

Welcome, Citizen Scientist/CPP Stebbins Volunteer!

This is a step-by-step guide to help you with your phenological monitoring! If you're ever feeling shaky about finding plants on the trail, knowing which datasheets to use, or telling poison oak from sneaky look-a-likes, you can always turn back to this document.

Monitoring session checklist

You'll need...

1. A clipboard (in the mailbox)
2. A pencil or pen
3. Species Profile sheets for all the species you'll be monitoring today (in the mailbox, laminated)
4. The "definitions" sheet, with verbal descriptions of all the phenophases and their appropriate quantity "bins" (in the mailbox, laminated)
5. The Trail "A" datasheet or the Trail "B" datasheet (OR both!), depending on which trail you signed up to monitor today. (extras are in the mailbox, but it's very helpful to us if you print one before coming to Stebbins!)
6. The Plant Checklist: this guide lists all the monitored plants on the Stebbins Phenology Trail, in the order that you encounter them, beginning from the trailhead. This document has helpful hints about where to find the plants, if you're having trouble. Once you get confident with the trail's layout, you may not need this sheet, but having a list of the numbered individuals in order can be a helpful way to make sure you haven't missed any plants. (In the mailbox)
7. Trail Map: Once you get confident with the trail's layout, you may not need this sheet, but this can also be helpful for finding plants on the trail. (in the mailbox)



PHENOPHASE DEFINITIONS for CPP at Stebbins Cold Canyon Reserve
 Definitions for Trees and Shrubs: Deciduous, semi-deciduous, and evergreen

LEAVES

Breaking leaf buds
 One or more breaking leaf buds are visible on the plant. A leaf bud is considered "breaking" once a green leaf tip is visible at the end of the bud, but before the first leaf from the bud has unfolded to expose the leaf stalk (petiole) or leaf base.
 How many buds are breaking?
 Less than 3; 3 to 10; 11 to 100; 101 to 1,000; 1,001 to 10,000; More than 10,000

Young leaves
 One or more young, unfolded leaves are visible on the plant. A leaf is considered "young" and "unfolded" once its entire length has emerged from the breaking bud so that the leaf stalk (petiole) or leaf base is visible at its point of attachment to the stem, but before the leaf has reached full size or turned the darker green color or tougher texture of mature leaves on the plant. Do not include fully dried or dead leaves.
 How many young leaves are present?
 Less than 3; 3 to 10; 11 to 100; 101 to 1,000; 1,001 to 10,000; More than 10,000

Do you see...	Date:	Date:	Date:	Date:
	Time:	Time:	Time:	Time:
Breaking leaf buds	y n ?	y n ?	y n ?	y n ?
Leaves	y n ?	y n ?	y n ?	y n ?
Increasing leaf size	y n ?	y n ?	y n ?	y n ?
Colored leaves	y n ?	y n ?	y n ?	y n ?
Falling leaves	y n ?	y n ?	y n ?	y n ?
Flowers or flower buds	y n ?	y n ?	y n ?	y n ?
Open flowers	y n ?	y n ?	y n ?	y n ?

Plant Checklist: Monitored Individuals for Trail A (in order, as you encounter them along the trail, starting from the trailhead)

Trail Sign	Species	Metal Tag ID	Location
B1	Sticky Monkeyflower	CPP-STEB-MIAU-B1-866	On left side of the trail
A1	Coyotebrush	CPP-STEB-BAPI-A1-867	On right side of trail, in a...
A2	Toyon	CPP-STEB-HEAR-A2-868	On left side of the trail. Th...
A3	Toyon	CPP-STEB-HEAR-A3-869	On left side of the trail
	Coyotebrush	CPP-STEB-BAPI-A4-870	On left side of the trail, bu... surrounded by many other... you are looking at only thi...
B2	Sticky Monkeyflower	CPP-STEB-MIAU-B2-884	On left side of the trail, ne... On right side of the trail. Th...

Now you're ready to go!

On the Trail

The Basics: The Stebbins Phenology Trail has two different monitoring units along the same stretch of trail. The trails intermix along the way, and our entire phenology trail ends before crossing the creek (which is dry for most of the year).

Trail A

- Labeled with **GREEN** trail markers
- Has 15 individuals that belong to three of our monitored species: Coyotebrush, Buckeye, Toyon
- Mostly along the first half of the trail

Trail B

- Labeled with **YELLOW** trail markers
- Has 14 individuals for the three other monitored species: Sticky Monkeyflower, California Laurel, Chamise
- Mostly along the second half of the trail

Labels and Markers: Each plant that we'll be monitoring is labeled in two different ways: with a **trail marker** and with a pair of **metal tags** tied to the plant.

