fritillaria liliacea</i>	Nicasio Ridge	<ul style="list-style-type: none"> census meet w/ranchers regarding rare plant populations 	<ul style="list-style-type: none"> develop a new method for sampling serpentine grassland community; or refine previously used method 	Every 2 years (R)	2005	no
MED	<i>Fritillaria liliacea</i>	SFWD	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> discuss exotic removal; serpentine grassland restoration with SFWD/CNPS 	Every 2 years (R)	2004	no
LOW	<i>Hesperolinon congestum</i>	Nicasio Ridge	<ul style="list-style-type: none"> none meet w/ranchers regarding rare plant populations 	<ul style="list-style-type: none"> develop a method for sampling serpentine brush/grassland community 	Every 2 years (jt)	2005	no

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
HIGH	<i>Hesperolinon congestum</i>	SFWD	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> discuss exotic removal; serpentine grassland restoration with SFWD/CNPS 	Every 2 years (jt)	2004	no
MED	<i>Lessingia arachnoidea</i>	SFWD	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> discuss exotic removal; serpentine grassland restoration with SFWD/CNPS develop a method for sampling serpentine grassland community; 	Every 2 years (jt)	2004	no
MED	<i>Linanthus ambiguus</i>	SFWD	<ul style="list-style-type: none"> Census and map population 	<ul style="list-style-type: none"> discuss exotic removal; serpentine grassland restoration with SFWD/CNPS 	yearly for 3 years; then every 2 years (jt)	2004	no
MED	<i>Linanthus rosaceus</i>	Mori Pt.	<ul style="list-style-type: none"> Census 	none at this time	yearly for 3 years; then every 2 years (jt)	2004	no
MED	<i>Lupinus arboreus</i> var. <i>eximus</i>	SFWD	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> research literature for new taxonomic treatments of this species 	Every 3 years	2004	no
LOW	<i>Malacothamnus fasciculatus</i> var. <i>arcuatus</i>	Sweeney Ridge	none	<ul style="list-style-type: none"> Wait for wildfire before conducting next survey 	postburn – 1, 2, 5, 10 yrs	?	no
HIGH	<i>Pentachaeta bellidiflora</i>	SFWD	<ul style="list-style-type: none"> Census 	<ul style="list-style-type: none"> develop a new method for sampling serpentine grassland community; or refine previously used method 	Every 3 years (R)	2004	no
HIGH	<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	Sweeney Ridge	<ul style="list-style-type: none"> voucher specimen identification needs verification census remove ox-eye 	none at this time	Yearly for three years; then every 2 years (jt)	2004	yes

Priority in 2004	Species	Location	To do in 2004	Recommendations	Suggested Monitoring Interval	Next Monitoring year	Voucher specimen ?
			daisy				
HIGH	<i>Stebbinoseris decipiens</i>	MVAFB	<ul style="list-style-type: none"> survey/census 	<ul style="list-style-type: none"> develop a method for sampling serpentine chaparral community 	Yearly for three years; then every 2 years (jt)	<i>Pending positive identification</i>	no
MED	<i>Stebbinoseris decipiens</i>	STBE	<ul style="list-style-type: none"> survey other potential species habitat along Highway 1 and within GGNRA boundary 	<ul style="list-style-type: none"> none at this time 	Yearly for three years; then every 2 years (jt)	2004	no
LOW	<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	MVAFB	none	<ul style="list-style-type: none"> develop a method for sampling serpentine chaparral community 	Every 3 years (R)	2005	no
LOW	<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	Nicasio Ridge	none	<ul style="list-style-type: none"> develop a method for sampling serpentine brush/grassland community 	Every 3 years (R)	2006	no

Rare Plant Monitoring to be Conducted in 2004 (by Park Area)

Oakwood Valley

No rare plant populations are scheduled for monitoring in 2004

Green Gulch

Elymus californicus: document population

Muir Woods

Elymus californicus: survey for health of habitat

Muir Woods – Four Corners

Calochortus umbellatus: census

Marin Headlands

Arabis blepharophylla: census

Erysimum franciscanum: census

Cirsium andrewii: census

Sweeney and Milagra Ridge

Plagiobothrys chorisianus var. *chorisianus*: census, continue to survey new areas; pull ox-eye daisy

Mori Point

Linanthus rosaceus: census

Fort Funston

Chorizanthe cuspidata var. *cuspidata*: census pops. 5, 6, 11

Stinson Beach

Survey/inventory

Stebbinoseris decipiens

Mill Valley Air Force Base

Arctostaphylos hookeri ssp. *montana*: collect voucher

Calochortus umbellatus: collect voucher

(*Eriogonum luteolum* var. *caninum*): census pending I.D. confirmation

Streptanthus glandulosus ssp. *pulchellus*: collect voucher

(*Stebbinoseris decipiens*): document population occurrence

Bolinas Ridge

Arctostaphylos virgata: survey/voucher specimen collection

Ceanothus gloriosus var. *exaltatus*: survey

Ceanothus masoni: survey

GGNRA Northern Lands

Castilleja ambiguous ssp. *humboldtensis*: census

Cordylanthus maritimus ssp. *paulstris*: census

Dirca occidentalis: survey

Fritillaria affinis var. *tristulis*: census

Nicasio Ridge -

Castilleja affinis ssp. *neglecta*: census

Calochortus umbellatus: survey

Ceanothus sp. *nova*: none

Fritillaria liliacea: none

Hesperolinon congestum: none

Streptanthus glandulosus ssp. *pulchellus*: none

Pedro Point

Arabis blepharophylla: census

Erysimum franciscanum: census

SFWD

Priority species in 2004

Acanthomintha duttonii: final attempt to document population before declare extirpated

