Reducing Environmental Barriers to Wind Energy Development – PIER Research Overview

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Issue

- Bird and bat mortality due to collisions with wind turbines
- CEQA, Federal and State Wildlife Laws
- Uncertainties – can cause permitting delays
  - Predicting impacts on proposed sites
  - Determining mortality on existing sites
  - Mitigating impacts

Energy Commission Publications

- *Avian Guidelines*– October 2007
  - http://www.energy.ca.gov/windguidelines/documents/index.html
- *Roadmap for PIER Research* – October 2008
  - http://www.energy.ca.gov/windguidelines/documents/index.html
- *Final Reports / Project Fact Sheets*
  - http://www.energy.ca.gov/publications/

Roadmaps – Strategic Research Path

- Define issues
- Detailed analysis of what is known and information gaps
- Prioritize research needed to fill information gaps
- Used to Guide Competitive Solicitations
- Stakeholder Driven and Vetted Process

Wind Roadmap Topics

- **Bird Survey Techniques**
  - **Assess Variations in Survey Techniques**
  - **Develop Fatality Estimates for WRAs and Identify Correlates of Risk**
- Species-Specific Vulnerability
- Habitat, Species, and Land-Use Mapping
- Effects of Turbine Design and Site Characteristics
- **Nocturnal Survey Techniques**
- **Post-Construction Fatality Monitoring**
  - **Search Area and Frequency and Scavenging Trials**
  - **Fatality Adjustment Equations**
- Bat Auditory Deterrents and Operations Modification
- Buffer Zones for Birds and Bats
- Effectiveness of Compensatory Mitigation

California Energy Commission

Improving the Accuracy and Cost-effectiveness of Pre-Construction and Operations Monitoring Efforts for Bats and Birds at Wind Energy Facilities in California

US Forest Service
PI: Ted Weller

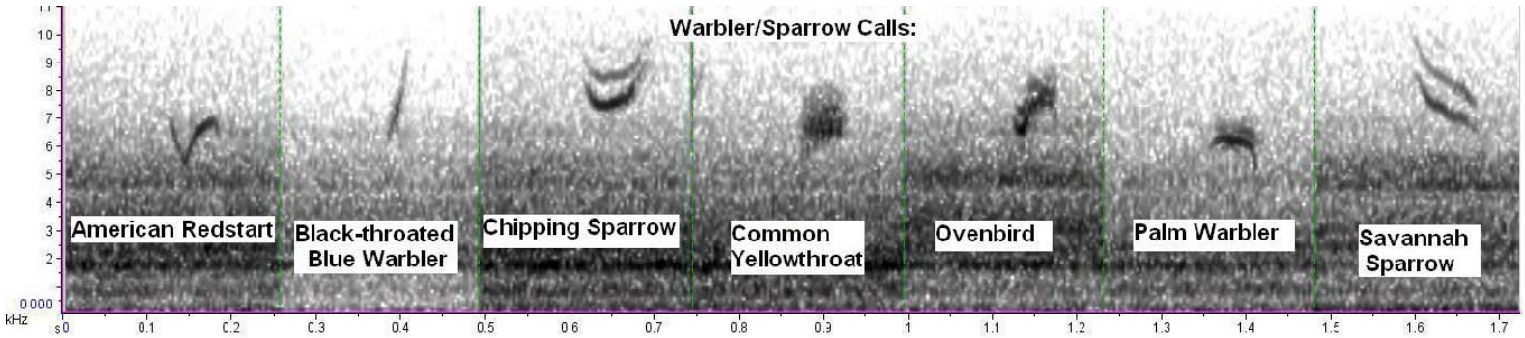
Anabat detectors, solar panels, and audio cables.

Previous PIER-funded project

- Determined predictors of bat activity
  - Higher temperature
  - Lower wind speed
  - Also barometric pressure and time of year
- Save time and money by directing surveys at most critical times
- Curtailment for greatest mortality reduction and minimized loss of generation

Current Research

- **BAT detectors**
  - New type of bat detector that may improve data and reduce survey time and cost
- **Goals**
  - *Improve* accuracy and cost-effectiveness of methods used to monitor bat and bird activity (especially nocturnal activity) and fatalities at wind energy facilities
  - Determine if bat and bird activity levels predict fatality levels



Source: Ted Weller

Radar, Acoustic and Observational Study to Assess Bat and Bird Movements and Mortality

H.T. Harvey and Associates

- Project Goals
  - Assessment of survey techniques for correlation to risk of mortality
    - ABR marine radar
      - Simultaneous observations using infrared goggles
    - Acoustic monitoring using Avisoft Bioacoustics system
    - Night vision system

Improving Methods to Assess and Mitigate Impacts of Wind Energy Development on Birds and Bats in California

CalWEA

- Project goal: Improve the accuracy of methods for estimating the number of bird and bat fatalities at wind energy facilities

Project goals

- Compare mortality estimation methods
  - Several existing equations to estimate mortality
    - Searcher bias / scavenging / time / frequency
- Test and evaluate scavenging curves
- Evaluate survey error with respect to various environmental factors
  - Density of carcasses
  - Environmental conditions such as ground cover
- Develop guidance for future surveys

