

## INTRODUCTION

### A Brief History on Chimney Swifts

The chimney swift (*Chaetura pelagica*) is an insectivorous bird that was once very prevalent in Connecticut, but since the 1970's the population has steadily declined (Figure 2). Connecticut's chimney swift decline can be attributed to decreasing nest site availability and changes in insect populations.

Chimney swift natural roost sites were once old-growth tree cavities. They have adapted to nesting in chimneys of local homes. One conservation strategy is to construct chimney swift towers in their breeding range, which are used as an artificial roost and nest site. Kearney (2015) found that in Connecticut, chimney swifts used towers less than expected and this was attributed to the fact that alternative nests were plentiful. Chimney swift food availability has changed as a result of pesticide usage (Nocera et al., 2012).

### What Action Should be Taken?

Kearney (2015) concluded that education is an important conservation priority. I created a series of activities for students in Kindergarten through Grade 6, cross-referencing with the Next Generation Science Standards (NGSS). These activities are designed for elementary to middle school students specifically but can be extended or adapted to fit higher grade levels. The activities engage students so that they are encouraged to conserve and protect chimney swifts and other aerial insectivores in their communities.



Figure 1. Chimney swift (The Cornell Lab of Ornithology)

### “Dream House”



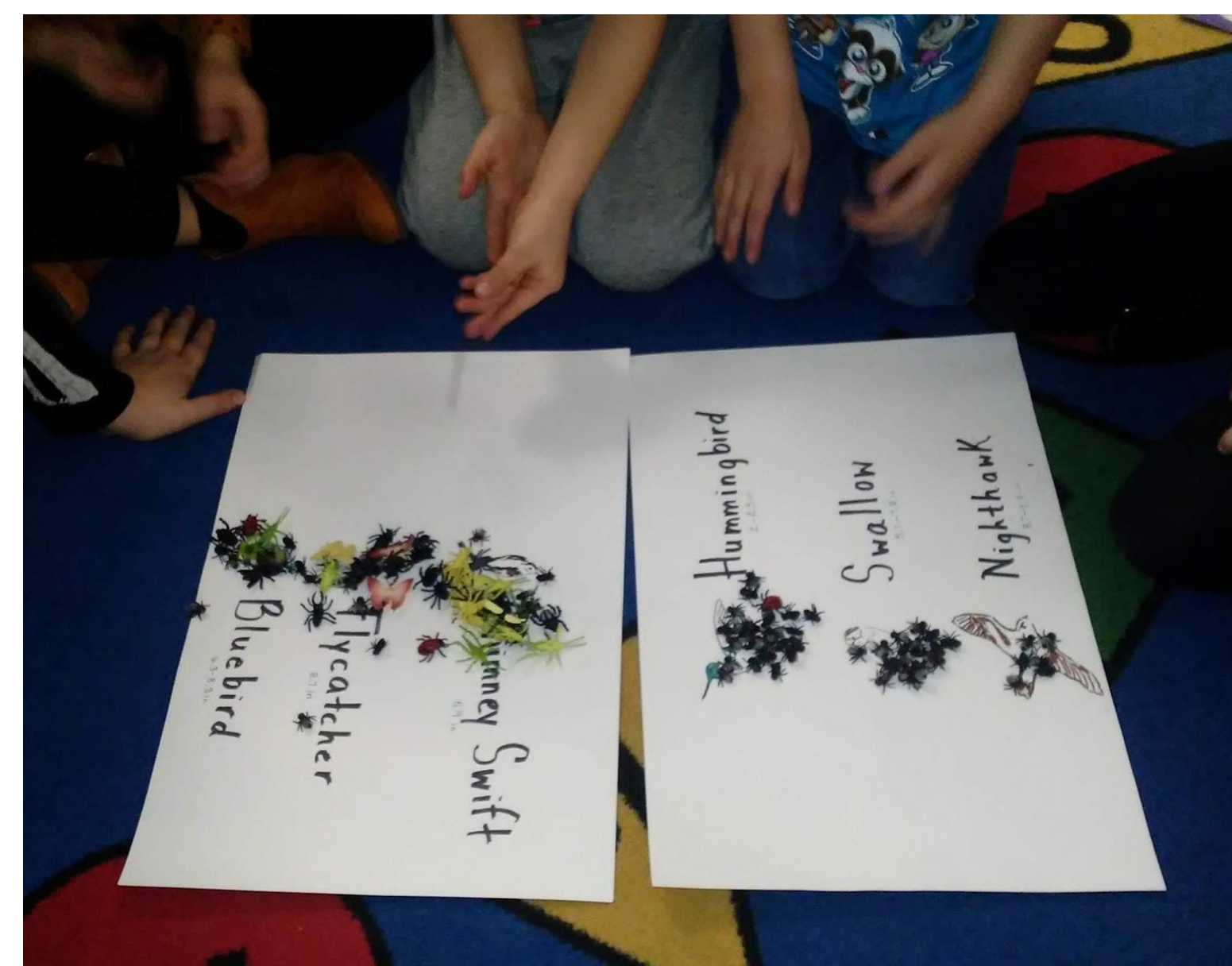
Students learn that Chimney swifts' survival depends on the availability of insects, surfaces to cling to, and hunting areas. By capping chimneys, humans are excluding Chimney Swifts from their nest sites. They depend on human-made structures for nesting and for roosting.

