The Case of the Missing Frogs

By Bryan Hamilton

Why are there no frogs in Great Basin National Park? Great Basin National Park seems like a perfect refuge for frogs, with plenty of water--ten perennial streams, hundreds of springs, and six alpine lakes, but apparently there are no amphibians.

During 2002, an amphibian inventory was conducted within Great Basin National Park. Crews surveyed perennial streams, springs, and alpine lakes, but did not observe any adult amphibians, tadpoles, or egg masses. The reasons for this are unclear, but apparently frog distribution depends on more than just abundant water.

Lack of suitable breeding habitat is a major limiting factor in amphibian distribution. Most amphibians require still or extremely slow moving water to lay their eggs in. High gradient streams in the Park do not provide appropriate breeding habitat. The hundreds of springs in the Park may provide this habitat, however, no amphibians were found at the dozens of springs surveyed this year.

Isolation from source populations is another limiting factor. Streams leave the Park and then quickly disappear underground. Amphibian populations near the Park are not directly connected to these streams. Thus no corridors exist between the Park and nearby amphibian populations.

One amphibian species that does not require aquatic corridors for migration is the Great Basin Spadefoot (Spea intermontana), commonly referred to as a "toad." Spadefoots are distinguished from "true toads" (members of the family Bufonidae) by a black wedge shaped spade on their hind feet, used for burrowing. Spadefoots move considerable distances over land during spring and summer rains, travelling to breeding sites. They mate and lay their eggs in ephemeral pools and ponds, then burrow underground with their "spadefeet" to await the next rain. Spadefoots can remain underground for up to two years. The eggs of spadefoots mature very quickly; two weeks after laying eggs, the tadpoles have metamorphosed from tadpoles to adults, and have left the breeding ponds. The ability of spadefoots to aestivate during drought and quickly metamorphose from egg to adult allows them to take advantage of infrequent periods of moisture and rapidly shrinking breeding habitat. Spadefoots are superbly well adapted to the desert habitat.

Woodhouse's Toad (Bufo woodhousei) a "true toad" looks very similar to spadefoots, but is larger with wartier skin, and lacks the black wedge shaped spade on their hind feet. Woodhouse's Toad was collected several times in the 1930's from Warm Creek in Snake Valley, Utah. Woodhouse's toad is thought to have entered the Great Basin from the southwest after the Pleistocene.

After the Pleistocene, Great Basin climates rapidly became warmer and drier. Aquatic frogs such as Northern Leopard frogs and Spotted frogs became isolated in shrinking desert streams, marshes, and springs. Why frog species did not move upstream into the Park during this time, like Bonneville cutthroat trout and Great Basin spring snails, is unclear.

Northern Leopard frogs (Rana pipiens) are found in marshes and large valley springs. Northern Leopard Frogs are known from Shoshone and Cleveland ranches in Spring Valley and Bishop Springs and Gandy Salt Marsh in Snake Valley. Leopard Frogs have undergone dramatic declines throughout their range due to habitat loss, fungal infections, and competition with non-native fish and amphibians.

Bullfrogs (Rana catesbeiana) are non-native frogs that have been widely introduced into the Great Basin. Bullfrogs are found in Bishop Springs and Lower Strawberry Creek. Bullfrogs are large frogs, up to 8 inches long, and capable of swallowing leopard and spotted frogs whole. The introduction of non-native bullfrogs is a major concern in maintaining native frog populations. To protect native frog populations, DO NOT MOVE FROGS BETWEEN BODIES OF WATER.

Although no amphibians have been found in the park, we are still optimistic. Great Basin Spadefoots will likely be found in the Park's lower elevations and there is a small chance of finding Western Toads in the alpine lakes. The mystery of the missing frogs continues…

Caption: The Columbia Spotted Frog (Rana luteiventris) is found in two wetlands in Snake Valley, Utah.

