

ONE TAM FREQUENTLY ASKED QUESTIONS: *TRACHUSA GUMMIFERA*, THE SAN FRANCISCO LEAF-CUTTER BEE

Learn about the San Francisco leaf-cutter bee and One Tam's 2024 detection of this rare species after decades. Visit onetam.org/tamalpais-bee-lab to learn more about our efforts to understand and protect bees in Marin County.

FINDING *TRACHUSA GUMMIFERA*

Q: What is the San Francisco leaf-cutter bee?

A: The San Francisco leaf-cutter bee, *Trachusa gummifera*, is a charismatic bee species that belongs to the leaf-cutting family. They're characterized by their unique habit of collecting leaves, potentially resin, and other material to build their nests. This species is currently known only from the greater San Francisco Bay Area and hadn't been detected in Marin since 1977.

Q: How was the bee detected?

A: In 2017, the One Tam partnership created the [Tamalpais Bee Lab](https://onetam.org/tamalpais-bee-lab) to learn more about our local bee populations. This important gap in our knowledge of local ecosystems was identified in our effort to study and improve the [health of Mt. Tamalpais](#). In 2017-18, we collaborated with Dr. Gretchen Lebuhn at San Francisco State University to conduct the first inventory of native bee species within Marin County public lands. You can view our results in the [2023 Peak Health report](#). This includes a list of current species, a historical species list (a list of what should be in Marin County according to historical records), and a list containing species of interest that experts recommended for further study.

This third group are species that may have had range extensions due to changes in climate, species with restricted foraging habits, or could be rare and unique species. One of them, *Trachusa gummifera*, was present in the historical record but missing in our inventory. It hadn't been documented in Marin in decades.

Sara Leon Guerrero, Community Science Program Manager at the Golden Gate National Parks Conservancy, conducted preliminary research about *T. gummifera*. She designed a community science approach to involve volunteers in a "search party" for the species.



This photo is one of the first images ever taken of the San Francisco leaf-cutter bee (*Trachusa gummifera*) in its entirety. The bee had not been seen for decades before One Tam's community science program found it in Marin County in 2024. This photo was taken by a professional biologist. Wildlife monitoring is conducted with appropriate training and handling under agency permits. ©Sara Leon Guerrero/Parks Conservancy

Sara and colleagues were out scouting sites for the search in May 2024 when she unexpectedly came across a bee that fit the description. Through her photographs, the USDA confirmed that it was indeed a male *T. gummifera*!

Q: Why wasn't *T. gummifera* seen for so long?

A: It's possible that in recent decades no one was looking for it. The last public record we found was from Napa in 1980. We did find the bee in one of its historical locations. This rare species seems to only exist in a restricted range.

Scientific research capacity and resources are limited. One Tam shares our expertise and resources to pursue this type of investigative work and creates opportunities for community participation. Our community science programs bolster support for species that need our help and attention. This work also feeds into broader state and national programs— increasing the impact.



Q: Where is the bee? Could I find it in my backyard or neighborhood?

A: The bee was detected in the Lagunitas Creek watershed on Mt. Tamalpais. To protect this sensitive species and its habitat, we can't share the exact location. Anyone who studies or handles this rare San Francisco leaf-cutter bee must have a scientific collecting permit from the California Department of Fish and Wildlife.

You're unlikely to see this bee in your backyard or neighborhood. While we still know relatively little, it seems to be associated with a particular chaparral habitat. We hope to learn more about its specific needs as we investigate further.

Q: Why is this bee, and finding it after so long, important?

A: Finding *T. gummifera* is good news for both scientific and broader communities. Scientists are documenting the impact of climate change and habitat loss. Many organisms are struggling because of these and other stressors. It's hopeful to see that a rare bee with a restricted range has persisted, despite changes that have occurred since it was last seen in the 1970s. It's possible other species that haven't been seen in a long time may also be found again.

When we study a single organism on the landscape, we're also looking at an entire web of relationships including all that it depends on to survive. *T. gummifera* is largely unknown to us, so in the next phase of our work, we have a great opportunity learn more about its life and ecology. This includes which plants it forages and where it gets the resin it needs to build its nests. We also have questions about forest health and the resources that are out there for this and other species.

For our community, this species is one that makes the lands we live and work in so special!

SUPPORT BEES & GET INVOLVED

Q. I want to learn more about bees and get involved in community science. Where do I start?

A. If you'd like to develop your skills and learn more about native bee biology and ecology in the field, we encourage you to join a local bee community science effort!

