Park News

Great Basin National Park
National Park Service
U.S. Department of the Interior

The Midden

Our 20th Year of Publication!

The Resource Management Newsletter of Great Basin National Park

Bat Blitzes Show Many Species in Park

by Kelsey Ekholm, Joseph Danielson, and Bryan Hamilton, Bat Biologists

NPS Photo by Gretchen Baker

BioBlitz participants getting a close look at a bat held by Nevada Department of Wildlife biologist Jason Williams.

Humans remain largely unaware of the vast numbers of bats flying above us each night. Bats are the only mammals capable of true flight and use high frequency echolocation calls to detect and capture insect prey. Although most echolocation calls are above the range of human hearing, insects are able to detect, avoid, and interfere with bat calls in the night skies.

Bats provide billions of dollars in ecosystem services through insect predation which reduces food costs, the need for harmful pesticides, and disease risk from insect vectors such as mosquitoes. Unfortunately, bat populations face unprecedented threats such as habitat loss, climate change, wind energy development, and disease. White-nose syndrome (WNS), a fungal disease, has spread across the US in last decade, killing millions of bats in its wake.

In an effort to learn more about populations, the park led two survey events for bats last summer. The first of these events was the Great Basin National Park (GRBA) BioBlitz, held August 20-22. GRBA's BioBlitz is an annual citizen-science event which focuses on a different group of organisms each year and serves to increase our knowledge of the target taxa within the park, as well as educate the public. The Mojave Network (MOJN) Bat Blitz was held at GRBA August 26-30. The MOJN Bat Blitz is an annual event in which biologists from parks within the Mojave Network get together for a coordinated survey effort of the bat community in a specific area (the host park or unit).

The goal of these events was to increase our knowledge of the bat communities in and around GRBA and how they utilize the landscape, as well as to educate the public (in the case of the GRBA BioBlitz). With threats to bat populations increasing in the United States, these survey efforts are crucial to develop management strategies.

For both blitzes, groups went to various survey areas (e.g., water sources, flyways, near roosts) to capture bats via mist nets or harp trap. For each individual captured, groups recorded the species, sex, age, reproductive condition, weight, and other relevant measurements. All captured bats were released by hand and no specimens were collected. Acoustic surveys were conducted in conjunction with trapping events at most sites.

The GRBA BioBlitz had over 60 participants and conducted

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In This Issue

Bat Blitzes (continued)

surveys at six locations over two nights. Through this effort, 821 bats representing 8 species were captured and 7 species were detected acoustically for a total of 9 species documented overall, including Pallid bat (*Antrozous pallidusi*), Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivigans*), western small-footed bat (*Myotis ciliolabrum*),long-eared myotis (*M. evotis*), long-legged myotis (*M. volans*), *and* Mexican free-tailed bat (*Tadarida brasiliensis*).

NPS Photo by Joseph Danielson

Setting up a net for one of the Bat Blitzes.

NPS Photo by Joseph Danielson

Two of the many bats caught during the Bat Blitzes.

The MOJN Bat Blitz had 39 participants from nine NPS units (Great Basin, Death Valley, Joshua Tree, Lava Beds, Lake Mead, Mojave Network, Pinnacles, Timpanogos Cave, and Zion), as well as other organizations including Nevada Department of Wildlife, U.S. Fish and Wildlife Service, Great Basin Institute, Christopher Newport University, Oregon State University, and volunteers. During this blitz, 17 sites were sampled over 4 nights which resulted in the capture of 701 bats of 9 species and the acoustic detection of 10 species, for a total of 10 species documented overall, including canyon bat (*Parastrellus Hesperus*) in addition to the 9 species documented during the GRBA BioBlitz.

NPS Photo by Joseph Danielson

Volunteers watch how to process a bat during the 2019 BioBlitz.

With the help of the volunteers who participated in these events, we were able to survey areas of the park we would not normally be able to, as well as survey multiple areas in the park simultaneously. This gave us new insight into the bat activity and landscape use throughout the park and at varying elevations and habitats. Furthermore, through pairing our bat trapping efforts with acoustic surveys, we were able to compare these data to better understand the acoustic variation within our park's bat species and give context to previous recordings from these areas. These data, funded by the National Park Service and Southern Nevada Public Land Management Act, are being used to minimize the impacts of wind energy, recreational caving, and disease on bat populations. On the next warm summer evening, look up and consider the unseen aerial ballet between bats and insects, and how it helps humans.

2020 BioBlitz

The 2020 BioBlitz will focus on Hemiptera (True Bugs). It will be a virtual BioBlitz you can do anywhere, including your own backyard!

