Park News

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

The Midden

The Resource Management Newsletter of Great Basin National Park

Park Hosts First Bioblitz

by Gretchen Baker, Ecologist

During the weekend of September 11-13, 2009, Great Basin National Park hosted its first annual BioBlitz, focusing on beetles (Order Coleoptera). Participants came from Southern Utah University in Cedar City, Dixie State College in St. George, University of Nevada-Reno, University of Nevada-Las Vegas, the Nevada Department of Agriculture, and also included park visitors and staff who wanted to learn more about beetles. Altogether, over 600 volunteer hours were contributed by 44 people, with over half visiting the park for the first time.

The BioBlitz lasted for 24 hours, from noon on Saturday to noon on Sunday. During that time, participants split into teams and covered a variety of elevations from 5,300 to 10,800 feet. They visited various habitats, including riparian, shrubland, wetland, forest, lake, and sub-alpine areas, and used an assortment of collecting techniques like sweep nets, pan traps, pitfall traps, and light traps.

Preceeding the BioBlitz, a beetle workshop was held to teach participants some beetle basics, such as life history and taxonomy of beetles and proper mounting techniques. While most participants were out collecting during the BioBlitz, some stayed in the "science hall" to identify the specimens that were brought in.

Photo by Gretchen Baker, NPS

Entomologists identify collected beetles to the family level during the park's first BioBlitz.

Entomologists began identifying beetles Saturday night and continued until mid-afternoon on Sunday, led by Jeff Knight from the Nevada Department of Agriculture. These first round identifications were to family. Mr. Knight took the beetles back to the state entomology lab to identify them further.

Preliminary results from the Beetle BioBlitz showed 716 beetles collected, with at least 30 different families represented. One surprise included beetles at higher elevations that had long since disappeared for the season at lower elevations, like tiger beetles.

BioBlitzes throughout the country are gaining popularity as a way to document diversity in a short period of time. While some areas undertake an inventory of all plant and animal species, Great Basin National Park has chosen to focus on one order each year, starting with invertebrates. Invertebrates in the national parks are often overlooked, but BioBlitzes provide an opportunity to focus on them.

Great Basin National Park is planning on conducting another BioBlitz next year, focusing on the Order Orthoptera—Grasshoppers and Crickets. Currently only two species are known in the park, and there are likely at least a hundred more. It should be an exciting weekend, scheduled for May 22-23. This event is open to anyone who is interested in insects, regardless of experience.

In This Issue

First Year of Great Basin Rattlesnake Telemetry Study

by Meg Horner, Biological Technician and Bryan Hamilton, Wildlife Biologist

In national parks, human-wildlife interactions are important resource management issues. Rattlesnakes and humans often encounter one another in park residential areas, visitor centers, roads and campgrounds. Because rattlesnakes are venomous, these encounters are viewed as conflicts and often result in the translocation of the offending snake.

But when moved long distances from their capture sites (>1 km), rattlesnake survival rates are significantly lower than non-translocated snakes because they are moved outside of their home range and are unable to adapt to their new environment. This presents a challenge to park managers: preserving and protecting wildlife while also providing for a safe and enjoyable visitor experience.

Short distance (<100 meters) translocations of rattlesnakes are becoming the preferred management option. Snakes may eventually return to their capture sites, but their survivorship greatly increases because they remain within their home range.

In Great Basin National Park, rattlesnake-human conflicts arise several times each year. In order to understand the effects and effectiveness of short distance translocation, resource management has initiated a study on Great Basin rattlesnakes (*Crotalus lutosus*). With the assistance of a veterinarian, wildlife biologists surgically implanted three adult male Great Basin rattlesnakes with temperature sensing radio transmitters. The implanted radio transmitters emit a unique radio frequency that can be picked up using radio telemetry equipment so snakes can be tracked. This provides resource staff the opportunity to learn about the natural history, hibernacula locations, movement patterns and responses to human interference and translocations– meaningful data when managing venomous snakes.

Photo by Leslie Green, NPS

Wildlife biologist Bryan Hamilton surgically implants a telemetry receiver in a rattlesnake.

