A Management Planning Tool to Enhance Biodiversity Conservation and Ecosystem Resilience in the Sierra Nevada

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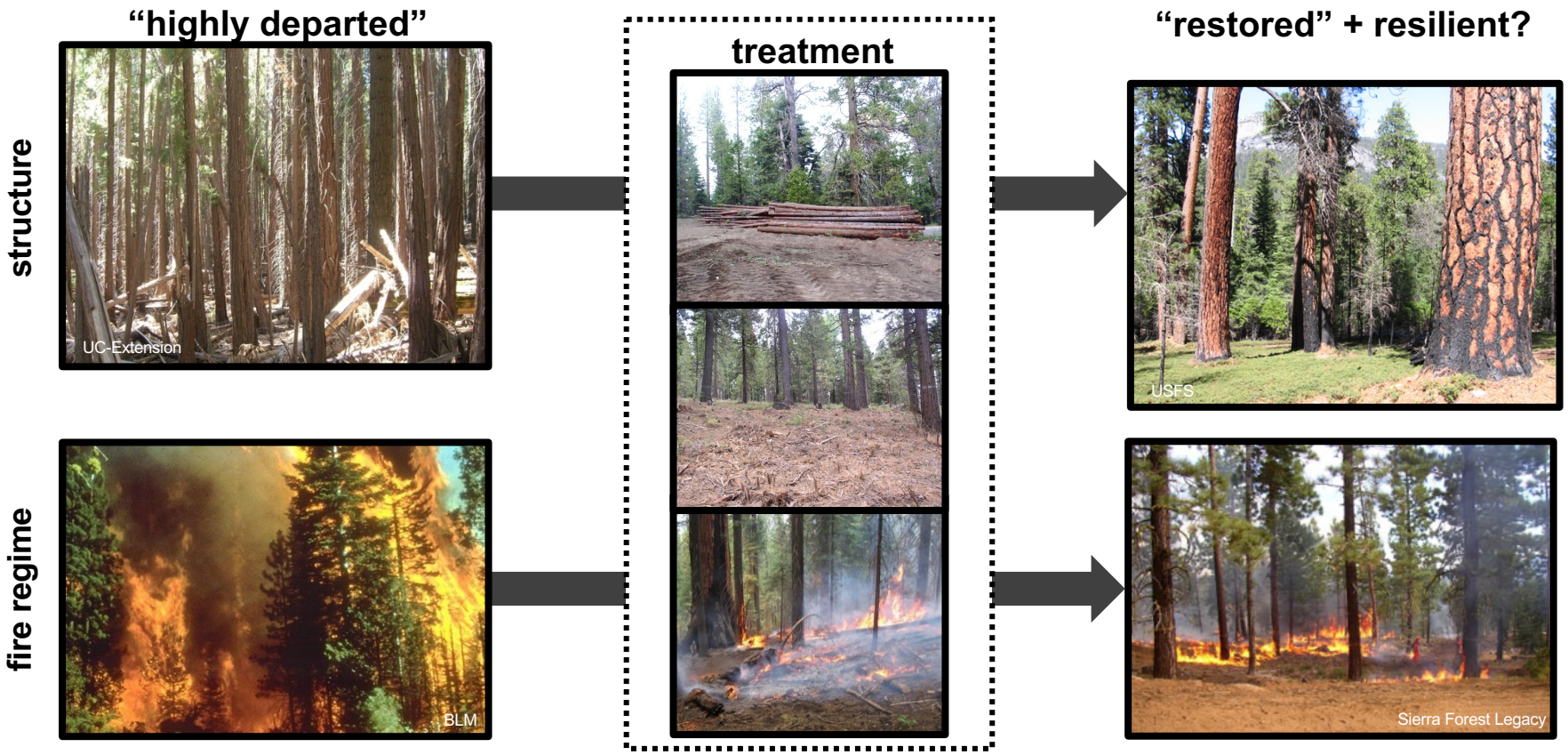
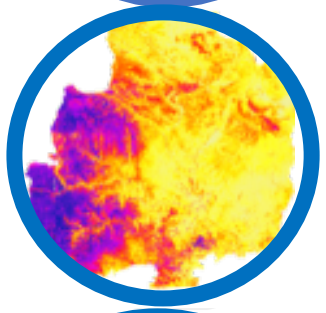
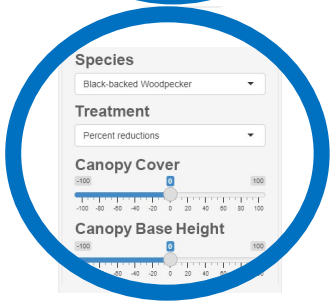
Promoting Ecosystem Resilience in the Sierra Nevada



But, impacts to biodiversity?

