

# Modeling Working Group Presentation

## Overview of Grand Canyon Noise Analysis Results

Presented to: Third Meeting of the Grand Canyon Working Group  
Of the National Parks Overflights Advisory Group

By: FAA/NPS Technical Working Group

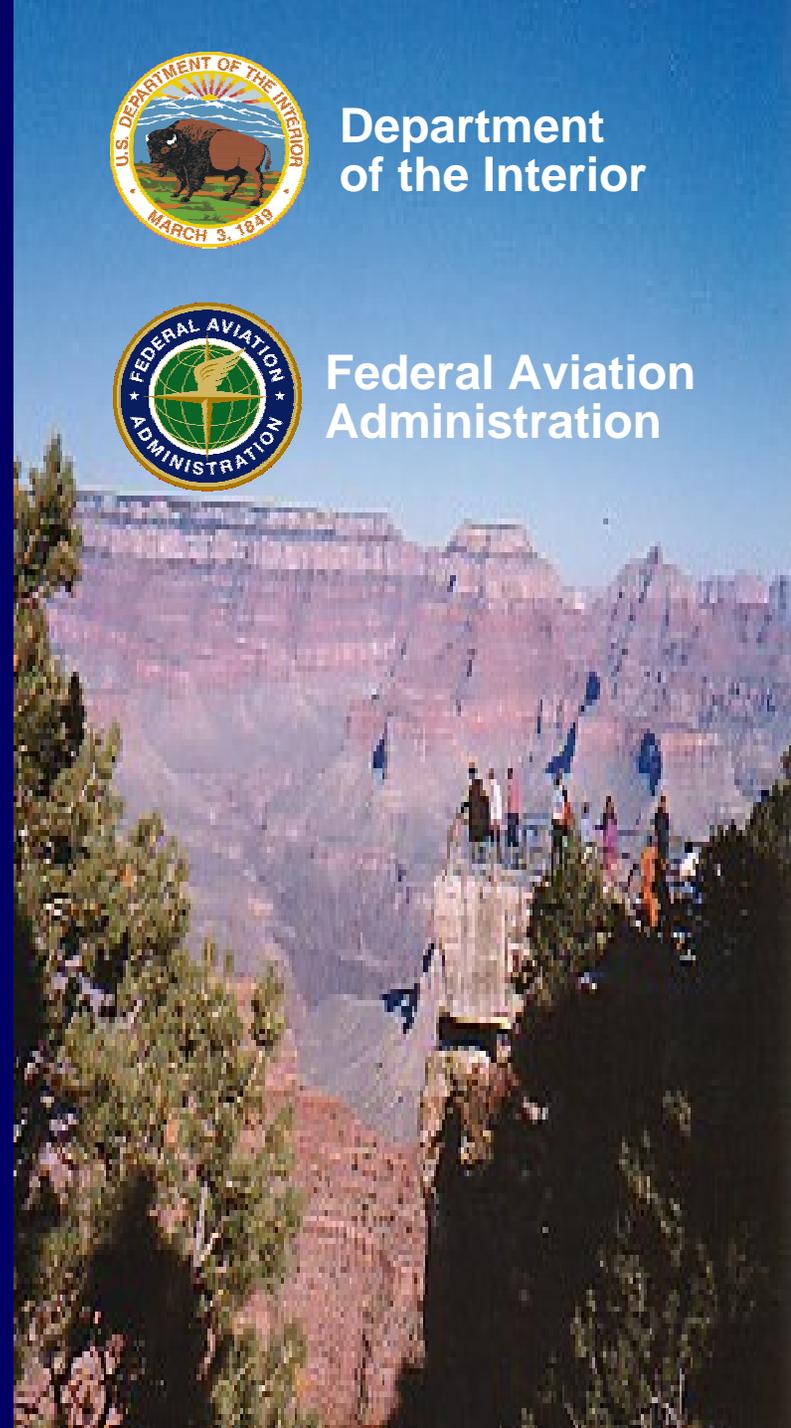
Date: January 31, 2006



Department  
of the Interior



Federal Aviation  
Administration



# Overview of Noise Analysis of Current Conditions

- INM Version 6.2
- 2004/2005 ambient data
- Noticeability/Detectability zones
- 2005 operational data
- Flight track data
- Output
- Results



# Modeling Platform

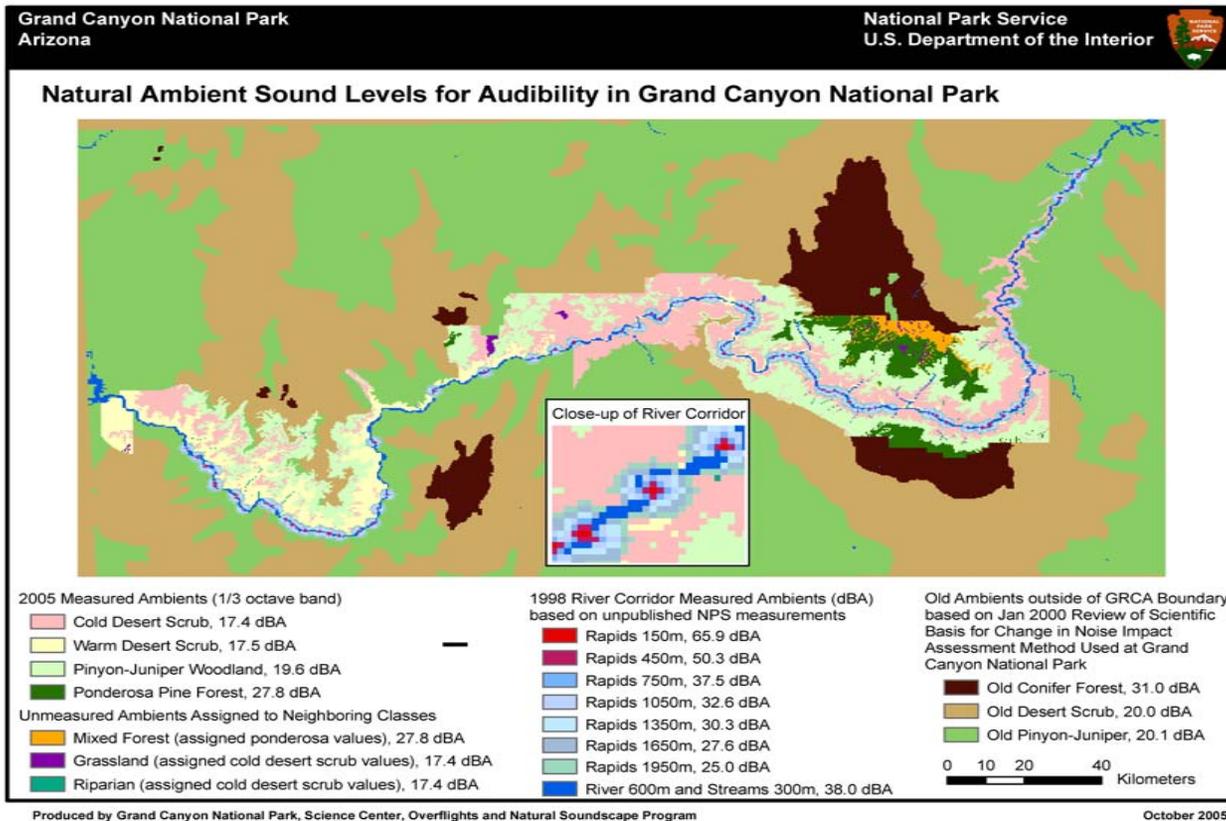
“FICAN recommends INM 6.2 as the best practice modeling methodology currently available to evaluate aircraft noise in the national parks.” [FICAN (February 2005)]

