# Advanced Aviation Environmental Modeling Tools to Inform Policy Makers

## Inter-Noise 2012

Volpe The National Transportation Systems Center

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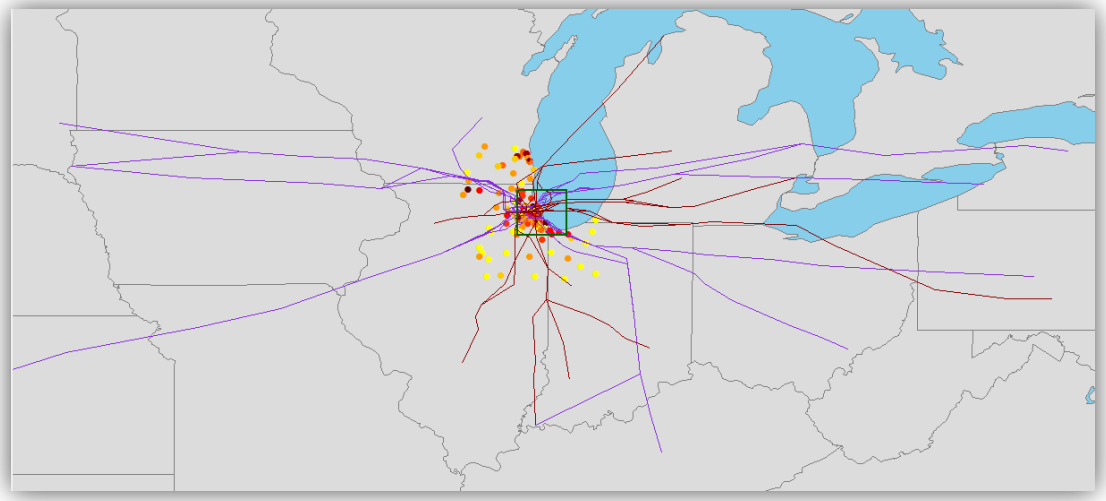
U.S. Department of Transportation

**Research and Innovative Technology Administration**

John A. Volpe National Transportation Systems Center

# Outline

- Introduction to FAA's AEDT
- Example Interdependencies Analysis
- Conclusions



# AEDT

# Aviation Environmental Design Tool (AEDT)

- Investigate environmental interdependencies within a single tool
- Trade-offs between noise, fuel burn, and emissions
- Example: Optimized Profile Descents
  - Reduced noise *=> Concentration of noise: potential increases*
  - Reduced fuel burn and $CO_2$

# AEDT2a

- AEDT Version 2a: Released March 2012
- Addresses gap in environmental interdependency modeling
- Focus on Regional Analyses
  - More than 1 airport
  - Proposed air traffic airspace and procedure actions above 3,000 ft AGL

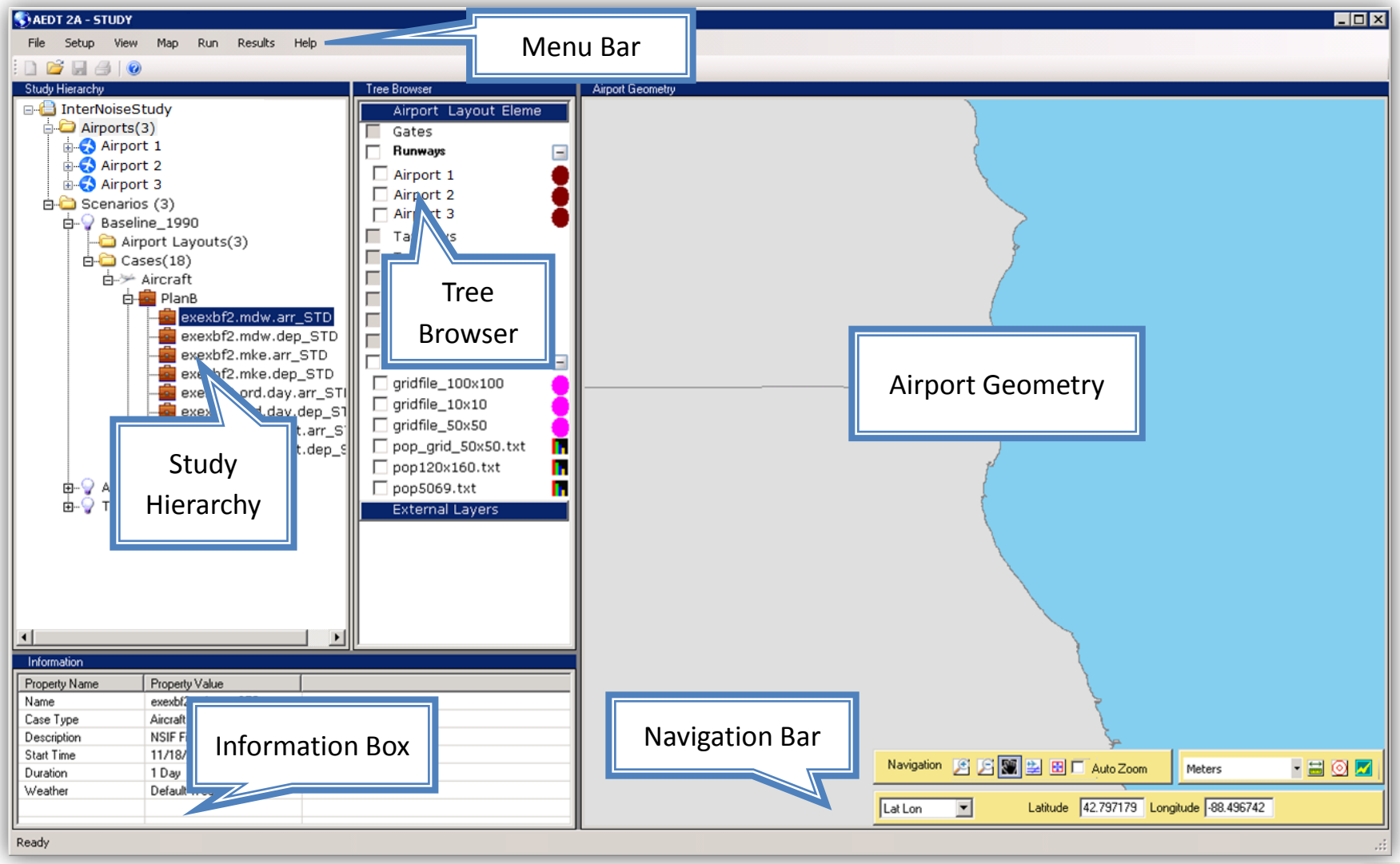
# AEDT2a - Data

- AEDT Standard Input File (ASIF)
  - Supports importing  disparate data sets
  - Extensible markup language (XML)
  - Import individual study elements
    - Accommodates iterative nature of environmental planning & analysis
- High Fidelity Weather
  - RUC: NOAA Rapid Update Cycle
  - GEOS: NASA Goddard Earth Observing System
  - NCAR: National Center for Atmospheric Research

# AEDT2a – Key Functionality

- Change Analysis
  - Comparison of noise levels  between two scenarios
- Impact Evaluation
  - Investigation of noise level based on operation and track assignment
  - Operation reassignment