Developing a Biodiversity & Ecosystem Resilience Decision Support Tool for the Sierra Nevada



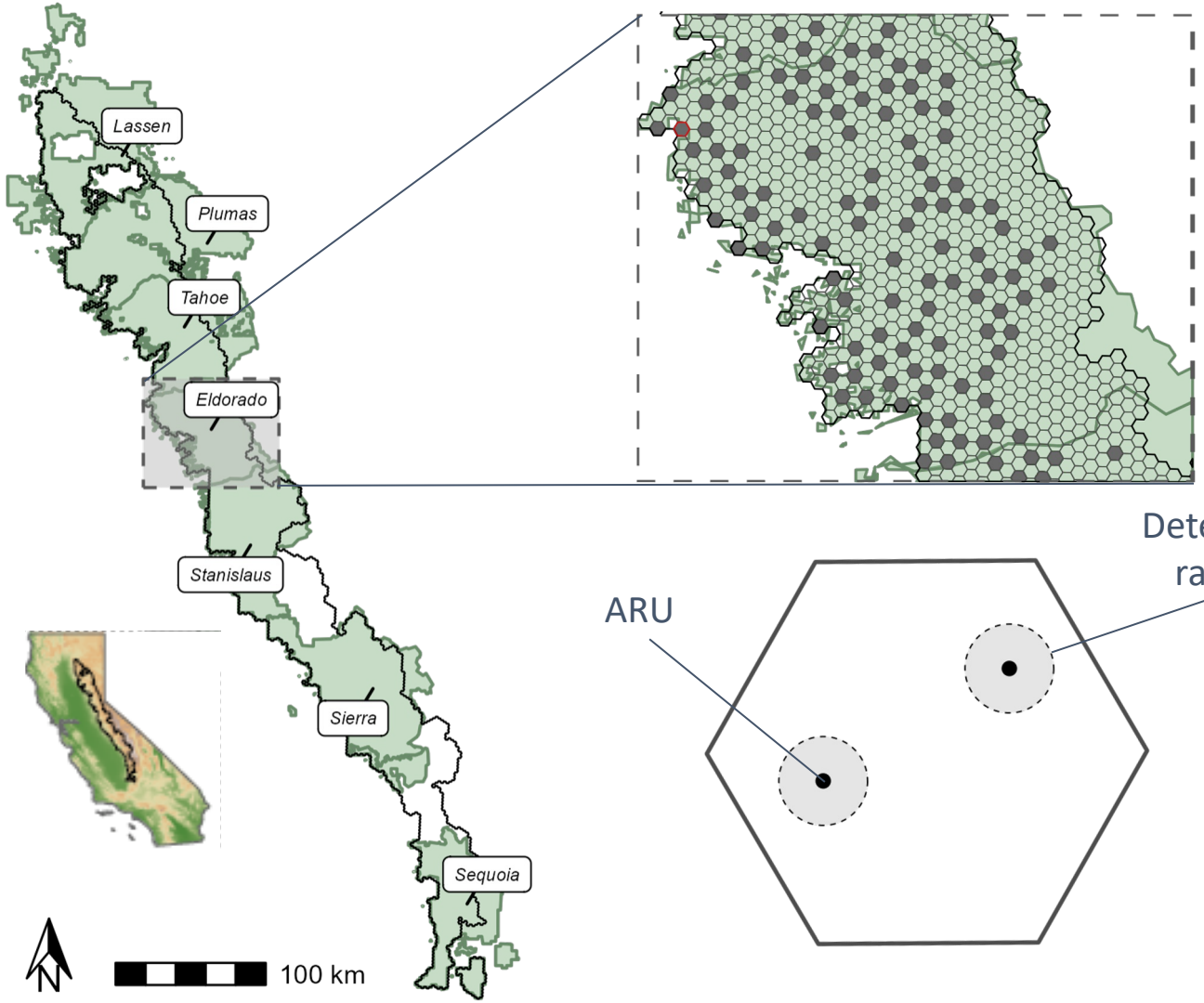


1. Passive Acoustics Surveys
2. Habitat Suitability Models
3. Web-based Software

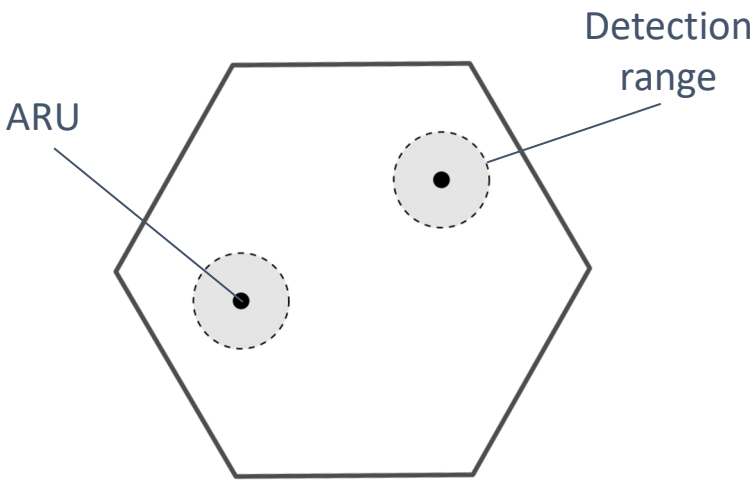
End-user (USFS) Input

Facilitate “Biological Effects Analyses” required by NEPA

1. Passive Acoustic Surveys



- Annually sample 850 hexagonal, 400ha cells
- 2 ARUs/cell (1700 total/year)
- 5-week deployments
- 1 million hours (100 years) audio data/year