- INM Version 6.2
  - Terrain shielding (line-of-sight blockage)
  - High-resolution terrain data (GridFloat and DEMs)
  - Expanded aircraft database (EC-130, PA-31)
  - New Metrics (Time Audible, Change in Exposure)
  - Contour boundary area percentage
  - Variable flight segment modeling
  - ETMS import modeling capability



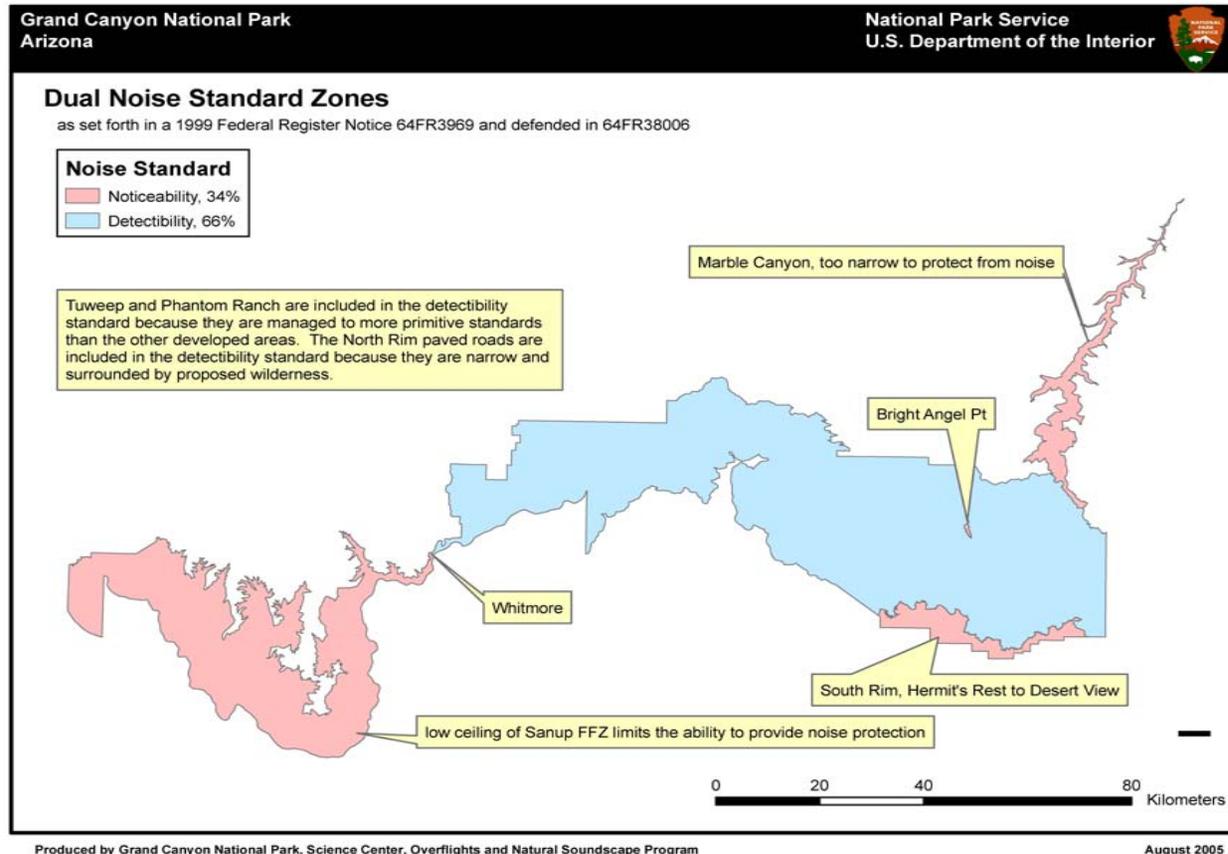
# 2004/2005 Ambient Data

- 2004/2005 NPS measurements
- Mapping/measurements consistent with agreed NPS/FAA methodology



# Noticeability/Detectability Zones

- Modeled as a 10 dB offset to the ambient data
- Used as a surrogate to mechanical noise (e.g., roadway, human activity)



# 2005 Operational Data

“August 8, 2005 is the Peak day”...”Peak day represents the highest daily number of all documented aircraft operations for the month of August 2005.”  
[GCNP NPS Memorandum to FAA (November 2005)]

