Bonneville Cutthroat Trout Reproducing Well in New Streams

By Gretchen Baker

Population surveys conducted in September on South Fork Big Wash and Strawberry Creeks revealed that Bonneville cutthroat trout are reproducing and growing well.

In 2000, 56 Bonneville cutthroats were reintroduced into South Fork Big Wash. Our

2003 survey found 10 adults and 8 young of the year in a 100m section. Adults averaged almost nine inches (221.7mm) in length, longer than the average length of brown, brook, or rainbow trout in Baker and Lehman creeks.

In 2002, 34 Bonneville cutthroats were moved into Strawberry Creek. Just one year later, six adults and 12 young of the year were found in one 100m section. The average length for adults was six and a half inches (165mm).

Both of these populations appear to be dispersing throughout the stream, which we anticipate continuing for several years. These populations, along with others in the park, will continue to be monitored to ensure that the Bonneville cutthroat trout are thriving. Within a few years, these Bonneville cutthroat trout populations should be large enough to provide good fishing opportunities for a unique trout.

Beavers Found in Park

by Stephanie Leslie

We have beavers in the park! There are seven beaver dams, ponds and one lodge along Strawberry Creek inside the park boundary. In order to verify beaver activity, resource management is trying to photograph the beavers at the main beaver pond. This may be a challenge since beavers are nocturnal animals. They build and repair their dams every evening, replacing damaged sticks and patting on more mud. Beavers are equipped with many adaptations that allow them to dive and remain comfortable underwater, making them even more elusive. Even their lodges are entered through the water. Beavers are considered to be a keystone species, since their existence shows that conditions are right for many other species to live nearby. Beaver ponds play several different roles, from helping forest succession to creating habitat for fish

and amphibians. The presence of beavers leads to many interesting questions: Are beavers a native species to this area? Will the presence of beavers in Strawberry Creek help the recently introduced Bonneville cutthroat trout population? These questions will hopefully be answered in the near future.

Tracking Elk Reveals Surprises

By Neal Darby

It's been 16 months now since Rocky Mountain elk wearing radio telemetry transmitters appeared in Great Basin National Park. So far we have recorded 82 locations for these elk, providing us with information on the elk herd's home range, habitat use, population size, and population growth. This is all critical information needed to properly implement the White Pine County Elk Management Plan.

The elks' overall home range covers approximately 33,000 acres of the Weaver Creek, Strawberry Creek and west slope of the south Snake Range. The park comprises just 22 percent of their home range. This home range estimate only reflects the main herd found here, mostly cows, calves and yearlings. Bulls and some yearling cow elk tend to wander more and can cover extensive area. For example, this was a banner year for elk sightings. Elk, mostly bulls, were seen in every major drainage on the east side of the park. We even caught elk on film (see photo).

The most surprising information we have found is the almost exclusive use of pinyon, juniper and mahogany habitats. Of 82 locations obtained, 67 locations or 80 percent were found in or adjacent to pinyon and juniper or mahogany. The remaining locations were in mountain shrub or mixed conifer habitats. In all cases sagebrush and native bunchgrasses were either in the understory or nearby. This was expected in the winter, but not the summer when we thought they would use the higher elevation aspen and mountain meadows found in the park.

Obtaining the exact number of elk that range in the woodlands on the south Snake Range is a daunting task. Even with elk wearing radio telemetry transmitters, seeing every elk as they walk through a pinyon forest is impossible. Even if they cross an opening, elk tend to bunch together and that makes it difficult to get an accurate count. We are using the home range and seasonal distribution information we gather to develop a strategy to survey for a population estimate. In the meantime, the highest number we have counted in a single sighting was 74, and there were more! This number is certainly more than the 25 estimated to be here in 1999.

Whenever we see the elk we try to get a classification count. In other words we count them by cow, calf, and bull. By knowing the number of calves and cow elk we can gauge population growth. So far we have

averaged 41 percent calves in our counts, which indicates excellent recruitment and a growing herd. By knowing the number of bulls and cows we can understand the impact of predation on the herd. So far, the numbers of bulls have averaged 25 percent of cows. This number indicates that hunting or any other mortality on bulls is not enough to negatively affect the herd. If bulls were 15 percent or less of the number of cows this would be considered detrimental for population health. Elk are definitely here to stay.

