

Project Title: Evaluation of a new bird deterrent system in the North Central Region [Termination Report]

Total Funds Committed: \$34,400

Initial Project Schedule: September 1, 2020-August 31, 2021 [Extended to December 31, 2022]

Current Project Year: September 1, 2021-August 31, 2022

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Extension Liaison: Matthew Smith (The Ohio State University)

Industry Liaison: Dan Vogler (Haretta Hills Trout Farm, Haretta Hills, MI)

Non-Funded Collaborators: Andrea McDonald (Michigan Wholesale Walleye, Sault St. Marie, MI); Dan Vogler (Haretta Hills Trout Farm, Haretta Hills, MI); Larry Cleveland (Ozark Fisheries, Stoutland, MO); Larry Brown (Fountain Bluff Fish Farm, Gorham, IL)

Project Objective

The objective of this project is evaluation of the Sound Blanket system from Guardian Technologies (formerly Wildlife Defense Systems, Inc.) as a method of deterring predation of fish by birds in the North Central Region (NCR).

Project Summary

Predation of fish by birds is a significant economic loss to fish farmers and killing those birds is becoming less acceptable within our society. Estimated economic losses on individual farms range as high as \$500,000 in the Northeast to over \$25 million annually in the catfish industry. This project was designed to evaluate a new non-lethal method of deterring avian predators that relies on disrupting communications among birds, which in turn makes the local area uninhabitable even when an abundance of food is available. This method is in use in the fruit tree industries throughout the US. In those industries, multiple species of birds are destroying crops. The Sound Blanket system discourages consumption of agricultural crops leaving their more natural food items as the available food supply. This non-lethal deterrent system has not been evaluated in aquaculture where a unique suite of predacious birds exists. Diminishing losses to predacious birds would significantly improve economic viability of aquaculture operations and result in more fish in the US supply chain. Further, using non-lethal means of reducing predation would result in a significant new marketing opportunity (environmentally friendly, food production compatible with ecosystems, etc.) that fits well within the newer definitions of sustainability. This short-term evaluation identified positive effects of the system in deterring birds from landing on aquaculture production systems and the time they spent if they did land.

Anticipated Benefits

If the Sound Blanket System is successful, fish producers will have a new method of deterring avian predators from production units, resulting in more fish to sell and potentially improved economics of operations. Disease transmission via birds may also be reduced, resulting in healthier fish and a safer food supply for consumers. A marketing opportunity exists if this system is successful. Deterring birds by non-lethal methods might be considered positive by many consumers who may equate that effort as one of the new sustainable approaches for food production/ecosystem interaction. Numerous undergraduate students will have the opportunity to

work closely with faculty and staff at two universities, as well as fish farms. This hands on, experiential learning opportunity might be a profound component of their education.