Save the date for July 15-17!

Email GRBA_BioBlitz@nps.gov to be added to the email list or check the Park website.

Lehman Caves Cave Shield Study

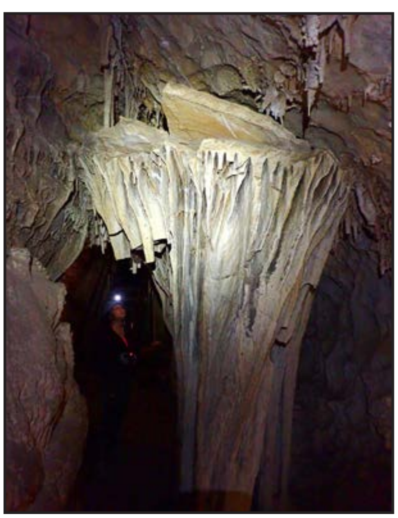
by Morgan Hill, Geoscientist-in-the-Park

For years it has been estimated that nearly 300 cave shields exist within Lehman Caves, with a few other occurrences in nearby caves. However, there has not been an extensive investigation into the quantity or location of the shields within Lehman Caves. During the winter of 2020 (Jan-April), GRBA partnered with Americorps' Geoscientist-in the-Park (GIP) program to complete an inventory of the many shields located in Lehman Caves.

NPS Photo

Morgan Hill, Geoscientist-in-the-Park, looks at one of the more than 500 cave shields in Lehman Caves.

Cave shield formation is still puzzling. It is hypothesized that cave shields form along joints or cracks in the ceiling, wall, and floor of the cave through the process of capillary action. Calcite-rich water under hydrostatic pressure moves through the joints and cracks within the bedrock. As this water loses carbon dioxide to the cave chamber, it precipitates calcite on either side of the crack, creating an extension of the crack. This builds plates of concentrically-layered calcite separated by a thin, hair-sized crack,



NPS Photo

Some shields are very large, up to 10 feet in diameter.

called a medial crack. The result is two thin calcite plates separated by a narrow, water-filled void. Eventually the water overflows and the plates are covered with additional calcite in the form of draperies, stalactites, and more.

For this study, we documented all identifiable cave shields within each traversable passage of Lehman Caves. Not all shields are easily identified, and not all passages are easily traversable! Our goal was to achieve a better understanding of the quantity and distribution of shields. We noted the location of the shield, which side of the pathway it is on, and if it is located on the floor, wall, or ceiling. We took measurements of the shield (width, azimuth, and inclination), as well as any visible joints or fractures in the bedrock. Shields that were inaccessible were still counted and estimated for measurements.

In total, we identified 504 cave shields and measured 205 joints. We originally hypothesized that there is a directional correlation between joints and shields. The data showed joints in in a north-northeast distribution, while shield distribution varied throughout cave passages. Only a few rooms, such as the Music Room and Crystal Palace show a strong directional distribution of shields, while most other rooms display weak distribution. These results are not unusual, as some shields could very well have grown from the jumbled fractures in the bedrock.

Areas of the cave with large concentrations of shields included from the Music Room to the Tom Tom Room and the Grand Palace to the Sunken Garden. Areas of the cave with no shields included the Talus Room and Gypsum Annex.

Most shields are found in parts of the cave covered in dense, thick late speleothem deposits, which made measuring joints and fractures difficult. Additionally, condensation corrosion (a dissolutional process that removes calcite from cave surfaces), has likely played a significant role in the degredation of cave shields in many areas of the cave.

Analysis of the data is ongoing as we continue to learn more about the amazing cave shields in Lehman Caves.

NPS Photo

Many shields show evidence of condensation corrosion.

National Invasive Species Awareness Week 2020

by Meg Horner, Biologist

National Invasive Species Awareness Week (NISAW) is held May 16-23, 2020, but you can help find invasive species anytime!

National Invasive Species Awareness Week, or NISAW, begins on May 16, 2020. NISAW supports events across the nation to raise awareness and identify solutions to invasive species issues at local, state, tribal, national, and international levels. The goal of this public awareness campaign is to support education, legislation, and practical efforts to stop the spread of invasive plant and animal species on the nation's lands and waterways to preserve natural ecosystems for the benefit of everyone.

Invasive species have the potential to negatively impact both natural and cultivated landscapes we enjoy and rely on. During this time of social distancing, people are spending more time outside and getting reacquainted with backyards, local open spaces, empty lots, and alleyways. People spending more time outdoors in their local area provides a great opportunity to locate and report invasive species infestations.

One publicly available and comprehensive tool to report and learn about invasive species is EDDMapS.