- Air tour and air tour related (August 8, 2005 mutually agreed to by NPS/FAA based on Elrod spreadsheet)
  - Commercial air tours
  - Grand Canyon west
  - Transportation, repositioning, maintenance and training
  - Over the edge
  - Bar 10
- Other (based on FAA/ETMS/PDARS)
  - General aviation
  - Military
  - Commercial high altitude overflights



# 2005 Operational Data

## Operations by Aircraft Contribution, August 8, 2005

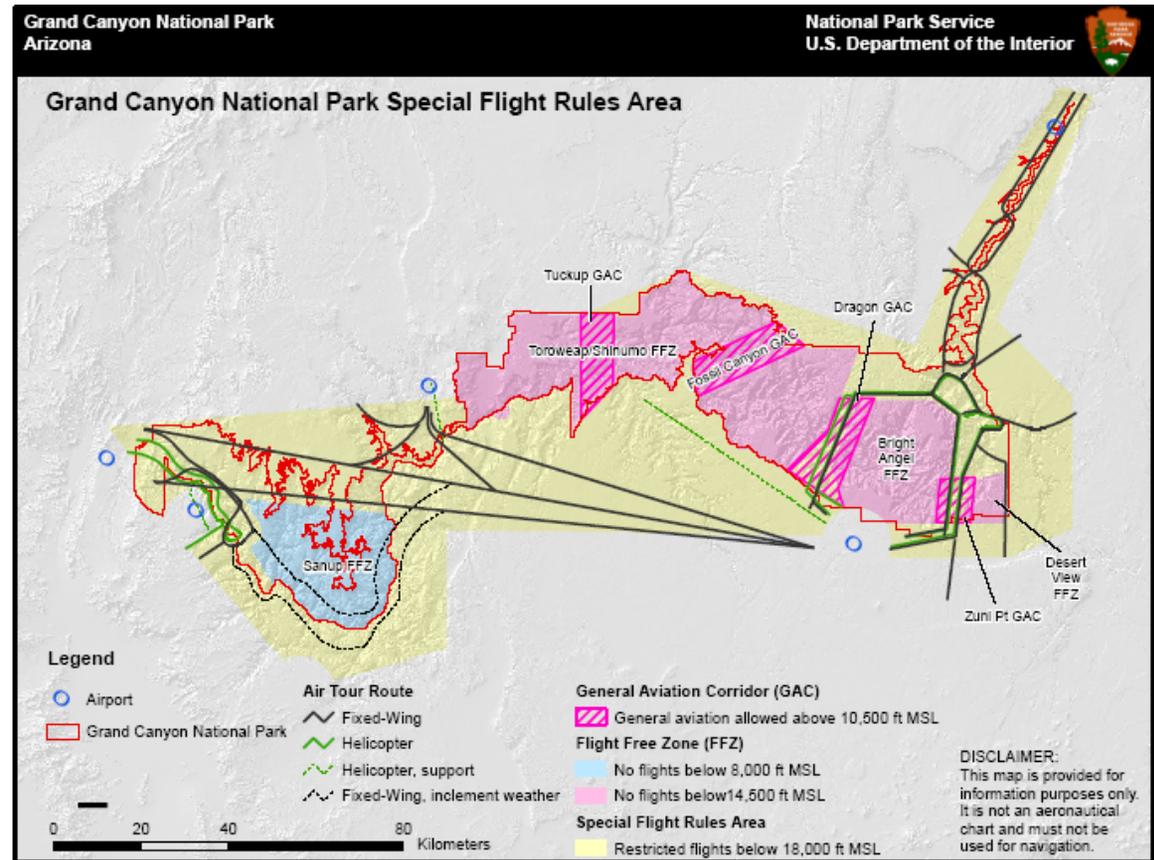
Aircraft	Number of Operations*
Air tour and air tour related	635
General Aviation (GA)	187
Military	11
Commercial	1214

\* Daytime operations only (7 am to 7 pm)

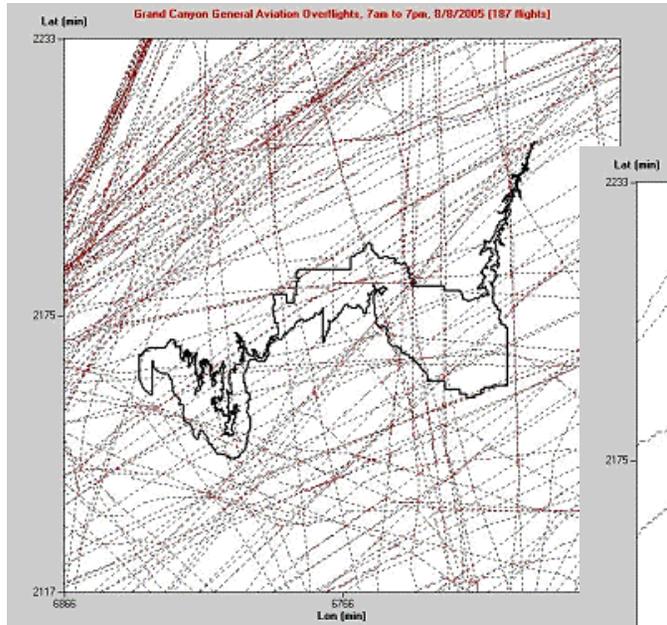


# Flight Track Data

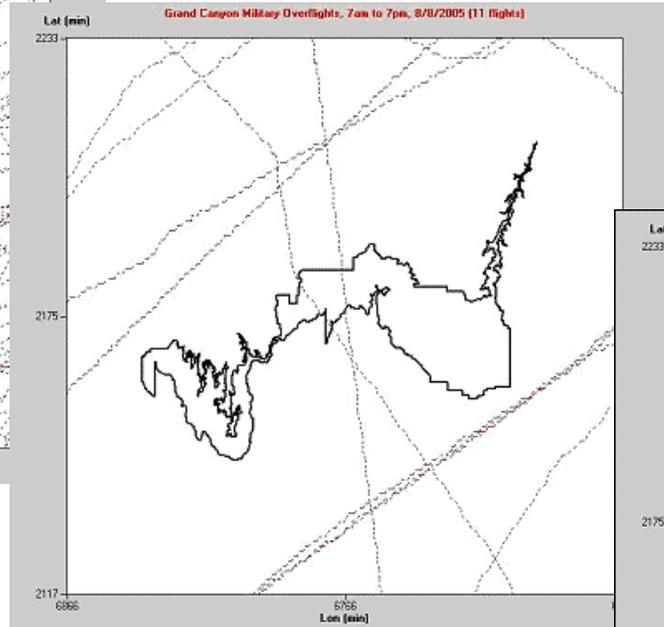
- Create flight tracks and profiles
- Assign aircraft noise-power-distance data
- Populate with 2005 operational data



