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Subject: BCI Subterranean Program - Evaluation of Cave, Abandoned Mine Features, and Several Canyons within Grand Canyon, AZ.

Dates of Evaluation: August 8 2013 - August 15, 2013

Summary: From August 8-15, 2013 Bat Conservation International conducted a donor raft trip through Grand Canyon. The trips put in was Lee's Ferry and take out point was Diamond Creek. The purpose of this trip was to excite BCI donors about our work, give them the opportunity to not only meet, but work with Program Staff, participate in some limited field work, see past project sites, and to have a wonderful and enjoyable journey through Grand Canyon.

Over the course of the trip we conducted a few surveys of cave and mine features of interested to GCNP resource managers. We also conducted limited mist netting in a few side canyons for the purpose of showing live bats to trip participants. Overall, 1 abandoned mine feature and 5 natural caves were assessed. During the surveys we located bats in three of the sites and the remainder contained bat guano and insect parts confirming seasonal or periodic usage. One of the sites once housed a large colony of bats, likely Mexican free-tailed bats (*Tadarida brasiliensis*) with a very large guano pile (10' high x 30' long) and large areas of roost staining on the cave ceiling.

All features surveyed contained good-quality air throughout at time of survey although α radiation levels (Radon and its progeny) were moderate in Stanton's Cave. Alpha and γ radiation levels were negligible in all other sites surveyed.

Mist net sites were selected based on presence of pooled, still water in areas that provided flight constrictions, such as the narrows of Blacktail Canyon. We netted on three separate nights at three different locations; Blacktail Canyon, Olo Camp, and Fern Glen. We captured 10 individuals of 3 species: the canyon bat (*Parastrellus hesperus*), the pallid bat (*Antrozous pallidus*), and the Yuma myotis (*Myotis yumanensis*).

Other bats located on the trip were a juvenile female Mexican free-tailed bat in Christmas Tree Cave, a juvenile female Arizona myotis (*Myotis occultus*) near the mouth of Elves Chasm, a Mexican free-tailed bat day roosting under an overhang in upper Deer Creek Canyon, and a juvenile female California myotis (*Myotis californicus*) located in one of the abandoned platinum mines in Havasu Canyon.

Conserving the world's bats and their ecosystems to ensure a healthy planet.

As a part of collecting baseline data on the presence of the fungus that causes white-nose syndrome, soil samples were collected in all of the sites surveyed during the course of the trip. Soil samples have not yet been delivered to Dr. Jeff Foster at Northern Arizona University but will be dropped off before the end of 2013.

Please note that one feature listed on our permit, the Bass asbestos mine, was not visited or surveyed during this trip due to logistical reasons.

Feature Profiles:

Feature: 25.5 Mile Cave

Location: NAD 83 12S– 428644, 4048131

Date of Survey: 8 August, 2013

Observations: This natural limestone cave was located just a few feet above river level in Marble Canyon. A good amount of guano was scattered about on the break down in the entrance of the cave. Just 30' into the cave, a large and old guano pile was located. The pile, approximately 30' long x 10' high, was the product of either a moderate number of bats (~2,000 – 5,000) roosting in the cave over a very long period of time or a larger number of bats utilizing the cave for a shorter period of time. Above the guano pile the cave roof was shaped into an oblong and very deep dome. This dome was deeply roost stained over the entirety of its surface. Some fresh guano from 2013 was scattered about on the floor indicating continued use but the amount of guano was quite limited and likely the result of less than 100 bats. Temperatures were warm at 30°C and relative humidity coming in at a low 16.9%.

Feature: Cobble Cave

Location: NAD 83 12S– 427716, 4047651

Date of Survey: 8 August, 2013

Observations: This small limestone cave consists of a single room extending for 50 feet or more into the cliff just a few feet above river level. At high water during flood events the cave clearly becomes submerged as evidenced by sand and flotsam inside the cave. Numerous small pockets existed within the ceiling offering perfect roost spots for a variety of bats. However, the shallow nature of the feature means a general instability in temperature and humidity thus relegating it to a less than ideal day roost for bats. Scattered guano and insect parts further back this up and provide evidence of night roosting and some limited day roosting, likely by single bats. Temperatures were warm at 27.7°C and relative humidity coming in at a low 19.5%.

Feature: Cave Springs Cave

Location: NAD 83 12S– 427536, 4047319

Date of Survey: 9 August, 2013

Observations: This limestone cave sits right at water level and appears to partially flood on a near daily basis. Overall length of passage was between 100 and 200 feet depending on how measurements were taken. The ceiling of the cave was cut with numerous cracks, crevices, pockets, and pipes that extended upward for short as well as great distances. Small amounts of guano were scattered in these areas and stuck to the cave walls. High humidity of around 90% and “cooler” temperatures of 19.4°C indicate limited warm season day and night roost use.

Feature: Stanton's Cave

Location: NAD 83 12S – 423042, 4039767

Date of Survey: 9 August, 2013

Observations: This large limestone cave was gated with a large bat gate sometime in the late 1990's. The gate is intact and unmolested. The cave contains hundreds of feet of passage and several very large rooms. Evidence of bats is scattered throughout the cave and consists of guano, insect wings, and heavy roost staining. No live bats were observed during our survey but fresh guano from earlier in the summer clearly indicates active use. The cave offers excellent habitat and numbers are lower than historic estimates likely due to the long term exclusion of bats during archeological excavations. With a nearly infinite availability of suitable roosting habitat, it may take years before a full recovery of the colony ever occurs. For human health and safety, α radiation was measured in several areas of the cave and found to be between 2 – 5 picocuries per liter which according to NIOSH standards triggers a recommendation for the use of a half face respirator fitted with P100 filters. These numbers are at the very lowest end of the spectrum for causing a concern over radon and its progeny. However, the National Park Service might consider informing employees and researchers of the issue and making the use of respirators up to individuals.

Feature: Havasu Platinum Mine

Location: NAD 83 – 12S 342637 4018643

Date of Survey: 12 August, 2013

Observations: The Havasu Adit was originally worked in the early 1900's to mine for platinum. This adit is relatively long, approximately 30 meters, and at 30 meters in, a 30 meter side drift joins the main adit, making the total length of the feature approximately 60 meters. Within the workings, we found scattered guano and roost staining, likely from pallid bats (*Antrozous pallidus*), big brown bats (*Eptesicus fuscus*), and unknown myotids (*Myotis* spp.). We observed one active juvenile female California myotis roosting in the feature at the time of the survey. Temperatures were warm at 25°C and humidity was low at 15%. Overall, one of the more frequently used mine features in Grand Canyon whose use by bats is likely limited by the overall amount of human visitation.

Recommendation: N/A**Feature:** Christmas Tree Cave

Location: N/A

Date of Survey: 12 August, 2013

Observations: This is a small, fairly shallow, one-room cave along the lower half of the Colorado River in Grand Canyon. It has no dark zone area within it. The cave is roughly dome shaped with a fairly high ceiling. During our survey, we found abundant scattered guano throughout the cave from Mexican free-tailed bats (size and odor of the guano was distinctive of this species). Heavy roost staining is evident on the ceiling in a number of places indicating long term use by a number of bats. We located one juvenile female Mexican free-tailed bat that was volant but appeared weak due to a heavy parasite load. This cave would be interesting to monitor, as it seems to be a site that a sizable number of Mexican free-tailed bats use to gather and roost, yet it is very well-known and accessible to river runners and is obviously visited often. Temperatures were warm at 28°C and humidity was low at 13%.

Recommendation: N/A

END OF SURVEY REPORT