#### Materials:

- Cardboard box with brick pattern self-adhesive
- Tiny twigs or thin brown paper slices
- Modge Podge
- Air Dry Clay

Students are introduced to specialized adaptations of chimney swifts. They build a 3-D replica of the interior of a chimney, chimney swift and eggs to represent the chimney swift nest site. Students are informed about deforestation and how chimney swift nest site selection was primarily located in old-growth tree cavities. Imitation eggs are given out to students so that they can have a recreation of what the home of a chimney swift may look like.

### “Small but Mighty”



Students will find similarities between certain birds, as well as the uniqueness of chimney swifts compared to others. Students will understand that what you eat can reflect the distance that a species travels. It shows food availability and the diversity needed for their diets.

#### Materials:

- PVC pipe cutouts
- Paper with 6 species of birds (including chimney swift) pasted on

This activity is meant to show the different sizes of various aerial birds. Students do an activity to learn more about the sizes of chimney swifts using PVC pipe cutouts with images of different birds on them. With each bird comes a description of the bird, including background on their diet, habitat and migration patterns. By comparing chimney swifts with other birds, students can become more knowledgeable about the chimney swift, and bird species altogether.

### “Destination & Diet”



This activity provides students with a visual representation of chimney swifts' diet. If chimney swifts do not have enough food availability, they will be prevented from meeting their demanding needs for the amount of food it takes in order to migrate.

#### Materials:

- Plastic bugs
- 3 Buckets
- Landmarks for locations
- Species Identification photos

Students take turns finding hidden insects for their group's bucket to illustrate the diet of chimney swifts that consists of terrestrial and aquatic flying insects. Students then do a geography activity that follows the migration patterns of 7 insectivorous birds: nighthawks, swallows, hummingbirds, bluebirds, flycatchers and chimney swifts. There are flags to represent different locations, and each team of 3 students will be a type of bird.

## RESULTS & DISCUSSION

Chimney swift populations are declining and it is not a topic brought up in classrooms. The majority of students at the beginning of the activities were not aware of chimney swifts (Figure 3). By introducing students to this program and giving them hands-on activities that tie into concepts such as habitat, diet, size, and migration patterns, they will become more aware of this species and be more prepared to take conservation action in their communities.

The activities that I created can be useful to broader concerns about threatened species; the same approach towards educating students can be used in various situations. However, there are limitations to the activities that I provided. The activities are focused on the chimney swift in Connecticut and so some topics discussed would need to be changed to address issues that are more applicable to those areas. This program is also meant for students in elementary school, so taking this to higher grade level students would require adjustments. Yet, these activities are still useful and could be integrated into the work done by Shannon Kearney and her activities.

Education plays a key role in conservation of threatened and endangered species. This chimney swift curriculum has the goal to make communities more active with their environment and by doing so increase the population of chimney swifts by learning about their importance to the ecosystem. These activities align with NGSS.