Technical Summary and Analysis

Six separate evaluations were conducted; three in the southern portion of the NCR (Fountain Bluff, IL, and 2 at Ozark Fisheries) and 3 in the northern portion (2 at Wholesale Walleye and 1 at Harietta Hills, both in Michigan). Evaluations at Ozark Fisheries facilities were conducted at both their Missouri and Indiana farms. Evaluations were conducted in Spring 2021 at Fountain Bluff, Ozark Fisheries, Missouri, and Harietta Hills, and 2 evaluations were conducted in Fall 2021 at Wholesale Walleye. An additional evaluation was conducted at Ozark Fisheries, Indiana in Spring 2022. Fall evaluations in the southern portion of the region were not conducted because Fountain Bluff permanently closed their facility citing excessive bird predation, and Guardian Technologies could not deliver a deterrent system to Ozark Fisheries. In all locations, initial bird activity was documented with the system in place, but inactive. Bird counts were collected every 15 minutes beginning at sunrise and concluding at sunset. Additionally, time birds spent actively hunting fish was quantified at all sites. The northern and southern sites initially used two different approaches in this evaluation. At the northern sites, participating farms were close to LSSU, while participating farms in the southern portion were much farther from Purdue. At the northern sites, initial bird activity data were collected, the system turned on, then follow-up data collection occurred 7 days later. At the southern sites, initial bird activity was collected, the system turned on and the effectiveness of the system was evaluated the next day. Overall evaluation of data from all sites, all species and both evaluation approaches (1-day and 1-week) indicated there was not a significant effect ($p=0.9215$) of the system on time birds spent foraging at aquaculture facilities (Figure 1). Overall results are presented in Figure 2 for the cooperating farms. While bird numbers were reduced at all sites with the use of the sound system, statistical differences between numbers of birds observed ($p=0.36$) and time birds spent hunting fish ($p=0.19$) were not detected. Figure 3 depicts the effectiveness of the system on various guilds of birds using the 1-day evaluation approach. While there were some differences, data were not statistically significant ($p=0.6245$ for birds observed and $p=0.6542$ for time spent foraging). Evaluation of number of birds and time spent foraging using the 7-day evaluation approach are shown in Figures 4 and 5, respectively. These results were more promising, yet no statistical difference between numbers of birds ($p=0.0846$) or bird minutes ($p=0.0543$) were detected. These data suggest the system might be more effective after 1-week compared to 1 day as the area needs to become saturated with sound. These data also indicate a delay in the evaluation period might be appropriate in future evaluations. Evaluation of individual species of birds at each site was conducted (data not presented due to the limited number of evaluations, high number of bird species, and variation in bird species by site). While statistical analyses were difficult to identify, biological and/or economic significance may be realized by the reduction in birds observed, time spent hunting and potentially reduced losses. Non-funded collaborators felt the system was an improvement in deterring birds from their facilities.

Principal Accomplishments

The principal accomplishments were the initial evaluation of a new bird deterrent system for use in aquaculture and evaluation of two approaches for future evaluations. Bird activity was reduced with the use of the Sound Blanket System. Further, a YouTube video was developed describing the system and is available (https://www.youtube.com/watch?v=B_hpK6vU_SE).

Impacts

Identification of a non-lethal bird deterrent system can be a significant improvement in terms of numbers of fish produced in the NCR and significantly improve economics of aquaculture.

Recommended Follow-Up Activities

This project was a short-term, limited project designed to simply evaluate the potential of the system. Longer term evaluations need to take place using cameras in place of student labor. The effective range of the system should be evaluated and the potential of acclimation to the system needs to be defined. Additional deterrent systems are also available, in use in the NCR, and showing promise for deterring bird predators.

Technical Update

See figures below.

Publications, Manuscripts, Workshops, and Conferences

See the Appendix for a cumulative output for all NCRAC-Funded Other activities.