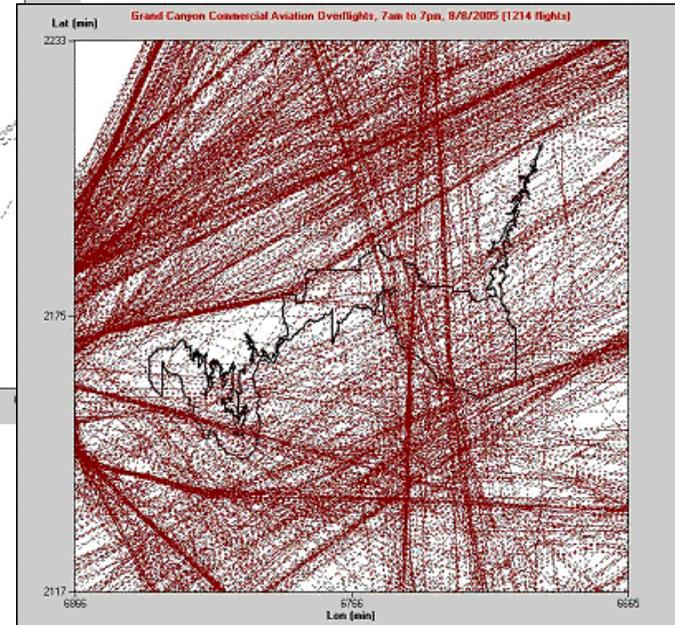
# Flight Track Data



General Aviation



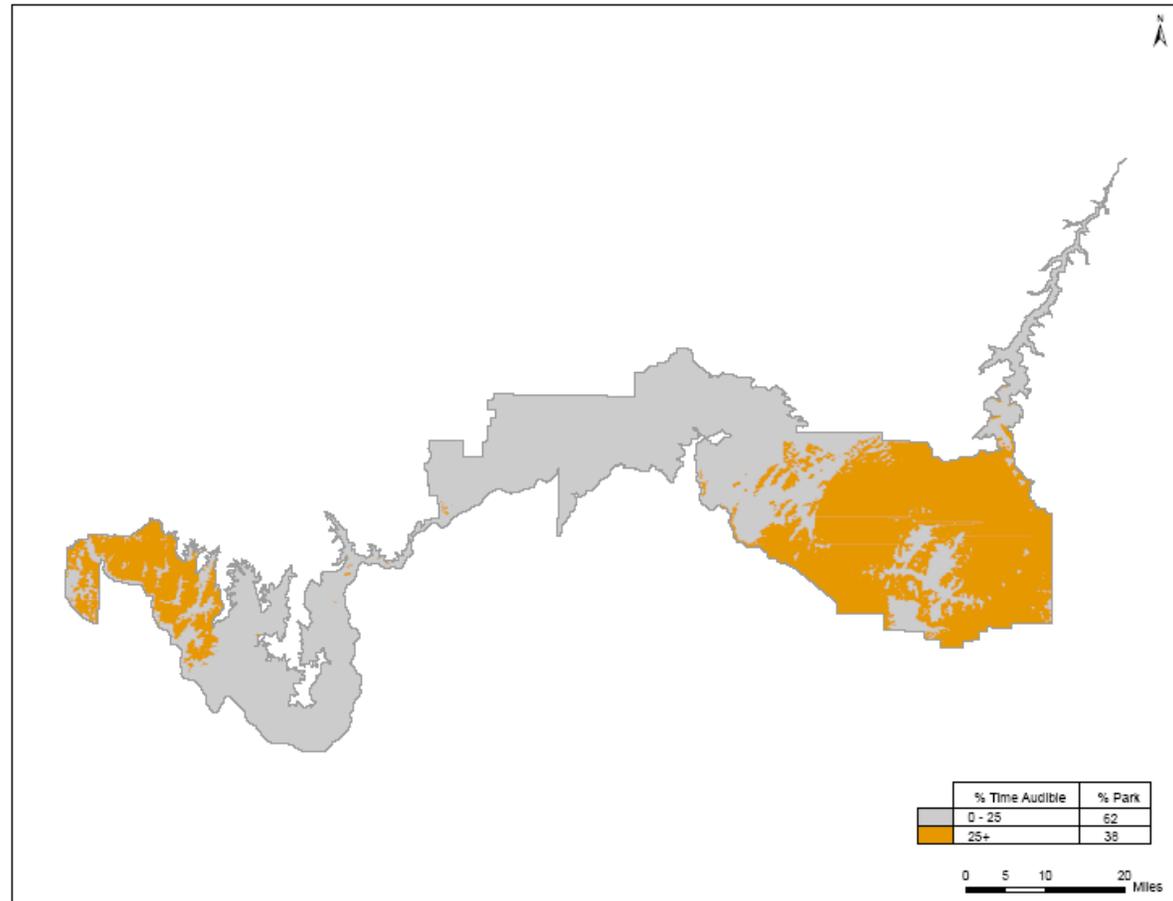
Military



Commercial

# Output

- Noise metrics
  - Time Audible
  - $L_{eq12}$
  - $L_{max}$
- Contours
- Location points
- Results by aircraft contribution



