

## APPENDIX W

# ISSUES RELATING TO MITIGATION OF AIRCRAFT NOISE IMPACTS ON ZION NATIONAL PARK

Several comments on the St. George Replacement Airport Draft EIS raised issues about the FAA's responsibilities regarding the mitigation of aircraft noise impacts on Zion National Park (Zion) resulting from aircraft from the proposed replacement airport as well as high-altitude overflights.

In its comment letter dated November 8, 2005, Zion, while acknowledging that the Draft EIS demonstrates that National Park Service (NPS) units are unlikely to be significantly adversely affected by the direct operation of the replacement airport, raises concerns about the overall noise environment over Zion, noting that the cumulative impacts of aircraft overflight noise from all sources will be steadily increasing in the future.

The Grand Canyon Trust (GCT) expresses its concern in its November 7, 2005 letter that growing cumulative noise impacts of commercial aviation on the natural soundscape of Zion is causing and will continue to cause, substantial impairment of the park. Although GCT recognizes the "precedent-setting nature" and "extraordinary depth" of the noise analysis, GCT asserts that the alleged existing substantial impairment of Zion requires immediate FAA mitigation, such as rerouting of high-altitude commercial flights into areas that do not contain national parks or monuments, limiting the numbers of such flights, or limiting such flights to certain times of each day. GCT cites several references, including Section 4(f)/303(c) and FAA Order 1050.1E, as support for this mitigation requirement.

These comments raise several quite distinct issues, requiring separate but related responses: First, does the EIS data for the without-project alternative reflect current or future levels of cumulative aircraft overflight noise impacts large enough to be characterized as "significant" under NEPA, or a "use" of Zion under 40 U.S.C. Section 303(c)? Second, even if "significance" or a "use" were found, does the FAA have any obligation to implement mitigation of without-project impacts, under either NEPA or Section 4(f)? Third, what benchmark condition should be used to evaluate any impacts that may result from the replacement airport project?

### **FAA Policy and Regulations for Evaluating Aircraft Noise**

In the *Aviation Safety and Noise Abatement Act of 1979*, Congress directed the FAA to: (1) establish a single system of noise measurement to be uniformly applied in measuring noise at airports and in surrounding areas for which there is a highly reliable relationship between projected noise and surveyed reactions of people to noise; (2) establish a single system for determining the exposure of individuals to

noise from airport operations; and (3) identify land uses that are normally compatible with various exposures of individuals to noise (49 U.S.C. § 47502). In implementing these requirements, the FAA adopted the “day-night average sound level” (DNL) as the noise metric for determining the exposure of individuals to airport noise, and developed land-use compatibility guidelines showing the DNL levels that are compatible with various land uses (14 C.F.R. § 150.9(b); *id.*, App. A, Table 1.) All of the land uses listed in these guidelines are compatible with noise levels below DNL 65 dB.

FAA Order 1050.1E, which contains the FAA’s policies and procedures for assessing environmental impacts, specifics DNL as the FAA’s primary noise metric, and the Integrated Noise Model (INM) as the primary analysis tool to be used in determining whether or not FAA actions result in significant noise levels (FAA Order 1050.1E, Appendix A, Section 14). Under this Order, a significant noise impact would occur were an INM analysis to show that a proposed action would cause noise-sensitive areas to experience an increase of noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure, when compared to the no action alternative for the same timeframe (Order 1050.1E, Appendix A, Paragraph 14.3). Order 1050.1E also incorporates the FAA’s land-use compatibility guidelines (Order 1050.1E, Appendix A, Paragraphs 4, 6.2g, 6.2h, 6.2i, 14.4b).

### **Noise Analysis for the St. George Replacement Airport EIS**

The EIS noise analysis for the St. George replacement airport project shows current and future without-project noise cumulative levels over Zion are well below DNL 65 dB.

