



Wilderness

Air Tour Noise Assessment Framework

George Wright Society

April 2, 2015

*Judy Rocchio (presenter)
Megan McKenna, Brent Lignell, Amanda Rapoza,
Cyndy Lee, Vicki Ward*



Summary

Wilderness Air Tour Noise Assessment Framework

- ☐ Why Wilderness?
- ☐ Why Air Tours?
- ☐ Why a Noise Assessment Framework?
- ☐ Framework Development
- ☐ Acoustic Conditions Modeled Using the Integrative Noise Model Analysis
- ☐ Framework Example - Haleakalā National Park
- ☐ Improving Wilderness Character
- ☐ Broader Implications for Wilderness Protection

Why Wilderness? It's the law and NPS Policy!



1964 Wilderness Act

Defined wilderness by its character and qualities:

- Untrammeled by man
- Natural undeveloped lands
- Provides solitude
- Primitive unconfined recreation
- Spiritual inspiration
- Study of nature

- Noise from low flying air tours impacts visitor perception of **solitude and naturalness**.
- Air tours, a form of mechanized transport, degrade the **undeveloped and primitive** qualities of wilderness.

2006 NPS Management Policies

Section 6.3.7 Natural Resources

“The principle of **nondegradation** will be applied to wilderness management, and each wilderness area’s condition will be measured and assessed against its own unimpaired standard. “



Why Air Tours? It's the law!

National Parks Air Tour Management Act, 2000,

Objective: ... “develop acceptable and effective measures to mitigate or prevent significant adverse impacts, if any, of commercial air tour operations upon the natural and cultural resources and visitor experience in national park units.”



Commercial Air Tours

Sightseeing flights over or within 1/2 mile of any national park and flying at or below 5,000 above ground level.

Why a Wilderness Air Tour Noise Assessment Strategy?



Natural Sounds
are an integral part
of Wilderness
Character!



- Preserving wilderness character must be integrated into national park resource management planning and air tours are inconsistent with preservation of Wilderness character. (Directors Order 41, Wilderness Stewardship)

- Air tour management plans or voluntary agreements must prevent or minimize negative impacts of air tours. (National Park Air Tour Management Act)





Framework Development

Wilderness Air Tour Noise Impacts Assessment

Based on:

- Existing air tour overflight activity
- Modeled indicators of sound impacts
- Scientific understanding of human responses to noise

Integrates the **spatial extent, time and magnitude** of air tour noise impacts over an entire wilderness area to determine an Air Tour Noise “tier” value .

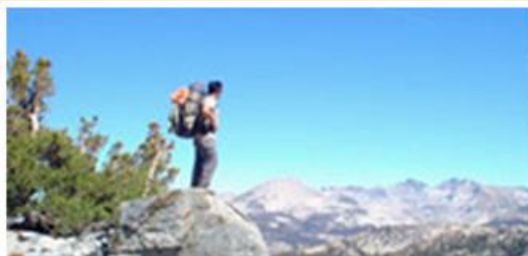
- **Tier 0** = no air tour noise in wilderness
- **Tier 5** = air tour noise covers a large area, lasts a long time, is loud and occurs the majority of the year

NPS uses the principal of **non-degradation** to manage wilderness which requires maintaining Tier 0 and reducing Tier levels 1-5.

