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

Value and Beauty in Great Basin National Park's Night Sky

By Terrel Gallaway, Reed N. Olsen, and David M. Mitchell, Economics Department of Missouri State University

Light pollution is a serious problem. In the United States, about 25 percent of the electricity produced is used for lighting, and an estimated 30 percent of this light is wasted as light pollution or light trespass. This translates into over 300 million mwh of wasted electricity at a cost of $28.7 billion a year. This unnecessary electricity usage generates an additional 275 million metric tons of CO_2.

Eliminating light pollution would be the CO_2 equivalent of removing over 40 million cars from the road. In addition, light pollution has been shown to harm wildlife—interfering with bird migration and sea turtle reproduction, for example. Studies have also suggested an increase in the risk of breast cancer in women due to lower levels of melatonin production. In addition to these costs, there are substantial aesthetic and cultural losses from the reduced visibility of the night sky. We are trying to measure some of these costs.

Photo by Night Sky Team, NPS.

View of Milky Way over Great Basin National Park.

Table 1:
Visitor Activity at Great Basin National Park

Park Activity	*Percentage of Respondents*
Star Gazing	45%
Visitor Center	75%
Hiking	69%
Photography	60%
Watching Wildlife	56%
Scenic Viewpoints	52%
Fishing	12%

In the summer of 2007, we conducted a survey in four national parks, including Great Basin National Park, to determine visitors' attitudes and perceptions about light pollution. Approximately 140 Great Basin visitors took the survey. Park visitors engaged in or planned on engaging in a wide variety of activities (Table 1). Many visitors (45 percent) star gazed or planned to do so.

Our results indicated that almost half of all visitors considered the dark skies as an important or very important consideration when they were making their travel plans to go to Great Basin National Park, and approximately 20 percent brought equipment such as a telescope, binoculars, or a camera for observing the night sky.

This is not surprising since 88 percent of people indicated that they had noticed the effects of light pollution, i.e. 'sky glow', in their home towns, and 64 percent of respondents indicated they were bothered by such light pollution. Furthermore, only 27 percent of respondents indicated that they can readily see the Milky Way on a clear night where they live.

In order to gauge how much damage light pollution causes, we asked survey participants to indicate how much they would be willing to pay to preserve dark skies at Great Basin and reduce light pollution in their hometowns. Fifty-three percent of survey respondents indicated that they were willing to pay a positive amount to address light pollution.

We have only just started our analysis, but preliminary results suggest that, for visitors to Great Basin National Park, the value of preserving dark night skies in the park exceeds a million dollars per year. Economists recognize that even those who have not had the pleasure of visiting the park can value the existence of dark skies at Great Basin. Accordingly, for the US as a whole, the value of preserving darks skies at Great Basin National Park is likely to be much larger than this million-dollar figure.

Visit the park website for more information about the dark skies. http://www.nps.gov/grba/naturescience/lightscape.htm

In This Issue

Lincoln Cirque Restoration Completed

By Ben Roberts, Natural Resource Program Manager

The park successfully completed the restoration of the Lincoln Cirque Mining Exploration Area which originally consisted of 31.5 acres with 10 trenches, 12 waste piles and 1.7 miles of roads. Due to the high elevations, thin soils, low overall productivity and extreme weather conditions, few of the features had stabilized or revegetated in the 50 years since they were created.

In the second year of this two year project, 16.5 acres of land were restored to a natural state including 0.6 miles of road. An additional 0.5 miles of road were converted to an environmentally friendly trail. For all features, disturbed earth was placed back into its original condition, within 5 percent of natural slope, restoring the natural drainage patterns.

This work was conducted by park staff using a small skid steer loader with a backhoe attachment for earth removal and placement. Park hand crews then placed native mulch, large rocks and woody debris on the sites. This will assist with natural revegetation by creating microenvironments to intercept rainfall and wind blown seeds and to increase seed germination. As the last section of the road was reclaimed, hand crews successfully converted it to a new trail that meets all NPS trail standards and successfully negates the hydrologic issues of the old road. This new trail is accessible via the Mt. Washington Road, which is best approached with a high-clearance 4x4 vehicle.

Photo by Ben Roberts, NPS.

The previous road into Lincoln Cirque.

Photo by Ben Roberts, NPS.

The road is now reclaimed to include a hiking trail.

Detailed Geologic Map Adds Information to Park

By Ben Roberts, Natural Resource Program Manager

Great Basin National Park has just received a newly updated digital geologic map. This map was made to meet the requirements of the NPS Inventory and Monitoring goal of creating basic datasets for all parks including geology, soil, vegetation, climate, and wildlife. The map was created by the Geologic Resource Division based on geologic maps produced primarily by Dr. Elizabeth Miller of Stanford University.

While basic geologic maps exist for the surrounding area, typically in the 1:100,000 scale, this is the first time that the park has had complete geologic coverage of all topographic quadrants in the 1:24,000 scale. In addition, the park has received five geologic cross sections of the park, the most detailed yet produced for the South Snake Range. This exciting new resource is available to the public at http://science.nature.nps.gov/nrdata/ and search for Great Basin National Park.