Fish Populations Increase in Baker and Lehman Creeks

By Rob Colvin

During August 2003 fish populations were surveyed in Baker and Lehman Creeks with volunteer assistance from the Southern Nevada Chapter of Trout Unlimited (SNCTU). The surveys used backpack electrofishing equipment to perform three pass surveys. For each stream, a 100m section was blocked off with nets, and staff attempted to remove all the fish from that section by stunning them with an electrical current and netting them. Fish were then identified, measured, weighed, and returned to the stream at the end of the survey. The number of fish found in each 100m section were extrapolated to estimate the number of fish per mile.

Baker Creek

The 1990 survey electrofished 500ft with one pass between the Grey Cliff Narrows and Baker Creek trailhead, and estimated 598 brown trout, 367 brook trout and 123 rainbow trout per mile. The 2003 survey took place approximately 50m upstream of Baker Creek Campground. Fish per mile estimates were 692 for brown trout, 756 for brook trout, 531 for rainbow trout and 547 for young of the year (YOY). Average length for all trout species was approximately six inches. Fish per mile totals in the 2003 survey were slightly higher for BNT and much higher for BKT and RBT. Although the methods varied between the two surveys, an increase in the population reveals Baker Creek has suitable spawning, feeding, and rearing habitat and can provide ample opportunities for recreational anglers.

Lehman Creek

A population survey conducted in 1990 on Lehman Creek between the park boundary and Lehman Creek Campground using one pass electrofishing projected 15 brown trout, 243 brook trout and 516 rainbow trout per mile. A 2002 survey at the same location predicted 106 brown trout, 275 brook trout, 381 rainbow trout and 42 YOY per mile, using the three-pass method. In 2003 a 100m section was surveyed at the Lower Lehman Creek Campground, with estimates of 209 brown trout, 627 brook trout, 595 rainbow trout and 466 YOY per mile. Brown trout lengths averaged seven and a half inches (190mm), with rainbow trout at six

inches (162mm) and brook trout at five inches (137 mm). All trout species and YOY populations showed large increases in population size from 1990 to 2003.

Summary

Comparing the 2003 fish population surveys, more fish were caught in Baker Creek, with 157, than in Lehman Creek, with 118. The proportion of each species caught for each creek was similar, except for brown trout, which were found in more abundance in Baker Creek. This is possibly due to a lower-elevation survey site in Baker Creek, and larger pools and riffles in the 100m section. The 2003 fish population surveys showed larger overall population sizes than previous surveys.

Acknowledgements

A special thanks goes to the members of SNCTU for volunteering over 400 hours of their time to help with various fisheries projects during the 2003 field season.

Reference

GRBA/NDOW Trout Survey Field Trip Reports, 1988-1991.

A Closer Look at Marmots

By Neal Darby

Marmots! Threatened! Most people don't think much about yellow-bellied marmots. If they do it's usually because they are a pest. In fact, most states that marmots call home designate them as varmints with no legal protection. So, marmots were not really paid that much attention in Great Basin National Park. However, after three years of climbing and traversing the south Snake Range we have not seen another marmot outside of Baker or Lehman Creeks. Then a scientist came through and told us that a resurvey of all known marmot populations in Nevada found marmots may be extinct in three mountain ranges and severely reduced in two others! These events led us to take a closer look at marmots.

This past summer we spent time looking for and trying to determine how many marmots we had. We searched Baker Creek and Lehman Creek and areas where we have historical records or observations of marmots. All we found were the marmots in Baker Creek, about 12 individuals. They are apparently in two

colonies, one near the Baker Creek campground and the other near the Baker Creek trailhead. Both colonies are using the road fill for burrow sites despite extensive rock talus nearby. Marmots like to burrow and sun themselves among large rocks and boulders, hence their nickname rockchucks. No other marmots or marmot signs (i.e., feces, burrows) were found in Lehman Creek or areas of historical records and observations. Finding no marmots in Lehman Creek was surprising because we know there were marmots there in 2002.

However, we learned that we only had a short time to look for them. Marmots spend over 80 percent of their time in a burrow and this includes hibernating! The marmots in Baker Creek first appeared the end of March and were last seen about the end of June. If they don't appear again until April 2004, that means they will have hibernated for nine months after being active for only three months!