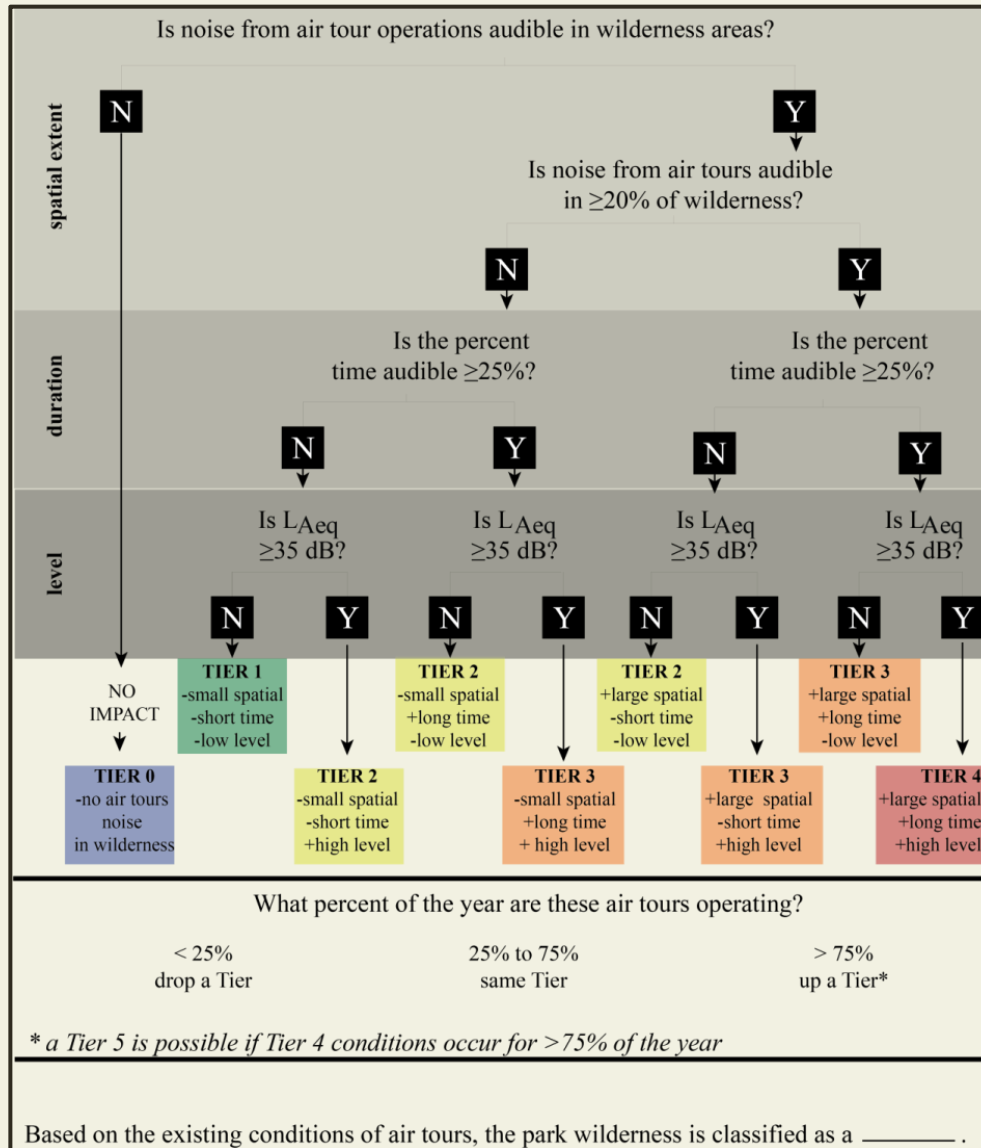


Framework Decision Points

Indictor	Measured As	Decision Point	Justification
Spatial Extent	% Acres Affected	20% or More	Defined by Natural Resource managers as significant soundscape fragmentation and loss of solitude
Duration	% Time Audible	25% or Greater	Visitor Surveys of Backcountry Day-hikers where they report interference with naturalness
Magnitude	Average Noise Level	35 dB LA _{eq}	Multiple Studies on human response to noise



Wilderness Air Tour Noise Assessment Framework





Acoustic Conditions in Wilderness

Modeled aircraft noise from existing air tour operations

Integrated Noise Model Analysis (INMA)

Developed by U.S. Department of Transportation,
John A. Volpe National Transportation Systems Center (Volpe)

INMA is an extension to the FAA Integrated Noise Model (INM) developed by Volpe. INMA is a Windows application that allows users to assess noise exposure from various combinations of air tour activity over **pre-modelled** routes in INM.

