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TOP STORY

Crickets crucial species in Mammoth Cave

CAROLINE EGGERS ceggers@bgdailynews.com 39 min ago



Kurt Helf crawled through Mammoth Cave National Park on Friday, holding a humidity-measuring device in one hand and a camera in the other. He leaned in awkward positions parallel to limestone curvatures, joking that “yoga is coming in handy” as he laid on his back to photograph long-legged, spideresque critters.

For the past five years, Helf, an ecologist with the National Park Service, has led an effort with the Cumberland Piedmont Network to monitor more than 100 species of crickets living inside Mammoth Cave.

“Crickets are the most numerous species in caves, and most are secretive,” Helf said.

Cave crickets are also an essential element of subsurface ecosystems. Declines in cave cricket populations can be an early warning of issues with cave ecosystem health.

They’re considered a “keystone” species, Helf said, because other organisms depend on the food they bring into the cave. Cave crickets’ eggs, dead bodies and guano – the fungus that grows on feces – feed other animal populations, including larger invertebrates such as mites, snails and beetles, which then serve as food for other species.

Helf worked Friday alongside two field assistants, park rangers Mary Schubert and Jenna Hammond, from 9 a.m. until mid-afternoon.

They first extended a tape measure several dozen meters from the entrance and selected numbers at random to set up 10-centimeter-wide “sects,” designated with red lasers, to measure cricket populations through “cluster sampling.” Helf photographs each cluster of crickets so he won’t have to rely on rough estimates of the counts.

“I’ve been coming here since 1994. Crickets seem to like ... the same spots,” Helf said.

The team estimated Friday about 100 crickets within a few feet of the entrance. The largest cluster within the sampling site was 350 crickets in a dark crevice.

They weren't just counting crickets to estimate their populations, however. Helf is examining the ratios of adults to juveniles and males to females, and specific meteorological conditions, such as temperature, relative humidity and air flow trends.

“(Crickets) can be dependent on the weather outside and climate change. They like warm wet summers and mild, wet winters. They don’t hibernate,” Helf said.

Crickets forage for food about every two weeks at the surface. Climate change impacts the crickets directly through the increase in heavy precipitation events and droughts, which affect their ability to find food. Crickets also don’t like to go outside when it’s less than 10 degrees Celsius, so extended cold periods can lead to starvation.

Understanding these factors helps park staff better manage the ecology of the cave – and that’s the ultimate goal of the monitoring efforts.

In recent years, park staff replaced the standard door to the Frozen Niagra Tour with a revolving door to help reduce air draft, since the crickets are sensitive to evaporative water loss. The park also switched from hot, incandescent lights to LED lights, and crickets actually returned to the lit areas.

“If they’re putting a new piece of infrastructure, we can say this is a cricket hotspot,” Helf said.

Since 1970, humans have “wiped out” 60 percent of the mammals, birds, fish and reptiles, according to the World Wildlife Fund’s 2018 Living Planet Report.

While it’s easier to study large mammals, there has been increasing evidence of threats to animals on the smaller end of the scale.

Earlier this year, the first global review of insect populations revealed that 40 percent of insect species are threatened with extinction.

The rate of insect extinctions is eight times greater than that of mammals, birds and reptiles. The largest threat is habitat loss by conversion to intensive agriculture, followed by agro-chemical pollutants, invasive species and climate change, according to the review published in *Biological Conservation*.

Cave crickets do not appear to be in this category, based on initial data gatherings at Mammoth Cave.

The Cumberland Piedmont Network monitors the health of the park’s ecosystem by collecting data on forest vegetation, ozone pollution, water quality, cave meteorology and specific species, including bats, aquatic biota, Allegheny woodrats and cave crickets.



To monitor the cricket populations, the network monitors more than a dozen developed and undeveloped cave entrances within the park during biennial visits.

Since the project requires sensitive movement to safeguard both cave formations and animals, Hammond and Schubert trained during the winter to participate in the monitoring event.

Schubert volunteers with several animal monitoring, park restoration and cave exploration efforts.

“So many people don’t like crickets, but I do like crickets,” Schubert said.

Hammond, who recently finished graduate school at Western Kentucky University, volunteers to help monitor bat populations in addition to crickets.

“I’m trying to incorporate what I’m learning with Kurt into my tours,” she said.

Helf developed this project “from scratch” and won’t be ready to share conclusions about the data until he has a full set in the next year or so. But he does have anecdotal observations.

In the past few decades, cricket populations have risen and fallen. After some period of decline, cricket populations seem to be stabilizing or even increasing – but there is still year-to-year variability. That’s why long-term data collection is essential.

“You can’t necessarily get a snapshot of what the populations are doing in the short-term,” Helf said.

Helf expected that the recent dry weather contributed to slightly smaller numbers on Friday than recent visits. He plans to return in December.

– Follow reporter Caroline Eggers on Twitter @eggersdailynews or visit bgdailynews.com.

Caroline Eggers

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