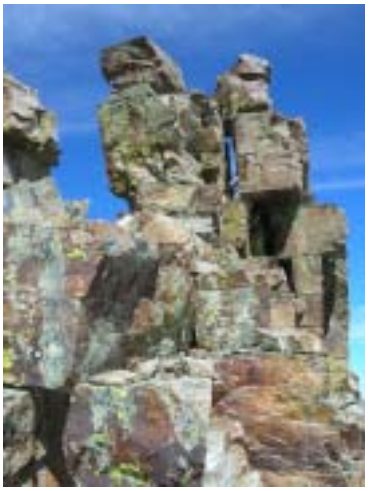

Photo by Gretchen Baker, NPS.

The Park's geology is better understood with the new geologic map at the 1:24,000 scale.

2007 Water Quality Inventory

by Meg Horner, Biological Science Technician

Great Basin National Park began a baseline inventory of its water resources in December of 2006 to establish current water quality conditions for each key water body within the park. Water quality, water chemistry and water quantity data were collected from a total of 65 sites including four caves, six lakes, 37 springs, and 18 stream locations. The sites were sampled seasonally in December, March, June and September. The alpine lakes were sampled during the summer months along with higher elevation sites that were inaccessible during the winter.

Photo by Meg Horner, NPS.

Preparing the float tube to conduct water quality analyses at different depths in Baker Lake.

At each sampling site several measurements were taken and two water samples were collected and sent off to a water testing laboratory. The measurements taken in the field included dissolved oxygen, water temperature, specific conductance, pH, surface velocity, and stream width, depth and discharge. The lab tested for other important water chemistry elements including metals, minerals, total dissolved solids, alkalinity and turbidity to gauge water source condition.

Macroinvertebrates (aquatic insects) were also sampled at selected sites because certain species are sensitive to poor water quality and therefore can serve as good indicators of water source quality. Any changes in their populations can signal a change in water chemistry.

The data collected over the last year will be used to establish baseline conditions for the Park's water resources and allow for the detection of any future changes in water resource condition. The inventory will also help determine trends and seasonal fluctuations for the park's streams, springs and caves.

New Soil Survey for Park

By Jenny Beuerman, Biological Science Technician

During the summer of 2007, the park worked cooperatively with the Ely office of the Natural Resource Conservation Service (NRCS) to perform a soil survey within Great Basin National Park.

Three NRCS soil scientists and an NPS Biological Science Technician worked full time on the project while a fourth NRCS Range Conservationist worked part time. This survey is to update the original soil survey done for the park in 1992. Due to changing survey standards and more accurate imagery, the new survey was deemed necessary to assist park staff in managing the park.

The park had twenty-six official series descriptions (OSDs) already written from the previous soil survey. This summer the twenty-six OSDs were re-evaluated via soil pits and additional information about the soil and the surrounding ecological area was added to the description.

Based on the reevaluations and new locations, seven new soil types were located and described. In 2008, the soil survey will continue during the summer months to complete the process.

See back issues of *The Midden* at Great Basin National Park's website: www.nps.gov/grba.

To be added to the email distribution list, send a message to Gretchen_Baker@nps.gov.

Resource Management Project Briefs

By Bryan Hamilton, Ben Roberts, Gretchen Baker, and Tod Williams

Sagebrush – Steppe Wildlife Inventories: Building the Knowledge Base

Due to 100 years of fire suppression and a host of other anthropogenic effects, sagebrush-steppe habitats are one of the most threatened communities in the United States and wildlife species dependent on these habitats are in decline. Great Basin National Park has lost over 10,000 acres of sagebrush to woodland encroachment. An additional 8,000 acres are in a serious state of decline.

In 2007, Great Basin National Park launched an inventory of sagebrush-steppe dependent wildlife species to find isolated populations of sagebrush dependent species. Park staff conducted 340 person hours of surveys targeting these species with a primary objective of documenting new populations.

Six new marmot populations and four populations of sagebrush voles were found. Although kingsnakes were not found within the park, six were found just outside the boundaries in a multi-agency and volunteer cooperative search.

The project will continue in 2008 and 2009 and will assist with the development of a vegetation management plan focused on the restoration of declining community types.

Photo by Ben Roberts, NPS

Bull thistle leaves

Invasive plants

Park staff inventoried 254 acres for invasive plants in FY2007 and treated a total of 62 acres. Nonnative invasive species of focus include spotted knapweed, white top, bull thistle, musk thistle, and common mullein.

Eleven acres of spotted knapweed were treated by herbicide and one acre in a sensitive area was treated by hand pulling. The park has successfully eradicated four acres of spotted knapweed in the Strawberry Creek drainage and has eradicated five acres in the Baker Creek drainage. One acre of new infestation was found in the Baker Creek drainage and treated.

An additional 49 acres of bull and musk thistle, white top and mullein across six watersheds were also treated with herbicide. Most of the acreages are new infestations discovered this year.

