

# Appendix F: Santa Monica Mountains NRA CPP Monitoring Guide

Version 1

## Revision History Log:

Version #	Revision Date	Author	Changes Made	Reason for Change
1.00	9/18/2013	Crystal Anderson	Corrected Typos, added comments for review	Typos

***Phenological monitoring guide:  
Santa Monica Mountains National Recreation Area  
(SAMO)***

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



CPP focal species *Eriogonum fasciculatum* at Santa Monica Mountains NRA Sandstone Peak monitoring sites (photo by Brian Haggerty)

## **Contents**

I. Introduction.....	3
II. SAMO Points of Contact .....	4
III. CPP Species Monitored at SAMO.....	5
IV. SAMO Monitoring Locations and Maps .....	14
V. Frequency of Monitoring and Estimated Time Investment .....	18
VI. Datasheets and Data Entry .....	19
VII. Preliminary Phenological Calendars for SAMO focal taxa: estimates of phenophase onset and duration .....	20
VIII. Suggestions for Interpretative Programs for the Public.....	25

## **I. Introduction to the California Phenology Project**

**Phenology** is the study of the timing of seasonal biological events such as the flowering and fruiting of plants; the annual emergence of insect pollinators and pests; and the migration of birds and mammals. With funding from the National Park Service (NPS) Climate Change Response Program, the **California Phenology Project (CPP)**; [www.usanpn.org/cpp](http://www.usanpn.org/cpp) was launched in 2010 as a pilot project to develop and test protocols and to create tools and infrastructure to support long-term phenological monitoring and public education activities in California's national parks. On-the-ground pilot activities focused on seven California 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).

The goals of the *California Phenology Project* are to: (1) recruit and to train NPS staff in the Divisions of Resource Management, Education, and Interpretation; formal and informal educators; students; and the public in the skills needed for recording and interpreting phenological data; (2) establish baseline phenological patterns and track long-term phenological trends to document the effects of climate change on wild plants and animals; and (3) guide adaptive management of California's natural resources. For a detailed description of the CPP's scientific goals, please refer to the *Plant Phenological monitoring Protocol*.

Products of the pilot period include a *Plant Phenological monitoring Protocol* (with step-by-step instructions for conducting monitoring) and *park-specific monitoring guides* for each of the seven pilot parks. The material in this monitoring guide is meant to serve as a reference for CPP participants who are observing plants at **Santa Monica Mountains National Recreation Area (SAMO)**. It identifies and describes all of the CPP and USA-NPN resources that observers will need to start monitoring plants at SAMO (e.g., USA-NPN datasheets, SAMO monitoring sites and locations, and CPP species profiles). This guide, however, is not meant to replace participation in an official training event, nor is it meant to provide detailed background information about phenology and the USA-NPN monitoring protocols. Please refer to the *Plant Phenological Monitoring Protocol* for detailed monitoring instructions. For more information about the USA-NPN monitoring protocols, visit the USA-NPN's *How to Observe* webpage (<http://www.usanpn.org/how-observe>). To learn more about phenology, visit the CPP ([www.usanpn.org/cpp](http://www.usanpn.org/cpp)) and USA-NPN websites ([www.usanpn.org](http://www.usanpn.org)), where you can download newsletters, project briefs, presentations, and more (<http://www.usanpn.org/cpp/resources>).

## **II. Points of Contact**

For scientific collaboration or scientific inquiries regarding phenology research at Santa Monica Mountains N.R.A., please e-mail or call Christy Brigham, Chief of Planning, Science and Resource Management at [Christy\\_Brigham@nps.gov](mailto:Christy_Brigham@nps.gov) or 805-370-2339

For volunteer opportunities regarding phenology research, including data collection or individual projects, fill out a volunteer application at <http://www.nps.gov/getinvolved/volunteer.htm> and specify Santa Monica Mountains NRA as the park you are interested in.

### **Other CPP contacts:**

Dr. Angie Evenden  
Pacific West Region, Californian Cooperative Ecosystem Studies Unit  
[angela\\_evenden@nps.gov](mailto:angela_evenden@nps.gov)

Dr. Susan Mazer  
Professor of Ecology and Evolution  
University of California, Santa Barbara  
[mazer@lifesci.ucsb.edu](mailto:mazer@lifesci.ucsb.edu)

Dr. Liz Matthews  
Postdoctoral Associate  
University of California, Santa Barbara  
[matthews@lifesci.ucsb.edu](mailto:matthews@lifesci.ucsb.edu)

### III. CPP Species Monitored at SAMO

There are currently six species targeted for monitoring at Santa Monica Mountains NRA: *Adenostoma fasciculatum*, *Baccharis pilularis*, *Eriogonum fasciculatum*, *Quercus lobata*, *Quercus agrifolia*, and *Sambucus nigra* ssp. *caerulea*.

The two-sided CPP species profiles 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>. 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.** CPP species monitored in SAMO, with their USA-NPN protocol category and the other National Parks where they are monitored. (Abbreviations used: GOGA=Golden Gate NRA; JOMU= John Muir National Historic Site; REDW= Redwood National Park; JOTR=Joshua Tree National Park)

Scientific Name	Common name	USA-NPN Protocol Category	Parks
<i>Adenostoma fasciculatum</i>	Chamise	Broadleaf Evergreen Trees & Shrubs (no leaf buds)	SAMO
<i>Baccharis pilularis</i>	Coyotebrush	Broadleaf Evergreen Trees & Shrubs (with pollen, no leaf buds)	SAMO; GOGA; JOMU; REDW
<i>Eriogonum fasciculatum</i>	CA buckwheat	Semi-deciduous Trees & Shrubs	SAMO; JOTR
<i>Quercus lobata</i>	Valley oak	Deciduous Trees & Shrubs (with pollen)	SAMO
<i>Quercus agrifolia</i>	Coast live oak	Broadleaf Evergreen Trees & Shrubs (with pollen)	SAMO; GOGA
<i>Sambucus nigra</i> ssp. <i>caerulea</i>	Blue elderberry	Deciduous Trees & Shrubs	SAMO; JOMU

To see the complete list of CPP focal species, please visit <http://www.usanpn.org/cpp/AllSpecies>

Brief descriptions of the four species targeted for monitoring at SAMO are provided below.

**4.1 *Adenostoma fasciculatum* (ADFA; Chamise)** is a chaparral indicator species that is widespread in California, and it occurs across a range of environmental gradients (e.g., latitude, elevation, inland-coastal). It has showy white flowers and blooms later in the season than many other chaparral species. Its commonly synchronous flowering may be an important floral resource. Because chamise possesses a number of adaptations that enhance its flammability, it is an important species to consider for fire management. Chamise is a good species for Citizen Science efforts as it is easy to recognize and not easily confused with other chaparral species. It is widespread across California's public lands (e.g., it is present in 10 National Park units and 15 University of California Natural Reserves).