Eriophyllum latilobum: census, threats from yearly mowing

Hesperolinon congestum: census, exotic threats

Calochortus umbellatus: census, document presence of population

Cirsium fontinale var. *fontinale*: census, exotics/mowing threats

Lessingia arachnoidea: census, exotic threats

Fritillaria liliacea: census, exotic threats

Linanthus ambiguous: census, map population location

Pentachaeta bellidiflora: census

Other species to be monitored but of less urgency

Arabis blepharophylla: census

Elymus californicus: census

Erysimum franciscanum: census

Lupinus arboreus var. *eximus*: census

Arctostaphylos montaraensis: exotics

Dirca occidentalis: survey to document distribution and abundance

Appendix IV: 1998 – 2003 Monitoring Results

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
SFWD	<i>Acanthomintha duttonii</i>	1	6	No survey	0	0	0	No survey	No survey	Plant not observed since 1991
Marin Headlands	<i>Arabis blepharophylla</i>	1		626	1289	383	325	No survey	No survey	
		2		3	2	0	No survey	No survey	No survey	Unable to access due to bridge construction
		3		770	720	30	111	No survey	No survey	
		4		1364	*3792	546	545	No survey	No survey	*One portion of pop. 4 not found in 1999
		5		266	*80	47	12	No survey	No survey	*Pop. 5B not found in 1999; found 5B in 2000
		6		0	0	0	0	No survey	No survey	
		7		0	0	0	0	No survey	No survey	
		8		1445	298	900	303	No survey	No survey	Polygon shape change in 1999; Pop C not found in 2000
		9		0	No survey	0	0	No survey	No survey	
		10		265	850	176	324	No survey	No survey	
		11		15	211	87	78	No survey	No survey	threatened by <i>Carpobrotus</i>
		12		20	35	47	47	No survey	No survey	
		13		--	11	11	0	No survey	No survey	
		14		--	51	4	0	No survey	No survey	
		15		--	48	5	5	No survey	No survey	
		16		--	1019	296	572	No survey	No survey	Additional polygon added in 2001
		17		--	5	0	2	No survey	No survey	
		18		--	885	265	149	No survey	No survey	
		19		--	18	134	128	No survey	No survey	
		20		--	101	10	7	No survey	No survey	
		21		--	Surveyed; not censused	27	34	No survey	No survey	
		22		--	20	*0	0	No survey	No survey	*Surveyed too late in season
		23		--	11	0	4	No survey	No survey	
		24		--	Surveyed; not censused	7	0	No survey	No survey	
		25		--	--	1	0	No survey	No survey	
		26		--	--	4	Population not found	No survey	No survey	
		27		--	--	9	34	No survey	No survey	

Location	Species	Pop. Num.	NDDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
		28		--	--	1	9	No survey	No survey	
		29		--	--	72	101	No survey	No survey	
		30		--	--	--	5	No survey	No survey	
		31		--	--	--	15	No survey	No survey	
		32		--	--	--	--	--	25	
		33		--	--	--	--	--	85	
		34		--	--	--	--	--	12	
		35		--	--	--	--	--	67	
		36		--	--	--	--	--	12	
		37		--	--	--	--	--	7	
Milagra	<i>Arabis blepharophylla</i>	1		*1,334	876	34	294	No survey	No survey	*total of counts in patches 1&2
		2		--	*61	17	101	No survey	No survey	*total of counts in patches 3, 4, 5
		3		15	6	40	289	No survey	No survey	
		4		--	--	10	*28	No survey	No survey	*planted 38 individuals not included in count
		5		--	--	76	345	No survey	No survey	
		6		--	--	Population not found	Population not found, location is uncertain; late survey	No survey	No survey	
		7		--	--	*	65	No survey	No survey	*combined totals for pops 5 & 7 into 5 since two populations merged in 2001
		8		--	--	--	225	No survey	No survey	
		9		--	--	--	40	No survey	No survey	
Pedro Point	<i>Arabis blepharophylla</i>	1		--	--	--	--	--	approx 27	
SFWD	<i>Arabis blepharophylla</i>	1		surveyed; not censused	234	130	779	No survey	No survey	
		2		--	Population not found, mapped incorrectly	204	186	No survey	No survey	
		3		--	--	>2000	718	No survey	No survey	
Sweeney	<i>Arabis blepharophylla</i>	1		176	158	27	535	No survey	No survey	
MVAFB	<i>Arctostaphylos hookeri</i> ssp. <i>montana</i>	1		925	973	820	596	established photopoints	No survey	

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
		2		--	--	306	624	established photopoints	No survey	
		3		--	--	--	--	79	No survey	
SFWD	<i>Arctostaphylos montaraensis</i>	1	6	--	Surveyed; not censused	Surveyed; not censused	Surveyed; not censused	No survey	No survey	Last census conducted by T. Corelli in 1991; plants have same disturbance threats as in previous years
		2	6	--	Surveyed; not censused	Surveyed; not censused	Surveyed; not censused	No survey	No survey	
Bolinas Ridge	<i>Arctostaphylos virgata</i>	1	16	--	Surveyed; not censused	Surveyed; not censused	No survey	No survey	No survey	
MVAFB	<i>Calamagrostis ophitidis</i>	1	--	--	--	--	--	Surveyed; not censused	No survey	
		2	--	--	--	--	--	Surveyed; not censused	No survey	
MVAFB	<i>Calochortus umbellatus</i>	1		102	1162	1851	1177	1276	No survey	
		2		197	251	998	720	369	No survey	
		3		--	--	--	117	758	No survey	
Muir Woods (Four Corners)	<i>Calochortus umbellatus</i>	1		--	--	--	--	--	approx. 470	
Nicasio-on private land	<i>Calochortus umbellatus</i>	1		710	826	1151	349	No survey	No survey	Larger area sampled in 1999 and 2000 than 1998. Population entirely on private land; no further surveys to be conducted
SFWD	<i>Calochortus umbellatus</i>	1		--	--	*Surveyed; not censused	0	No survey	No survey	*too late in season
Nicasio	<i>Castilleja affinis</i> ssp. <i>neglecta</i>	1		--	--	--	--	--	4	
Nicasio-on private land		1a*	8	100	41	84	68	No survey	No survey	*Census figures from portion of population on private land; no further surveys to be conducted
Martinelli/Giacomini	<i>Castilleja ambigua</i> ssp. <i>humboldtensis</i>	1		--	--	--	--	No survey	0	
		2		--	--	--	--	No survey	787	
		3		--	--	--	--	No survey	*15,000	*Census counts approximate
		4		--	--	--	--	No survey	*10	*Census counts approximate
		5		--	--	--	--	No survey	*100	*Census counts approximate

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
		6		--	--	--	--	No survey	144	
		7		--	--	--	--	No survey	*1,000	*Census counts approximate
		8		--	--	--	>1,000	No survey	*10,000	*Census counts approximate
Bolinas-Fire Rd.	<i>Ceanothus gloriosus</i> var. <i>exaltatus</i>	1		4	37	Surveyed; not censused	No survey	No survey	No survey	
Bolinas-McCrady		1a		6	4	Surveyed; not censused	No survey	No survey	No survey	
Bolinas-Bourne		2		--	--	--	--	1	No survey	
Bolinas-Fire Rd.	<i>Ceanothus masonii</i>	1	1	83	91	Surveyed; not censused	No survey	No survey	No survey	
Bolinas-McCrady		1a		*0	1	Surveyed; not censused	No survey	No survey	No survey	*all plants identified as CEGLEX
Bolinas Rdge		2		--	--	--	--	Surveyed; not censused	*Surveyed; not censused	*voucher specimen collected; sent to expert for species verification
Bolinas Rdge		3		--	--	--	--	Surveyed; not censused	*Surveyed; not censused	*voucher specimen collected; sent to expert for species verification
Nicasio	<i>Ceanothus</i> sp. <i>nova</i>	1		--	Surveyed; not censused	Cover data: 61% live 39% dead	Surveyed; not censused	No survey	Surveyed; not censused	
Ft Funston	<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	1	4	1117	146	1432	3660	Surveyed; not censused	No survey	
		2	4	588	167	398	910	Surveyed; not censused	No survey	
		3	4	--	Surveyed; not censused	2149	820	Surveyed; not censused	No survey	
		4	4	2029	968	2481	750	Surveyed; not censused	No survey	
		5	4	403	75	268	470	503	225	
		6	4	--	--	218	510	605	600	
		7	4	--	approx 1500	Surveyed; not	>20,000	Surveyed; not	No survey	