# AEDT2a Graphical User Interface



# Interdependencies Analysis

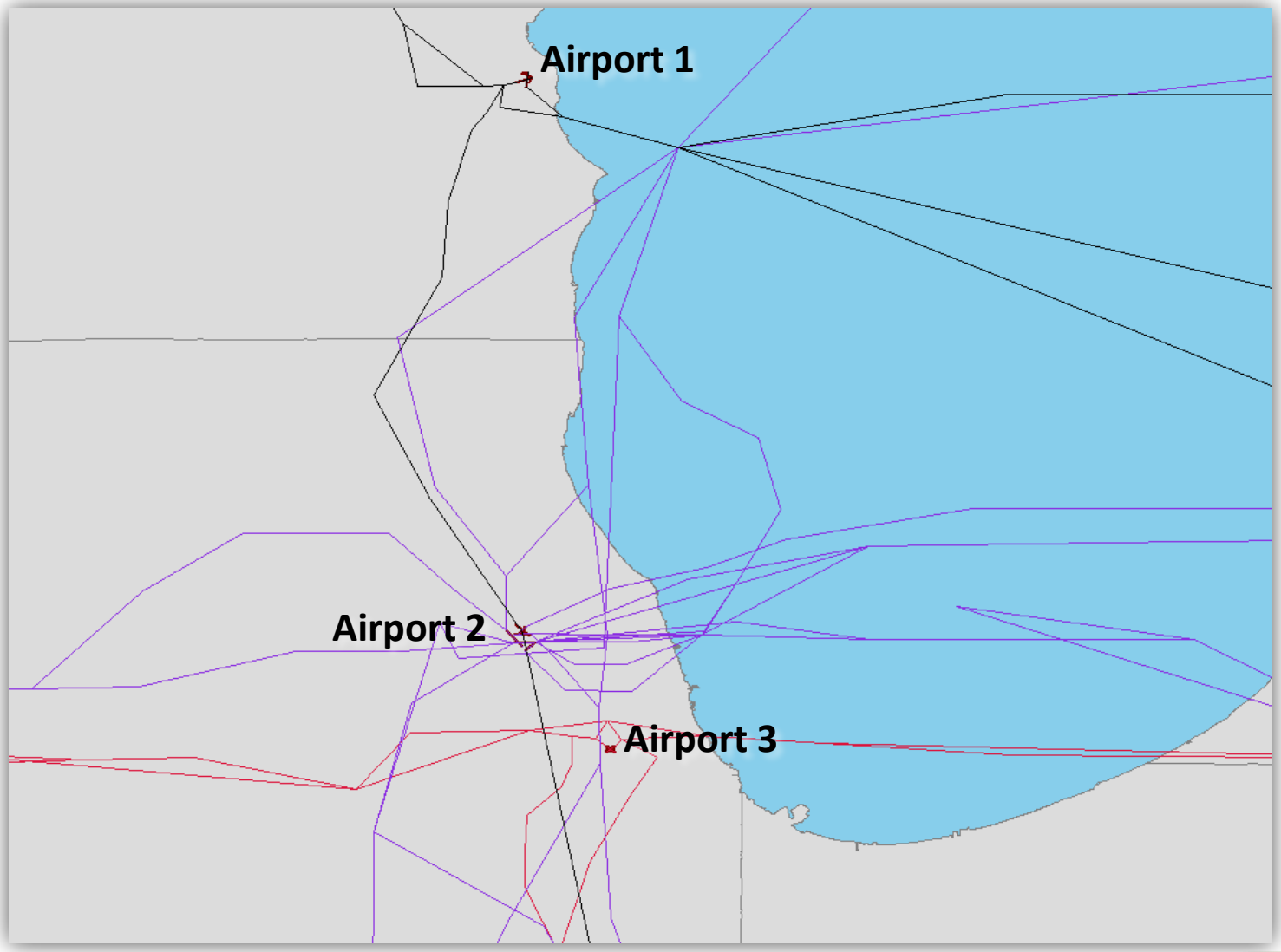
# Sample Study

- Three commercial airports
- One geographic region
- Baseline scenario: “current” departure operations
- Alternative scenario: “future” growth in departure operations

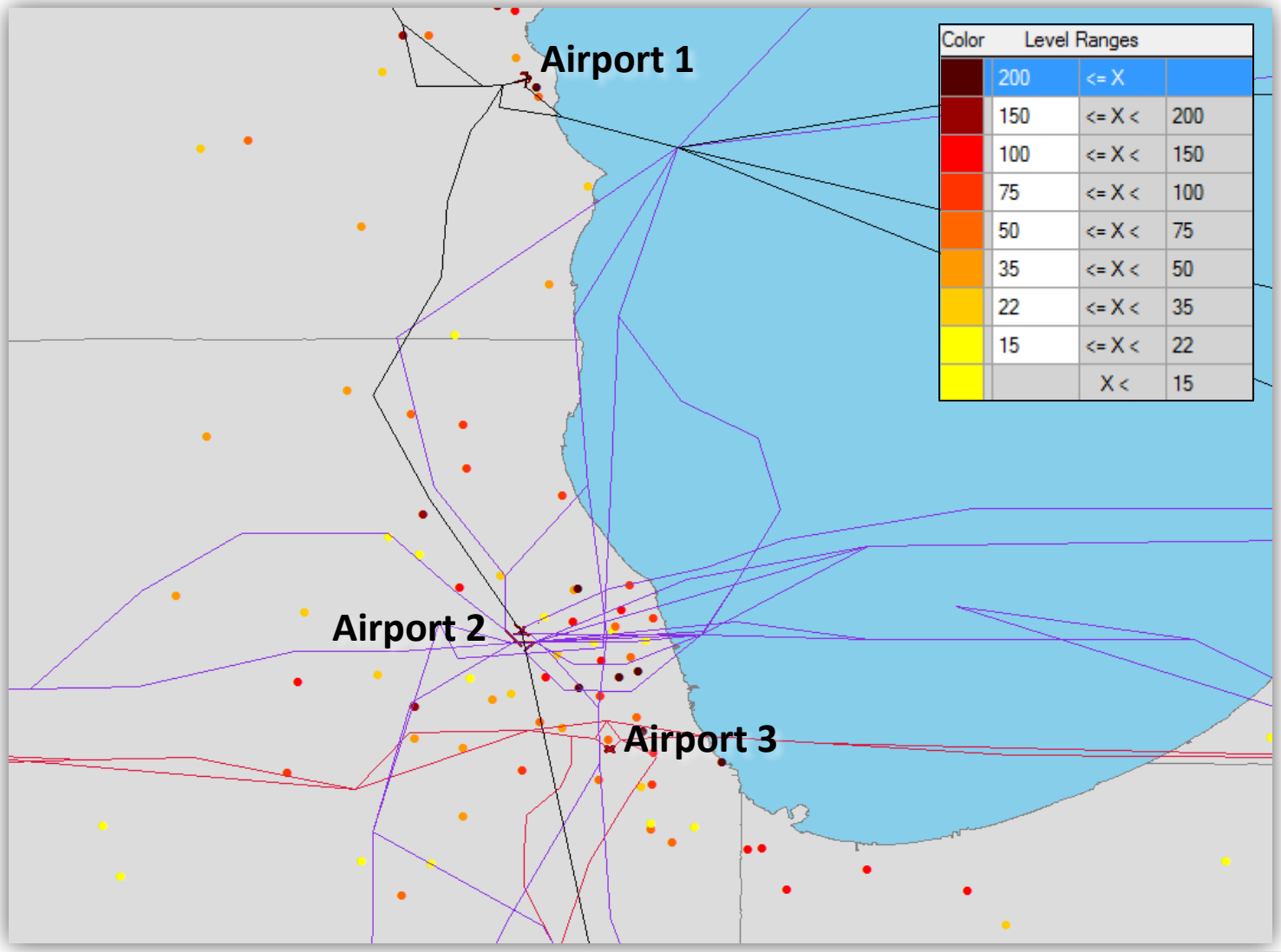
# Analysis Goals

- Identify areas of interest
  - Sensitive areas
  - Areas with high population concentration
- Analyze proposed track configuration
  - Consolidate departure tracks
  - Evaluate noise, emissions, and fuel burn changes