Three rattlesnakes were surgically implanted with temperature sensitive radio transmitters in the summer of 2009. Following a 24 hour recovery period, the snakes were released within 100 meters of their capture site. Snakes were tracked weekly to determine their location, distance from capture and release sites, and body temperature.

Continued on Page 3

Photo by Bryan Hamilton, NPS

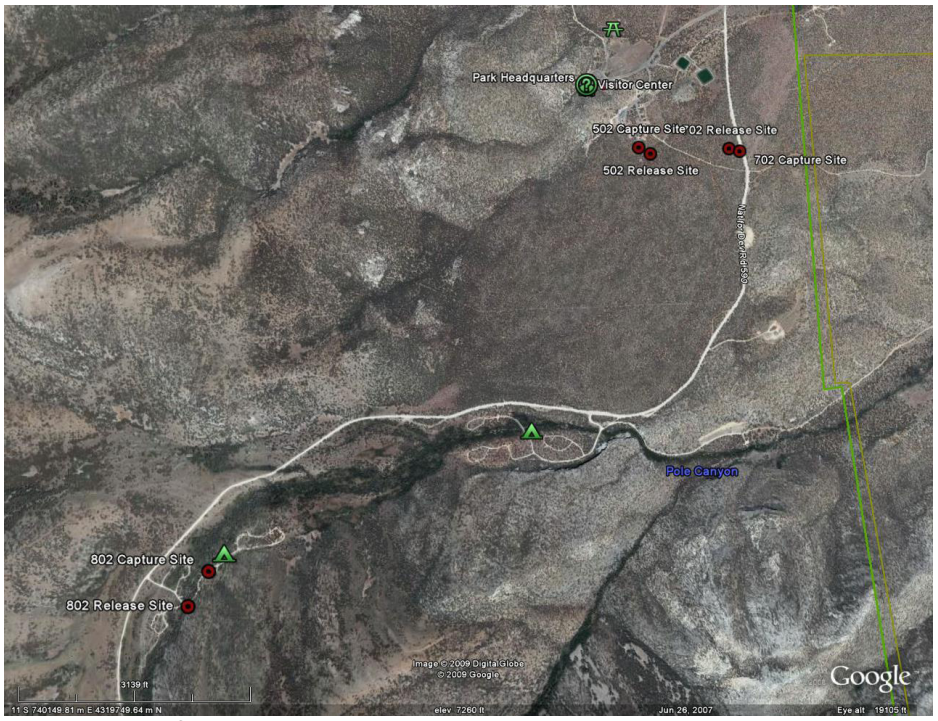
Great Basin Rattlesnake

Rattlesnake Telemetry Study (continued)

The three snakes were relocated 17 times. Only one of the snakes returned to its capture location within a park residential area; the other two did not return to their capture locations after release nearby.

The snakes travelled an average of 2 km between their release sites and hibernacula, and two of the snakes retreated to the same den site. The snakes' mean body temperature (T_b) was 24° C with a range between 15.5° C and 34° C. Mean air temperatures tended to be slightly lower (22° C) than T_b. Substrate temperatures (T_s) were on average higher than T_b, and the correlation between T_b and T_s was weak (r^2=0.27) suggesting the snakes were thermoregulating to maintain a suitable range in body temperature.

Valuable information has been gleaned from the first year of this project. Two previously unknown hibernacula have been located; the length and timing of rattlesnake movements has been documented; and the propensity for one snake to return to its capture site was also documented. Continued tracking



Location of rattlesnake capture and translocation areas in the park residential areas and near Baker Creek Campground.

efforts will shed light on when these rattlesnakes emerge in the spring, their winter survivorship, how many individual snakes are using hibernacula, movement patterns in the spring and early summer, and will allow for opportunistic observations of other behaviors.

The persistence of these rattlesnakes from post-surgery to hibernation in the first year of study supports the need for short-distance translocation procedures to ensure survival for ratttlesnakes. This study can provide support for responsible management actions that take into account survival of possibly dangerous wildlife while still providing for a safe and enjoyable visitor experience.