FAA Order 1050.1E recognizes, however, that the DNL 65 dB threshold does not adequately address the effects of noise on visitors to areas within a national park, where non-aircraft noise is often very low and a quiet setting is often a generally recognized purpose and attribute of the area (Order 1050.1E, Appendix A, Paragraphs 4.3, 6.2i, 14.3, 14.4b). In such situations, Order 1050.1E provides that “the FAA will consider use of appropriate supplemental noise analysis in consultation with the officials having jurisdiction for national parks . . . where a quiet setting is a generally recognized purpose and attribute that FAA identifies within the study area of a proposed action.” (Order 1050.1E, Appendix A, Paragraph 14.5g).

Accordingly, the FAA consulted with the NPS about appropriate supplemental metrics for the proposed replacement airport at St. George, and the FAA’s Office of Environment and Energy (AEE) specifically authorized the use of additional supplemental metrics for this EIS in order to assist the agency and the public in better understanding the overall noise environment existing and anticipated for Zion. In approving the use of supplemental metrics for this EIS, however, AEE cautioned that such supplemental noise analysis “is not, by itself, a measure of adverse aircraft noise or significant aircraft noise impact” (AEE email, March 25, 2005; quoting FAA Order 1050.1E, Appendix A, Paragraph 14.5g.).

The supplemental metrics authorized for this EIS include: a) Equivalent Sound Level (Leq), disclosing average noise levels for both 24-hours and daytime (7:00 a.m. through 10:00 p.m.) hours), b) Time Above (TA), showing time of exposure above the existing (L50) ambient for existing and natural noise levels, c) Single Event Maximum Noise Levels (Lmax), and d) Numbers of events during the average annual day that would exceed various noise levels ranging from 20 dBA through 60 dBA . In addition, following the public release of the Draft EIS, the FAA decided to perform an additional analysis for Zion, using the time-based supplemental metric of "Audibility" in INM v6.2b. The FAA and NPS entered into a Memorandum of Agreement (MOA) governing this audibility analysis. (See **Appendix Y, NPS/FAA Memorandum of Agreement**, dated January 19, 2006 in the Final EIS).

This EIS does not identify specific quantitative thresholds for any supplemental metrics, above which noise impacts would be regarded as significant. In letters dated February 4, 2005 and April 26, 2005 (included in **Appendix N** in the Final EIS), the NPS identified certain soundscape goals for Zion and stated that it considered exceedences of the "Percent Time Audible" values to be significant, therefore requiring mitigation. However, in a subsequent Memorandum of Agreement (MOA) with the FAA (included in **Appendix Y** in the Final EIS) regarding the audibility analysis presented in **Appendix T** of the Final EIS, the NPS agreed that these soundscape goals "represent the park's expression of a desired condition for soundscape management and do not represent a specific standard to which the FAA must hold. The Percent Time Audible is presented in the Final EIS as supplemental noise information."

The identification of the best metric for evaluating aircraft overflight noise over quiet settings in national parks and the prospects for assigning a numerical threshold of significance are topics currently under consideration within the FAA and NPS. These are complex issues on which there are divergent opinions and very limited studies, and they will not be resolved during the duration of this EIS. Accordingly, a wide array of noise metrics have been applied to this EIS analysis that together provide a comprehensive understanding of aircraft noise, so that one can understand the extent of cumulative exposure to aircraft noise over time (DNL Leq-24, Leq-d), the maximum decibel level (i.e., loudness) of individual aircraft noise over time (Number of Events Above thresholds, LMax), the amount of time aircraft noise would be above the ambient level of all other noise in areas of a park (Time Above Ambient - existing), the amount of time aircraft noise would be above only the natural ambient noise level (Time Above Ambient – natural), and finally, the amount of time aircraft noise could be audible to an attentive listener in Zion (Time Audible and Percent Time Audible).

Notwithstanding the lack of specific quantitative thresholds of significance, the FAA is not without any qualitative guidance in making significance determinations for its noise analysis in this EIS. The Counsel on Environmental Quality (CEQ), in its regulations implementing the National Environmental Policy Act (NEPA), defines the term "significantly" both in terms of context and intensity (40 CFR §1508.27). For this project, context requires consideration of both short and long term impacts on

Zion. Intensity requires consideration of the severity of these impacts. In concluding that the St. George replacement airport project would not have significant overflight noise impacts on Zion, this EIS considers both context and intensity.

