Sea Duck Joint Venture
Annual Project Summary
FY 2017 – (October 1, 2016 to Sept 30, 2017)

Project Title: SDJV Project #149: Population Dynamics of American Common Eider (*Somateria mollissima dresseri*): Estimating Population Growth and Recruitment Rates.

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Project Description:

The current American Common Eider population estimate is around 300,000 birds and is among the most commonly harvested sea ducks in several coastal regions of eastern Canada and U.S. The sustainable harvest rate was estimated around 10%, and harvest was estimated to be about 32,000 birds (mean harvest 1998 to 2003) which exceeded the estimate of sustainable harvest for this subspecies. Although the distribution and relative abundance of American Common Eider has been well described, there exists no comprehensive monitoring program for this subspecies. Despite the lack of population data, waterfowl managers are concerned about the status of this population, especially across the southern portion of their breeding range where numbers appear to be declining (Maine, New Brunswick and Nova Scotia).

Although there is no long-term large scale survey program for *S. m. dresseri* there have been several large banding programs focused on banding adult females on the breeding colonies. Using Pradel's (1996) models, capture-recapture data can be used to estimate population growth and recruitment rates. These models have been used successfully to estimate recruitment and growth rates for a subset of the eider banding data in the St. Lawrence Estuary, Québec and for northern Newfoundland and Labrador.

Objectives:

- Compile the capture-recapture histories for the various banding datasets for *S. m. dresseri*.
- Estimate contemporary recruitment and population growth rates for *S. m. dresseri* for different segments of the population (i.e. for the period after 2000).
- Where data are available, estimate and compare past rates of recruitment and population growth for *S. m. dresseri* to current estimates.

Preliminary Results*:*

Datasets were compiled from several colonies in Quebec, Nova Scotia, New Brunswick, Newfoundland, Labrador, and Maine (Fig. 1), but were only included for analyses if they had banding programs that spanned during at least five years with regular annual capture operations, and which included more than 400 banded breeding females within a given insular colony or within nearby islands of an archipelago (Table 1).
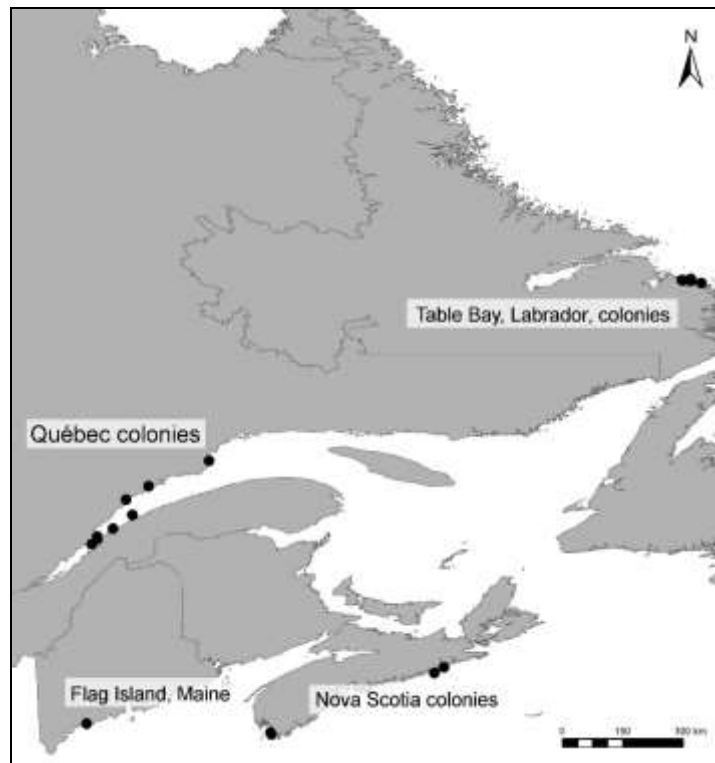
Figure 1. Location of the 14 eider colonies grouped in four regions in Quebec, Maine, Nova Scotia, and Labrador.

Table 1. Number of adult female common eiders banded and recaptured, and total number of recaptures in colonies located in Québec, Nova Scotia, Labrador, and Maine.