Bristlecone Pine Research Shows Highest Trees Growing Faster

Researchers from the Laboratory of Tree-Ring Research at the University of Arizona have recently published some of their results of a National Science Foundation funded study about bristlecone pines. They surveyed three sites, including the Mt. Washington area in Great Basin National Park.

They found that the bristlecones within the top 150 meters of treeline are growing faster now than they

Photo by Gretchen Baker, NPS

This bristlecone pine growing near the treeline has been growing faster in recent decades.

have in the last 3700 years, and they expect that the bristlecone treeline will be expanding higher. Bristlecones at lower elevations did not show the growth spurts of the higher elevation trees.

To see the National Science Foundation news release and audio slide show: http://www.nsf.gov/news/news_summ.jsp?cntn_id=115942&org=NSF&from=news

15 Tons of Debris Removed from Cave

by Ben Roberts, Natural Resource Program Manager

Work continues on the Southern Nevada Public Lands Management Act (SNPLMA)-funded Lehman Cave Restoration Project. This project is restoring 4,700 square feet of cave floor in Lehman Caves to a pre-disturbance condition. Restoration will be accomplished by removing an abandoned electrical system and paved walkways.

The physical deterioration and decomposition of these abandoned features are impacting natural resources and water quality in the cave. During 2009, approximately 320 feet of trail in the Talus Room have been removed, totaling just over 15 tons of debris.

Photos: The top photo shows the old Talus Room trail. The bottom photo shows the same area after restoration. Photos by Rick Bowersox, Southern Nevada Grotto.

Twelve Plant Species Added to Park List in 2009

by Gretchen Baker, Ecologist

During the 2009 field season, resource management staff covered the obscure areas of the park to complete vegetation plots to fill in gaps for a new, comprehensive vegetation map. Areas targeted were those that had not been visited in the 2003-04 field season when a fuels vegetation project was underway, or by efforts in 2008 by Eastern Nevada Landscape Coalition and NatureServe.

A total of 135 plots were completed, and together with the previous 205 plots, help provide a picture of what vegetation exists where in the park. This winter, a vegetation specialist will classify the different types of vegetation, and then mappers will begin the task of creating the new map.

Botanist Glenn Clifton came to the park to assist with the vegetation plots for over two weeks. During that time he also supplemented his Key to the Snake Range, which is the guide most-used by park staff for keying out plant species. His key expanded to over 1,000 species, with 699 of them found within the park boundaries. Of special note are 12 species that he found in the park this summer that had not previously been seen in the Snake Range area (Table 1). Eighteen additional species that had been known to occur outside the park boundary were found in the park.

Table 1. Plant Species Added to Park List in 2009

Common Name	Scientific Name	Family
Macoun's Cudweed	Gnaphalium macounii	Asteraceae
Disc mayweed	Matricaria discoidea	Asteraceae
Sleeping popcornflower	Allocarya hispidula	Boraginaceae
Whitetop	Cardaria draba var. draba	Brassicaceae
Woodland draba	Draba nemorosa	Brassicaceae
Scorpion milkvetch	Astragalus lentiginosus var. scorpionis	Fabaceae
Oneflowered broomrape	Orobanche uniflora	Orobanchaceae
Elliptical buttercup	Ranunculus glaberrimus var. ellipticus	Ranunculaceae
Silverweed cinquefoil	Potentilla anserina	Rosaceae
Owyhee mudwort	Limosella acaulis	Scrophulariaceae
Inland sedge	Carex interior	Cyperaceae
Toad rush	Juncus bufonius var. occidentalis	Juncaceae

Cultural Resources Update

by Nicole Lohman, Archaeological Technician

The Cultural Resource staff has been busy this fall with several projects. In August, two of our archaeologists traveled to the southeast side of the park to record the previously unrecorded Chapman-Taylor Mine in Big Wash. In September, six new rock art sites were located and recorded in the Grey Cliffs area, and in October and November, numerous dendroglyphs (aspen carvings) and several prehistoric sites were located in the Baker Creek area.

