Sea Duck Joint Venture
Annual Project Summary
FY2021 (October 1, 2020 – September 30, 2021)

Project Title:

#150: Improving our understanding of the population structure and harvest composition of American common eiders in the US and Canada

Principal Investigators:

Chris Dwyer, US Fish and Wildlife Service, chris_dwyer@fws.gov; Scott Gilliland, Canadian Wildlife Service, scott.gilliland@canada.ca; Sarah Sonsthagen, USGS Nebraska Cooperative Fish and Wildlife Research Unit, ssonsthagen@usgs.gov

Partners:

This project has been supported by funds as well as in kind support from USFWS, CWS, and USGS. We partnered with the Nunatsiavut Government and the NunatuKavut Community Council to collect samples from Labrador.

Project Description:

An assessment of the harvest potential of American common eiders (*Somateria mollissima dresseri*) suggested that under current harvest policies, and given our understanding of demographic information throughout the range of this species, there is a substantial risk of overharvest (Koneff et al., 2016). Furthermore, American common eiders may be experiencing different demographic rates throughout their breeding range (i.e., declining abundance in Maine & Maritime Canada, stable to increasing in the St. Lawrence estuary, and an increasing population in along the Northshore of the Gulf of St. Lawrence & in Newfoundland and southern Labrador; Bowman et al. 2015, Giroux et al. 2021, Noel et al. 2021). Determining the geographic source(s) of common eiders in the U.S. and Canadian harvest may help reduce uncertainty in harvest management decision-making, develop priority areas for habitat conservation efforts and identify potential differences in relative productivity across the breeding range of American common eiders.

We are applying a genetic approach to probabilistically assign common eiders harvested along the Atlantic Flyway to natal areas. Genetic information from 12 microsatellite loci, mtDNA control region, and 9 restriction site associated DNA loci have been collected annually from breeding reference locations and hunter-harvested eiders.

Project Objectives:

(1) Further determine the population structure of American common eiders, and to probabilistically assign sport-harvested American common eiders to their breeding (source) areas.
(2) Determine whether changes in the harvest composition of American common eiders occurred following the implementation of harvest regulation changes (reduced season length, bag limit and timing) for sea ducks in the Atlantic Flyway, that began with the 2016-17 season.

Preliminary Results:

Genetic data have been collected from the following eider wing samples harvested along the Atlantic Flyway: US seasons 2013/2014 to 2019/2020 (n = 723) and Canada seasons 2014/2015 to 2018/2019 (n = 424). See Figure and Table for sample location, sizes, and status of genetic data collection.

Project Status:

In FY21, we collected genetic data from hunter harvested eiders from the 2019/2020 US season (n = 42) and eiders nesting in Labrador and other potential source areas for birds involved in harvest (n = 150). We completed the data set by filling in data gaps and conducting quality control checks on genotype and sequence information (i.e., collection of genetic data in replicate for 20% of the samples).

Currently we are finalizing the data set; proofing genetic and sample information in the data spreadsheet.

Due to COVID related building access restrictions, we have not been able to ship the hunter harvested samples from the 2019/2020 Canada season to the USGS Alaska Science Center for data collection. We anticipate building access by December and genetic data collection will start as soon as samples are received.

In FY22, we will complete data collection and conduct analyses (genetic diversity, structure, and connectivity and assignment of harvested birds to natal areas). We will also prepare manuscripts for submission to scientific peer-reviewed journals.

Anticipated manuscripts:

(1) Regional scale assessment of genetic connectivity of common eiders nesting along the Atlantic coast and Saint Lawrence Estuary.
(2) Evaluation of the harvest composition of common eiders in the Atlantic Flyway.
(3) Identification of source populations of common eiders involved in Wellfleet Bay Virus mortality events.

Project Funding Sources (US$).

No funding was received by SDJV in FY21.