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
						censused		censused		
		8	5	209	75	327	112	Surveyed; not censused	No survey	
		9	5	--	--	442	1450	Surveyed; not censused	No survey	
		10	--	--	--	655	No survey	No survey	No survey	
		11	--	--	--	--	--	5,088	1,000	
Marin Headlands	<i>Cirsium andrewsii</i>	1		*210	388	298	245	Established photopopints	No survey	*population not relocated in subsequent years. Population no. 1 in different location in subsequent years.
		2		--	95	54	22	Established photopopints	No survey	All counts for <i>C. andrewsii</i> of flowering individuals only. Number of rosettes counted recorded on data sheets.
		3		--	187	112	63	Established photopopints	No survey	
		4		--	166	40	33	Established photopopints	No survey	
		5		--	13	19	9	Established photopopints	No survey	
		6		--	37	19	22	Established photopopints	No survey	
		7		--	10	8	8	Established photopopints	No survey	
		8		--	6	9	3	Established photopopints	No survey	
		9		--	22	21	11	Established photopopints	No survey	
		10		--	*0	**no survey	**no survey	Established photopopints	No survey	*Juveniles found but no matures so no count entered; ** wrong area surveyed; 2 individuals counted in 2000 added to population 9 totals; population 10 was enhanced by outplanted seedlings in winter of 1998/1999
		11		--		64	42	Established photopopints	No survey	
		12	--	--	--	--	--	1	No survey	
		13	--	--	--	--	--	19	No survey	

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
		14	--	--	--	--	--	11	No survey	
		15	--	--	--	--	--	4	No survey	
		16	--	--	--	--	--	46	No survey	
		17		--	--	--	--	--	145	
		18		--	--	--	--	--	1	
SFWD	<i>Cirsium fontinale</i> var. <i>fontinale</i>	1	1	--	2264	1800	1809	No survey	No survey	Note that <i>C. fontinale</i> counts include both rosettes and flowering individuals
		2	2	--	942	473	539	No survey	No survey	
		4		--	65	7	No survey	No survey	No survey	
		5	5?	--	1258	1334	708	No survey	No survey	
		7	7?	--	812	430	575	No survey	No survey	
		8	8?	--	87	82	183	No survey	No survey	
Bolinas Lagoon	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	1	--	--	--	--	--	3	25	
		2		--	--	--	--	--	18	
Giacomini/Martinelli	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	1	--	--	--	--	approx. 250	No survey	1,507	
		2		--	--	--	--	--	230	
		3		--	--	--	--	--	3,010	
		4		--	--	--	--	--	2,493	
DEGU	<i>Dirca occidentalis</i>	1	28	80	*not found	approx. 50	68	No survey	No survey	* Surveys conducted too late in season to identify plant
SFWD	<i>Dirca occidentalis</i>	1			*not found	*not found	15	No survey	No survey	
		2	--	--	*not found	*not found	5	No survey	No survey	
		3	--	--	*not found	*not found	10	No survey	No survey	
Bolinas Lagoon	<i>Elymus californicus</i>	1	--	--	--	--	--	101	No survey	
		2	--	--	--	--	--	770	No survey	
		3	--	--	--	--	--	112	No survey	
		4	--	--	--	--	--	310	No survey	

Location	Species	Pop. Num.	NDDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
Oakwood Valley	<i>Elymus californicus</i>	1	--	--	--	--	--	260	No survey	
MUWO	<i>Elymus californicus</i>	all	--	approx. 1485	no survey	710	No survey	No survey	No survey	
SFWD	<i>Elymus californicus</i>	1	--	--	Surveyed; not censused	Surveyed; not censused	Surveyed; not censused	No survey	No survey	
Lagunitas Creek	<i>Elymus californicus</i>	1	--	--	--	--	206	No survey	No survey	
Cross Marin Bike	<i>Elymus californicus</i>	2	--	--	--	--	69	No survey	No survey	
MVAFB	<i>Eriogonum luteolum</i> var. <i>caninum</i>	1		17	31	33	587	Surveyed; not censused	No survey	
		2	--	--	--	--	346	Surveyed; not censused	No survey	
SFWD	<i>Eriophyllum latilobum</i>	1	1	--	443	Surveyed; not censused	189	No survey	No survey	
Ft Funston	<i>Erysimum franciscanum</i>	6			*	*	17	No survey	No survey	*Counts confused by plantings: missing 2001 d-sheets for FOFU populations
		7			*	*	5	No survey	No survey	
Marin Headlands	<i>Erysimum franciscanum</i>	1		575	112	298	No survey	No survey	No survey	Populations 1 and 3 difficult to census due to inaccessibility
		2		989	*325	498	447	No survey	No survey	*northern most patch of MAHE#2 not censused; remainder of MAHE#2 censused in April; plants may have been past peak
		3		403	117	*80	*87	No survey	No survey	*Likely undercounts due to inaccessibility
		4		56	9	13	0	No survey	No survey	
		5		29	9	2	46	No survey	No survey	
		6		--	--	6	7	No survey	No survey	
		7		--	--	*1	Population not found, location is uncertain	No survey	No survey	*possible out planting
		8		--	--	--	--	--	17	
Milagra	<i>Erysimum franciscanum</i>	1		*2222	95	156	755	No survey	No survey	*Total of pops. 1,2, 3
		2		--	15	78	740	No survey	No survey	
		3		--	10	7	9	No survey	No survey	

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
Pedro Point	<i>Erysimum franciscanum</i>	1		--	--	--	--	--	105	
SFWD	<i>Erysimum franciscanum</i>	1		--	*20	1	0	No survey	No survey	*late survey - 05/20/99
		2		--	*10	0	0	No survey	No survey	*late survey - 05/20/99
		3		--	*	*	13	No survey	No survey	*numbers entered in pop. 11; same area surveyed but assigned new map #
		4		--	--	5	36	No survey	No survey	
		5		--	--	20	88	No survey	No survey	
		6		--	--	260	246	No survey	No survey	
		7		--	--	12	24	No survey	No survey	
		8		--	--	407	241	No survey	No survey	
		9		--	--	5	16	No survey	No survey	
		10		--	--	--	2473	No survey	No survey	
		11		>200	1186	2390	1823	No survey	No survey	
		12		--	--	--	103	No survey	No survey	
		13		--	--	--	46	No survey	No survey	
Sweeney	<i>Erysimum franciscanum</i>	1		not found	*488	176	327	No survey	No survey	*missing '99 d-sheet; #s from year-end report
Olema Valley	<i>Fritillaria affinis</i> var. <i>tristulus</i>	1		--	--	--	3	No survey	1	
Nicasio	<i>Fritillaria liliacea</i>	1		--	--	--	--	No survey	*22,097	*Data collected on GGNRA land only
		1a		Surveyed; not censused	*46,109	Surveyed; not censused	*40,000	No survey	No survey	*Data collected on both private and GGNRA land
SFWD	<i>Fritillaria liliacea</i>	1	19	--	*41	919	Survey; not censused	No survey	No survey	*No d-sheet for 1999, surveyed past peak bloom; polygon size much smaller in 1999 than 2000 and 2001
		2	19	--	--	--	Surveyed; not censused	No survey	No survey	
Marin Headlands	<i>Gutierrezia californica</i>	0		676	1274	No survey	1250			Removed from Special Status Plant list in 2002
		1		*323	1157	No survey	1045			*divided total #s for pops 3 & 3a into pops 1&2; polygons assigned new numbers in 2000, 2001
		2		*323	1011	No survey	943			
		3		385	1653	No survey	1431			
Nicasio	<i>Hesperolinon congestum</i>	1		157	87	>2000	178	No survey	313	Figures from 1998-2001 include counts from pop. on private land