**Section 5.1.4**, in the Draft EIS and **Section 8.3.1.1**, in the Final EIS, describe the affected environment of Zion, and suggest that many areas of Zion represent a quiet setting associated with wilderness-type experiences. Furthermore, as suggested by the 2002 District of Columbia Court of Appeals opinion that led to the FAA's decision to prepare this EIS (*Grand Canyon Trust v FAA*, 290 F.3d 339 (D.C. Cir. 2002)), **Section 6.6** in the Draft EIS relies heavily upon the May 2002 Wyle Laboratories noise measurement report describing existing noise conditions at 13 Zion locations. This report was then used by the Volpe National Transportation Systems Center to prepare an acoustic map of L50 (existing) and L50 (natural) levels throughout Zion. These L50 levels then served as the basis for the EIS **Chapter 7** considerations of project impacts on Zion cumulative noise levels from all sources of aircraft noise.

In its 2002 decision, the Court of Appeals noted that the CEQ guidelines first require an analysis of without-project cumulative noise impact on Zion, against which the additional incremental noise impact of the replacement airport can then be evaluated in order to determine whether the project is "the straw that breaks the back of the environmental camel." *Grand Canyon Trust*, 290 F.3d at 343 (quoting *Hanly v. Kleindienst*, 471 F.2d 823, 831 (2<sup>nd</sup> Cir. 1972)).

Under FAA criteria, the supplemental noise analysis in **Chapter 6** and **Chapter 7** of the EIS shows that both with and without the replacement airport project, both current and future noise levels within Zion are not only well below the FAA's DNL 65 dB standard for incompatible land use used for most urban types of land uses (See Appendix A to 14 CFR Part 150), but also are well below the DNL 55 dB level that the U.S. Environmental Protection Agency has identified as the level to protect human health and welfare with a 5 dB margin of safety<sup>1</sup>, and are additionally well below the DNL 45 dB goal to be achieved indoors when sound insulating residential and other buildings.<sup>2</sup>

Future cumulative DNL noise levels for the no project alternative range from 31.3 to 35.6 dBA, with the replacement airport causing -0.2 to + 0.3 DNL changes when compared to the without-project case (Draft EIS, **Section 7.2.3.1**, **Table 7.5**). Many of the Zion locations evaluated have cumulative aircraft DNL levels of less than the natural or existing measured ambient noise levels, which generally range from the lower 20s to upper 30s (Draft EIS, **Tables 6.24**, **6.24A**).

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<sup>1</sup> United States Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety*, March 1974.

<sup>2</sup> Federal Aviation Administration, Airport Improvement Program Handbook 5100.38c, Chapter 8, Section 812.b.1.

Future cumulative Leq noise level data (24-hour and daytime) is similar to the DNL data, the Leq(24) metric ranges from 30.0 to 34.3 dBA for the no project alternative, with the replacement airport causing from -0.9 to +0.3 changes when compared to the without project case (Draft EIS, **Section 7.2.3.1** and **Table 7.6** and **Table 7.7**). The Leq(daytime) metric ranges from 31.9 to 33.4 dBA for the same scenario, with changes due to the replacement airport ranging from minus 0.9 to 0.3. Again, many of these aircraft Leq results are less than natural or existing ambient Zion noise levels.

In terms of the cumulative time various Zion locations would be exposed to aircraft noise from all sources above existing and natural ambient levels, Draft EIS **Table 7.8** presents summary statistics for time in minutes for future years, showing that in 2020 Zion would be exposed to cumulative aviation noise for an average of 182 minutes/day above the median of existing ambient levels, and an average of 232 minutes/day above the median of natural ambient levels, from the existing St. George Airport. This EIS data reflects that the replacement airport would result, at the worst-case location in Zion, in slightly more than five minutes/day of additional aircraft noise exposure during the average day in the year 2020 (Draft EIS, **Section 7.2.3.2**).