Example Time Audible Contour

# Results

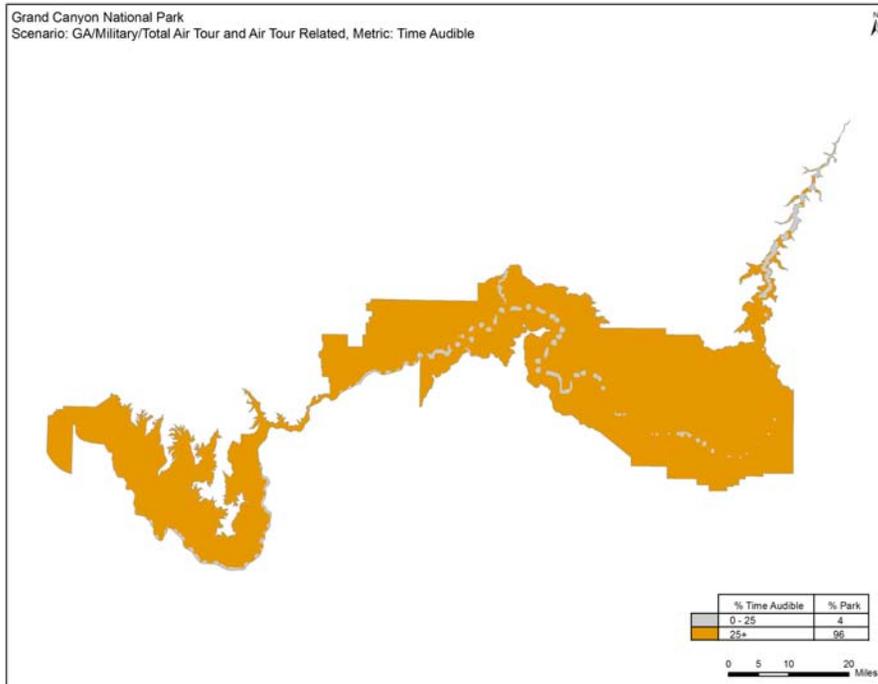
The goal is to achieve restoration of natural quiet. Natural quiet is obtained when "50 percent or more of the park is experiencing natural quiet (i.e., no aircraft audible) 75 to 100 percent of the day," each and every day. [NPS Report to Congress (July 1995)]

Aircraft	% of Park	% Restored	% Area Uncertainty
Total Air Tour and Air Tour Related, GA, and Military	96.3	3.7	-1.6%, +3.1%
Total GA, Military, and Commercial	99.0	1.0	-0.4%, +1.4%
Commercial Air Tours	38.4	61.6	-2.5%, +2.2%
GC West	7.3	92.7	-0.4%, +0.5%
Transportation, Repositioning, etc.	10.3	89.7	-2.2%, +2.2%
Over the Edge	4.6	95.4	-2.2%, +2.2%
Bar 10	0.0	100.0	0%
Total Air Tour and Air Tour Related	46.1	53.9	-1.8%, +1.8%
General Aviation (GA)	69.7	30.3	-21.6%, +30.9%
Military	0.0	100.0	0%
Commercial	92.2	7.8	-1.8%, +4.4%

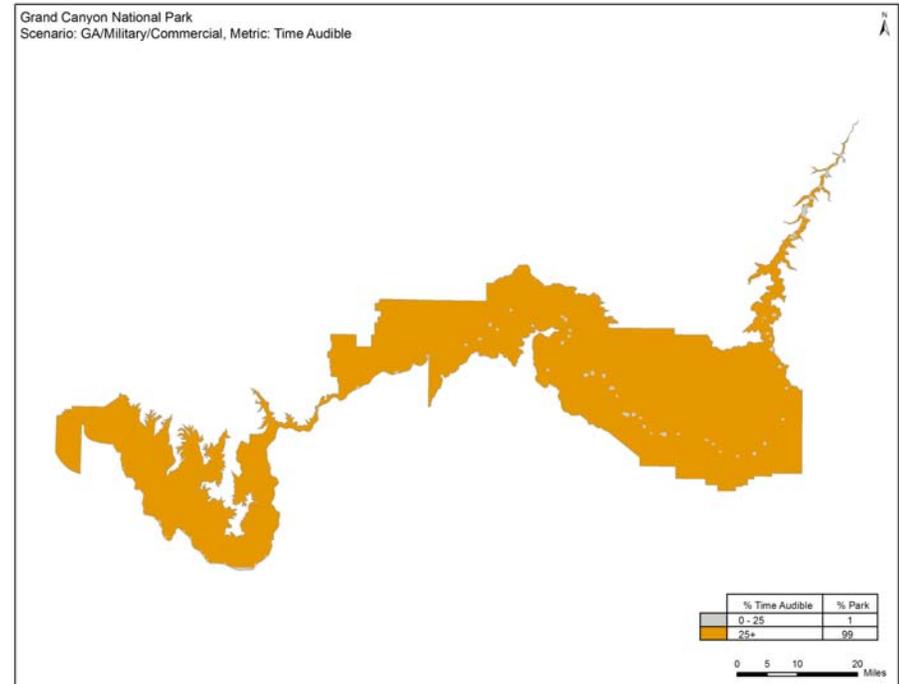
\* Note: For additional discussion on contour uncertainty, please refer to pages 52-53 in the FICAN report, "Assessment of Tools for Modeling Aircraft Noise in the National Parks." [FICAN (February 2005)]