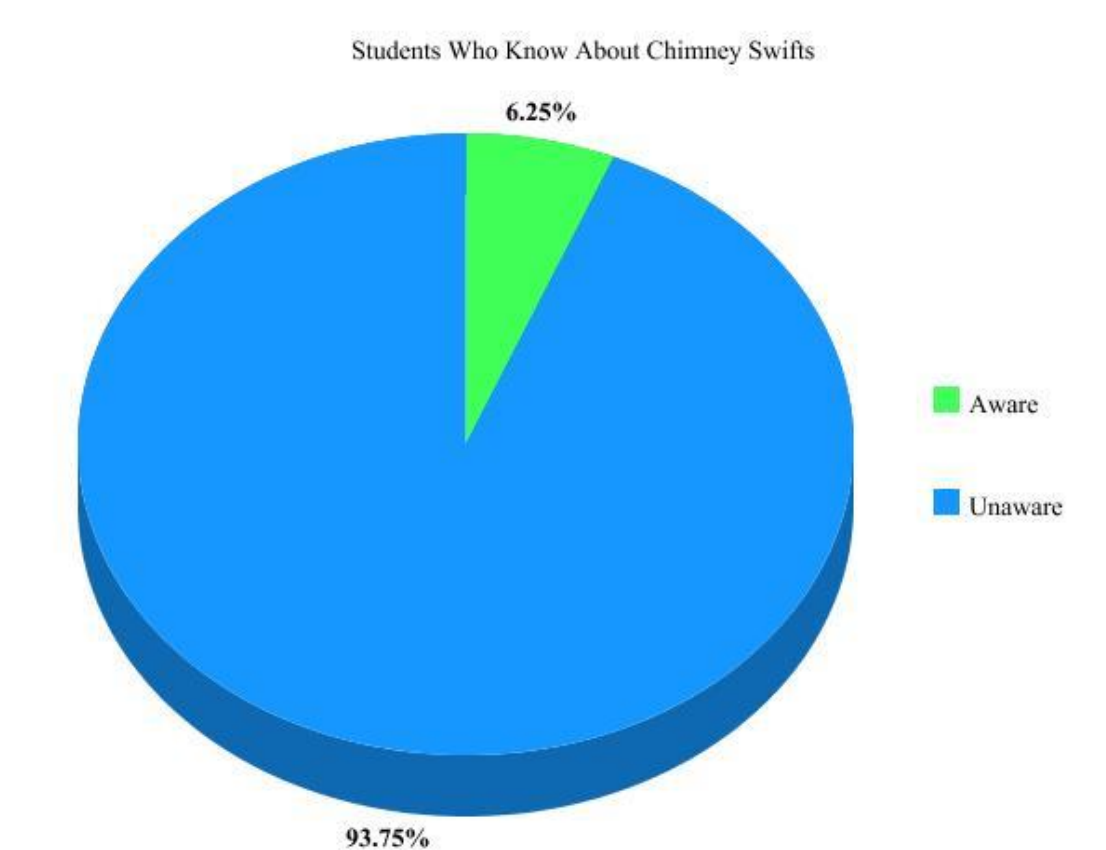


Figure 3. Results of survey question asking students if they were aware of chimney swifts

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### Chimney Swift [*Chaetura pelagica*]

