Eavesdropping on Birds:

Evalutating the Effect of Distance and Directionality on the Detectability of Avian Vocalizations by Autonomous Recording Units

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Introduction

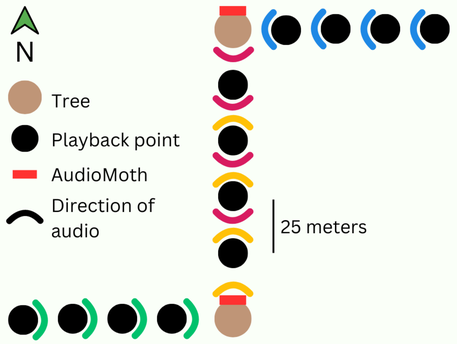
Autonomous recording units (ARUs) allow researchers to record vocalizations without human intervention.

Hypotheses:
1.) **Calls would be more detectable from greater distances on a 0° bearing** relative to the ARU, **compared to 90°, 180°, 270° bearings** due to the presence of the tree on which the ARU is mounted.
2.) **Calls played with the speaker facing away from the ARU would be less detectable at greater distances** than calls played toward the ARU.

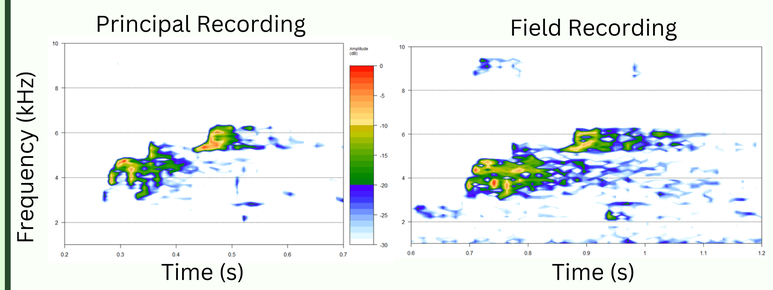
Methods

This experiment was conducted using AudioMoth ARUs. Audio of an Acadian Flycatcher call was played on **4 bearings (0°, 90°, 180°, and 270°)** and at **4 distances (25m, 50m, 75m, and 100m)**.

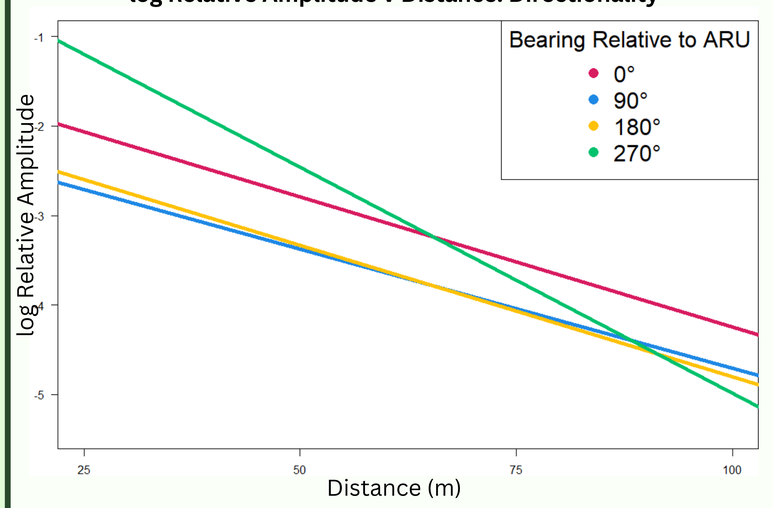
The calls were then clipped and compared to the principal call that was played in the field. **Detectability was quantified using relative amplitude.**



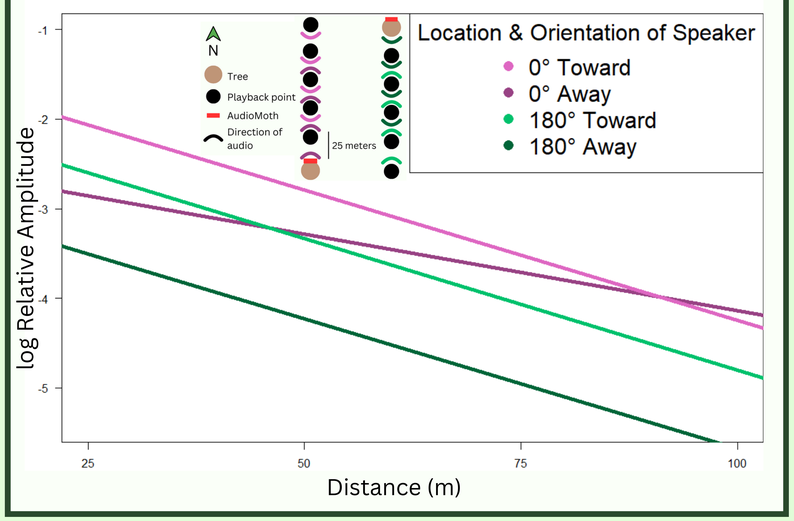
Results



log Relative Amplitude v Distance: Directionality



log Relative Amplitude v Distance: Toward and Away



Conclusion & Future Implications

1.) Directionality has an impact on detectability.
- **The calls on a 0° bearing had the highest relative amplitude at 75 and 100 meters.**
- **Calls on the 90° and 180° bearings had a lower relative amplitude than calls played on the 0° bearing.**
- The calls played on a 270° bearing had the highest relative amplitude at 25 and 50 meters, but had the fastest rate of decay. We hypothesize that this may be due to foliage present at the 270° bearing location or wind.

2.) Whether the call is played facing away from or towards the ARU has an impact on detectability.
- Calls played facing away from the ARU had a lower relative amplitude compared to calls played with the speaker facing toward the ARU.

These findings should be used to inform researchers on the effects of directionality and distance on the detectability of avian vocalizations by ARUs, which should be considered to optimize avian vocalization detection.

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