Mountain Lakes Research Group 2025 & 2026 Newsletter

University of California Sierra Nevada Aquatic Research Laboratory

Using science to solve management challenges in California's Sierra Nevada lake ecosystems, with a focus on recovering endangered mountain yellow-legged frogs



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PC:Georgia Lattig

In 2025 and 2026, we continued to build on decades of mountain yellow-legged frog recovery work, reintroducing increasing numbers of frogs (*Rana sierrae* and *Rana muscosa*; MYL frogs) to new lakes and watersheds. To date, we have reintroduced **over 5,000 zoo-reared adult frogs and almost 1,500 wild-caught adult frogs to over 60 sites**, ranging from the Desolation Wilderness near Lake Tahoe to the Golden Trout Wilderness south of Mount Whitney. As we continue to monitor survival and recovery at nearly every population we have reestablished, we find ourselves facing a remarkable "problem." Some lakes now support so many *R. sierrae* frogs that our small team can barely count them all. This is the best possible outcome in endangered species recovery.

"How are the frogs doing?" The answer has two contrasting sides. *Rana sierrae* continues to increase in occupancy and abundance as a direct result of habitat restoration and reintroductions, and because they are naturally evolving resistance to the amphibian chytrid fungus, Bd (*Batrachochytrium dendrobatidis*). Scientists worldwide regard this recovery of *Rana sierrae* as one of the best models of amphibian resilience to disease. Unfortunately, we are not yet witnessing the same recovery in the southern Sierra for *Rana muscosa*. ***Rana muscosa* still faces extinction** because few populations survived recent disease outbreaks. Discovering how *R. muscosa* will evolve and recover like its northern relative is a major goal in the next phase of our conservation research.

Conservation successes rely on our MLRG staff and our large network of research and agency partners. Our collective success emerges from our collaborative team, led by Thomas Smith, Roland Knapp, and Alexa Lindauer, and our passionate and highly capable seasonal field technicians. We rely on the expertise of our partners at San Francisco and Oakland Zoos, Yosemite and Sequoia-Kings Canyon National Parks, US Forest Service, California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service to rear, release, and monitor frogs across 200 miles of Sierra Nevada wilderness. Collaborators at half a dozen universities extend the scale and impact of our research, discovering more about MYL frog vocalizations, thermal preferences, microbiomes, immune responses, genetics, and disease dynamics. By uncovering the biological factors that drive population growth, our research informs adaptive management and translates new knowledge into conservation action.



PC: Leonie Walderich

2025 Highlights

Reintroductions. We reintroduced **794 adult frogs** in 2025. We released frogs into 13 different lakes, including five new sites, spread across Yosemite, Kings Canyon, and Sequoia National Parks and the Inyo and Sierra National Forests. These frogs were collected as tadpoles from populations that are persisting with the often lethal chytrid fungus (*Batrachochytrium dendrobatidis,* Bd), and were reared to adulthood at the Oakland and San Francisco Zoos. Frog transport was facilitated by agency and zoo partners.

Translocations. We translocated **60 adult frogs** in 2025 to two sites in Yosemite and the Inyo National Forest, including one new site. In translocations, we catch wild adult frogs from *Bd*-persistent populations that are large enough to sustain the removal of adults, and move these frogs directly to other lakes. In 2025, we paired one translocation with a reintroduction in an experiment to compare these two recovery techniques.

Collections. In preparation for 2026 and 2027 reintroductions, we and our partners collected a total of **828 tadpoles** from six sites in Yosemite and Kings Canyon National Parks and the Inyo National Forest.

RIBBiTR and LTREB. As members of the National Science Foundation-funded Resilience Institute Bridging Biological Training and Research (RIBBiTR), we collaborate with biologists and educators across nine universities to understand resilience to disease in amphibian populations. As part of the NSF Long Term Research in Environmental Biology program (LTREB), we document and quantify long-term changes in MYL frog populations in response to Bd. We are able to do this because of the longevity of our research program (30 years!). Connected to RIBBiTR and LTREB projects, we collected almost **540 samples** from frogs in 2025 to learn more about frog genetics and immune defenses, and the genetic differences of different Bd isolates, differences that may affect frog survival.