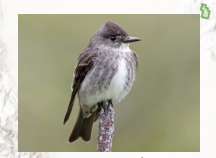
1. Passive Acoustic Surveys

- Scan with ML algorithm (BirdNET)
- 101 bird species ID’d with high precision

Acorn WP

Oak/
Hardwood

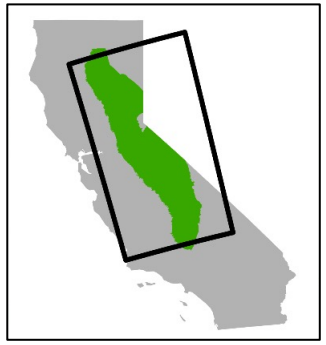
Olive-sided Flycatcher



Late Seral, Open-canopy Conifer

Hermit Warbler

Late Seral, Closed-canopy Conifer



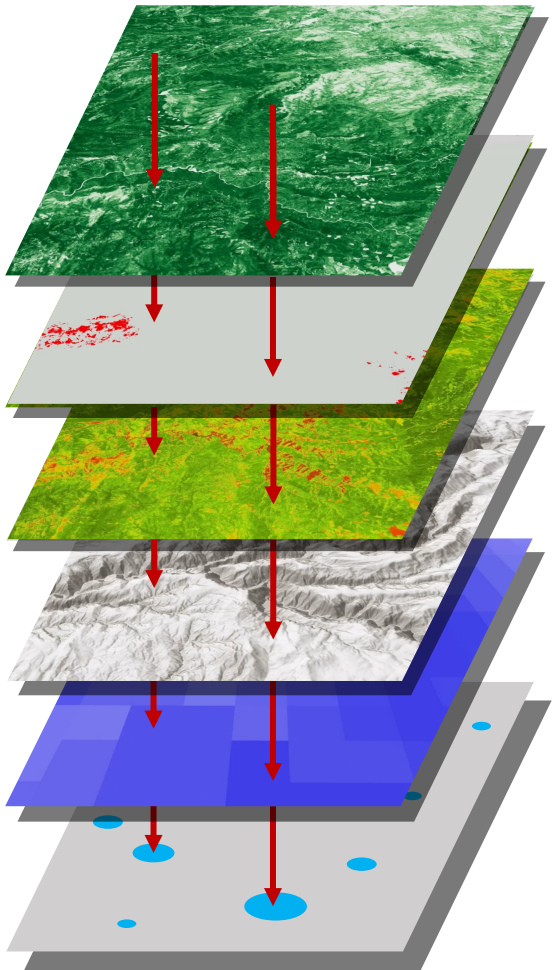
N

0 25 50 100
Kilometers

- Occupied
- Unoccupied
- National Forest
- National Park