Download the USA-NPN datasheet and the CPP profile for ADFA here:  
<http://www.usanpn.org/cpp/ADFA>

**4.2 *Baccharis pilularis* (BAPI; Coyotebrush)** is a shrub in the Aster family that is widespread and common in coastal California vegetation types. It is easy to identify, and not easily confused with other species. It flowers late summer-fall-early winter so it is a nice choice for CPP participants who want to monitor at that time of the year. Coyotebrush is dioecious, 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). It is widespread in California's public lands (e.g., it is found in 10 National Park units and 19 UC Natural Reserves) and is currently monitored at Redwood National Park, Golden Gate NRA, and Santa Monica Mountains NRA.

Download the USA-NPN datasheet and the CPP profile for BAPI here:  
<http://www.usanpn.org/cpp/BAPI>

**4.3 *Eriogonum fasciculatum* (ERFA; California buckwheat)** is a widespread perennial shrub in the Polygonaceae family. This widespread species is currently monitored at Joshua Tree National Park and Santa Monica Mountains NRA.

Download the USA-NPN datasheet and the CPP profile for ERFA here:  
<http://www.usanpn.org/cpp/ERFA>

**4.4 *Quercus agrifolia* (QUAG; California Live Oak)** is a dominant tree in the lower-elevation mixed evergreen woodlands of California. It is easy to identify with lots of potential for exploring interactions with animals (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, least Bell's vireo and least tern). It is also commonly used in restoration projects. QUAG is widespread in California's public lands (e.g., it is found in 8 National Park units and 11 UC Natural Reserves) and is currently monitoring at Golden Gate NRA, Santa Monica Mountains NRA, and John Muir NHS.

Download the USA-NPN datasheet and the CPP profile for QUAG here:  
<http://www.usanpn.org/cpp/QUAG>

**4.5 *Quercus lobata* (QULO; Valley Oak)** is a keystone species that is endemic to California. It is a large tree that is winter deciduous and provides important food resources to wildlife. In southern California, Valley Oak is at the southern edge of its range; here, and elsewhere, it is already experiencing reproductive issues related to land-use change and climate change (see USFS profile here for a detailed discussion about management issues:

<http://www.fs.fed.us/database/feis/plants/tree/quelob/all.html#20>). It is present in 6 National Park units in California.

Download the USA-NPN datasheet and the CPP profile for QULO here:  
<http://www.usanpn.org/cpp/QULO>

**4.6 *Sambucus nigra* ssp. *caerulea* (SANI; Blue Elderberry)** is a shrub in the Caprifoliaceae family. It is common throughout the state, occurring across a broad latitudinal range. It is easy to identify, although a recent history of taxonomic uncertainty may result in some confusion (the taxon was incorrectly referred to as *Sambucus mexicana* in many parts of California, although *Sambucus mexicana* is a taxonomic synonym for a taxon not occurring in CA). SANI is easy to grow (e.g., it grows quickly from seed to maturity) and is a good candidate for use in phenology gardens. *Sambucus* spp were used by Native Americans for medicinal purposes and as a food source, and elderberry fruit is edible and used today in jams and wine.


It is also a species of management concern. It is the food plant of the rare Valley Long-Horned Beetle and is already monitored in the Central Valley for this reason. It is also a food resource for many other wildlife species and is commonly used in restoration. The flowers are insect pollinated, fruits are animal and gravity dispersed.

Download the USA-NPN datasheet and the CPP profile for SANI here:  
<http://www.usanpn.org/cpp/SANI>




Adenostoma fasciculatum species profile (Version 2, March 2012):

**California Phenology Project:**  
species profile for  
**Chamise**  
*(Adenostoma fasciculatum)*



**UCSB**



---

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




Photo credit: Barry Breckling

**What does this species look like?**

This species is an evergreen shrub up to 4 meters tall. The small leaves are linear, shiny, oily, clustered, and are 4 to 10 millimeters long. The small flowers are 5 millimeters in diameter and white, found in clusters at the ends of branches. The flowers have 5 petals and 5 stamens.

**When monitoring this species, use the USA-NPN broadleaf evergreen (no buds) datasheet.**

---

**Species facts!**

- The CPP four letter code for this species is **ADFA**.
- Chamise is a characteristic shrub of chaparral ecosystems.
- It is often dominant in hot and dry habitats.
- The oils from chamise were used by Native Americans for medicinal purposes, including the treatment of skin infections.
- Chamise is well adapted to fire and re-sprouts following burns.




Photo credit: Arnold Zane

---




Photo credit: KQED QUEST


**Where is this species found?**

- Chamise is found in chaparral, on dry slopes, on ridges, and in woodland and forest communities.
- Found at elevations less than 1600 meters.
- Present in California and Nevada.


---

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  
**Chamise**  
*(Adenostoma fasciculatum)*



**UCSB**



---



Cait McHugh and Anjanette Garcia


**Young leaves**

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

**Note:** Because there is no petiole on ADFA leaves, this phenophase may be difficult to identify on this species!

Similar to other species in Mediterranean and desert ecosystems, Chamise may respond to precipitation events with a flush of new leaf production. If water becomes unavailable after growth is initiated, however, then leaf expansion may be arrested, resulting in many small leaves on the plant. These responses to water availability (initiation of growth followed by arrested growth when the resources give out) can be confusing for observers. If you are unsure of what you are seeing, do not hesitate to circle ? on the USA-NPN datasheets. With more experience, you may be able to distinguish between newly produced, small young leaves and small old leaves. As you observe this species throughout the year, take note of the differences between new and old leaves—color, texture, and size can all be used to identify young leaves!


---



Brian Haggerty

**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 flower has both male and female parts that are visible when the flowers open fully.

**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"

---



Arnold Zane


**Fruits**

The fruit is tiny and capsule-like; it changes from green to rusty-brown or brown, and then drops from the plant when ripe.


**Ripe fruits**

The fruit is considered ripe when it is dry and rusty-brown or brown.

**Note:** fruit phenophases are nested; if you record **Y** for "ripe fruits" you should also record **Y** to "fruits"



Phenophases not pictured: Recent seed or fruit drop




← Ripe fruits close-up

Version 2, March 2012


Version 2, March 2012

*Baccharis pilularis* species profile (Version 3, April 2012):

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



**UCSB**



---

**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.




Photo credit: Jess Gambel

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

**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.





Photo credit: Jerry Kirkhart (Flickr)


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))

Version 3, April 2012

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



**UCSB**



---




Photo credit: Brian Haggerty

**Young leaves**

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




Photo credit: Crystal Anderson

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




Photo credit: Crystal Anderson

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




Photo credit: 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.




