Project Title: Evaluation of a new bird deterrent system in the North Central Region *[Progress Report]*
Total Funds Committed: $34,400
Initial Project Schedule: September 1, 2020-Auguest 31, 2021 [Extended to July 1, 2022]
Current Project Year: September 1, 2020-Augest 31, 2021
Participants: P.B. Brown, Brian MacGowan, Bob Rode, Purdue University, and Jason Garvon, Lake Superior State University
Extension Liaison: Matthew Smith, The Ohio State University
Industry Liaison: Dan Vogler, Harietta Hills Trout Farm, Harietta Hills, MI
Non-Funded Collaborators

Michigan Wholesale Walleye, Sault St. Marie, MI	Andrea McDonald
Harietta Hills Trout Farm, Harietta Hills, MI	Dan Vogler
Ozark Fisheries, Stoutland, MO	Larry Cleveland
Fountain Bluff Fish Farm, Gorham, IL	Larry Brown

Project Objective
The objective of this project is evaluation of the Sound Blanket system from 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 seeks 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 and negatively impacting the finances of these farm. 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.

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.

Project Progress
Five separate evaluations have been conducted to date; two in the southern portion of the NCR (Fountain Bluff, IL, and Ozark Fisheries, MO) and three in the northern portion (two at Wholesale Walleye and one at Harietta Hills, both in Michigan). Evaluations were conducted in Spring 2021 at Fountain Bluff, Ozark Fisheries, and Harietta Hills, and two evaluations were conducted in Fall 2021 at Wholesale Walleye. Fall evaluations in the southern portion of the region were not conducted because Fountain Bluff permanently closed their facility citing excessive bird predation, and Wildlife Defense Systems could not deliver a deterrent system to Ozark Fisheries. Statistical analyses are still underway, but overall statistical results are presented below, and they are similar across sites. Statistical differences between numbers of birds observed and time birds spent hunting fish were not detected, but all graphs indicate a reduction in both values. Statistical probability values were commonly in the 0.3 range, largely due to the inherent biological variability of bird foraging behavior in natural settings. In this case, 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.

Outreach Overview
A video of the need for the system, it's deployment and during operation is almost complete. Finalizing statistical analyses will provide the final component for the video. Presentations at several state aquaculture association meetings, including Indiana and Ohio, will occur when the field research and data is finalized.

Target Audiences
Target audience for this work is all aquaculture producers, regardless of cultured species, with outdoor facilities experiencing predation of their animals by avian predators.

Deliverables (Outputs)
Technical publications and videos are in development.

Outcomes/Impacts
This project is nearing completion and there are no measurable impacts, yet. The non-funded collaborators have positive views of the system and will likely be effective spokespersons for the system.

Impacts Summary
Relevance. — Predation of cultured fish is a significant economic loss for aquaculture producers using outdoor facilities. Any deterrent system would be a valuable addition to farm operations and a non-lethal deterrent system might provide additional marketing opportunities for producers.
*Respons*e. — We are conducting the first evaluation of a bird deterrent system that has been used in the orchard industries. The evaluations have been conducted in multiple states, multiple production systems and multiple fish species,

Results. — Thus far, the system appears to deter birds. Although the results are not statistically significant, biological and/or economic significance might be achieved.

Recap. — Loss of cultured fish is a significant problem and the current options for deterring birds are only marginally effective. Additional options for producers would be valuable and this system appears to have promise as a method of decreasing numbers of birds visiting facilities and the time they spend hunting fish.

Publications, Manuscripts, Workshops, and Conferences

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

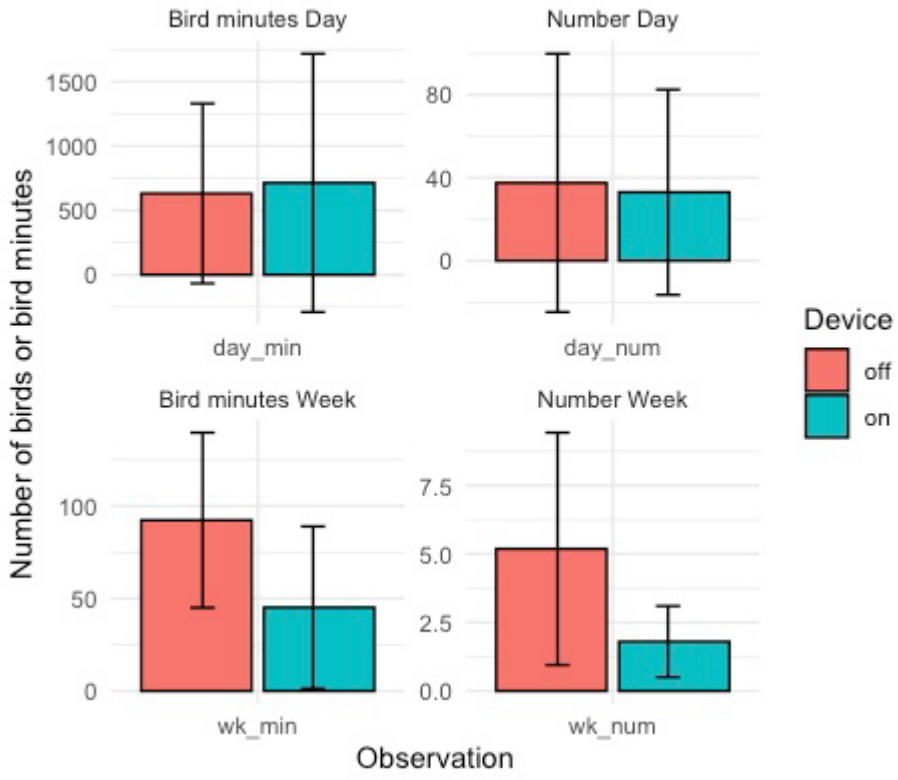

Figure 1. Combined results from the two northern sites, Wholesale Walleye and Harietta Hills.