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
		2		56	0	Surveyed; not censused	0	No survey	*2,363	*Larger area censused than in previous years
Nicasio – on private land		3		--	*2	740	No survey	No survey	No survey	*not exactly same polygon as in 2000, 2001; too late in season for census
Nicasio – on private land		4		--	--	285	No survey	No survey	No survey	
		5		--	--	>200*	130	No survey	1,267	*ocular estimate; question on d-sheet whether this pop. was pop. 2 in 1998
		6		--	--	>200*	182	No survey	891	*ocular estimate
		7		--	--	--	160	No survey	343	
SFWD	<i>Hesperolinon congestum</i>	1		--	not found	569	910	No survey	No survey	
		2	22	--	not found	143	54	No survey	No survey	
		3		--	--	210	320	No survey	No survey	
		4		--	--	2486	160	No survey	No survey	
		5		--	--	>5000	Surveyed; not censused	No survey	No survey	
		6		--	--	17	0	No survey	No survey	
SFWD	<i>Lessingia arachnoidea</i>	1	2	--	--	Surveyed; not censused	1,500	No survey	No survey	
		2	3	--	--	Surveyed; not censused	50,000	No survey	No survey	
		3	2	--	--	Surveyed; not censused	5,000	No survey	No survey	
		4	1	--	--	Surveyed; not censused	170,000	No survey	No survey	
SFWD	<i>Linanthus ambiguus</i>	--	--	--	--	--	Surveyed; not censused	No survey	No survey	
Mori Point	<i>Linanthus rosaceus</i>	--	--	--	--	--	--	Surveyed; not censused	>500	
SFWD	<i>Lupinus arboreus</i> var. <i>eximus</i>	1	--	--	28	28	24	No survey	No survey	

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
Sweeney	<i>Malacothamnus fasciculatus</i> var. <i>arcuatus</i>	1	--		0	0	0	No survey	No survey	
SFWD	<i>Pentachaeta bellidiflora</i>	1	1		11,446,998	112,355,758	Surveyed; not censused	No survey	No survey	Population has remained high since 1982; was scheduled to be monitored every three years; 2002 was third year
Sweeney/S. Mdw	<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	1	--	0	No survey	No survey	No survey	0	No survey	
Sweeney Ridge		2	--	--	--	--	--	approx. 35	93	
MVAFB	<i>Stebbinsoseris decipiens</i>	1		--	--	*135	*782	0	0	*determined in 2003 that all or majority of individuals actually <i>Uropappus lindleyii</i>
		2		--	--	*55	*58	0	0	*determined in 2003 that all or majority of individuals actually <i>Uropappus lindleyii</i>
Stinson	<i>Stebbinsoseris decipiens</i>	1	15	*No survey	0	* No survey	0	0	0	*From description on datasheet, surveyed wrong area
MVAFB	<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	1	11	129	555	923	*Surveyed; not censused	** 2,491	No survey	*too late in season to census **larger area sampled in 2002 than previous years
		2**	10	0	No survey	1122	*Surveyed; not censused	1,668	No survey	*too late in season to census; **combined populations 2 and 3 into 2 in 2002
Nicasio	<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	1		1,088	*Surveyed; not censused	1,368	118	No survey	256	*too late in season to census Figures include counts from pop. on private land
		2		--	--	--	12	No survey	127	
		3		--	--	--	53	No survey	469	
		4		--	--	--	--	--	989	
		5		--	--	--	--	--	120	
Cliff House	<i>Tanacetum camphoratum</i>	4		--	--	--	No survey			Removed from Special Status Plant List 2002
Fort Funston	<i>Tanacetum camphoratum</i>	1		--	--	--	No survey			
		3		--	--	--	No survey			
		7		--	--	--	No survey			
		8		--	--	--	No survey			
		9		--	--	--	No survey			
		10		--	--	--	No survey			
Sutro Baths	<i>Tanacetum camphoratum</i>	1		986	Low	Low	No survey			

Location	Species	Pop. Num.	NDDB Occ. No.	1998	1999	2000	2001	2002	2003	COMMENTS
Sutro Heights	<i>Tanacetum camphoratum</i>	2		439	Low	Med	No survey			
		3		--	Med	Med	No survey			
		4		--	Sparse	Sparse	No survey			
		5		--	Sparse	Sparse	No survey			

Appendix V. Rare Plant Monitoring Protocol

Golden Gate National Recreation Area Rare Plant Monitoring Protocol (revised 2003)

Monitoring of Rare Plants

Pre-monitoring planning

Contacts. There are a number of organizations/individuals who have conducted past rare plant surveys in the GGNRA, each of whom are excellent resources for information. These contacts can give time saving information about population locations, as well as habitat preferences and historical conditions of each population. Resources include contractors, interns, volunteers and Park Service staff. For areas such as the San Francisco Water District, these contacts are often outside of NPS (see **K/common/rareplnt/contct.doc**).

Field Forms. It is essential to review all old-field forms and maps before conducting a census. The hard copies are housed in the Marin Headlands, Building 1061. They are also located in the park restoration database. Originals are not to be taken into the field; copies should be made before site visits.

Field Maps. In the rare plant folders are hardcopies of ArcView maps for each population occurrence. In addition to obtaining copies of these maps, the surveyor should have a small-scale map of the region and a list of the rare plants known to occur in that region. Having a small-scale map will enable the surveyor to record new populations or extensions of a population's range.

Field schedule. All plants need to be censused during their peak blooming times; consulting the blooming calendar for all species helps for efficient planning of field days (**J/common/arcview/data/veg/rare/plants/Flwr_cal.xls**). Climatic variability from year to year can result in earlier or later blooms than previous years. It is often necessary to make several trips to a population to conduct a census.

Permits, keys, combination locks.

Northem lands. To access Nicasio Ridge, notify the Range Conservationist (currently Mark Hamrichhausen) at Point Reyes National Seashore (415-464-5172) of the intended dates of your sites visits. He will notify the ranchers and PORE law enforcement.

To enter Mount Tamalpais State Park, a call must be made to law enforcement (415-331-3812).

Marin Headlands.

Gerbode Valley and Tennessee Valley require gate combos for access. Point Bonita requires a FP2 key to enter the land adjacent to the lighthouse. Of course, you can always walk a short ways.

Southern lands.

For Fort Funston, notify the staff (currently Asha Setty) to inform them of your presence (415) 239-2366.

Sweeney Ridge requires a SP2 key or the gate combination for access.