Photo credit: Steven Krause

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




Photo credit: 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"*




Photo credit: 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.




Photo credit: 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


*DRAFT Santa Monica Mountains NRA Monitoring Guide (April 2013)- Page 10 of X*

*Eriogonum fasciculatum* species profile (Version 2, March 2012):

**California Phenology Project:**  
species profile for  
**Eastern Mojave Buckwheat**  
(*Eriogonum fasciculatum*)



**UCSB**



---

**CPP site(s) where this species is monitored:** Santa Monica Mountains National Recreation Area, Joshua Tree National Park




Photo credit: Stan Shebs

**What does this species look like?**  
This perennial shrub can be up to 2 meters tall and 3 meters wide. The leaves are clustered at branch nodes and are leathery in texture; some varieties have white fuzz below, whereas others are glabrous. Leaves are a grey-green color, and rolled along the edges. The small flowers are 2.5 to 3 millimeters diameter, white to pinkish in color, and arranged in a dense clusters.

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 ERFA.
- This species was used by Native American groups to treat headaches, diarrhea, and wounds.
- This species is visited by a variety of butterflies, and is an important source of nectar for honeybees in dry areas.
- Can form associations with mycorrhizal fungi to aid in seedling survival and the colonization of new sites.




Photo credit: Brian Haggerty

---




Photo credit: wanderingnome (Flickr)

**Where is this species found?**


- Found in dry slopes, washes, and canyons.
- A member of sagebrush scrub, desert scrub and coastal sage scrub plant communities.
- Found at elevations less than 2300 meters.
- In California, it is distributed in the Southern Sierra Nevada, Central West CA, Southwestern CA, East of Sierra Nevada, and Deserts.

---


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))

Version 2, March 2012


**California Phenology Project:**  
species profile for  
**Eastern Mojave Buckwheat**  
(*Eriogonum fasciculatum*)



**UCSB**



---




Cait McHugh and Anjanette Garcia

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


Similar to other species in Mediterranean and desert ecosystems, Buckwheat may respond to precipitation events with a flush of new leaf production. If water becomes unavailable after growth is initiated, however, then leaf expansion may be arrested, resulting in many small leaves on the plant. These responses to water availability (initiation of growth followed by arrested growth when the resources give out) can be confusing for observers. If you are unsure of what you are seeing, do not hesitate to circle ? on the NPN datasheets. With more experience, you may be able to distinguish between newly produced young leaves vs. old, small leaves. As you observe this species throughout the year, take note of the differences between new and old leaves—color, texture, and size can all be used to identify young leaves!

---



Brian Haggerty

**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.

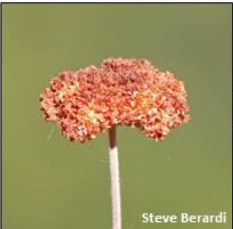


Brian Haggerty

**Open flowers**  
You can see the pollen-producing anthers emerging from the flower in the photo to the left. **Proportion of open flowers** should be recorded at the scale of individual flowers, not inflorescences (i.e. estimate the proportion of individual flowers that are open!).


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

---



Steve Berardi

**Fruits**  
The fruit is tiny and capsule-like, partially enclosed in a spent flower base (calyx), with many such spent flower bases tightly clustered together. The spent flower base changes from green to light brown or rusty brown as it dries out.



Arnold Zane

**Ripe fruits**  
A fruit is considered ripe when the spent flower base enclosing it has turned light brown or rusty brown. **Note:** fruit phenophases are nested; if you record Y for "ripe fruits" you should also record Y to "fruits"


---

The green, pre-ripe fruit phenophase may be difficult to identify on this species. Remember you can circle ? if you are unsure of what you are seeing! Phenophases not pictured: **Leaves, Recent fruit or seed drop**


Version 2, March 2012

*Quercus agrifolia* species profile (Version 2, March 2012)

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



**UCSB**



---

**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))

Version 2, March 2012

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




**UCSB**



---


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



Crystal Anderson


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

**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*



Crystal Anderson

**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.**


---



Ralph Waycott

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

---



Ralph Waycott

**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.)*

---

**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**

Version 2, March 2012


*DRAFT Santa Monica Mountains NRA Monitoring Guide (April 2013)- Page 12 of X*

*Quercus lobata* species profile (Version 2, March 2012):

**California Phenology Project:**  
species profile for  
**Valley Oak**  
(*Quercus lobata*)



**UCSB**



---

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




Photo credit: Adam Dale (Flickr)

**What does this species look like?**

This deciduous tree can be over 30 meters tall. The light grey bark has a texture reminiscent of alligator hide. When trees are very old, the branches may droop. The deeply lobed leaves are rounded and 5-12 centimeters long. The shiny leaves are dark green on the upper surface and pale green with a soft fuzzy covering on the lower surface. 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.

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

---

**Species facts!**

- The CPP four letter code for this species is **QULO**.
- Native Americans ground the acorns for mush, soup and bread.
- Acorns generally fall in October and are eaten by mammals, birds, and beetles.
- Valley oaks can have large galls on their twigs and leaves made by small wasps.
- They tolerate wildfire and hybridize often with other oak species.
- Requires access to groundwater to survive.





Photo credit: KP Botany (Wikipedia)

---



Breaking leaf buds with developing male catkins, Photo credit: Crystal Anderson


**Where is this species found?**

- Quercus lobata* is found on slopes and in valleys
- Found at elevations less than 1700 meters.
- Endemic to California; distributed from Shasta County south through the Central Valley and lower-elevation foothills and valleys of the Sierra Nevada and Coast Ranges to Los Angeles County.


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))

Version 2, March 2012


**California Phenology Project:**  
species profile for  
**Valley Oak**  
(*Quercus lobata*)



**UCSB**




---




Brian Haggerty

**Breaking leaf buds**




Brian Haggerty

**Leaves**




Brian Haggerty

**Increasing leaf size**



Tracey Hall


**Colored leaves**



**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 at the point where a new leaf is attached.

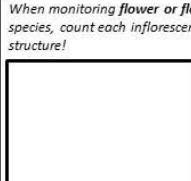
When monitoring flower or flower bud abundance for this species, count each inflorescence as a single flowering structure!



**Open flowers**


The male flowers will open once the 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.

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, and drops from the plant.



Steven Ryan

**Ripe fruits/Recent fruit or seed drop**

The fruit is ripe when it is light brown and drops from the plant. Since fruits drop from the plant when ripe, do not observe the Ripe Fruits phenophase (leave this line blank on your datasheet). Instead record Recent fruit or seed drop (as pictured).