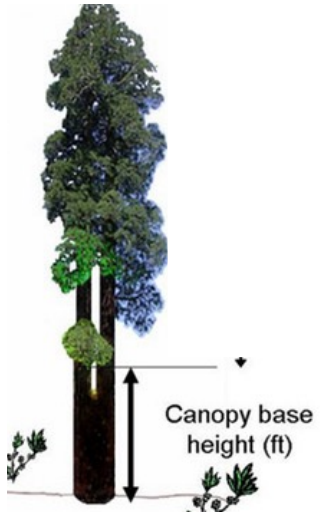
2. Habitat Suitability Models

- Fit occupancy models to acoustic detections and habitat metrics



Forest structure

Canopy Cover
Canopy Base Height
Basal Area



Fire history

Forest composition

Topography

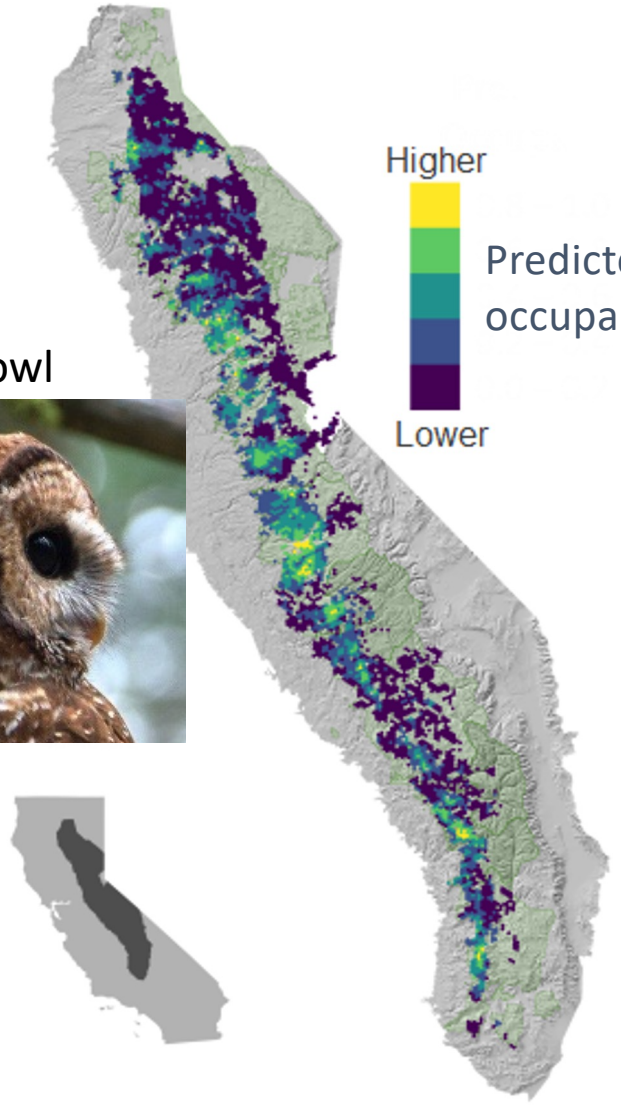
Climate

Acoustic detections

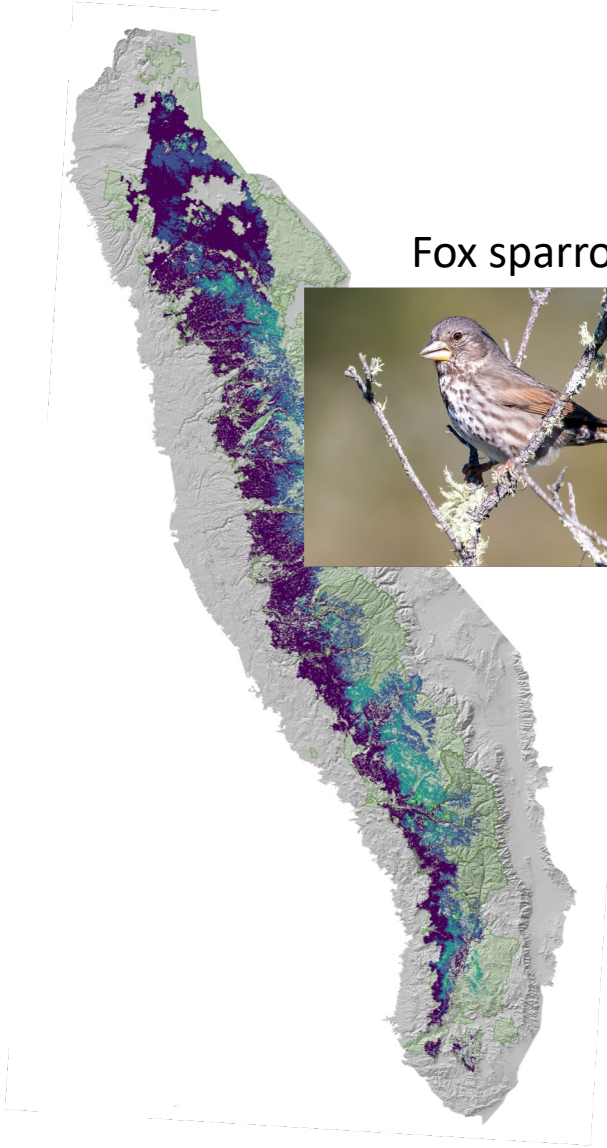
5yr Lower Severity Fire

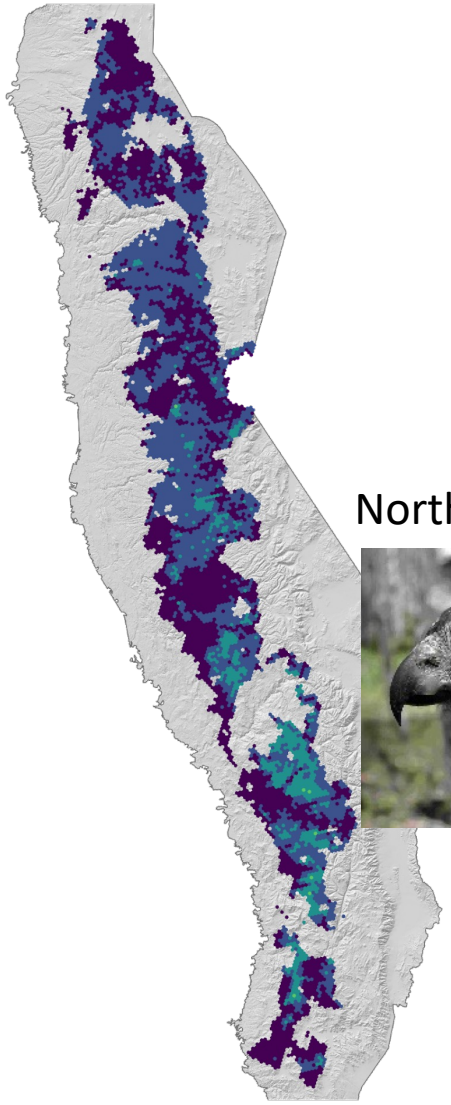
2. Habitat Suitability Models

