Gwich'in Renewable Resource Board
Funding Application 2002-2003

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HABITAT REQUIREMENTS OF WHITE-WINGED AND SURF SCOTERS IN THE MACKENZIE DELTA REGION, NORTHWEST TERRITORIES

1. Project Summary

This is the final year of this project which examines how habitat characteristics affect the abundance, distribution, and productivity of white-winged and surf scoters in the Gwich'in Settlement Area (GSA). The forested wetlands of the GSA are among the most important breeding sites in North America for these two species of sea ducks. The combined scoter population has declined by approximately 75% during the past 40 years and this is of concern to subsistence hunters from the GSA and wildlife managers across North America. Scoters, locally known as black ducks, are an important subsistence resource for Gwich'in people. A long-term decline in the population of these key harvested species threatens the availability of this traditional food source. Because little previous research has been conducted on scoters, particularly in the northern portion of their breeding range, reasons for their decline are not well understood. Determining the habitat requirements of these little-studied ducks is an important first step in understanding their ecology and in developing conservation initiatives.

Total amount of funding requested from the GRRB: $16,000

2.1 Background and Rationale

Apparent long term declines in continental populations of surf (*Melanitta perspicillata)* and white-winged scoters (*M. fusca*) have raised concerns about underlying causes for decreases and long term viability of these sea duck species. Because scoters are possibly the least studied species of waterfowl in North America (Bellrose 1980), reasons for this decline are not well understood (Can. Wildl. Serv. Waterfowl Committee 1999). Although annual waterfowl breeding population surveys indicate the majority of the combined scoter population breeds in the northwestern boreal forest between Great Slave Lake and the Arctic Ocean (Bellrose 1980), very little research on these species has been conducted in this region.

Life-history attributes of scoters are typical of most long-lived species of waterfowl (Bellrose 1980). Band recoveries have shown that white-winged scoters may live 18 years or more (Kehoe et al. 1989). Scoters may not breed until they are two or three years old, and some older individuals may not breed in some years. Survival of young follows a pattern of "boom and bust" (Krementz et al. 1997). These features may make scoters especially sensitive to habitat change and disturbance (Brown and Fredrickson 1989, Brown and Fredrickson 1997, Savard et al. 1998).

Data collected by the U.S. Fish and Wildlife Service suggests that breeding success of scoters may have decreased since the early 1970s (Krementz et al. 1997, Can. Wildl. Serv. Prairie and Northern Region Sea Duck Team 2000). A low duckling survival rate experienced by scoters may contribute to low breeding success even under favorable nesting conditions (Brown and Brown 1981, Brown and Fredrickson 1986, Savard and Lamothe 1991). Scoters are among the last ducks to reach breeding grounds in spring and one of the last to nest (Bellrose 1980). This late start, coupled with a 9 – 11 week fledging period (Brown and Fredrickson 1997), and the fact that adult females usually abandon broods between weeks one and three, means that scoter ducklings must endure cool water and near freezing evening temperatures late in the season without the benefit of brooding by the hen. Scoter ducklings may have difficulty balancing high energy demands needed to stay warm against equally demanding requirements for growth (Brown 1981, Brown and Fredrickson 1986). Such a high demand for energy may account for scoter duckling dependence on predictable, energy-rich food resources (Brown 1981, Brown and Fredrickson 1986, Brown and Fredrickson 1989). This implies that female scoters may select habitats that have specific wetland features that offer good quality foraging for nutrient-rich foods or provide physical protection to ducklings. This project examines these theories by comparing characteristics of wetlands used by white-winged and surf scoters during nesting and brood rearing with features of wetlands that are not used by scoters.

As the northwestern boreal forest is still largely untouched by human development, this study will provide an opportunity to learn about habitat requirements before development begins. A recent renewal of oil and gas exploration in the Mackenzie Delta and surrounding area means there is the possibility of negatively affecting important scoter breeding habitat. An understanding of potential impacts and ways to mitigate them will be valuable for effective scoter population management. Thus, results of this work (i.e., pre-impact) will be extremely useful for future environmental impact assessment studies.