San Francisco Water District

For the San Francisco Water District the surveyor must contact Kathy Zalok (650-872-5934), assistant to Joe Naras, to obtain a request form for access into the Water District. The permit requires information on vehicle, permittee, supervisor, entry and exit times, etc. The request requires a minimum of one month to be approved. A liability statement must be sent to the district, releasing the water district from responsibility for any injuries incurred on this property. If approved, the permit will be sent to the main contact listed on the request form. The permit is kept on the dash of the vehicle. A Sergeant 25 and/or 63 keys must be requested at the same time as the permit. After obtaining a permit, the surveyors must let the watershed keeper, John Adza (650-652-3210), know one week before entering where NPS staff will be working. It is important to follow the specific guidelines set forth in the permit. Violations can result in a loss of access.

Equipment. A GPS unit must be reserved for use in the censusing. There are several available in the GIS office, Bldg. 1061, 1st Floor, Marin Headlands.

Survey Methods

Note: The following protocols were followed through the 2003 season. These methods may be modified in 2004.

The plants to be monitored are perennial and annual, shrubs and subshrubs, forbs, and grasses. Monitoring protocol vary for each type depending on size, growth habit, and location. Note that some populations of the same species have different monitoring protocol depending on their location. For example, *Elymus californicus* individuals are counted in Muir Woods, but only the population boundaries are mapped in the SFWD. This is because the size of the population in the SFWD is too large to count all individuals whereas the populations in Muir Woods are small enough to count all individuals.

Counting individual plants and mapping population edges or occurrences.

For these species, the population sizes are small, so each plant is recorded.

Arabis blepharophylla

In order to determine individual number of plants for *Arabis*, it is important to distinguish what constitutes an individual. This plant sends up many flowering stalks per basal rosette, so careful observation of individual basal rosettes must be made while censusing.

Acanthomintha duttonii

Arctostaphylos hookeri ssp. *montana*

Lupinus eximius

Eriophyllum latilobum

Castilleja affinis ssp. *neglecta*

Castilleja ambigua ssp. *humboldtiensis*

Calochortus umbellatus

Chorizanthe cuspidata var. *cuspidata*

Cirsium andrewsii

Both immature plants (those without flowering stalks) and mature plants are censused.

Only the number of mature plants is included in the total number of individuals censused.

Cirsium fontinale var. *fontinale*

Both immature and mature plants are included in the total number of individuals censused.

Cordylanthus maritimus ssp. *palustris*

Dirca occidentalis

Elymus californicus (Muir Woods)

Eriogonum luteolum var. *caninum*
Erysimum franciscanum
 (*Gutierrezia californica* – no longer censused after 2001)
Hesperolinon congestum
Malacothamnus fasciculatus var. *arcuatus*
Plagiobothrys chorisianus var. *chorisianus*
Stebbinsoseris decipiens
Streptanthus glandulosus ssp. *pulchellus*

Mapping population edges or separate occurrences; no individual number.

Arctostaphylos virgata
Arctostaphylos montaraensis
Ceanothus gloriosus var. *exaltatus*
Ceanothus masonii
Ceanothus species nova
Elymus californicus (Bolin Ridge/Lagoon, Lagunitas Creek, Cross Marin Bike Trail, Oakwood Valley, SFWD)
Dirca occidentalis

Sampling a sub-set of a population and mapping edges.

Fritillaria liliacea

The population count was derived from sub-sampling 10% of the total area covered by the fritillary. The total area covered by the population can be determined using ArcView. For this species, 10% of the population was sampled. To randomly choose this area to sample, a grid was created in ArcView and overlaid on a map of the population

(J/common/arcview/scripts/Makegrid.exe). After determining the number of grid cells that cover 10% of the population, the cells are assigned numbers, and random cells are chosen to sample. The UTM coordinates of one corner of the cell are recorded in order to determine its location in the field. In the field, the chosen grid cells are found with a GPS unit and sampled, and the numbers are extrapolated to the entire population.

Note: Only grids falling on GGNRA were sampled in 2003. In previous years, grids falling on both GGNRA and private land were sampled. The same grids falling on GGNRA land sampled in 1999 were resampled in 2003 rather than randomly sampling a new series of grids.

Lessingia arachnoidea

A sampling design has not yet been developed for this species. Due to the size of the population, ocular estimates of number of individuals were made in 2001. No other population estimates have been made.

Pentachaeta bellidiflora

Randomly select a starting point and direction within the largest range area and stretch a 50 meter tape in this direction. Stretch a two-meter tape perpendicular to the 50 meter tape edge. Count the number of individuals in ten, ten centimeter plots every two meters.

Site visit - Field Form Protocol

The CNPS field survey form is completed for each population and includes information on location, species biology, habitat, reporter, method of identification, contact people, and date of survey. The electronic field form is found on the GGNRA Restoration Database, blank forms are found in the Rare Plant file drawer.

Population identification.

Some of the populations that have been censused in previous years have a Natural Diversity Database (NDDDB) occurrence number that can be found on the previous year's datasheet. The occurrences are also listed on the Fish and Wildlife's NDDDB database. GGNRA owns a copy of *RareFind2*, software that enables the user to assign new NDDDB occurrence numbers for new populations of rare and endangered species. Along with the occurrence number, the populations have an identification number assigned by the GGNRA for the park database. This number is found on old datasheets, or by accessing the ArcView tables associated with the rare plant polygons. Each population has a two-part label, with a name and number. The name represents a general area, such as SFWD. New populations are assigned the name and a number that is the next in order from the last recorded occurrence in the area. General area labels, not including the Presidio, include the following: Nicasio Ridge, Devil's Gulch, Bolinas Ridge, Bolinas Lagoon, Stinson Beach, Mill Valley Air Force Base, Marin Headlands, Muir Woods, Muir Woods - FourCorners, Oakwood Valley, Fort Funston, Milagra Ridge, Sweeney Ridge, Mori Pint, Pedro Point and the SFWD.

Location.

Includes information on where the population is found, directions to the population, landowner, and quadrangle name. A hand drawn map of the population is to be drawn on the back of the field survey form, in addition to the topographic map with the population drawn in.

Note: Be very detailed in describing population locations and directions to populations. Describe trails taken and landmarks used to mark where the trail was left to travel to the population location. Measure distances whenever possible using either odometers, meter tapes or pacing. If you have found easier access routes than previously used, provide that information to future monitors.

GPS Coordinates and Files.

UTM coordinates and rover files, if collected, are recorded on the field survey forms. For new populations, it is ideal to have the UTM coordinates of the location. Data dictionaries are unnecessary and time consuming, and are not recommended for censusing. To create a polygon, the surveyor should create a rover file, which will have to be converted later into an ArcView shapefile using Trimble Path Finder software. After the files have been converted, the Base, Rover, Corrected and any associated auxiliary files must be deleted. The only file that needs to be retained is the ArcView shapefile. The process of correcting and converting files takes time, so when possible, only take UTM coordinates.

Species Biology. Total number of individuals (if applicable), population area, phenology, age class, and comparisons from previous visit.

Habitat. Description of habitat, overall site quality, aspect, slope, topographic position, light, moisture, elevation, substrate/soils, plant communities, other rare species, and visible threats or disturbance.