Spotted owl

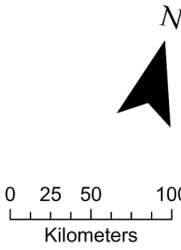


Fox sparrow



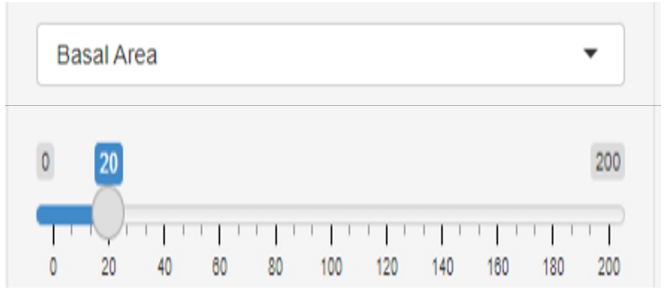


Northern goshawk



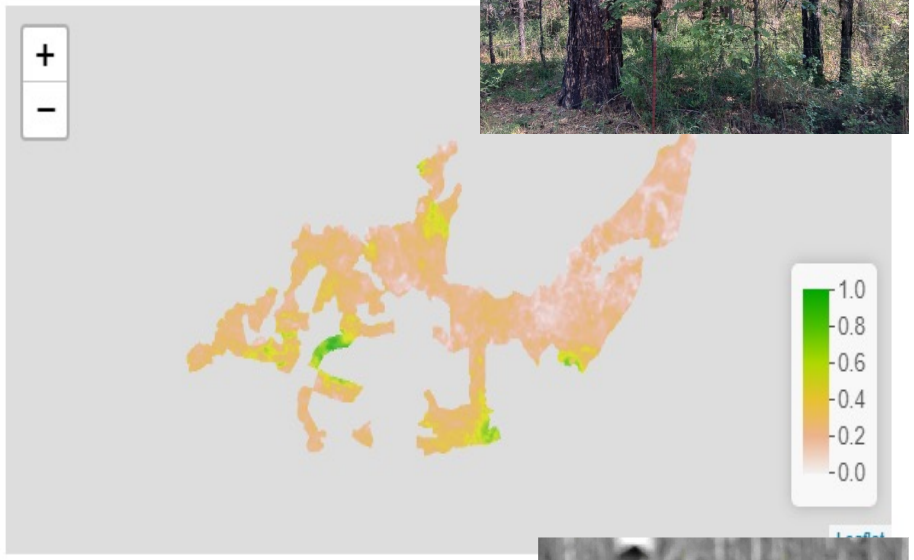
3. Web-based Biodiversity Conservation/Resilience Tool

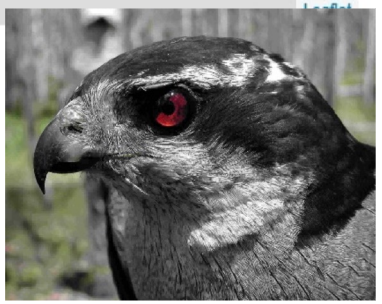
- Manipulate fuels metrics with sliders



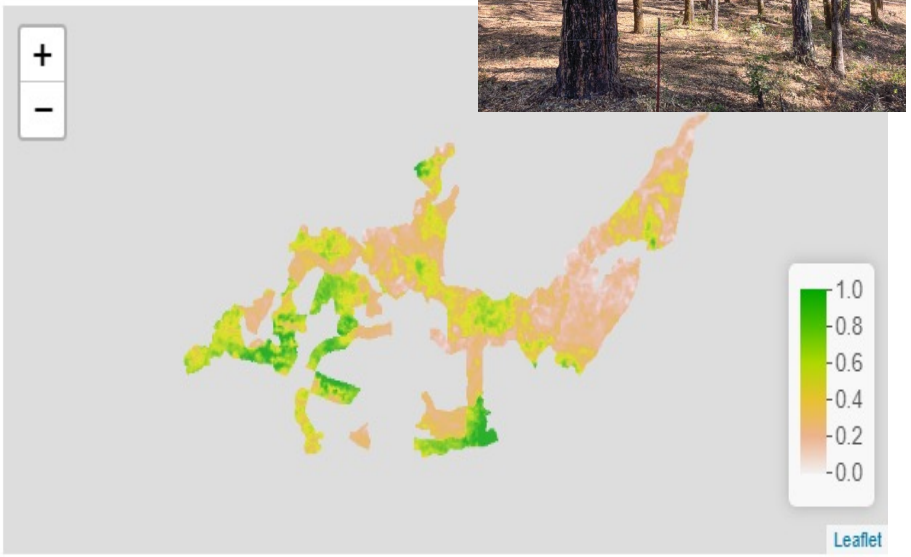
- Compare expected suitability pre- vs post-treatment
- Test alternative treatments