The Numbers

794 frogs reintroduced

60 frogs translocated

828 tadpoles collected

143 lakes surveyed

2271 adult frogs captured

1513 unique adult frogs identified

4029 adult MYL frogs observed during visual surveys

1831 subadult MYL frogs observed during surveys

43,602 MYL frog tadpoles observed during surveys

2229 skin swab samples collected

540 immunology/genetic samples collected

49 night surveys conducted

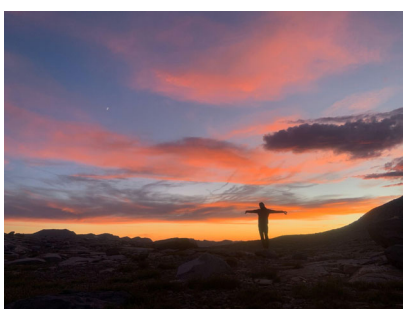
5 seasonal technicians

3 permanent employees

1 publication











2026 Highlights

Reintroductions. We reintroduced **761 adult yellow-legged frogs** in 2026. We released frogs into 11 different lakes, including three new sites, spread across Yosemite, Kings Canyon, and Sequoia National Parks and the Inyo and Sierra National Forests. These frogs were collected as tadpoles from populations that are persisting with Bd, and were reared to adulthood at the Oakland and San Francisco Zoos. Frog transport was facilitated by agency and zoo partners.

Translocations. We translocated **160 adult yellow-legged frogs** in 2026 to six sites in Yosemite, Kings Canyon, and the Sierra National Forest. These translocations included three new sites, two of which were our first translocations of adult *Rana sierrae* in Kings Canyon National Park. In translocations, we catch wild frogs from *Bd*-persistent populations and move these frogs directly to other lakes. In 2026, we paired two translocations with reintroductions in a multi-year experiment to compare these two recovery techniques.

Collections. We and our partners collected a total of **677 tadpoles** from seven sites in Yosemite and Kings Canyon National Parks for reintroduction in 2027.

Other amphibians. Although our research and recovery goals focus on the mountain yellow-legged frog species complex, we are branching out to support the work conducted by our partners in Yosemite and at the San Francisco Zoo to restore other native amphibians. In partnership with Yosemite staff, we helped conduct a Yosemite toad tadpole translocation, salvaging 3000 tadpoles from rapidly drying habitat and moving them to an unoccupied meadow. In 2025 and 2026, we conducted surveys of reintroduced California red-legged frogs. Through our night surveys, we also opportunistically observed novel behavior of Mount Lyell salamanders in lakes (see next page, and soon to be published in *Herpetological Review*). Project alum Kira Miller led a study on Bd and skin microbiomes in Pacific chorus frogs that co-occur with MYL frogs (see her linked 2026 publication).

The Numbers

761 frogs reintroduced

160 frogs translocated

677 tadpoles collected

203 lakes surveyed

3080 adult frogs captured

2079 unique adult frogs identified

859 new recruits tagged

4918 adult MYL frogs observed during visual surveys

1554 subadult MYL frogs observed during surveys

60825 MYL frog tadpoles observed during surveys

2879 skin swab samples collected

45 night surveys conducted

6 seasonal technicians

3 permanent employees

3 publications













News from the field: Mount Lyell salamanders like never before

In the summers of 2024 and 2025, our field crews stumbled on an incredible and novel observation of Mt. Lyell Salamanders in lakes in Yosemite, Kings Canyon, and Sequoia National Parks. This species is known to inhabit rocky upland seeps and stream margins, but observations of high densities of salamanders in lakes have never been reported. Crew member ***Parker Land*** *presented these observations at the 2026 California/Nevada Amphibian Populations Task Force meeting in Chico, CA, and our crew published their findings in Herpetological Review. Read the field notes from crew member Georgia Lattig below for a first-hand account of our crew's discovery.*