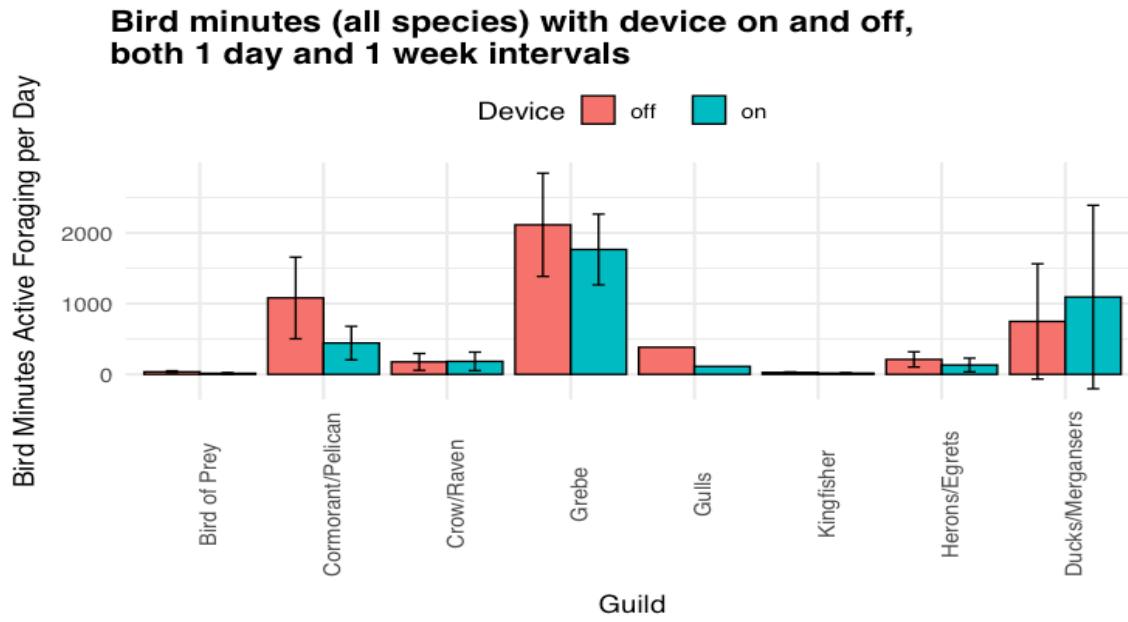


Figure 1. Overall comparison of time birds spent foraging at aquaculture facilities with the device either on or off. Data were not significantly different ($p=0.9215$).

