

***Phenological monitoring guide:  
Golden Gate National Recreation Area  
(GOGA)***

A designated monitoring site of  
The California Phenology Project (CPP)



*CPP focal species Diplacus aurantiacus at Golden Gate NRA monitoring sites*

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# I. INTRODUCTION

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With funding from the National Park Service (NPS) Climate Change Response Program, the **California Phenology Project (CPP)** was launched in 2010 as a pilot project to develop and test protocols, as well as to create tools and infrastructure to support long-term phenological monitoring and public education activities in California's national parks. The CPP was established as a partnership among 19 California NPS units, two Research Learning Centers (RLCs), 5 Inventory & Monitoring (I&M) Networks, the Californian Cooperative Ecosystem Studies Unit (CESU), the University of California-Santa Barbara, and the USA National Phenology Network (USA-NPN). On-the-ground pilot activities have focused on seven parks: Joshua Tree National Park (JOTR), Santa Monica Mountains National Recreation Area (SAMO), Golden Gate National Recreation Area (GOGA), John Muir National Historic Site (JOMU), Lassen Volcanic National Park (LAVO), Sequoia and Kings Canyon National Parks (SEKI), and Redwood National Park (REDW). Along with these seven parks, other project products and infrastructures are being designed to support monitoring and educational activities in other protected areas in California and across the nation.

The primary goals of the [California Phenology Project](#) are to recruit and to train California residents in the skills needed for recording and interpreting phenological data and to advance the scientific understanding of the effects of climate change on biodiversity and natural resources. The CPP uses a train-the-trainer approach to maximize the rate of participant recruitment, including citizen scientists, national park visitors, university students, science educators and their students, pre-service teachers, volunteer and non-profit groups, as well as under-served students and families who may not traditionally engage with nature in a way that contributes to their appreciation of its value and scientific importance.

Over the short-term, phenological monitoring in the parks will establish baseline phenological patterns, while continued monitoring will allow researchers and land managers to track long-term trends, document the effects of climate change on wild plants and animals, and guide adaptive management of California's natural resources. Long-term monitoring data will provide park resource managers specific information about the biological effects of a changing climate. This information will also help to address essential science and management questions, such as whether earlier bloom time creates susceptibility to frost damage or how prescribed burns can be timed to benefit ground-nesting birds.

To learn more about the California Phenology Project, visit the CPP website ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)), where you can download recent *Newsletters* and *Project Briefs* (<http://www.usanpn.org/cpp/resources>).

This monitoring guide is meant to serve as a reference for CPP participants who are observing plants at Golden Gate NRA (GOGA). It introduces the resources that observers will need to get started at GOGA (e.g., where the monitoring sites are located, how to access USA-National Phenology network (NPN) datasheets, where to download CPP species profiles), but the guide is not meant to replace an official training nor to provide detailed background information about phenology and the USA-NPN phenological monitoring protocols. To learn more about phenology, visit the USA-NPN website ([www.usanpn.org](http://www.usanpn.org)). To learn more about the USA-NPN monitoring protocols visit the “How to Observe” page on the USA-NPN website (<http://www.usanpn.org/how-observe>).

## II. POINTS OF CONTACT

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For volunteer opportunities regarding phenology research, including data collection or individual projects, please visit <http://www.volunteer.gov/gov/results.cfm?ID=12477> and fill out the volunteer application available at the end of that web page.

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### III. SUMMARY OF MONITORING PROGRAM

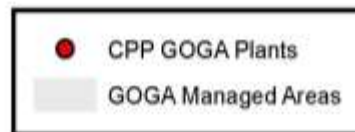
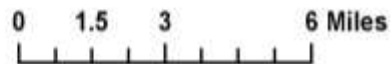
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The CPP pilot project was implemented at GOGA in the summer of 2011 where three monitoring locations and plants were chosen in the park. Of the 30 target plant species chosen by the CPP, 5 species were selected for monitoring in GOGA. The target species for this park are: coyotebrush (*Baccharis pilularis*), California live oak (*Quercus agrifolia*), California Poppy (*Eschscholzia californica*), Sticky monkeyflower (*Diplacus aurantiacus*), and common cowparsnip (*Heracleum maximum*). These species were selected based on their abundance and distribution throughout the Golden Gate NRA and their easy accessibility to monitoring, especially to members of the public. For a detailed summary of the entire CPP species selection process, visit the CPP resources page at (<http://www.usanpn.org/cpp/resources>).

Of the many trails and locations within the Golden Gate NRA, three locations were selected to be GOGA's phenological monitoring sites - Marin Headlands, Presidio, and Mori Point. These locations were selected based on the abundance and diversity of native vegetation (especially the 5 target species) and accessibility to audience groups that we could engage in the project. At each of the three locations, one monitoring trail (0.5 – 1 mile in length) was established. Each monitoring trail was divided into sites where each site contains multiple target plant species. For instance, monitoring at the Marin Headlands, the Old Bunker Road trail has been divided into 6 sites, and each site has approximately 5 plants that are being monitored. Each monitoring location (or trail) in GOGA has on average 30 plants.

For each of the three monitoring locations, the goal is to engage local residents in becoming citizen scientists as part of the CPP. The target groups include local schools, youth programs, parents, and members of the general public. The park has built relationships with each of these groups through park programs (i.e. Nursery, Park Stewardship, Presidio Park Stewards). For instance, at the Marin Headlands, the target participants may be volunteers at the Marin Headlands Nursery, and at Mori Point the target participants may be students from Oceana High School. These groups and other individuals who have a relationship with the Golden Gate NRA and wish to become more involved with the park would be the target participants for observing phenology as part of the CPP-GOGA.

# CPP GOGA Monitoring Locations





## IV. GOGA TARGET PLANT SPECIES PROFILES

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There are currently 5 species targeted for monitoring at Golden Gate NRA: *Baccharis pilularis*, *Quercus agrifolia*, *Diplacus aurantiacus*, *Eschscholzia californica*, and *Heracleum maximum*.

Two-sided CPP species profile cards for each species are available for download from the CPP website (front and back images are also included below):

<http://www.usanpn.org/cpp/AllSpecies>. The species profiles include a brief description of each species, as well as photos for most phenophases. Please note that some profiles are missing photos of observed phenophases - we encourage CPP participants to continue collecting photos and updating the species profiles.

Table 1. Monitored species information

<b>Common name (<i>Latin name</i>)</b>	<b>Taxonomic Family</b>	<b>CPP (Nature's Notebook) Category</b>
Coyotebrush ( <i>Baccharis pilularis</i> )	Asteraceae	Trees and Shrubs
California Live Oak ( <i>Quercus agrifolia</i> )	Fagaceae	Trees and Shrubs
Sticky Monkeyflower ( <i>Diplacus aurantiacus</i> )	Scrophulariaceae	Trees and Shrubs
California Poppy ( <i>Eschscholzia californica</i> )	Papaveraceae	Forbs
Common Cowparsnip ( <i>Heracleum maximum</i> )	Apiaceae	Forbs



*Trees and Shrubs-broadleaf evergreen (with pollen, no leaf buds)*

**1. Coyotebrush (*Baccharis pilularis*)**

- CPP four letter code – **BAPI**
- Download the USA-NPN datasheet and the CPP profile for BAPI here: <http://www.usanpn.org/cpp/BAPI>
- **Coyotebrush** is a perennial shrub in the Aster family that is widespread and common in coastal California vegetation types. It flowers from July through October, so it is a nice choice for CPP participants who want to monitor at that time of the year. Coyotebrush is dioecious where each individual plant has flowers with either all male or female parts; and BAPI observations might be used to explore how dioecious species respond to climate change. It is also considered an important "nursery" plant to species palatable to deer (e.g., allows oaks to grow above the browse line when oaks "hide" in coyote brush). Coyotebrush is widespread on California’s public lands and is currently monitored at Redwood National Park, Golden Gate NRA, and Santa Monica Mountains NRA.
- Table 2. Number of coyotebrush being monitored (per location and site)

MARIN HEADLANDS		PRESIDIO		MORI POINT	
OLBU 1	3	LDML 1	3	MORI 1	4
OLBU 2	3	LDML 2	4	MORI 2	3
OLBU 3	3	LDML 3	4	MORI 3	3
OLBU 4	3	LDML 4	3	MORI 4	0
OLBU 5	3	LDML 5	future site	MORI 5	2
OLBU 6	3	LDML 6	decommissioned	MORI 6	3
		LDML 7	0		
		LDML 8	1		
		LDML 9	3		
<b>TOTALS</b>	18		18		15
<b>GRAND</b>	51				

California Phenology Project:  
species profile for  
Coyotebrush  
(*Baccharis pilularis*)



CPP site(s) where this species is monitored: Golden Gate National Recreation Area, Redwood National Park, Santa Monica Mountains National Recreation Area



Photo credit: stonebird (Flickr)

**What does this species look like?**

This shrub can be up to three meters tall. The leaves are toothed, oval, and sticky. Coyotebrush is dioecious, meaning that each plant either produces flowers with only male parts or with only female parts. The male flowers produce yellow pollen and appear yellowish from a distance, and the female flowers produce fruit and are white. The flower heads appear round and disc-like.

When monitoring this species, use the USA-NPN **broadleaf evergreen (with pollen, no leaf buds) trees and shrubs** datasheet.

**Species facts!**

- The CPP four letter code for this species is **BAPI**.
- BAPI is a member of the sunflower family (Asteraceae).
- This species arrives as a secondary pioneer species after fire or grazing.
- *Baccharis* derives from the Greek word "bakkaris", referring to plants with fragrant roots, and *pilularis* refers to sticky globs on the flower buds.
- Native Americans used the heated leaves to reduce swelling, and the wood to make arrow shafts and houses.
- This species is an important nectar source for wasps, flies, and butterflies.



Insect gall  
(note: do not confuse galls for flower buds on this species!)

Photo credit: Jess Gambel




Photo credit: Jerry Kirkhart (Flickr)

**Where is this species found?**


- Found in many habitats including coastal bluffs and oak woodlands.
- Found from 0 to 750 meters elevation, but occasionally up to 1500 meters.
- This species is occasionally found on serpentine soil.

For more information about phenology and the California Phenology Project (CPP), please visit the CPP website ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)) and the USA-NPN website ([www.usanpn.org](http://www.usanpn.org))

## California Phenology Project: species profile for Coyotebrush (*Baccharis pilularis*)



USA npn  
National Phenology Network



UCSB



NATIONAL  
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SERVICE

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Brian Haggerty

**Young leaves**  
Young leaves are generally thinner and lighter colored than mature leaves.



Crystal Anderson

The flowers pictured to the left have only male parts (anthers) and will not produce fruit.



Crystal Anderson

The flowers pictured to the right have only female parts and will produce fruit. Each flower may produce a single seed.



Miguel Viera

**Flowers or flower buds**  
When monitoring flower and flower bud abundance for this species, count each inflorescence as a single flowering structure! For example, if there are two inflorescences with many flowers or buds each, then abundance should be recorded as <3.



Steven Krause

BAPI flower buds; Do not mistake for a gall (pictured on the front)



Steven Krause

**Open flowers**  
Can you see the anthers or stigma? Proportion of open flowers should be recorded at the scale of individual flowers, not inflorescences (i.e. count individual flowers)!

**Note:** USA-NPN flower phenophases are nested; if you record Y for "open flowers" you should also record Y for "flowers or flower buds"



Crystal Anderson

**Fruits**  
The fruit is a tiny, one-seeded capsule tipped with a tuft of white hairs. Fruits are grouped in a seed head and change from yellow-green to tan or light brown as they ripen. When fully dry, the fruits are blown from the plant.



Steven Krause

**Ripe fruits**  
The fruit is considered ripe when it is tan or light brown.  
**Note:** fruit phenophases are nested; if you record Y for "ripe fruits" you should also record Y to "fruits"

**Phenophases not pictured: Pollen release, Recent fruit or seed drop**

Version 3, April 2012

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DRAFT Golden Gate NRA Monitoring Guide – August 2012



## *Trees and Shrubs-broadleaf evergreen (with pollen)*

### **2. California Live Oak (*Quercus agrifolia*)**

- CPP four letter code – **QUAG**
- Download the USA-NPN datasheet and the CPP profile for QUAG here:  
<http://www.usanpn.org/cpp/QUAG>
- **California Live Oak** is a perennial species in the Beech family and is a dominant tree in the lower-elevation mixed evergreen woodlands of California. It blooms from March through May and the flowers are monoecious, meaning both male and female flowers occur on the same tree. This species is easy to identify and has potential for exploring interactions with co-evolved insects (e.g., moths and caterpillars). It is a species of management concern for a variety of reasons, including the spread of sudden oak death (SOD), predicted range shifts (e.g., models predict range expansion in some coastal National Park units, such as Point Reyes), and its importance to wildlife (e.g., coast live oak communities support many bird species, including two federally endangered species, [Bell's vireo and least tern]). This oak is currently monitored at Golden Gate NRA, Santa Monica Mountains NRA, and John Muir NHS.
- Table 3. Number of oaks being monitored (per location and site)

<b>MARIN HEADLANDS</b>		<b>PRESIDIO</b>		<b>MORI POINT</b>	
OLBU 1	0	LDML 1	0	MORI 1	0
OLBU 2	0	LDML 2	1	MORI 2	0
OLBU 3	0	LDML 3	0	MORI 3	0
OLBU 4	0	LDML 4	1	MORI 4	0
OLBU 5	0	LDML 5	future site	MORI 5	0
OLBU 6	0	LDML 6	decommissioned	MORI 6	0
		LDML 7	2		
		LDML 8	2		
		LDML 9	2		
<b>TOTALS</b>	0		8		0
<b>GRAND</b>	8				

California Phenology Project:  
species profile for  
California Live Oak  
(*Quercus agrifolia*)



**CPP site(s) where this species is monitored:** Golden Gate National Recreation Area, Santa Monica Mountains National Recreation Area



Photo credit: randomtruth (Flickr)

**What does this species look like?**

This large evergreen tree has a dark grey, stout, short trunk and wide spreading branches. The leathery leaves are shiny on the upper surface and dull on the lower surface, which is covered with fuzzy hairs. The leaf margins are spiny and holly-like. The individuals are monoecious; each tree bears both male and female flowers but the male flowers produce only anthers and the female flowers produce only pistils. The yellow-green male flowers are clustered in elongated, drooping catkins that are 4-10 cm long, and the female flowers are clustered in reddish green spikes.

When monitoring this species, use the USA-NPN **broadleaf evergreen (with pollen) trees and shrubs datasheet**.

**Species facts!**

- The CPP four letter code for this species is **QUAG**.
- This oak is very fire resistant. Adaptations to fire include evergreen leaves, thick bark, and the ability to sprout post-fire from the roots, trunk, and upper crown.
- Individuals can live up to 250 years.
- Susceptible to Sudden Oak Death disease.
- Wind pollinated.
- Each acorn takes a full year to develop from a pollinated flower.



Photo credit: randomtruth (Flickr)



Photo credit: Jerry Kirkhart (Flickr)

**Where is this species found?**

- In valleys, slopes, mixed-evergreen forest, and woodlands at elevations less than 1500 meters.
- Endemic to California; found in North Coast Ranges, Central Western California, and SW California.
- Occurs on soils ranging from silts and clays to weathered granite.

For more information about phenology and the California Phenology Project (CPP), please visit the CPP website ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)) and the USA-NPN website ([www.usanpn.org](http://www.usanpn.org))

California Phenology Project:  
species profile for  
California Live Oak  
(*Quercus agrifolia*)



**Breaking leaf buds**

This phenophase can be difficult for this species; remember, you can circle ? if you are unsure of what you are seeing!



**Young leaves**

Young leaves are generally thinner and lighter colored than mature leaves.