INMA inputs used to calculate decision points in the framework are:

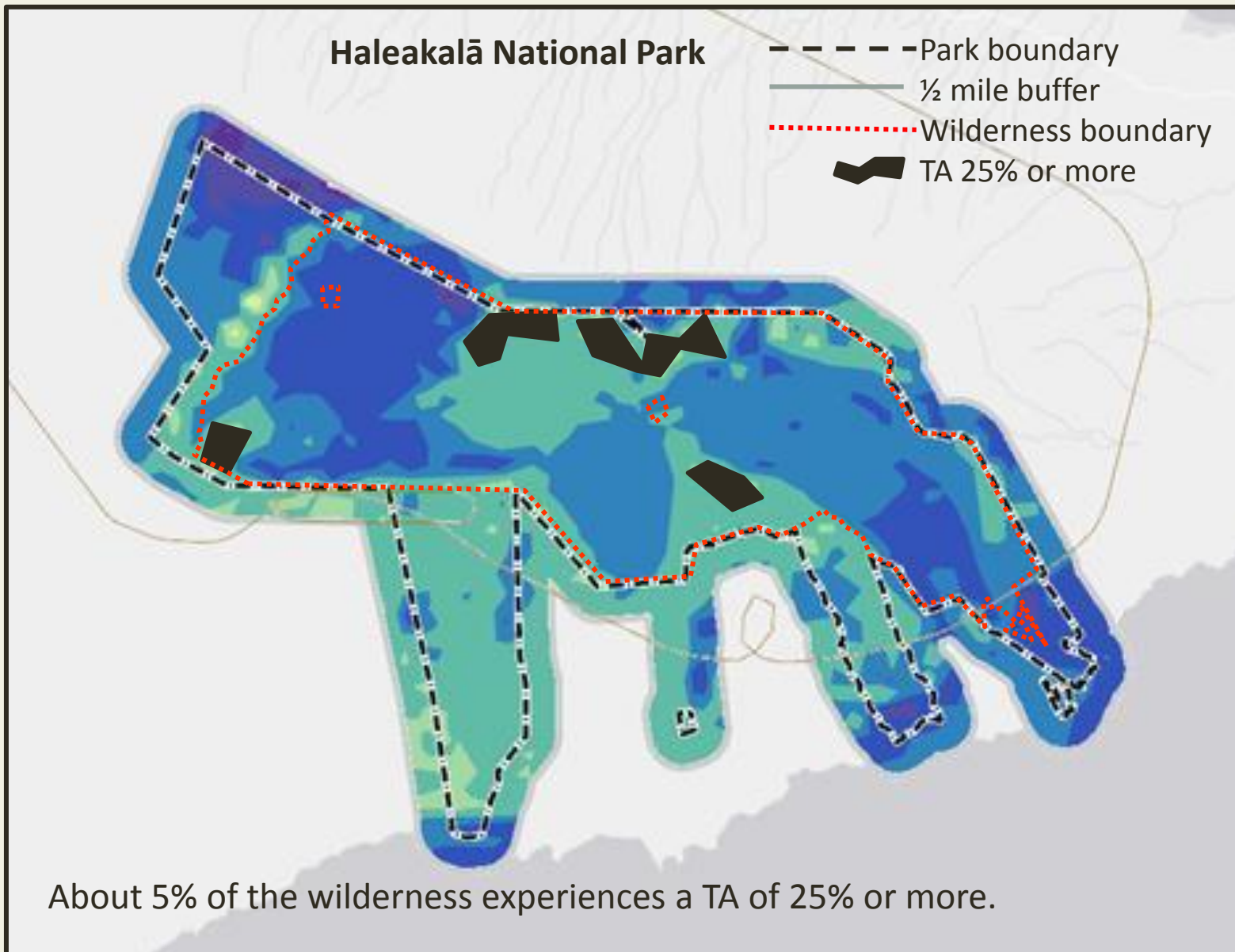
- **Daily Hours of Operation**
- **Average Number of Flights per Day**

Aircraft type, routes and number of annual flights are also obtained from operator reported data.