Located in the North Fork of Big Wash, the historic Chapman-Taylor mine was in operation from 1915-1916 and produced 500 tons of tungsten ore. Historically tungsten was mined for use as an alloy in the manufacture of steel. Park archaeologists visited the site this year to record and document the material remains of the historic mining operation. A relatively intact cabin was located, along with the remains of several other structures. An adit, mining prospects, and open cuts were also observed. The site also includes a large historic trash scatter. Although the site had been known for some time, this was the first time that the site has been formally documented.

Six new rock art sites were located in the Grey Cliffs area this September by visiting members of the Nevada Rock Art Foundation. In the past, the foundation has helped to document Upper and Lower Pictograph caves. Thanks to their work, several new sites were found and reported to the cultural resources staff. These sites consist of black pigment pictographs of line and "rake" figures. One of the sites contained twelve panels of pictographs including some red ochre figures. Due to the style of these drawings they are suspected to date around 1000 BC or earlier. The fact that all of the sites include black pigments is quite unique for the area.

In October, our staff was able to view the interior of Upper Pictograph Cave. During the summer the cave hosts a maternity colony of the rare Townsend's Big-Eared Bats, which prevents entry. The archaeologists who visited the cave inspected the interior rock art for damage and did notice some vandalism has occurred. Visitors are reminded that entry into the cave at any time is by permit only. Please remember that rock art is a fragile resource and must not be touched, chalked, or damaged in any way. Please help to preserve this resource for the future. Plans are underway to make the site more visitor friendly through the installation of barriers and interpretative signage.

Survey for campground improvements and new trails in the Baker Creek area have yielded a large number of dendroglyphs as well as several prehistoric sites. At least 75 new aspen carvings of various ages were observed and are in the process of being recorded. It is illegal to carve into the park trees at the present, but prior to becoming a National Park many individuals enjoyed leaving markings. Please feel free to observe the historic carvings but we ask that you please do not make your own.

A large new prehistoric site was also located in the Baker Creek region. This site has a multifarious assemblage of stone tool production waste flakes. Over four hundred artifacts have been observed at this site. Our staff is excited to find such a large new site with such a prodigious assemblage of artifacts.

Photo by Karla Jageman, NPS

This log cabin is one of the remains of the Chapman-Taylor mine that was recorded by park archeologists in August.

Aerial Photos Show Changes in Park Landscape

by Laura Steadman, GIS Intern, Mojave Desert I&M Network

Knowing the ways in which the environment has changed in the past can help us to better understand climate change and predict future changes. One way to interpret the past environment is through historic aerial photographs. Unfortunately, these photographs and information about them have not always been well-preserved, and are often only available as prints. Creating digital copies of these prints preserves the information they hold from further loss, and also allows that information to be analyzed via geographical information systems (GIS).

The Mojave Desert Inventory and Monitoring Network (MOJN) has recently begun a project to inventory and digitize aerial photographs of the seven parks within the network, starting with Great Basin National Park. With the assistance of park staff, MOJN Data Miner Stacy Holt inventoried and gathered all of the park's hard-copy aerial photographs. They found a total of 463 unique photographs, taken as far back as 1954. Most of the photographs obtained have a ground resolution of 1 meter or better!

In addition to the prints, MOJN was able to facilitate the procurement of 6-inch resolution digital aerial photography from Southern Nevada Water Authority (SNWA), taken in 2007. MOJN GIS Intern Laura Steadman scanned the photographs and is now finishing the process of creating indices and metadata for each dataset. These indices will allow a user to identify individual photos of interest based on geographic location, which will facilitate analysis of landscape changes over time.

Continued on Page 7

Table 1. Summary of Historic Aerial Datasets for the Park.

Year of Dataset	Number of Photos	Film Type	Complete Coverage of Park?
1954	9	BW	NEAR
1962	20	BW	NO
1970	53	Color	NO
1974	1	BW	NO
1979	5	BW	Approx. half of Park
1982	6	Color-IR	YES
1984, 1985	164	Color	NEAR
1985	27	Color-IR	YES
2003	148	Color	YES
unknown	3	BW	NO
2007	digital (SNWA)	Color	YES

Figure 1. July 8, 1962 aerial photo of the Wheeler Cirque Rock Glacier.