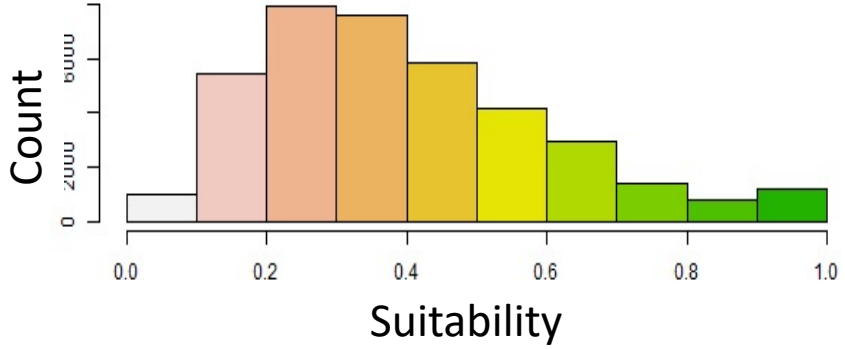
Pre-treatment





Post-treatment

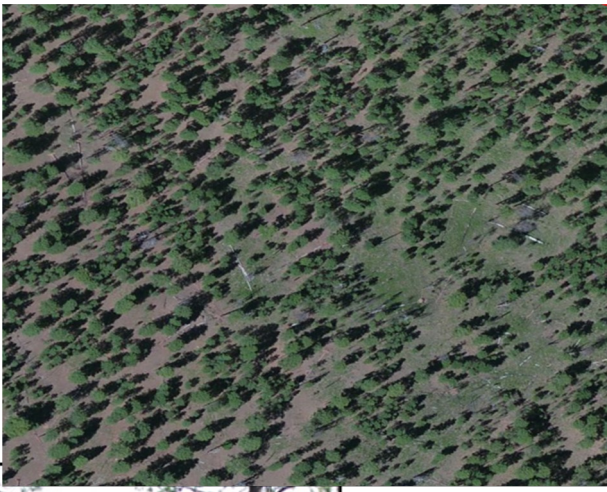


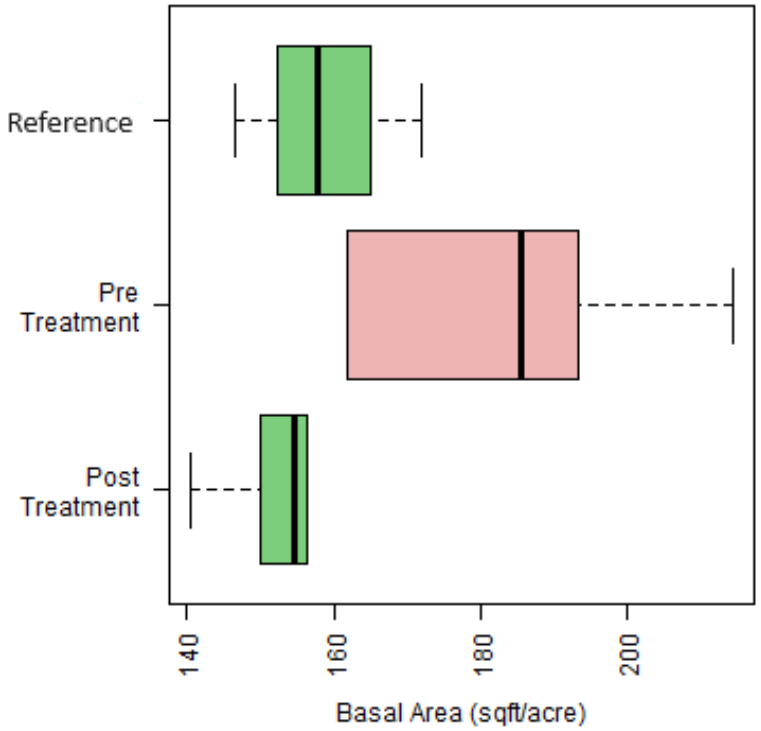


3. Web-based Biodiversity Conservation/Resilience Tool

Achieving Ecosystem Resilience?

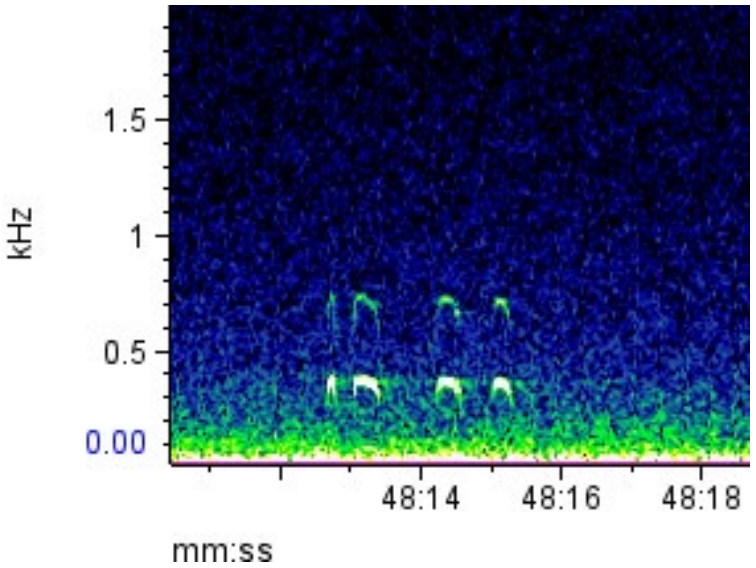
- Compare forest structure against Sierra Nevada “reference areas”
- Reference areas: ≥2 lower-severity fires and no logging in last 60 years