Crystal Anderson



**Flowers or flower buds**

The male inflorescence is a catkin, which is initially compact and stiff, but eventually unfolds, lengthens, and hangs loosely from the branch. Female flowers are very small and petal-less, emerging from the growing stem



**Open flowers**

The male flowers will open once the compact catkin has unfolded and is hanging loosely. Female flowers are open when the pistils are visible, but will be very difficult to see where they are out of reach.

Bri Weldon

When monitoring **flower or flower bud abundance** for this species, count each inflorescence as a single flowering structure!

at the point where a new leaf is attached.

When monitoring the **proportion of open flowers**, estimate the number of individual flowers that are open, not inflorescences! For big trees, estimate proportions of open flowers for a few branches and extrapolate for the rest of the tree.



**Fruits**

The fruit is an acorn that changes from green to light brown.



**Ripe fruits**

The fruit is ripe when it is light brown and drops from the plant. **Since fruits (acorns) drop from the plant when ripe, do not observe the Ripe Fruits phenophase for this species. (Leave this line on the datasheet blank.)**

Ralph Waycott

Ralph Waycott

**Important Note:** NPN flower and fruit phenophases are nested. If you say "Y" to "open flowers" you should also have said "Y" to "flowers or flower buds" and if you say "Y" to "ripe fruits" you should also have said "Y" to "fruits"

Instead of recording ripe fruits, observe **Recent fruit or seed drop** (as pictured above).

Phenophase not pictured: **Pollen release**



## Trees and Shrubs – semi deciduous

### 3. Sticky Monkeyflower (*Diplacus aurantiacus*)

- CPP four letter code – **MIAU\***

*\*Species formerly named Mimulus aurantiacus. Accordingly, the four letter code for the species is MIAU.*

- Download the USA-NPN datasheet and the CPP profile for MIAU here: <http://www.usanpn.org/cpp/MIAU>
- **Sticky Monkeyflower** is a perennial shrub species in the Figwort family that blooms from March through August. It can be found in coastal scrub, oak woodland, and chaparral habitats in the states of California and Oregon. Because of its long blooming season, the Sticky monkeyflower is a good source of nectar for hummingbirds and insects. This species is only being monitored at Golden Gate NRA.
- Table 4. Number of monkeyflower being monitored (per location and site)

MARIN HEADLANDS		PRESIDIO		MORI POINT	
OLBU 1	0	LDML 1	0	MORI 1	0
OLBU 2	3	LDML 2	3	MORI 2	0
OLBU 3	2	LDML 3	2	MORI 3	0
OLBU 4	2	LDML 4	2	MORI 4	0
OLBU 5	0	LDML 5	future site	MORI 5	3
OLBU 6	4	LDML 6	0	MORI 6	3
		LDML 7	0		
		LDML 8	2		
		LDML 9	1		
<b>TOTALS</b>	11		10		6
<b>GRAND</b>	27				



California Phenology Project:  
species profile for  
**Sticky Monkeyflower**  
(*Diplacus aurantiacus*)



CPP site(s) where this species is monitored: Golden Gate National Recreation Area



Photo credit: Maggie Smith (Flickr)

**What does this species look like?**

This perennial plant occurs as either a shrub or a subshrub and can grow up to 1.5 meters tall. The foliage can be hairy or glabrous. The leaves are deep green and linear, with edges (margins) that roll under and are generally sticky. Flower color can range from white to yellow, orange, or red. Flowers are tubular with five broad lobes.

When monitoring this species, use the USA-NPN **semi-deciduous trees and shrubs** datasheet.

**Species facts!**

- The CPP four letter code for this species is **MIAU** (this species was formerly named *Mimulus aurantiacus*).
- Host plant for the larvae of the Common Checkerspot butterfly.
- Pollinated by both bees and hummingbirds.
- The flowers and roots were used medicinally by Native Americans to heal scrapes and burns.



Photo credit: Brian Hoggerty



Photo credit: Jerry Kirkhart (Flickr)


**Where is this species found?**

- Occurs on rocky hillsides, cliffs, canyon slopes, disturbed areas, borders of chaparral and within open forest.
- Found at elevations less than 1600 meters.
- Can tolerate serpentine soil.


For more information about phenology and the California Phenology Project (CPP), please visit the CPP website ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)) and the USA-NPN website ([www.usanpn.org](http://www.usanpn.org))

*Diplacus aurantiacus* species profile (Version 2; March 2012):

**California Phenology Project:  
species profile for  
Sticky Monkeyflower  
(*Diplacus aurantiacus*)**




**UCSB**




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**Young Leaves**




Bri Weldon

**Leaves**




Brian Haggerty

**Flowers or flower buds**  
Flowers of this species appear singly; count individual flowers when measuring abundance.




Jason Hollinger

**Open flowers**  
These flowers have both male and female parts. Can you see the anthers and stigma?  
**Note:** flower phenophases are nested; if you record Y for "open flowers" you should also record Y for "flowers or flower buds"



Brian Haggerty

**Fruits**  
The fruit is a capsule that changes from green to tan or brown; it then splits open to expose the seeds. Do not include empty capsules that have already dropped all of their seeds.



Bri Weldon

**Ripe fruits**  
A fruit is ripe when it has turned tan or brown and has split open to expose the seeds. Do not include empty capsules that have dropped all of their seeds.  
**Note:** USA-NPN fruit phenophases are nested; if you record Y for "ripe fruits" you should also record Y for "fruits".

Phenophases not pictured: **Recent fruit or seed drop**

Version 2, March 2012

## Forbs

### 4. California Poppy (*Eschscholzia californica*)

- CPP four letter code – **ESCA**
- Download the USA-NPN datasheet and the CPP profile for ESCA here:  
<http://www.usanpn.org/cpp/ESCA>
- **California poppy** is in the Poppy family and can be annual or perennial. The flowers bloom from February through October but heavily from March through May. The genus is named after Dr. Johann - Friederich Eschscholtz, a Russian medical doctor who was one of the first scientists to explore California in 1816. The California poppy was scientifically named from a specimen that Eschscholtz collected at the Presidio of San Francisco on that expedition. The fruit is a long, slender pod that dries from green to tan or light brown, and splits open, shooting tiny round black seeds. Poppy seeds and seed banks can lay dormant underground for many years. During a heavy rain period, the seeds rapidly germinate and prolific poppy bloom may create a carpet of “gold” on California hills. This species is only being monitored in the Golden Gate NRA. However, due to gopher herbivory, the number of poppies being monitored in this park has declined.
- Table 5. Number of individuals being monitored (per location and site)

MARIN HEADLANDS		PRESIDIO		MORI POINT	
OLBU 1	0	LDML 1	0	MORI 1	3
OLBU 2	0	LDML 2	0	MORI 2	0
OLBU 3	0	LDML 3	0	MORI 3	0
OLBU 4	0	LDML 4	0	MORI 4	0
OLBU 5	0	LDML 5	future site	MORI 5	3
OLBU 6	0	LDML 6	Decommisioned	MORI 6	0
		LDML 7	0		
		LDML 8	0		
		LDML 9	0		
<b>TOTALS</b>	0		0		6
<b>GRAND</b>	6				



**California Phenology Project:  
species profile for  
California Poppy  
(*Eschscholzia californica*)**



CPP site(s) where this species is monitored: Golden Gate National Recreation Area



Photo credit: Vslion (Wikipedia)

**What does this species look like?**

This herbaceous plant is an annual (but occasionally perennial) in habit and grows up to 60 centimeters in height. The blue-green leaves are subdivided into long segments. The flowers have four petals and range in color from yellow to orange. They are bisexual, having both male and female parts within each flower. The petals close at night and in cold or windy weather.

When monitoring this species, use the USA-NPN *forbs* datasheet.

**Species facts!**

- The CPP four letter code for this species is **ESCA**.
- The official state flower of California; April 6<sup>th</sup> is California Poppy Day.
- Although considered toxic, Native Americans used the roots and leaves for pain relief and the leaves for food.
- California Poppy is primarily pollinated by honeybees, bumblebees, and solitary bees, although it is visited by a large variety of insects.



Photo credit: Brian (PYHOOYA, Flickr)



Photo credit: Brian Michelsen (Flickr)

**Where is this species found?**

- Found in grassy, open, and desert habitats.
- Grows well in disturbed areas.
- Found in sites with well drained soil.
- Occurs at elevations between 0-2000 meters.
- Ranges from Southern Washington to Baja California.

For more information about phenology and the California Phenology Project (CPP), please visit the CPP website ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)) and the USA-NPN website ([www.usanpn.org](http://www.usanpn.org))

California Phenology Project:  
species profile for  
California Poppy  
(*Eschscholzia californica*)



**Initial growth**

Look for cotyledons that appear with germination, before the first leaves unfold.

Cindy Roessler



**Leaves**

Each leaf is divided into long thin sections.

nociveglia



**Flowers or flower buds**

Flowers of this species appear singly; count individual flowers when measuring abundance. Because the flowers close when the air is cool, it can be difficult to distinguish un-open from open flowers on cool days or evenings.

nakae



**Open flowers**

These flowers have both male and female parts. **Note:** flower phenophases are nested; if you record Y for "open flowers" you should also record Y to "flowers or flower buds"

Liz Matthews



**Fruits**

The fruit is a capsule; changes from green to tan or brown; and then splits open at its base.

Cindy Roessler



**Ripe fruits**

The fruit is ripe when it splits open at its base. **Note:** fruit phenophases are nested; if you record Y for "ripe fruits" you should also record Y to "fruits".

Phenophases not pictured: **Recent fruit or seed drop**

## 5. Common Cowparsnip (*Heracleum maximum*)

- CPP four letter code – HELA\*

\*Species formerly named *Heracleum lanatum*. Accordingly, the four letter code for the species is HELA.

- Download the USA-NPN datasheet and the CPP profile for HELA here: (<http://www.usanpn.org/cpp/HELA>)
- **Cowparsnip** is a perennial shrub/herbaceous plant in the Carrot/Parsely family that blooms from February through September. It can be found in woodlands, forest openings, grasslands, riparian areas (wet meadows, stream terraces, floodplains, stream and lake margins). Cowparsnip is the only member of the genus *Heracleum* native to North America. The plant has a wide distribution across the country but is listed as endangered in Kentucky and a species of special concern in Tennessee. The plant attracts birds and butterflies, especially the larvae of the Anise swallowtail butterfly.
- Table 6. Number of individuals being monitored (per trail/location)

MARIN HEADLANDS		PRESIDIO		MORI POINT	
OLBU 1	3	LDML 1	0	MORI 1	0
OLBU 2	0	LDML 2	0	MORI 2	1
OLBU 3	0	LDML 3	0	MORI 3	0
OLBU 4	0	LDML 4	0	MORI 4	0
OLBU 5	0	LDML 5	future site	MORI 5	0
OLBU 6	0	LDML 6	0	MORI 6	0
		LDML 7	0		
		LDML 8	2		
		LDML 9	1		
<b>TOTALS</b>	3		3		1
<b>GRAND</b>	7				



California Phenology Project:  
species profile for  
Common Cowparsnip  
(*Heracleum maximum*)



CPP site(s) where this species is monitored: Golden Gate National Recreation Area, Redwood National Park



Photo credit: Jerry Oldenettel (Flickr)

**What does this species look like?**

Common cow parsnip is a perennial, herbaceous plant growing 3 to 10 feet tall. The large broad leaves are lobed and it has thick, hairy stems. On an individual plant, the small white flowers either have both male and female parts or have only male parts. Flowers are grouped into small clusters that are assembled into larger, showier, flat-topped clusters that resemble umbrellas. This is a type of compound inflorescence called an "umbel".

When monitoring this species, use the USA-NPN **forbs** datasheet.

**Species facts!**

- The CPP for letter code for this species is **HELA** (this species was formerly named *Heracleum lanatum*).
- In the carrot family, Apiaceae.
- This species is phototoxic; meaning when compounds are exposed to photons and come into contact with skin they react to cause a rash.
- Common cowparsnip was used by Native Americans for food and medicine; the toxic effects were reduced avoided by peeling the stalks, and selecting the youngest growth.



Photo credit: Jerry Oldenettel (Flickr)



Photo credit: James Gaither (Flickr)

**Where is this species found?**

- In moist to semi-wet, well-drained soils.
- Prefers loam and sandy loam soils and clay and gravelly substrates.
- Found in woodlands, forest openings, grasslands, and riparian areas.
- Found at elevations less than 2900 meters (Note: according to the Jepson manual).

For more information about phenology and the California Phenology Project (CPP), please visit the CPP website ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)) and the USA-NPN website ([www.usanpn.org](http://www.usanpn.org))



Heracleum maximum species profile (Version 2; March 2012):

California Phenology Project:  
species profile for  
Common Cowparsnip  
(*Heracleum maximum*)



Initial growth



Leaves



**Flowers or  
flower buds**

When monitoring **flower or flower bud abundance** for this species, count each inflorescence as a single flowering structure! For example, if there are two inflorescences with many flowers or buds each, then abundance should be recorded as <3.



**Open flowers**

Each small flower typically has both male and female parts; many small flowers make up each cluster.

**Proportion of open flowers** should be recorded at the scale of individual flowers, not inflorescences (i.e. count individual flowers)!

**Note:** flower phenophases are nested; if you record Y for "open flowers" you should also record Y for "flowers or flower buds"



**Fruits**

The fruit is a tiny flattened capsule that changes from green to light-green, white, tan, or brown and displaying four conspicuous vertical purple lines.



**Ripe fruits**

The fruit is ripe when it is dry and light-green, white, tan, or brown, and displaying four conspicuous vertical purple lines. **Note:** fruit phenophases are nested; if you record Y for "ripe fruits" you should also record Y to "fruits"

Phenophases not pictured: **Recent fruit or seed drop**

Version 2, March 2012

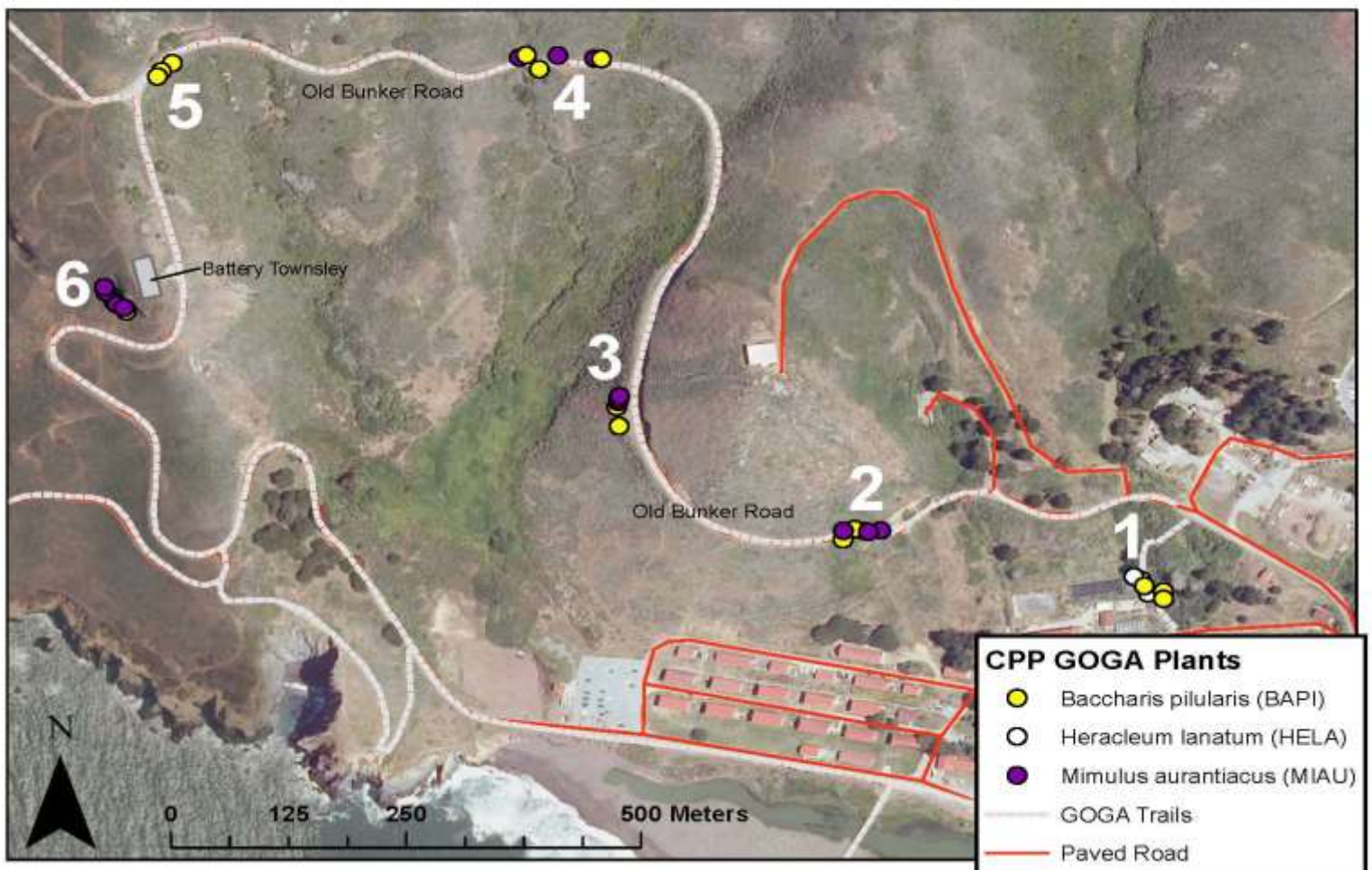
## V. Monitoring Locations and Maps

The maps shown in this section (except for the hand drawn maps) are available for download from (<http://www.usanpn.org/cpp/node/62>).

