

Case Studies



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Visually impaired students help collect acoustic data in Grand Canyon National Park

Students, staff, and crew of the Leading the Way program commemorate their trip down the Colorado River with a photo. The participants logged natural and human-related sounds at seven locations in Grand Canyon National Park.

By Laura Levy and Sarah Falzarano

DURING SUMMER 2008, 12 VISUALLY impaired students along with sighted teenagers and guides embarked on a Colorado River trip through Grand Canyon National Park that was the first of its kind. They were participants in a program called “Leading the Way,” a partnership between two nonprofits, Grand Canyon Youth (GCY) and Global Explorers, and two commercial outfitters, Canyon Explorations and Arizona Raft Adventures. Grand

Canyon Youth provides experiential education along the rivers and canyons of the desert Southwest. The program requires students to participate in a service project as part of their field experience to encourage resource stewardship. Past projects have involved removing invasive plants and photographing beaches along the Colorado River for a campsite atlas. However, given that hearing is an especially important sense for many in this group, a sound-oriented project was a natural choice. Additionally, this project encour-

ages science education in a national park setting through the involvement of the students in collecting acoustic data for the Grand Canyon National Park Soundscape Program.

Methodology

At 1.2 million acres (0.5 million ha), the sheer size of the national park makes it a challenge for staff of the Grand Canyon National Park Soundscape Program to collect acoustic data across this incredibly diverse landscape. The Leading the Way trip

provided a special opportunity to gather preliminary data to help characterize the river soundscape, assist with managing river recreation, and provide input into future draft backcountry and wilderness management plans. Seven locations were monitored along the Colorado River for 15 minutes each. Sites were selected from a list provided by the Soundscape Program or opportunistically as weather and river activities permitted. The list was generated based on the need to collect additional acoustic information from river locations under air tour corridors or, in contrast, from areas suspected to be relatively devoid of air tour noise.

Prior to the GCY work, the park had very little river-based acoustic data. “Observer logging,” as the activity is called, is usually conducted for an hour, but weather and time constraints limited the length of these survey sessions. The students were grouped into pairs of visually impaired and sighted individuals. Using a system of hand signals (to eliminate human voice noise), visually impaired students relayed information to their sighted partner about what he or she was hearing and for how long. The sighted student would then interpret the hand signals and document them on a log sheet, noting the time indicated by a watch. At least three pairs of GCY students simultaneously surveyed sounds at each sampling location. At several sites, one or two sighted adults also participated in the survey. The group used a Larson-Davis model 831 sound-level meter to collect 1-second sound pressure levels over a 15-minute period, measured in decibels (dB[A]). They did not make digital sound recordings.

Results and discussion

The group reported hearing many natural sounds, including the river, thunder, wind, insects, and birds. Aircraft that included propeller planes, helicopters, and high-altitude jets were the most common human-caused sounds detected. Interestingly, no

motorized rafts were noted during the sessions, perhaps because most of the logging occurred in the late afternoon or early evening when most boats are already parked in camp.

Soundscape Program staff later calculated the minimum, maximum, and median sound levels from the 1-second decibel data. Six of seven sites had median sound levels 2 to 5 dB(A) above minimum sound levels, indicating that sound levels were close to minimum levels for most of the measurement period. Median sound levels at the sites ranged from 49 to 67 dB(A), which are normal near the Colorado River (Falzarano and Levy 2007).

something they might not have appreciated before.

After the pilot program in 2008, the park decided to conduct more extensive observer logging training with students before any future river trips and to build in longer daily sampling time. In 2009, Grand Canyon Youth, Global Explorers, and Grand Canyon National Park hosted another group of visually impaired and sighted students on a river trip, and it was again a big success. Better training allowed students to begin collecting data immediately and improved the overall workflow and productivity. The staff of the Soundscape Program is excited about this new

This project encourages science education in a national park setting.

Conclusion and future plans

Overall, this pilot program was a success. Students collected sound data in areas of the park that otherwise require extensive staff time, money, and resources to reach. However, the short duration (15 minutes) of logging offers only a glimpse of the sites' soundscapes. The Soundscape Program, therefore, considers these as pilot data sets, with additional data and locations to be added in the near future. Data collected in 2008 and 2009 will help determine where to conduct more extensive surveys in the future, involving longer durations, and with the addition of digital recordings.

The experience was a good one for the students, who learned about threats to natural soundscapes and the challenges of soundscape management. They were enthusiastic about the project and noted that the experience led them to listen more carefully to their surroundings and notice the natural sounds and the intrusion of human-caused sounds. Students also noted how loud the cicadas were,

partnership and looks forward to working with Grand Canyon Youth as we create more stewards of our natural soundscapes.

References

Falzarano, S. R., and L. B. Levy. 2007. Colorado River rapids acoustic conditions. Unpublished NPS Report GRCA-07-03. Grand Canyon National Park, Arizona, USA.

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