**Important Note:** USA-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"

**Phenophases not pictured: falling leaves, pollen release**

Version 2, March 2012

*Sambucus nigra* ssp. *caerulea* species profile (Version 2, March 2012):

California Phenology Project:  
species profile for  
**Blue Elderberry**  
(*Sambucus nigra* ssp. *caerulea*)



UCSB



---

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



Photo credit: flit (Flickr)

**What does this species look like?**

This deciduous shrub forms thickets with many branches and can have multiple trunks. It grows up to 8 meters tall. The leaves are subdivided into 5 to 9 leaflets with toothed edges. The small yellowish-white flowers are found in dense clusters. They are bisexual, having both male and female parts within each flower. The fruits are a dark blue berry displayed in clusters.

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

---

**Species facts!**

- The CPP four letter species code for this species is **SANI**.
- The fruit is used to make wine, jellies, candy, pies, and sauces.
- Its wood is used to make combs, spindles, mathematical instruments, blowguns, flutes, and whistles.
- The bark is used to make a dye, and its leaves are used as an insecticide and medicinally.
- Several parts of the plant, including its unripe fruit, contain a poisonous alkaloid and cyanogenic glycoside.



Photo credit: James Gaither (Flickr)

---



Photo credit: KQED Quest (Flickr)

**Where is this species found?**


- Found in openings in moist forest habitat and moist areas within drier, open habitats
- Associated with riparian plant communities
- Grows best on loam or sandy loam soils.
- Most common at low to mid elevations.

---

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))

Version 2, March 2012


California Phenology Project:  
species profile for  
**Blue Elderberry**  
(*Sambucus nigra* ssp. *caerulea*)



UCSB




---




Crystal Anderson

**Breaking leaf buds**



Brewbooks

**Leaves**



Crystal Anderson

**Increasing leaf size**


**Colored leaves**



Forest & Kim Starr

**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.*



Liz Matthews

**Open flowers**

*Can you see stigmas and anthers? Proportion of open flowers should be recorded at the scale of individual flowers, not inflorescences (i.e. estimate the proportion of individual flowers that are open)!*


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 berry-like and changes from green to dark purple to black.*



Liz Matthews

**Ripe fruits**

*The fruit is ripe when it is dark purple to black*

Note: fruit phenophases are nested; if you record Y for "ripe fruits" you should also record Y to "fruits"

*Phenophases not pictured: Falling leaves, Recent fruit or seed drop*

Version 2, March 2012

## IV. SAMO Monitoring Locations and Maps

The CPP has established five monitoring locations at Santa Monica Mountains NRA: Cheeseboro Canyon, Paramount Ranch, Rancho Sierra Vista/Satwiwa, Sandstone Peak, and Zuma Canyon. Maps for each monitoring site are available for download at <http://www.usanpn.org/cpp/SAMO/maps>.

Table 2. SAMO monitoring locations, target plant species at each location (with number of targeted individuals), and the approximate phenologically active season for each phenophase category at each location. Estimates of the phenologically active season at each location are based on observations recorded in 2011, 2012, and 2013. Estimates should be revised as additional years are represented in the dataset.

	<b>Location (4-letter code)</b>	<b>Target Species (# of individuals)</b>	<b>Year monitoring initiated</b>	<b>Approximate Phenologically Active Season</b>
(1)	Cheeseboro Canyon (CHCA)	<i>Baccharis pilularis</i> (4)	2011	Leaves: year round Flowers: August-February Fruit: August-February
		<i>Eriogonum fasciculatum</i> (6)	2011	Leaves: year round Flowers: year round Fruit: year round
		<i>Quercus agrifolia</i> (8)	2011	Leaves: October-July Flowers: December-May Fruit: May-January
		<i>Quercus lobata</i> (12)	2011	Leaves: year round Flowers: February-May and September-November Fruit: April-December
		<i>Sambucus nigra</i> (5)	2011	Leaves: year round Flowers: February-July Fruit: May-August
(2)	Paramount Ranch (PARA)	<i>Adenostoma fasciculatum</i> (16)	2011	Leaves: TBD Flowers: April-July Fruit: year round
		<i>Baccharis pilularis</i> (5)	2011	Leaves: year round Flowers: July-December Fruit: October-March
		<i>Eriogonum fasciculatum</i> (13)	2011	Leaves: October-March Flowers: March-August Fruit: year round
		<i>Quercus agrifolia</i> (5)	2011	Leaves: April-June Flowers: April-August Fruit: year round
		<i>Quercus lobata</i> (12)	2011	Leaves: February-December Flowers: March-August Fruit: May-December
		<i>Sambucus nigra</i> (10)	2011	Leaves: year round Flowers: February-August Fruit: May-August
(3)	Rancho Sierra Vista/Satwiwa (RSVS)	<i>Adenostoma fasciculatum</i> (4)	2011	Leaves: December-August Flowers: February-July Fruit: year round

	<b>Location (4-letter code)</b>	<b>Target Species (# of individuals)</b>	<b>Year monitoring initiated</b>	<b>Approximate Phenologically Active Season</b>
		<i>Baccharis pilularis</i> (19)	2011	Leaves: year round Flowers: year round Fruit: October-April
		<i>Eriogonum fasciculatum</i> (4)	2011	Leaves: year round Flowers: February-August Fruit: March-December
		<i>Quercus agrifolia</i> (5)	2011	Leaves: March-August Flowers: April-May Fruit: July-December
		<i>Sambucus nigra</i> (2)	2011	Leaves: year round Flowers: February-October Fruit: April-October
(3)	Sandstone Peak Trail (SAPE)	<i>Adenostoma fasciculatum</i> (33)	2011	Leaves: TBD Flowers: TBD Fruit: TBD
		<i>Eriogonum fasciculatum</i> (28)	2011	Leaves: TBD Flowers: TBD Fruit: TBD
(6)	Zuma Canyon (ZUMA)	<i>Baccharis pilularis</i> (4)	2011	Leaves: year round Flowers: August-November Fruit: August-April
		<i>Eriogonum fasciculatum</i> (5)	2011	Leaves: year round Flowers: February-August Fruit: year round
		<i>Quercus agrifolia</i> (1)	2011	Leaves: year round Flowers: December-May Fruit: May-January
		<i>Sambucus nigra</i> (12)	2011	Leaves: year round Flowers: February-September Fruit: year round