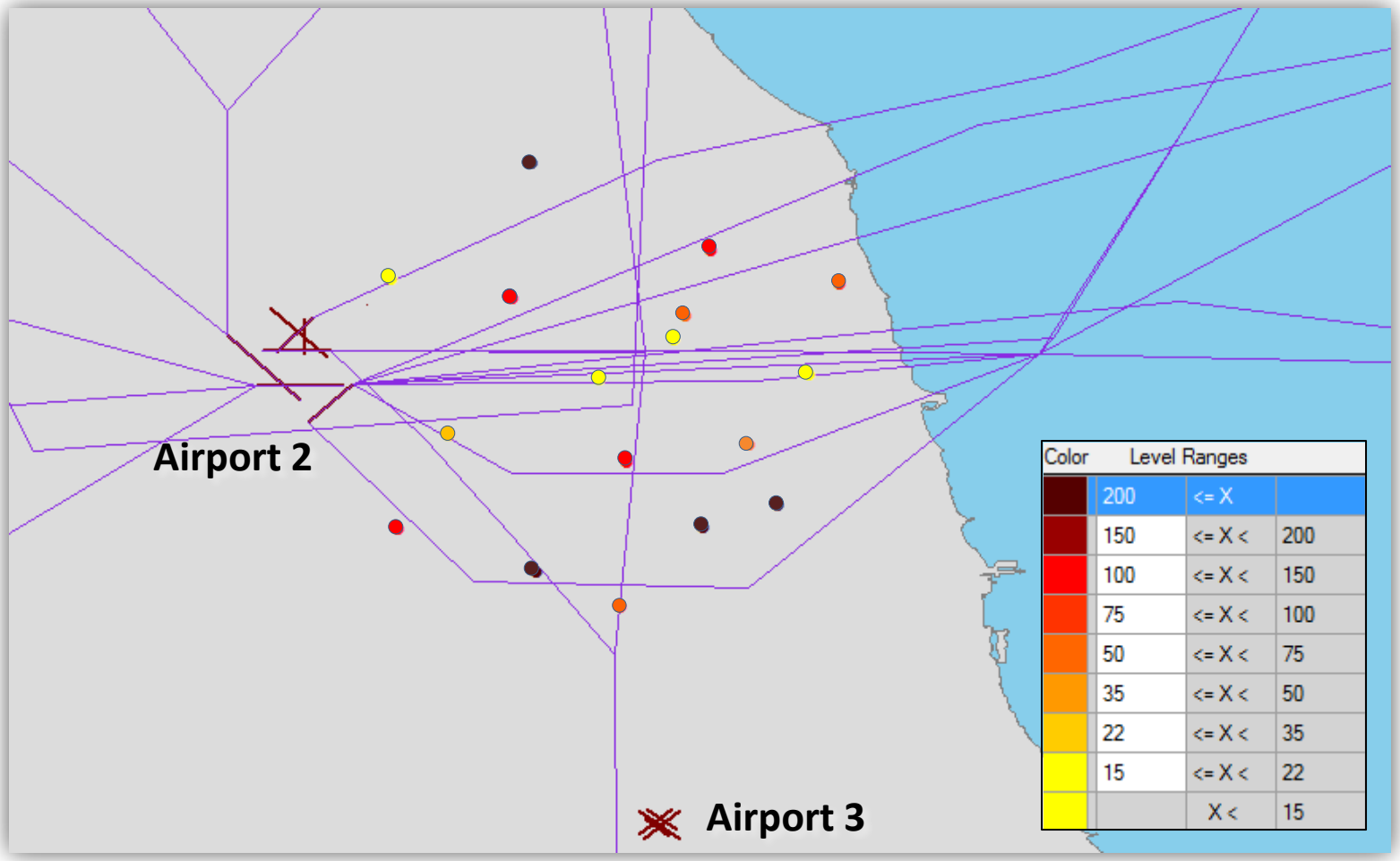
# Airports and Departure Tracks



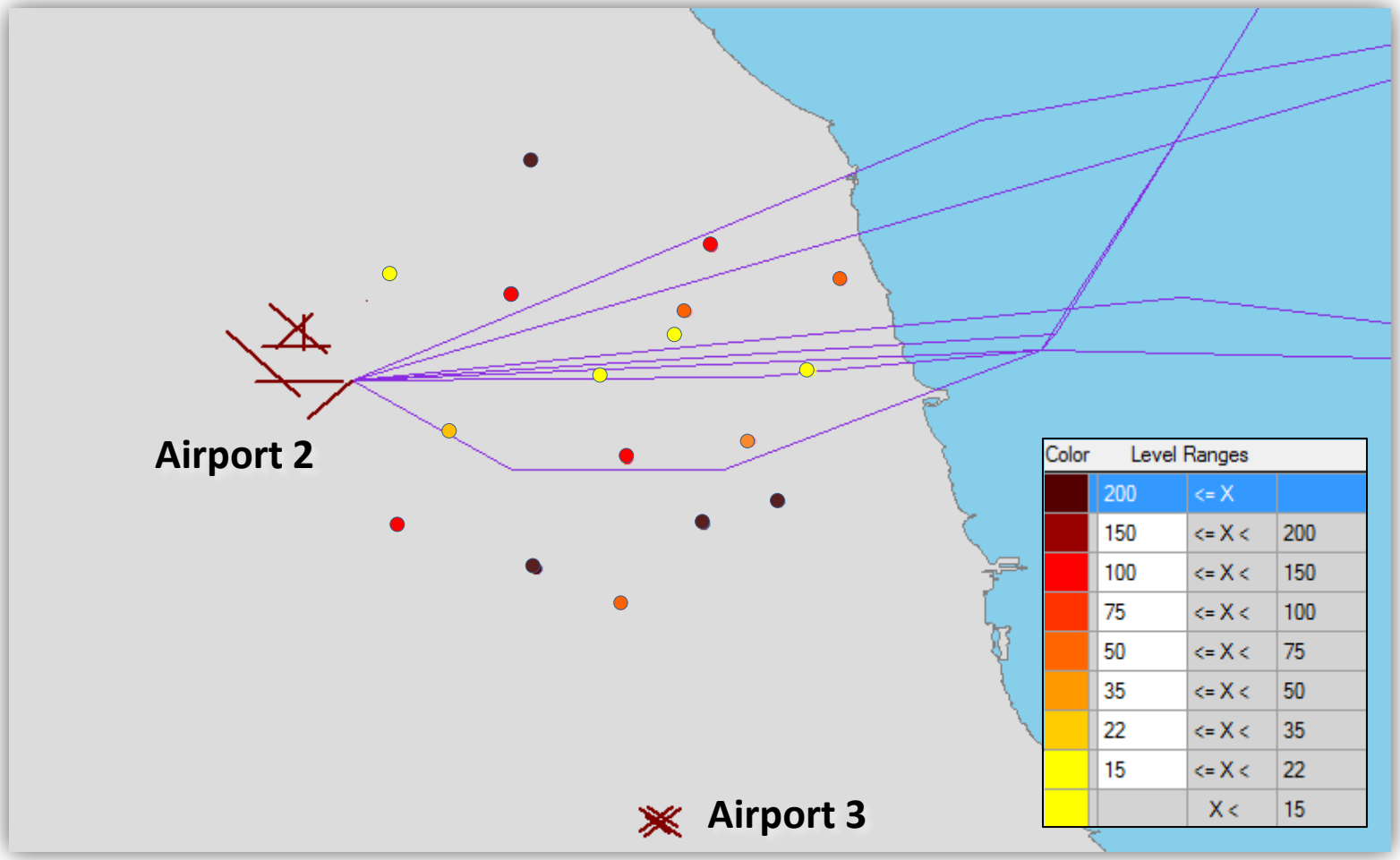
# Population Representation



# Area of Interest