# Results

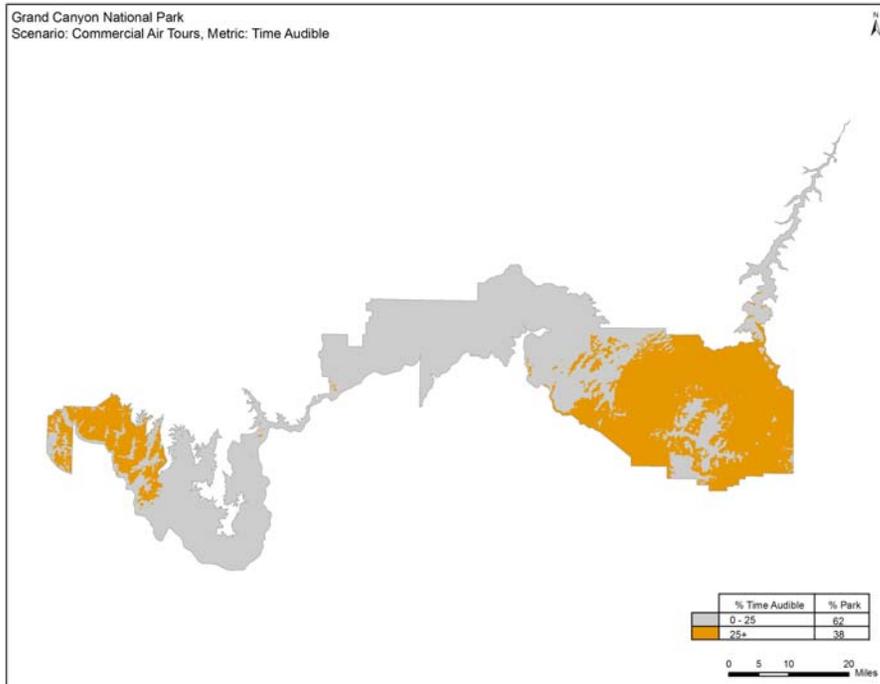


Total GA, Military, Air Tour and Air Tour Related  
96.3% of the park (3.7% "Restored")

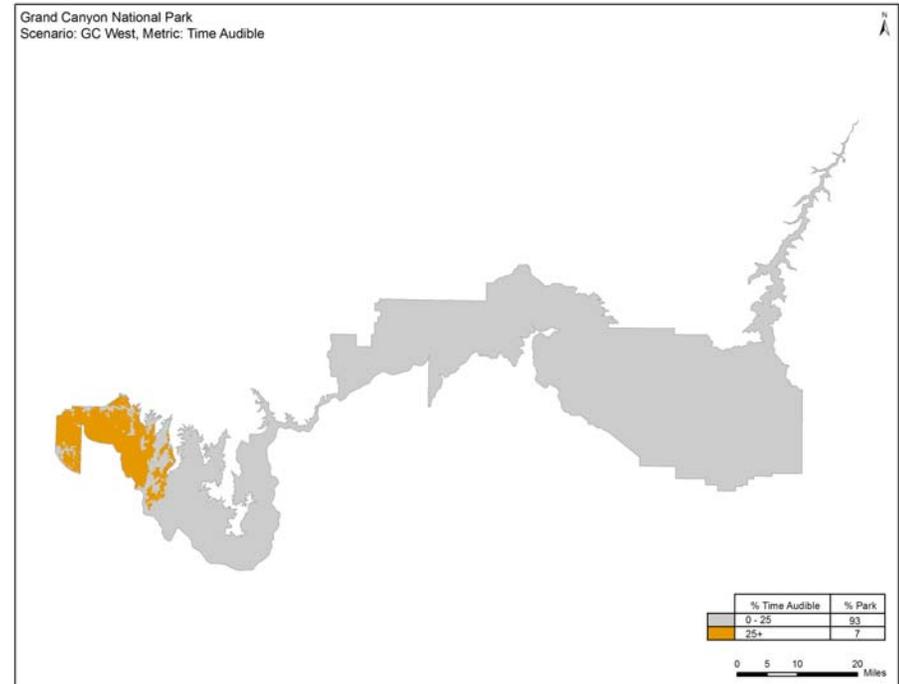


Total GA, Military, Commercial  
99.0% of the park (1.0% "Restored")

# Results

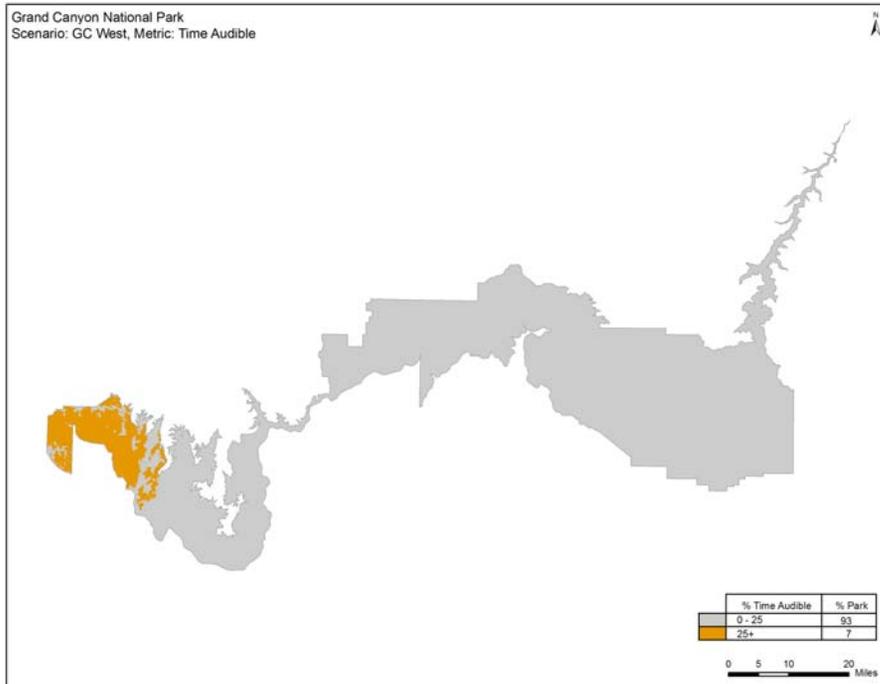


Commercial Air Tours  
38.4% of the park (61.6% "Restored")