Photographs. Slide or digital photographs are taken of both the plant and its habitat. The originals are stored at Building 1061, Ft. Cronkhite for all species except those that occur on the Presidio. The slides are also to be scanned, and stored on the network **(K/common/RareInt/images).**

Identification. A definitive identification using an updated key such as The Jepson Manual is essential. Other good reference materials are Endangered Plants of San Mateo County by

Corelli *et al.*, Plants of the San Francisco Bay Region by Kozloff, Marin Flora by Howell, and Arctostaphylos key by Vasey and Parker.

2. **Equipment**

Gear

Survey forms and survey form key (GGNRA Restoration Database)

Clip Board

Camera and slide film

Compass

Counters

Keys (obtained from supervisor)

Maps

Past survey forms and methods (photocopied; no originals in the field. Bldg. 1061

MAHE)

Meter tapes

GPS unit (Bldg. 1061, Marin Headlands)

Appendix VI. Protocol and File Structures for Arcview files

PROTOCOL AND FILE STRUCTURES FOR TEMPLATE.DBF AND RAREFLORA.DBF: GGNRA RARE PLANT MONITORING PROJECT

The tables below contain attributes associated with the Rare Plant Survey ArcView shape files located on the GGNRA network at the following path: "q:\Home_working\Rare_03\Arcview\". Populations for each species of concern are contained in a file with the following data structure. Each year a copy of the previous years shape file and associate files are copied, renamed and repopulated with that years data.

Rare Species ArcView Shape files: ([sp_code]+[survey year].shp)

Each year, a new ArcView Shape file is created for each rare plant species known to occur in GGNRA or in the San Francisco Watershed District. The file names consist of the species code followed by the last two digits of the survey year (e.g. the shape file for *Arabis blepharophylla* in 2003 is called *arbl_03.shp*). Each of these files are located at "j:\common\arcview\data\vegrare*" in the folder for that year. Every shape file attribute table must have the following file structure. A -99 denotes no data available. This is used so that there is no confusion between no data and numeric data equaling zero.

	Field Name	Type	Width, Decimal	Description
1	POP_CODE	Character	25	Unique population code. Derived from the species code, location and population number fields. (e.g. ARBL_MAHE_05). This code is the only unique field for a population.
2	PARTS	Numeric	11	Number of polygons associated with this population. Greater than one polygon can be associated with each population.
3	CREATOR	Character	30	Person or persons who surveyed the population this year.
4	TOTAL_IND	Numeric	10	Total number of individuals for this population counted this year. -99 denotes no data available whereas 0 denotes no species observed at the site.
5	SP_CODE	Character	6	4 or 6-letter species code derived from the first two letters of the genus, species and sub specific names given in the Jepson Manual. This is used to link to <i>rareflora.dbf</i> and as well as part of the field pop_code.
6	EST_YEAR	Numeric	4	Year this population was first added to GGNRA Rare Plant Surveys
7	SURV_DATE	Character	9	Date population was surveyed this year written as mm/dd/yy; this will be -99 if no survey was attempted this year (SURV_STAT=5)
8	SURV_YEAR	Numeric	4	Survey year-assigned even if no survey was done this year.
9	POP_NUM	Numeric	2	Unique population number for a general location.
10	LOCATION	Character	10	General location name for this population
11	MAP_SOURCE	Character	10	Survey methods used to map population
12	MODIFIED	Character	100	Notes regarding changes to polygon this year
13	AREA	Numeric	18,4	Area in square meters of population
14	PERIMETER	Numeric	18,4	Perimeter, in meters, of population
15	ACRE	Numeric	18,4	Area in, acreage, of population
16	SURV_METH	Character	25	Methods used to census population this year

17	SURV_STAT	Numeric	2	Survey status for this years census: 1=Population located and counted this year. 2=Population located, but not counted this year 3=Population site located with high certainty, but no individuals were observed. 4=Population site <u>not</u> located with high certainty, no individuals observed. 5=Population not visited this year.
18	NDDDB_OCC	Numeric	5	Natural Diversity Database Occurrence number, if any.

rareflora.doc

This table contains the attributes for rare vascular plant species listed in CNPS's Inventory of Rare and Endangered Vascular Plants of California that are known to occur in Golden Gate National Recreation or the San Francisco Watershed District. Nomenclature primarily follows The Jepson Manual: Higher Plants of California (Hickman 1993).

	Field Name	Type	Width, Decimal	Description
1	CODE	Character	6	Unique 4 or 6 letter code derived from the first two letters of genus, species and sub specific names given in the Jepson Manual (Hickman 1993).
2	FAMILY	Character	18	Family
3	GENUS	Character	16	Genus
4	SPECIES	Character	25	Specific epithet
5	SP_AUTH	Character	55	species authority
6	RANK	Character	4	Ssp., var., or s.l. designation s.l. = <i>sensu lato</i> ; in the broad sense. Used when insufficient information is available to determine subspecies or variety
7	SSP	Character	20	subspecific name, if applicable
8	SSP_AUTH	Character	55	subspecific authority
9	TRINOMIAL	Character	115	full latin species name
10	COMMON	Character	50	Common name of taxon; convention dictates that these not be capitalized even when in latin
11	COM_SOURCE	Numeric	1	Source of common name: 1 = <u>The Jepson Manual</u> (Hickman 1993) 2= <u>CNPS's Inventory of Rare and Endangered Vascular Plants of California</u> (Skinner 1994)
12	FORM	Numeric	2	11 = Annual Herb 12 = Biennial Herb 13 = Perennial Herb 20 = Sub-shrub 30 = Shrub - unknown if deciduous or evergreen 31 = Deciduous Shrub 32 = Evergreen Shrub 41 = Deciduous Tree 42 = Evergreen Tree 50 = Other 99 = Unknown
13	RARITY	Numeric	1	CNPS Rarity Code: 1=Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time. 2=Distributed in a limited number of occurrences, occasionally more if each

				occurrence is small. 3=Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported.
14	ENDANGER	Numeric	1	CNPS Endangerment Code" 1=Not endangered 2=Endangered in a portion of its range 3=Endangered throughout its range
15	DISTRIB	Numeric	1	CNPS Distribution Code: 1=More or less widespread outside California 2=Rare outside of California 3=Endemic to California
16	STATE	Character	2	State-Listed Plant Codes: CE=State-listed, endangered CT=State-listed, threatened CR=State-listed, rare CC=Candidate for state listing
17	FED	Character	3	Federally-listed codes: FE=Federally-listed, endangered FT=Federally-listed, threatened PE=Federally-proposed, endangered PT=Federally-proposed, threatened C1=Enough data are on file to support federal listing. C2=Threat and/or distribution data are insufficient to support federal listing. C2*= Threat and/or distribution data are insufficient to support federal listing, but the plant is presumed extinct C3a=Extinct C3b=Taxonomically invalid C3c=Too widespread and/or not threatened
18	CNPSLIST	Character	2	Code for CNPS lists: 1A:Plants Presumed Extinct in California 1B:Plants Rare, Threatened or Endangered in California and Elsewhere 2=Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere 3=Plant About Which We Need More Information--A Review List 4=Plant of Limited Distribution--A Watch List
19	COMMENTS	Character	50	comments regarding nomenclature

Directions on how to copy and rename last year's shape files (themes) to present year's folder:

(using ArcView 3.1)

-Open any ArcView view window:

-File

-Manage Data Sources

-Copy and rename files to this years name (e.g. change ARBL_02 to ARBL_03)

-Repeat for each species file.

