How Does the Distance Away from Trails Affect Bluebird Nesting?

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ABSTRACT

The animals of Connecticut can face many problems as climate change and human development continue to progress. One particular animal that is facing many different issues is the Eastern Bluebird (*Sialia sialis*). Unfortunately, this species has had a particularly hard time nesting over the past few years. This is mostly due to a loss of habitat due to human disturbance, but it also could be linked to habitats being taken by other bird species, such as the House Wren (*Troglodytes aedon*). Due to this, the Audubon at the Bent of the River has set up bird houses around the property in order to provide ideal habitats for these nesting bluebirds. Every week during the summer, the contents of these bird houses are recorded and managed according to the situation (such as removing hornet nests or dead animals). In addition, some of these boxes were also protected from predators by adding grease to the poles or adding a funnel-like cover below the box. Although these boxes have provided homes for some bluebirds, some of the boxes were very close to the trails, causing many to wonder if the boxes proximity to hikers caused the bluebirds to nest elsewhere.

The objective of the project is to assess if the distance between the bluebird boxes and trail has any effect on its contents. The outcome of this project will provide essential information when building, installing and maintaining future bluebird boxes.

To address this objective, data on the contents of the bird houses collected over the last three years, and proximity of the box to the nearest trail were used. The findings of the project indicated that the success of bluebird nests appeared to be uncorrelated to the boxes' proximity to the trails. This could potentially mean that the distance from the trail does not affect the rate of bluebird nesting, but more research should be conducted before any official conclusions are made.

INTRODUCTION

Habitats are very important to birds. In particular, birds need certain environmental features to nest if they are to successfully reproduce and rear young. Unfortunately for *Sialia sialis*, or the Eastern Bluebird (Fig. 1), nesting isn't always an option. These birds have lost a lot of their nesting areas to human disturbance and other bird species, such as House Wrens (*Troglodytes aedon*), leading to a decline in their population.

In turn, the Bent of the River Audubon distributed wooden bluebird boxes around the property to provide the bluebirds with suitable nesting area. To make sure these boxes provided the necessary environment, they were checked weekly during the summer, where the contents of each box were recorded and modified if necessary. For additional protection, some of the poles were covered in slippery grease or blocked off by funnel-like structures to prevent access from ground animals, like snakes and raccoons.

Even though these structures have provided habitats for bluebirds as intended, the location of these bird houses concerned a few members of the sanctuary. A few of the boxes were extremely close to trails used by many hikers, employees, or even cars. While usually not harmful to the boxes themselves, the close proximity of the boxes to these human activities could be causing the bluebird to ignore these sites. Consequently, I evaluated if the proximity of these bird houses to trails did influence the use of these structures by bluebirds.

I hypothesize that if the bluebird box is located farther from the trails, then there will be a higher chance of bluebirds nesting in it because there is less disturbance the farther it is away from the trails.

Fig 1. *Sialia sialis*, or Eastern Bluebird.

MATERIALS AND METHODS

Study Area

- Audubon at the Bent of the River, Southbury, CT.
- 16 bird house sites.

Data Collection Protocol & Analysis

I. Bird House Content Data:
   1. Open the bird house with a screwdriver (be wary of hornet nests).
   2. Record the contents of the box.
   3. The number of bluebird nests were recorded.
   4. Content values were added over 3 years for each box.

II. Distance Data (Requires Two People):
   1. Stop at the closest point on a trail to the bird house.
   2. Have one person (Person A) hold the start of the measuring tape and the other (Person B) hold the end.
   3. Have Person B travel to the bird house.
   4. Record the distance at the center of the pole (Fig. 2b).
   5. Record the general location of the bird house and its number on the front (Fig. 2b).
   6. Take at least two photos: one of the bird house alone and another of the birdhouse in relation to a noteworthy object nearby (Fig. 2a).