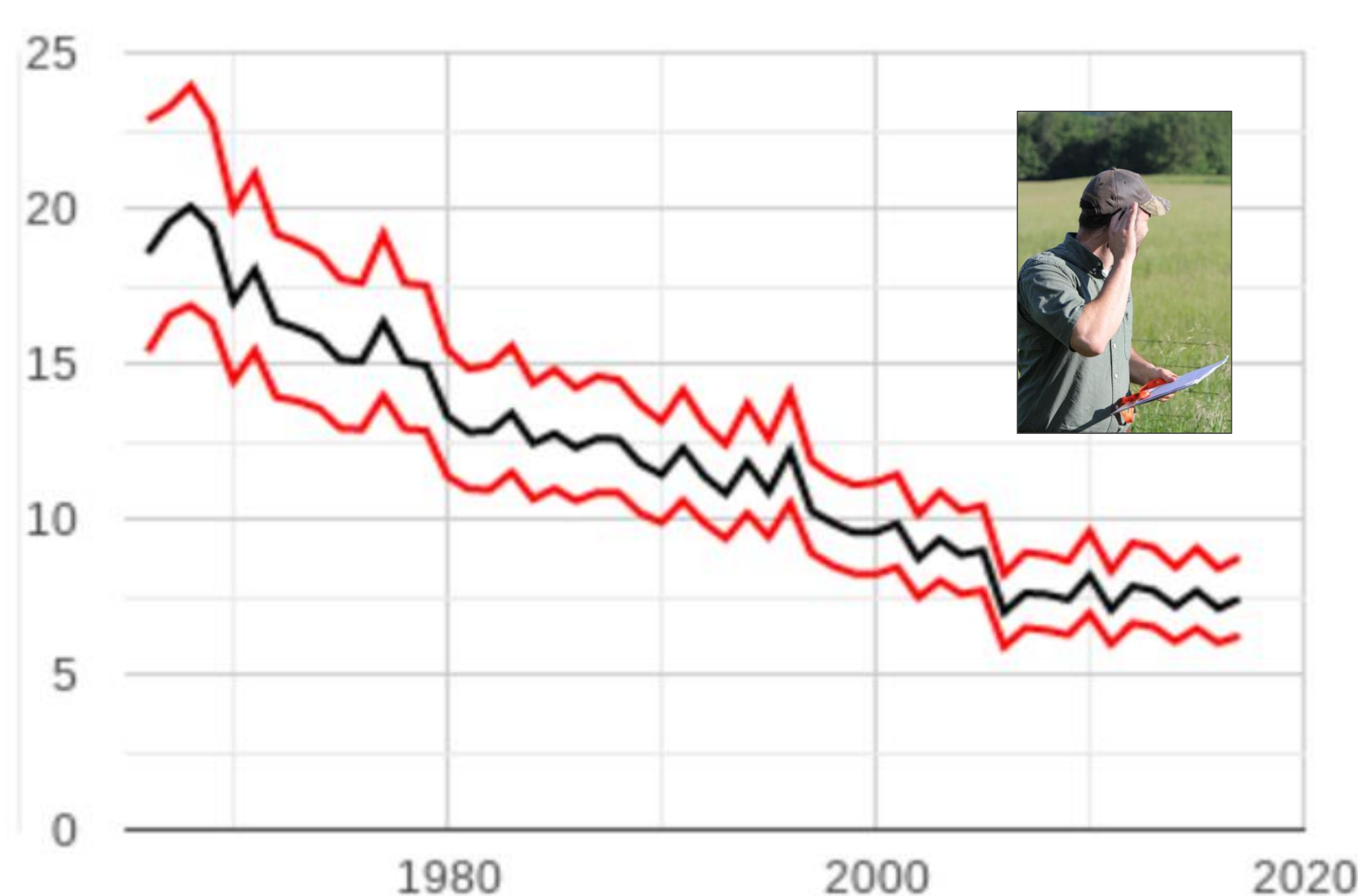


Figure 2. Connecticut Chimney Swift Breeding Bird Survey trend 1966 - 2017 (USGS Patuxent Wildlife Research Center Bird Population Studies)

*When students are being taught the material in this curriculum they will be able to refer back to what they're learning in class and in future classes. Here are the Next Generation Science Standards (NGSS) that each activity corresponds to depending on the grade levels that I had in my after-school program.*

#### MS-LS1-4:

**How characteristic animal behaviors affect the probability of successful reproduction of animals and plants respectively**

This activity discuss the importance of chimney swift ability to adapt to chimneys since limited tree availability after deforestation. Otherwise they would be unable to nest to produce offspring.

#### 4-LS1-1:

**How plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction**

This activity illustrates the uniqueness of chimney swifts when it comes to size and traits that allow them to travel for a large portion of their lives, compared to other bird species.

#### 5-LS2-1:

**Describing the movement of matter among plants, animals, decomposers, and the environment**

This activity shows the importance of insects in chimney swift and other bird species' diets, but also shows the importance of the environment to provide them with the energy they need. Otherwise, population decline may occur.