### 1. Marin Headlands – Old Bunker Road Trail

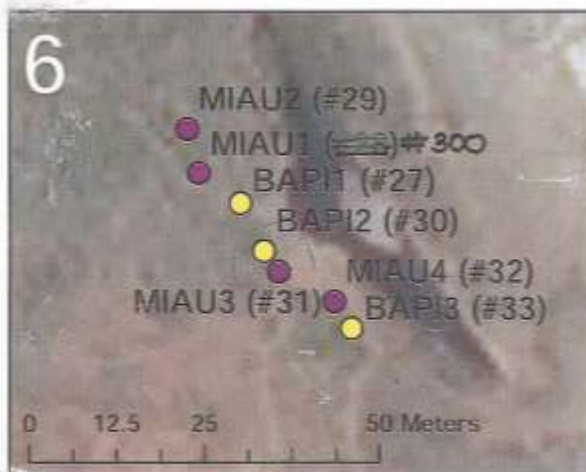
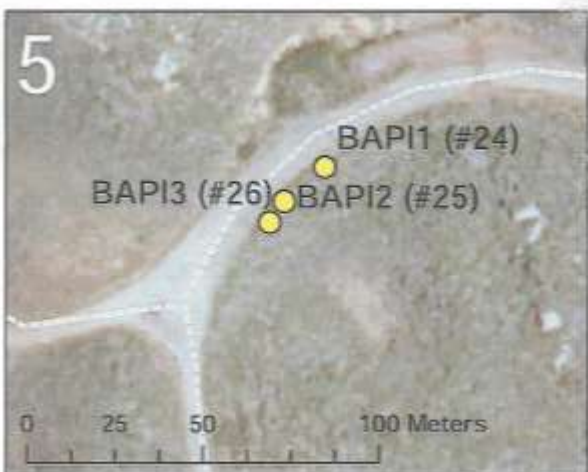
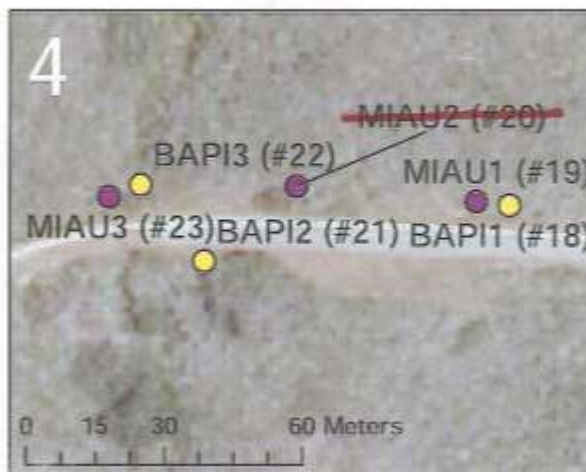
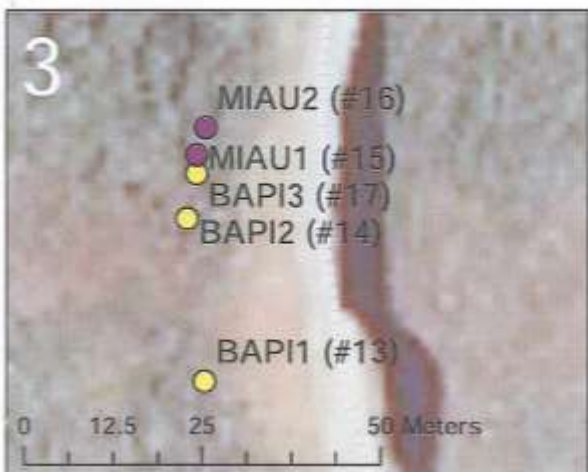
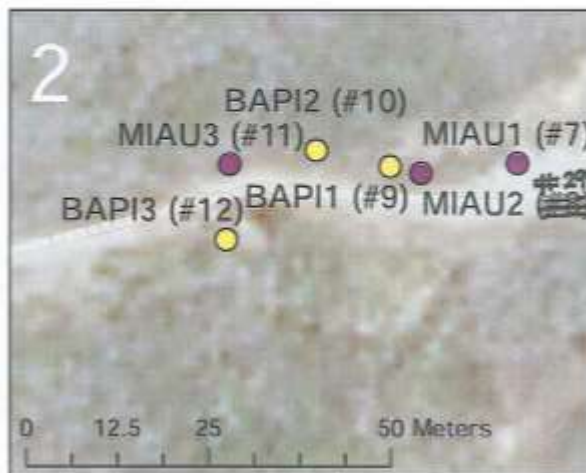
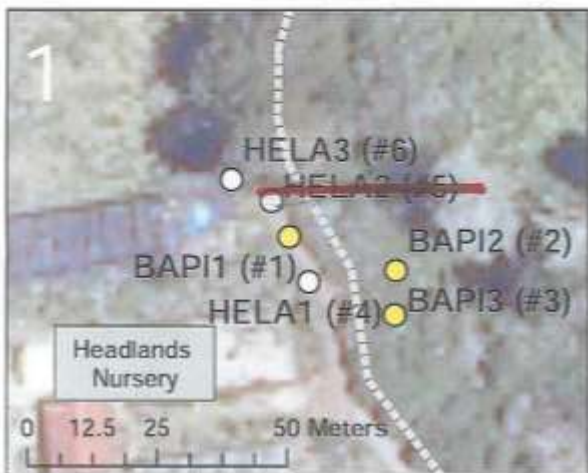
- The **Old Bunker Road (OLBU)** sites are on the first mile of the Old Bunker Road Trail, beginning at the Marin Headlands nursery. There are 6 sites at this trail and a total of 33 plants being monitored. Target species being monitored are *B. pilularis*, *D. aurantiacus*, and *H. maximum*.
- **TRAIL LENGTH – 1 mile**
- **MONITORING TIME – 60 minutes**
- **ELEVATION GAIN – 75 feet (Site 1) to 326 feet (Site 6)**

### CPP GOGA Old Bunker Road (OLBU) Monitoring Sites

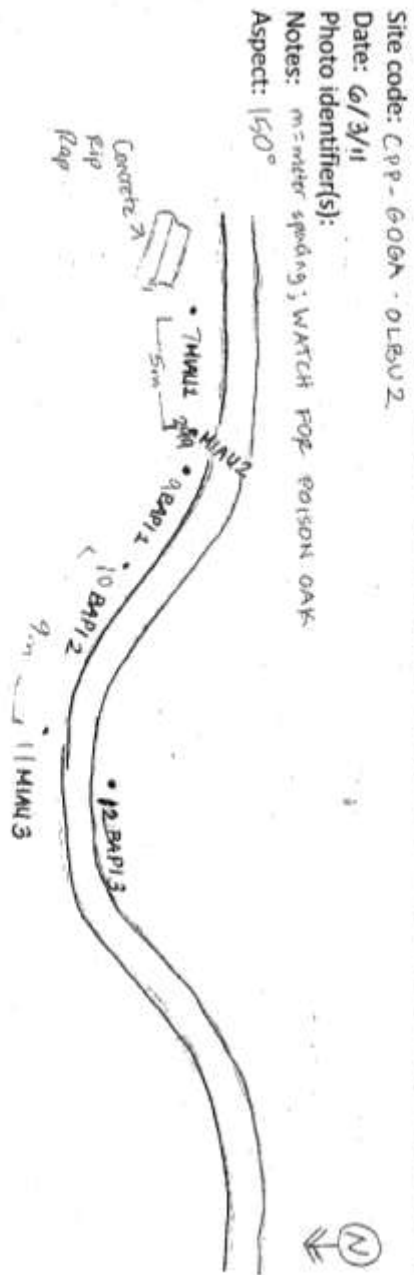
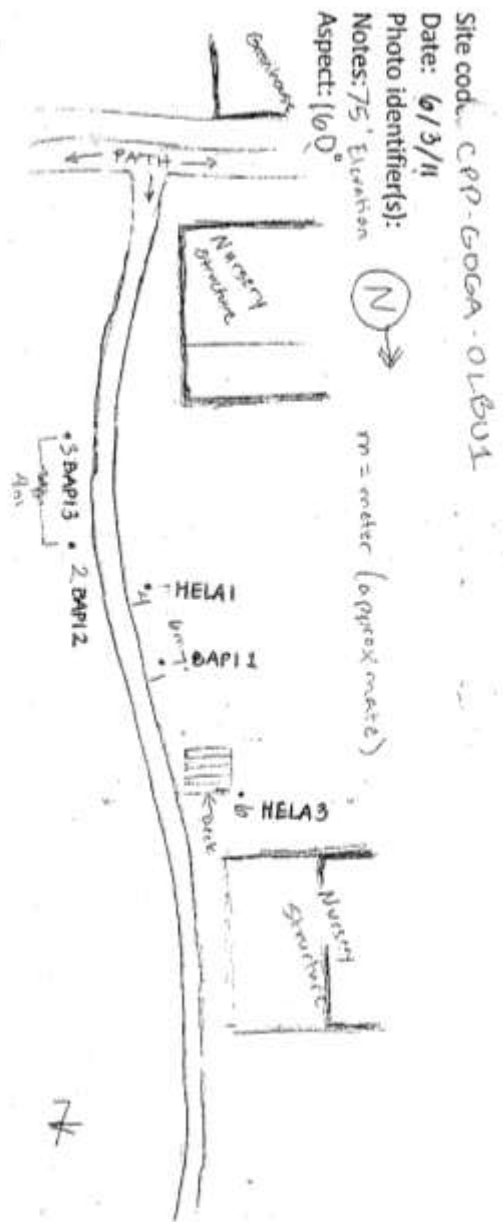




# CPP GOGA Old Bunker Road (OLBU) Monitoring Sites and Plants



CPP-GOGA OLBU SITE 1 AND SITE 2



**CPP-GOGA-OLBU1**

Site Notes- Walking up from Marin Headlands nursery, heading N. Elevation 75 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
1	HELA	<i>Heracleum maximum</i>	1	4	4187432	541021	on L side of trail
1	HELA	<i>Heracleum maximum</i>	3	6	4187442	541013	on L; last individual up the trail at this site
1	BAPI	<i>Baccharis pilularis</i>	1	1	4187435	541018	L side of trail, between CA sage
1	BAPI	<i>Baccharis pilularis</i>	2	2	4187431	541026	R side of trail
1	BAPI	<i>Baccharis pilularis</i>	3	3	4187427	541027	R side of trail



## CPP-GOGA-OLBU2

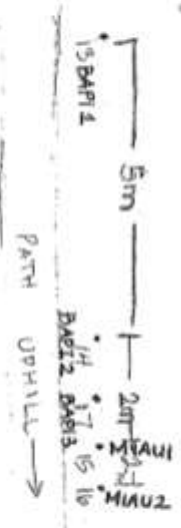
Site Notes – Uphill from Marin Headlands nursery, heading NW, left at service vehicle parking lot, near concrete rubble pile. Elevation 144 feet.



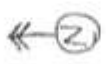
SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
2	BAPI	<i>Baccharis pilularis</i>	1	9	4187482	540787	on the R side of the trail
2	BAPI	<i>Baccharis pilularis</i>	2	10	4187483	540782	R side of trail
2	BAPI	<i>Baccharis pilularis</i>	3	12	4187480	540770	on the L, orange cone under individual, on edge of trail
2	MIAU	<i>Diplacus aurantiacus</i>	1	7	4187482	540790	R side of trail
2	MIAU	<i>Diplacus aurantiacus</i>	2	299	4187482	540787	R side of trail
2	MIAU	<i>Diplacus aurantiacus</i>	3	11	4187484	540773	R side of trail

CPP-GOGA OLBU SITE 3 AND SITE 4

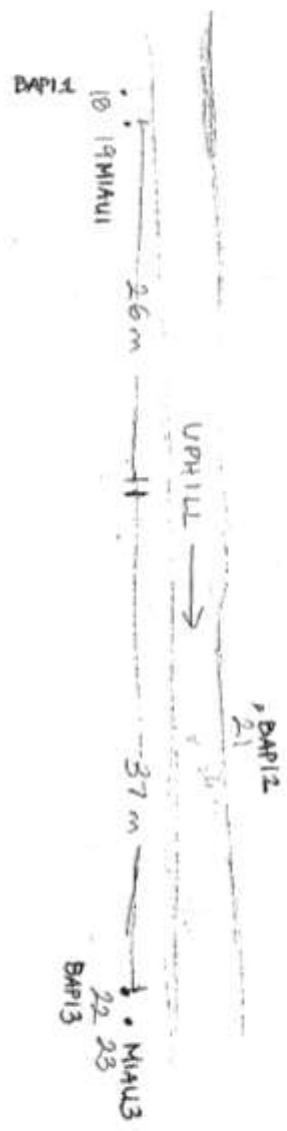
Site code: CPP-GOGA-OLBU3  
 Date: 6/3/11  
 Photo Identifier(s):  
 Notes: m= approximate meters; WATCH FOR POISON OAK!  
 Aspect: 260°



Site code: CPP-GOGA-OLBU4  
 Date: 6/3/11  
 Photo Identifier(s): 108-1083-11082  
 Notes: m= approximate meters spacing  
 Aspect: 160°



WATCH FOR POISON OAK!