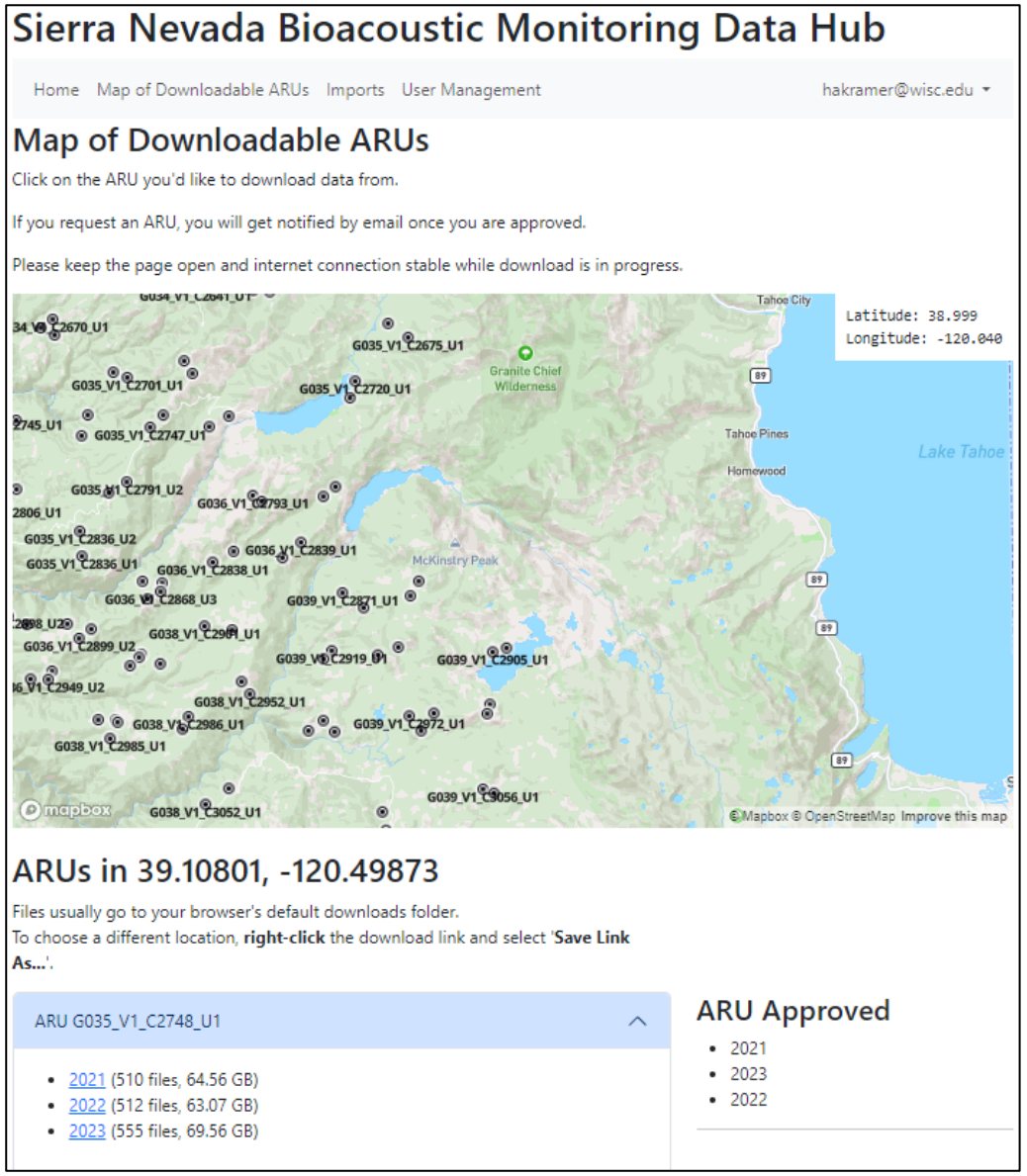




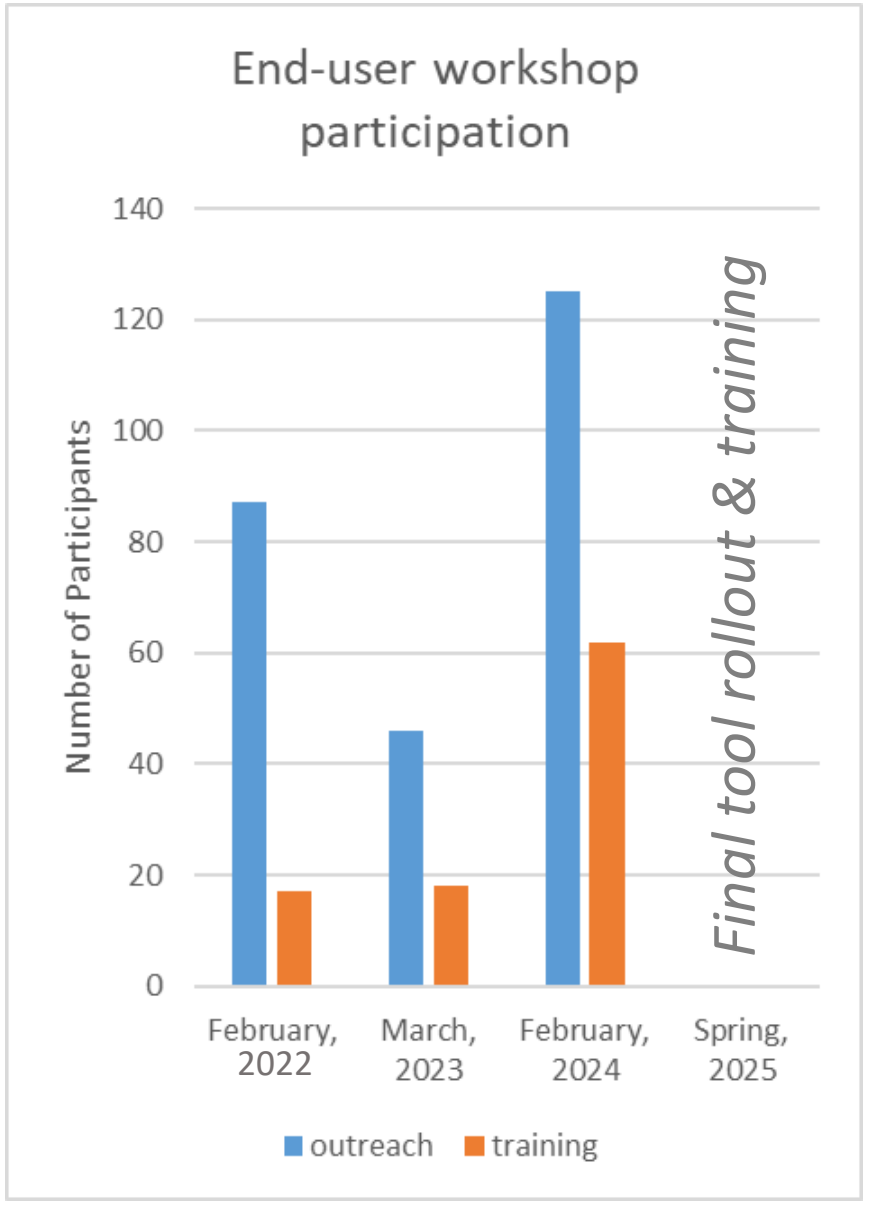
3. Web-based Biodiversity Conservation/Resilience Tool