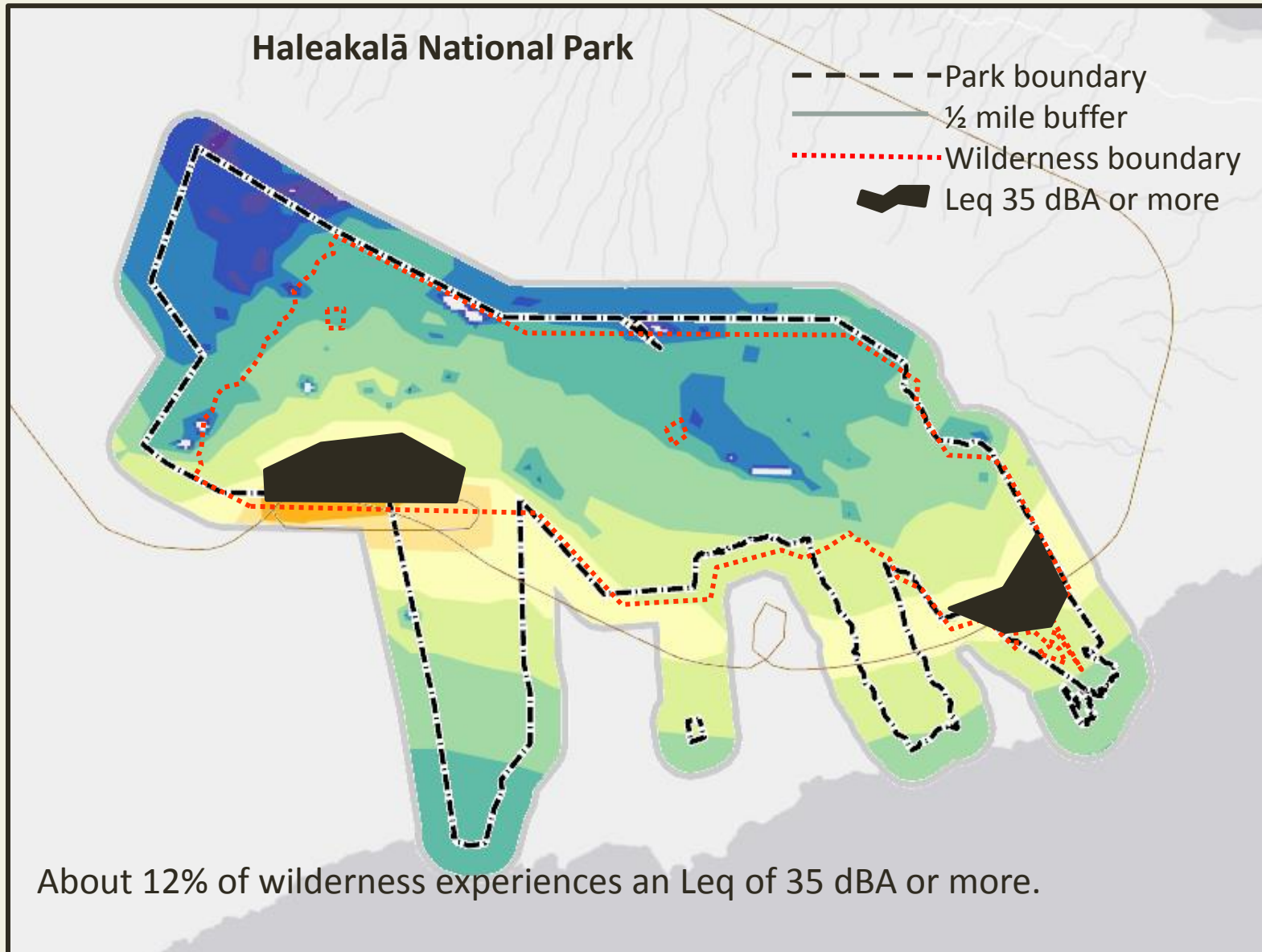
Integrated Noise Model Analysis

Time Audible contour and showing Area of Audibility

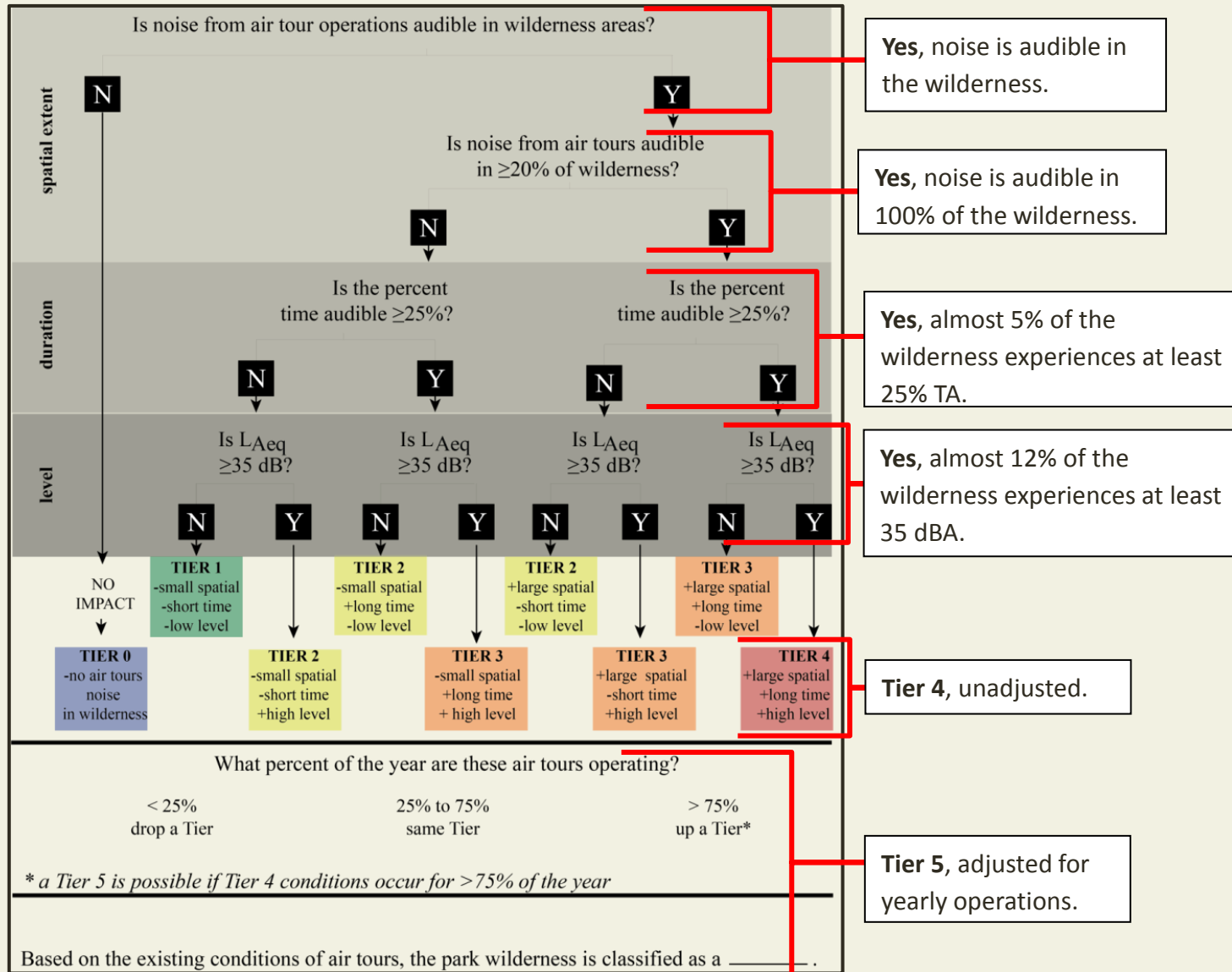


Integrated Noise Model Analysis

generating average sound level (Leq) contour



INMA / evaluate results using decision tree



INMA / improving wilderness character



INPUT					OUTPUT				
Route	Aircraft	Alt.	Flts/day	hrs ops/day	Area of Audibility (%) [non-zero? ≥ 20%?]	Time Audible [≥ 25%?]	Leg [≥ 35 dBA?]	Tier	Adj. Tier
Reported Flights (13.5/day)									
Southern	EC-130	500 ft	5.6	11	100	"27 to <28 %"	"44 to <45 dBA"	4	5
Southern	AS350	500 ft	7.9	11					
2 fewer flights									
Southern	EC-130	500 ft	4.6	11	100	"24 to <25 %"	"43 to <44 dBA"	3	4
Southern	AS350	500 ft	6.9	11					
4 fewer flights									
Southern	EC-130	500 ft	3.6	11	100	19 to <20 %	42 to <43 dBA	3	4
Southern	AS350	500 ft	5.9	11					
Only 1 flight each									
Southern	EC-130	500 ft	1	11	100	4 to <5 %	35 to <36 dBA	3	4
Southern	AS350	500 ft	1	11					
13.5 flights, all QT									