Trail markers

- Small, labeled trail markers are all along the phenology trail and should be easily visible from the trailside
- Plants on the "A" trail are marked with trail sign bearing a **green "A"** and their number (#1-15), e.g. "A1"
- Plants on the "B" trail are marked with a trail sign bearing a **yellow "B"** and their number (#1-14), e.g. "B12"
- Once you find a labeled plant, simply match the trail marker number with the corresponding column on the Trail A or Trail B datasheet.

Metal tags

- Each plant also has a pair of metal tags for verification--in case the trail markers are unclear or have been tampered with
- On a regular basis, you might not need to look at the tags, but if you're ever unsure, these metal tags contain information about the species and the trail marker number
- Each round tag has a unique, three-digit number on it, which is used by CPP on Nature's Notebook. The rectangular tag has a code on it with the following format:

CPP – STEB – Species Code – Trail Marker # - Round Tag #

For instance, Plant B1 (a Monkeyflower) reads: "CPP-STEB-MIAU-B1-866"

This format is used across other sites in the CPP network, and the plants' IDs on our Nature's Notebook page have an identical format. If you're ever uncertain that you're monitoring the right individual, check for the metal tag, and match the number to the one found on the "Plant Checklist."

The species codes might seem confusing, but they are derived from the first two letters of the Latin Genus name and Species name of each plant species. For our species this looks like:

Chamise = *Adenostoma fasciculatum* = "ADFA"

Sticky Monkeyflower = *Mimulus aurantiacus* = "MIAU"

Coyotebrush = *Baccharis pilularis* = "BAPI"

Toyon = *Heteromeles arbutifolia* = "HEAR"

Buckeye = *Aesculus californica* = "AECA"

California Laurel = *Umbellularia californica* = "UMCA"

Data Collection

Once you find a labeled plant and have matched the trail marker number (e.g. “B1”) with the corresponding column on the Trail A or Trail B datasheets, you can begin recording your phenological observations. We have practiced this in our trainings, but these are some helpful tips to remember:

- **Which plant am I looking at?**

Before you begin, make sure you have a sense of where the individual plant begins and ends. Many of the plants are growing close together and have several stems. It is often helpful to trace the stems to the base of the plant and give the stems a gentle shake to make sure you are monitoring the entire individual.

- **The Big-picture**

At first, it is often helpful to get a general sense of the “vegetative status” (leaves and leaf buds) and the “reproductive status” (flowers, fruits, and seeds) of the plant. Before beginning, it can be useful to ask yourself: What’s happening vegetatively with this plant? Does it have leaves? What’s happening reproductively with this plant? Do you see flowers or fruits right away? This can give you a sense of the plant’s general status before beginning in-depth monitoring.

- **The Datasheet as a Guide**

As you record your observations, use the datasheet to guide you and try to tackle the phenophases one-by-one. Each species has a unique set of phenophases that we are interested in monitoring, and they will appear in a logical order. For instance, for Buckeye, the stages on the datasheet proceed as: “breaking leaf buds; expanding leaves; leaves; falling leaves; flowers and flower buds; fruits...”

- **Clarifying Phenophases**

If a phenophase is ever unclear, use both the written definitions (on the “Definitions” sheet) and the photographs and associated descriptions (on the Species Profile sheets) to clarify or reinforce your observations. If you ever feel uncertain about a phenophase, don’t hesitate to circle the question mark on the data sheet. Other volunteers may be having similar trouble, so feel free to email us with any questions you have. If you have a camera, it can also be helpful to snap a picture to send to other volunteers!

- **Plants are Patchy**

Make sure you check many different parts of the plant; the appearance of flowers, fruits, or leaf buds may vary across a single plant.

- **Estimation Strategies**

Try your best to estimate the number of each phenophase present, using the strategies we discussed at the trainings, such as breaking the plant down into visual “pieces” and then scaling up. But if you are feeling uncomfortable with an observation, don’t worry about leaving this field blank. Use the definitions sheet to find the appropriate bins for the quantity of each phenophase, and remember that some are expressed as “abundances” (e.g. 100-1000, 1,000-10,000), while others are represented as percents (e.g. 75%-95%).

- **Calibrate**

It's often helpful to check your observations with a partner. Talk about what you found, and discuss your differing strategies.

