

Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 05 – (October 1, 2004 to Sept 30, 2005)
Reporting Deadline: September 30, 2005

Project Title:SDJV #70: Timing and Location of Acquisition of Nutrients and Energy for Clutch Formation by Black Scoters

Principal Investigator(s):

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Project Description:

Annual breeding pair surveys have indicated a decline in numbers of scoters in tundra habitats in Alaska; because almost all scoters in this environment are Black Scoters, this is considered to be the best indicator of trends of Pacific breeding Black Scoters in North America. As with many sea ducks, the cause or causes of this decline are not clear, spurring the need for directed research to address this issue.

Reproduction in birds requires a large investment of energy and nutrients. Energetic and nutritional requirements for reproduction may be met by increased foraging in the local environment or by using stored nutrient reserves during high demand periods. Where birds fall along the capital to income continuum reflects their particular life history strategy and attributes of their environment, and indicates when and where management actions are most effective for influencing productivity.

In waterfowl, the egg synthesis stage of reproduction is particularly challenging, requiring large amounts of nutrients and energy over a relatively short period. Because waterfowl are diverse in morphology, distribution, behaviour, and diet, considerable interspecific variation exists in reliance on endogenous reserves for clutch formation. These issues are important in general, and for Black Scoters in particular, because understanding the strategy that a species uses for nutrient acquisition for reproduction leads to clear conservation implications. Black Scoters initiate nests weeks later than other waterfowl species and the reason for this delay is unknown. Nutritional status has been directly related to timing of nesting, clutch size, and subsequently overall production of young. Nutritional constraints that lead to depression of productivity can, in turn, lead to population declines. By defining the strategy by which birds acquire nutrients for reproduction, we can identify the portion of the annual cycle (both geographically and temporally) when nutritional constraints could be expected to affect productivity. Depending on the outcome, this can lead to direct management actions. We are attempting to address this issue in Black Scoters, with the intent of contributing to the growing knowledge base needed to conserve this declining species.

Objectives (*should identify how the project addresses SDJV priorities*):

In simple terms, the research question can be phrased as: “**Where and when do Black Scoter females acquire the nutrition and energy needed to form their eggs?**”. Using the approach described below, we will be able to determine:

- (1) whether females build reserves on marine areas for subsequent investment in reproduction;
- (2) whether herring spawn contributes a significant amount of energy and nutrition in Black Scoter eggs;
- (3) whether wintering, spring staging, or breeding areas are most important for acquisition of egg nutrients; and,
- (4) the importance of nutrients obtained on breeding areas for egg production and/or maintenance during incubation.

Results:

We collected 38 Black Scoters from late winter, spring staging, and breeding areas during 2005. These carcasses are intended for use in studies of body composition and stable isotope signatures of reproductive tissues, to determine the strategies that black scoter females employ for acquiring and allocating nutrients and energy for reproduction.

We currently do not have funds to analyze these samples, nor to increase sample sizes to adequately quantify these issues.

Project Status (*e.g., did you accomplish objectives, encounter any obstacles, do you have plans for the future?*)

We consider this project ongoing, and intend to seek funding to finish this important research.

Project Funding Sources (US\$) (complete only if funded by a SDJV partner e.g., USFWS, CWS, DU, USGS, or Flyway rep; this is used to document how SDJV appropriated funds are matched):

| SDJV (USFWS) Contribution | Other U.S. federal contributions | U.S. non-federal contributions | Canadian federal contributions | Canadian non-federal contributions | Source of funding (agency or organization) |
|---------------------------|----------------------------------|--------------------------------|--------------------------------|------------------------------------|--|
| | \$38,500 | | | | USGS |
| | | | | \$5,200 | Simon Fraser Univ. |
| | \$8,500 | | | | USFWS |
| | | | | | |

Total Expenditures by Category (US\$) (complete only if project is funded by a SDJV partner e.g., USFWS, CWS, DU, USGS, or Flyway rep; dollar amounts should include all partner contributions):

| ACTIVITY | BREEDING | MOLTING | MIGRATION | WINTERING | TOTAL |
|----------------------|----------|---------|-----------|-----------|-------|
| Banding | | | | | |
| Surveys | | | | | |
| Research | \$53,200 | | | | |
| Communication | | | | | |
| Coordination | | | | | |