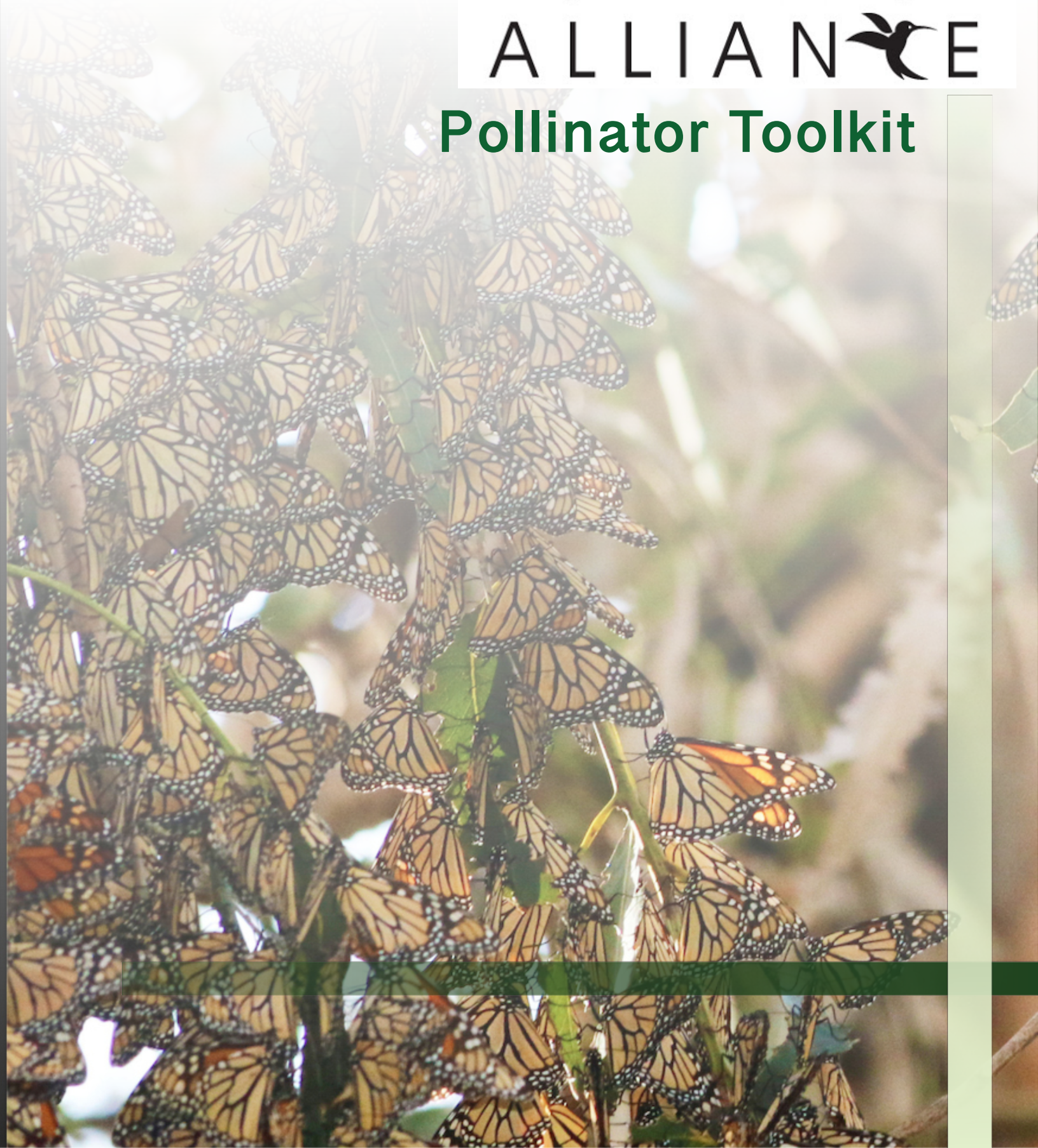


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Pollinator Toolkit



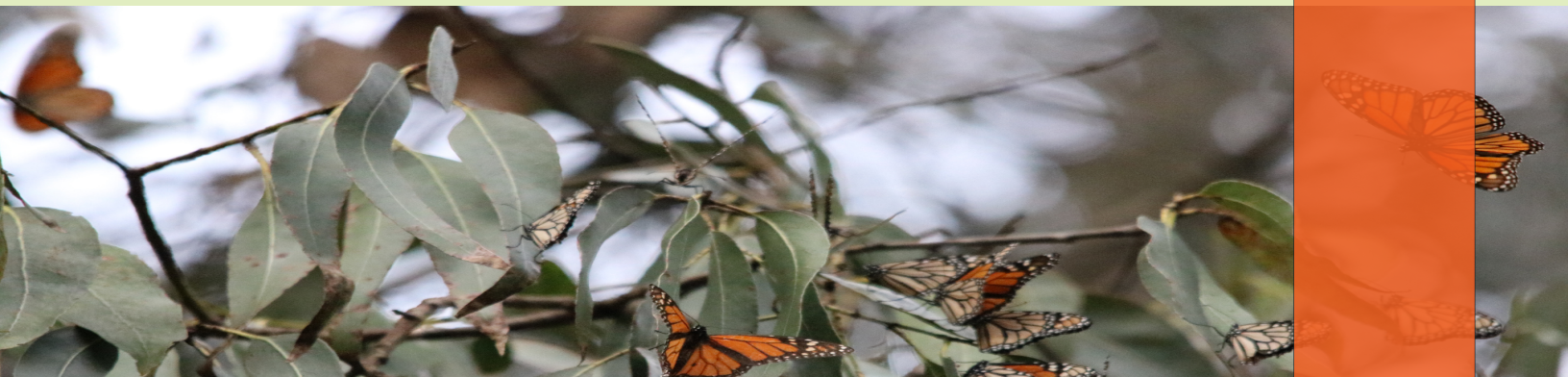
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Pollinators Need Our Help

Pollinators touch our lives in countless ways

Pollinators are responsible for the food we eat, much of the clothing we wear, and they define our seasons — flowering meadows, summer berries, and the pumpkins we carve at Halloween. What do you think a world without pollinators would look like?

Historically, millions of monarchs overwintered along the Pacific coast — The Xerces Society estimates there were 4.5 million in the 1980s. The Xerces Society's Western Monarch Thanksgiving Count in 2020 showed less than 0.01% of the historic population remains. Not only do monarchs face stress, but other invertebrates do too, such as bumble bees, who also play an essential role in our ecosystem.

We are responsible for long term pollinator decline. It is due to stressors like habitat loss and degradation, pesticide use, and climate change.

As different pollinator populations become more at risk, we are facing the responsibility of supporting pollinators by creating habitat, food, water, and shelter for them.



What can you do to help?

Growing a pollinator garden creates a habitat for these amazing creatures. It has other benefits like increasing biodiversity, adding beauty to your space, and allows for wonder and learning (great for kids and adults alike!). Creating a pollinator garden is rewarding and fun for everyone who participates.

Get Involved!

Did you know pollinators are responsible for one in three bites of food we eat?

Yet, pollinator populations are more threatened than ever! Fortunately, there is lots we can do to help.



You don't have to have a large space to support our pollinators!

Start by finding a place you regularly visit to create your pollinator garden. Some places to start could be a corner of your backyard, in garden boxes or planters, window boxes, along a sidewalk, in front of your work place, on a patio or balcony!

Another option would be to join your local community garden.

Find your local community garden by searching a county wide community registry hosted by the Master Gardener Association of San Diego County (1)

Bee one in a million!

The Million Pollinator Garden Challenge (MPGC) is a nationwide call to action to preserve and create gardens and landscapes that help revive the health of bees, butterflies, birds, bats and other pollinators across America.

You can get involved by registering your garden on the MPGC Map (2)! Share your pollinator friendly garden with other pollinator enthusiasts and get ideas for enhancing your own garden!

You can find all links are typed out in the Resources section for your convenience as well.

Meet the Pollinators

Birds, bats, and all sorts of creatures are pollinators! However, insects are the most prevalent pollinators you'll see in your garden. Most people think of bees and butterflies as our insect pollinators, and are surprised to hear that flies, wasps, moths, and beetles are also common pollinators found in your backyard.



