

DEPARTMENT OF THE INTERIOR**National Park Service****Notice of Recommendation From the Aircraft Noise Model Validation Study**

AGENCY: National Park Service, Department of Interior.

ACTION: Notice.

SUMMARY: Following the recommendation in the recently issued National Park Service Aircraft Noise Model Validation Study, released January 23, 2003, this announcement provides notice that the NOISEMAP Simulation Model is the model of choice for calculating aircraft audibility at Grand Canyon National Park and other National Park Service units.

ADDRESSES: Copies of the National Park Service Aircraft Noise Model Validation Study report are available on computer discs (CDs) and may be requested from Grand Canyon National Park, or viewed on the Grand Canyon National Park Webpage at <http://www.nps.gov/grca/overflights/index.htm>.

FOR FURTHER INFORMATION CONTACT: Ken McMullen, Overflights and Natural Soundscape Program Manager, National Park Service, Grand Canyon National Park, 823 N San Francisco Street, Flagstaff, Arizona 86001. Telephone 928-779-2095; or by e-mail at ken_mcmullen@nps.gov.

SUPPLEMENTARY INFORMATION:**Background**

Public Law 100-91 (1987) tasked the National Park Service (NPS) and the Federal Aviation Administration (FAA) with developing a plan for aircraft use of Grand Canyon airspace that will succeed in "substantially restoring the natural quiet in the park". In its "Report on Effects of Aircraft Overflights on the National Park System" (1995), the NPS defined substantial restoration of natural quiet as occurring when "50% or more of the park achieve[s] 'natural quiet' (i.e., no aircraft audible) for 75-100 percent of the day". Computer modeling was determined to be the most practical method to assess whether or not natural quiet had been substantially restored at Grand Canyon National Park.

Model Validation Study

Although models that compute when aircraft are audible over large land areas have not been widely used, two models have been employed to calculate the percent of time aircraft are audible at Grand Canyon National Park. The National Park Service Overflight Decision Support System model (NODSS) was developed for the NPS to

calculate aircraft-produced noise in backcountry settings; NODSS was designed to account for park terrain features, its calculations are based on one-third octave band acoustic spectra information, and it calculates audibility directly. The results from NODSS have been used by the NPS to calculate the percent of substantial restoration of natural quiet achieved by various airspace and operations alternatives at Grand Canyon National Park. A second model, the Integrated Noise Model (INM), version 5.1, is the FAA-developed, aircraft noise computation model used internationally to calculate aircraft-produced noise in airport environments. INM bases its computations on A-weighted aircraft sound levels and accounts for differences in site elevation but does not account for shielding due to terrain. Results from INM have been presented in environmental assessments associated with FAA draft and final rules on Grand Canyon National Park airspace regulations. The two models, using Grand Canyon operations data but based on different metrics, produced somewhat different results. To comply with the National Environmental Protection Act's requirement to use "the best available science", a model validation study was designed to compare computer model results with measurements made on-site at the Grand Canyon. A third model, NOISEMAP Simulation Model (NMSIM) developed by Wyle Laboratories, the U.S. Air Force, and the National Aeronautics and Space Administration, was included in this study as was a second version of INM (Research Version). NMSIM, like NODSS, uses spectral information, accounts for park terrain, and computes aircraft audibility. In addition to these capabilities, NMSIM also simulates aircraft flying in the time sequence in which they occurred and includes the directivity of each aircraft type. The Research Version of INM uses spectral, rather than A-weighted, information but is in other major ways similar to INM.

The goal of the study was to: "Determine the degrees of accuracy and precision that existing computer models provide, in comparison with field measurement, in the calculation of the percent of time tour aircraft are audible in the Canyon. * * *" In this study, determining "accuracy and precision" is termed "validation".

The NPS Aircraft Noise Model Validation Study was designed through a cooperative process involving the NPS, the FAA, the Volpe National Transportation Systems Center, Wyle Laboratories, and Harris Miller Miller &

Hansen Inc. After a draft research approach had been developed, a Technical Review Committee (TRC) consisting of internationally recognized experts reviewed and commented on the plan. Suggestions made by TRC members were incorporated into the study design. As results were produced the full team, including TRC members, were involved in review and comment. The full team has reviewed and commented on drafts of the study report. Their comments were incorporated extensively.

Acoustic data for the NPS Aircraft Noise Model Validation Study were collected from some 39 sites at Grand Canyon over a four-day period in September 1999. The collected data were reduced to provide hourly information for modeling tour aircraft audibility and sound levels for each hour of operations, and for then analyzing the results. Each of the four models (NODSS, INM in two versions, and NMSIM) were exercised with the same set of input data. The models were run to produce for each site the hourly values of both the percent of time tour aircraft were audible and the tour aircraft hourly equivalent sound level, L_{eq} . These values were then compared directly with measured values, site-by-site, hour-by-hour.

In August, 2002, as the NPS Aircraft Noise Model Validation Study report was nearing completion, the United States Court of Appeals, District of Columbia Circuit ((in *United States Air Tour Association v. Federal Aviation Administration* (Grand Canyon Trust, Intervenor)) declared that the FAA's practice of including only air tour aircraft-produced noise in the calculation of substantial restoration of natural quiet at GCNP should be remanded back to that agency for reconsideration. The Court indicated that noise from all aircraft overflying the park should be included in the noise calculations. Although the NPS Aircraft Noise Model Validation Study was based on data from tour aircraft conducting operations over Grand Canyon National Park, the inclusion of noise from other aircraft sources will not invalidate the results of this study. Similarly, as the models respond to the principles of acoustics and physics, the results of the NPS Aircraft Noise Model Validation Study are applicable to other National Park units.

Model Validation Study Recommendation

The study concluded, "We consider NMSIM to be the model most suited for immediate use in computing percent of