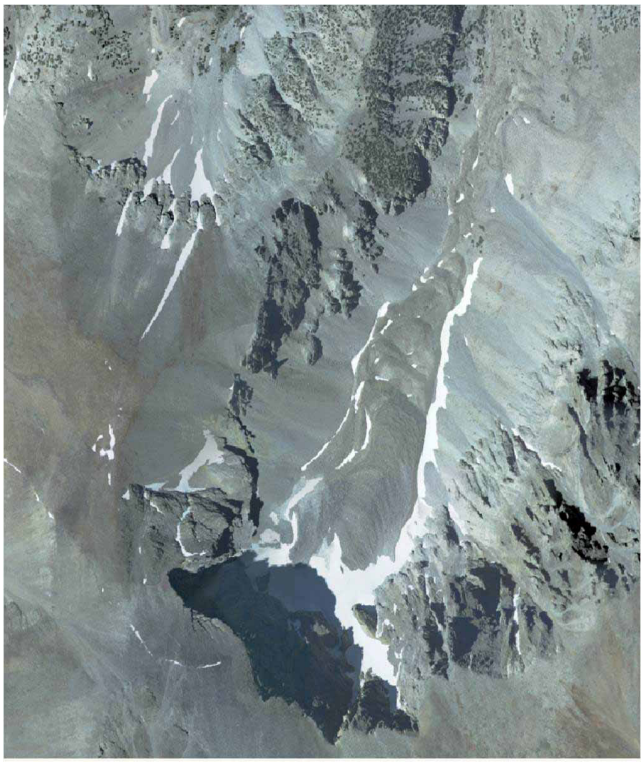


Figure 2. June/July 2007 aerial photo of the Wheeler Cirque Rock Glacier. Note the reduction in snow and more-lobed appearance of the rock glacier. SNWA Photo.

Aerial Photographs (continued)

Visual inspection of the photographs reveals interesting changes within the park over the past fifty years. Many landscape changes evidenced by these photographs can be quantified through GIS analysis, including changes in vegetation, geomorphology (e.g., landslides, stream alteration), and changes in glacier and snow cap size. Figures 1 and 2 illustrate the utility of these images. They both show the glacier and snow cap on Wheeler Peak during June/July (1962 and 2007).

While this is a purely subjective analysis and does not take into account anomalies in the weather, GIS analysis of the aerial photography can allow a more objective understanding of such changes over time.

Invasive Weeds Treated

by Ben Roberts, Natural Resource Program Manager

Great Basin National Park began the first year of work on the Snake Valley Invasive Weeds project, utilizing Southern Nevada Public Land Management Act (SNPLMA) funds. This project, funded during Round 9 under the Eastern Nevada Landscape Restoration Program (ENLRP) category, was a joint project between the National Park Service, U.S. Forest Service, and the Bureau of Land Management.

These agencies are working together with the Snake Valley Cooperative Weed Management Area to identify and eradicate invasive and noxious weed species from Snake Valley. During the summer of 2009, park staff and members of the Lake Mead Exotic Plant Management Team inventoried over 500 acres and treated 56 acres of invasive plants. Current species that the park monitors and treats are spotted knapweed, Canada thistle, musk thistle, bull thistle and tall whitetop. These species are invasive and can take over native habitats if left untreated.

Recent Publications about Great Basin National Park

Allander, K.K. and D.L. Berger. 2009. Seismic velocities and thicknesses of alluvial deposits along Baker Creek in the Great Basin National Park, east-central Nevada. U.S. Geological Survey Open-File Report 2009-1174, 14 p. Available at: http://pubs.usgs.gov/of/2009/1174/

Hamilton, B.T., S.E. Moore, T.B. Williams, N. Darby, M.R. Vinson. 2009. Comparative effects of rotenone and antimycin on macroinvertebrate diversity in two streams in Great Basin National Park, Nevada. North American Journal of Fisheries Management 29: 1620-1635.