EDDMapS stands for Early Detection and Distribution Mapping System. This web-based platform allows citizen scientists, land managers, state agencies, and pest management professionals to report invasive species locations and explore invasive species information and distribution maps. EDDMapS' goal is to maximize the effectiveness and accessibility of the immense numbers of invasive species and pest observations recorded each year. As of April 2020, EDDMapS has over 4.8 million records. This data will become the foundation for a better understanding of invasive species and pest distribution around the world.

How can you report? Check out the EDDMapS website - https://www.eddmaps.org/ - and download the app to your smartphone.

Here are some other ways that NISAW.org encourages you to help:
Learn about invasive species, especially those found in your region. Your county extension office and State Department of Agriculture website are both trusted resources.
Clean hiking boots, waders, boats and trailers, off-road vehicles, and other gear to stop invasive species from hitching a ride to a new location.
Avoid dumping aquariums or live bait into waterways.
Don't move firewood – instead, buy it where you'll burn it, or gather on site when permitted.
Use forage, hay, mulch, and soil that are certified as "weed free."
Plant native plants in your garden and remove any known invaders.

There are a variety of other online resources to learn more, increase your impact as a citizen scientist, and help protect local landscapes – PlayCleanGo, Don't Move Firewood, Habitattitude, Wild Spotter and iNaturalist. Invasive species data collected with Wild Spotter and iNaturalist are included in the EDDMapS database.

NPS Photos by Julie Long

Examples of invasive plants that Park staff focus treatment efforts on - hoary cress (left) and bull thistle (right).

Evidence of a Sulfuric Acid Origin for Lehman Caves

by Harvey DuChene and Louise Hose, Cave Geologists

Lehman Caves is one of the key attractions in Great Basin National Park. In 1885 Absalom Lehman rediscovered the cave and made it into a show cave. Since at least 1960, the cave has been the subject of geologic investigation. Our knowledge of how caves are formed has come a long way since 1960, and we now know that there are multiple ways that caves can develop. The most common caves are epigenic, which means that they form near the surface of the earth as a result of limestone dissolution by carbonic acid. These caves are part of regional drainage systems. A great example is Mammoth Cave in Kentucky, and there are many thousands of similar caves in karst regions throughout the world. More than a dozen caves in Great Basin National Park are epigenic.

In the 1970s, researchers in Carlsbad Caverns National Park realized that caves of the Guadalupe Mountains did not fit the epigenic model that had been established for Mammoth Cave. They discovered that most caves in the Guadalupe Mountains were formed by processes that took place inside the earth and were not connected to surface drainage systems.

These caves are hypogenic, which means that they were formed by aggressive (acidic) water rising from deep-seated sources. They also found evidence of a significant chemical reaction mostly in the form of massive deposits of gypsum, a mineral that forms as a byproduct of the dissolution of limestone by sulfuric acid. Pioneering work by geologists Stephen Egemeier in the Kane Caves of Wyoming and Carol Hill in Carlsbad Cavern led to the sulfuric acid theory of cave formation and the subsequent recognition of similar caves all around the world. One place that contains evidence of development by sulfuric acid is Lehman Caves. Lehman Caves, at least in the Gypsum Annex (Fig. 1), displays evidence that it was formed when sulfuric acid dissolved marble in the Pole Canyon Limestone along natural fractures, enlarging them and creating cave passages. Gypsum, the byproduct of the reaction between sulfuric acid and limestone (or marble), has mostly been removed from the known parts of Lehman Cave. However, there are telltale signs that gypsum was once present. These signs include an array of bedrock features (speleogens) that formed when the sulfuric acid event was happening several million years ago. These speleogens include rillenkarren, pseudo-scallops, incised water lines or notches, and overhung pool margins (Fig. 2). Taken together, these features are indicators that there was once a pool of water that contained dilute sulfuric acid. We call these ancient pool sites acid pool basins.

This is an excerpt from a longer article. To read more, please visit this Park webpage.

