



*Above: A native bee to be on the lookout for this spring in Tahoe. This is *Habropoda depressa* (California mountain digger bee) visiting manzanita flowers. These bees are very active in the spring. Image Credit: Rachel Vannette, UC Davis TERC.*

*Below: Another bee to keep an eye out for is *Bombus vosnesenskii* (yellow-faced bumblebee). Below this, native species can be seen visiting *Ribes* (currant) flowers. Image Credit: Rachel Vannette, UC Davis TERC.*

Bees, Pathogens, and the Future of Tahoe's Wildflowers

This summer, the UC Davis Tahoe Environmental Research Center is “buzzing” with a new line of research. (Sorry, couldn't resist.)

We are excited to welcome the work of **Rachel Vannette**, PhD., Professor and Vice Chair of the Department of Entomology and Nematology at UC Davis, whose research focuses on bees and their defenses against pathogens.



Vannette and her team have studied bee health along the California coast and in the Sierra foothills, exploring the remarkable strategies bees use to combat fungal and microbial threats. But this work has never been conducted in the Lake Tahoe Basin. Bringing this research to Tahoe is especially exciting because of our region's unique climate, elevation, and seasonal snowpack. These conditions create different environmental pressures than those experienced by bees elsewhere in California, raising important questions:

How are Tahoe's bees adapting? Are their defenses against pathogens different? And what does that mean for the broader ecosystem?

Why Bees Matter in Tahoe

Bees are fascinating in their own right, but they are also essential to maintaining native plant diversity in the Tahoe Basin. Pollinators enable plants to reproduce, and

not all pollinators are equally effective. Previous student research has shown that, for example, honeybees do not always successfully pollinate certain [native Tahoe plants](#), including the camas lily. Native bees, however, may be far more important for sustaining local plant populations.

Pollination also promotes **outcrossing** — the transfer of pollen between different plants — which increases genetic diversity in seeds. Greater genetic diversity makes plant populations more resilient to climate change, shifting snowpack patterns, and other environmental stressors. In short, if you love Tahoe's wildflowers, you can thank a bee.

The Science of Bee Defense

Bees have evolved diverse and creative ways to protect themselves from pathogens. Some produce their own antimicrobial compounds or gather them from plants. Others rely on beneficial microbial partners that generate protective chemistry. Vannette investigates these microbial symbionts (organisms living in symbiosis with another) and the unique compounds they produce with graduate students in her lab at the University of California, Davis, and in collaboration with other researchers at additional Universities.

This research may have implications beyond bees. Some of the antifungal compounds that bees use to suppress pathogens, such as *Aspergillus*, could inform human medicine. With increasing concerns about fungal infections — including recent outbreaks of *Candida* in places like Las Vegas — understanding how bees naturally suppress pathogens could inspire new approaches to control or treat disease.

A Missing Baseline

Despite the ecological importance of pollinators, Tahoe lacks comprehensive long-term data on native bee populations. While point surveys have been conducted, we do not yet know whether native bees are thriving, declining, shifting in elevation, or changing their seasonal timing (phenology). Research on bumble bees conducted at the continental scale suggests that cold-adapted bees are decreasing in relative abundance, while data from the Rocky Mountains suggest that reduced snowpack can limit solitary bee overwintering survival. Yet without long-term datasets, it is difficult to detect trends or understand how climate change may be affecting pollinator communities in Tahoe.

Vannette's work represents a groundbreaking baseline study for the Tahoe Basin — the beginning of a much-needed effort to document and understand our native bee populations.

Citizen Science: Join the Buzz

This summer, [TERC will launch an iNaturalist citizen science project](#) focused on bees. A TERC intern will help community members learn to document bee sightings using the app, creating a shared dataset that tracks when bees emerge, where biodiversity hotspots occur, and how bee activity relates to snowpack and seasonal change. Watch your inbox for information on how you can participate.

This effort will empower residents and visitors to contribute directly to Tahoe science. By observing and recording bees, participants will help build the long-term record we currently lack — a record that could reveal how pollinators are responding to environmental change.

Why This Matters

Bees are small, but their impact is enormous. They sustain wildflower diversity, support ecosystem resilience, and may even hold clues to new antifungal strategies that benefit human health.

By bringing this research to Tahoe, TERC is expanding its watershed-wide approach to ecosystem health — recognizing that healthy lakes depend on healthy forests, and healthy forests depend on pollinators.

If you see a bee this summer, take a closer look. You may be witnessing one of Tahoe's most important — and most overlooked — environmental allies.

You can learn more about Dr. Vannette and her team here: [Vannette Lab](#)

Don't forget about our other upcoming events, including our Ski with a Scientist program happening at Palisades Alpine!

TERC events:

Ski with a Scientist

Feb 6 - Apr 10, 2026

Palisades Alpine Meadows 2600 Alpine Meadows Rd, Alpine Meadows, CA 96146

Who Cares? Lessons on Parenting From Frogs

Apr 2, 2026 @ 5:00 pm - 7:00 pm

Sunnyside Restaurant & Lodge, 1850 W Lake Blvd, Tahoe City, CA 96145

Plastic Pollution in the Tahoe Basin

Apr 30, 2026 @ 5:00pm - 7:00pm

Sunnyside Restaurant & Lodge, 1850 W Lake Blvd, Tahoe City, CA 96145



*Above: The larval picture is not a Tahoe bee, but it is the prepupa of *Anthophora bomboides*, which nests on the California coast. This bee partners with beneficial bacteria to protect against pathogenic fungi. We are hoping to study its relatives that live in Tahoe to see if they do something similar. Photo Credit: Shawn Christensen, (Vannette lab)*



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