Do Song Sparrows Alter Song in Noisy Natural Habitats?

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Introduction

Birds depend on vocal communication to successfully attract a mate, hold a territory, or call out an alarm. The effects of anthropogenic sound on birds has been widely studied, but the effects on song in the presence of natural sound, is not well understood.

The Song Sparrow (*Melospiza melodia*) has a documented song note and hearing range of 3 -8 kHz (Okanoya and Dooling 1988). This makes it a model species to research when looking at vocal plasticity.

Objective

The objective of this study was to compare the minimum frequency level of low notes sung by Song Sparrows in environments with different levels of ambient natural sound to look for evidence of altered song.

We hypothesized that Song Sparrows in noisy ocean bluff environments would sing higher minimum frequency notes than Song Sparrows occupying quiet environments.

Methods

- Data collected over 8 weeks at two study sites
- Recorded each Song Sparrow detected singing for a minimum of three songs
- Recorded the ambient noise level in dB for two minutes at each detected location
- Spectrograms of song recordings analyzed in Raven Lite 2.0 (Fig. 1)

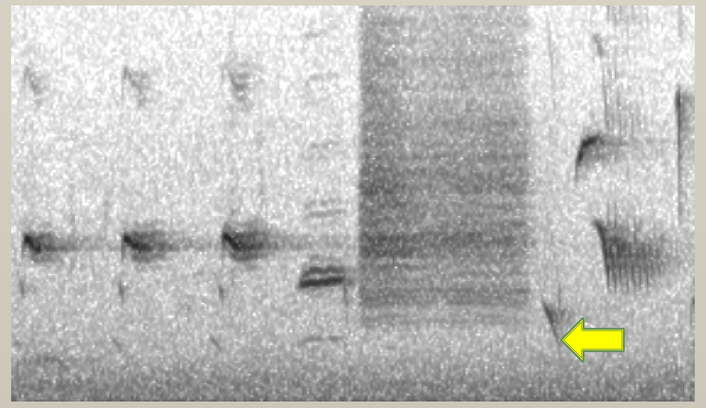

Figure 1. Spectrogram from a recorded Song Sparrow in Blue Lake, Ca. The arrow indicates the lowest frequency note.

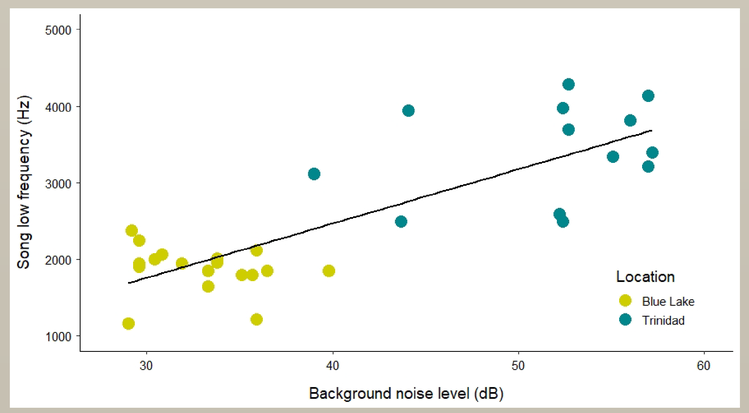

Figure 2. Evidence of plasticity in Song Sparrow song (n=31, $p < 0.001$)

Results

- Spearman Rank Correlation test for significance (CI 95%)
- Significant difference in low note frequencies detected between locations (n=31, $p < 0.001$)
- As ambient noise levels increased in dB, Song Sparrow minimum frequency notes increased (Fig. 2)

Discussion

- These findings suggest that Song Sparrows actively adjust their song in the presence of loud ambient natural noise
- Song Sparrows and other passerine species may be more resilient to anthropogenic noise than previously thought
- Provides evidence that vocal plasticity likely arose as an adaptation to the competing natural sounds of the ocean, rivers, and wind
- Other anthropogenic environmental factors likely contribute to habitat selection/avoidance

Literature Cited

Okanoya, K., and R. J. Dooling. 1988. Hearing in the Swamp Sparrow, *Melospiza georgiana*, and the Song Sparrow, *Melospiza melodia*. Animal Behavior 36:726–732.