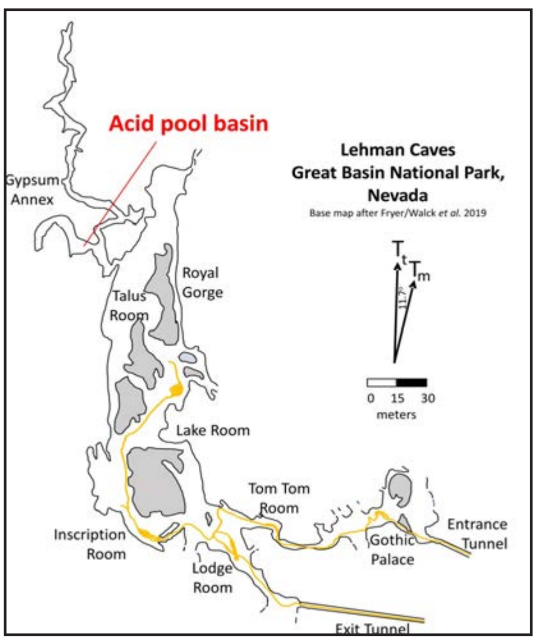


Figure 1. Map of Lehman Caves showing the acid pool basin in the Gypsum Annex.

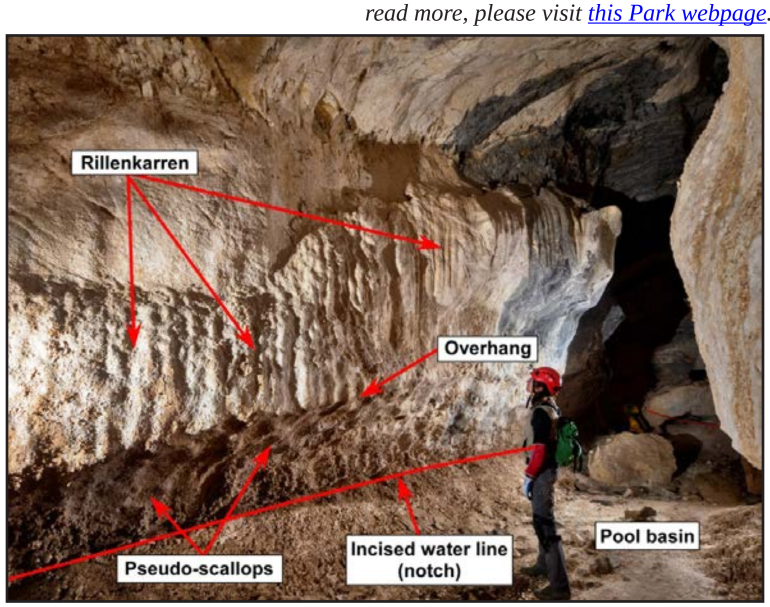


Photo by Dave Bunnell

Figure 2. Acid pool basin in Gypsum Annex of Lehman Caves. Features characteristic of acid pool basins are rillenkarren, pseudo-scallops, an incised water line, the overhung wall, and the pool basin.

Where Did Lehman Caves Dirt Come From?

by Louise D. Hose and Harvey R. DuChene, Cave Geologists

We recently have determined that Lehman Caves passages and rooms formed through hypogenic (rising groundwater) processes and there is no evidence that surface streams ever flowed through the cave. Obviously, some surface drainage has entered through the natural entrance, but no streams flowed through the cave. The cave "scallops" common throughout the cave, once thought to be evidence of former rivers, are now recognized as "pseudo-scallops" and result from sulfuric acid condensation in a hypogenic setting (DuChene and Hose, this issue). Yet, clastic[1] sediments (dirt) are scattered in several places throughout the cave. Where did they come from?

The first, and most obvious, source is material washed in from the surface. Debris under the natural entrance in the Gothic Palace and nearby passages came into the cave this way. But, the surface as a source of clastic debris appears limited to the area immediately below and adjacent to the natural entrance.

The second, and probably very minor, source was insoluble material in the marble bedrock. However, the Pole Canyon Limestone is quite pure limestone and dolostone so this source is likely a trace contributor (Table 1, p.69).

A third source of dirt is clastic fracture filling in the marble. A shale-siltstone is exposed in the walls in several places in the Gypsum Annex, the northwesternmost part of the cave (Fig. 1). Fractures filled with similar material are exposed in the ceilings in this region of the cave, as well.

Figure 1. Shale exposed in a short side passage of the Gypsum Annex

Last year, Hose (2019) also noted "pods" of shale on the surface near the northwest part of the cave. At that time, she hypothesized that the surface pods are fragments of Pioche Shale torn off and emplaced within the Pole Canyon marble during the Snake Range Décollement event. However, based on our observations this spring within Lehman Caves and in nearby Little Muddy Cave, we think that these localized outcrops of shale are more likely clastic dikes from the stratigraphically lower Pioche Shale injected after the marble became brittle and during or after it fractured. Clastic dikes result from the flow of less dense, plastic rock into cracks within more dense, overlying rock (Fig. 2).

