



Aircraft Overflights Quarterly Focus - Spring 2005

Last quarter's Focus article was an educational effort to provide definitions of terms used in sound characterization and sound measurements conducted at GCNP. It provided a list of terms and definitions being used by the NPS National Sounds program:

This Focus article is on "natural ambient" and how it is determined and used in soundscape characterization at GCNP.

Natural Ambient was defined in last quarter's article as "The natural sound conditions found in a given area, including all sounds of nature." The natural ambient sound level of a park is comprised of the natural sound conditions in a park which exist in the absence of mechanical/electrical human-produced noises. Some human-caused sounds (talking and walking) may be part of the natural soundscape, but not those generated by mechanical, electrical, or other non-natural means. These conditions are actually composed of many natural sounds, near and far, which often are heard as a composite, not individually. In an acoustic environment subjected to high levels of human-caused sound, natural ambient sounds may be masked by other sound sources. Natural ambient sound is considered synonymous with the term "natural quiet," although "natural ambient sound" is more appropriate because nature is occasionally not quiet.

Natural ambient is measurable and can vary from day to day, hour to hour, and seasonally. It is also shaped by the vegetation type or habitat, site elevation, atmospheric conditions, and temperature and humidity. The vegetative habitat type will also help to predict the type and quantity of wildlife using the area, presence of water, etc., thus influencing the components of the natural soundscape. Being able to determine and characterize the natural ambient of the entire park, over yearly and seasonal changes, etc. is nearly impossible, and would be quite expensive and time consuming to try and do so. In order to reduce the workload and costs to collect meaningful natural ambient data for GCNP, "representative" areas, based on elevation and vegetation type (by major vegetative components), were developed and selected for study.

The representative areas at GCNP were determined with the Warren et al.¹ map of vegetation communities in the park based on aerial photos. Consultation with the Park's Natural Resources and Fire Management Divisions resulted in five representative types of vegetative cover: pinyon-juniper woodland, ponderosa pine forest, mixed forest, warm desert scrub, and cold desert scrub. These types represent approximately 98 percent of the Park's land area.

To determine the natural ambient for each representative type, GCNP is collecting sound information at one specific location in each of the five vegetation types, for two main seasons (summer and winter). As a parallel effort, at least two additional locations will be randomly selected for each of the representative types, and ambient data will be recorded for the same time period. In this way up to three sites, for each representative vegetation type, will be sampled. The median value, from all three sites, will become the representative natural ambient established for the park's modeling and monitoring efforts. There will initially be a summer natural ambient and a winter natural ambient, with model runs assessing aircraft noise for both the summer and winter seasons.

It is expected that by the mid-to-late fall, 2005, summer natural ambient values will be established, to be followed by winter natural ambient values in the spring of 2006. Once the collection of natural ambient data is completed, GCNP will produce a "natural ambient" zone map for use in modeling and future planning efforts. Additional sound recording may be taken in underrepresented areas of the park, like inner canyons, the river corridor, and remote backcountry locations, in future

monitoring efforts.

¹Warren, P. L., K. L. Reichhardt, D. A. Mouat, B. T. Brown, and R. R. Johnson. 1982. Vegetation of Grand Canyon National Park. Technical Report No. 9. Applied Remote Sensing Program, Office of Arid Land Studies, University of Arizona and Cooperative National Park Resource Studies Unit.