Reinemann, S.A., D.F. Porinchu, A.M. Bloom, B.G. Mark, J.E. Box. 2009. A multi-proxy paleolimnological reconstruction of Holocene climate conditions in the Great Basin, United States. Quaternary Research 72: 347-358.

Rickart, E.A., S.L. Robson, and L.R. Heaney. 2008. Mammals of Great Basin National Park, Nevada: Comparative field surveys and assessment of faunal change. Monographs of the Western North American Naturalist 4:77-114. Available at: http://www.bioone.org/toc/mwna/4/1

Salzer, M.W., M.K. Hughes, A.G. Bunn, and K.F. Kipfmueller. 2009. Recent unprecedented tree-ring growth in bristlecone pine at the highest elevations and possible causes. Proceedings of the National Academy of Sciences of the United States of America 1-6. PNAS published online before print November 16, 2009, http://www.pnas.org/content/early/2009/11/13/0903029106.full.pdf+html

Zeppelini, D., S.J. Taylor, and M.E. Slay. 2009. Cave *Pygmarrhopalites* Vargovitsch, 2009. (Collembola, Symphypleona, Arrhopalitidae) in United States. Zootaxa 2204:1-18. Available online at:http://www.mapress.com/zootaxa/2009/f/zt02204p018.pdf

National Park Service
U.S. Department of the Interior

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
Andy Ferguson

Chief of Resource Management
Tod Williams

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 numerous middens.

Great Basin National Park

Meet the Latest Described Cave Species

Cave biologist Steve Taylor recently announced that the park is home to another newly-named and described cave species, a tiny springtail. Its scientific name is *Pygmarrhopalites shoshoneiensis*, or it may be called the Shoshone springtail. The species name honors the Western Shoshone, a group of Native Americans who have visited the caves of Great Basin National Park for many hundreds of years, leaving behind only traces of their lives. Their tribal homeland encompasses large portions of the Basin and Range province of the Great Basin region.

This springtail was found in Model Cave, and seems to prefer wet habitats. It has no pigment and no eyes. It has not yet been photographed, because in order to identify it, it had to be mounted on a slide and according to Dr. Taylor, "thus looks like a bug that hit the windshield at 70 mph."

Photo by Dr Jean K. Krejca, Zara Environmental

Closely related to the new species is this springtail, *Arrhopalites caecus*. It has a worldwide distribution, but its documentation in the park is the first record for Nevada.

Upcoming Events:

Dec 17: Christmas Bird Count, Baker, NV Area. Help collect data for the longest running ornithological database, begun on December 25, 1900. Contact Melissa Renfro at 775-234-7154. http://www.audubon.org/bird/cbc/

Jan 3 : Fish Springs National Wildlife Refuge Christmas Bird Count. Call 435-831-5353 for more information.

Jan 3-4: Quandratid Meteor Shower. Large number of meteors. http://meteorshowersonline.com/quadrantids.html

Feb 12-15: Great Backyard Bird Count. Annual event to help understand bird distribution in winter. Takes as little as 15 minutes. http://www.birdsource.org/gbbc/

March 13: Messier Marathon Star Party. See how many celestial objects you can check off. Visit http://www.richardbell.net/marathon.html.

April 23-25: National Association for Interpretation regional conference in Ely with special night sky program at the park. http://www.nairegions.org/9/

May 22-23: Orthoptera Bioblitz. Help collect grasshoppers, crickets, and more to add to the baseline data on invertebrates in the park.

May 29-30: Great Basin Star Party. Special program & night sky viewing with telescopes. See http://www.nps.gov/grba for more details.

July 25-26: Great Basin Star Party. Full moon walks and more.

August 6-8: Great Basin Astronomy Festival. Special programs & night sky viewing with telescopes. See http://www.nps.gov/grba for more details.

Lehman Cave Tours daily at 9 AM, 11 AM, 1 PM, and 3 PM.
Visitor Center open 8 AM to 4:30 PM daily except 12/25 & 1/1.
Snowshoe programs on Christmas, New Year's, and Martin Luther King weekends--see park website for details.