- UW Acoustic Data Hub: **Making the audio data accessible!**
- Rolled out March, 2024
- 18 users
- 2000 files, 15 TB data downloaded…so far

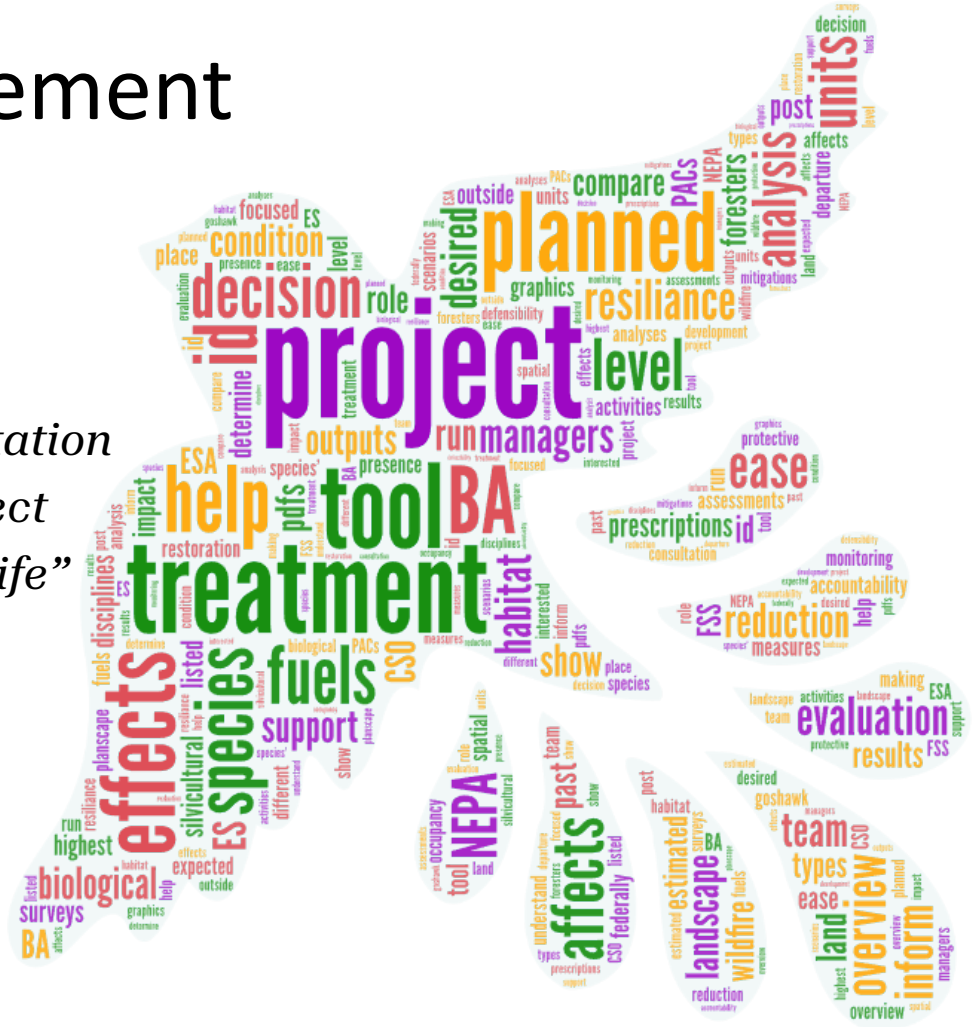




Project Status and End-user Engagement



"It would help forests determine the best vegetation treatments to meet project needs and support wildlife"



What decision(s) will the tool support?

"This tool would give us a much more ecologically relevant, quantifiable justification for planning or not planning treatments in certain areas"

Thanks!

Funding: NASA Ecological Forecasting, US Forest Service Region 5, National Park Service, California Department of Fish and Wildlife, California Department of Forestry and Fire Prevention

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