Butterflies and moths are both valuable pollinators. They support the health of agriculture and ecosystems, but are facing a significant decline in population size. For example, the western monarch's population has dropped to less than 1% of the population's historic size.

Did you know there are an estimated 20,000 species of bees worldwide, and approximately 3,600 are native to the U.S. and Canada? Unfortunately 28% of all North American bumblebees are facing some risk of extinction.



Fossil records suggest that beetles were probably the first insect pollinators of prehistoric flowering plants in the late Jurassic era, around 150 million years ago! Beetles—which make up about 40% of all known insects—mostly pollinate open, bowl-shaped flowers that they can walk over, such as poppies, goldenrod and yarrow.

Wasps are predatory insects that can be used as pest control! Most wasps are smooth-bodied omnivores that while feeding on nectar and pollen, incidentally pollinate flowers..



Hoverflies pollinate incidentally. They hover, like hummingbirds, over flowers to drink nectar. Their hairy bodies brush against the flower's stigmas and pollen is transferred.

What is a pollinator garden?

A pollinator garden is one that supports the various needs of a pollinator. **So, what does a pollinator need?**

A pollinator garden provides food, water, host plants, and shelter for a diverse range of pollinators.

Food – Flowers provide nectar and pollen to pollinators. Plant a diversity of plants to support a variety of pollinators. Flowers of different colors, fragrance, and bloom time will provide food throughout the year.

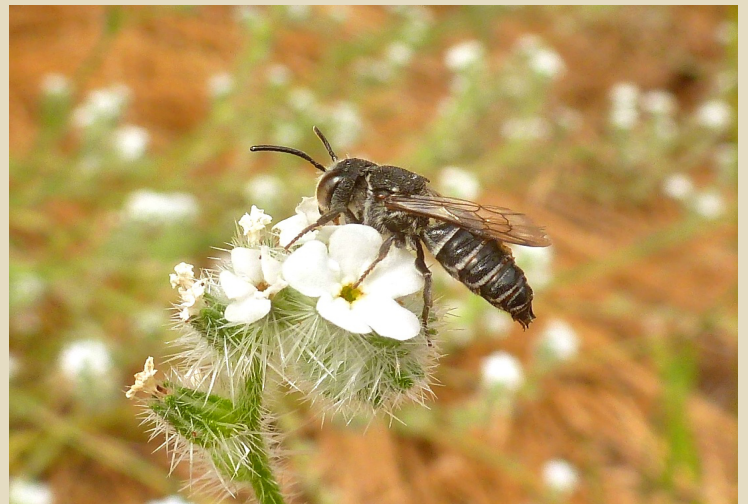
Water – A reliable and clean source of water is essential in your pollinator garden. Human-made and natural water features such as dripping or running water, pools, ponds, and even bird baths provide water for pollinators.

Shelter – Pollinators need protection from weather and predators. Trees, shrubs, and different sized perennial plants can support them. Consider bee boxes, bug boxes, bat boxes, or bird houses as well.

Host Plant – Are specific plants that animals need to live, either as a source of food or as a nursery plant for eggs and larvae, such as milkweed for monarchs.

Plant California Natives!

Native plants provide multiple benefits to both people and wildlife! They contribute greatly to healthy soil and water, don't need pesticides or fertilizers to survive, are water-wise, support biodiversity, provide shelter and food for wildlife, promote stewardship of our natural heritage, and most importantly, attract and sustain pollinators!



Take a look at the plant above and on the left.

Keep in mind that a variety of colors, shapes, and plant types is important to your garden's success and the variety of pollinators it attracts. Plant the rainbow and get creative!

Your Unique Pollinator Garden

Your pollinator garden is one of a kind! The most successful gardens are ones with a plan. Use this page like a journal to write out your expectations, pollinators you want to see, and what you want to learn from this experience.

Do you want to entirely redo your garden or start from scratch? Or, are you incorporating a couple pots or boxes?

What specific plants do you want in your pollinator garden?

What pollinators are you hoping to see?

What do you hope to get out of this experience? Is there anything specific you want to learn?

Where is your garden?

What's the weather like in your corner of San Diego?