Sage Grouse Conservation

By Neal Darby

Great Basin National Park has been participating on the White Pine and Lincoln Counties Sage Grouse Conservation Planning teams. These teams are made up of personnel from the Bureau of Land Management, Forest Service, Nevada Division of Wildlife, USDA Wildlife Services, Natural Resource Conservation Service, local ranchers, sportsmen and concerned citizens. The team was sanctioned by Governor Guinn to provide local solutions and decision making that would protect, enhance and restore sage grouse populations and their habitats. The White Pine and Lincoln County teams meet approximately every three weeks in Ely and Caliente, respectively. In addition, approximately once a month, a joint meeting between the two counties is held alternating between Ely and Pioche. Everyone who is a citizen or has an interest in White Pine or Lincoln County is encouraged to attend.

Sage Grouse Conservation planning was initiated in response to potential petitions being submitted to list the sage grouse as a threatened species under the Endangered Species Act. In fact, there were several petitions submitted this past summer. By completing an acceptable conservation plan, listing the sage grouse could be avoided, maintaining more flexible management activities from state, federal agencies and private landowners.

The conservation plan will lay out the following objectives: 1) Delineate Population Management Units (PMUs) or areas containing interacting populations of birds, 2) Assess and evaluate habitat conditions within each PMU, 3) Assess and evaluate population risks within each PMU, 4) Prioritize and set population goals for each PMU, and 5) Develop and submit a Sage Grouse Conservation Plan. These objectives are to be completed by December 2002.

Currently, Great Basin National Park is located in the Spring/Snake Valley Population Management Unit. Historically, sage grouse were common around Lehman Caves and the Rowland Ranch area. Several leks, or strutting grounds, where the birds congregate in the spring to breed were located between Strawberry Creek and Big Springs. However, surveys in these areas by park staff the past two years failed to detect any sage grouse. A Forest Service Research Scientist observed one female sage grouse in May 2002 below Clay Springs, southwest of the Baker water tank. Sage grouse are still found throughout Spring Valley and some of these birds are known to use the Strawberry Creek headwaters during the summer.

Work done to date concerning the park is shown in the figure below. It depicts a draft habitat assessment and evaluation for Great Basin National Park. Due to the high elevation of the park the primary threat to sage grouse habitat in the park is pinyon, juniper and mahogany encroachment. In fact, nearly 9,000 acres of sage grouse habitat has been lost in the park. This is shown in the figure by crosshatches, which represent historic sagebrush and grass habitat that are now stands of pinyon, juniper and mahogany forest. Diagonal lines exhibit currently existing sagebrush or mountain shrub plant communities being threatened with pinyon, juniper and mahogany encroachment. Areas outside the park are still being mapped due to

lack of more detailed information.

The team is currently developing population and habitat risks, which will then be used to set population goals and prioritize areas for enhancement or restoration work.

Involvement from local citizens has been minimal and we would like to encourage everyone to become involved and provide input. If you are interested and want to learn more about sage grouse conservation planning or would like to become involved please contact Neal Darby at the park (775) 234-7331 ext. 232.

Fish News: Bringing Back the Natives

By Gretchen Schenk

Bonneville Cutthroat Trout Reintroduced into Strawberry Creek

Thirty-four Bonneville cutthroat trout were moved from Mill Creek into Strawberry Creek on October 15th. Although this is a small number of fish, they have the potential to have hundreds of babies in their first year. Park staff will monitor the population and supplement it with additional reintroductions if necessary. Strawberry Creek has five miles of fish habitat in the Park and an additional two miles outside the Park.

Strawberry Creek was once connected to the Snake Arm of Lake Bonneville, and as the lake dried up, Bonneville cutthroat trout moved into the stream. When settlers came into the area and began stocking Strawberry Creek, the non-native brook and rainbow trout outcompeted the Bonneville cutthroat and it disappeared. Since the National Park Service mandates that national park areas be managed for the native species, the NPS, in cooperation with the Nevada Division of Wildlife (NDOW), treated Strawberry Creek in 2000 with the piscicide rotenone to remove the non-native trout. After electrofishing the stream three times and determining that the treatment was successful, Bonneville cutthroat were reestablished.