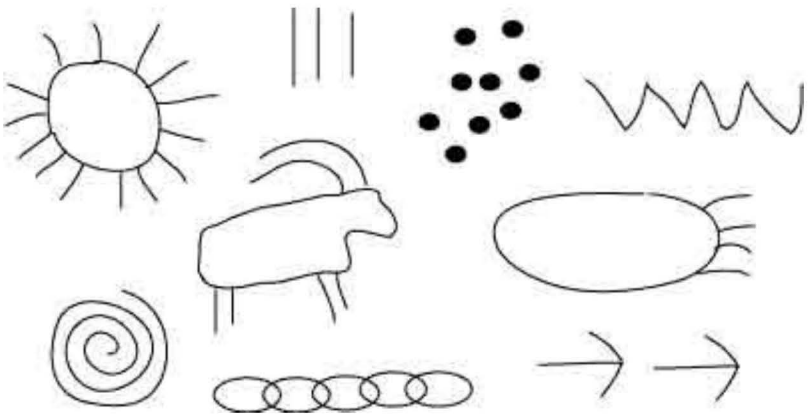
So what is happening to the marmots? From marmot biology we know they prefer boulder fields or large rock talus slopes adjacent to meadows or shrub and grass uplands. Being near standing water helps too. The key seems to be lots of grass and forbs to gorge themselves on, and nearby rocks to escape predators and facilitate burrowing. Based on this, one possible reason for the marmot decline is that forests in the park, including pinyon and juniper and mixed conifer, have become denser and have expanded their distribution into shrub and grass uplands and even meadows. Marmots do not like conifer cover, especially when it begins to reduce the grass and forb understory. So several sites in Baker Creek and Lehman Creek, adjacent to the existing marmots, have been identified to remove the pinyon and juniper and restore marmot habitat.

News Caves Discovered
By Shylo Johnson

Great Basin National Park is filled with caves. Besides the well known Lehman Caves, the park has over 31 (or 32 depending on what you read) known wild caves. The park now has four more, found by the ridgewalking efforts of cave crew, Krupa Patel, Ryan Shurtz and myself, Shylo Johnson, over the last few months. These four caves are Rockfall Cave, Chamber Cave, High Hole, and Mystery Cave.

Each time a new cave is found, we hope that it will be a second Lehman--a large decorated cave. Of the four caves, we have already surveyed Rockfall Cave and know that it ends after 50ft. For the other three caves, each has a dark zone, but only one cave, Mystery Cave, appears to still extend beyond what we

have seen. Chamber Cave was a large chamber roughly 40ft x 20ft x 30ft high and High Hole appeared to end after 30ft. Mystery Cave went back about 25ft before we reached unnatural blockage; stones had been stacked in the passageway. Additionally, we felt a cool breeze indicating passage beyond. A future endeavor will consist of surveying these new caves to learn if they extend beyond what we know, but most likely the search for the second Lehman will have to continue.



Rock art - images carved in or painted on rock faces - include animals, suns, and geometric shapes such as spirals, circles, and lines.

NPS line art.

Rock Art in Great Basin National Park

By JoAnn Blalack

There are seventeen known rock art sites within Great Basin National Park. Of these sites, nine are petroglyphs (rock engravings), seven are pictographs (rock paintings) and one has both petroglyphs and pictographs.

Pictographs

Most pictographs are found on light-colored rock surfaces in protected areas such as caves, rockshelters or beneath overhangs protecting them from the weather. The two colors used to create pictographs within Great Basin National Park were shades of red (the most common color) and black. The various shades of red were almost always made from iron oxide hematite (ocher) while the black colors came from charcoal.

In order to make the paint, the mineral was ground into a fine powder and mixed with a binder. The type of

binder varied from place to place depending upon availability. Types of binder included animal and vegetable oils, blood, and whites of eggs.

Applying the paint to the rock surface was done in several ways, including using frayed twigs, small bundles of stiff grass, pointed sticks, and fingers.

Petroglyphs

Petroglyphs are frequently found on rocks composed of limestone, sandstone, granite, or volcanic basalt. Within the park, petroglyphs are found on limestone rocks. These rock types, especially in desert regions, have dark patination occurring on the surface due to the exposure of the elements (sun, wind, rain, snow). When this patination is removed, it creates a contrast between the dark outer layer and the lighter, newly exposed rock underneath.

The main method used when making petroglyphs was pecking. This was done by either using a hammer stone, which created rough outlines with a shallow design, or the use of a stone chisel along with the hammer stone to create finer, more controlled lines. Scratching a design on the rock surface was also used. This created a very shallow design.