**CPP-GOGA-OLBU3**

Site Notes – Across from the tilted geologic formation on the R side of the trail. Elevation 186 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
3	BAPI	<i>Baccharis pilularis</i>	1	13	4187581	540584	on the L side of the trail
3	BAPI	<i>Baccharis pilularis</i>	2	14	4187599	540582	on the L
3	BAPI	<i>Baccharis pilularis</i>	3	17	4187604	540583	on the L
3	MIAU	<i>Diplacus aurantiacus</i>	1	15	4187606	540583	on the L
3	MIAU	<i>Diplacus aurantiacus</i>	2	16	4187609	540584	on the L

**CPP-GOGA-OLBU4**

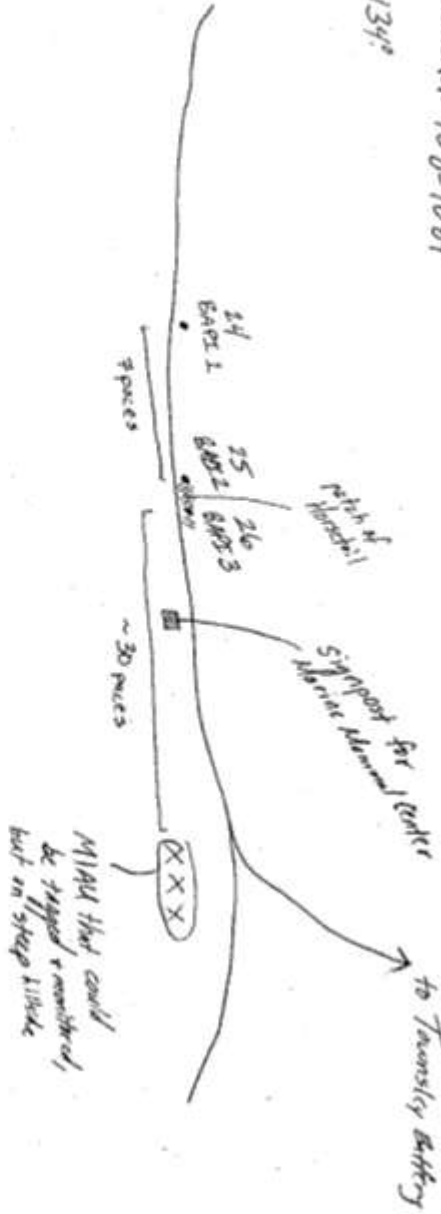
Site Notes – Clearing on the L side of trail for the overlook, large willow on the R side of the trail. Elevation 254 feet.



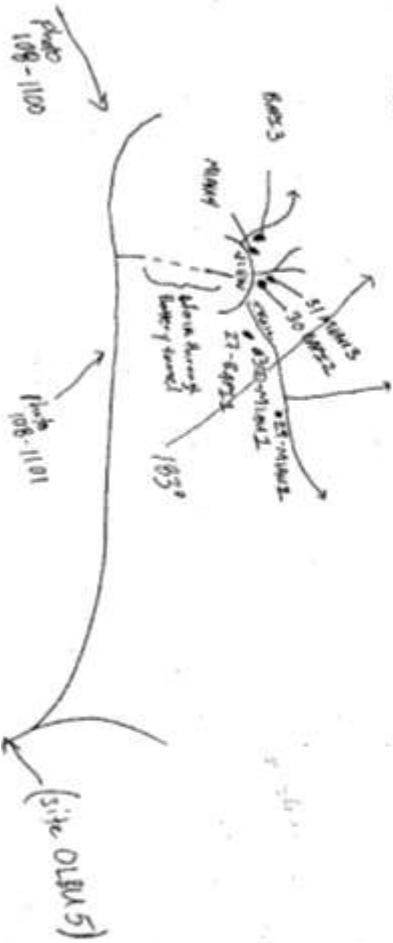
SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
4	MIAU	<i>Diplacus aurantiacus</i>	1	19	4187927	540560	on the R surrounded by yellow bush lupine, sagebrush, coyotebush
4	MIAU	<i>Diplacus aurantiacus</i>	3	23	4187929	540503	on the R past willow; surrounded by <i>poison oak</i> ; last individual up the trail at this site.
4	BAPI	<i>Baccharis pilularis</i>	1	18	4187926	540560	on the R side of the trail; surrounded by yellow bush lupine, sagebrush, and monkey flower.
4	BAPI	<i>Baccharis pilularis</i>	2	21	4187915	540525	on the L; surrounded by <i>poison oak</i> .
4	BAPI	<i>Baccharis pilularis</i>	3	22	4187928	540504	on the R past willow; surrounded by <i>poison oak</i> .

CPP-GOGA OLBU SITE 5 AND SITE 6

Site code: CPP-GOGA-OLBU5  
 Date: 6/3/11  
 Photo Identifier(s): 108-1089  
 Notes:  
 Aspect: 134°



Site code: CPP-GOGA-OLBU6  
 Date: 6/3/11  
 Photo Identifier(s): 108-1100, 108-1101  
 Notes:  
 Aspect: 183°



**CPP-GOGA-OLBU5**

Site Notes – Continuing up trail, across from Marine Mammal Center Sign. Elevation 321 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
5	BAPI	<i>Baccharis pilularis</i>	1	24	4187921	540196	on the L; base of plant surrounded by <i>poison oak</i> and a horsetail.
5	BAPI	<i>Baccharis pilularis</i>	2	25	4187918	540191	on the L; surrounded by a patch of horsetail.
5	BAPI	<i>Baccharis pilularis</i>	3	26	4187916	540191	on the L; last plant up the trail at this site; surrounded by a patch of horsetail.



**CPP-GOGA-OLBU6**

Site Notes – Headed West towards Battery Townsley, through the entrance towards the trail.  
Elevation 326 feet.

**Photo 108-1101 – refer to schematic map of OLBU6**



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
6	BAPI	<i>Baccharis pilularis</i>	1	27	4187704	540152	on the R side of the trail
6	MIAU	<i>Diplacus aurantiacus</i>	1	300	4187704	540152	on the R side of the trail
6	MIAU	<i>Diplacus aurantiacus</i>	2	29	4187705	540146	on the R; surrounded by sagebrush

Photo 108-1100 – refer to schematic map of OLBU6



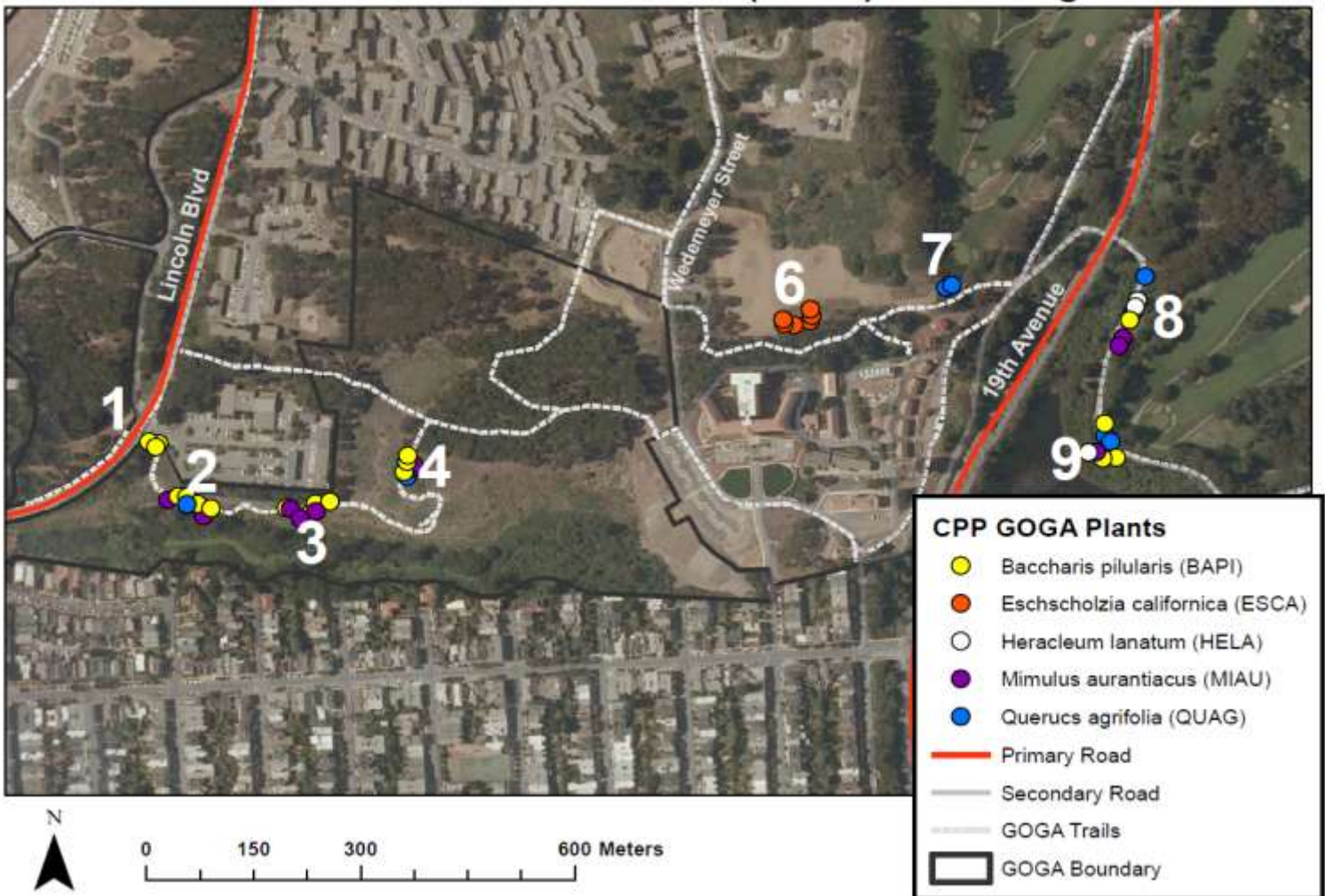
SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
6	BAPI	<i>Baccharis pilularis</i>	2	30	4187699	540157	on the L side of trail, right in front of the battery tunnel
6	BAPI	<i>Baccharis pilularis</i>	3	33	4187686	540167	on the R, near sagebrush and dried yellow-bush lupine
6	MIAU	<i>Diplacus aurantiacus</i>	3	31	4187699	540157	on the L side of the trail, right in front of the battery
6	MIAU	<i>Diplacus aurantiacus</i>	4	32	4187689	540165	on the R

## 2. Presidio – Lobos Dunes/Mountain Lake Trail

- The **Lobos Dunes-Mountain Lake (LDML)** sites are on the first mile of the Lobos Dunes to Mountain Lake Trail, beginning at the Lobos Dunes trail head at Lincoln Boulevard and Howard Road (1-4). This trail follows the Lobos Dunes boardwalk, up to the Presidio Hills (7), and down into Mountain Lake (8, 9). This trail is relatively flat with one uphill climb and one set of stairs. There are 9 sites at this trail (Site 5 has yet to be established and Site 6 is decommissioned) and a total of 39 plants being monitored. Target species being monitored are *B. pilularis*, *D. aurantiacus*, *Q. agrifolia*, and *H. maximum*. When stepping off trail at this monitoring location, take note of the endangered *Lessingia* flowers (right).
- TRAIL LENGTH** – ~ 1 mile
- MONITORING TIME** – 60 minutes
- ELEVATION GAIN** – 72 FEET (Site 1) to 150 feet (Site 9)



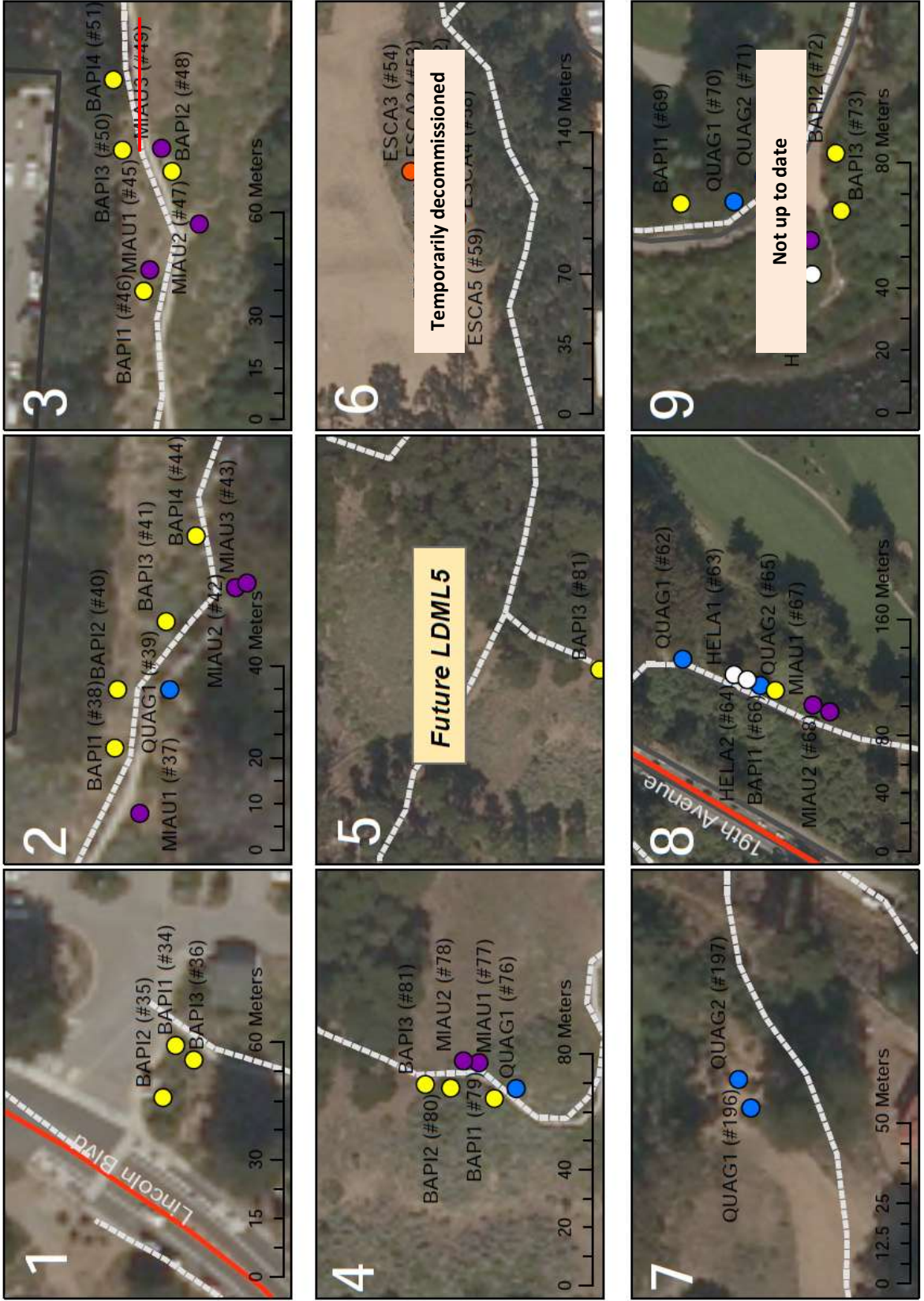
CPP GOGA (Presidio)  
Lobos Dunes to Mountain Lake (LDML) Monitoring Sites







# CPP GOGA (Presidio) Lobos Dunes to Mountain Lake (LDML) Monitoring Sites and Plants



CPP-GOGA LDML SITE 1 AND SITE 2

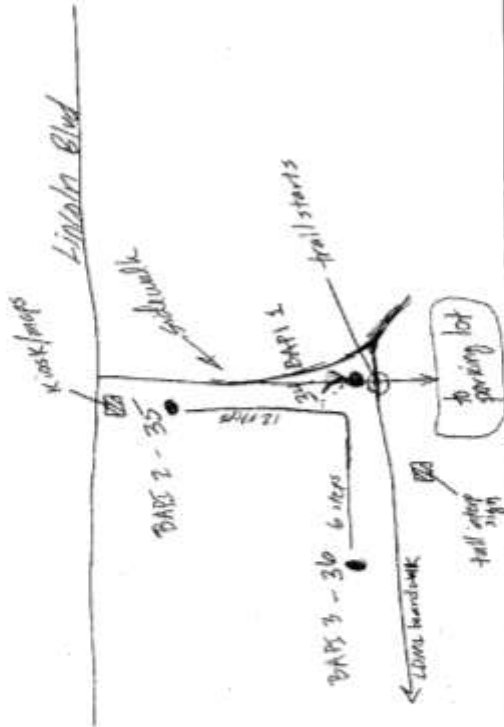
Site code: CPP-GOGA-LDML1

Date: 6-4-11

Photo identifier(s):

Notes:

Aspect: None



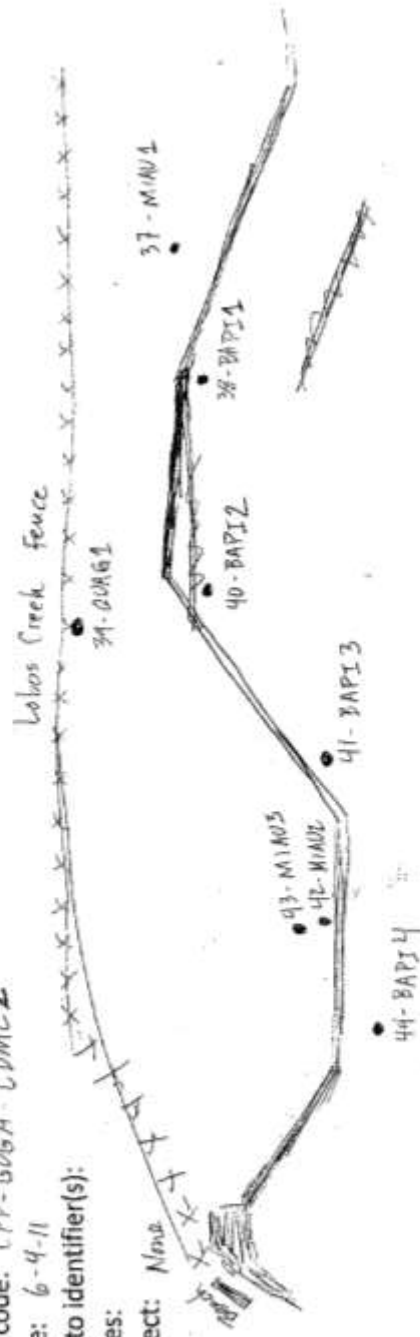
Site code: CPP-GOGA-LDML2

Date: 6-4-11

Photo identifier(s):

Notes:

Aspect: None



**CPP-GOGA-LDML1**

Site Notes – Start of Lobos Creek boardwalk trail. Elevation 72 feet.