- **Tamalpais Bee Lab** (One Tam): Our local effort to better understand bee communities, gather information to inform future targeted monitoring studies, and contribute local data to broader efforts seeking to study and protect native bees. Stay tuned via our [newsletter](#), [website](#), and [social media](#) for exciting hands-on ways the community can get involved in building our local bee knowledge!
- **California Bumble Bee Atlas** (Xerces Society for Invertebrate Conservation): A statewide community science effort to conserve California's native bumble bees.

- **The Great Sunflower Project** (San Francisco State University): A nation-wide community science program collecting data on pollinator-plant relationships in yards, gardens, schools, and parks. Just select plants in your garden, document how many pollinators visit, and upload your observations to your Great Sunflower account!
- **Ground Nesting Bees** (Cornell University): A national effort using [iNaturalist](#) to better understand and protect nests of ground-nesting bees. Approximately 75% of all native bee species nest in the ground and yet we don't know much about their requirements and preferences for nesting habitat. Community scientists can help fill critical knowledge gaps on where and when bees nest so researchers and land managers can better work to protect and promote them in our public lands.



Volunteers look for bees to document for the California Bumble Bee Atlas. Photo: Kelly Sullivan

Q. How can I support One Tam's work to study bees?

A: Stay tuned! Our Tamalpais Bee Lab season has concluded for 2024, and we're planning next steps.

Hear about our community science offerings including future Tamalpais Bee Lab events by signing up for [Parks Conservancy](#) and [One Tam newsletters](#), and keep an eye on our [calendar](#). You can also [donate to One Tam](#) to support this and all our programs to protect the region's biodiversity.

Q: How can I support bees more generally?

A: One way to support bees is to get outside and start noticing these small organisms that are easy to overlook in our backyards and neighborhoods, and open spaces where we recreate. Join one of our events to practice this with other interested community members!

You can also support bees and other pollinators by choosing native plants for your home garden, or by participating in one of many programs from One Tam partners and other community partners to care for our local ecosystems.

TIPS FOR IDENTIFYING BEES

Q. I think I saw *T. gummifera*. What should I do?

A. Carefully take a photo of the bee in flight or foraging and upload it to [iNaturalist](#). See a tutorial plus more tips and resources for identifying bees below. Please don't attempt to handle and/or collect *T. gummifera*—this requires a [permit](#) from the California Department of Fish & Wildlife.

Q. Which other bee could it be?

A. Depending on the habitat surrounding your home or wherever you saw the bee, you may be observing another similar-looking bee. We have records of [276 bee species in Marin County](#) and believe there could be as many as 300-400! See below other native bees that may be visiting your garden.

SOME COMMON BACKYARD BEES



T. gummifera (San Francisco leaf-cutter bee)
Rare bee found in Marin after decades. Shown for comparison, NOT a common backyard bee. ©Sara Leon Guerrero/Parks Conservancy



Trachusa perdita (California Resin-Leaf-cutter Bee)
A more widespread, closely related species that looks similar and flies May-June in most of its range. ©Cat Chang



Megachile spp. (Leaf-cutter Bees)
Many species of leaf-cutter bees share similar characteristics to *T. gummifera*, like large mandibles, hairy thoraxes, and pollen-collecting hairs under the abdomen (on females). They fly spring-fall. ©Zoe Ferraris



Megachile brevis
A small- to medium-sized leaf-cutter bee that flies July-fall. ©Pinecone Priestess



Anthophora spp. (Digger Bees)
Fast-flying, hairy bees that fly late spring-fall. Distinguished from *T. gummifera* by their small mandibles, and that females have pollen-collecting hairs on their legs rather than on the underside of the abdomen. ©John Kehoe



Svastra obliqua expurgata (Western Oblique Longhorn Bee)
A large, fast-flying specialist bee that collects pollen from plants in the Asteraceae family but nectars at a variety of plants. They have small mandibles and females collect pollen on their legs. ©Christopher Jason



Megachile fidelis
A medium leaf-cutter bee that flies late spring-early fall. ©selwynq



Megachile montivaga
A medium leaf-cutter bee that flies summer-fall and collects flower petals instead of leaves for its nest construction. ©Robin Gwen Agarwal



Eucera (Peponapis) pruinosa (Squash Bee)
This specialist bee only collects pollen from plants in the genus *Cucurbita* but will nectar at a variety of other plants. They also have small mandibles and females collect pollen on their legs. ©Riley Walsh



