Annual Status Update - January 2021

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

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Background: 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., a decreasing population in Maine & Nova Scotia, a stable population in the Gulf of St. Lawrence, and an increasing population in Newfoundland). 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.

Aims: Further determine the population structure of American common eiders, and to probabilistically assign sport-harvested American common eiders to their breeding (source) areas. This information will help determine whether: this sub-species should be managed differently across its range based on differences in demographic rates and/or harvest pressure, and support information needs of managers to ensure that actions are directed at the most appropriate population segment. An additional objective is to 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.

Status: This project has been supported by funds from USFWS to collect genetic information from hunter harvested common eiders from the 2013/2014–2019/2020 seasons and breeding reference locations; USGS to collect genetic information from breeding reference locations and additional marker development; and SDJV to collect genetic information from hunter harvested common eiders from 2016/2017–2019/2020 seasons and breeding reference locations. CWS funded collections of reference samples from colonies in New Brunswick, Quebec, Nova Scotia, Newfoundland and Labrador and Nunavik. throughout eastern Canada and collections of tissue samples from CWSs National Harvest Surveys from 2013 to 2020. To collect samples on Labrador we partnered with the Nunatsiavut Government and the NunatuKavut Community Council. In kind support was also provided by CWS, USFWS, and USGS.

Genetic information from 12 microsatellite loci, mtDNA control region, and 9 restriction site associated DNA loci have been collected annually, with one exception: in FY20, COVID related delays with processing of hunter harvested wings , and therefore shipment of harvested as well as breeding samples to USGS, and collection of genetic data occurred.

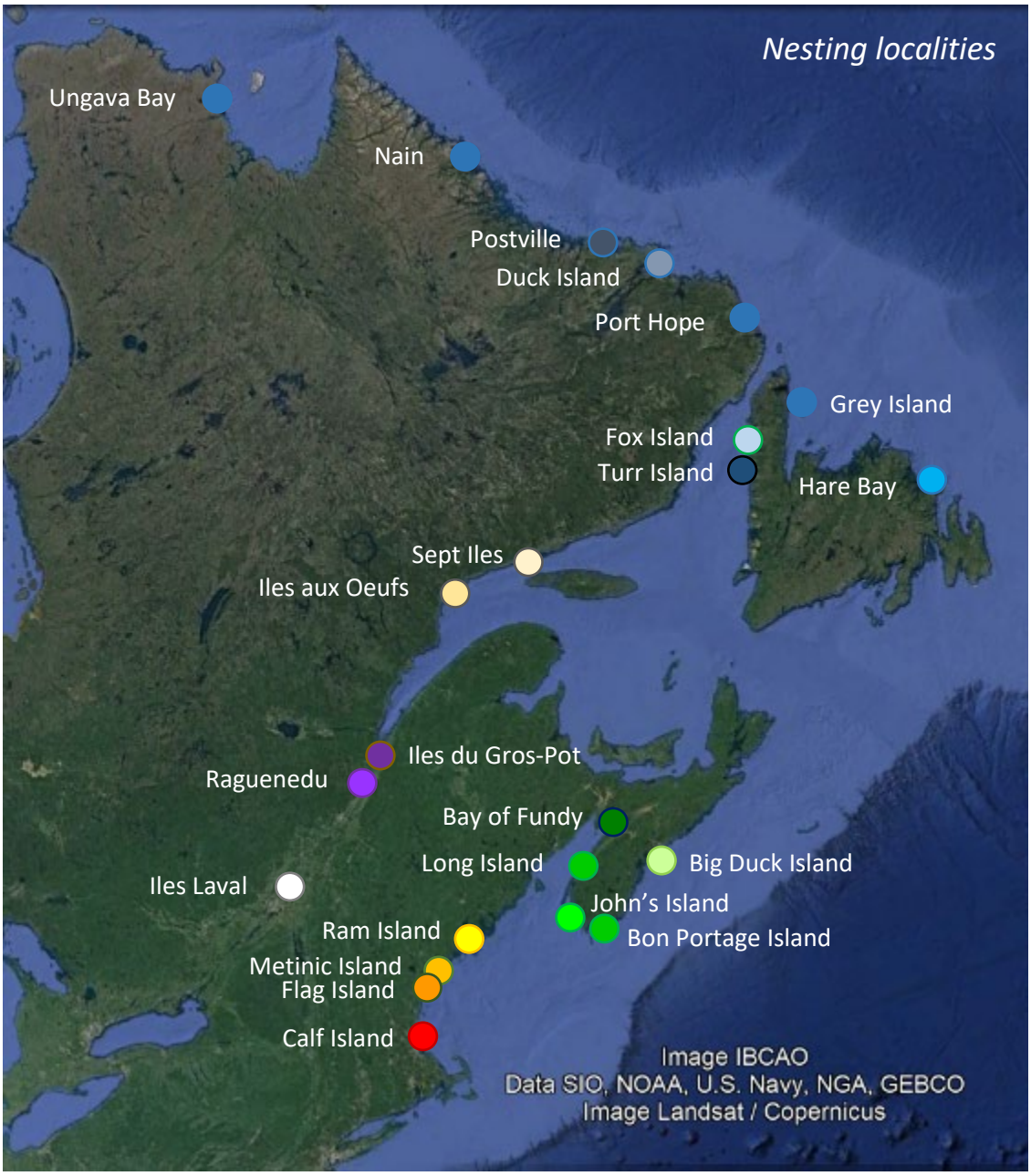

Figure 1. General locations of locations of the breeding reference collections. We have obtained samples from 26 breeding reference locations (n = 762).

Genetic data have been collected from the following eider wing samples harvested along the Atlantic Flyway: US seasons 2013/2014 to 2018/2019 (n = 681) and Canada seasons 2014/2015 to 2018/2019 (n = 424). See Table for sample location, sizes, and status of genetic data collection.

Tentative Timeline:

FY21:

Dec-Feb: Collect genetic data from eiders nesting in Labrador and other potential source areas for birds involved in harvest (n = 150).

Feb-Mar: Receive hunter harvested samples from the 2019/2020 US and Canada seasons.

Feb-July: Collect genetic data from hunter harvested eiders from the 2019/2020 seasons (n = 100). Complete 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).

July-Sept: Finalize and proof genetic and sample information in data spreadsheet.

FY22+:

Oct-Feb: Conduct analyses (genetic diversity, structure, and connectivity and assignment of harvested birds to natal areas).

Feb-Oct: 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.

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