Did you know San Diego county is the most biodiverse county in the continental United States? California has over 5,000 native plant species and 30 biotic communities. Due to the varied topography and unique, temperate climate, San Diego County is a biodiversity hotspot. The temperature, sun exposure, elevation, and annual rainfall vary greatly between each region of the county. When deciding where you will be gardening, take into account what your unique weather conditions are.



Picking the perfect location

When picking your pollinator garden location, there is a lot to consider. Keep in mind sunlight is a priority! Most plants native to San Diego that attract pollinators require full sun for at least half of the day.

When considering location, you must also observe the quality of the soil. Is it acidic, rocky, sandy, or clay like? Consider adding mulch or a nutrient rich topsoil, but you do not need to add soil amendments or fertilizer.

You may also want to consider how you're going to water your pollinator garden. Will you irrigate or hand water? Consider being water wise and investing in a rain collection barrel and selecting native plants that don't require much water. You can check out this [extensive guide](#) (4) on drought tolerant natives to incorporate into your garden. Local nurseries are a great source of information for planting guides. Resource links can be found at the end of this document (3).

Learn More!

Consider your biotic zone (5) when planning your pollinator garden.

A video on how to plant and water native plants can be found in resources 6 and 7.

Your Garden Layout

Now that you have chosen the location of your new pollinator garden, the fun part begins! How are you going to lay out your garden space, and what plants are you planning to incorporate?

What to Think About When Choosing Your Plants

Consider native host plants, nectar sources, water needs, and include a diverse range of shapes, sizes, colors, and bloom times, and how many plants will be needed to fill your space.

What plants should I consider?

Start by checking out the basic native plant list on the following page to get an idea of what plants to incorporate. Then check out the [CalScape Garden Planner](#) (8) to find plants unique to your zip code and design ideas for a range of landscaping styles.

In four easy steps you will get a list of plants suitable to your area. Explore the different species of plants, and start selecting which varieties you want to grow.

Garden Inspiration

Check out California Native Plant Society's User Submitted [Native Garden Profile](#) data base (9) to inspire your landscaping.

Not sure where to start when finding native plants?

[California Native Plant Society](#) (10) has a list of locations where you can purchase native plants.



Beyond plants

There are other ways to attract pollinators to your garden. Incorporating bird and hummingbird feeders, bird baths, rocks, logs, and landscape features can help bring a wide variety of pollinators to your space. Also, think of incorporating bird houses, bat boxes or bug structures that create spaces for other pollinators. [Click here](#) (11) to watch a quick video on how to create your very own bug hotel.

Sustainability tip - Reuse materials around your home to make feeders and homes for pollinators! Check out your old pots and planters before purchasing new ones.

