

Sea Duck Joint Venture
Annual Project Summary
FY2022 (October 1, 2021 – September 30, 2022)

Project Title:

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

Principal Investigators:

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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 from breeding reference locations and hunter-harvested eiders during the 2013/14 to 2019/20 seasons in the Atlantic Flyway.

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 2019/2020 (n = 456). See Figure and Table for sample location, sizes, and status of genetic data collection.

Project Status:

In FY22, we collected genetic data from hunter harvested eiders from the 2019/2020 Canada (n = 34) season. 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). Genetic data from hunter harvested eiders from the 2019/2020 U.S. (n = 42) season were collected during FY21.

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

In FY23, we will finalize the sample location information 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 FY22.

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>

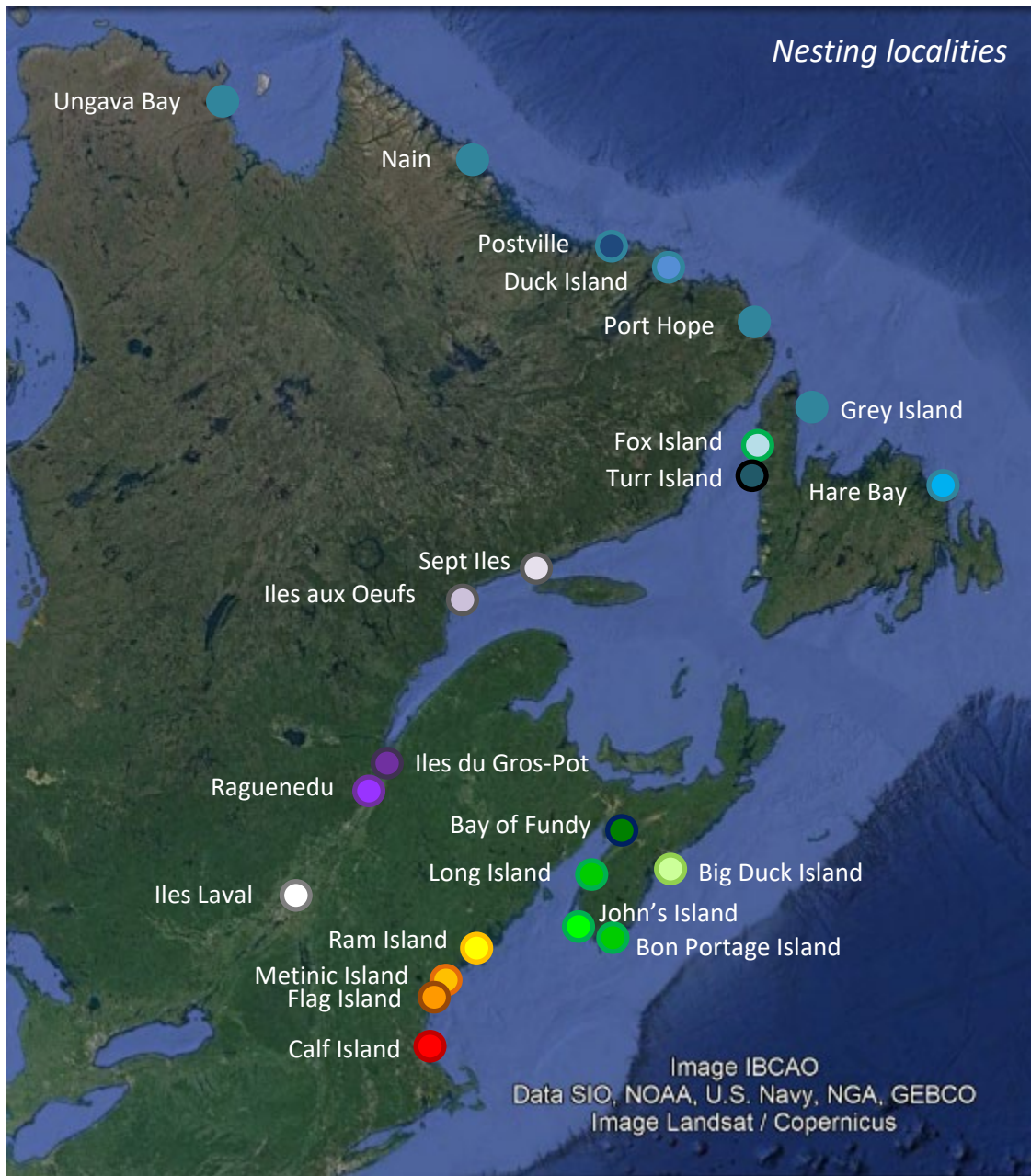


Figure. General locations of locations of the breeding reference collections. We have obtained samples from 26 breeding reference locations ($n = 762$).

Table: Sample locations and sizes for common eiders used in this study. Genetic data collection for microsatellite, ddRAD, and mtDNA loci is complete. Finalizing of sample location information is in progress.

Sample Location	Sample Size
Quebec, Ungava Bay, Eider Island	15
Quebec, Ungava Bay, Gyrfalcon Island	15
Labrador, Nain	20
Labrador, Postville	17
Labrador, Hopedale	10
Labrador, Makkovik	10
Labrador, Duck Island	35
Labrador, Port Hope	20
Labrador, Rigolet	30
Newfoundland, Grey Island	35
Newfoundland, Fox Island	35
Newfoundland, Turr Island	19
Newfoundland, Hare Bay	33
Quebec, Sept Iles	40
Quebec, Iles aux Oeufs	40
Quebec, Iles du Gros-Pot	29
Quebec, Raguenedu	30
Quebec, Iles Laval	29
New Brunswick, Bay of Fundy, Hay Island	27
Nova Scotia, Big Duck Island	23
Nova Scotia, Long Island	17
Nova Scotia, John's Island	30
Nova Scotia, Bon Portage Island	24
Maine, Metinic Island	38
Maine, Ram Island	43
Maine, Flag Island	17
Massachusetts, Calf Island	55
Massachusetts	26
Canada Harvest 2014/15 season	105
Canada Harvest 2015/16 season	79
Canada Harvest 2016/17 season	102
Canada Harvest 2017/18 season	69
Canada Harvest 2018/19 season	67
Canada Harvest 2019/20 season	34
US Harvest 2013/14 season	126
US Harvest 2014/15 season	186
US Harvest 2015/16 season	82
US Harvest 2016/17 season	71
US Harvest 2017/18 season	101
US Harvest 2018/19 season	115