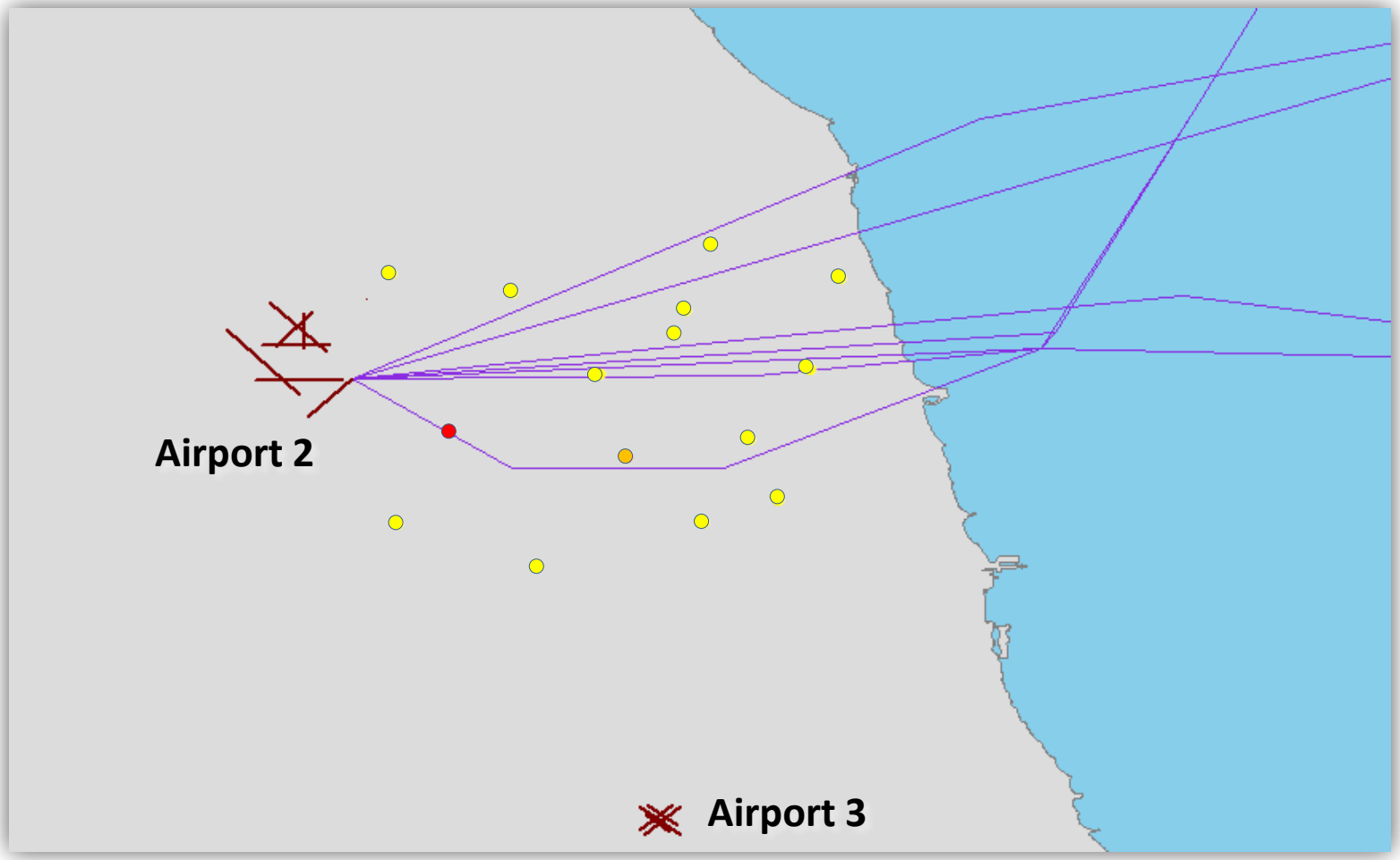


# Area of Interest, Runway 1 tracks

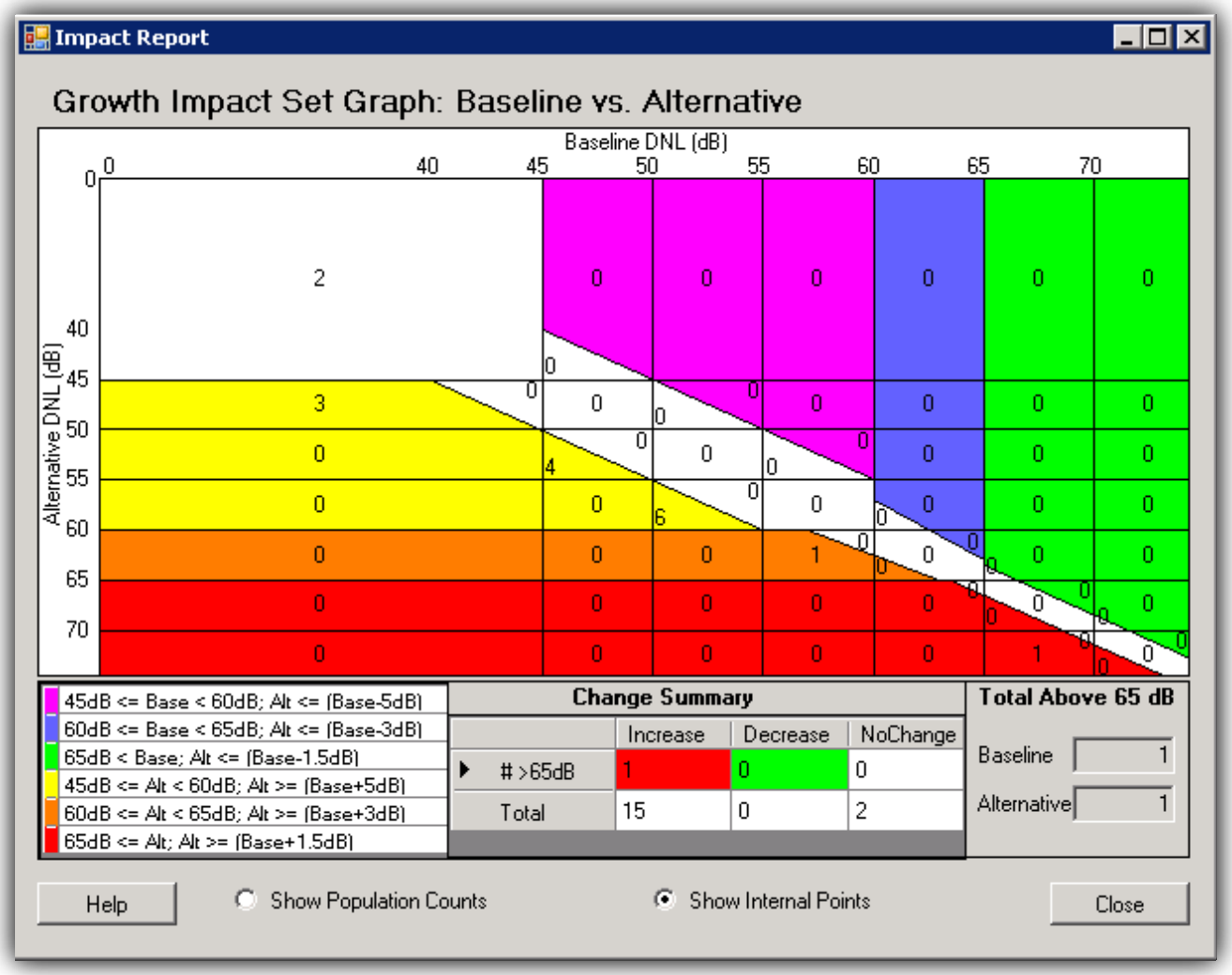


# Noise Exposure Comparison

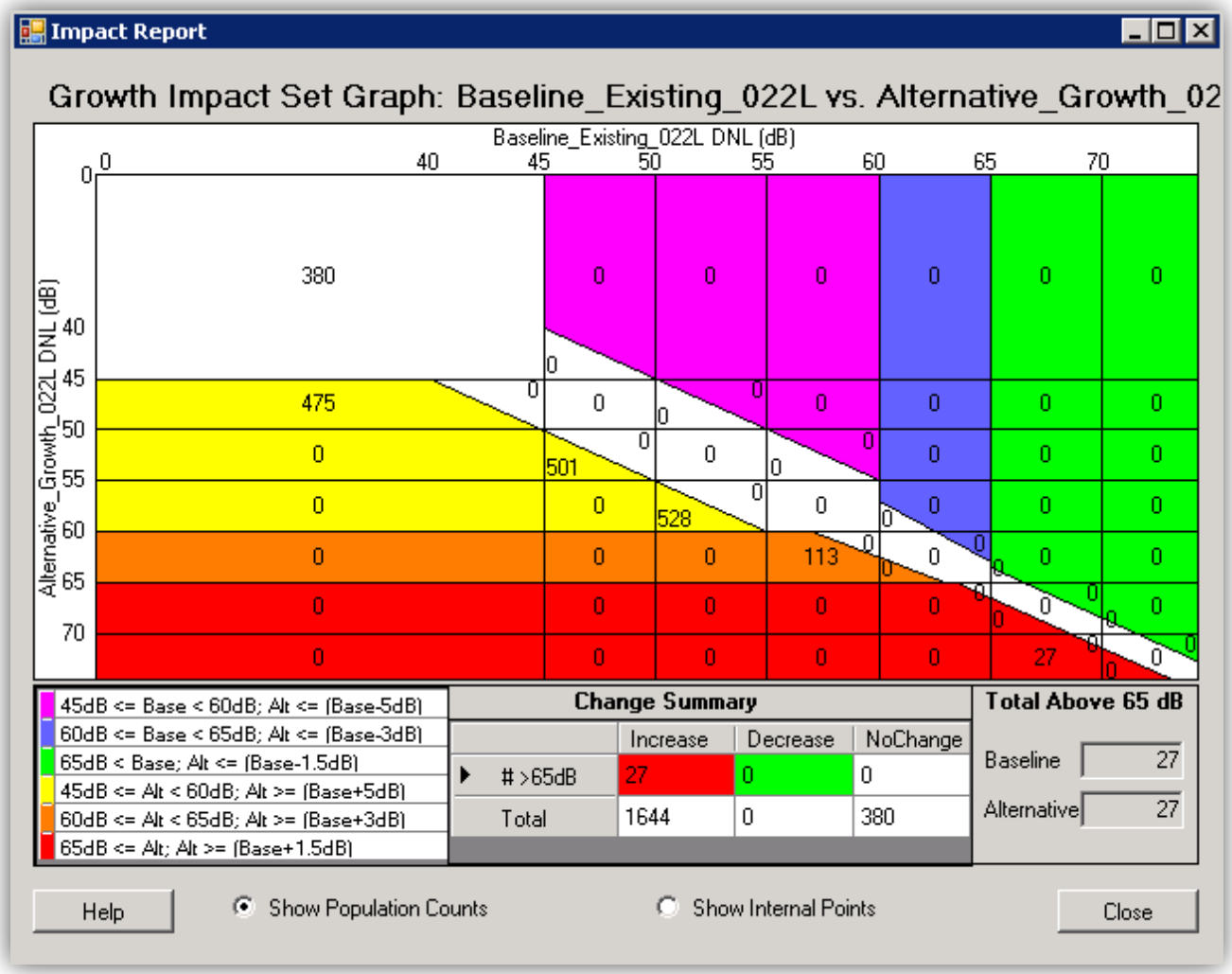
