

What do ducks hear?

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A type of duck known as a common eider swims near a sensor, perhaps waiting for a worm, which is used as a reward for pecking the sensor after hearing a ping. Credit: Kate McGrew

One of the threats facing diving ducks are gill nets that fishermen use,

which cause hundreds of thousands of inadvertent deaths to sea birds annually.

To help prevent birds from dying in gill nets, University of Delaware researchers are testing at what frequency ducks hear to possibly equip those nets with pinger systems to deter the ducks from approaching. Similar devices are deployed to deter marine mammals away from nets.

Chris Williams, professor in the Department of Entomology and Wildlife Ecology in UD's College of Agriculture and Natural Resources, explained that there are federal laws mandating that these pinger systems be used to avoid the deaths of dolphins and whales.

"Since 1998-2003 when pingers were first required, porpoise bycatch has declined from 1,800 to 300 animals per year," Williams said.

"Because of the success here, we wanted to see if it could work for the ducks. Of course, we know ducks hear, but the next question is what do ducks hear? We don't know the answer to this question and it is critical information for the development of effective pingers. Ideally, the existing pingers for marine mammals could just be used for diving ducks."

Kathleen McGrew, a master's level student in Williams' lab, is leading the study at UD. The study is a joint project between the U.S. Geological Survey (USGS) and the U.S. Fish and Wildlife Service (USFWS), which was awarded to UD through a Cooperative Ecosystem Studies Unit (CESU) agreement for McGrew to do her master's work.

McGrew uses operant conditioning (rewards) to train the ducks to participate in behavioral [hearing tests](#). The training techniques used with the ducks are very similar to those used to train dogs.

The research is taking place at the USGS Patuxent Wildlife Research

Center in Laurel, Maryland. McGrew said she has worked with several types of ducks, including surf scoters, long-tailed ducks and common eiders, raising the birds from ducklings who hatched in 2016.



UD graduate student Kate McGrew is guiding a research project to learn at what frequency ducks hear sounds, with the hope of producing pinger systems to deter ducks from diving into fishing nets in search of food. The ducks get caught in the net and die. Credit: University of Delaware

"When they're young, they're moldable and food oriented and ducklings have a natural tendency to imprint on their hen," McGrew said. "What

we do is we hand raise the ducklings so they imprint on us. That way, we are able to influence their behaviors and they're comfortable working with us and do not exhibit undue stress."

McGrew worked with each [duck](#) for an hour a day in a four-meter deep dive tank, usually five and sometimes six days a week over the summer. When classes are in session, McGrew goes to the facility at least once a week, but has a technician that keeps up with the training and hearing testing regime.

"We start training almost immediately after they hatch so we can acclimate them to the equipment and get them food oriented," said McGrew.

Using meal worms as a reward, McGrew said the ducklings participate in hearing tests similar to what one would encounter in a doctor's office.

"Instead of a person raising their hand to say, 'Yeah, I heard the tone,' or pressing a button, we actually train the duck to peck a target," McGrew said. "When he hears that tone, he knows to surface and peck a target and he'll get rewarded for that. Through many replications of individuals and trials, McGrew will eventually be able to determine the range of frequencies diving ducks hear and do not hear.

As far as the difficulty involved in training the ducks, McGrew said that it can be tricky but it's not as difficult as one would think.

"Training is pretty time consuming," McGrew said. "We have to piece together the entire behavior regime that is needed to have them correctly respond to the hearing test. While it takes months to train them, the birds are surprisingly trainable. When I was first introduced to this project, I was kind of like 'Really? You want me to train ducks to do a complicated task?' But it's definitely doable. I have data for three

individuals so far. While this project is a lot of work, it's very rewarding when the ducks behave correctly. And it's gratifying to know my results may help the long-term conservation of diving ducks."

Provided by University of Delaware

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