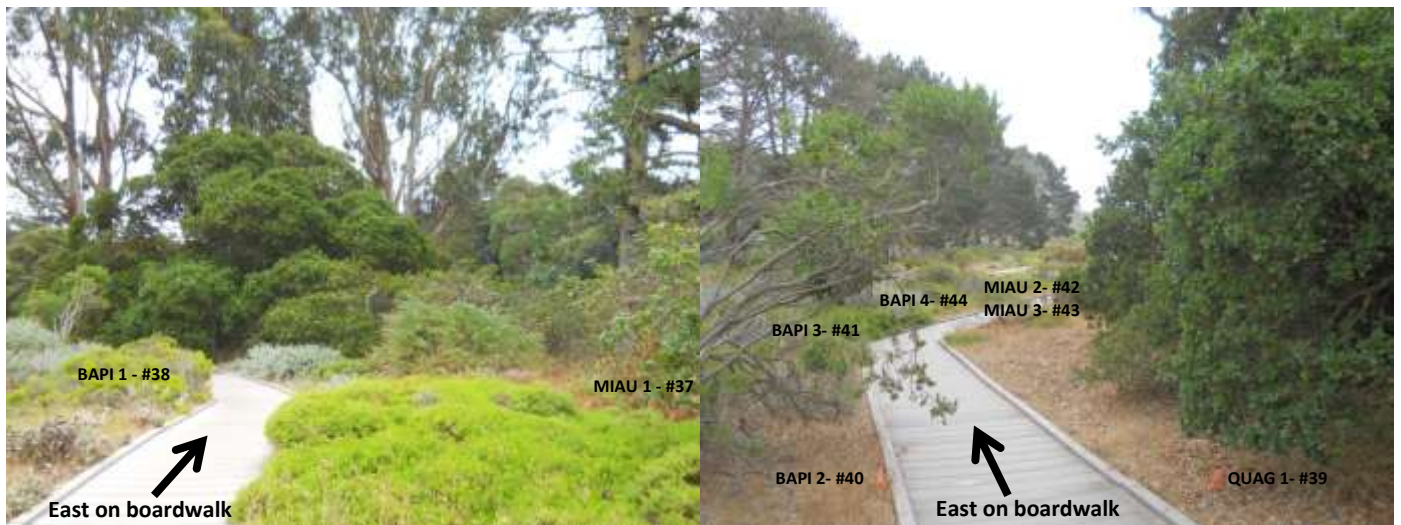


SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
1	BAPI	<i>Baccharis pilularis</i>	1	34	4182474	545588	on the R; shrubby (erect) individual, corner of boardwalk
1	BAPI	<i>Baccharis pilularis</i>	2	35	4182475	545578	behind bench; shrubby (erect) individual
1	BAPI	<i>Baccharis pilularis</i>	3	36	4182468	545583	R, after Lobos Creek Trail sign; shrubby individual



## CPP-GOGA-LDML2

Site Notes – On the LDML trail headed E. Elevation 68 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
2	BAPI	<i>Baccharis pilularis</i>	1	38	4182394	545623	on the L, near edge of boardwalk; prostrate
2	BAPI	<i>Baccharis pilularis</i>	2	40	4182393	545631	on the L, shrubby individual
2	BAPI	<i>Baccharis pilularis</i>	3	41	4182393	545634	on the L, shrubby individual
2	BAPI	<i>Baccharis pilularis</i>	4	44	4182399	545652	on the L, across from the Eucalyptus
2	MIAU	<i>Diplacus aurantiacus</i>	1	37	4182395	545621	on the R, ~2 meters off trail
2	MIAU	<i>Diplacus aurantiacus</i>	2	42	4182395	545645	on the R, under Eucalyptus
2	MIAU	<i>Diplacus aurantiacus</i>	3	43	4182395	5456465	on the R, under Eucalyptus
2	QUAG	<i>Quercus agrifolia</i>	1	39	4182390	545633	on the R, hanging over the fence (tag is right by the fence line)



CPP-GOGA LDML SITE 3 AND SITE 4

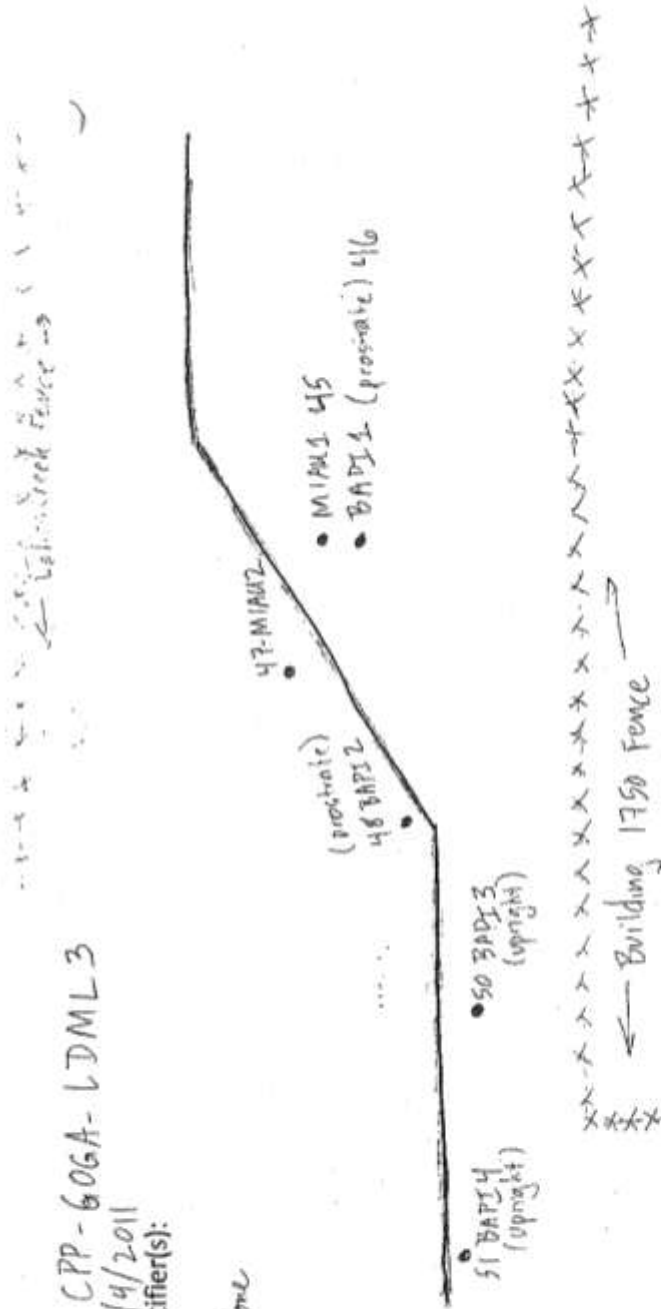
Site code: CPP-GOGA-LDML3

Date: 6/4/2011

Photo identifier(s):

Notes:

Aspect: None



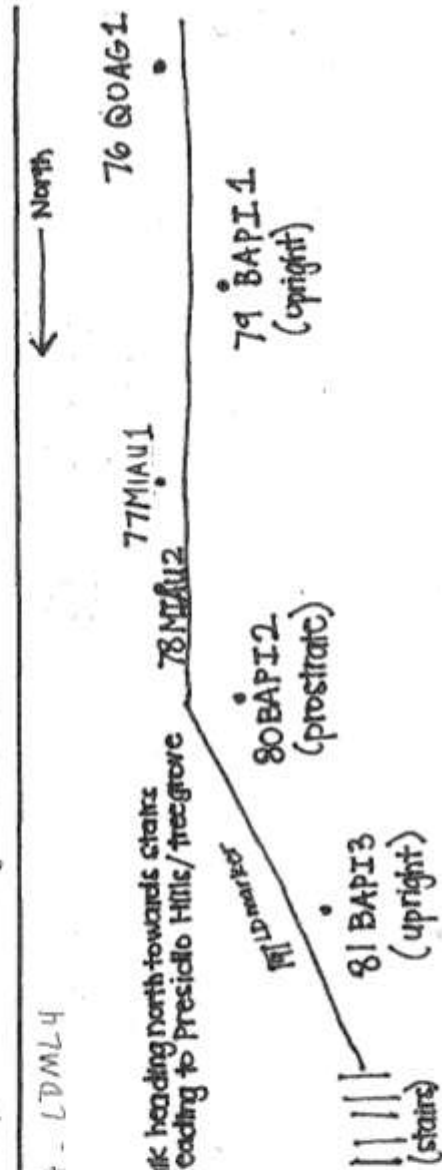
Site code: CPP-GOGA-LDML4

Date: 8/4/2011

Photo identifier(s):

Notes: On the boardwalk heading north towards stairs leading to Presidio Hills/treasure

Aspect:



# CPP-GOGA-LDML3

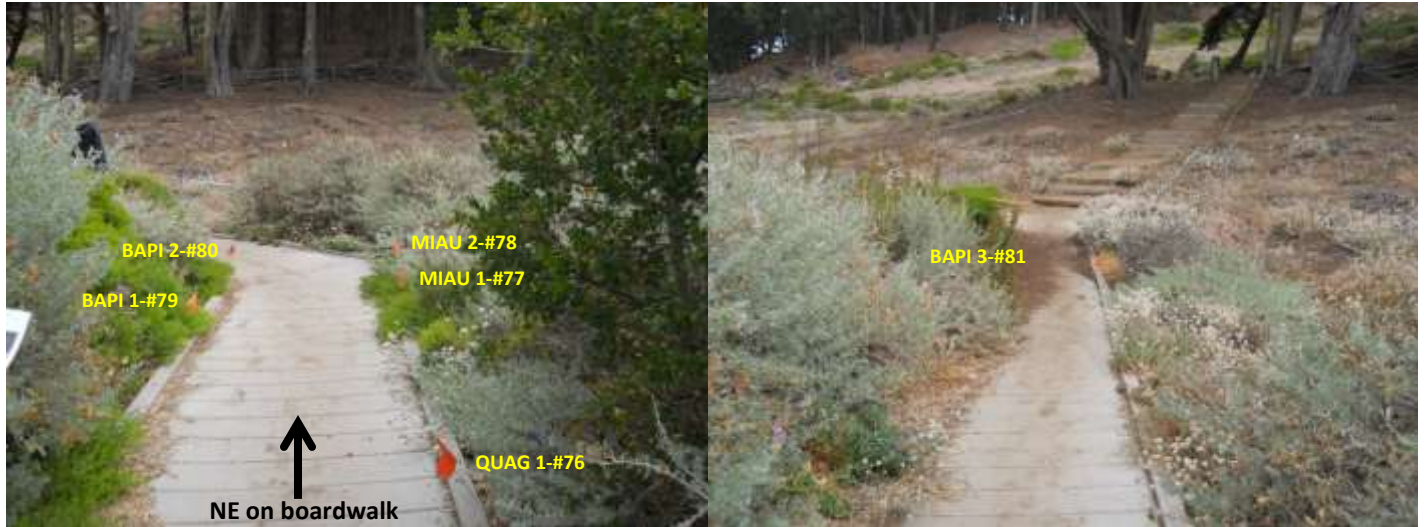
Site Notes – On LDML trail headed E. Elevation 70 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
3	BAPI	<i>Baccharis pilularis</i>	1	46	4182399	545652	on the L, prostrate
3	BAPI	<i>Baccharis pilularis</i>	2	48	4182391	545660	on the R, prostrate and surrounded by bare ground
3	BAPI	<i>Baccharis pilularis</i>	3	50	4182399	545770	on the L; shrubby individual
3	BAPI	<i>Baccharis pilularis</i>	4	51	4182396	545781	on the L; shrubby individual, under cypress tree
3	MIAU	<i>Diplacus aurantiacus</i>	1	45	4182395	545744	on the L
3	MIAU	<i>Diplacus aurantiacus</i>	2	47	4182392	545753	on the R

## CPP-GOGA-LDML4

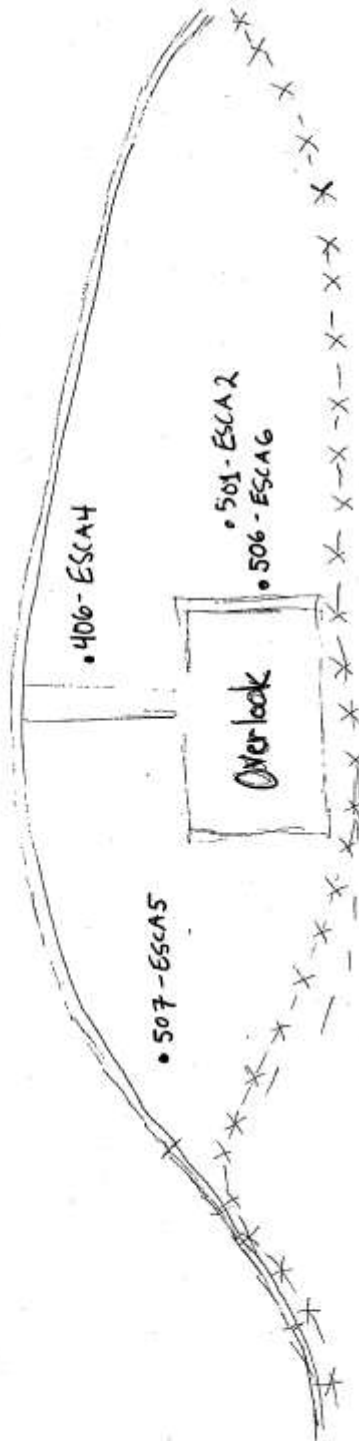
Site Notes – On the trail headed N to Presidio Hills leading up to the stairs entering historic forest. Elevation 92 feet.