Comparing Utilization Data for Siting New Wind Power Generation

Shawn Smallwood

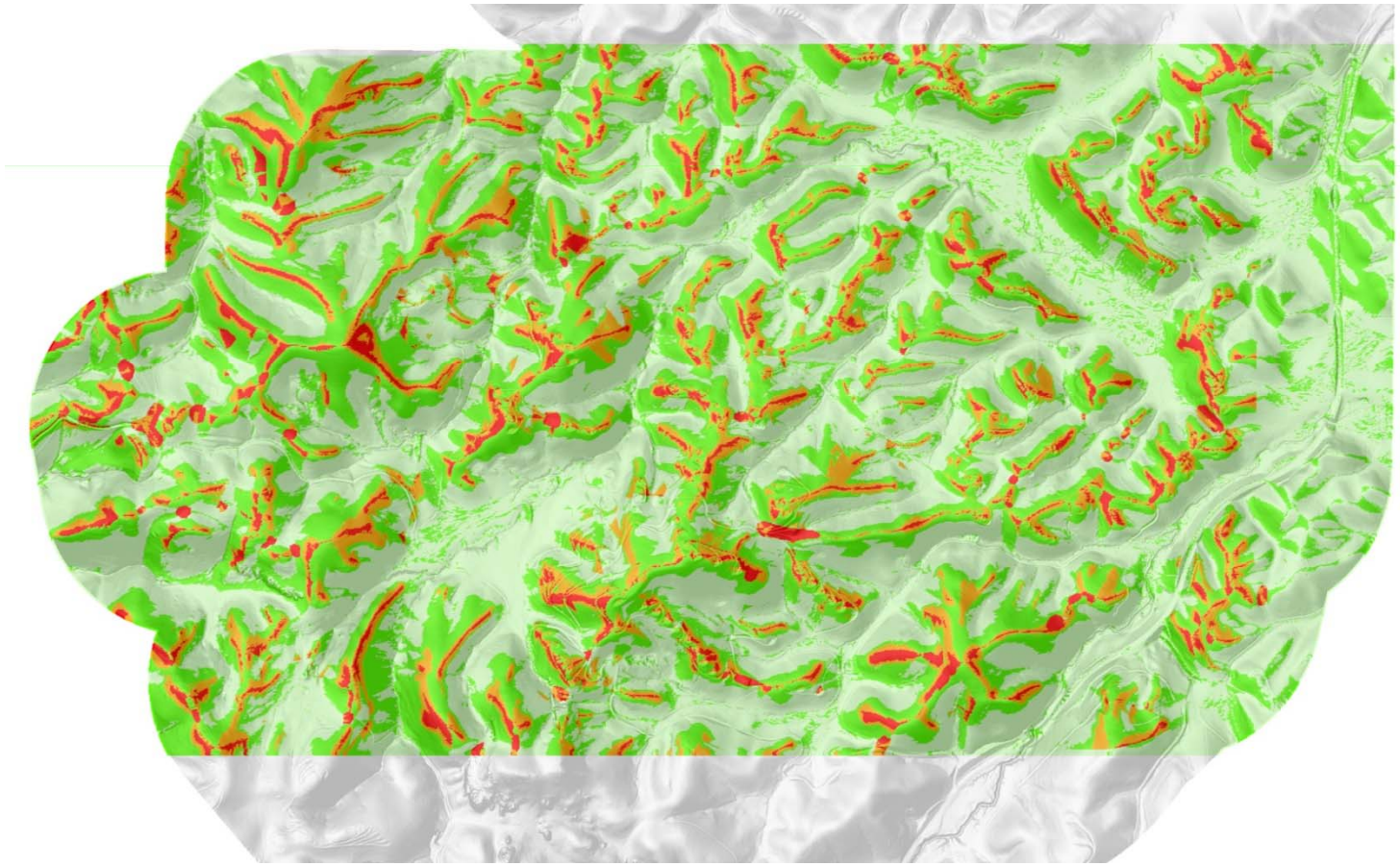
Correct for biases in avian activity observations:

- Rapidly declining detection rate of raptors with increasing distance from the observer
- Variable portion of the surveyed air space that is hidden from the observer due to complex terrain
- Shifts in detection rates with change in the observation session duration

Benefits

- Allow adjusting for large biases in avian utilization data
  - comparability of datasets
- Develop maps of least-hazard wind turbine locations which can be used to facilitate repowering of the Altamont Pass wind resource area.

Golden eagle hazard zones (red / orange areas)



Source: Shawn Smallwood

Assessing the Long-term Survival and Reproductive Output of Desert Tortoises at a Wind Energy Facility Near Palm Springs, California

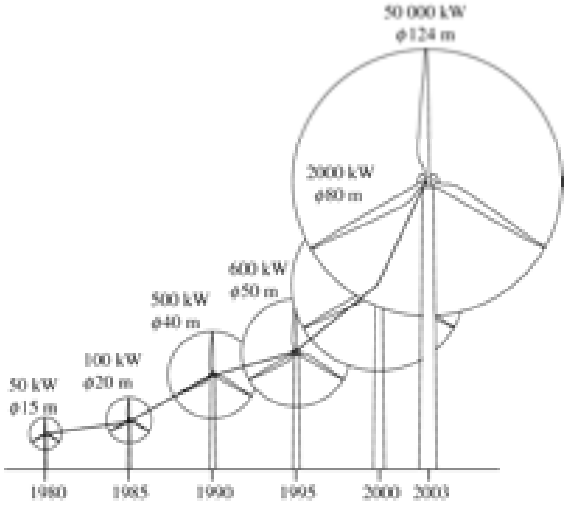
USGS – Jeff Lovich

- Goal: Investigate desert tortoise survivorship and population levels at a wind energy facility; develop recommendation report.

Source: Jeff Lovich

Future Trends

- More large turbines
- Offshore wind
- Large solar installations



Questions

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