Might similar clastic dikes within the marble be the potential source of the abundant "dirt" on the floor in Lehman's Inscription Room? The abundant dirt in this area is uncharacteristic of the rest of the cave (away from the Natural Entrance) and a puzzle. A relatively simple study could be done, perhaps as an undergraduate senior thesis, to compare the Inscription Room floor "dirt" with the fracture filling material to see if they comprise similar mineralogy. It would also be profitable to map (and inventory) the exposures of clastic dikes and exposures in Lehman and Little Muddy Caves to see what insight their distribution might shed on the development of the caves. Any geology students interested in a fun project?

The fourth potential source of dirt, especially in parts of the Inscription Room, is the possibility that some of it was hauled into the cave by humans in the distant and unrecorded past. Only further study of the Inscription Room dirt will help solve the mystery of its origin.

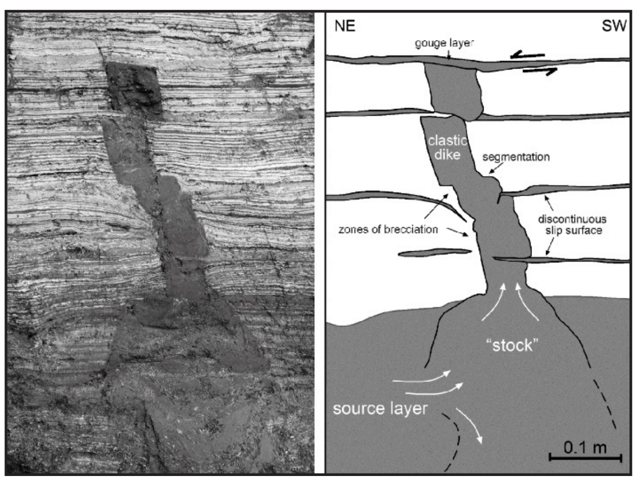


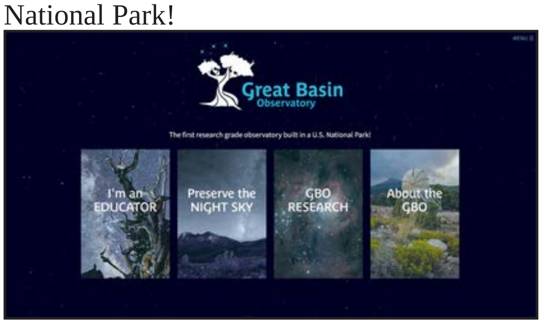
Figure 2. Clastic dikes consist of sand, silt, clay, or other clastic material derived from underlying sedimentary beds of lower density than the overlying layer. The clastic material flows into cracks in overlying rock, moving from a higher pressure to a lower pressure environment. Diagram and photo from Weinberger et al. (2015-Conference proceedings)

1 *Clastic: Pertaining to sediment composed principally of broken fragments of preexisting rocks or minerals.*

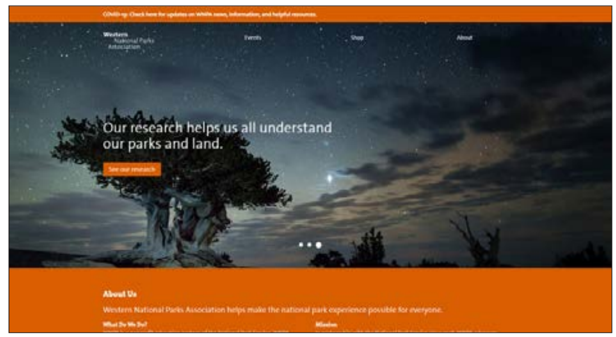
Fun Links

The Mojave Desert Network has their own [newsletter, The Oasis.]

Check out what's going on with the Great Basin Observatory, a remote observatory located in Great Basin National Park!



The Western National Parks Association (WNPA) is a partner to Great Basin National Park. They operate the bookstore at each of the visitor centers, offering educational materials. They also provide funds for research and special park projects like the yearly Astronomy Festival and BioBlitz. WNPA offers an online store, so even if you can't get out to the Park, you can still find cool mementos and learn about research in various parks, including Red Fox research in Great Basin National Park.