Now that you know the difference between pictographs and petroglyphs along with how they were made, you're probably asking yourself, "What do all those designs (lines, circles, zigzags, dots, animal and human-like figures) mean?" Good question. When it comes to the interpretation of rock art drawings, the only person who knows the full meaning behind the drawings (if there is a meaning) is the artist himself. Because of this, archeologists can only document the site with photos, drawings and descriptions.

Protection of Rock Art

When I talk about the protection to rock art sites, I'm not talking about protecting the sites from the natural elements like the sun, wind, rain, or snow. These elements are a natural process and cannot be controlled. What I'm talking about is the protection from human impacts. When looking at rock art you may not see that it is very fragile and can be destroyed in a very short time. Yes, the natural impacts upon rock art are also destroying it, but this process can take hundreds if not thousands of years. The human impact can be within minutes. These impacts include: outlining the drawings with paint, chalk, crayons, or graphite (pencil); graffiti; touching (touching pictographs can rub the pigment off); and even breaking off a drawing. These are all destructive acts that not only take away the history of the area but are a Federal offense.

So when hiking around Great Basin National Park, or another National Park, Forest Service or Bureau of Land Management land, and you come upon a rock art site, congratulations, you have found a bit of history. Hopefully the only thing you will take is pictures, so that the next person to come along will also be able to enjoy the history of the area.

Aquatic Inventory Results

By Nancy Williams

This past summer, the Aquatics Crew trekked thirteen of the park's watersheds and documented a whopping total of 169 springs (See table for watershed totals). These springs ranged from mucky seeps to lush meadows to turbulent streams. While Lehman Creek held the record high of 77 springs, Clay, John's Wash, Pole Canyon, Box Canyon, and Dry Canyon had none. Next year the remaining watersheds will be surveyed for additional springs.

Watershed	Number of Springs
Box Canyon	0
Burnt Mill	4
Can Young 8	18
Clay	0
Dry Canyon	0
John's Wash	0
Lehman Creek	77
Lincoln	2
Mill 13	13
Pole	0
Snake Creek	37
Williams	11
Young	7
SUBTOTAL	169

Great Basin Weather Stations

By Ben Roberts

Because of the elevational gradient at Great Basin National Park (approximately 5,280 to 13,063 ft) weather conditions vary greatly, even on the same day. It may be snowing at Wheeler Peak Campground and warm and sunny at the Baker Administration site.

The park maintains several weather stations used for general weather collection, fire weather predictions, air quality monitoring, and environmental education. The park, in cooperation with the National Oceanic and Atmospheric Administration, plans on the installation of a new long-term weather station as part of the U.S. Climate Reference Network. This new network consists of multiple sites around the country with an emphasis on high quality data collection expected to last at least fifty years. Sites were selected based on historical weather stations (Lehman Caves has been collecting weather data since the mid 1940's) and other indicators of long term weather and climate. Due to the long climate record obtained from tree ring data from bristlecone pines (4000 + years), Great Basin National Park makes a great site!

The Long Now Foundation owns property adjacent to Great Basin National Park on Mt Washington. The Long Now Foundation seeks to promote "slower/better" thinking and to foster creativity in the framework of the next 10,000 years. Long Now Weather Station is located at 11,000 feet on Mt. Washington. Live weather data can be accessed from:
http://epoch.longnow.org/weather/ (http://epoch.longnow.org/weather/)

Several of the park weather stations can be accessed for real time and historic data.

Baker Flat Weather Station is located near the park housing area at 6841 feet. This site is used primarily for fire weather forecasting. Live weather data can be accessed from:
http://www.met.utah.edu/cgi-bin/roman/meso_base.cgi?stn=BKFN2 (http://www.met.utah.edu/cgi-bin/roman/meso_base.cgi?stn=BKFN2)

Mather Weather Station is located near Mather Overlook at 9268 feet. This site is used primarily for fire weather forecasting. Live weather data can be accessed from:
http://www.met.utah.edu/cgi-bin/roman/meso_base.cgi?stn=MTHN2 (http://www.met.utah.edu/cgi-bin/roman/meso_base.cgi?stn=MTHN2)

Resource Management Weather Station is located at the Resource Management office at 6725 feet. Information is used for resource education. Live weather data can be accessed from:
http://www.aws.com/aws_2001/asp/obsForecast.asp?id=GRBSN&units=0 (http://www.aws.com/aws_2001/asp/obsForecast.asp?id=GRBSN&units=0)