Southern	EC-130	500 ft	13.5	11	100	22 to <23 %	43 to <44 dBA	3	4
Southern	AS350	500 ft	0	0					
7 flights, all QT									
Southern	EC-130	500 ft	7	11	100	12 to <13 %	40 to <41 dBA	3	4
Southern	AS350	500 ft	0	0					
3.5 flights, all QT									
Southern	EC-130	500 ft	3.5	11	100	6 to <7 %	37 to <38 dBA	3	4
Southern	AS350	500 ft	0	0					
1 flight, all QT									
Southern	EC-130	500 ft	1	11	100	2 to <3 A	32 to <33 dBA	2	3
Southern	AS350	500 ft	0	0					

Current Air Tour Noise Tier designation for Haleakalā NP Wilderness and Tier levels resulting from a reduction in daily air tour activity or use of quiet technology. Changes in routes, altitudes, or distribution of yearly operations will also affect Tier values.

Broader Implications for Wilderness Impacts Assessments



This type of tier designation can be used for assessing impacts other than noise from air tours, as long as;

- The activity and associated impacts have a direct connection to wilderness values and qualities .
- The activity can be measured (and modeled if possible) over broad space, time and magnitude scales.
- Decision points are based on best management practices and scientific understanding of impacts.
- The policy of non-degradation requires we reduce existing wilderness resource impacts.

What other examples can you think of?





A Wilderness Assessment Framework Applied to Soundscape Condition

Megan F McKenna^{1*}, Brent Lignell¹, Amanda Rapoza², Cyndy Lee²,
Vicki Ward¹,
Judy Rocchio³

¹ Natural Sounds and Night Skies Division, US National Park Service

² Volpe Center, US Department of Transportation

³ Pacific West Regional Office, US National Park Service

* Author of correspondence (megan_f_mckenna@nps.gov)

Introduction

The 1964 Wilderness Act directs federal agencies to manage wilderness areas to preserve wilderness character. The qualities of wilderness character include “Natural”, “Untrammelled”, “Solitude or Primitive and Unconfined Recreation”, “Undeveloped”, and “Other Features of Value” (Keeping it Wild in the National Park Service 2014).



Questions?