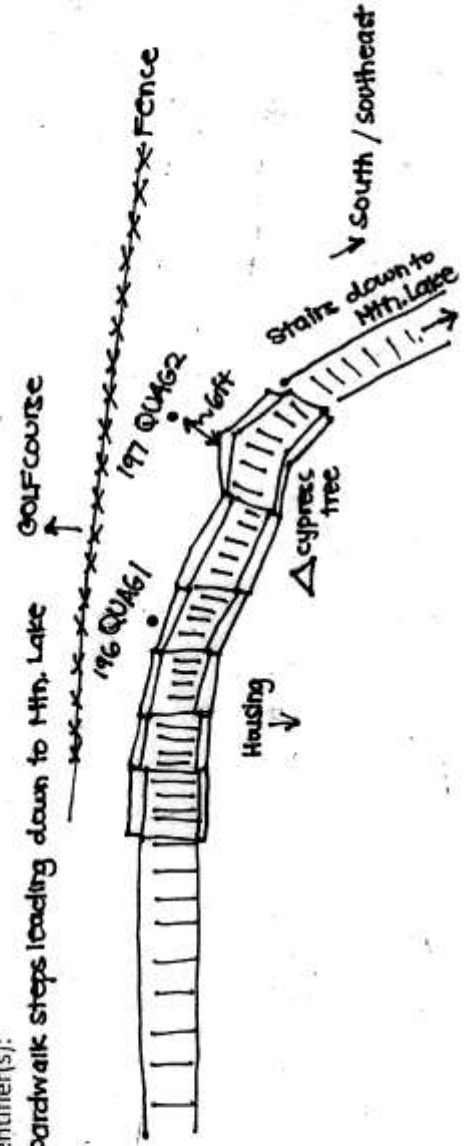
SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE PLANT IDENTIFIER	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
4	BAPI	<i>Baccharis pilularis</i>	1	79	4182442	545870	on the L, prostrate
4	BAPI	<i>Baccharis pilularis</i>	2	80	4182442	545872	on the R, prostrate and surrounded by bare ground
4	BAPI	<i>Baccharis pilularis</i>	3	81	4182449	545872	on the L; shrubby individual
4	MIAU	<i>Diplacus aurantiacus</i>	1	77	4182439	545873	right hand side of the trail, first MIAU after coffee berry.
4	MIAU	<i>Diplacus aurantiacus</i>	2	78	4182440	545873	on the R
4	QUAG	<i>Quercus agrifolia</i>	1	76	4182437	545870	on the R side of the trail between silver bush lupine. First and only QUAG on site.

CPP-GOGA LDML SITE 6 AND SITE 7

Site Code: CPP-606A-LDML6  
 Date: 9/30/2011  
 Photo identifier(s):  
 Notes: Merchant-Marine Cemetery Overlook, @ Lessingia Recovery area  
 Aspect:



Site code: CPP-GOGA-LDML7  
 Date: 8/8/2011  
 Photo identifier(s):  
 Notes: Boardwalk steps leading down to Mtn. Lake  
 Aspect:





**CPP-GOGA-LDML5**

**Site Notes – Site 5 is not established due to future plans for tree removal.**

**CPP-GOGA-LDML6**

**Site Notes – headed E on Mountain Lake extension trail, Merchant Marine Overlook (*This site has been temporarily decommissioned*).**

**CPP-GOGA-LDML7**

**Site Notes – Headed SE on boardwalk past lessingia patch, towards stairs leading down to Mountain Lake. Elevation 245 feet.**



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
7	QUAG	<i>Quercus agrifolia</i>	1	196	4182652	546467	fourth boardwalk step; across from cypress tree
7	QUAG	<i>Quercus agrifolia</i>	2	197	4182655	546474	sixth boardwalk step at bend before going down stairs; across from



**CPP-GOGA-LDML8**

Site Notes – Through 19<sup>th</sup> Ave overpass, headed E towards Mountain Lake 3-bench overlook.  
Plants are 1 ft. behind the fence in the buffer strip. Elevation 162 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
8	QUAG	<i>Quercus agrifolia</i>	1	62	4182666	546688	first oak headed east towards seating overlook. Under cypress tree. Third fence pole down on L.
8	QUAG	<i>Quercus agrifolia</i>	2	65	4182633	546671	
8	HELA	<i>Heracleum lanatum</i>	1	63	4182637	546673	
8	HELA	<i>Heracleum lanatum</i>	2	64	4182636	546673	
8	BAPI	<i>Baccharis pilularis</i>	1	66	4182623	546668	Above storm drain
8	MIAU	<i>Diplacus aurantiacus</i>	1	67	4182590	546655	To the right of Douglas Iris and red elderberry.
8	MIAU	<i>Diplacus aurantiacus</i>	2	68	4182587	546652	Under twinberry on L.



**CPP-GOGA-LDML9**

**Site Notes – Headed E towards overlook, past woodchip area on right. Some plants are across entrance to overlook in buffer strip, others are along the wood chipped path down to the overlook. Elevation 150 feet.**



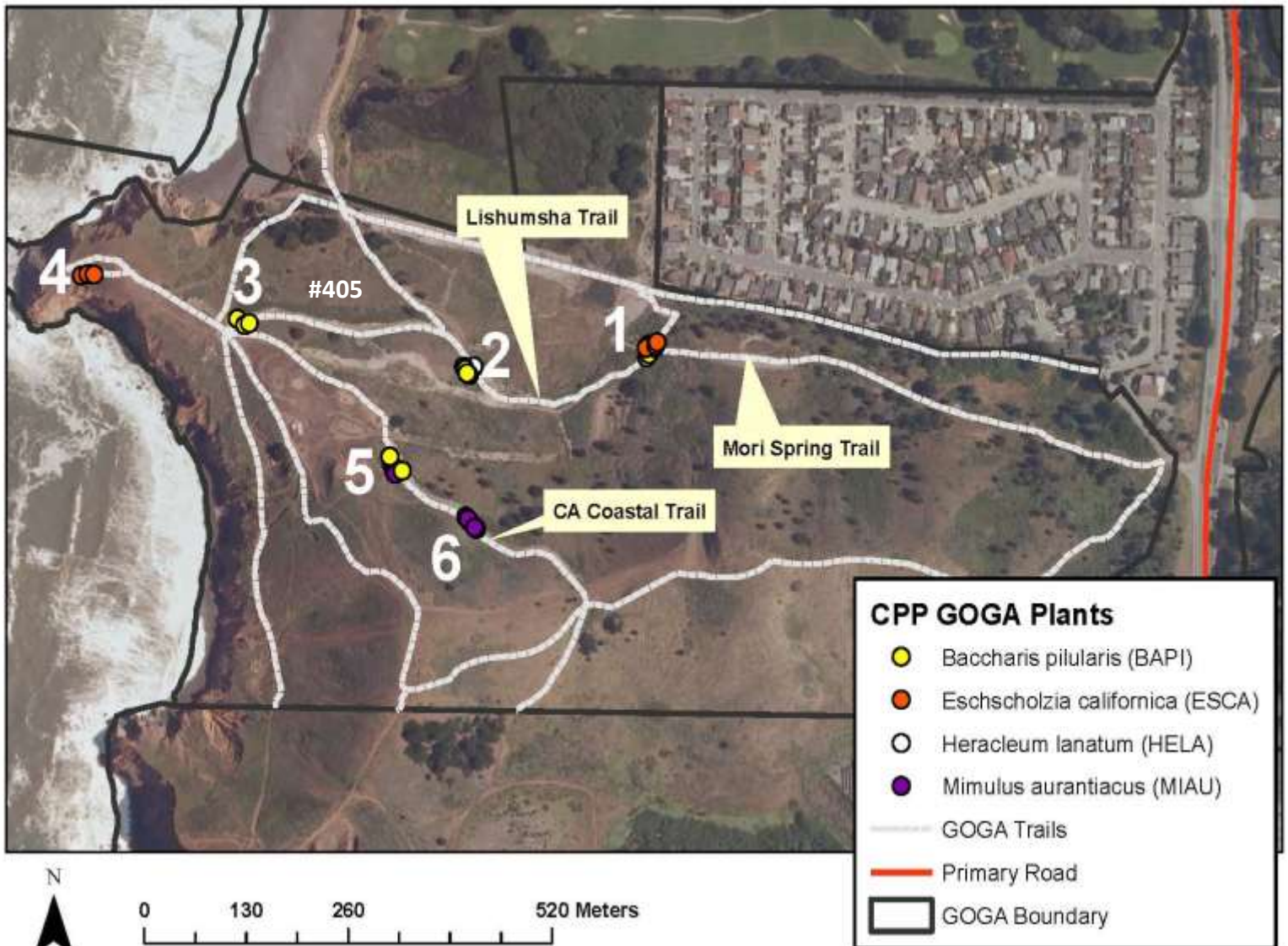
SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
9	QUAG	<i>Quercus agrifolia</i>	1	70	4182477	546646	Across from entrance to 3-bench Mountain Lake overlook, in front of toyon.
9	QUAG	<i>Quercus agrifolia</i>	2	71	4182475	546651	Under cypress tree, across from entrance to 3-bench Mountain Lake overlook.
9	BAPI	<i>Baccharis pilularis</i>	1	69	4182497	546640	Behind fence
9	BAPI	<i>Baccharis pilularis</i>	2	72	4182463	546650	On the left of trail down to overlook (upright).)
9	BAPI	<i>Baccharis pilularis</i>	3	503	4182463	546625	across from middle bench on 3-bench ML overlook. On R. Prostrate.
9	MIAU	<i>Diplacus aurantiacus</i>	1	504	4182493	546639	across from entrance to 3-bench ML overlook
9	HELA	<i>Heracleum mAximum</i>	1	75	4182461	546630	on right along trail down to benches.



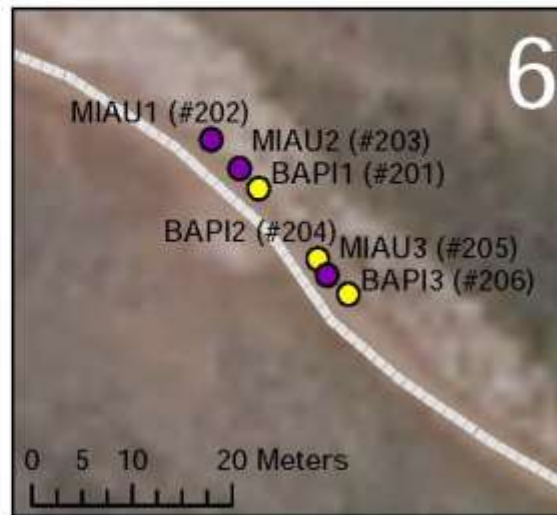
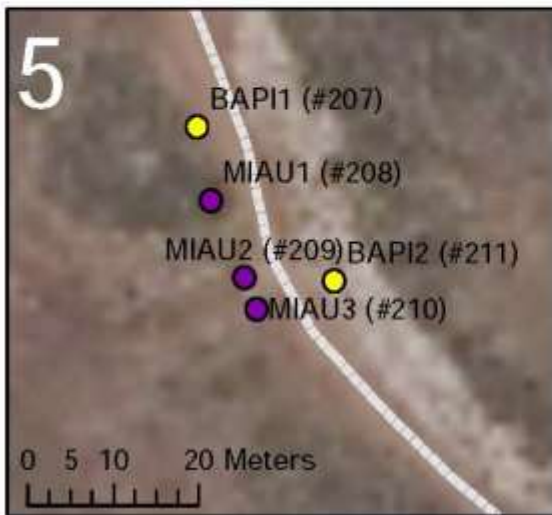
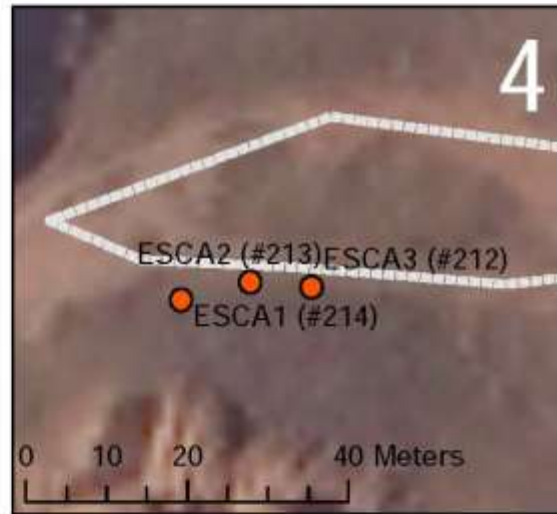
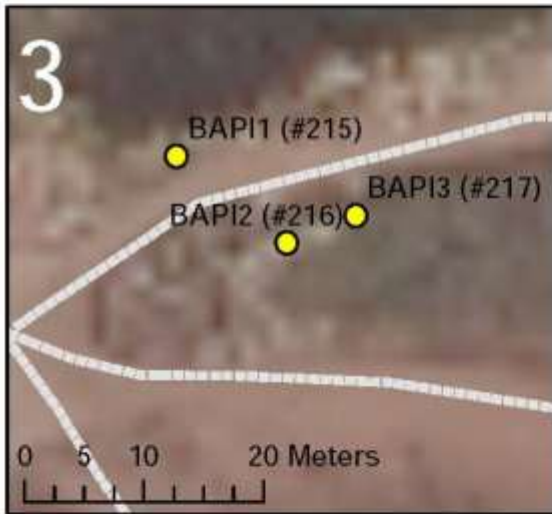
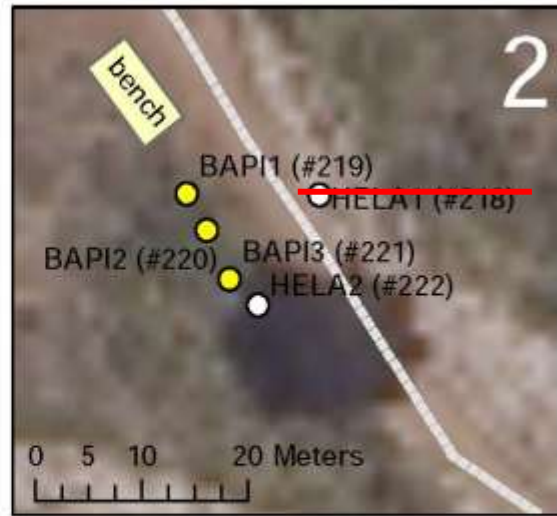
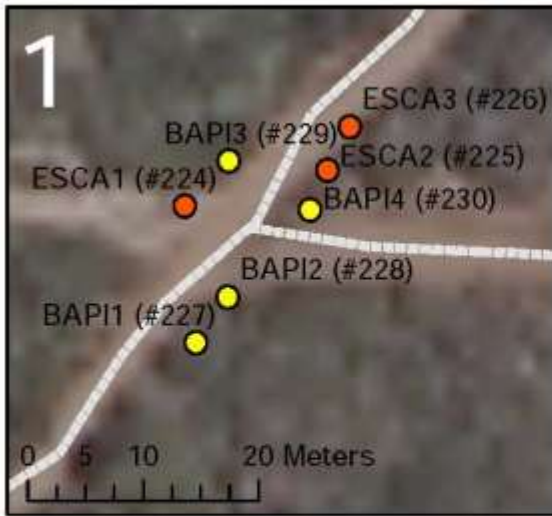
### 3. Pacifica – Mori Point trails

- The **Mori Point (MORI)** sites are located along multiple, primarily uphill, trails. First three sites are along the Lishumsha Coastal trail. The fourth site is on the trail headed towards the point. The remaining trails are along the Timigtac Coastal (CA Coastal) trail. There are 6 sites at this trail and a total of 28 plants being monitored. Target species being monitored are *B. pilularis*, *D. aurantiacus*, and *H. maximum*.
- **TRAIL LENGTH – 0.5 miles**
- **MONITORING TIME – 50 minutes**
- **ELEVATION GAIN – 35 feet (Site 1) to 185 feet (Site 6)**