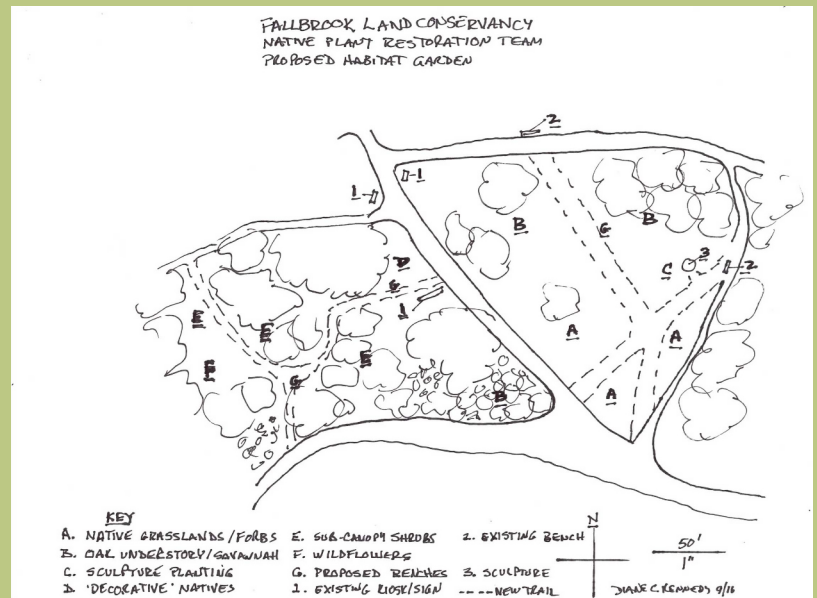
San Diego Native Plant List

Common Name	Scientific Name	Bloom Season	Pollinators
Yarrow	Achillea millefolium	Apr-Aug	Moths, butterflies, bees, insects
Narrowleaf Milkweed	Asclepias fascicularis	May-Sept	Butterflies (monarchs), birds
Sticky monkeyflower	Diplacus aurantiacus	May-Aug	Butterflies, birds (hummingbirds)
Ladyfingers	Dudleya edulis	May-Jul	Butterflies, moths, birds (hummingbirds)
Chalk dudleya	Dudleya pulverulenta	May-Jul	Butterflies, moths, birds (hummingbirds)
Coast sunflower	Encelia californica	Feb-Jun	Butterflies, moths, insects, small birds
Seaside daisy	Erigeron glaucus	Jan-Aug	Butterflies and bees
California buckwheat	Eriogonum fasciculatum	Apr-Oct	Butterflies, moths, bees, birds
California poppy	Eschshoizia californica	Apr-Jul	Butterflies, moths, bees, small herbivores
Giant coreopsis	Leptosyne gigantea	Jan-May	Moths, butterflies, bees
Southern honeysuckle	Lonicera subspicata	May-Aug	Moths, butterflies, birds (hummingbirds)
Silver bush lupine	Lupinus albifrons	Apr-Jul	Butterflies, moths, bees, birds
Summer lupine	Lupinus formosus	Jun-Oct	Bees, butterflies, birds
Margarita BOP	Penstemon heterophyllus X	Yr Round	Bees, butterflies, birds (hummingbirds)
Bladderpod	Peritoma arborea	Nov-Jun	Beetles, butterflies, birds (hummingbirds)
White sage	Salvia apiana	Apr-Jul	Beetles, carpenter and bumblebees, butterflies, birds (hummingbirds)
Black sage	Salvia mellifera	Mar-Jul	Butterflies, birds (hummingbirds, quail, towhees etc.)
Woolly blue curls	Trichostema lanatum	May-Aug	Bees, butterflies, birds

Extensive lists and care guides based on your zip code can be found on Calscape linked in the Resources section

Draw your Garden!

The space below is for you to draw your garden. Consider the habitat garden sketch on the right. You could color code, create a key, or just brainstorm! Use this page let your ideas flow and get inspired!



Consider the Season

Tips for a Successful Landscape

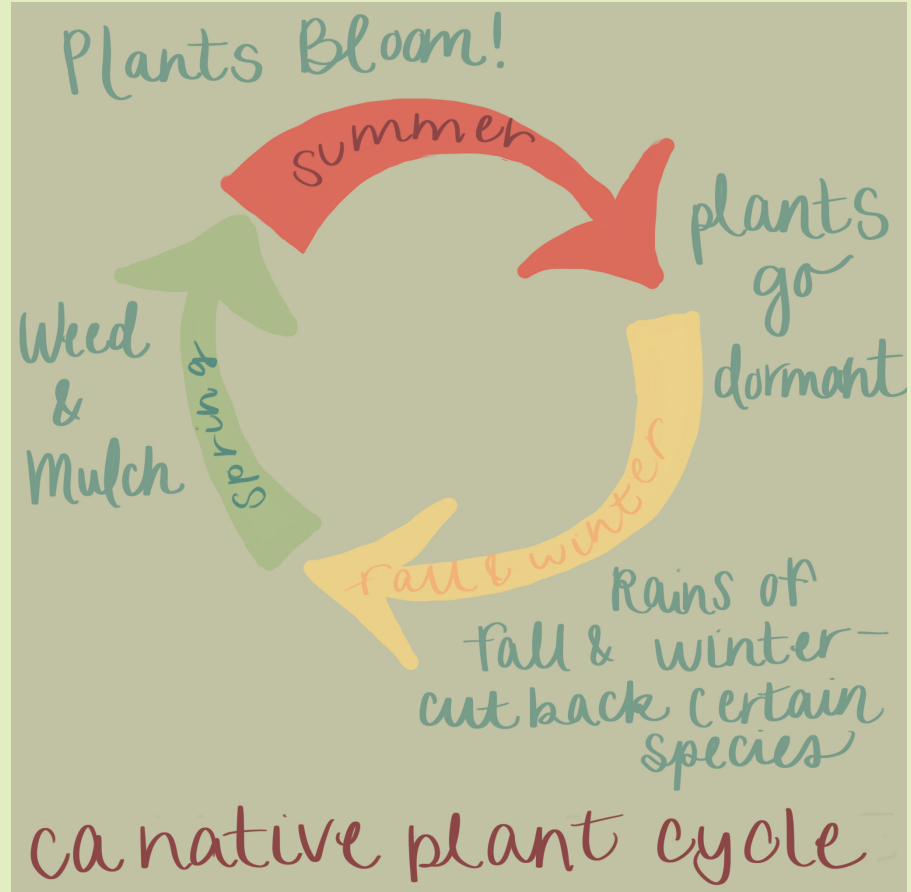
When planting your garden, keep in mind the time of year. It is best to plant in the cool of late fall and winter when we're likely to get rain. Planting in the cooler seasons helps the plants establish. Hot summer or early fall conditions are difficult times to start most plants. Click [here](#) to find a guide on when it is best to plant based on your location in the county. Whether you are close to the coast or in a dry inland valley, consider your microclimate when timing the planting of your natives.

