Evaluating Deterrent Stimuli for Increasing Species-specific Effectiveness of an Advanced Ultrasonic Deterrent

NWCC Webinar
17 March 2020
Project Team

NRG Systems

Texas State University

Bowman Consulting

TCU

Bat Conservation International

NEXTe®

Wildlife Imaging Systems
• Understand how bats are responding to ultrasonic acoustic deterrents (UADs) & improve the effectiveness of UADs for as many species as possible
Project Objectives

• Quantify the relationship between bats & sound pressure level (SPL) at different frequencies
  – ‘Low’ frequency (20–32 kHz)
  – ‘High’ frequency (38–50 kHz)
  – ‘All’ frequency (20–50 kHz)

• Observe potential seasonal differences in behaviors (i.e., spring vs. autumn)

• Determine whether bats change their echolocation characteristics in the presence of deterrent signals
Methodology

- ‘Open air’ flight cage
  - 60 m x 9.8 m x 4.3 m

Project team assembling the flight cage at Texas State University (Video by Rob Tyler)
Methodology

• Use thermal video cameras & acoustic detectors to record flight & echolocation behavior between control & treatment conditions
• Randomize treatments
• Randomize deterrent signal location

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<th>Session</th>
<th>Time (minutes)</th>
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<tr>
<td>Control</td>
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<td>Treatment 1</td>
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<td>Treatment 3</td>
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Preliminary Trials

• Initiated autumn 2019
• Conducted trials
  – 30 cave myotis (*Myotis velifer*)
  – 12 Brazilian free-tailed bats (*Tadarida brasiliensis*)
• Fine-tuning tracking software to output quantitative data
• Spring 2020
  – Tricolored, eastern red & evening bats
Anticipated Outcomes

• Response among treatments
  – Do ‘high-frequency’ bats respond to ‘low-frequency’ deterrent signals?

• Shifts in echolocation
  – Do bats shift the frequency of their calls to get ‘outside’ the deterrent signal?

• Importance: May allow UADs to focus on ‘low-frequency’ signals
Anticipated Outcomes

• **Relationship between SPL & distance**
  - Importance: Provides a SPL to target that will deter bats the length of the blade

• **Response between spring & autumn**
  - Importance: Studies conducted in spring may not be applicable OR we can pool data across seasons

• **Big Caveat:** study conducted in a flight cage without the potential attraction of a wind turbine

Graduate students reviewing thermal video (Photo by Sarah Fritts)
Next Steps

• 2020: Spring season suspended. Resume testing in autumn
• 2021: Report results
• 2021+: Continue using the flight cage to investigate additional treatments that further enhance the effectiveness of deterrents

Western red bat (Photo by Cris Hein)
Acknowledgements

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• [Link](https://www.energy.gov/eere/wind/environmental-impacts-and-siting-wind-projects)

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Thank you

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Brazilian free-tailed bats (Photo by Cris Hein)