

# Curators and cavers: How a tip from a citizen scientist led to deep discoveries in Utah's caves

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Scientists from the Natural History Museum of Utah have taken a deep dive into the not-so-distant past thanks to a friendly tip from Utah's caving community. In a paper published this week by the [Journal of Mammalogy](#), five scientists from the Natural History Museum of Utah (NHMU) and colleagues from Utah's caving community have published the first research from their collaborative fieldwork effort deep in Utah's caves.

The journal's feature article reveals why caves make such compelling research archives, what was uncovered in Boomerang Cave in northern Utah, why [skeletal remains](#) provide new access to hard-to-get data from the recent past, and offers a new zoological baseline for mammalian changes in an alpine community.

"To understand the impacts of climate on alpine ecosystems, we record current mammal species—mostly through trapping. But that method doesn't tell us anything about the mammalian diversity in the recent past," said Kaedan O'Brien, lead author and anthropology Ph.D. candidate at the University of Utah. "So not a lot of study has been done on past alpine ecosystems because they are harder to get to, and when you do, there is a slim chance of finding older skeletal remains intact."

In NHMU Chief Curator and paleoecologist Dr. Tyler Faith's words, "We want to know what animals were there in the 1800s, but that's nearly impossible in the absence of historical records. How do we document the recent past without a time machine?" An out-of-the-blue email from local caver and study co-author Eric Richards offered an unexpected method of time travel: rappelling hundreds of feet down into Utah's caves to find what may have fallen in—and when.

In early 2019, Richards emailed NHMU Curator of Paleontology Dr. Randy Irmis to ask if he or the museum had any interest in the animal bones that he'd been finding on Utah [cave](#) adventures, and he sent

photographs. Irmis replied right away, including colleagues Dr. Tyler Faith and O'Brien, a Ph.D. student in Faith's lab. The group met, hit it off, and after a couple of trial outings for equipment training, Faith and Irmis were lowering themselves into caves to collect bones of bygone animals.

"To be clear, this project would have never happened without the cavers reaching out to us, and investing time, and training with us. Eric and his wife Fumiko literally 'showed us the ropes,'" said Faith. "I hope people realize that research isn't just done by scientists who work at the museum; it can be public collaboration—in this case, with trained experts (do not try this at home)."

After Faith obtained a research permit from the U.S. Forest Service in September 2019, Richards took the team to Boomerang Cave in the Bear River Range, where they collected specimens for lab analysis at the museum. O'Brien managed the lion's share of that work, upon which the paper is based.

"Identifying skeletal remains is painstaking work because you just go bone by bone, sorting by size and element, and then comparing them with regional museum voucher specimens," said O'Brien. But the result is exciting.

Using [radiocarbon dating](#), fossils found in Boomerang Cave were shown to span the past 3,000 years, with the bulk from the last 1000 years or so. Comparison of these fossils to museum records and present-day mammals collected by co-authors and NHMU zoologists Dr. Eric Rickart and Katrina Derieg showed that the cave provided a faithful reflection of mammal diversity in the area.

Perhaps most exciting is that the fossils also revealed the presence of species unknown to the region, like Merriam's shrew. The full list of

fossils is in the current *Journal of Mammalogy*, along with more on why this research matters.

"Our work highlights the value of collecting skeletal remains from caves as a convenient and accurate method for understanding the mammal communities," said Irmis. "Caves help us create comprehensive and long-term records and better understand how animals have changed in the recent past."

**More information:** Kaedan O'Brien et al, The utility of alpine cave fossil assemblages for zoological census: an example from northern Utah, United States, *Journal of Mammalogy* (2023). [DOI: 10.1093/jmammal/gyad093](https://doi.org/10.1093/jmammal/gyad093)

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