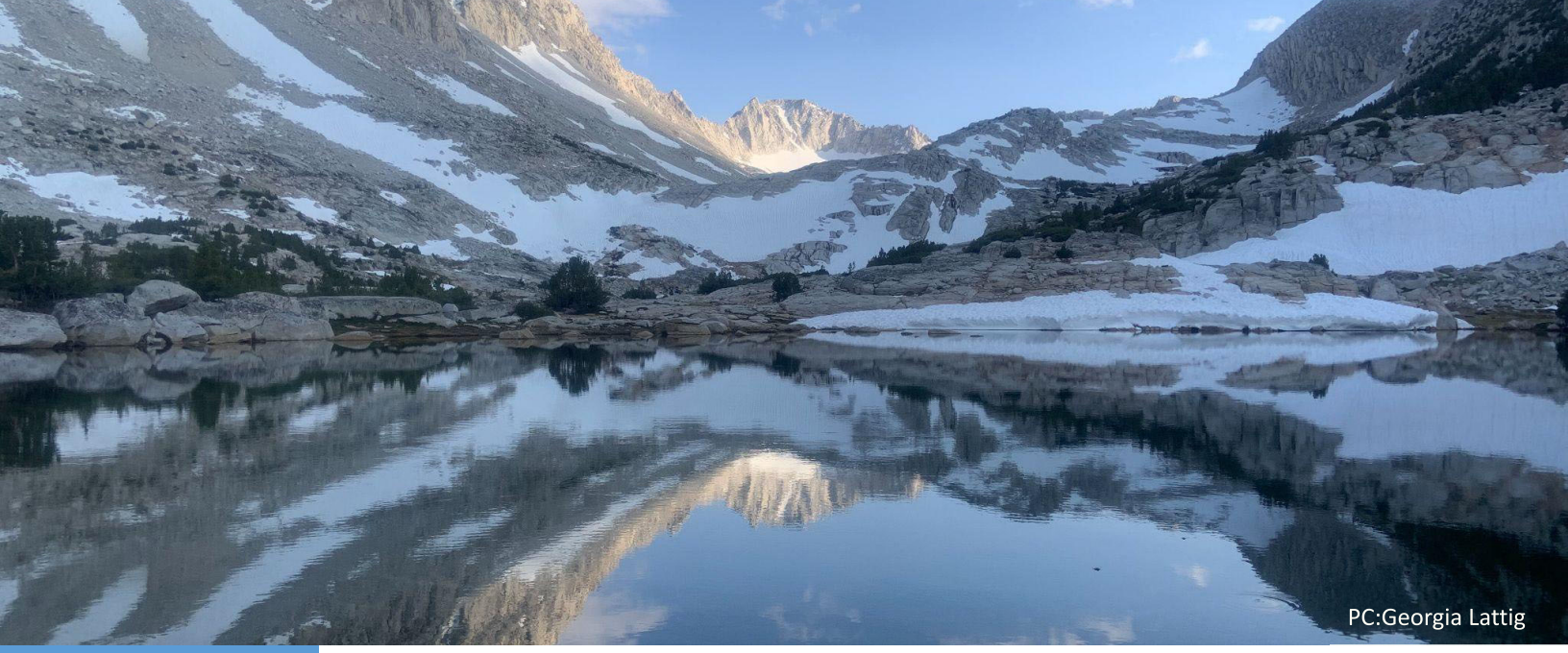
08/19/25 23:35 YOSEMITE NATIONAL PARK

We reached a grassy section of shoreline where the green bank rolled down to a shallow sandy beach. Parker saw something in the beam of his headlamp and bent down to exclaim that it was a salamander. Naturally, Leonie and I bent down too to get a look, and from this new vantage point we quickly located two, then three more salamanders, all tucked into the wet mossy tangles of the bank. From then on we began to scan the shoreline and cast our lights down the length of it. It was littered with the long, shimmery bodies of salamanders. Some were entwined together and others were curled into near obscurity in the damp root system. A few salamanders were completely submerged in the lake. What were they doing underwater?! We were all completely stunned.

As Parker and Leonie were admiring the first big collection of salamanders, I crawled my way down the shoreline, counting aloud. Soon I had reached 47 salamanders (later to reach ~60!!) and then I crawled back to lean over the bank on my stomach and observe a few individuals. Each one was slightly different in hue — several were pale gray with dark flecks, but some were a much warmer gold overall, and many were a deep shade of lavender. I admired their thick, tapering tails and their squat, webbed feet, and of course, their glittering eyes. To see so many individuals of a secretive species at once, and to be in the presence of so many exquisite creatures! was both a mystery and a marvel. What an unexpected and extravagant discovery.