Megachile perihirta
A medium to large leaf-cutter bee that flies summer-fall. ©Chris Evers

MORE ABOUT IDENTIFYING BEES

Q. Can you help me identify a bee that I saw?

A. It's wonderful to hear that community members are taking time to observe bees and other life around us! While we can't offer individual assistance with identifying organisms, there are lots of resources out there to help. Keep in mind that it can be difficult to identify native bees on the wing because many species look similar, and the characteristics used to tell them apart are often impossible to see with the naked eye. However, you can often narrow down to a particular group or family by observing certain characteristics and behaviors. Like all skills, learning to identify bees takes time and practice. See below for some tips and more resources!



IDENTIFICATION RESOURCES

Below are a few suggestions for print and online guides.

FIELD GUIDES AND IDENTIFICATION BOOKS

- [Bees of the World: A Guide to Every Family](#)
- [Common Bees of Western North America](#)
- [Field Guide to the Common Bees of California](#)
- [The Bees in Your Backyard: A Guide to North America's Bees](#)

ONLINE GUIDES

- [A Beginner's Field Guide to Identifying Bees](#) (Colorado State University Extension)
- [Bee Identification Guide](#) (Pollinator Partnership)
- [Bee Observer Cards](#) (Encyclopedia of Life)

INATURALIST

One of the most helpful things you can do is to take a good photo of the bees in question and submit it to iNaturalist. See the tutorials below. If you want to go deeper, please subscribe to the One Tam newsletter and keep an eye on our calendar for a future bioblitz. These quick biodiversity surveys are a great way to build observation skills and get practice with iNaturalist.

- [How to submit a photo with the iNaturalist app](#)
- [Getting started with iNaturalist](#)

QUESTIONS TO HELP IDENTIFY BEES

What time of year is the bee flying? Most California native bees are regionally seasonal, so depending on where you live you only see them flying at certain times of year. For example, mining bees (*Andrena* spp.) are typically spring bees in the Bay Area, so you generally won't see them in summer and fall. Summer long-horned bees (*Melissodes* spp.) fly in summer and fall, so if you see a long-horned bee in spring it's probably a spring long-horned bee (*Eucera* spp.). Some species are social (like [bumble bees](#)) or have multiple generations per year (like [Agapostemon texanus](#)) so you'll see them flying for longer periods.

Where are females collecting pollen on their bodies? Different species have different strategies for collecting pollen. For most, females have special pollen-collecting hairs called [scopae](#). Where these hairs are on the body can help with identification. Many bees in the families [Apidae](#), [Andrenidae](#), and some [Colletidae](#) have scopae on their legs. Most [Megachilidae](#) (including [Trachusa](#) spp.) have scopae on their abdomen. Some bees, like masked bees (*Hylaeus* spp.), ingest pollen into a crop and regurgitate it when they get back to their nests, so they won't have scopae. Other bees that won't have scopae are the [cuckoo bees](#) (such as *Nomada* spp., *Coelioxys* spp., *Sphecodes* spp.) which are cleptoparasites that take over the nests of their hosts.

Do they have any unique markings on their face or bodies? In addition to different hair color patterns, bees may have distinguishing markings on their face or bodies. Males often have markings on their clypeus (the area below the antennae but above the mouth). In some species, males and females may have banding on their abdomens that can be either appressed hairs (such as *Anthophora urbana*) or part of their exoskeleton (like *Anthophora californica*). Other bees like carder (*Anthidium* spp.) or masked bees may have markings on their thorax or abdomen that distinguish them from other groups.

Which flowers are they visiting? Bees can range from generalist foragers that visit plants from many different families for pollen to specialists who collect from a limited number of plants. There are many generalist foragers in our region including bumble bees, many sweat bees (*Halictidae*), large (*Xylocopa* spp.) and small (*Ceratina* spp.) carpenter bees, leaf-cutter bees, and carder bees. But even generalist foragers may exhibit preferences for certain flowers. Specialists include some mining bees, summer long-horn bees, and turret bees (*Diadasia* spp.). Learn more about specialist bees in our area from [Jarrod Fowler's website](#).

Are they collecting other resources such as leaves, petals, mud, resin, or plant fibers? Bees in the leaf-cutting family (*Megachilidae*) collect many different types of materials to construct their nests. They often have prominent and highly modified mandibles that allow them to cut, scrape, or masticate different materials. Some other groups, such as the digger bees, collect water and spray it on bare ground to construct their nests.