Snake Creek Treatment

Snake Creek also sported native Bonneville cutthroat trout at one time, and the upper four miles of the stream was designated as a location to return the native trout. Towards that end, this section of stream, from the top of the pipeline past the last fish in each of the upper tributaries, was treated with antimycin August 5th-10th. Antimycin is a more selective killer than rotenone, and it did not have as large an impact on the macroinvertebrate population in Snake Creek as rotenone did in Strawberry Creek. Macroinvertebrates will continue to be sampled and their recovery will be compared to that of Strawberry Creek so that fisheries managers in other areas will be able to make better decisions about how they remove non-native fish. In addition, the entire upper section of the creek will be electrofished twice more to

make sure that the treatment was successful, and then Bonneville cutthroat trout will be reintroduced. NDOW is an important partner in this process, since they control most of the donor populations. With their cooperation, BCT may be reintroduced into Snake Creek in September 2003.

South Fork Big Wash Bonnevilles Growing Quickly

In September we completed a standard fish population survey in the South Fork of Big Wash, where Bonneville cutthroat trout were reintroduced in 2000. The fish that had been moved there from Mill Creek had taken advantage of the bigger creek and more nutrients and had grown 60% in length over two years. Several were larger than any Mill Creek fish. These fish successfully spawned last year, as evidenced by the several small fish we found.

In late September, a storm caused a flash flood in the creek, washing unstable slopes from last year's wildfire into the creek. While large fish were found in several pools, the sediment was up to two inches deep in some pools and may have harmed this year's spawning success.

Volunteers contributed over 700 hours to the fisheries program at Great Basin National Park in 2002. We would like to extend a huge thank you to everyone who came out and helped us-we couldn't have done as much as we did without your help!

More Than Just a Hole in the Ground

By Don Seale

The wild cave project team at Great Basin has had a very active field season. Extensive surveys of eight caves were undertaken with the intention of creating cave maps and establishing three-dimensional spatial relationships among the caves. While we were surveying, we had ample opportunity to begin work on the physical and biological inventories of the wild caves. With these inventories, we can monitor the impact that cavers are having when they enter the cave.

Of course, when someone mentions cave biology, people automatically think about bats. Part of the biological inventory involves mist-netting bats. A very fine-thread net is placed over the opening of a cave and bats become entangled as they enter or exit the cave. On three different occasions, Park staff and volunteers braved the cold night to capture bats in order to measure their size, weight, and gender. More than 200 bats were captured, their data recorded, and released during the year. This includes 97 bats captured in one net over a 4-hour period. You can imagine the difficulty involved in untangling, measuring, and releasing bats that are very unhappy with their situation, at a rate of one every two minutes for 4 hours. We were happy to find that several large communities of bats, and four National Park Service Sensitive

species, live within the park.

We also had the opportunity to spend several days deep in the interior of the Park searching for new caves. With winter fast approaching, we will likely wait until next summer to begin surveys, but initial exploration has revealed some truly beautiful caves. Three members of the Resource Management staff braved the below freezing cave temperatures to rappel down the face of a 100 foot frozen waterfall.

With almost eight months worth of data, we now look forward to a winter of office work as we condense and compile all of our work. By the end of the winter, we will have in place a working, science-based management plan for the caves in the park.

Wildlife Surveys

Wildlife surveys completed in Great Basin National Park during the summer of 2002 included searches for bighorn sheep lambing grounds, bighorn sheep composition counts, monitoring of collared elk movement and elk composition counts.

Studies of bighorn sheep habitat found that potential lambing habitat was likely deficient in the park. However, where the bighorns were actually lambing was unknown. So park staff spent time in the high country in June trying to locate lambing grounds. The search was conducted between Decathon Canyon and Baker Peak and involved "glassing" the terrain with binoculars and spotting scopes. After four days, only the bighorn ram with green eartags was spotted. Remember from previous issues, this ram is now 14 years old! Then on the fithe and last day of our effort, two ewes and a lamb were spotted in Decathon Canyon. Plans are now underway to see what habitat improvements may be needed to enhance the area for bighorn lambing.