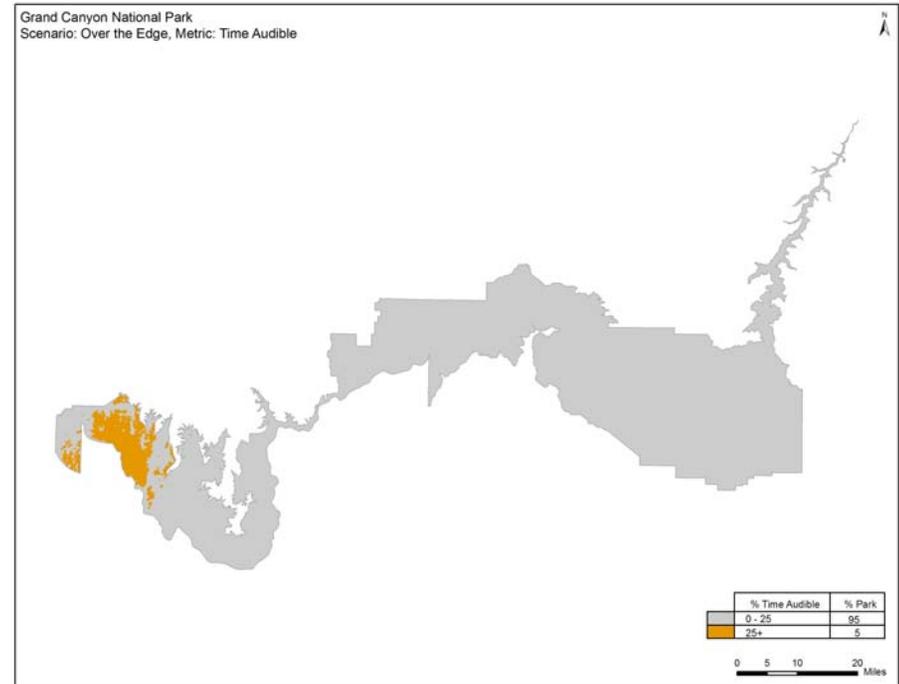


GC West  
7.3% of the park (92.7% "Restored")

# Results

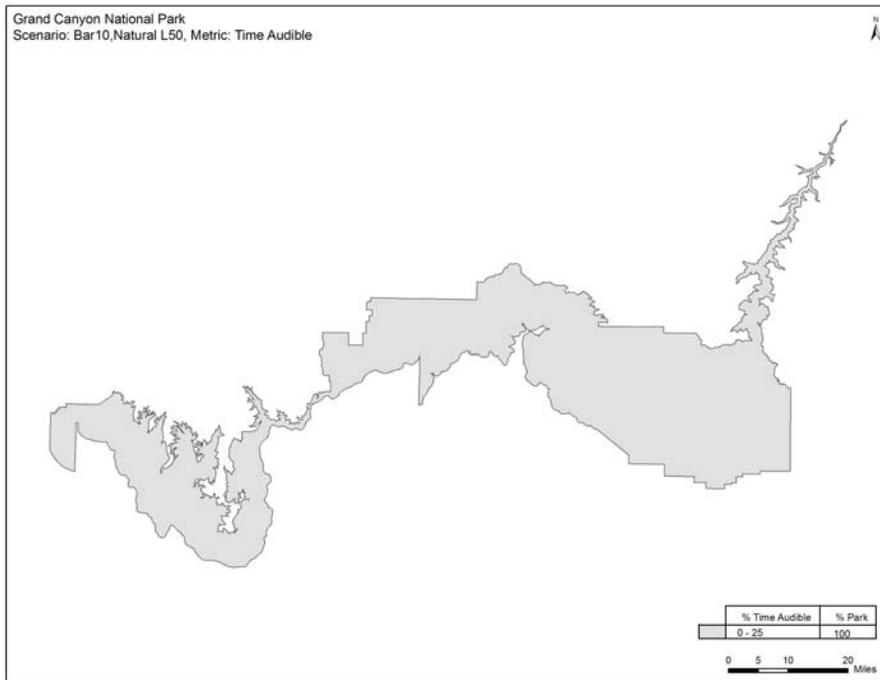


Transportation, Repositioning, etc.  
10.3% of the park (89.7% “Restored”)

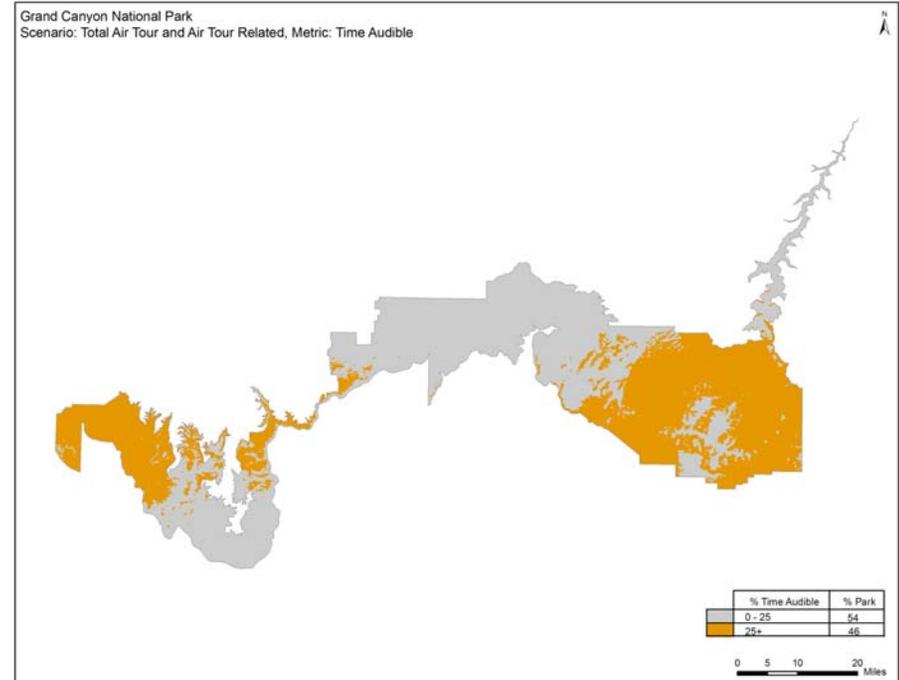


Over the Edge  
4.6% of the park (95.4% “Restored”)