**You must repopulate the newly created attribute table with present years data

Directions on how to add a new population to an existing species file:

After copying and renaming files, add your newly created theme to a view

-Theme

-Start Editing

-Click on the draw polygon editor to add an polygon and .

- Stop and save edits
- remember to recalculate the area, perimeter and acre fields after adding the new polygon

To calculating a field's values

To update the area, perimeter and acre fields:

- Select the table of the shape file to which a change in polygon size or shape has been made
- Select the field to be updated by clicking on the field name at the top of the column
- Select (i.e. highlight) the records that are to be updated (you can update a single record or several at a time)
- Select "Field" "Calculate" in the drop down menu
- Type in the expression
 - [Shape].ReturnArea – calculates area of a polygon
 - [Shape].ReturnLength – calculates perimeter of a polygon
 - [Area]*0.0002471 – calculates acres

For additional information look in the Arcview Help menu under "Calculating a field's values"

Directions on how to modify an existing population:

After copying and renaming files, add your newly created theme to a view

- Theme
- Start Editing
- click on 'vertex edit' and modify polygon as needed
- Stop and Save edits
- remember to recalculate the area, perimeter and acre fields after adding the new polygon

How to convert shape files from previous years into present years format.

Merge shapes:

Before 2001, if there were greater than one polygon for a population, there was greater than one record for that population. These multiple records also contain identical information as each other. This is confusing and a potential risk for data interpretation. It is possible to place multiple polygons within a single table record. The only downside is that it is slightly more arduous to add another polygon to an existing population. It is just as simple to add a new population to a shape file. It is easiest to merge polygons before adding this years data to the tables. Once this is done, it will never have to be done again unless you add a new polygon to an existing population.

Directions on how to merge population polygons in a shape file

**You only need to do this procedure if there are multiple polygons for a population.

When you merge polygons, ArcView 3.1 will automatically create a new summary shape file. Fear not, you will not be overwriting the source shape file.

- Open the shape file you want to merge
- Open the attribute table
- If you have not already done so, you need to create a field that contains a unique code for each population.
 - Table
 - Start editing
 - Edit
 - Add field
 - Add a string (character) field called *pop_code* with 25 characters in it.
 - Populate this field with the species code, location code and the population number. It should look something like this: HECO_MAHE_01

Stop and save edits.

Click on the *pop_code* field header.

Click on the summary button

Select where and what you want to call the summary table to be saved.

Add *merge_shape* to the right box, this will merge all polygons that contain identical entries in the *pop_code* field. This is the most important field to keep. Add the remaining fields that you want to be added to your summary field.

Once you've selected all your fields and how you want them to be summarized, click on OK.

Now you have a summary field with all the wrong field names. For example, the *perimeter* field will be called *sum_perimeter* in the summary table. This means that you have to rename the field *perimeter*. In arcview 3.1 there is now simple way to do that. Instead, you have to add a new field called *perimeter* and copy the original data in there. See directions below on how to update these fields to the present file structures.

How to update shape file attribute table files structures

Unfortunately in ArcView 3.1 there is no quick way to rename file structures or change their type (numeric, string, boolean etc...). Instead you have to create a new field, copy the data from the old field into the new field and delete the old field. The end result is a table with an identical file structure to the one in the table above.

Appendix VII. Problematic Species Information

***Ceanothus masonii* McMinn**

Mason's ceanothus

Rarity Status

Federal Listing: None

State Listing: Rare

CNPS List: 1B / R-E-D Code: 3-2-3

Nomenclature

The Jepson Manual: accepted

CNPS: accepted

2003 update:

1. Status of the species *C. masonii*

A new treatment of the genus *Ceanothus* is being prepared as part of a forthcoming book, *Ceanothus*, by David Fross & Dieter Wilken, to be published by Timber Press, Portland, Ore. Dr. Wilken indicates that because of the close similarity between *C. masonii* and *C. gloriosus* var. *exaltatus*, *C. masonii* should be included within *C. gloriosus* (also a special status species occurring within the GGNRA) rather than considered a separate species. Note that this treatment has not yet been finalized and published and therefore this update is presented here for guidance only; it should be treated with caution. Dr. Wilken's treatment notes that populations conforming to the description of *C. masonii* are of special conservation concern due to their restricted distribution. His description indicates that these populations mostly have leaves 7-21mm long (a slightly different set of measurements from the *C. masonii* description above, which is taken from the Jepson manual).

It is not clear what impact this new treatment, when published, might have on the recognition of *C. masonii* by other botanists and organizations. *C. masonii* has been recognized as a separate species for many years. Note that even if included within *C. gloriosus*, the plants may merit special status.

Populations currently documented as *C. masonii* should continue to be managed as special status plants unless the CNPS ceases to recognize them.

2. Status of populations within the GGNRA

Two new areas containing plants that resembled *C. masonii* (CEMA_Bolinas_02, CEMA_Bolinas_03) were investigated during late summer 2002 and tentatively added to the inventory of rare plant populations. In spring 2003 the populations were revisited and samples taken from plants in bloom. The flower color in both populations was medium purple to pale purple, becoming lighter in color as flowers aged. Leaf morphology was very variable but appeared in at least some plants to be consistent with specimens labeled as *C. masonii* in the California Academy of Sciences herbarium. Plants from the area of Pop. 2 have previously been considered specimens of *C. masonii* by Dr. Tom Parker at SFSU and by Dr. Mike Hardig at the University of Montevallo, Al. (Dr. Hardig has researched *Ceanothus* taxonomy).

Specimens from these populations were sent to Dr. Cliff Schmidt, the author of the *Ceanothus* treatment in the Jepson Manual, who said that they did not seem to fit any one taxon. *Ceanothus* taxa hybridize easily and Dr. Schmidt suggested that the plants may be hybrids

between different local species. In December 2003, the specimens were sent to Dr. Wilken for further evaluation.

Management recommendations

No changes in management approach should be undertaken until the status of the species and populations becomes clearer. Populations currently confirmed as *C. masonii* should continued to be monitored every three years. Management of the new potential populations depends on the response of Dr. Wilken; if he determines that the plants belong to a special-status taxon, they should be monitored in the same way as other *Ceanothus* populations. If he determines they do not merit special status, they can be removed from the inventory. Until the status of these plants is determined, the populations should be checked every three years to verify their continued presence but there is no need for full monitoring.

***Grindelia hirsutula* H. & A. var. *maritima* (Greene) M.A. Lane**

San Francisco Gumplant

Rarity Status

Federal Listing: None

State Listing: None

CNPS List: 1B / R-E-D Code: 2-2-3

Nomenclature

The Jepson Manual: Accepted

CNPS: Accepted

Discussion

Summary: This variety may occur on coastal bluffs in the Marin Headlands, but the plants are in general so variable that it is very difficult to identify them with confidence. In addition the taxonomy of the genus *Grindelia* is widely seen as problematic: the descriptions, names and overall number of species have changed repeatedly. Locations of plants more or less conforming to the description of var. *maritima* were noted and some specimens taken. Marin CNPS' Doreen Smith agreed to attempt identification. No further work should be done on this plant unless the specimens are identified as var. *maritima* by at least two competent people.