Bowman, T.D., Silverman, E.D., Gilliland S.G. & Leirness, J.B. 2015. Status and trends of North American sea ducks: reinforcing the need for better monitoring. *In* J.-P.L. Savard, D.V. Derksen, D. Esler & J.M. Eadie (eds.), *Ecology and Conservation of North American Sea Ducks*, pp. 1–27. Studies in Avian Biology No. 46. CRC Press, Boca Raton, Florida, USA.

Giroux, J.-F., Patenaude-Monette, M., Gilliland, S.G., Milton, G.R., Parsons, G.J., Gloutney, M.L., Mehl, K.R., Allen, R.B., McAuley, D.G., Reed, E.T. and McLellan, N.R. 2021, Estimating Population Growth and Recruitment Rates Across the Range of American Common Eiders. Jour. Wild. Mgmt.. https://doi.org/10.1002/jwmg.22122

Koneff, M.D., Zimmerman, G.S., Dwyer, C.P., Fleming, K.K., Radding, P.I., Devers, P.K., Johnson, F.A., Runge, M.C., and Roberts, A.J. 2017. Evaluation of harvest and information needs for North American sea ducks. PloSOne 12, e0175411.

Noel, K., McLellan, N., Gilliland, S. et al. 2021, Expert opinion on American common eiders in eastern North America: international information needs for future conservation. Socio Ecol Pract Res 3, 153–166. https://doi.org/10.1007/s42532-021-00083-6