## Baseline vs. Alternative



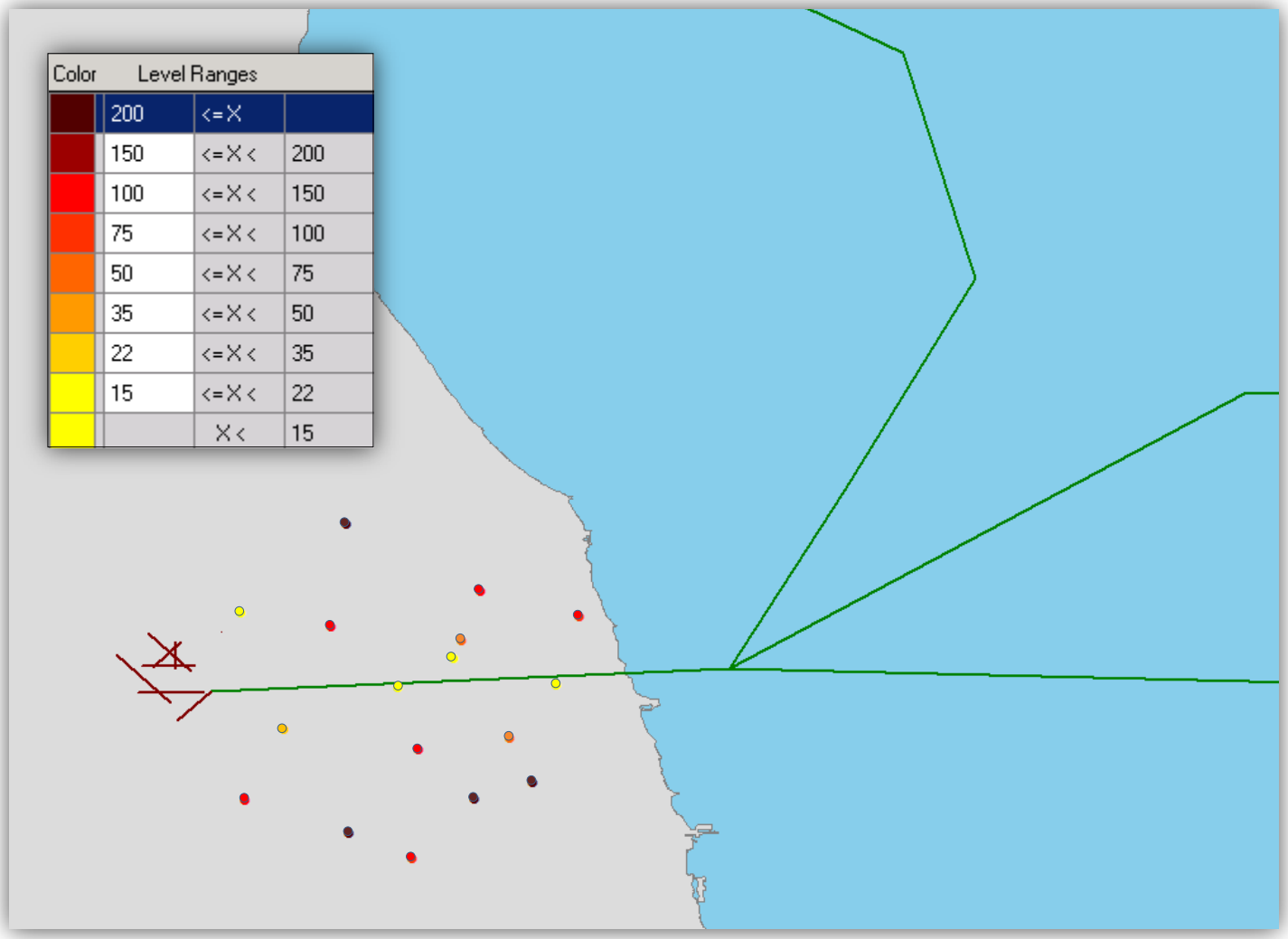
# Noise Exposure – Graph, Receptor



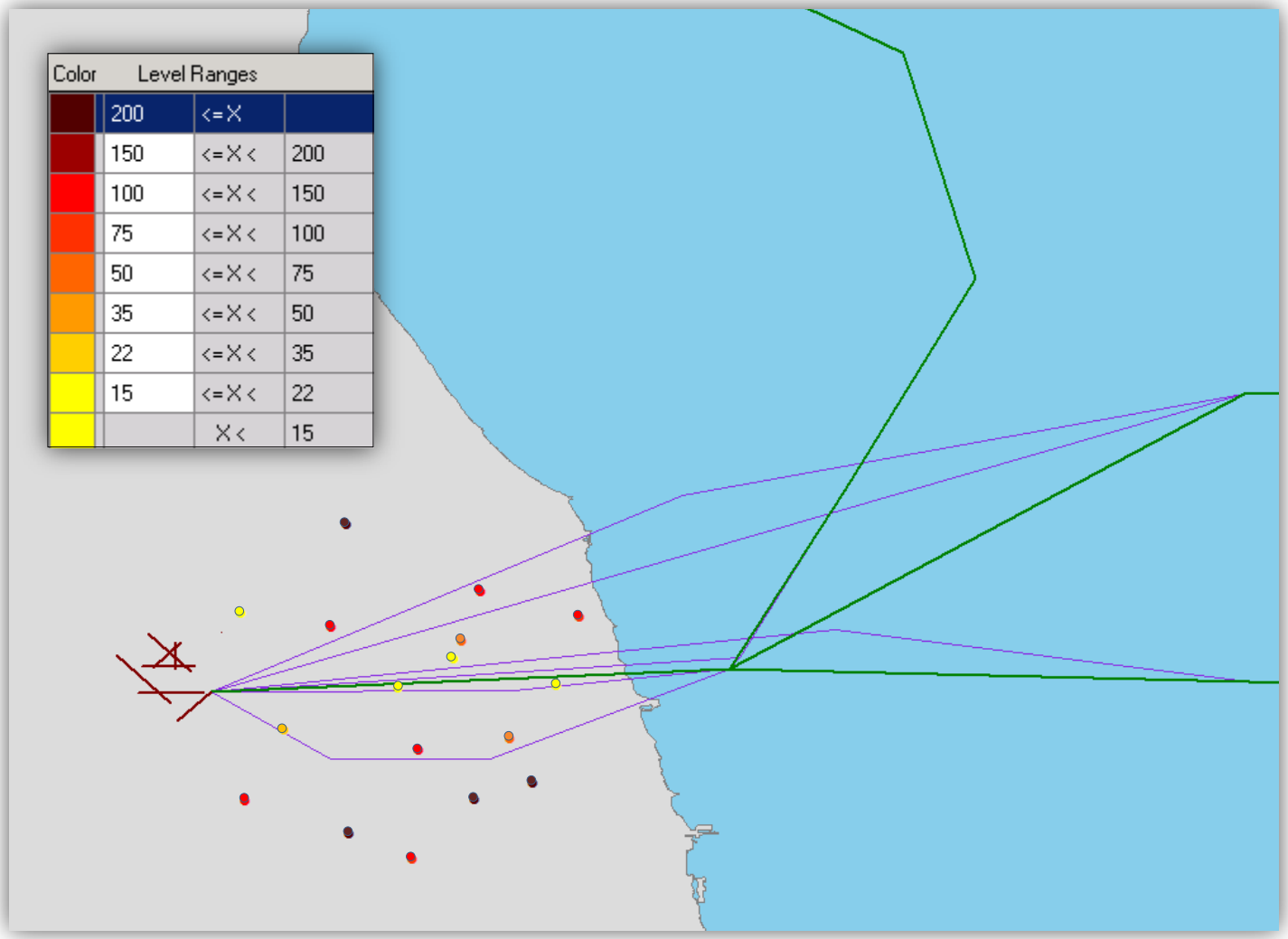