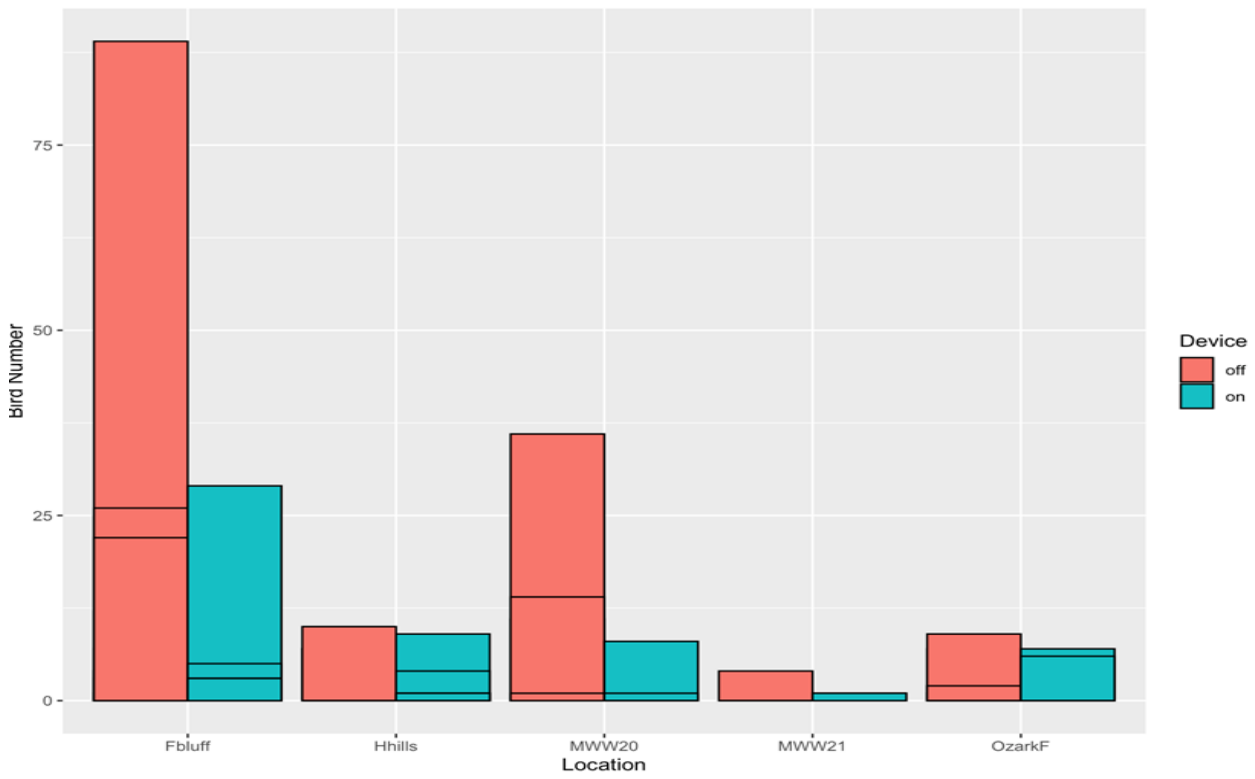


Figure 2. Effectiveness of the sound system on bird numbers at the cooperating farms; Fountain Bluff (Fbluff, IL, 1 day), Harietta Hills (Hhills, MI, 1 week), Midwest Wholesale Walleye (MWW, MI, 1 week), and Ozark Fisheries (OzarkF, MO, 1 day). Data were not significantly different.

Bird minutes with device on and off, first day active

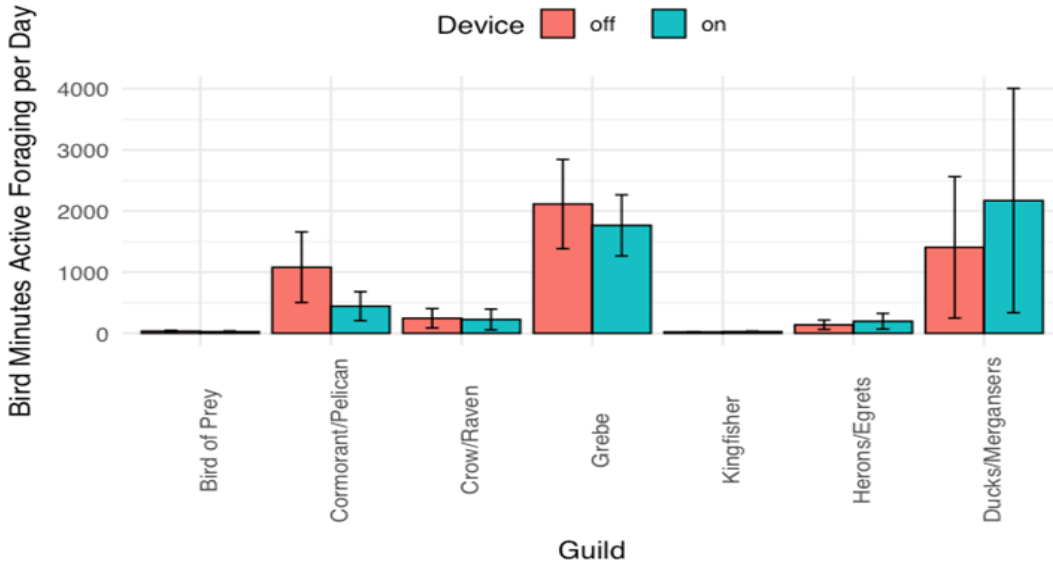


Figure 3. Time birds spent on production facilities using the 1-day evaluation approach. Data were not significantly different.