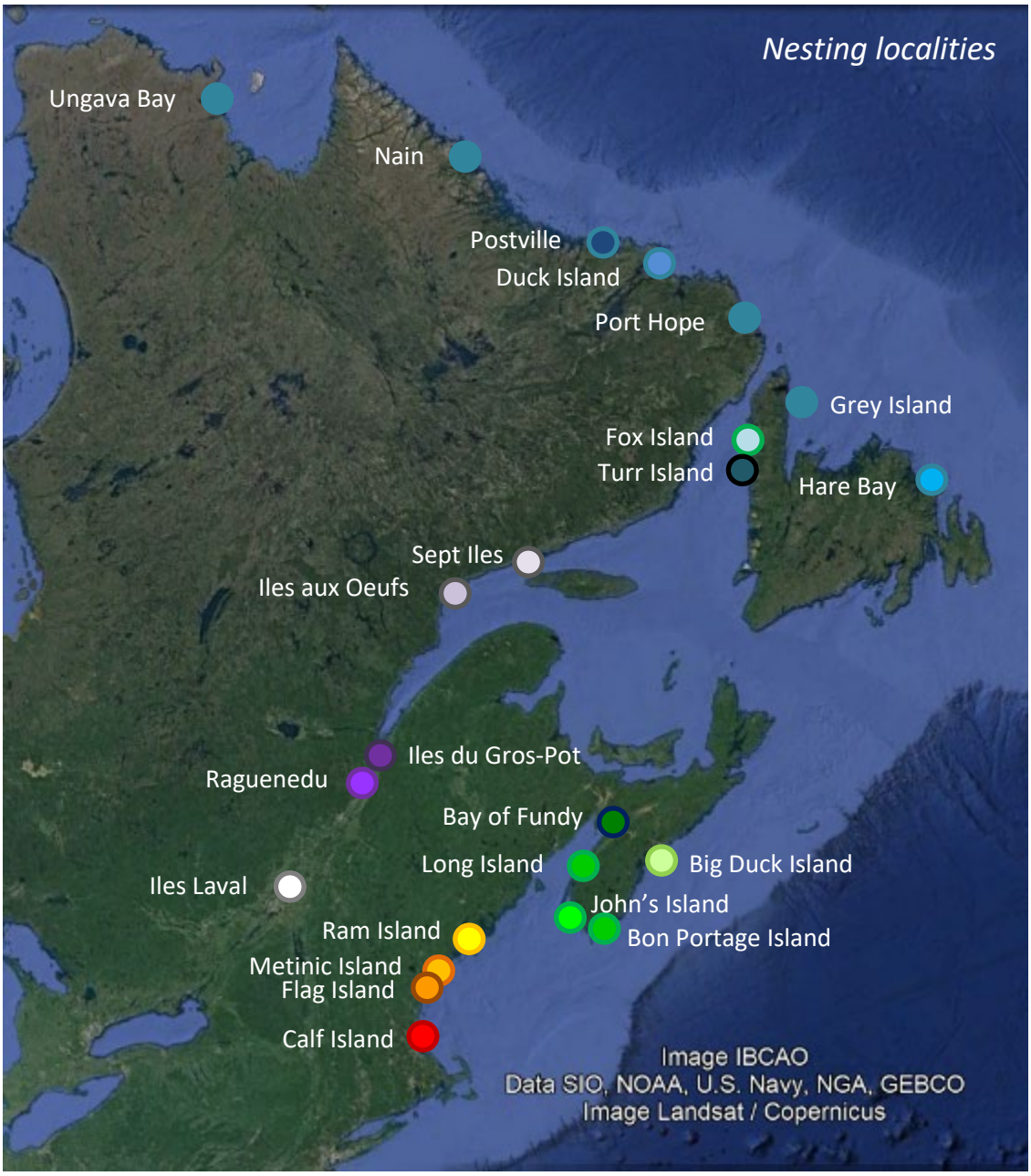

Figure. General locations of locations of the breeding reference collections. We have obtained samples from 26 breeding reference locations (n = 762).

Table: Sample locations and sizes along with status of genetic data collection for common eiders used in this study.

Sample Location	Sample Size	Status – Data collection
Quebec, Ungava Bay, Eider Island	15	Finalizing dataset
Quebec, Ungava Bay, Gyrfalcon Island	15	Finalizing dataset
Labrador, Nain	20	Finalizing dataset
Labrador, Postville	17	Finalizing dataset
Labrador, Hopedale	10	Finalizing dataset
Labrador, Makkovik	10	Finalizing dataset
Labrador, Duck Island	35	Finalizing dataset
Labrador, Port Hope	20	Finalizing dataset
Labrador, Rigolet	30	Finalizing dataset
Newfoundland, Grey Island	35	Finalizing dataset
Newfoundland, Fox Island	35	Finalizing dataset
Newfoundland, Turr Island	19	Finalizing dataset
Newfoundland, Hare Bay	33	Finalizing dataset
Quebec, Sept Iles	40	Finalizing dataset
Quebec, Iles aux Oeufs	40	Finalizing dataset
Quebec, Iles du Gros-Pot	29	Finalizing dataset
Quebec, Raguenedu	30	Finalizing dataset
Quebec, Iles Laval	29	Finalizing dataset
New Brunswick, Bay of Fundy, Hay Island	27	Finalizing dataset
Nova Scotia, Big Duck Island	23	Finalizing dataset
Nova Scotia, Long Island	17	Finalizing dataset
Nova Scotia, John's Island	30	Finalizing dataset
Nova Scotia, Bon Portage Island	24	Finalizing dataset
Maine, Metinic Island	38	Finalizing dataset
Maine, Ram Island	43	Finalizing dataset
Maine, Flag Island	17	Finalizing dataset
Massachusetts, Calf Island	55	Finalizing dataset
Massachusetts	26	Finalizing dataset
Canada Harvest 2014/15 season	105	Finalizing dataset
Canada Harvest 2015/16 season	79	Finalizing dataset
Canada Harvest 2016/17 season	102	Finalizing dataset
Canada Harvest 2017/18 season	69	Finalizing dataset
Canada Harvest 2018/19 season	69	Finalizing dataset
Canada Harvest 2019/20 season	TBA	
US Harvest 2013/14 season	126	Finalizing dataset
US Harvest 2014/15 season	186	Finalizing dataset
US Harvest 2015/16 season	82	Finalizing dataset
US Harvest 2016/17 season	71	Finalizing dataset
US Harvest 2017/18 season	101	Finalizing dataset
US Harvest 2018/19 season	115	Finalizing dataset
US Harvest 2019/20 season	42	Finalizing dataset