# Noise Exposure – Graph, Population



# Proposed Departure Tracks

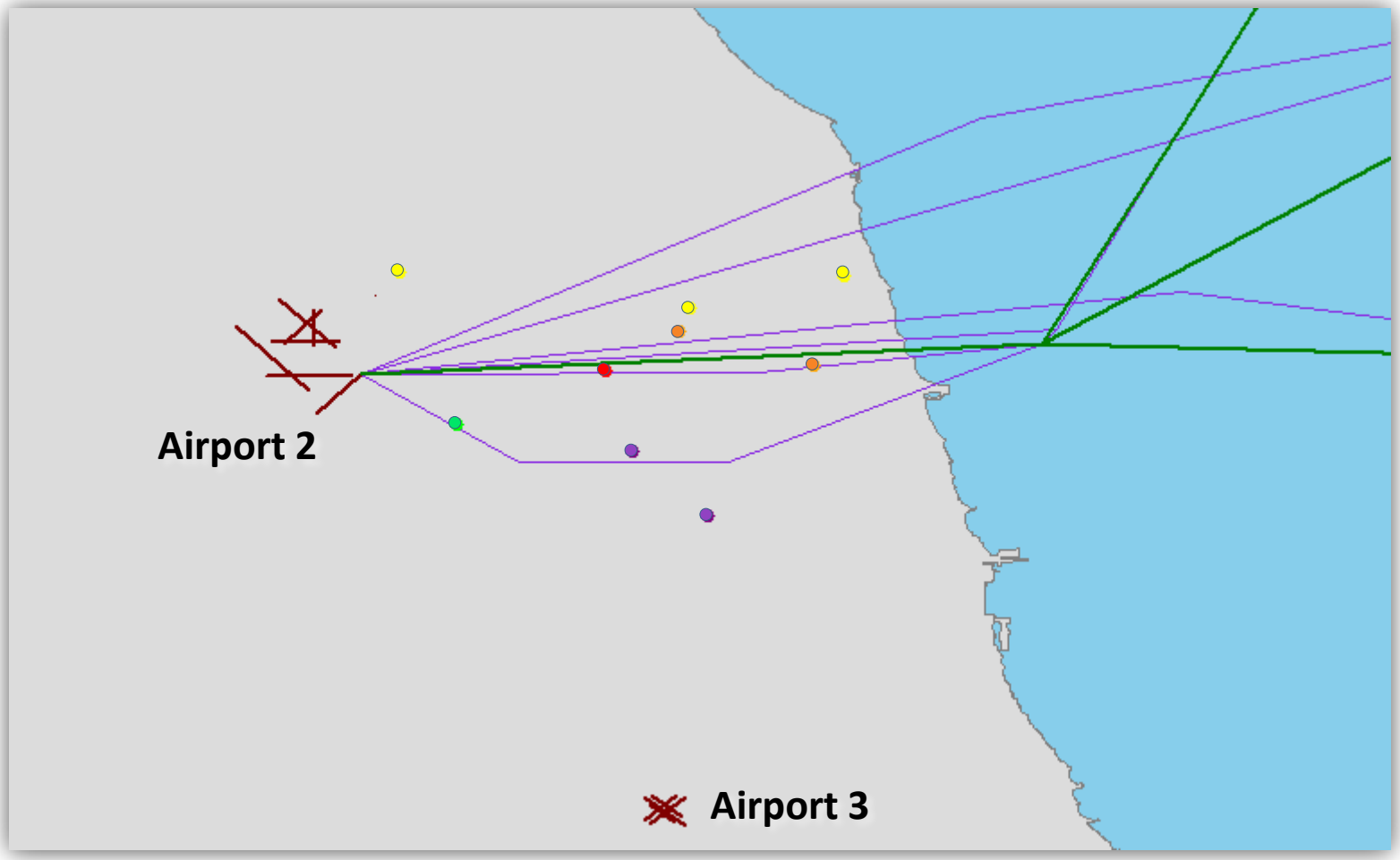


# Original and Proposed Tracks



# *NEW* Noise Exposure Comparison

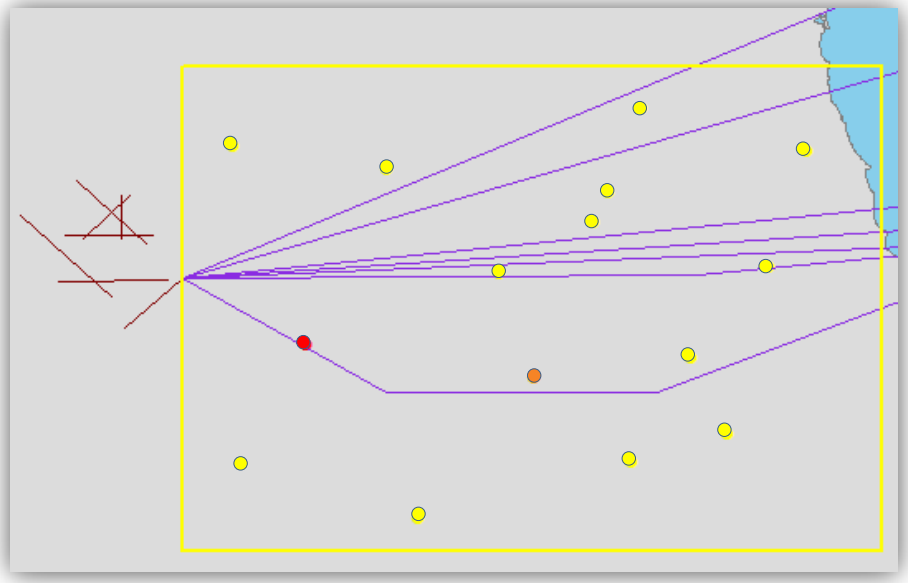