III. Regression analysis evaluated the relationship between the content data and the distance data.

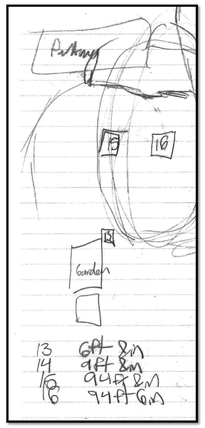


Fig 2a. (Left) A photo of bird house #3 in relation to the fence and trail (where the person is). The visible line is the measuring tape used to measure the distance. Fig 2b. (Right) A scan of the paper used to record distance and general location for bird houses #13-16.

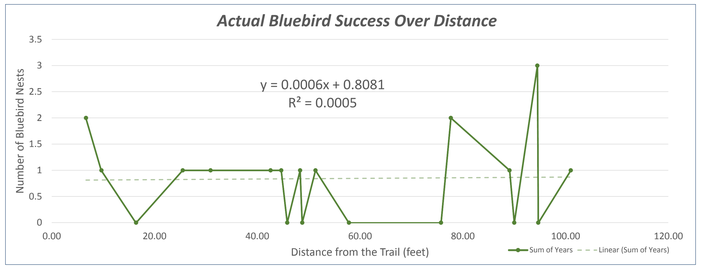
Fig 3a. (Left) Bluebird #10 house next to a Sycamore. Fig 3b. (Top Middle) Birdhouse #4. Fig 3c. (Top Right) Bluebird eggs in a nest inside of a bluebird box. Fig 3d. (Bottom Right) A young bluebird in a nest inside a bluebird box.

RESULTS

I hypothesized that bluebird nesting success in bluebird boxes would increase with increasing distance from trail (significant positive correlation [p-value ≤ 0.05]; see Fig. 4b)

Actual Bluebird Success with Distance

- Conversely to the hypothesis, bluebird nesting success was not significantly correlated with distance to trail (Fig. 4a; p-value = 0.482).
- In other words, nesting success did not increase or decrease with distance.



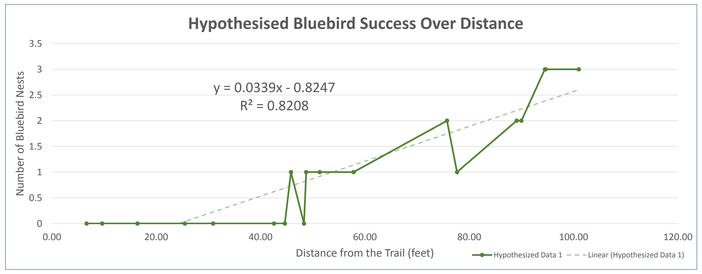


Fig 4a. (Top) A graph displaying the actual nesting success (y-axis) to distance from trail (x-axis). Fig 4b. (Bottom) A graph displaying an example of the hypothesized significant positive correlation between nesting success (y-axis) and distance to trail (x-axis).

CONCLUSIONS

The results of this research indicate that there is no noticeable statistical difference in the success rate in bluebird nesting as the distance from trails change. Accordingly, it appears that the location of bluebird boxes with successful nesting are random and do not depend on the proximity to the trails. This does not support the hypothesis.

There are a couple of reasons for these results. The first possibility is that the pros and cons of changing proximity balance each other out. Although the bluebirds may be less willing to nest near human activity, those that do may face less competition from other birds or less predation from snakes and raccoons. The far boxes face the opposite situation; as a decrease in human activity may not matter if it gets replaced by an increase in predation or competition.

Other factors that may have influenced nesting success is the degree of human activity on the trails. For example, the rarely traveled Garden Trail will face much less human disturbance than the frequently traveled driveway that cars and hikers use to access buildings on the property. Similarly, many other factors could be influencing nesting success; thus, other factors should be assessed better understand placement of bluebird boxes.

Due to this, I will continuing to work on this project over the next couple years to collect more data in order to better understand the relationship between bluebird box location and nesting success.

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