After a long while spent in admiration of the salamanders, we all paused for a moment on some flat granite slabs and turned off our headlamps to admire the stars. In the sky as well as in the gently rippling dark expanse of the lake, bright white stars blinked in mesmerizing rhythm, and the cloudy band of the milky way stretched lazily, gloriously, across it all.




PC:Georgia Lattig

Wishlist

100 microchip tags to track frogs
$165

Six Garmin InReach subscriptions
$720

SNARL office & lab rent for one month
$995

Data collection app for one year
$2,580

Summer field technician housing at SNARL/Valentine
$8,800

One summer field technician salary & benefits
$20,000

Frog disease testing for one field season
$32,000

One year of MLRG operations
$350,000

We need your help in 2026 and 2027.

The Mountain Lakes Research Group has studied Sierra lake communities for thirty years, developing science and management tools to create a resilient future for Sierra Nevada lakes and amphibians. Our budget comes entirely from gifts and from grants that we competitively apply for. Most of our annual budget of approximately $350,000 pays people, who are our greatest asset; we employ two permanent scientists and four to six seasonal research staff.

Today, we face increased competition for a shrinking number of funding opportunities. When grant funding is scarce, we are forced to reduce or suspend our research activities and frog recovery work, and we face losing our staff.

In ecosystems, biodiversity can promote stability and resilience. Now, we need financial diversity to stabilize and support our work. We are always grateful for grants from the National Science Foundation, U.S. Fish and Wildlife Service, CDFW, or the National Park Service. However, private donations and gifts from foundations have been critical in lean times. As of Fall 2026, gifts could bridge the gap in traditional forms of support until new grants are awarded. Financial gifts put frogs on the ground and keep people employed. To keep recovering Sierra Nevada frogs in Summer 2027, we are asking for help now.

HOW TO HELP: If you are interested in making a financial gift, contact Thomas Smith (tcsmith@ucsb.edu), Roland Knapp (roland.knapp@ucsb.edu), and Cecilia Sousa (cecilia@eri.ucsb.edu) at UCSB Earth Research Institute. UCSB is a non-profit 501(c)(3) academic institution. Gifts are made to The UC Regents, EIN: 95-6006145. UCSB overhead on gifts is 6%, and we also use these funds to pay a 5.77% fee for university information technology. If your employer offers matching funds for charitable giving, you may be able to double your impact. If you have a Donor-Advised Fund, you can recommend a grant to our project through your DAF provider. You can review UCSB's other giving options here: https://giving.ucsb.edu/how-give.

Despite these challenges, we are excited for new research and frog recovery opportunities on our horizon. With more funding, we can maintain our large and skilled team, continue to increase the pace and scale of frog recovery in the Sierra Nevada, pursue big unanswered questions, and train more future scientists.

Sincerely and gratefully,

Thomas C Smith Roland A. Knapp



Our projects don't move forward without our seasonal field team of early career scientists. They are rigorous field biologists and experienced mountain athletes. We specifically thank our 2025 summer field technicians **Allie Chipman, Sage Kruleski, Parker Land, Georgia Lattig, and Leonie Walderich**; our 2026 field technicians **Janna Ellman, Parker Land, Georgia Lattig, Andy Martinez, and Leonie Walderich**; and UCSB undergraduate research fellow **Victor Rodriguez** for their flexibility, hard work, positive team-oriented energy, and remarkably clean data. Alumni **Sara Dykman, Sage Lee,** and **Juyung Yoo** returned to volunteer and share their expertise in the field. **Sam Lapp, Hannah Nossan, Cannon Mallory, and Cob Staines** contributed valuable time in the field, and at SNARL to teach everyone in our core team about their respective corners of biology and data science.

PC: Sage Kruleski

Acknowledgements.

Our work would not be possible without our agency, zoo, non-profit, and university partners. A tremendous thank you to our collaborators and friends at the San Francisco and Oakland Zoos, Yosemite and Sequoia-Kings Canyon National Parks, Inyo and Sierra National Forests, California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service for their dedication to amphibian conservation and joint efforts in permitting, planning, funding, and field work. Additional thanks to Carol Blanchette, Everett Phillips, and staff at SNARL and the UC Santa Barbara Natural Reserve System, and our administrative support from UCSB Earth Research Institute.



The summit of Mount Goddard, Kings Canyon National Park, is a favorite after work hike and thrilling dinner location. PC:Georgia Lattig