Additionally, Gwich'in hunters rely on scoters as an important subsistence food resource. Gwich'in elders and hunters have reported declines in the number of scoters returning to the area each year (Gwich'in Elders 1997). Future decline threatens the availability of this traditional food source.

2.2 Objectives

Understanding habitat requirements is an important first step in understanding their breeding ecology and in developing conservation initiatives; therefore the following objectives were developed for this project:

1. Characterize wetland habitats available to breeding surf and white-winged scoters in the Mackenzie Delta and adjacent upland wetlands.
2. Test for evidence of habitat selection by determining how specific wetland characteristics affect abundance, distribution and productivity of surf and white-winged scoters:
    a) where scoter pairs are found versus available habitat;
    b) where scoter broods are reared versus those used by breeding pairs, or not used at all.
3. Determine whether Landsat data can be used to predict scoter distribution (using 2001 duck data), and, if so, validate model predictions with independent duck data collected from new survey areas in 2002.

3. Methods and Study Area

In 2001, a study area of approximately 6200 km^2 was chosen, made up of the southeastern Mackenzie Delta and surrounding upland area south of Inuvik (Figure 1). Scoters were counted during helicopter surveys of 205 wetlands located within 31 randomly-selected, 1-km radius plots situated in the Delta and adjacent upland area; plots were evenly distributed to include both delta and upland habitat. Each wetland was surveyed twice in June for breeding scoters and twice in late July/early August for broods. Data collected from the surveys were used to assign each wetland into one of seven "use categories" (for each species): (1) used by breeding pairs only, (2) used by broods only, (3) used by breeding pairs and broods; or used by neither species.