Selected Publications about the Park

Havlena, Z.E., L.D. Hose, and S.D. Jones. 2019. Reconnaissance geomicrobiology survey of Lehman Cave, Great Basin National Park. In GSA Annual Meeting in Phoenix, Arizona, USA. Abstact

Hose, L.D. and Z.E. Havlena. 2019. Speleogenesis and geology of Lehman Caves, Great Basin National Park, Eastern Nevada, USA. In GSA Annual Meeting in Phoenix, Arizona, USA. Abstract

Mark, B.G., E. Sambuco, N. Patrick, J.Q. DeGrand, D.F. Porinchu, S.A. Reinemann, and J. Box. 2019. Hourly to decadal patterns of mountain temperature variability from embedded sensors spanning 2000m in Great Basin National Park, 2006-2018. American Geophysical Union Fall Meeting, 2019, pp.GC51L-1070. Abstract

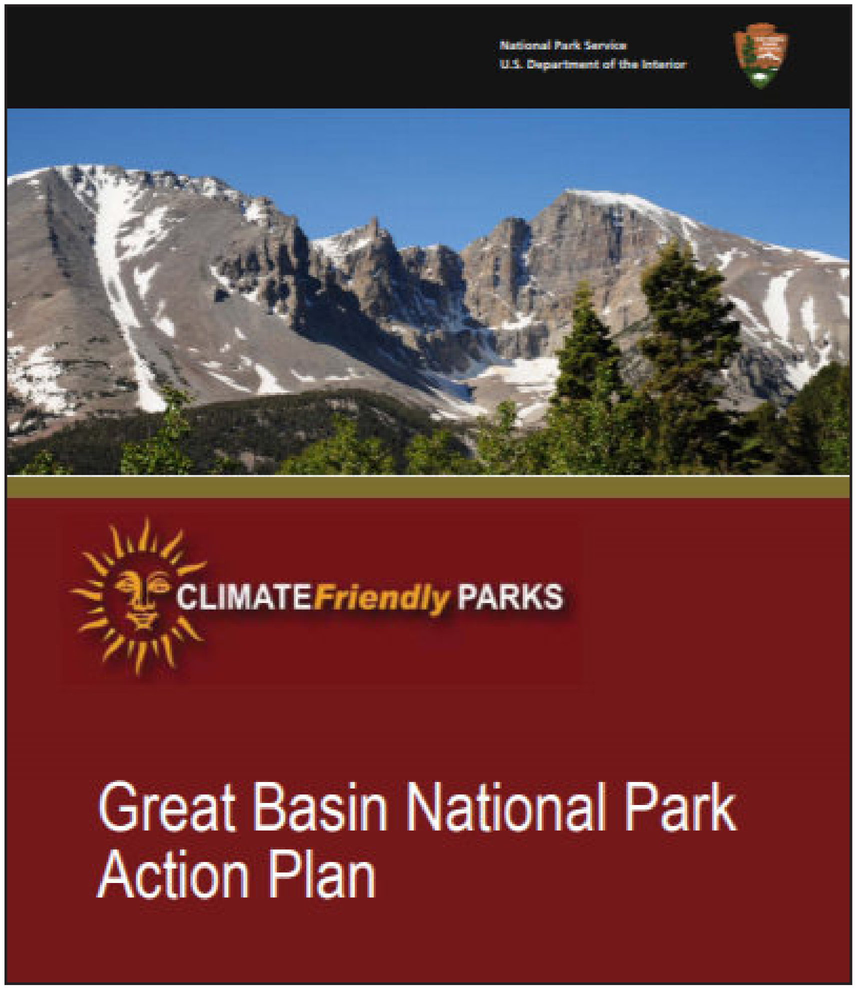
Nelson, N.C. and P.M. Gardner, P.M. 2019. Geochemical evaluation of the hydraulic connection between Snake Creek and Big Wash drainage basins, Great Basin National Park. In GSA Annual Meeting in Phoenix, Arizona, USA. Abstract

Soni, N., B.G. Mark, F.S. Schoessow, S.A. Reinemann, J.Q. DeGrand, D.F. Porinchu, E.M. Vega, and J.M. Manos. 2019. Interannual rock glacier surface elevation changes using UAS in Great Basin National Park, Nevada. American Geophysical Union Fall Meeting, 2019, pp.NS11C-0646. Abstract

Van Gunst, K.J., Klinger, C., Hamilton, B., Slocum, K. and Rhea-Fournier, D., 2020. Rapid biodiversity sampling for bat assemblages in Northwestern Nevada. Journal of Fish and Wildlife Management. Abstract

A Brief History of Great Basin National Park's Green Team

by Julie Long, Biological Science Technician



Over the past ten years, Great Basin National Park (GRBA) has developed various plans regarding sustainable actions. A Green Team was formed in 2009 to help implement and promote sustainability initiatives developed by the NPS – the Climate Friendly Action Plan and Green Parks Plan. After a lull of a few years and inconsistent participation, the Green Team has been restored!

The Park is in the process of devising realistic sustainability practices to fulfill some of the goals outlined in these plans. The Green Team is reestablishing practices such as practical recycling options, outreach through social media and the park's newsletter, and modeling behaviors that advocate for sustainability.