EIS **Section 7.2.3.3** discusses the number of events above specific decibel levels, and uses Draft EIS **Table 7.9** and **Table 7.10** to compare the number of events per average future day above various single-event decibel threshold levels in Zion, ranging from 20 dBA to 60 dBA. Project-related changes in number of events per average day above noise threshold levels range from minus 8.0 percent to plus 5.8 percent, at various Zion locations, highlighting the small contribution the St George airport, in either its existing or proposed replacement location, makes to the calculation of maximum aircraft noise levels in the area.

### **Audibility Analysis for the St. George Replacement Airport**

The results of the audibility analysis, found in **Appendix T** of the Final EIS, indicate that, when calculated against both the natural and existing ambient noise levels in Zion, at all of the points within the park the cumulative condition with the replacement airport resulted in a decrease in the minutes of audibility.<sup>3</sup> When the differences in contributions to audibility were compared for the existing and replacement airports alone, the replacement airport resulted in a decrease in the minutes audible and the percent time audible at every point within Zion National Park. The percent time audible for airport-only conditions at the replacement airport ranged from 0.5 percent to 12.5 percent of the day for both existing and natural ambient conditions, with average exposures ranging from 2.9 percent to 5.4 percent of the day.

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<sup>3</sup> For cumulative conditions in all years, with or without the replacement airport, the computed time above audibility at all grid points in Zion National Park approached or exceeded 100 percent of the 24-hour day. As Appendix T explains, in cases where ambient levels are low enough that many aircraft independently reach and exceed audibility levels, such as the audibility study in Zion National Park, INM v6.2b results in "double counting" of time audible that can result in calculations of time audible that exceed 100 percent of a full day.

In addition to showing a reduction in audible aircraft noise with the proposed replacement airport, the EIS supplemental cumulative noise data show that aircraft noise is and will continue to be audible in Zion, even without the proposed replacement airport. All audibility calculations of cumulative aircraft noise show high amounts of time of audible aircraft noise. Audibility, however, is the newest supplemental metric for national park noise analysis. To date, audibility has been partially tested at Grand Canyon National Park. At Grand Canyon, audibility directly relates to a specific legislative mandate to substantially restore natural quiet. NPS has defined the substantial restoration of natural quiet at Grand Canyon National Park to mean that no aircraft are audible in 50 percent or more of the park for 75 to 100 percent of the day. This is a substantial restoration goal established for one specific national park in response to legislation; it is not an impact criterion for significance under NEPA.

Audibility is also being used as one of a variety of metrics in environmental documents for air tour management plans in other national parks under the *National Parks Air Tour Management Act of 2000*, 49 U.S.C. § 40128 et. seq. None of these air tour environmental documents has been completed to date, and no determination has been made on the amount of weight to give to the audibility analysis, compared to the other noise metrics, for NEPA purposes or in decisions on air tour management plans. The St. George EIS is the first use of audibility in a more traditional NEPA analysis for a proposed FAA action.

The calculation of audibility under INM v6.2b provides certain useful and relevant information (e.g., that the replacement airport at St. George would decrease the audibility of aircraft noise at Zion National Park), but audibility is a new and unproven metric for aviation noise impact determinations under NEPA. The FAA is aware that NPS regards audibility as a highly useful tool for noise planning in national park management plans. The FAA does not necessarily share the NPS view, but at the same time understands that audibility can be more meaningful for evaluations of whether a park's management program is making progress towards particular desired conditions for human-made noise in various types of park zones. However, audibility alone does not provide sufficient information to determine impact.