Seasonal Care

Each plant has specific needs. For example, native milkweeds die back every winter, but non-native tropical milkweeds need to be cut back from November through March. Be sure to check out [Calscape](#) to learn more about what your natives need during each season.

Learn the cycles of California Natives

Plants native to Mediterranean climates, such as in San Diego County, have had to develop mechanisms to survive seasonal heat stress. Unlike the plants on the East Coast, most natives in San Diego go through a period of summer dormancy which is broken by the first rains of fall. In spring, weed your garden and renew mulch if needed. Allow most of your plants time to rest in summer, and be sure not to over water or fertilize. Some will even shed most of their leaves or die back to just their root stock in fall. These plants have evolved to survive in our hot, dry summers and wet winters.



Graphic created by Morgan Graves

Monitoring your Pollinator Garden

Be a Citizen Scientist!

Once you have a pollinator garden established, it is important to monitor it. This will help you keep track of what pollinators it attracts, and the health of your plants. We provided a simple monitoring chart and questions to think about. Come back to this resource monthly to keep up with your unique pollinator garden.

What kind of pollinators do you want to attract?

There are all kinds of pollinators to attract! Most prefer different plants over others. The plants you choose to grow will encourage certain pollinators to your garden. View the native plant chart to help make your plant selections based on which pollinators you want to attract, and set some goals for your garden!



Is it working?

Every garden is different! Sometimes certain pollinators visit often and others only briefly. By monitoring the garden, you can keep track of when and how often pollinators are visiting and interacting with specific plants. This can help determine what is working and what may not be

Once a month, sit in your pollinator garden on a sunny day, and spend 5 minutes with each of your flowering pollinator plants. Using the chart below, record each animal that comes into contact with a flower on the plant you're watching.

Journal Prompt

In your notes, record anything else of interest—about your plants phenology, or observations of animals that were not pollinating, but were nearby or eating plant material or other insects.

Which plants attract which kinds of pollinators?
What changes do you see from season to season (phenology)?

Pollinator Monitoring Chart

Date:	Temp: Weather Conditions:	Time Started:	Time Stopped:
Pollinator	Plant	Number of Flower Interactions	Notes
Bees (Anthophila)			
Wasps (Vespa)			
Bumblebees (Bombus)			
Butterflies/ Moths (Rhopalocera)			
Flies (Diptera)			
Ants (Formicidae)			
Hummingbirds (Trochilidae)			
Other			

Digesting Your Data

Help from the Team!