## Baseline vs. (Proposed) Alternative



# Noise Exposure Comparisons

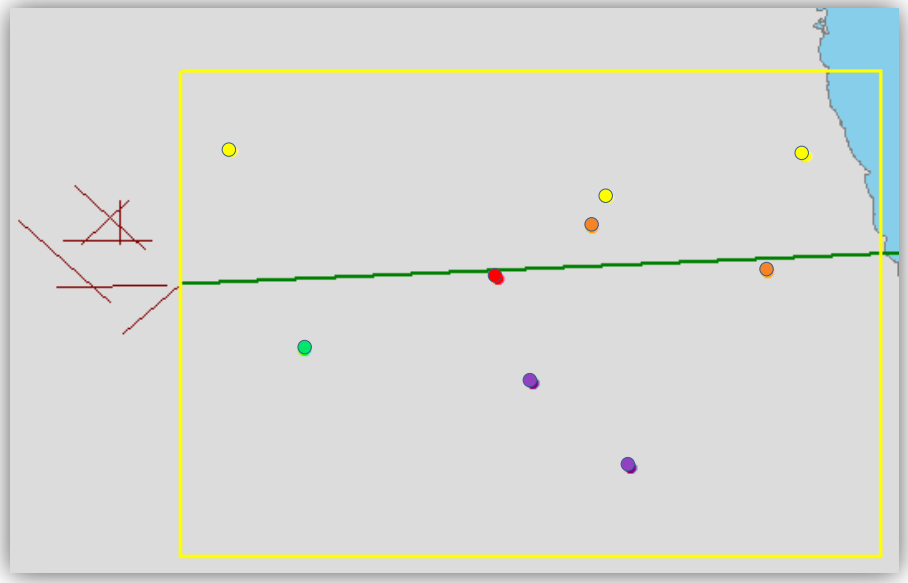
## Original

Baseline vs. Alternative (growth)