- **The Comments box**

The bottom of your data sheet has a "comments" section. It's helpful to leave yourself notes here whenever a phenophase is confusing, a trail marker is missing, or something particularly interesting is happening with the plant. We want to know if our plants have become too poison oak or lost a tag, but we also love hearing about if you observed an unidentified caterpillar on a toyon or a strange new gall on a coyotebrush. Your observations might not be limited to just plant phenology, so feel free to record your other observations and share them with the community

Data Entry

When you've finished collecting data for the 15 plants on the A Trail or the 14 plants on the B Trail (OR, all 29 plants on the whole trail!), your work is done (though we highly recommend enjoying or exploring the parts of Stebbins *beyond* our phenology trail). But once you're back home, the final step of the monitoring process is entering the information from your data sheet into Nature's Notebook. In the **data entry guide**, you can find step-by-step instructions, and it's extremely helpful if you enter your data no later than one week after your visit to Stebbins. This helps our community keep track of how much data "coverage" we have along our phenology trail.

Poison Oak & Sneaky Look-A-Likes

At Stebbins Cold Canyon, Poison Oak is common. The scientific name of Poison Oak, *Toxicodendron diversilobum*, literally translates to mean “poison tree (Toxicodendron) with varying, lobed leaves (diversilobum),” and after touching poison oak, most people develop an unpleasant, itchy rash. **ALL parts of this plant (including leaves, naked stems, flowers, and fruits) contain a poisonous oil called “urushiol,” which causes irritation on human skin. Urushiol stays active for a long time, so you can develop a rash from touching clothing or equipment that came in contact with poison oak.**



Figure 1: Poison Oak at Stebbins

Leaves of Three: Poison oak leaves resemble oak leaves, with edges that can vary from gently wavy to deeply lobed. These leaves appear in groups of three, so many people use the rhyme “*Leaves of three? Let it be!*” to remember what this plant looks like. Poison oak may appear as a small shrub, or as a vine that can climb up trees and shrubs. In the fall, Poison oak leaves turn bright red and eventually fall off, but even naked stems and red leaves can still cause itching.

As you are monitoring plants, keep an eye out for poison oak that may have tangled itself into one of our study individuals. Our trail crew is working hard to keep all of our study individuals free of poison oak so that you can monitor safely and easily. It is important to remember that other areas on the trail are not poison-oak-free, and this plant may re-grow in areas where it has been cleared. It is helpful to keep our community updated when too much poison oak has grown into our monitoring areas.

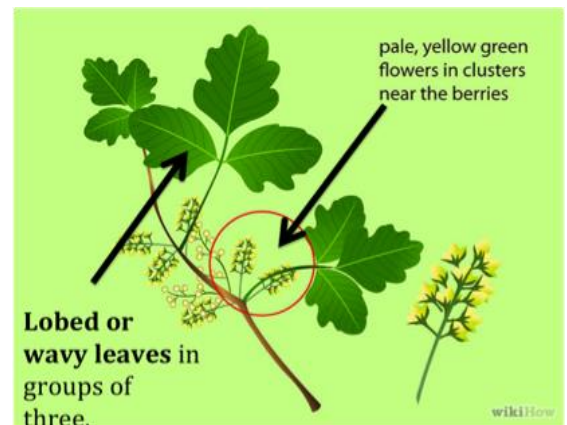
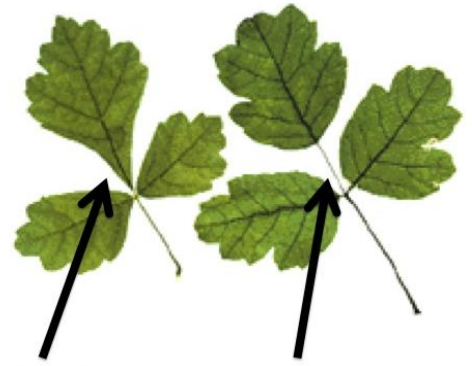


Figure 2: Leaves of Three, Let it Be!

Poison Oak Treatment: If you think you have touched poison oak recently, it is best to wash those areas as soon as possible. It can take about 6-8 hours for most people to react to urushiol oils, so if you remove the oils quickly, you dramatically reduce your likelihood of developing a rash. Soap and water are helpful, but specialized soaps like “Tecnu” are even more effective. **But the best of all treatments is avoidance: Wear long sleeves or long pants whenever you’re hiking, and your contact with poison oak will be rare!** Just be sure to carefully remove your clothes and wash them upon returning from Stebbins.

A Poison Oak Look-a-Like: At Stebbins, there is another plant that closely resembles Poison Oak. Skunkbush sumac, or *Rhus trilobata*, is closely related to Poison Oak, and like Poison Oak, it has lobed leaves in groups of three. Unlike Poison Oak, however, Skunkbush does not cause itchy rashes. There's an easy way to tell the difference between the two similar plants: On poison oak, the leaflets have clear "stalks" (a small gap connecting the leaflet to the stem), but on skunkbush, the leaflets are connected directly to the stem, without that clear "stalk" (see image to right).



Skunkbush lacks a distinct stalk on the middle leaflet.

Poison oak has a clear stalk on the middle leaflet.