In 2009, park staff drafted [GRBA's Climate Friendly Parks Action Plan] with the help of the Mojave Desert and Mediterranean Coast Climate Friendly Parks Workshop. The twenty-page document addresses climate change, outlines goals and strategies to reduce greenhouse gas emissions, and how to implement sustainable, best practices within the Park. The plan highlights increasing climate change outreach and reducing greenhouse gas emissions resulting from activities within and by the Park (energy use, waste and transportation management, etc.).

A [Green Parks Plan] to advance the NPS mission through sustainable operations was published in the spring of 2016 for the entire agency. The plan focuses on partnerships and sustainable landscapes, reflecting on the NPS sustainability vision. Goals from this plan include:

- Continuously Improve Environmental Performance
- Be Climate Friendly and Climate Ready
- Be Energy Smart
- Be Water Wise
- Green Our Rides
- Buy Green and Reduce, Reuse, and Recycle
- Preserve Outdoor Experiences, Promote Healthy Engagement
- Strengthen Sustainability Partnerships
- Foster Sustainability Boundaries
- Green Our Grounds

The Green Team's main message today encourages the concept of reduce and reuse in and outside of the Park. We are in the process of modifying our mission statement, requesting and installing water bottle filling stations, and contacting other parks to brainstorm ways to be "Green" and promote sustainability. If you have any feasible ideas regarding sustainable actions within the Park, please contact Julie Long (julie_long@nps.gov) or Robb Reinhart (robert_reinhart@nps.gov).

Making the Cave Less Green

by Gretchen Baker, Ecologist

While we're striving to make the park a greener park (more energy efficient and conservation-minded), we are also trying to make the cave less green, literally. You can see green in the cave next to the artificial cave lights, and that green is made up of algae, moss, and bacteria, sometimes referred to as lampenflora. The lampenflora provides an unnatural food source to the cave's wildlife. It also can become part of the speleothems and damage their growth and beauty.

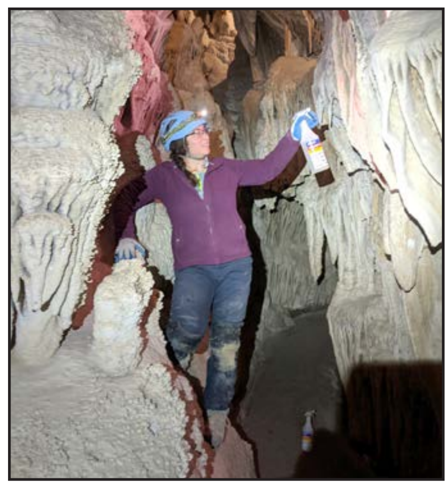
Over the years we've experimented with different light wavelengths and changed out most of the lightbulbs to LEDs to make the cave less green. Nevertheless, last year was a very wet winter and spring, which meant that we had water dripping into the cave for months, refilling pools and making many speleothems grow. The extra moisture encourages algae growth. BYU Researcher Steve Leavitt and his students sampled the algae in May and November 2019, finding very different assemblages both times. After his sampling, selected algae was sprayed with a 10% bleach solution in November and December 2019 (Table 1).

During the two lint camps in January, nearly all the algae was sprayed (except areas that were too difficult to access). Still, algae found a way to grow. In March, the algae was sprayed once more. Each time, the amount of algae that needed to be sprayed decreased, starting with over 1,000 square feet on January 17th, and dropping to 445 square feet on March 20th (Table 1). The average amount of algae per light dropped from 5.9 square feet to 2.6 square feet. That's still a lot of algae, though.

With the lights in Lehman Caves will be off for weeks/months, that may be the final death throe for much of the algae. Caves that are closed for the winter, like Timpanogos Cave and Crystal Cave in Sequoia National Park, have much less of an algae problem than caves that are open year-round, like Mammoth Cave, Carlsbad Caverns, and Lehman Caves. One solution we may be able to use in the future is to have lantern or flashlight Explorer Tours in the winter to reduce the amount of light in the cave, avoid spraying bleach in the cave (which is not good for the native cave life), and give visitors a cool opportunity to feel like an explorer and help conserve the cave.

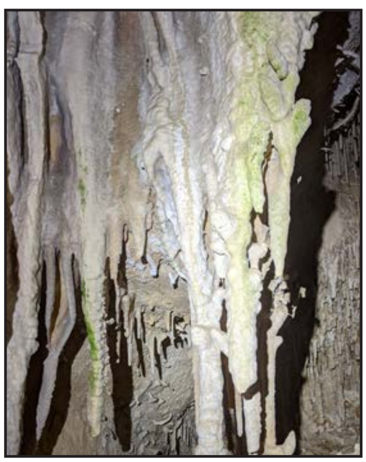
NPS Photo by Gretchen Baker

Growth near cave lights may not only consist of algae, but also moss and bacteria.



