

## Sea Duck Joint Venture

### Annual Project Summary for Endorsed Projects FY 2007 – (October 1, 2006 to September 27, 2007)

**Project Title:** Ecological and behavioural monitoring of American Common Eiders during the annual cycle (SDJV # 71; Year 2 of 3)

**Principal Investigator:** Magella Guillemette, Département de biologie, chimie et sciences de la santé, Université du Québec à Rimouski, P.O. Box 3300, 300 allée des Ursulines, Rimouski, Québec, Canada G5L 3A1 [magella\\_guillemette@uqar.qc.ca](mailto:magella_guillemette@uqar.qc.ca)

**Partners:** Sea Duck Joint Venture ; Canadian Wildlife Service (Quebec Region); Université du Québec à Rimouski (UQAR)

#### Project Description

In this project, we want to apply a recent technique for the study of sea ducks that enables an investigator to monitor the behavior and energy expenditure of an individual during a full annual cycle. The American race of Common Eiders is facing increasing environmental pressure from harvesting of coastal resources, hunting, oil spills and soon, offshore wind parks. Our main goal is to link the various biological phases (post-hatching, molting, pre-laying, etc.) of the annual cycle together by understanding the relationships between habitat use, energy expenditure, food demand and migratory movements.

Our objectives are 1) to quantify the timing and duration of annual phases, 2) to quantify habitat use (depth), energy expenditure, time spent diving and body condition of post-reproductive females, 3) to use depth, daily diving and bottom time to estimate feeding efficiency and foraging effort throughout the annual cycle, 4) to estimate the duration of the pre-laying period based on the timing of spring migration and relate these (individual) estimates to energy expenditure, foraging behavior and laying date.

#### Preliminary results

Our objectives for FY 2007 required to deploy data loggers (DLSs), to monitor breeding biology and assess body condition of post-hatching females. We conducted our study at Pointe Mitis (47°34' N; 70°12' W) for the deployment of DLSs. This colony was chosen based on its low number of breeding females and easy access. Because our study requires the deployment of DLSs a first year and catch back the same females one year later, our main concern is to maximize our chances to catch instrumented females.

**CATCHING AND HATCHING SUCCESS OF FEMALES:** We designed nest boxes that we are able to close at 500 feet distance using a remote control. Seventy-two (72) such nest boxes were installed this year and most (64) of these were used by breeding eiders. Among the nest boxes used, 14 (22 %) females hatched eggs, 14 (22 %) nests were predated and 36 (66 %) had an undetermined fate. Laying date was late averaging 19<sup>th</sup> May  $\pm$  (SD) 5 days. The high number of undetermined fate of nests observed was most probably caused by a late (12<sup>th</sup> July) check of the nest boxes when crows and gulls may scavenge empty (no incubating females) nest boxes for unfertile eggs.

**Planning FY08:** We plan to build new nest boxes (with an automatic closing) in order to increase their number mostly because some nest boxes were used twice in succession and a small number (4) of females were nesting outside nest boxes.

#### RETURN RATE AND DEPLOYMENT OF DLSs

Six females were instrumented with DLSs in spring 2006 among which 3 (50 %) were re-captured in spring 2007. Analysis of the data of these three loggers will start this fall. We deployed with success a total of 23 DLSs in spring 2007. However, one DLS (24<sup>th</sup>) was not deployed as it was apparently not functioning.

**Planning FY08:** We plan to install the nest boxes for the two next years (spring 2008 and spring 2009) in order to catch back instrumented females that may come back after skipping one year of breeding.

**ENERGY BALANCE AND ORGAN MASS:** Sixty-nine (69) specimens were collected during post-reproduction around île Bicquette, île Saint-Barnabé and Rivière Tartigou near Rimouski. Fresh muscle from three different regions of the body were removed and frozen at  $-80^{\circ}\text{C}$ . In addition, all specimens had their organs (lungs, pectorals, heart, gizzard, spleen, etc.) dissected and weighed and their wing morphology measured (wing span and wing area). Hemoglobin concentration was determined and fresh blood was conserved for further analysis. Enzyme assays were applied last winter (2007) to quantify the activity of proteazome, an index of protein deterioration. The ratio AND/ARN were also measured and together with the activity of proteazome will provide an index of protein turnover and growth of tissues. Finally, specimens were plucked, their wings removed and homogenized in an industrial blender. Triplicate samples of each specimens were prepared for chemical (water, protein and fat) analysis and sent to a commercial lab.

Planning FY08: We plan to continue the collection of specimens next year to increase our sample size further.

### **Project status**

We are very satisfied with data collection and lab analysis during the second year of the project while the collection of specimens is still going on at the time of writing. We are particularly satisfied with the success of our automatic nest boxes as we can almost catch all the females on the breeding colony. This is of an utmost importance as we will try to catch most instrumented females next year (FY 2008).