Photo by Bryan Hamilton, NPS.

A kingsnake

Extirpated Species Recovery

In 2000, Resource Management staff initiated a multi-year program to restore all extirpated native fish species to selected stream systems. Reviews of historical information found that park waters contained suitable but vacant habitat for Bonneville cutthroat trout, speckled dace, mottled sculpin, and redside shiner.

These four species originally lived in Lake Bonneville and then moved into streams as the lake dried up. Due to a variety of factors such as nonnative fish stocking, large scale stream diversions, and other land use practices, they were outcompeted and hybridized by nonnative fish species.

Photo by Gretchen Baker, NPS.

A diminuitive young-of-year mottled sculpin from Strawberry Creek

All four of these native species have been restored to park waters. Bonneville cutthroat trout occur in five stream systems encompassing over 12 miles of stream in the Park. Monitoring efforts in 2007 have found viable self reproducing populations with an average of 700 fish per mile in each system. As distribution expands into available habitat over the next ten years, Bonneville cutthroat trout will inhabit over 50 percent of their historic range within the park. The other three species were reintroduced into two streams in 2006 and ongoing monitoring will follow their progress.

Update on Restoration of Johnson Lake Historic District

By JoAnn Blalack, Archeologist

During the summer of 2007 a stabilization crew from North Cascades National Park in Washington State was back at the Johnson Lake Mine cabins to complete the stabilization of the largest of the cabins known as the cookhouse. In 2006 when the crew began the project, it was hoped that during the 2007 summer session that they would start on the stabilization of the Stamp Mill, but it was not to be. The cookhouse took longer than anticipated so it is hoped that in the summer of 2008 they will be back to work on the Stamp Mill.

The cookhouse took longer due to the north side (photo 1) of the building. This side leaned slightly to the north and needed to have two bottom logs replaced.

In order to remove the two bottom logs, the crew first had to dig as much soil away from and under the building to be able to lift the building using hydraulic jacks, pulleys, wedges, and crowbars. Once the logs were removed, braces and blocks were used to keep the building standing (photo 2) until new logs could be cut to size and placed. The crew was fortunate that during the 2004-2005 winter an avalanche occurred near the work area leaving an abundant supply of downed trees from which to choose.

Once the new logs were brought to the work area it took one full day to place each log and a half day to place a rock foundation (photo 3).

You are welcome to visit the site. Plan on at least a half- day hike and check with the visitor center for necessary gear and weather conditions. Please leave the buildings and any other items you encounter as you found them so that other explorers can enjoy the area.

Note: to read a brief history on the Johnson Lake Mine Historic District and the restoration project please see the Summer 2007 Midden.

Photo by Dana Barton, NPS.

Photo 1. Logs at bottom of cabin were rotting.

Photo by Joann Blalck, NPS.

Photo 2. Cabin is stabilized after rotted logs have been removed.

Photo by Dana Barton, NPS.

Photo 3. Cabin has new logs to help support and preserve it. Rocks are placed under the logs instead of soil to prevent decay.

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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:
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Or call us at: (775) 234-7331

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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

Alpine Caves Surveyed for New Species

by Gretchen Baker, Ecologist

The focus for finding new cave biota during the second year of a two year study was at high elevations. A Cooperative Ecosystem Studies Unit (CESU) agreement with the Illinois Natural History Survey allowed park staff to work in close cooperation with cave biologists.

In July, six alpine caves were visited. Despite the cool and even frigid temperatures in some of the caves, most contained more diverse and abundant biological populations than expected.

Specimens were collected and given preliminary identifications in the field. The Principal Investigator is in the process of refining identification and will then send specimens to taxonomic experts as necessary.

In addition to the alpine cave survey, park staff continued monthly cave biota monitoring in Lehman Caves to provide an entire year of data that can be analyzed to determine if seasonality, impact, distance from entrance, and/or distance from trail affect the distribution of cave biota.

Photo by Gretchen Baker, NPS.

A pseudoscorpion. Total length is about one inch.

The findings of this project will allow planning for cave visitation and monitoring of visitation to preserve these unique populations.

If you'd like to learn more about these unique creatures, visit the park website to see the newly created *Field Guide to Cave Life*. It contains photos and information about the life cycle of several cave critters.
http://www.nps.gov/grba/naturescience/cave-life.htm

Upcoming Events:

Dec 13/14: Geminid Meteor Shower One of the most reliable meteor showers. http://www.skyandtelescope.com

Dec 14: 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 3/4: Quandratid Meteor Shower Large number of meteors. http://meteorshowersonline.com/quadrantids.html

Feb 15-19: Great Backyard Bird Count Annual event to help understand bird distribution in winter. Takes as little as 15 minutes. http://www.birdsource.org/gbbc/

Feb 21: Total Lunar Eclipse More information at http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html

Lehman Cave Tours daily at 9 AM, 11 AM, 1 PM, and 3 PM.
Visitor Centers open 8 AM to 4:30 PM daily except 11/22, 12/25 & 1/1.