Details: *Grindelia hirsutula* var. *maritima* is a plant of coastal bluffs. Within the GGNRA, occurrences are documented at the Presidio.

The Jepson manual description, by Meredith A. Lane, describes the variety as more or less glabrous, often leaning, with red-brown to purple stems and with heads more or less subtended by phyllary-like bracts. The phyllaries are erect to spreading and the ray flowers are short, 11-15mm in length.

Other members of the genus that occur on or near coastal bluffs include *G. stricta* var. *platyphylla* and the common *G. hirsutula* var. *hirsutula*. It was suggested by Lane that *Grindelia* frequently hybridize and that the rare var. *maritima* may have arisen as a hybrid of these two taxa.

G. hirsutula var. *maritima* can be distinguished from *G. stricta platyphylla* by leaf shape. The Jepson key distinguishes *G. hirsutula* var. *maritima* from *G. hirsutula* var. *hirsutula* by fruit morphology. However Marin specimens of both varieties in the California Academy of Sciences herbarium were examined in 2002, and no consistent distinguishing characteristics in the fruits could be observed in the time available.

The key in the forthcoming revision of the Marin Flora, written by Doreen Smith of Marin CNPS, distinguishes the two varieties by the phyllaries: in var. *hirsutula* the phyllaries have small hairs (i.e. are hirsutulous); in var. *maritima* they are glabrous. The two varieties also generally differ in stem and leaf morphology: var. *hirsutula* is hairy overall and var. *maritima* in Marin is more or less glabrous except for hairy leaf edges. Smith notes however that that plants are variable and that identification poses problems. A copy of this key and other documentation related to the variety was left with the rare plant documentation for *Grindelia* at Ft. Cronkhite Bldg. 1061.

Specimens from Marin, labeled as such by M.A. Lane, can be found in the CalAcademy herbarium. Only one specimen was found at the CalAcademy herbarium that had been collected in the Marin Headlands; it was taken from between Tennessee Cove and Pirate's Cove.

In 2002 field inventory surveys, plants that more or less conformed to var. *maritima* were found on coastal bluffs and hills in several locations in the Headlands. The plants that conformed most closely to the Jepson description of overall plant morphology were found on the north-facing slopes of Wolf Ridge above Tennessee Valley. Other plants were found along coastal bluffs between Muir Beach and Pirate's Cove; on hills north of Muir Beach; along the Middle Green Gulch Trail and east on north-facing slopes of Coyote Ridge. These plants were found in survey areas GOGA001, 012, 014, 018, 019, 025 (see the

inventory survey part of this report); the plants may be considered locally common on bluffs. In other areas searched, such as Rodeo Valley, the Conzleman Road/Hawk Hill area, and Sweeney Ridge, only plants that better fitted *G. hirsutula* var. *hirsutula* were found. Specimens were collected from several locations and pressed.

An unsuccessful attempt was made to contact the Jepson Manual author M.A. Lane for assistance with identification. It was not possible to locate another *Grindelia* specialist. John L. Strother, Research Botanist: Compositae at the Jepson Herbarium was also contacted; he expressed a willingness to compare specimens with those in the Jepson Herbarium, but some doubts about the likelihood of making a firm identification. The pressed specimens were given to Doreen Smith, who plans to compare them with specimens at the CalAcademy. The plants had not been examined by her by the time this report was prepared.

Management recommendations

No management action or further searches should be undertaken unless the specimens are positively identified as *G. hirsutula* var. *maritima*. If Doreen Smith feels that the plants belong to this taxon, another attempt could be made to find a specialist in this genus, or the specimens could be taken to John L. Strother at the Jepson Herbarium for comparison with different herbarium material. If both people concur that the specimens are indeed *G. hirsutula* var. *maritima*, populations might be mapped and fully documented at some point in the future.

Appendix VIII: Photo Credits

Cover page,

- p.7 *Acanthomintha duttonii*, John Game
- p.11 *Arabis blepharophylla*, Robert Potts, California Academy of Sciences
- p.19 *Arctostaphylos hookeri* ssp. *montana*, Gladys Lucille Smith, Cal. Academy of Sci.
- p.31 *Calamagrostis ophitidis*, Dean Wm. Taylor
- p.35 *Calochortus umbellatus*, Charles Webber, California Academy of Sciences
- p.39 *Castilleja affinis* ssp. *neglecta*, Dr. Robert Thomas and Margaret Orr, Cal Academy
- p.45 *Castilleja ambigua* ssp. *humboldtiensis*, Brother Alfred Brousseau, St. Mary's College
- p.49 *Ceanothus gloriosus* J. Howell var. *exaltatus* Charles Webber, California Academy of Sci.
- p.57 *Ceanothus* sp. Nova (undescribed), Brent Johnson, Contractor, GGNPA 2001
- p.61 *Chorizanthe cuspidata* var. *cuspidata*, John Game
- p.65 *Cirsium andrewsii*, Brother Alfred Brousseau, St. Mary's College
- p.69 *Cirsium fontinale* var. *fontinale*, J. E.(Jed) and Bonnie McClellan, Cal. Academy
- p.73 *Cordylanthus maritimus* Benth. ssp. *palustris* (Behr) Chuang & Heckard
- p.77 *Dirca occidentalis* flowers, Brother Alfred Brousseau, St. Mary's College
- p.78 *Dirca occidentalis* with fruits, Gladys Lucille Smith, California Academy of Sciences
- p.83 *Elymus californicus*, Doreen Smith
- p.91 *Eriogonum luteolum* E. Greene var. *caninum*, Bart and Susan Eisenberg
- p.92 *Eriogonum luteolum* E. Greene var. *luteolum*, Brother Alfred Brousseau, St. Mary's College
- p.95 *Eriophyllum latilobum*, Dean Wm. Taylor
- p.99 *Erysimum franciscanum*, Brent Johnson
- p.111 *Fritillaria affinis* var. *tristulis*, John Game
- p.115 *Fritillaria liliacea*, Brent Johnson, Contractor, GGNPA 2001
- p.125 *Lessingia arachnoidea*, Brent Johnson, Contractor, GGNPA 2001
- p.124 *Lessingia arachnoidea* and *Centaurea solstitialis*, Brent Johnson
- p.129 *Linanthus ambiguus*, Gladys Lucille Smith, Cal. Academy of Sciences
- p.135 *Lupinus arboreus* var. *eximus*, Dean Wm. Taylor
- p.139 *Malacothamnus fasciculatus* var. *arcuatus*, Sheri Lubin
- p.143 *Pentachaeta bellidiflora*, John Game
- p.147 *Plagiobothrys chorisianus* var. *chorisianus*, Dean Wm. Taylor
- p.155 *Uropappus lindleyii*, (formerly identified as *Stebbinoseris decipiens*), Brent Johnson, GGNPA 2001
- p.155 *Uropappus lindleyii*, Beatrice F. Howitt, California Academy of Sciences, 1999
- p.155 *Uropappus lindleyii*, Charles Webber, California Academy of Sciences, 1998

Appendix IX: Sources

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