## CPP GOGA Mori Point (MORI) Monitoring Sites



# CPP GOGA Mori Point (MORI) Monitoring Sites and Plants



CPP-GOGA MORI SITE 1 AND SITE 2

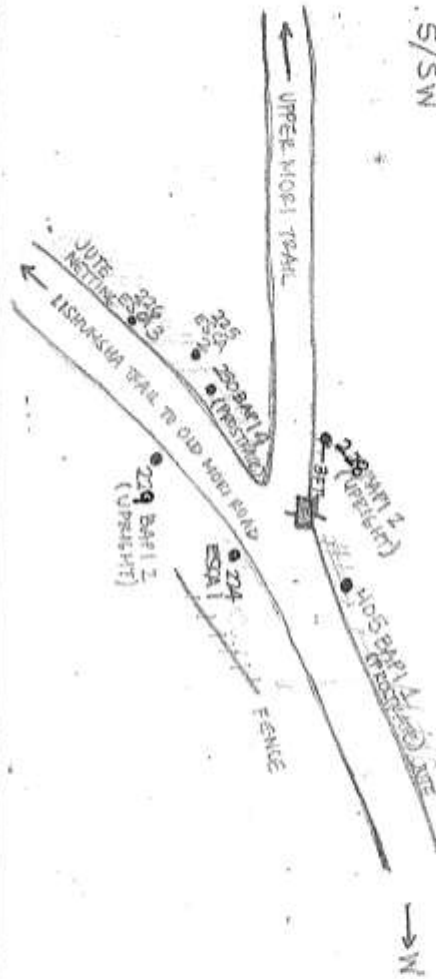
Site code: CPP - GOGA - MORI 1

Date: 6/5/2011

Photo identifier(s):

Notes: AT INTERSECTION OF LISHUNSHA AND UPPER MORI TRAILS

Aspect: S/SW



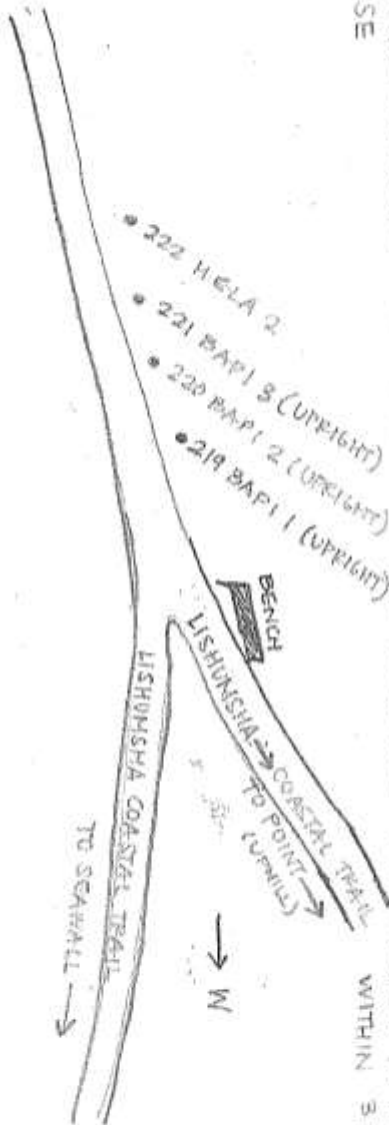
Site code: CPP - GOGA - MORI 2

Date: 6/5/2011

Photo identifier(s):

Notes: NEAR INTERSECTION OF LISHUNSHA COAST TRAIL AND TRAIL HEADED TO THE POINT, PLANTS WITHIN 3 FT OF TRAIL EDGE

Aspect: SE





## CPP-GOGA-MORI 1

Site Notes – Headed SW on the Lishumsha trail, near intersection of Lishumsha and Upper Mori trail. Elevation 35 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
1	BAPI	<i>Baccharis pilularis</i>	1	405	4163707	544853	on L on top of berm/jute netting, prostrate, last individual at site, past trail sign
1	BAPI	<i>Baccharis pilularis</i>	2	228	4163709	544859	on the L, shrubby individual, 3 ft into Upper Mori Trail heading east
1	BAPI	<i>Baccharis pilularis</i>	3	229	4163718	544859	on the R, shrubby (tree-like) individual
1	BAPI	<i>Baccharis pilularis</i>	4	230	4163719	544861	on L, prostrate individual, ~2 ft up from trail on top of berm/jute netting
1	ESCA	<i>Eschscholzia californica</i>	1	224	41637185	544856	on R, past BAPI 3, near fence
1	ESCA	<i>Eschscholzia californica</i>	2	225	4163717	544862	on L, on top of netting
1	ESCA	<i>Eschscholzia californica</i>	3	226	4163719	544865	on L, near edge of trail



## CPP-GOGA-MORI 2

Site Notes – Headed W on the Lishumsha – Coastal Trail headed uphill to bench. Elevation 66 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
2	HELA	<i>Heracleum maximum</i>	2	222	4163691	544676	on L, first individual at site
2	BAPI	<i>Baccharis pilularis</i>	1	219	4163639	544672	on L, last individual at site, shrubby individual
2	BAPI	<i>Baccharis pilularis</i>	2	220	4163692	544674	on L, 1 meter east of BAPI 1, shrubby individual
2	BAPI	<i>Baccharis pilularis</i>	3	221	4163691	544675	on L, 1 meter east of BAPI 2, shrubby individual

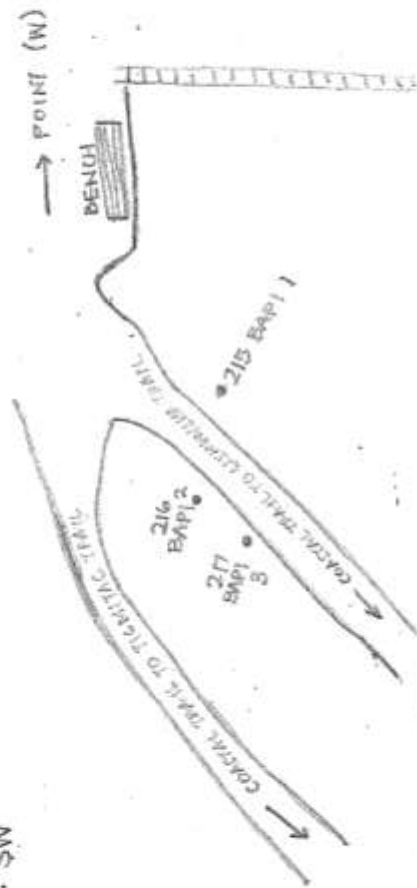
CPP-GOGA MORI SITE 3 AND SITE 4

Site code: CPP-GOGA-MORI 3

Date: 6/5/2011

Photo identifier(s):

Notes: ON LISHUMSHA COASTAL TRAIL, NEAR TOP OF RIDGE AND CONFLUENCE WITH BOOTLEGGER'S STEPS  
Aspect: SW

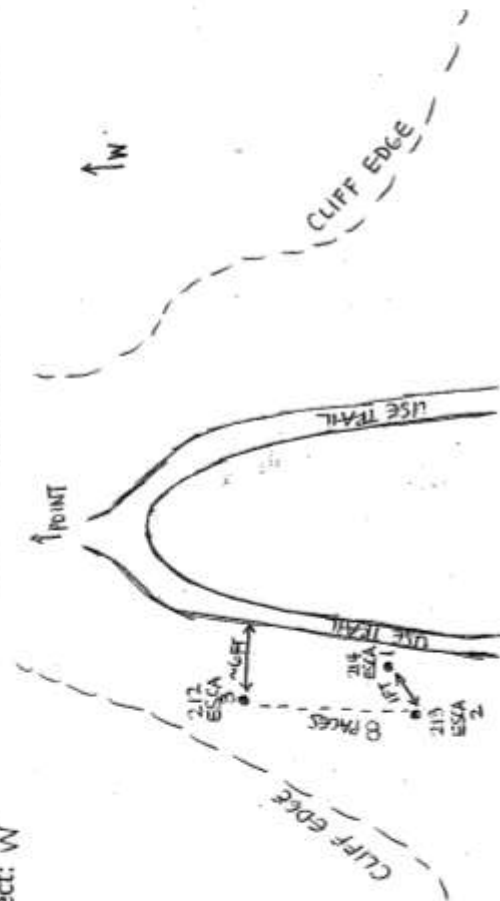


Site code: CPP-GOGA-MORI 4

Date: 6/5/2011

Photo identifier(s):

Notes: NEAR TERMINUS OF TRAIL TO POINT, PLANTS LOCATED ON SOUTH SIDE OF SOUTHERN USE TRAIL  
Aspect: W



### CPP-GOGA-MORI 3

Site Notes – Headed W on the Lishumsha - Coastal trail ~ 5m from overlook bench. Elevation 134 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
3	BAPI	<i>Baccharis pilularis</i>	1	215	4163737	544447	on R, last individual at site
3	BAPI	<i>Baccharis pilularis</i>	2	216	4163733	544450	on L
3	BAPI	<i>Baccharis pilularis</i>	3	217	4163735	544452	on L

**CPP-GOGA-MORI 4**

Site Notes – Headed W towards the point, flora patch on left side of trail. Elevation 97 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
4	ESCA	<i>Eschscholzia californica</i>	1	214	4163782	544295	on L
4	ESCA	<i>Eschscholzia californica</i>	2	213	4163781	544293	on L
4	ESCA	<i>Eschscholzia californica</i>	3	212	4163782	544289	on L, 8 paces down from ESCA 2, 6 feet from trail



CPP-GOGA MORI SITE 5 AND SITE 6

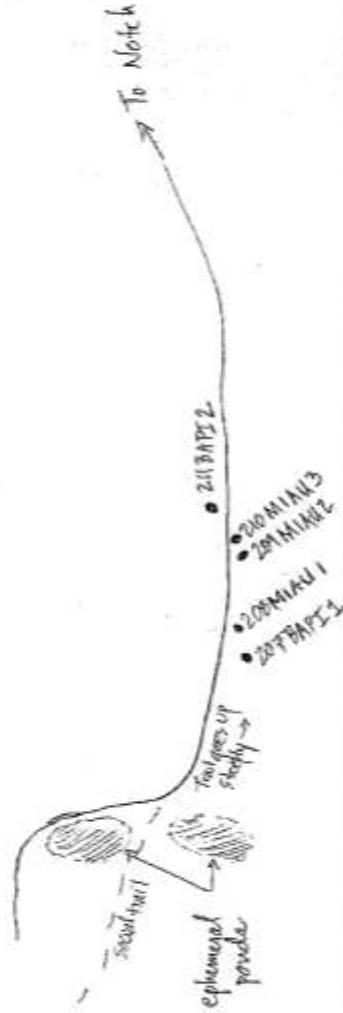
Site code: CPP-GOGA-MORI 5

Date: 6/5/2011

Photo identifier(s):

Notes: Along Coastal Trail heading to Notch ("Coastal" Trail); All plants on uphill (S) side of trail, about 5 feet from edge of trail  
 Except # 211, which is on downhill (N) side to trail, 2 ft from edge of trail

Aspect: NE



Site code: CPP-GOGA-MORI 6

Date: 6/5/2011

Photo identifier(s):

Notes: Along Coastal Trail heading to Notch ("Coastal" Trail); All plants on N-side of trail, about 1-foot off edge of trail

Aspect: NNE



## CPP-GOGA-MORI 5

Site Notes – on the coastal trail to Timigtac Trail, past ephemeral ponds, uphill. Elevation 151 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
5	MIAU	<i>Diplacus aurantiacus</i>	1	208	4163605	544598	on R
5	MIAU	<i>Diplacus aurantiacus</i>	2	209	4163601	544600	on the right, ~ 2 feet up slope from trail.
5	MIAU	<i>Diplacus aurantiacus</i>	3	210	4163601	544600	on the right, ~ 2 feet up slope from trail.
5	BAPI	<i>Baccharis pilularis</i>	1	207	4163607	544599	On the right ~ 3 feet up from trail (on slope). Upright individual.
5	BAPI	<i>Baccharis pilularis</i>	2	211	4163603	544602	On the left, ~ 2 feet downslope from trail edge. Upright individual.

## CPP-GOGA-MORI 6

Site Notes – on the coastal trail to Timigtac Trail headed towards highway (east), before tarped cape ivy patch. Elevation 185 feet.



SITE	SPECIES CODE	SPECIES NAME	INDIVIDUAL	UNIQUE IDENTIFIER CODE	NORTHING	EASTING	NOTES REGARDING PLANT POSITION
6	BAPI	<i>Baccharis pilularis</i>	1	201	41636543	544679	on L
6	BAPI	<i>Baccharis pilularis</i>	2	204	4163542	544681	on L
6	BAPI	<i>Baccharis pilularis</i>	3	206	4163542	544680	on L
6	MIAU	<i>Diplacus aurantiacus</i>	1	202	4163545	544674	on L
6	MIAU	<i>Diplacus aurantiacus</i>	2	203	4163545	544676	on L
6	MIAU	<i>Diplacus aurantiacus</i>	3	508	4163542	544681	on L

## VI. MONITORING GOALS

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### ***CPP Monitoring Goals***

The scientific goal of CPP monitoring is to accurately detect changes in plant phenology that can be used to assess the casual mechanism and biotic consequences. This requires large quantities of data, across wide and diverse geographic areas – like the state of California!

The CPP aims to use current phenological observations, distributed over local, regional, and state-wide environmental gradients, to measure phenological variation associated with spatial variation in temperature, moisture, light, slope, and aspect. Species or populations sampled over local gradients can be assessed for phenological responses to these microclimatic variables. Species sampled over broad geographic gradients (e.g., across latitude and elevation within or across biogeographic regions) will provide information on their responses to spatial variation in climate.

Understanding the degree to which the most common and widespread California plant species exhibit phenological variation related to current spatial variation in climate change is a first step toward predicting their responses to future temporal variation in climate.

For example, if across many species, the duration of flowering consistently becomes compressed in environments or elevations subject to the earliest onset of late-spring drought, then it may be predicted that, where climate change results in lower soil moisture earlier in the spring, the flowering durations of many species may also become shorter. Given that the length of the flowering and fruiting season of many species determines the diversity and abundance of the pollinators, herbivores, and seed dispersers that they support. Shorter flowering seasons of affected plant species can alert managers to the risks faced by the animal species that depend on them. In sum, changes in plant phenology may serve as a signal for management actions that could promote or preserve plant-animal interactions that are at risk.

Over extended periods of time, individuals and populations that are repeatedly monitored can be evaluated for their species-specific phenological responses to climate change. With long-term data, future scientists will be able to determine which phenological events and phenophases are most sensitive and responsive to climate change.

To achieve the CPP's scientific goals, the CPP seeks to engage Citizen Scientists across California to aid in observing phenological events, such as peak wildflower bloom and late season leaf-fall of deciduous plants.



To read more about the scientific goals of the California Phenology Project, download the *Scientific framework for the California Phenology Project: Report of scientific advisory meeting in Berkeley, CA (November 2010)* from the CPP website (<http://www.usanpn.org/cpp/resources>).

### ***Park Specific Goals***

At GOGA, the monitoring goal is to sustain and further develop the CPP project by engaging local schools, youth programs, volunteers, and parks staff in observing phenological events. Participating in the form of citizen science will make the observers more aware of nature around them, more connected to the park and its natural resources, and more aware of climate change and how it is affecting plant and animal life cycles. To achieve this goal, we need to sustain the relationships we currently have with schools, youth programs, and volunteers as well as to develop new community relationships. This can be accomplished by identifying and contacting teachers and youth program leaders in addition to continued outreach to volunteers. Youth programs such as the YMCA-SF, Boys and Girls Club, Boys and Girls Scouts are a few groups with which we have yet to establish communication. Schools such as City College of San Francisco, SF State, and Skyline College are either close to monitoring sites or have a standing relationship with the Parks and are areas where we can develop relationships and engage teachers and students.