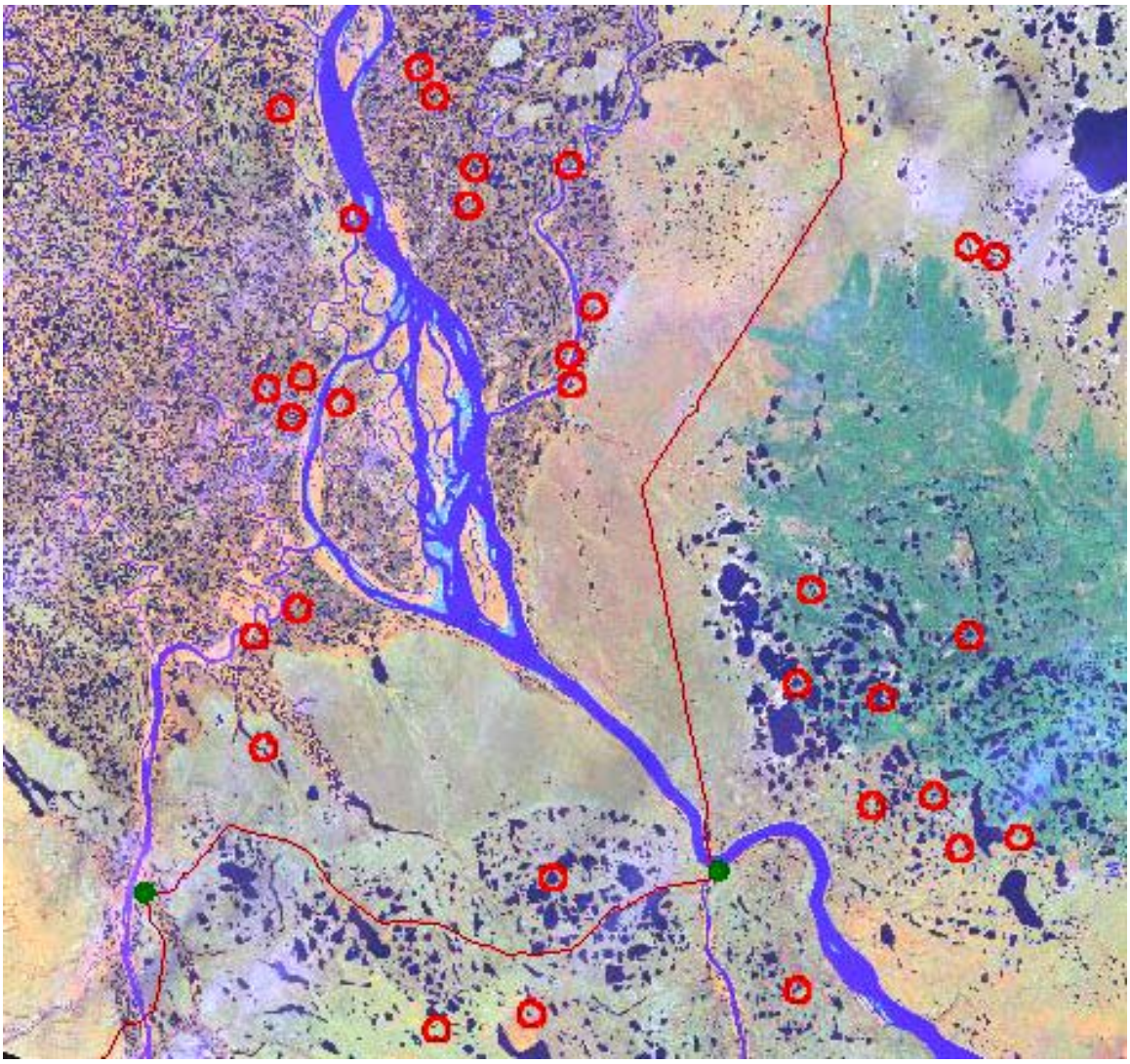
Wetland area, shoreline perimeter, and an edge:area ratio were calculated for each wetland surveyed using ArcView GIS. In mid-August, a randomly-selected subset of wetlands from each of the above mentioned "use categories" was sampled more intensively. Each of these wetlands was visited (using a float-equipped helicopter) to collect water samples, food items (amphipods), and other physical and spatial measurements of the wetlands and their adjacent uplands.

I will repeat these steps in 2002 with approximately 200 new lakes in new plots. Characteristics of wetlands from each "use category" will be contrasted to evaluate whether (a) wetland selection occurs at different stages of the breeding season; and (b) wetlands used by pairs differ from those used by broods. Additionally, one general objective is to determine whether or not it will be possible to model scoter abundance (or presence/absence) using wetland

characteristic data taken from Landsat images and/or data acquired from more intensive wetland habitat sampling. If it is, I will validate model predictions by comparing predicted (based on 2001 data) and observed (2002 data) scoter distributions.

In 2001 I collected wings of hunter shot scoters. I froze and stored the samples for future work on a related project focusing on molting and wintering areas of these birds. I will continue to collect wings from hunters during 2002.

Figure 1. Map of study area and plots surveyed in 2001 (below).



4. Community Involvement

This project has been planned based on information collected during consultation with duck hunters from all four Gwich'in communities during March and April 2000. I will continue to consult with the Renewable Resource Councils as this project progresses and will prepare a poster both this winter and next to communicate results to community members.

5. Time Schedule

The project began in 2000 and will continue until spring 2003.

Literature search and project development	September 2000 - February 2001
Scoter harvest sampling	Late May - Early June 2001/2002
Breeding pair surveys	Mid - Late June 2001/2002
Brood surveys	Late July - Early August 2001/2002
Habitat characteristic sampling	Mid August 2001/2002
Poster and progress report completed	January 2002/2003
Final Report (and thesis) completed	May 2003

6. Literature Cited

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7. Project Budget:

(Note: Financial information is not included in this pdf file)