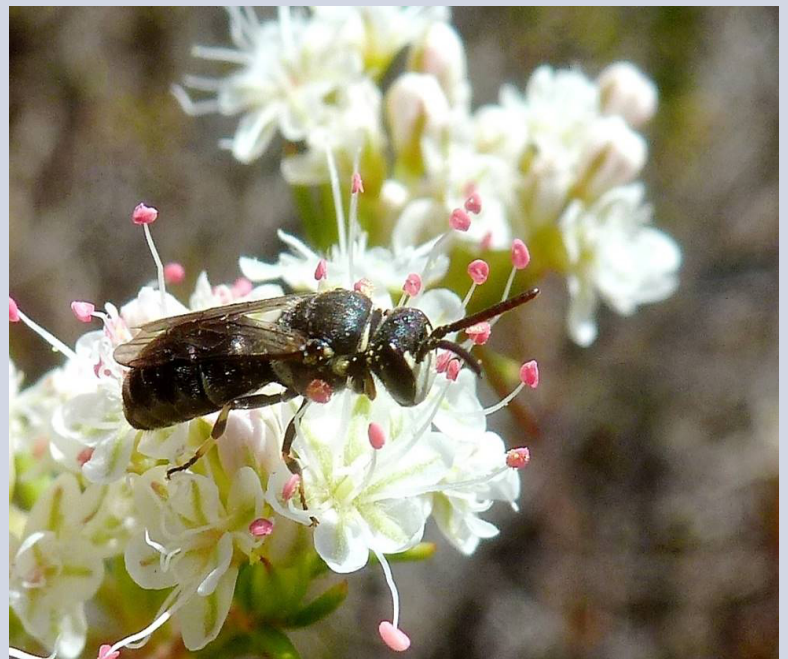
Hello from Cal State San Marcos Pollinator Team,

We hope that you are excited to start your pollinator journey and join the effort to support our native friends! We would like to give you a little background on what we do at our campus. In 2019, CSUSM installed a pollinator garden on campus with native flowering plants, shrubs, and trees. Shortly after, we decided to start monitoring the pollinators that are interacting with our native plants. For the last few years, student research assistants have been monitoring the garden once a week with roughly the same protocol as we have given you to use. The goal of our project is to gain information on pollinator interactions, ranges, patterns, and habits. Once we collect a sufficient amount of data, we use this data in order to help future pollinator projects such as garden design, corridor design, and monitoring protocols to name a few. We hope you enjoy your new garden; we are sure the pollinators will!

Check out the Cal State San Marcos Pollinator Garden [here](#) (13)!

Connect with Others!

Be a part of citizen science and supporting pollinator populations across the nation! Register your garden with the [Million Pollinator Garden Challenge Map](#) (12). Gain inspiration for your garden and share your studies with over a million pollinator enthusiasts!



Resources

- 1. Community Garden Search** - [xhttps://docs.google.com/document/pub?id=1Se-h5MV2o-qlzWChdR](https://docs.google.com/document/pub?id=1Se-h5MV2o-qlzWChdRJfXYIaPTAlpkek1III76ofu9E)[JfXYIaPTAlpkek1III76ofu9E](https://docs.google.com/document/pub?id=1Se-h5MV2o-qlzWChdR)
- 2. MPGC Map** - http://pollinator.beefriendlyfarmer.org/mpgcmmap/partners_2.html
- 3. Native Plant Guide:** <http://www.moosacreeknursery.com/california-native-planting-guide>
- 4. California Drought Tolerant Garden** - <https://www.lvmwd.com/home/showdocument?id=711>
- 5. Your Biotic Zone** - <https://www.laspilitas.com/comhabit/92000.htm>
- 6. “Plant it Right” Native Planting Video Series** - <https://californianativeplants.com/plantitright/>
- 7. Watering Natives** - <https://californianativeplants.com/wateringnativeplants/>
- 8. Calscape Native Plant Search** - <https://calscape.org/>
- 9. CNPSSD Garden Profiles** - <https://www.cnpssd.org/gardenprofiles-2020>
- 10. CNPSSD Where to Buy Native Plants** - <https://www.cnpssd.org/where-to-buy-native-plants-in-southern-california>
- 11. Youtube Video How To Make a Bug Hotel** - https://www.youtube.com/watch?v=Qpau_m2OCaE
- 12. Register your Garden:** <https://www.pollinator.org/mpgcmmap/>
- 13. Cal State San Marcos Pollinator Garden:** <https://sites.google.com/view/csusm-pollinator-garden/home?authuser=0>
- 14. Native Milkweeds & Monarch Conservation: Developing a San Diego Source for the Public Market:** <https://www.youtube.com/watch?v=BtUCV2dfqas>