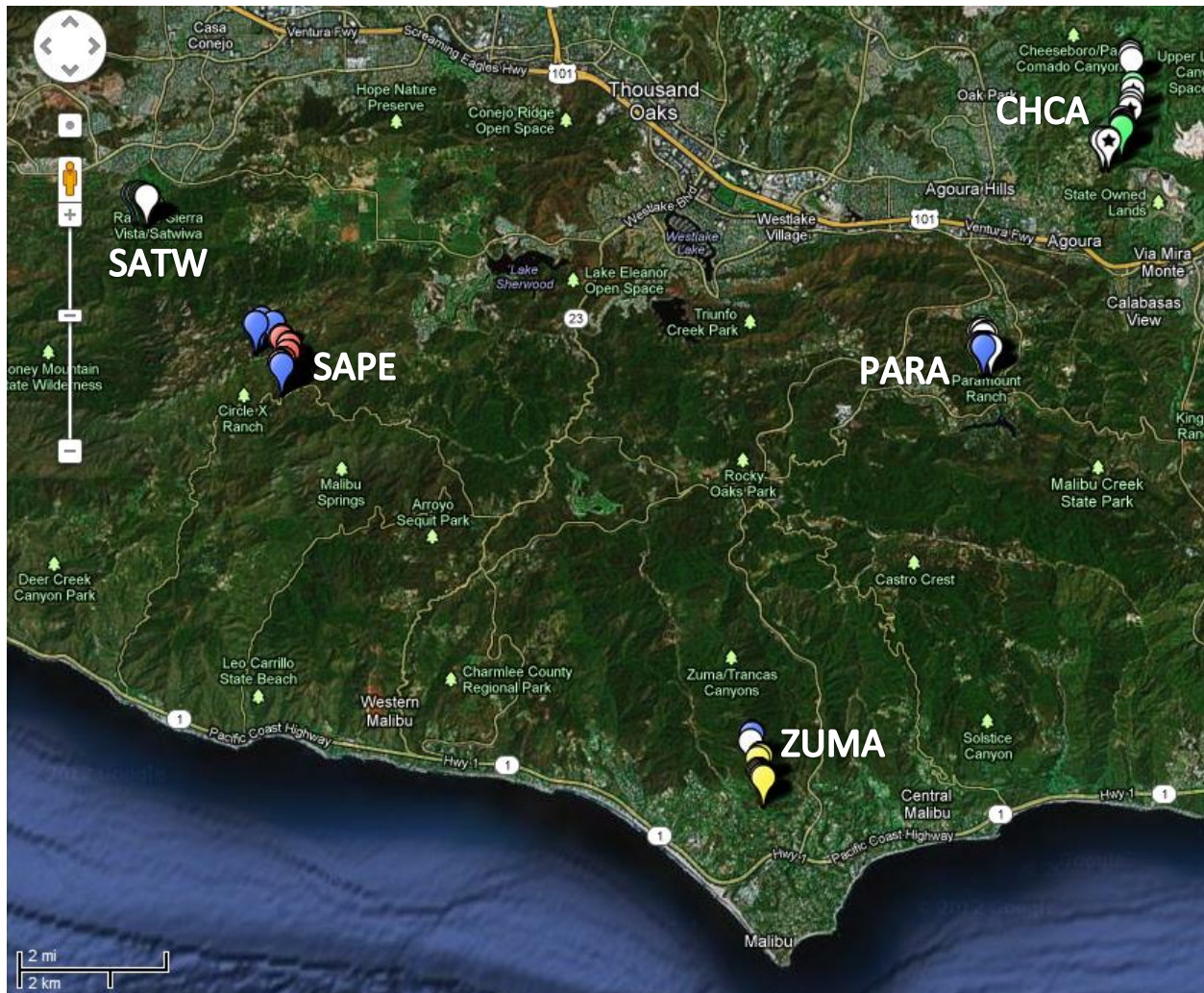


Figure 1. The five SAMO monitoring locations labeled with their four letter codes (used in the text below).

The *Cheeseboro Canyon (CHCA)* sites are on the first 1.75 miles of the Cheeseboro Canyon Trail, beginning at the parking area on Chesbro Road. This trail follows a streambed through a valley oak savannah and coast live oak riparian zone.

There are nine monitoring sites at *Paramount Ranch (PARA)*, most of which are on the Coyote Canyon Trail and Hacienda Trail. These trails cross sage scrub communities and oak savannahs. All nine sites can be visited.

The *Rancho Sierra Vista / Satwiwa (SATW)* sites are on the Satwiwa Loop Trail, Old Cabin Trail, Ranch Overlook and the Big Sycamore Canyon Trail.

There are nine monitoring sites at the *Sandstone Peak (SAPE)* trail. This 1.5 mile trail gains over 1000ft. Sandstone Peak is the highest point in the Santa Monica Mountains. Three sites at SAPE are monitored by Naturebridge students and staff.

The *Zuma Canyon (ZUMA)* sites are on the first mile of the Zuma Canyon Trail. The first site is just steps from the parking area at the end of Bonsall Dr.

A spreadsheet with GPS coordinates of tagged plants is available for download on the CPP website (<http://www.usanpn.org/cpp/SAMO>). Coordinates are provided in three formats: UTM, latitude-longitude, and decimal degrees. The datum for all coordinates is WGS84. The identifier code for each plant follows the same format: CPP-PARK-LOCA#-GESP#. LOCA# represents the location name in a four letter code (e.g., Sandstone Peak = SAPE) and the site at each location (e.g., site 3 at Sandstone Peak = SAPE3). GESP# represents the four letter code for each genus species combination (e.g. *Adenostoma fasciculatum* = ADFA) and the individual plant number at each site (e.g. the third *Adenostoma fasciculatum* = ADFA3).

## **V. Frequency of Monitoring and Estimated Time Investment**

As described in detail in the *CPP Plant Phenological monitoring protocol*, ideally plants should be monitored *at least* twice weekly to accurately detect changes in the onset and duration of phenophases. More frequent monitoring will maximize the ability to detect and to measure phenological change, although some CPP monitoring sites may be established primarily for interpretive purposes and monitored less frequently.

Although data entry is not time-sensitive, uploading observations to *Nature's Notebook* at least 4 times a year will minimize a back-log of data entry. Entering data more frequently (e.g., after each monitoring event or at the end of every week), however, is helpful in preventing confusion or correcting observation errors on the datasheets, since observers may remember the monitoring events well enough to correct errors during data-entry.

It is best to have only a small number of well-trained observers monitoring a site. Novices tend to interpret phenophase abundances or “quantities” differently, and if there are many observers with little experience recording abundance estimates, percentages and quantities may be estimated inconsistently on the data sheets.

## VI. Datasheets and Data Entry

Datasheets for all CPP species can be downloaded from the CPP website on the individual species pages (direct links to the datasheets are provided below) or from two locations on the USA-NPN website ([www.usanpn.org](http://www.usanpn.org)). See *Phenology Site and Trail Monitoring SOP #6* for additional instructions for downloading and using USA-NPN datasheets.