The amount of audibility that can be measured or computer-modeled is not the same amount that park visitors report hearing. An audible sound is defined as one that can be heard by a person of normal hearing who is attentively listening for noise. The person must be stationary and silent, specifically listening for the sound and making no extraneous noise. That is not the circumstance of most park visitors who are walking, talking, and attending to other interests. The NPS *Report on Effects of Aircraft Overflights on the National Park System*<sup>4</sup> recognized as one of five "important facts" that humans are not always aware of sounds that are audible, particularly when engaged in other activities. This report provided an example from Grand Canyon National Park that visitors who first viewed the Canyon at Lipon Point

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<sup>4</sup> United States National Park Service, *Report on Effects of Aircraft Overflights on the National Park System*, Report to Congress, September 12, 1994.

were not likely to recall hearing any aircraft, where only about 30 percent of the visitors interviewed reported hearing aircraft, although roughly 90 percent of the visitors could have heard aircraft based upon audibility. The FAA has observed a similar phenomenon in visitor surveys associated with aircraft noise, although percentages vary.

Noticeability, rather than audibility, has been used at times to quantify sound that a human can notice when engaged in another activity such as walking or talking. For the Grand Canyon noise analysis, noise modeling assumes a sound is noticeable if it is 10 dB above the threshold of audibility. However, for predictive purposes, noticeability is a more subjective metric than audibility, and it does not provide a sound indicator of impact. Simply because a sound is noticed by a human does not mean the sound imposes a potentially significant impact on the environment.

Neither audibility nor noticeability provides sufficient information on the intensity of noise. Sound level is not accounted for. A very loud sound and a barely heard whisper that last for the same duration of time have equal value in the audibility metric because it simply calculates the duration of audible time, not the sound level. Therefore, it is important to evaluate and consider together both sound pressure level and duration metrics, as presented in this EIS, to evaluate potential effects.

Finally, audibility calculations for en route aviation will always tend to be very high over an area with low ambient noise because there is a lot of high altitude en route air traffic flying over the U.S. on any given day, and the human ear has wonderful hearing capabilities. However, very few people would say that there are no quiet areas in the U.S. or that they are constantly impacted by aircraft noise, which is the conclusion that would be drawn by equating audibility with noise impact. An audibility analysis will capture a lot of noise that is too low to be noticed or to have any effect on people or animals. As in the St. George EIS, an audibility analysis can convey the impression of a lot of aircraft noise, while other supplemental metrics applied to the same amount of aircraft noise indicate much less noise.

The EIS audibility analysis shows that the proposed St. George replacement airport would decrease the audibility of aircraft noise at Zion National Park. With regard to audibility in general, however, as noted above, the FAA does not equate audibility with impact, and does not accept the premise that park visitors' ability to detect aircraft noise in a park-like setting is *per se* a significant adverse impact, or constitutes a substantial impairment of park values.

### **Legal Basis for the Requirement of Aircraft Noise Mitigation**

Even accepting the level of concern expressed by some of the public commenters regarding the increasing without-project above-ambient cumulative aircraft overflight noise levels at Zion, such concern, by itself, would not require the FAA to mitigate such overflight noise, either under NEPA or under 49 USC Section 303(c), since such cumulative overflight noise exists independent of, and does not causally result from, the replacement airport project being proposed for approval in this EIS.

FAA Order 1050.1E states that a significant noise impact would occur if a NEPA analysis shows that a proposed action would cause sensitive noise areas to experience noise increases above an accepted noise threshold, when compared to the no action alternative for the same timeframe (FAA Order 1050.1E, Appendix A, Paragraph 14.3) [emphasis added]. The future no-action alternative (here, cumulative noise without the proposed project) is thus the “benchmark” against which the FAA compares the magnitude of the future environmental effects” of its proposed actions.

This FAA policy is in accord with the following CEQ guidance.

“‘No action’ in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward” (Answer to question #3 from CEQ's “40 Most Asked Questions on NEPA Regulations”, 46 Fed Reg 18026, 18027).

CEQ interprets 40 CFR 1508.7 as referring only to the cumulative impact of the direct and indirect effects of the proposed action and its alternatives when added to the aggregate effects of past, present and reasonably foreseeable future actions” (emphasis added) [June 24, 2005 CEQ policy memorandum entitled “Guidance on the consideration of past actions in cumulative effects analysis].