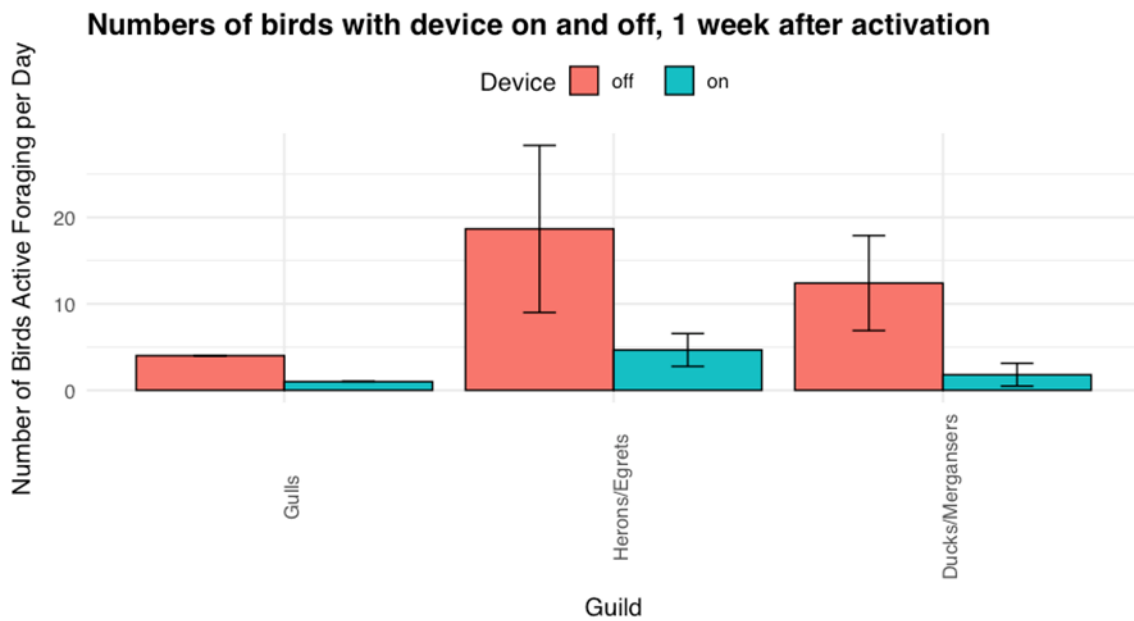


Figure 4. Number of birds observed using the 1-week evaluation approach. Data were not significantly different ($p=0.0846$).

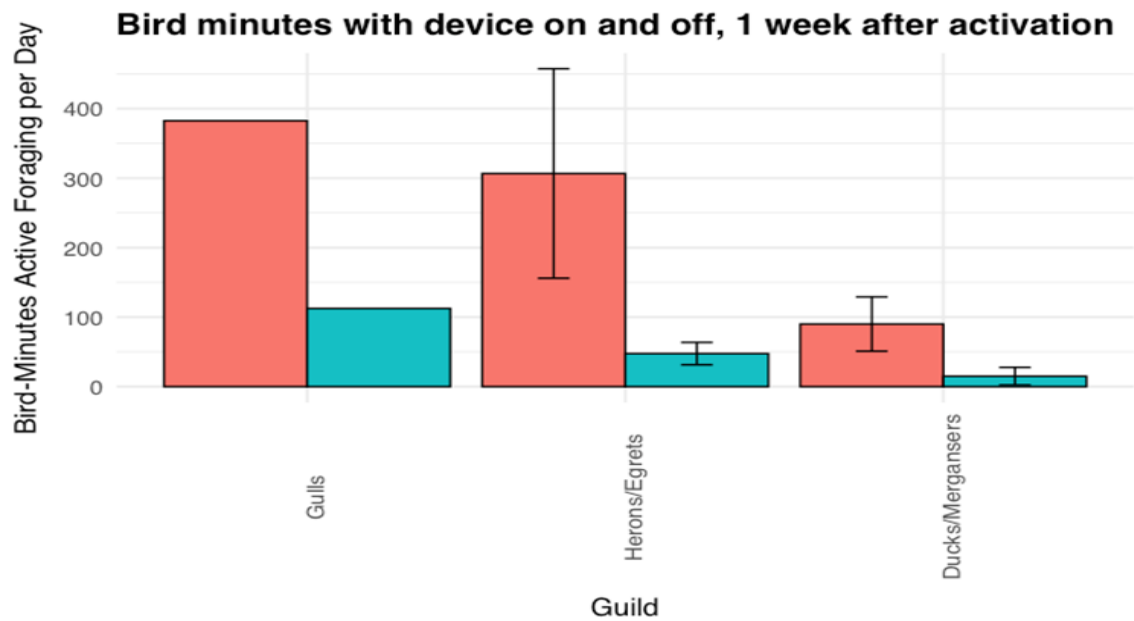


Figure 5. Time birds spent foraging using the 1-week evaluation approach. Data were not significantly different ($p=0.0543$).