Environmental Impact on Ovenbird Song Frequency

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INTRODUCTION

The ovenbird (*Seiurus aurocapilla*) is small songbird in the warbler family that is found in Connecticut in mature, closed-canopy deciduous forests.

The connection between the frequency of ovenbird calls and environmental stimuli provides valuable information about the suitability of the ovenbirds' habitat. Changes in bird activity can highlight the effects of habitat fragmentation and other environmental disturbances on the natural world.[1]

How do environmental factors affect the frequency of ovenbird songs?

In order to analyze changes in bird activity, it is first necessary to establish a baseline of how the birds interact with environmental stimuli (e.g. number of ovenbirds, forest fragment size, wind intensity, caterpillar count).

The objectives of this study were to:

- study the connection between the frequency of ovenbird song and the environment; and
- develop a story map to educate the public on the importance of bird song and their applications to conservation.

Hypotheses:

- H1. The higher number of ovenbirds in an area, the higher the frequency of their songs
- H2. The larger the forest fragment size, the higher the frequency of ovenbird songs
- H3. The higher wind intensity, the lower the frequency of ovenbird songs
- H4. The higher the caterpillar count, the higher the frequency of ovenbird songs

METHODS

Data Analysis

- Examined song recordings from autonomous recording units taken during three consecutive breeding seasons (2017-2019) in 28 Connecticut forest fragments.
- Listened to a subset of recordings and recorded every ovenbird song on a spreadsheet.
- Used the R programming language to compare the frequency of ovenbird songs with environmental factors using linear models and an ANOVA.

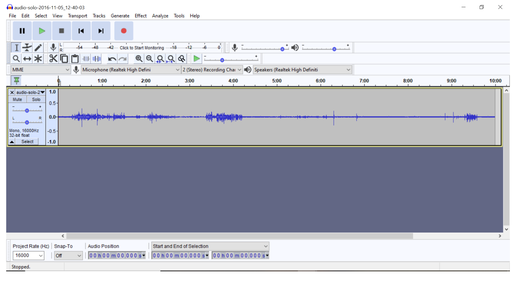


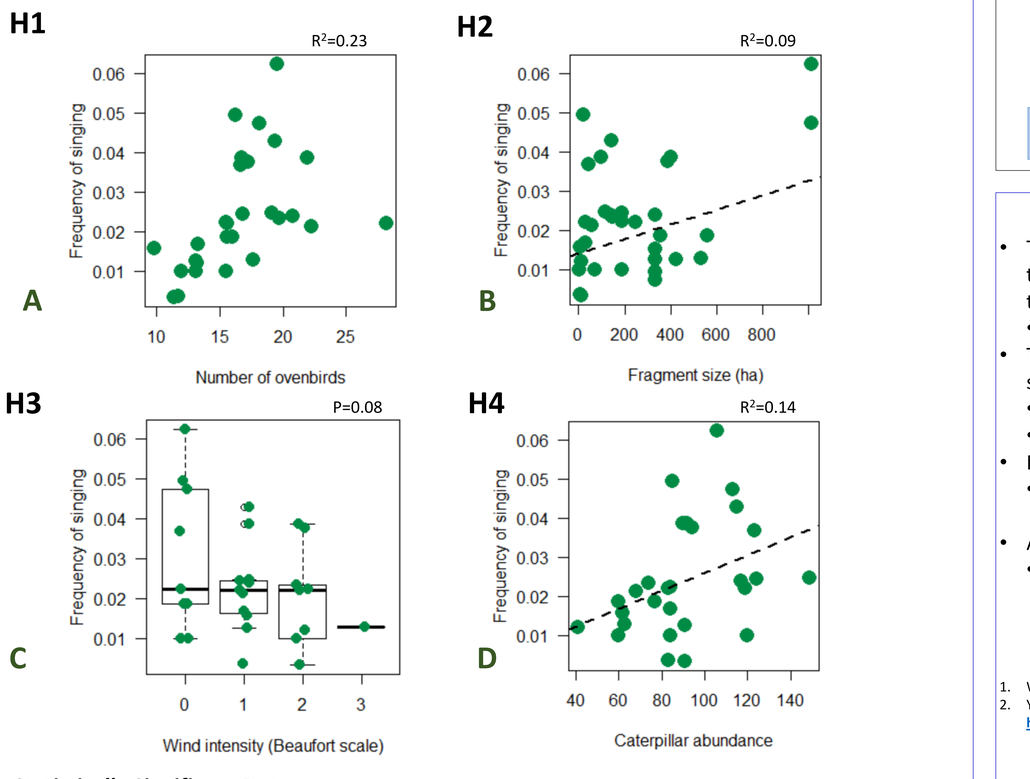
Fig. 1. The above image shows the audio software used to listen to the recordings.

A

B

Fig 2. A & B. Figure A shows an adult ovenbird in its natural habitat.[2] Figure B shows a typical ovenbird nest; the unique nest shape gave the ovenbird its name, as the dome and side entrance resemble a Dutch oven.

RESULTS



Statistically Significant Data

- The higher the number of ovenbirds, the higher the frequency of ovenbird songs.
- The larger the forest fragment, the higher the frequency of ovenbird songs.
- The higher the number of caterpillars, the higher the frequency of ovenbird songs.

Statistically Insignificant Data

- Wind intensity does not affect ovenbird song frequency.

Fig 3. A, B, C, D. The above graphs show the results of the four environmental variables that were studied in this project.

STORY MAP

Created map in ArcGIS including:

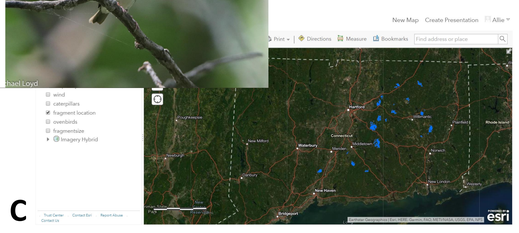
- 28 forest fragment sites
- Frequency of ovenbird songs
- Measurements of the four environmental variables

Created Story Map Journal including:

- Results of environmental variable comparisons
- Implications of the study

A

B



C

Fig 4. A, B, C. Figure A is a story map introduction screenshot. Figure B is the QR code to download the story map. Figure C shows the ArcGIS map with forest fragments marked in blue.

CONCLUSION

- This project showed relationships between some environmental variables and the frequency of ovenbird songs. From here, future research could investigate if these relationships change over time and explore causal links, such as:
  - Why does the forest fragment size affect ovenbird song frequency?
- This baseline of ovenbird interactions with the environment can be used to study:
  - A wider range of variables;
  - Connections between environmental variables.
- Methods for this project are transferable to other projects:
  - Recording devices can be used to gather data in areas that humans cannot easily reach, such as very dense forests with dangerous terrain.
- A research and story map combination makes it more accessible to the public.
  - Complex information conveyed with simple language and interactive maps is engaging and allows a wide audience to understand the project.

REFERENCES

1. Why Study Birds? The Institute for Bird Populations, https://www.birdpop.org/pages/whyStudyBirds.php
2. Young, Susan (Photographer). (2019, October 21). *Ovenbird* [digital image]. Retrieved from https://www.flickr.com/photos/95782365@N08/48993110991/in/photolist-Mph4Ci-28D9v7Q-2hDmv1c-NoT4dS

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