NEPA requires that an EIS address “any adverse environmental effects which cannot be avoided should the proposal be implemented.” 42 U.S.C. § 4322(2)(C)(ii). Where an EIS does reveal significant noise impacts, NEPA, as a primarily procedural statute, only requires a reasonably complete discussion of possible mitigation measures. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 109 S.Ct. 1835 (1989).

The appropriate scope of the mitigation discussion in an EIS depends upon the severity of the anticipated impacts. See, e.g., Vermont Public Interest Research Group v. U.S. Fish & Wildlife Service, 247 F.Supp.2d 495, 524 n. 21 (D. Vermont, 2002) (no mitigation discussion required where an agency reasonably concluded that impacts were minimal). Moreover, there is no requirement under NEPA to consider mitigation of impacts beyond those that would actually result from a proposed action. See, 40 C.F.R. § 1508.8 (definition of “effects”); see also 42 U.S.C. § 4322(2)(c)(ii)(requiring EIS to address adverse effects that “cannot be avoided should the proposal be implemented”).

By contrast, 49 USC § 303(c) is a substantive statute, prohibiting DOT from approving a project that “uses” publicly owned lands from a public park, unless there is no feasible and prudent alternative, and in such a case, the agency has an obligation to mitigate by including “all possible planning to minimize harm to the affected land from the proposed use.”

Consistent with these legal requirements and FAA implementing policy, and using both conventional and supplemental noise metrics, this EIS compares the existing airport noise impacts with replacement airport noise impacts for the future years of 2010 and 2020.

In accordance with the court's opinion in *Grand Canyon Trust v. FAA*, 290 F.3d 339 (D.C. Cir. 2002), the EIS includes an extensive analysis of the "total noise impact" on Zion National Park (and other Section 4(f)/303(c) properties in the expanded study area) that would result from construction of the replacement airport. Taking into account the projected cumulative aircraft noise without the replacement airport, there is no indication from this analysis that the "noise that is projected to come from the expansion of the St. George airport facility at a new location would *cause* a significant environmental impact," *id.* at 346 (emphasis added), or would be "the straw that breaks the back of the environmental camel." *Id.* at 343.

The EIS noise data discussed above for the various supplemental metrics shows that cumulative noise levels associated with operation of the replacement airport would not differ greatly from cumulative noise levels were the existing airport to remain in operation. A primary reason for this result is that noise energy from the St. George Airport contributes less than two percent of the total noise energy from overflights of Zion, the remaining energy being contributed by overflights between other airports. (Draft EIS, **Chapter 7, Figure 7.1**). Moreover, as noted above, the audibility analysis in **Appendix T** (in the Final EIS) indicates that the audibility of aircraft noise over Zion would decrease with the proposed replacement airport. In other words, the proposed replacement airport would not adversely affect natural quiet in Zion. Notwithstanding these factors, the FAA, recognizing the unique value of Zion and the concerns expressed by the NPS, GCT, and others, would establish approach procedures for the replacement airport that would be designed to keep aircraft as high as possible and west of Zion. This approach procedure is shown in **Exhibit 1.3** of the EIS (in the Draft EIS and reproduced as an attachment to **Appendix X** in the Final EIS). **Appendix X** of the Final EIS also discusses voluntary measures for reducing aircraft noise impacts on Zion and the Little Black Mountain Petroglyph Site.

Using the EIS supplemental noise analysis, **Chapter 8** in the Final EIS concluded, under 49 USC Section 303(c) standards, that the replacement airport project would not constructively use Zion or any other identified properties protected by Section 4(f)/303(c), since the cumulative noise data showed that the project-related noise levels would not constitute a substantial impairment of any activity, feature, or attribute of these properties, and therefore would not be high enough to amount to a "taking" of any portion of Zion for transportation purposes (see Final EIS **Section 8.5.1**). Accordingly, there is no requirement for this project to "include all possible planning to minimize harm to the affected land from the proposed use," as would be otherwise required under this statute.