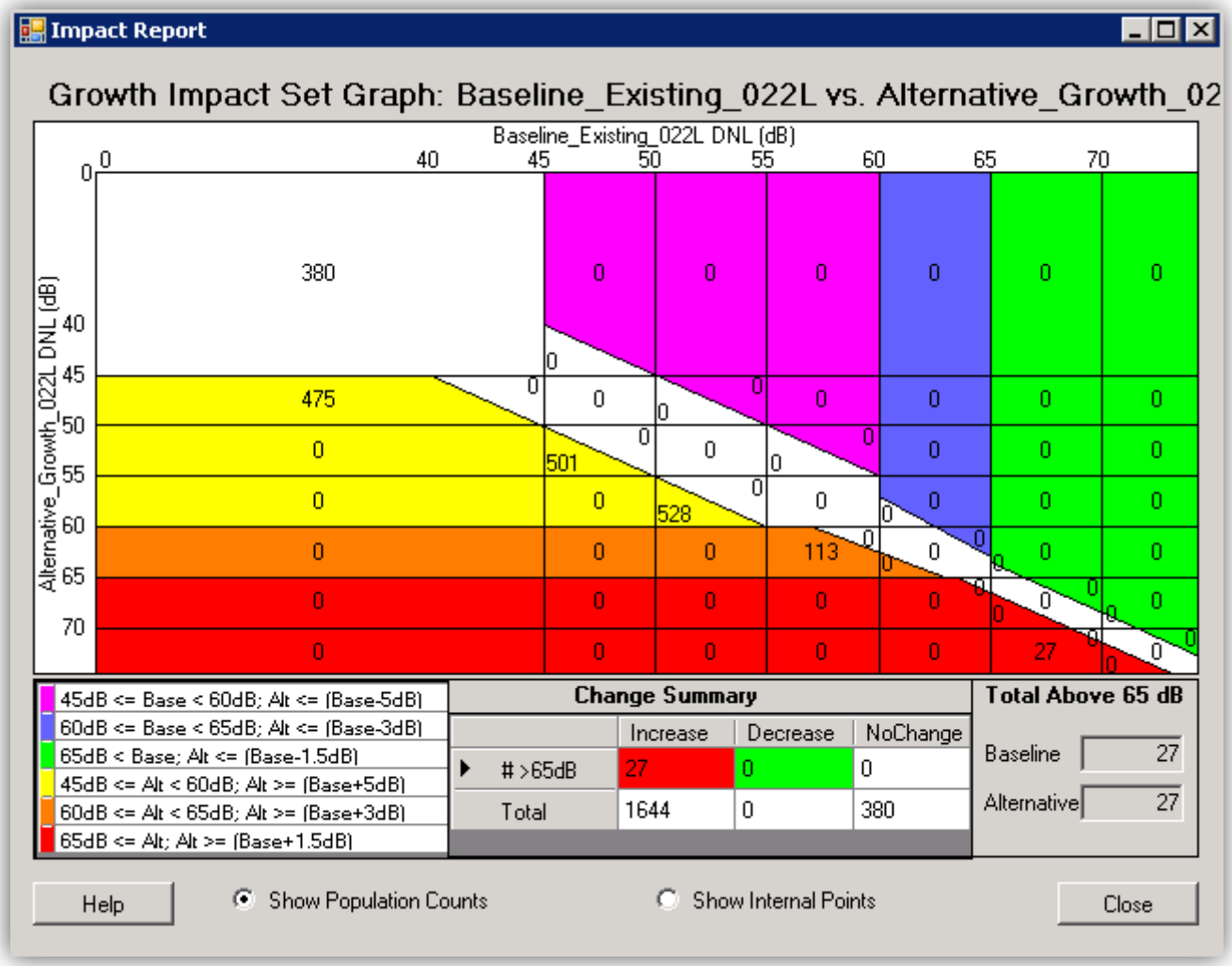
## Proposed

Baseline vs. Alternative (growth with proposed tracks)



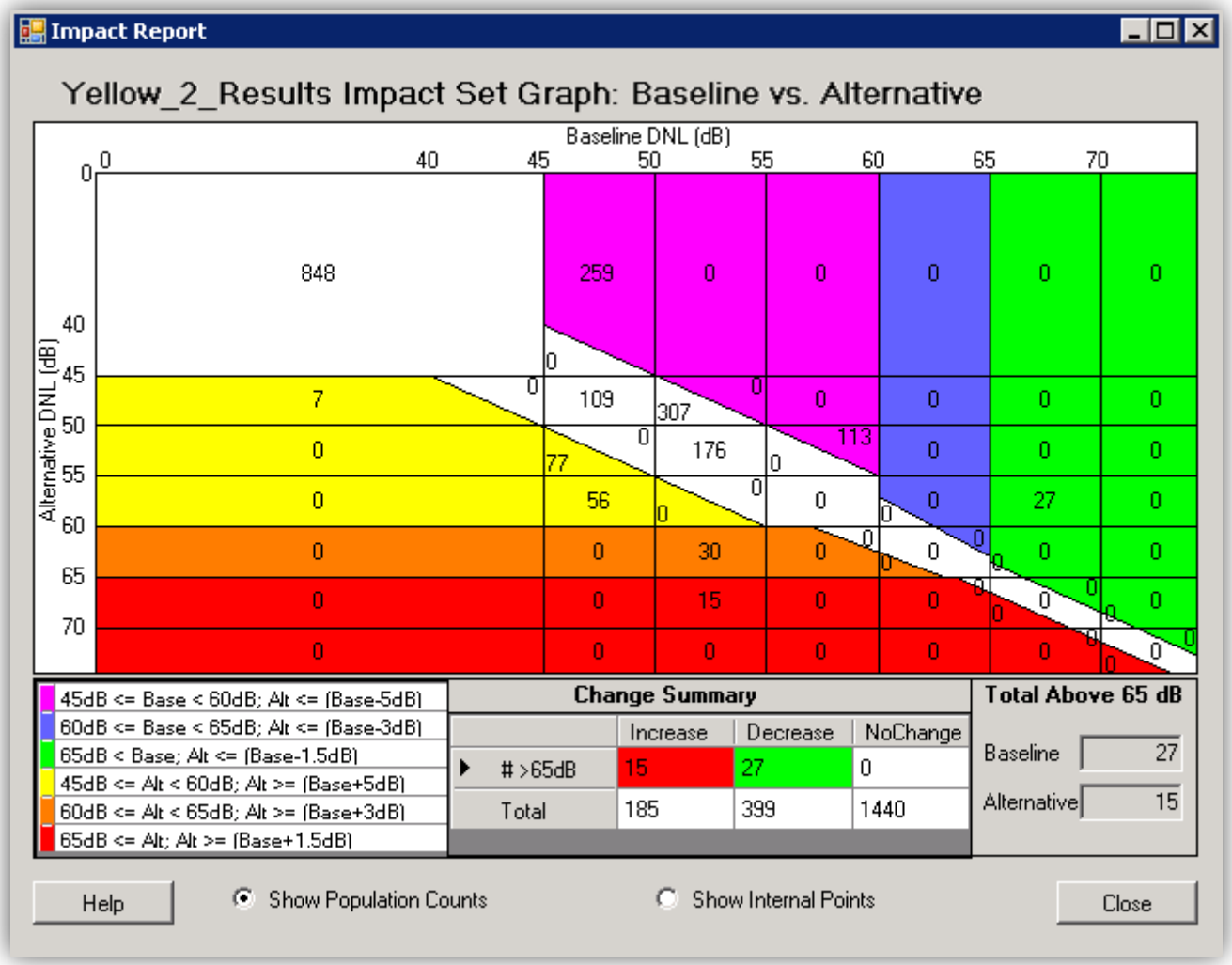
# Impact Set Graph Comparison

## Baseline (current) vs. Alternative (growth)



# Impact Set Graph Comparison

## Baseline (current) vs. Alternative (growth with proposed tracks)



# Conclusions

# Analysis Summary

- Growth with current track configuration
  - 1,644 people: significant noise exposure
  - 0 people: noise reduction
- Growth with proposed track configuration
  - 185 people: significant noise exposure
  - 1,440 people: noise reduction
  - 0.3% reduction in fuel burn
  - 0.23% reduction in NOx
  - 0.53% reduction in CO

# Modeling with AEDT2a

- Environmental interdependencies and consequences
  - Noise
  - Fuel burn
  - Local air quality
  - Greenhouse gas emissions
- More complete information for policymakers

# Acknowledgements

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# Questions?

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# Contact Information

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# Backup Slides

# Impact Evaluation