Educators who are interested in becoming involved with the project will receive our support (if it is requested) in areas such as developing educational materials and activities, and scheduling fieldtrips to monitor at a GOGA trail. Individual volunteers will receive support and appreciation for their contributions to the project through a “step” rewards program. For instance, volunteers will be able to receive park gear (i.e. shirts, hats) and possible National Phenology Network gear depending on the number of observations they have contributed over a time period.

Another way to engage prospective observers is to take advantage of the park programs in GOGA (i.e. nursery, park stewardship, trails, etc.) that work with groups of individuals on a daily or program basis. Inserting a phenology monitoring activity into these programs will engage new audiences into observing phenology.

Continual outreach through multiple avenues is important in order to engage large and diverse audiences. Taking advantage of Park media (i.e. Facebook, newsletters) as well as those of Park partners will help ensure that citizens are aware of the CPP in GOGA (outreach activities can be found in **Appendix 2**).

Implementing all of the above will help the park reach its goal of engaging schools, youth programs, volunteers, and park staff in the observation and collection of phenological data that will inspire involvement with the park and a connection to climate change issues. In turn, this will help the CPP achieve their scientific goals of monitoring the effects of climate change on biotic cycles.

## VII. FREQUENCY OF MONITORING/ TIME INVESTMENT

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To accurately detect changes in phenology, the CPP suggests monitoring sites *at least* twice weekly. More frequent monitoring will maximize the ability to detect and accurately estimate change, although some CPP monitoring sites may be established primarily for interpretive purposes and monitored less frequently. Data entry is not time-sensitive, although we suggest uploading observations to *Nature's Notebook* frequently and at least 4 times a year to minimize a back-log of data.

Monitoring each of the three sites twice a week may be accomplished by a collaboration of interns, volunteers, education partners, and local school groups. ***Twice weekly monitoring requires approximately 8 visits a month per month to each monitoring sites.*** Experienced monitors can generally record all the phenophases (and their abundance metrics) for an individual plant in <5 minutes. Therefore, depending on the number of plants per site and the distance along with which they are distributed, the time required to monitor all plants at a given location may vary among locations. At GOGA, monitoring all plants at a given location may take 1-1.5 hours. Monitoring all three sites in one day can take 3-4 hours; not including time spent traveling between sites. Mori Point is the shortest trail (~0.5 miles) and would likely take 1 hour whereas the Lobos Dunes-Mountain Lake trail (the longest trail) would likely take 1-1.5 hours. The Old Bunker Road trail is the most difficult trail because it is mostly uphill and would take 1-1.5 hours. Individuals will have to make time commitments according to the trail they want to be responsible for. This time includes traveling between sites along one monitoring location and stopping to monitor all plants. The time estimates do not include time it takes to enter data after each field session.

To date, the OLBU and LDML monitoring locations are being monitored most during the academic year by classes led by Nature Bridge and the Presidio Trust, respectively. During the summer, interns and volunteers monitor the LDML trail. Monitoring of the MORI location is not ongoing except for a few months during the summer (June-August).

To accomplish the monthly monitoring of one location (e.g. OLBU) by relying solely on volunteers, ideally, a total of 8 volunteers would be recruited such that each volunteer monitors once a month. Alternatively, 4 volunteers could monitor twice over one week of the month. The most consistent way to collect monitoring data would be to recruit a group of committed volunteers that would continually monitor the same trail over a long period of time. Volunteer groups would be established based on monitoring locations so there would be a group for Marin Headlands, Presidio, and Mori Point. The more committed volunteers we recruit per location, the smaller the commitment will be for any one volunteer. Individual volunteers can choose to monitor the whole trail (e.g. OLBU), or specific sites along a trail (e.g.

OLBU Sites 1, 3, 5, and 6), or specific plants (e.g. BAPI #3, HELA #1, MIAU #399) if they wish to do so, as long as their visits and observations are consistent and on a long term basis. Although each volunteer will be committed to monitoring at one location, they can choose to monitor and explore other monitoring trails if they wish.

We can also coordinate monitoring efforts between groups and individuals, where each group or individual would create a monitoring schedule by signing up for particular monitoring days via a volunteer monitoring network on Google Calendar. Again, the more groups and volunteers that are recruited, the smaller the commitment will be for any one volunteer. The drawback of this effort will be that school group monitoring would augment consistent and long term data collection as groups usually visit a trail once or twice during the school year. Nevertheless, engaging school groups, even if it is on an inconsistent basis is important because it is a main component of the CPP is education.

There are many different ways to allocate the monitoring activities among participating volunteers and staff members depending on volunteer interest and the amount of time volunteers can commit.



## VIII. SUGGESTIONS FOR INTERPRETIVE PROGRAMS FOR THE PUBLIC

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The CPP has developed a variety of educational and interpretive programs that can be downloaded from the *Education* page on the CPP website (<http://www.usanpn.org/cpp/education>). Whether you're looking for a simple hands-on activity for the backyard or schoolyard, or you're in need of a guide to plan, install, and use a phenology garden for year-round scientific and educational activities, you'll find over 25 phenology-focused resources on the *Education* page. These resources are designed by CPP scientists and educators for a variety of ages and scientific abilities.

The CPP Interpretive Guide is also available for download on the website on the *Resources* page (<http://www.usanpn.org/cpp/resources>). We expect this guide will help park interpreters and educators to introduce the CPP to park visitors. This guide also provides suggestions for ways in which — through hands-on activities — park staff can help visitors to learn how park scientists and volunteers are detecting the effects of environmental variation and climate change on the seasonal cycles of plants and animals.

# APPENDIX

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## 1. UPDATING MONITORING LOCATIONS AND PLANTS

*The instructions below are specific to GOGA monitoring locations.*

### **Establishing new monitoring sites**

When establishing a new site, consider the accessibility of the site, spatial extent, and the abundance and diversity of GOGA monitoring species. Individuals have to be accessible with only a short walk off trail into fragile habitat. Areas with concentrations of endangered species should be avoided. Currently, there are only plans to establish Site 5 (and perhaps re-establish Site 6) in the LDML trail.

Begin with a reconnaissance survey of the site to establish which species are present and how many there are. To establish the site, you will need a GPS unit, a blank schematic sketch map available in the *CPP Folder – Materials*, pin flags, camera, GOGA plant spreadsheet, plant tags, and attachment wire. Tag each plant with one Unique Identifier Code tag and one Identifier tag with the following information (code): CPP-PARK-LOCA#-GESP#. LOCA# represents the location name in a four letter code (e.g., Mori Point = MORI) and the site at each location (e.g., site 3 at Mori Point = MORI3). GESP# represents the four letter code for each genus species combination (e.g. *Baccharis pilularis* = BAPI) and the individual plant number at each site (e.g. the third *Baccharis pilularis* = BAPI3). For example, a code of **CPP-GOGA-LDML1-BAPI1** means that we are in the site 1 of the Lobos Dunes Mountain Lake trail (LDML1) and the tag is attached the first *Baccharis pilularis* (BAPI) in site 1.

Record the spatial coordinates (northing and easting) of each individual and relevant data listed under the GOGA Plant Spreadsheet.

Create schematic sketch maps of the site using a blank sketch map. Take a site photo with pin flags marking the relative location of each individual. Remember to record site notes and location information with sufficient detail so that another person will be able to relocate site and plants.

Update all files and folders accordingly. Establish new monitoring location in GOGA's *Nature's Notebook* account under "Add a New Site."

## Establishing new plant individuals

When an individual plant dies within a site (procedure highlighted below), you may choose to tag another individual that is in the same site. Choose a new individual and tag the plant with a *new* Unique Identifier Code and code tag. Fill in the relevant information requested on the GOGA plant spreadsheet, update an existing site map, and take a new site photo. Lastly, update GOGA’s Nature’s Notebook account under “Add or Edit Plants.”

In the past, we have had some tags (mainly the Unique Identifier Code tags) removed from plant individuals. If this occurs, retag the plant with a new identifier code and update the relevant pieces of information.

## Removing individuals

Individuals should only be removed if they are dead. To remove an individual from GOGA observations, label the plant as “-DEAD” (do not delete plant entry) in the “Notes regarding plant position relative to trail of other plants” column of the GOGA plant spreadsheet. Make a note of the action in the GOGA spreadsheet in the “Timeline” tab (keeps a history of the addition/removal of individuals). Do the same in *Nature’s Notebook* by clicking “Add or Edit Plants” and at the plant nickname option add -DEAD (e.g. BAPI (#34) – DEAD). In the plant comment box, note the new status.

Select the site where your plant is located. Site: CFFP-GOGA-LD1. [Help to add a new site? Add here.](#)

To add a plant, start typing the common or scientific name of a plant in the field marked "Plant Species". Select from the list of possible matches that will be displayed.  
If you don't find a match:

- [View available plants](#)
- [View candidate species](#)

(help) For more information on each option, hold your cursor over

Your plants:

[Add another](#)

**BAP11 (#34)**  
BAP12 (#35)  
BAP13 (#36)

**BAP11 (#34)**

Plant Species

Nickname BAP11 (#34)

Patch?

Shade status --Select

Water? Unknown

Watered? No

Fertilizer? Unknown

Gender?

Planting date:

Month (MM)

Day (DD)

Year (YYYY)

[Add image](#)

Plant Image

Comments

From starting point of LC trail, headed West on the RIGHT side of trail, shrubby individual. Nothing at 410376. Ending 44000

[Save this plant](#)

**e.g. Change to BAPI (#34) -**

**Change to "This individual has been labeled"**

Lastly, update schematic site map and site photos. Remember, all edits to monitoring sites and plants should be noted in the GOGA spreadsheet in the “Timeline” tab.

## 2. OUTREACH ACTIVITIES

The following are recommendations for outreach activities in order to recruit and engage prospective volunteers.

### i. Newsletters and Presentations

#### a. Presentations during Park Stewardship/Presidio Stewardship/Nursery Programs

- Brief 5-7 minute talk about the project during break time or end of work day.
- Helpful materials:
  - The CPP National Park unit map.
  - The CPP-GOGA monitoring sites map.
  - Graph of GOGA phenological data to exemplify progress.
  - Contact/website information cards
- Talking points:
  - What is phenology?
  - What is the CPP? (goals, pilot program, etc.)
  - Why monitor phenology?
  - Progress
  - What's next
  - *More ideas for talking points refer to the draft CPP Educator's Interpretive Guide on CPP website.*

#### b. Park Stewardship Program newsletters

- A brief blurb or short article detailing the project, progress, upcoming events (if applicable) to go in a once-monthly (depends on the program) newsletter.
- Newsletters
  - San Francisco Stewardship
  - Marin Stewardship
  - San Mateo/Pacifica Stewardship

#### c. Presidio Park Stewards/ Presidio Plant Patrol newsletter (email update)

- A bi-weekly newsletter sent as an email update to Presidio Park Stewards and Presidio Plant Patrol volunteers.
- Contact: Cate Gregory – [catherine.gregory@hotmail.com](mailto:catherine.gregory@hotmail.com)

#### d. Presidio eNews

- A monthly newsletter for Presidio events, activities, science, and announcements.
- Contact: Jody Sanford – [jsanford@presidiotrust.gov](mailto:jsanford@presidiotrust.gov)



e. Park eVentures

- A monthly newsletter from the Parks Conservancy detailing ecology, biology, events and adventure opportunities in the park.
- Contact: Denise Shea – Director of volunteer programs - [dshea@parksconservancy.org](mailto:dshea@parksconservancy.org)

f. Science Newsletter

- Description: A monthly newsletter for science and natural resource updates in San Francisco Bay Area National Parks.
- Contact: Michelle O’Herron – Science communication – [moherron@parksconservancy.org](mailto:moherron@parksconservancy.org)

**ii. Internet Media**

a. National park Service –Golden Gate and/or Presidio – Nature and Science Webpage

- A source for nature and science news in the Golden Gate and Presidio, including page for information on the NPS climate change monitoring program. (<http://www.nps.gov/goga/naturescience/adapting-to-climate-change.htm>)
- Contact: Will Elder – Presidio Interpretation – [Will\\_Elder@nps.gov](mailto:Will_Elder@nps.gov)

b. Parks Conservancy Facebook page

- Source for upcoming events, activities, nature news, and science in the parks.
- Contact: Mike Hsu – Communication Specialist – [Mhsu@parksconservancy.org](mailto:Mhsu@parksconservancy.org)

c. Parks Conservancy webpage

- For advertising on the homepage
- Contact: Mason Cummings – Online Communications Specialist - [MCummings@parksconservancy.org](mailto:MCummings@parksconservancy.org)

d. Parks Conservancy calendar

- Daily events
- Contact: Jennifer Belloni – [Jbelloni@parksconservancy.org](mailto:Jbelloni@parksconservancy.org)

e. Park Academy

- If there is a workshop/training event, it can be offered as a Park Academy course and is another way to reach new audiences.
- Contact: Clara Voight – Academy Administrator – [Cvoight@parksconservancy.org](mailto:Cvoight@parksconservancy.org)

- f. Parks Conservancy email list
  - Send information to multiple individuals (list-serve)
  - Contact: Betty Young – Director of Native Plant Nurseries – [BYoung@parksconservancy.org](mailto:BYoung@parksconservancy.org)
  
- g. Crissy Field Center – Educators email list
  - Center for youth engagement programs in the parks. Outreach to students and teachers who have a relationship with the Crissy Field Center.
  - Contact: Ernesto Pepito – Associate Director – Youth Leadership – [Epepito@parksconservancy.org](mailto:Epepito@parksconservancy.org)
  
- h. Long-term volunteer opportunities page
  - A National Park Service source for volunteer and internship opportunities. Hosted by [www.volunteer.gov](http://www.volunteer.gov)
  - Contact: George Su – Media Specialists – [George\\_Su@nps.gov](mailto:George_Su@nps.gov) – vip-pd-form.  
Theresa Kreidler – Volunteer Specialists – [Theresa\\_Kreidler@nps.gov](mailto:Theresa_Kreidler@nps.gov)

### iii. External Sources

- a. Park Cafés and Visitors Centers
  - Places to advertise and make available project related brochures, pamphlets, flyers.
    - Warming Hut
    - Lands End Lookout
  
- b. Sports Basement
  - A place to advertise and make available project related brochures, pamphlets, flyers.
  
- c. Nature Bridge at Golden Gate
  - Non-profit partner with the NPS that holds educational programs year round.
  - Contact: Kerri McAllister – Education – [kmcallister@naturebridge.org](mailto:kmcallister@naturebridge.org)  
*Kerri is unavailable during the summer season. Summer program educators are available at their office at Fort Cronkhite.*
  
- d. Jake Sigg’s Blog/List-serve
  - CNPS Programs Co-Chair with a list-serve and daily Nature News blog.
  - Contact: Jake Sigg – [jakesigg@earthlink.net](mailto:jakesigg@earthlink.net)

e. CNPS Yerba Buena Chapter

- Contact: Jake Sigg

Peter Brastow – Presidio – [peter@natureinthecity.org](mailto:peter@natureinthecity.org)

Kipp McMichael – Newsletter/Webmaster – [kimcmich@hotmail.com](mailto:kimcmich@hotmail.com)

f. Jasper Ridge

- Stanford University – Jasper Ridge Natural Preserve

- Contact: Nona Chiariello - [nonajrbp@stanford.edu](mailto:nonajrbp@stanford.edu)

g. KQED Newsletter

- KQED sends out an e-newsletter once a month that includes a community event section (40-60 words).

- Contact: Sevda Eris – [seris@kqed.org](mailto:seris@kqed.org).