### Direct links to datasheets for SAMO species:

*Adenostoma fasciculatum* (Chamise): [http://www.usanpn.org/files/shared/observationsheets/species\\_701.pdf](http://www.usanpn.org/files/shared/observationsheets/species_701.pdf)

*Baccharis pilularis* (Coyotebrush): [http://www.usanpn.org/files/shared/observationsheets/species\\_702.pdf](http://www.usanpn.org/files/shared/observationsheets/species_702.pdf)

*Eriogonum fasciculatum* (CA buckwheat):

[http://www.usanpn.org/files/shared/observationsheets/species\\_708.pdf](http://www.usanpn.org/files/shared/observationsheets/species_708.pdf)

*Sambucus nigra* ssp *caerulea* (Blue Elderberry):

[http://www.usanpn.org/files/shared/observationsheets/species\\_1015.pdf](http://www.usanpn.org/files/shared/observationsheets/species_1015.pdf)

*Quercus lobata* (Valley Oak): [http://www.usanpn.org/files/shared/observationsheets/species\\_704.pdf](http://www.usanpn.org/files/shared/observationsheets/species_704.pdf)

*Quercus agrifolia* (California Live Oak):

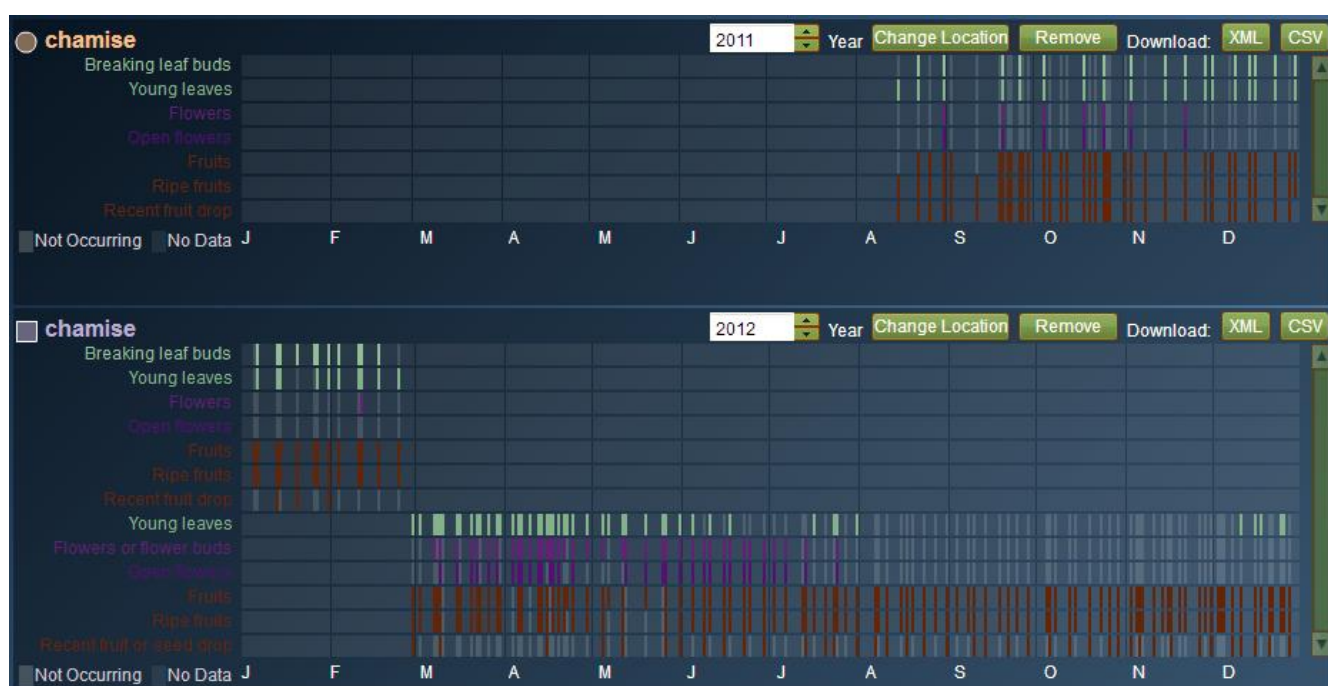
[http://www.usanpn.org/files/shared/observationsheets/species\\_705.pdf](http://www.usanpn.org/files/shared/observationsheets/species_705.pdf)

Step-by-step instructions for data entry into the National Phenology Database (NPDb) curated by the USA-NPN are provided in *Data Entry and Data Management SOP # 7*.

## VII. Preliminary Phenological Calendars for SAMO focal taxa: estimates of phenophase onset and duration

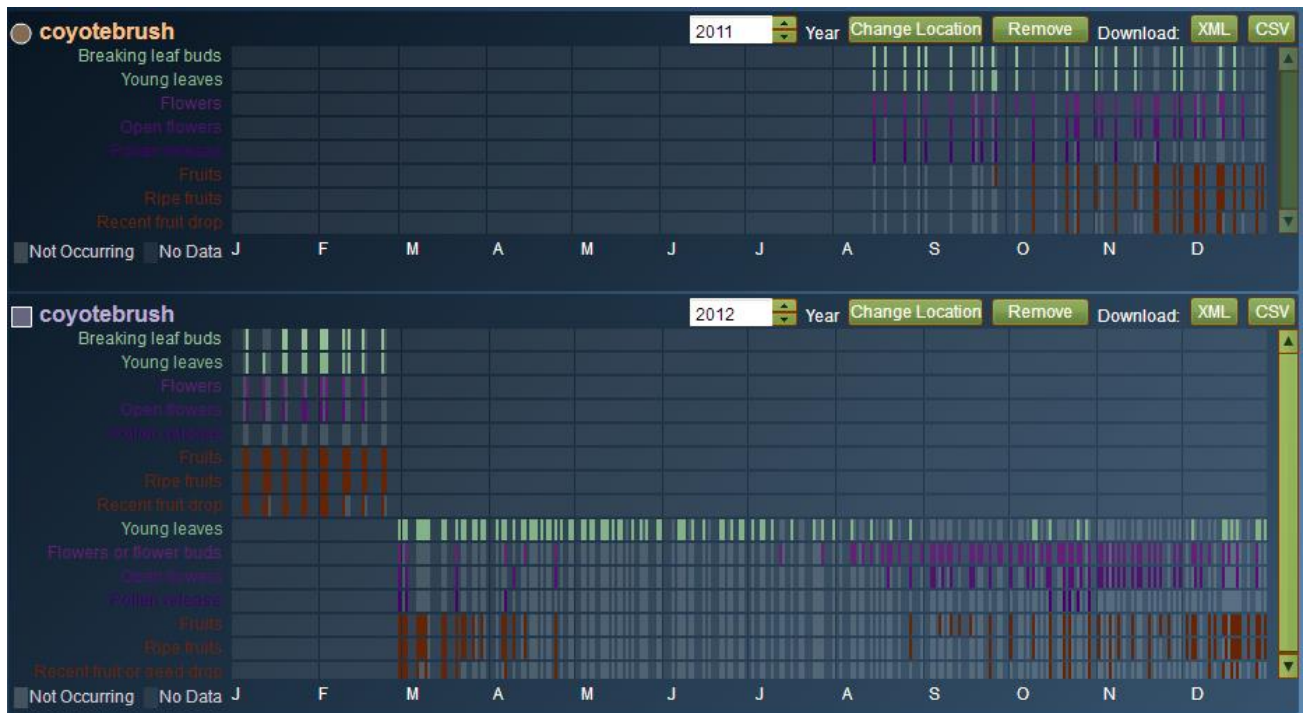
7.1 *Adenostoma fasciculatum* (Chamise): Observations recorded in 2011 and 2012 are summarized in the USA-NPN visualization tool below. Based on these preliminary records, the estimated phenologically active season for each chamise phenophase (at SAMO) is:

- *breaking leaf buds*: phenophase no longer observed
- *young leaves*: year-round
- *flowers*: year-round
- *open flowers*: year-round
- *fruits*: year-round
- *ripe fruits*: year-round
- *recent fruit drop*: year-round



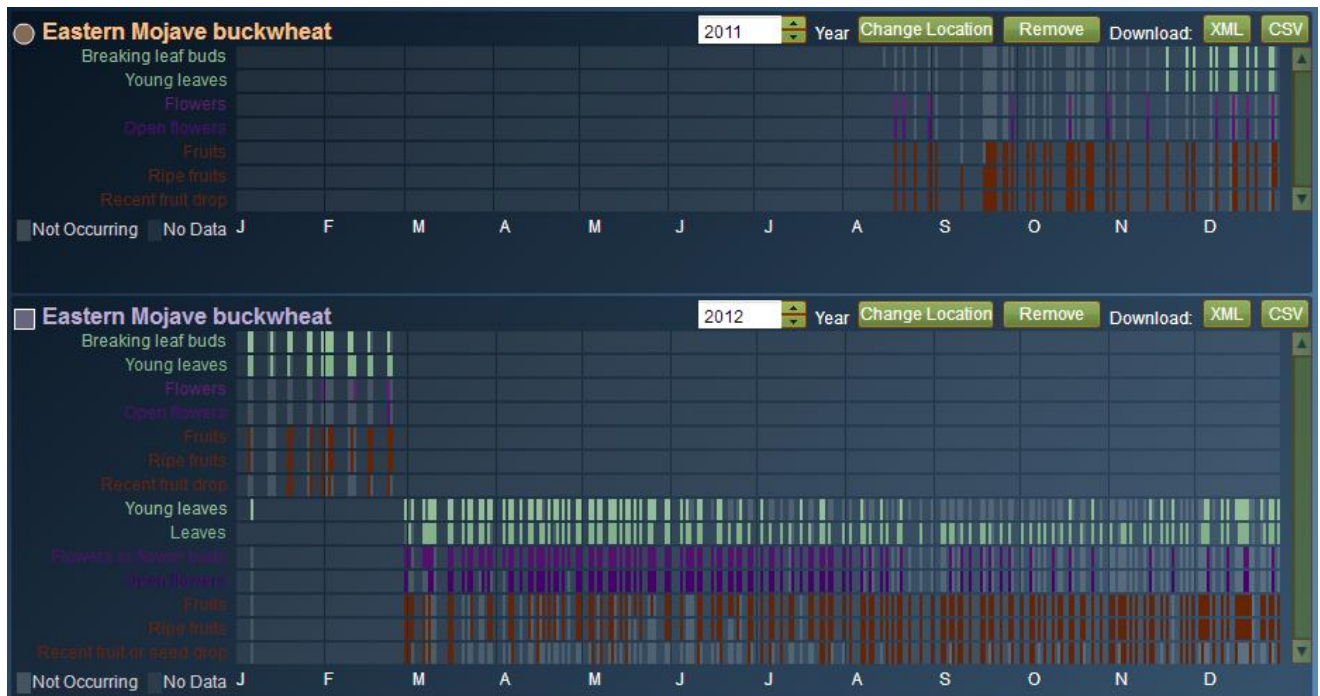
7.2 *Baccharis pilularis* (Coyotebrush): Observations recorded in 2011 and 2012 are summarized in the USA-NPN visualization tool below. Based on these preliminary records, the estimated phenologically active season for each coyotebrush phenophase (at SAMO) is:

- *breaking leaf buds*: phenophase no longer observed
- *young leaves*: year-round (sporadic)
- *flowers*: July-April
- *open flowers*: August-April
- *fruits*: August-April
- *ripe fruits*: August-April
- *recent fruit drop*: September-April



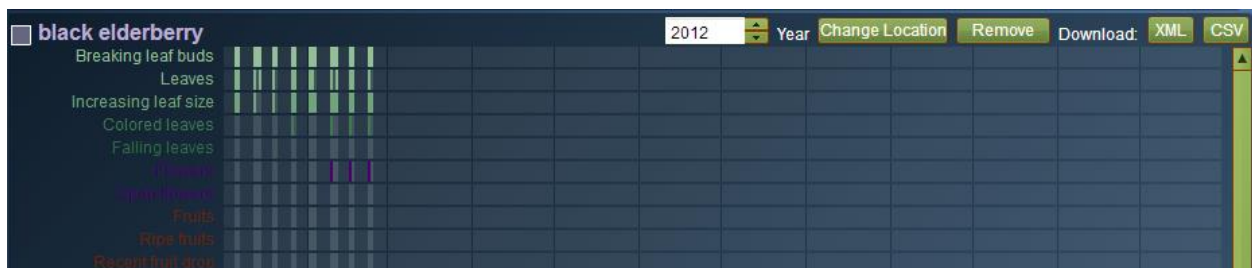
7.3 *Eriogonum fasciculatum* (CA buckwheat): Observations recorded in 2011 and 2012 are summarized in the USA-NPN visualization tool below. Based on these preliminary records, the estimated phenologically active season for each CA buckwheat phenophase (at SAMO) is:

- *breaking leaf buds*: phenophase no longer observed
- *young leaves*: year-round
- *leaves*: year-round
- *flowers*: year-round
- *open flowers*: year-round
- *fruits*: year-round
- *ripe fruits*: year-round
- *recent fruit drop*: year-round



7.4 *Sambucus nigra* ssp. *caerulea* (Blue elderberry): Observations recorded in 2012 are summarized in the USA-NPN visualization tool below (2011 observations were very sporadic and are not displayed). Based on these preliminary records, the estimated phenologically active season for each targeted elderberry phenophase (at SAMO) is:

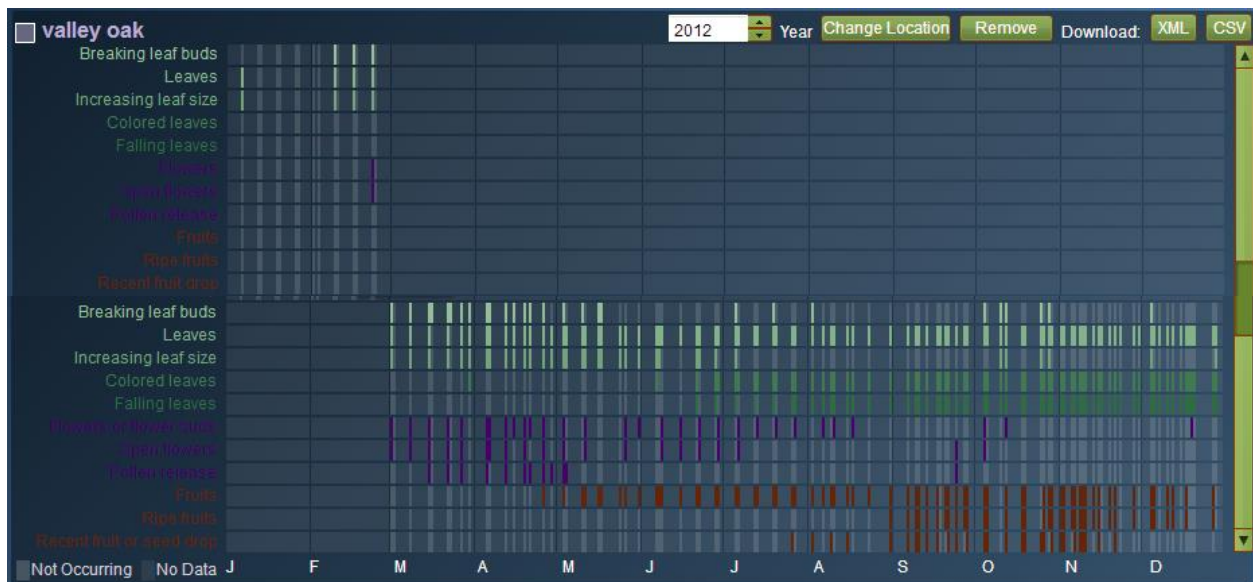
- *breaking leaf buds*: November-August
- *leaves*: year-round
- *flowers*: February-September
- *open flowers*: March-September
- *fruits*: April-December
- *ripe fruits*: May-December
- *recent fruit drop*: June-December





7.5 *Quercus lobata* (Valley oak): Observations recorded in 2012 are summarized in the USA-NPN visualization tool below (2011 observations were very sporadic and are not displayed). Based on these preliminary records, the estimated phenologically active season for each targeted valley oak phenophase (at SAMO) is:

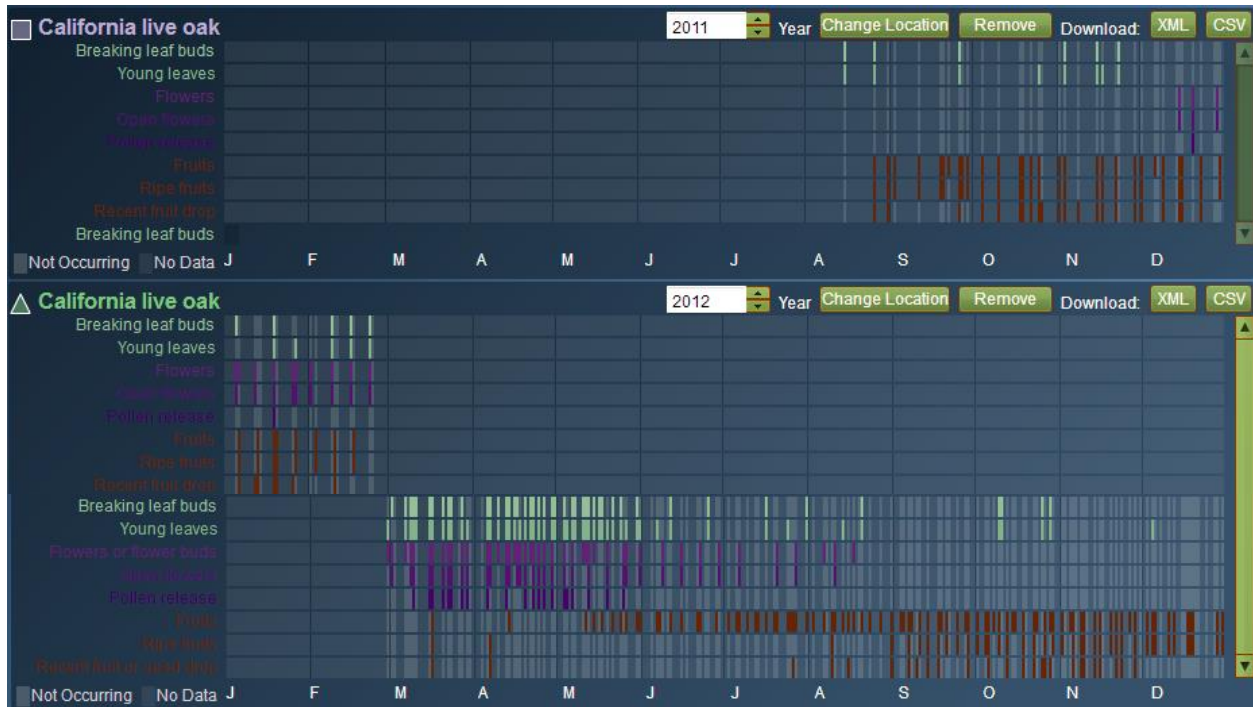
- *breaking leaf buds*: year-round, sporadic
- *leaves*: year-round
- *increasing leaf size*: October-July
- *colored leaves*: June-December
- *falling leaves*: June-December
- *flowers*: February-October
- *open flowers*: February-October
- *pollen release*: March-May
- *fruits*: April-December
- *ripe fruits*: August-December
- *recent fruit drop*: July-November



7.6 *Quercus agrifolia* (California Live Oak): Observations recorded in 2011 and 2012 are summarized in the USA-NPN visualization tool below. Based on these preliminary records, the estimated phenologically active season for each targeted CA live oak phenophase (at SAMO) is:



- *breaking leaf buds*: January-November
- *young leaves*: January-November
- *flowers*: December-August
- *open flowers*: December-August
- *pollen release*: December-May
- *fruits*: year-round
- *ripe fruits*: year-round
- *recent fruit drop*: sporadic, year-round



## VIII. Suggestions for Interpretative Programs for the Public

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.