Bighorn composition counts, which are held in late August or early September, were not successful this summer. Despite three days of extensive searching, the main group of ewes could not be found. The rams were spotted in the Mt. Washington area. One to three rams have been seen together throughout the summer by park staff and visitors. Efforts will be made this winter to obtain winter composition counts. Composition counts are important because we classify the animals to lambs, ewes and rams allowing us to determine reproductive success and over winter survival, quickly alerting us to potential problems.

Despite elk being present on the south Snake Range for the past 15 years, only antidotal information was available about their ecology. When two cow elk fitted with radio telemetry collars showed up with the herd on the south Snake Range, an opportunity arose to learn just that. We followed the elk to obtain information on movement, seasonal ranges, habitat use, reproductive rates and the number of elk.

The amount of information gathered so far is small, but some generalizations can be made about elk use of the south Snake Range. They are using an area covering almost 9,000 acres between Sacramento Pass and the Hub basin, with the center of activity being in Weaver Creek. Winter range is shaping up to be the west side of the south Snake Range and up on the north Snake Range. The two collared elk go separate ways in the winter. Spring, summer and fall ranges are in the Weaver Creek area. Some time is spent in the park, primarily during the breeding period or rut in late August and September. Habitat use was primarily Pinyon and Juniper forest adjacent to sagebrush/perennial grass openings. Reproductive rates appear to be adequate with a 40 percent cow: calf ratio. This equates to four calves for every 10 cows. Though below what elk are capable of it is enough to promote growth in the herd. Numbers of elk on the south Snake Range are more difficult to determine due to the extensive forest cover. We will use the information gathered to develop an adequate survey technique that provides a reliable estimate of elk numbers. However, we did count 49 elk in one encounter, the highest number ever counted on the south Snake Range.

Cultural Resources News

By Tod Williams

Archeological resources identified at Great Basin National Park include prehistoric artifact scatters, extensive rock art sites and caves or rock shelters, some with substantial midden deposits. Prehistoric occupation of the park extends from the Paleo?Indian Period (12000 B.C. to 9000 B.C.) through the Great Basin Desert Archaic (9000 B.C. to A.D. 500) and the Fremont (A.D. 500 to 1300) to the Western Shoshone Period (A.D. 1300 to Euro-American cultural expansion.).

Historic resources identified within the park include sites related to early exploration and use, military surveying and, most notably, the development of mining and ranching in the area. Mormon explorers reconnoitered the region in the 1850's and established an agricultural settlement south of Baker in 1855.

The park manages a small museum collection, with a majority of the collections housed at the Western Archeological and Conservation Center in Tucson, Arizona, due to limited space and facilities in the park. A museum management plan was completed in 1998.

Since the park was created there has never been any staff dedicated to preserving and managing the park's cultural resources. Starting December 16th, JoAnn Blalack will join the Resource Management Division as the park's Cultural Resource Program Manager. JoAnn comes to Great Basin after several years as an archeologist at the Western Archeological and Conservation Center. Welcome JoAnn!

How much water is in Park creeks?

We will now know the approximate water flow (discharge) every 15 minutes for six of the ten perennial streams and one ephemeral stream in the Park. The USGS installed ten stream gages in September and October to collect a long-term record of water amounts. These gages are located on Strawberry Creek, Lehman Creek, Rowland Springs, Baker Creek, Upper and Lower Snake Creek, South Fork of Big Wash, Decathon Canyon, Williams Creek, and Shingle Creek. Each site has a pressure transducer, which measures the height of water in the stream; a staff plate, from which a person can read the stream height; and a temperature datalogger. Every four to six weeks a technician downloads the pressure transducer data and measures the discharge. One of the stream gages, on Lehman Creek, transmits its data via satellite to a website every four hours. You can view this data, which is considered provisional (subject to checking and revision by a USGS analyst), at **https://waterdata.usgs.gov/nv/nwis/uv?10243260 (https://waterdata.usgs.gov/nv/nwis/uv?10243260)**