# Results

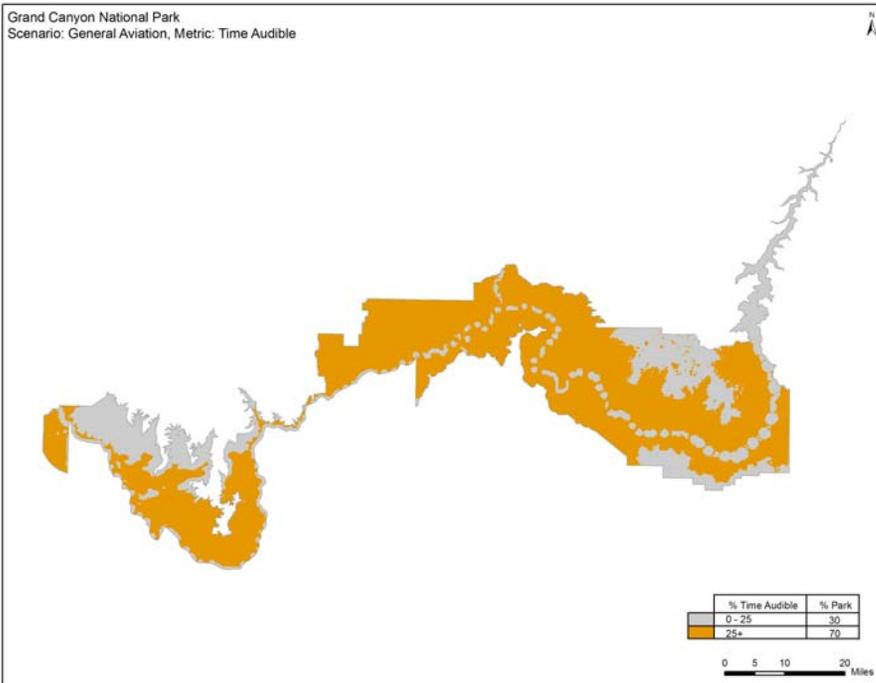


Bar 10  
0.0% of the park (100% “Restored”)

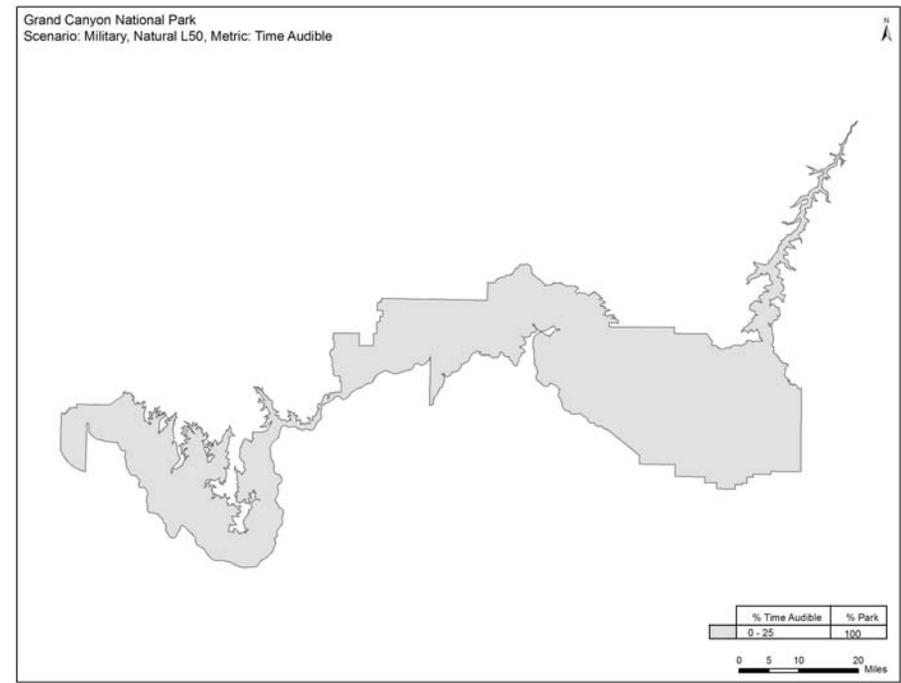


Total Air Tours and Air Tour Related  
46.1% of the park (53.9% “Restored”)

# Results

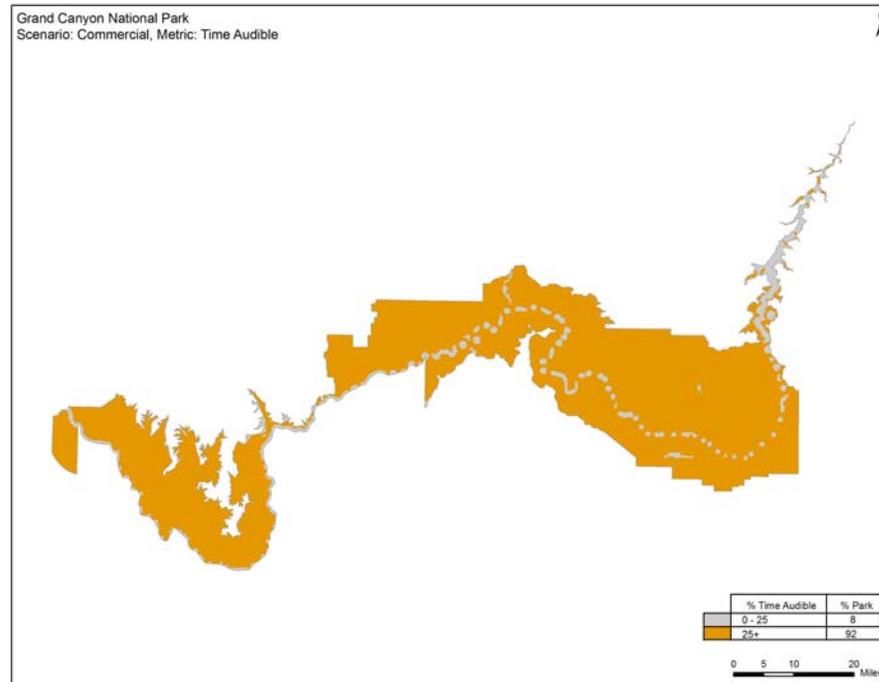


General Aviation  
69.7% of the park (30.3% "Restored")



Military  
0.0% of the park (100% "Restored")

# Results



Commercial  
92.2% of the park (7.8% “Restored”)