NPS Photo by Gretchen Baker

Spraying algae with a 10% bleach solution helps kill it, but also introduces a chemical to the delicate cave environment.



NPS Photo by Gretchen Baker

Cave algae discolors cave speleothems and may also hasten the demise of historic cave signatures.

Table 1. Date and amount of algae sprayed near lights in Lehman Caves.

Date	# of lights surveyed	# of lights sprayed	sq ft of algae	ave algae (sq ft)/light
Nov/Dec 2019	31	31	887	28.6
17-Jan-20	173	139	1029.3	5.9
26-Jan-20	163	128	892.4	5.5
20-Mar-20	173	138	445	2.6

National Park Service
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The Midden is the Resource Management newsletter for Great Basin National Park.

A spring/summer and fall/winter issue are printed each year. *The Midden* is also available on the Park's website at www.nps.gov/grba.

We welcome submissions of articles or drawings relating to natural and cultural resource management and research in the park. They can be sent to:
Resource Management,
Great Basin National Park,
Baker, NV 89311
Or call us at: (775) 234-7331

Superintendent
James Woolsey

Natural Resource Program Manager
Ben Roberts

Cultural Resource Program Manager
Eva Jensen

Editor & Layout
Gretchen Baker

What's a midden?

A midden is a fancy name for a pile of trash, often left by pack rats. Pack rats leave middens near their nests, which may be continuously occupied for hundreds, or even thousands, of years. Each layer of trash contains twigs, seeds, animal bones and other material, which is cemented together by urine. Over time, the midden becomes a treasure trove of information for plant ecologists, climate change scientists, and others who want to learn about past climatic conditions and vegetation patterns dating back as far as 25,000 years. Great Basin National Park contains many middens.

Great Basin National Park

USA Cave Animal of the Year

by Gretchen Baker, Michael Slay, and Matthew Niemiller, Cave Biologists

When you think of caves, do you think about what lives in them? A worldwide program, Cave Animal of the Year, seeks to help bring appreciation to subterranean creatures. Germany started the program in 2009 with a beautiful website. In 2019, Italy and Australia followed. Now, in 2020, the USA has joined the club.

Photo by David Hunter

This protonymph, or young, Great Basin Caves Pseudoscorpion has a lighter coloring than the adult form.

The USA Cave Animal of the Year for 2020 is the Great Basin Cave Pseudoscorpion (*Microcreagris grandis* Muchmore). It is a small arachnid in the family Neobisiidae and in the genus *Microcreagris*. This pseudoscorpion genus includes more than 20 related species, is found throughout the world, and includes both cave and surface species.

The Great Basin Cave Pseudoscorpion has a rather interesting history. The Lehman Caves National Monument Custodian (similar to today's superintendent), T.O. Thatcher, noted and collected the first specimens in the 1930s. However, it took until the 1960s for the pseudoscorpions from the cave to be identified, when Dr. William Muchmore determined it was a new species and formally named it *Microcreagris grandis*. Since then, this species has been found in other caves in the Park, including alpine caves. However, it has not been found in caves on other mountain ranges. Pseudoscorpions are small arachnids and are distant relatives of spiders, scorpions, harvestmen, and mites. They resemble scorpions but lack the stinging tail. Consequently, pseudoscorpions are sometimes referred to as false scorpions.

Most species are very small, up to three-tenths of an inch (8 mm), and possess eight legs and large claw-like appendages called pedipalps that they use to grab prey. They eat a variety of insects, including flies, beetles, larvae, and tiny springtails. There are more than 3,500 pseudoscorpion species throughout the world.
Although pseudoscorpions may be small to our eyes, they are huge in the cave ecosystem; they are the top invertebrate predator in Park caves.

Learn more at the USA Cave Animal of the Year website.

Upcoming Events

May 16-23: National Invasive Species Awareness Week See page 4.

July 15-17: Hemiptera (True Bugs) BioBlitz Get ready for the 12th annual BioBlitz, this year with virtual lectures and collecting anywhere and recording on iNaturalist! Email GRBA_BioBlitz@nps.gov for more info.

Mid-Summer: Release of Virtual Lehman Caves Tour While visititation to the cave may be limited this summer, we're going to bring the cave to you! Check park website and/or social media for more info in July.