Sea Duck Joint Venture

Annual Project Summary for Endorsed Projects
FY04 – (October 1, 2003 to Sept. 30, 2004)

Project Title: Winter habitat use and selection of the Barrow's Goldeneye (*Bucephala islandica*) Eastern population along the St. Lawrence River Estuary, Quebec, Canada (SDJV # 44; Year 1 of 3)

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Partners: Canadian Wildlife Service (Quebec Region); Université du Québec à Rimouski (UQAR)

Project Description: The St. Lawrence River estuary is the major wintering area for the Eastern North American population of Barrow's Goldeneye, which is legally considered "at risk" by the Canadian and Quebec Governments. During six months a year, this estuary supports over 50% of the entire population, estimated at no more than 4,500 birds. Still nothing is known about the factors that may control the species distribution (e.g. macro- and microhabitats, food preferences and depletion) along its main wintering area. Winter habitats are probably critical to this small population whose annual recruitment is subordinate to high adult survival.

Objectives: Our general goal is to describe and quantify, at two spatial and temporal scales, biotic (benthic community and prey availability) and physical (ice conditions, tide oscillations, depth, topography and substrate) components of the habitat of Eastern Barrow's Goldeneye as well as its time and energy budget. More specifically, our objectives are 1) to describe diet and trophic level using gut content examination and stable isotope analysis, 2) to describe macrohabitats used at the scale of the whole estuary using aerial photograph examination remote sensing and a dynamic model of pack ice cover fluctuation and movements within the estuary, 3) to describe microhabitats at the scale of the bay or foreshore flat itself using laser binoculars, quadrat and plankton sampling and 4) to quantify time and energy budget in order to understand what may constrain their survival in winter. Habitat requirements of Eastern Barrow's Goldeneye are quoted high priority need in SDJV Strategic Plan 2001 – 2006.

Preliminary Results: Our objectives in 2004 addressed habitat requirements at the microhabitat scale. Ground surveys were conducted along the wintering area between Saint-Irénée (47°34' N; 70°12' W) and Baie-Sainte-Catherine (48°06' N; 69°43' W) on the north shore of the St. Lawrence River Estuary from January to April 2004 (total of 84 surveys in 8 sites). Flocks of wintering Barrow's Goldeneyes were accurately positioned in the study site from hides using laser binoculars and a GPS unit. We positioned a total of 203 flocks with a mean size (±SD) of 25 individuals ±48. At each survey we recorded the number of individuals present on the site, sex-ratio, tide level, the extent of ice cover and quantified foraging intensity of the individuals. Habitat description was conducted in the intertidal and upper infralittoral zones of the wintering area in August 2004. Habitats were described in terms of substrate type, benthic communities, topography, depth and availability of potential preys.

This first year of data collection provided the first insight at the types of coastal habitat used by wintering Eastern Barrow's Goldeneye. As revealed by analysis of aerial (by CWS) and ground survey (by UQAR) data coupled with aerial photographs examination, Eastern Barrow's Goldeneye winter habitat corresponds to shallow foreshore flats of various size and remaining largely free of sea ice throughout the winter season. In-site habitat description revealed a wide diversity of substrate types and benthic communities. All sites are characterized by a shallow slope. Most of feeding activity takes place at high tide in the intertidal zone in water less than 2 meter deep. Barrow's Goldeneyes were observed feeding over rocky shelves supporting dense *Fucus* communities as well as over barren sand flats. Bivalves and polychaetes were almost completely absent in all sites surveyed but one. The near complete absence of benthic invertebrates at some sites suggests that Eastern Barrow's Goldeneye winter diet may be based on nektonic organisms, a very different diet than that of the western population. Furthermore, observation of intense diving activity along

the edge of the land-fast ice at high tide suggests that Barrow's Goldeneyes may wander under the ice presumably to feed on ice algae grazers. A sampling program designed to sample these organisms at the beginning of the next winter is underway.

Project Status: These preliminary results stem from the first year of data collection of an ongoing three year study. We met our objectives for 2004 by getting started with microhabitat description. Additional GIS analyses are currently underway in order to further discriminate the factors controlling macro- and micro habitat selection and use by Eastern Barrow's Goldeneye in its wintering grounds. Our goal for next year is to get field data collection going from November 2004 to May 2005. Our objectives will address time budget, diet and trophic level and will further address habitat selection at spatial and temporal macro- and micro-scale.

Extremely cold temperatures in the study area in January 2004 resulted in an unusually wide extent of pack ice over foreshore flats and the consequent contraction of available habitat to Barrow's Goldeneyes. This event rose higher our concerns that winter may be a critical period in the life cycle of Eastern Barrow's Goldeneye.

Project Funding Sources (US$) for FY04 (May 01 2004 to April 30 2005). These exclude in-kind contributions.

SDJV (USFWS) contribution	Other U.S. federal contribution	U.S. non-federal contribution	Canadian federal contribution	Canadian non-federal contribution	Source of funding (agency or organisation)
19793*					SDJV
			12388"		CWS
				15000	FQRNT**

* We received 19 793 $ from SDJV that we could use only from May 1 2004. The 9365 $ was spent as salary (6000 $) for the Ph.D. candidate (J.F. Ouellet) and as travel/accomodations (3 365 $) to the study site. The rest of the money (about 10 000 $) that we received from SDJV will be spent before December 31 2004 to rent and use a pick-up truck (3000 $ starting in October), to pay a field assistant (about 4 000 $) and pay the administrative costs to UQAR (about 3 000 $).

" The money from CWS was spent from December 2003 to purchase laser binoculars (9 300 $), for travel/accomodations (2 300 $) and the rest as administrative costs.

**Fond Quebecois de Recherche en Nature et Technologie.

Total expenditures by Category (US $) for FY04

ACTIVITY	BREEDING	MIGRATION	MOLTING	WINTERING	TOTAL
Banding					
Surveys					
Research				47181	47181
Communication					
Coordination					