	Number banded females	Number recaptured females	Total number recaptures
Québec 2003-2016[a]			
Bicquette	3048	511	620
Blanche	1754	661	1273
Fraises	1335	367	528
Laval	1301	310	431
Œufs	1452	299	400
Pommes	2026	599	929
Pot	1964	513	749
Ragueneau	492	94	109
Nova Scotia 1975-2016[b]			
Big White	1678	467	637
Goodwins	400	71	86
John's	1115	205	278
Tobacco	1080	208	285
Labrador 2004-2010			
Table Bay	1592	300	553
Maine 2003-2010			
Flag Island	747	237	342

a. *Except* Île Laval*, 2004-2013;* Île aux Œufs *2004-2013 & 2015-2016;* Ragueneau *2006-2008 & 2010-2016.* **b.** Big White *1975-2010, except 1976, 1985, 1995, 1996, 2003, and 2009;* Goodwins *1995-2009, except 1997, 2003, and 2008;* John's *1996-2016, except 1997 and 2003;* Tobacco *1970-2000, except 1984, 1986-1988, 1992, and 1996.*

Results suggest that most colonies in Quebec are stable or increasing, as determined by λ values relative to 1 (>1 increasing; <1 decreasing), with the exceptions of Bicquette and Ragueneay, Table Bay (Labrador) was increasing during the study period, while all colonies assessed for Maine and NS had decreasing populations (Table 2). Contribution of recruitment to population growth (f/λ) was variable across Quebec colonies but especially low on the Ragueneau archipelago (Table 3). In Nova Scotia recruitment was relatively low across all colonies, and extremely low for Goodwin's. Maine had a very low recruitment value, while Table Bay had the highest calculated value.

Table 2. Values (95% CI) of λ, f, and γ obtained from Pradel reverse capture-recapture models with structure φfλ based on captures of female common eiders in eight colonies located in the St. Lawrence estuary, Quebec, 2003-2016.

Colony	λ (95% CI)	f (95% CI)	γ (95% CI)
Québec			
Bicquette	0.99 (0.82-1.00)	0.18 (0.15-0.22)	0.82 (0.79-0.85)
Blanche	1.07 (1.04-1.10)	0.22 (0.19-0.25)	0.80 (0.77-0.82)
Fraises	1.06 (0.99-1.13)	0.22 (0.18-0.26)	0.80 (0.76-0.83)
Laval	1.01 (0.96-1.05)	0.14 (0.10-0.20)	0.86 (0.81-0.90)
Oeufs	1.02 (0.97-1.07)	0.22 (0.17-0.27)	0.79 (0.74-0.83)
Pommes	1.00 (0.98-1.03)	0.17 (0.14-0.19)	0.83 (0.81-0.85)
Pot	1.04 (1.01-1.08)	0.22 (0.19-0.26)	0.79 (0.76-0.82)
Ragueneau	0.95 (0.88-1.03)	0.06 (0.01-0.22)	0.94 (0.78-0.99)
Nova Scotia			
Big White	0.99 (0.98-1.00)	0.14 (0.13-0.16)	0.85 (0.84-0.87)
Goodwins	0.82 (0.75-0.89)	0.02 (0.001-0.35)	0.97 (0.61-1.00)
John's	0.96 (0.93-0.98)	0.14 (0.11-0.18)	0.83 (0.79-0.86)
Tobacco	0.98 (0.96-0.99)	0.14 (0.12-0.17)	0.85 (0.83-0.87)
Labrador			
Table Bay	1.05 (0.93-1.17)	0.25 (0.15-0.38)	0.77 (0.66-0.85)
Maine			
Flag Island	0.93 (0.84 - 0.97)	0.08 (0.04-0.16)	0.91 (0.83-0.96)

Table 3. Contribution of recruitment to population growth
(f/ λ) for each colony.

Colony	f/λ (95% CI)
Québec	
Bicquette	0.18 (0.14-0.24)
Blanche	0.21 (0.17-0.25)
Fraises	0.21 (0.16-0.26)
Laval	0.14 (0.09-0.22)
Oeufs	0.22 (0.15-0.29)
Pommes	0.17 (0.13-0.20)
Pot	0.21 (0.17-0.27)
Ragueneau	0.06 (0.01-0.27)
Nova Scotia	
Big White	0.14 (0.13-0.17)
Goodwins	0.02 (0.00-0.49)
John's	0.17 (0.16-0.19)
Tobacco	0.14 (0.12-0.18)
Labrador	
Table Bay	0.24 (0.12-0.46)
Maine	
Flag Island	0.09 (0.04-0.19)

Project Status:

Analyses are completed and a draft final report is under review by the PIs and will be made available as soon as possible

The next step will be to hold a meeting with all PIs to discuss these results, develop research and monitoring priorities, and development a manuscript to be submitted to a peer-reviewed journal.