

## Sea Duck Joint Venture Progress Report

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### SDJV Project #150: Using genetics to determine the breeding areas of common eiders harvested in the Atlantic Flyway

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Have you ever wondered where the sea ducks you see each winter come from? Many waterfowl enthusiasts and hunters relish in finding or harvesting a duck with a metal leg band, as it is a rare event, like finding a message in a bottle. On each band is a unique number that is linked to a database at the U.S. Geological Survey (USGS) Bird Banding Laboratory with the bird's age and sex, where the bird was originally caught and banded and if it was ever captured again and where. However, not all sea ducks are banded. How then can biologists determine where wintering sea ducks came from if they aren't banded? The answer lies in their genetics.



Male common eiders flying along the Atlantic coast. USFWS photo.

Each year, common eiders migrate from breeding areas along the northern coastlines to ice-free waters farther south. Wintering flocks are often composed of birds from several different breeding areas. Along the Atlantic coast, there are differences in population trends among the main eider breeding areas; numbers of breeding birds in northern Canada are increasing, those in central Canada are stable, whereas numbers of birds in the Gulf of Maine are declining. Declines in the Gulf of Maine raised concerns among biologists and

hunters. In 2016, management agencies changed harvest regulations in an attempt to reduce hunting pressure on eiders that breed in the Gulf of Maine.

Differences in population trends and changes in harvest regulations raised two questions, "Where are birds from different breeding areas harvested, and in what proportion?" and "Have changes in hunting regulations affected harvest rates differently among populations?"

The U.S. Fish and Wildlife Service and USGS partnered to answer these questions using genetics. The tendency of female common eiders to breed in the area where they hatched is so strong that each breeding population has a unique genetic fingerprint.



Common eider wings (male left, female right) harvested in Canada that have been included in the harvest composition assessment. USGS photo.

By generating genetic profiles of breeding areas along the Atlantic coast, we could answer the questions raised regarding the harvest composition of common eiders.

In the U.S. and Canada, hunters can participate in a program where they send a wing from each duck they harvest to U.S. and Canadian agencies, called the Parts Collection Survey, or the Waterfowl Wing Bee (<https://www.youtube.com/watch?v=SuS8N50mu8E>). Biologists record the age, sex, species, date harvested, and location for each wing received, providing information on the general harvest patterns across Canada and the U.S. Wings were then sent to the USGS and scientists collected genetic fingerprints of each harvested bird to determine the birds' breeding area and ultimately provide estimates of harvest for common eider populations along the Atlantic coast.

USGS scientists have determined the genetic fingerprints from more than 500 wings of common eiders submitted to the U.S. and Canadian Harvest Surveys in 2013-2016. These genetic profiles revealed that each breeding area, regardless of population size, is represented in relatively equal proportions in the harvest. The next step is to find out whether changes in hunting regulations started in 2017 have altered the harvest composition of the American common eider.