Habitat Requirements of White-Winged and Surf Scoters in the Mackenzie Delta Region, Northwest Territories

by Shannon L. Haszard

INTRODUCTION

In 1998 I was presented with an opportunity to fulfil a long-time dream: to work in the Arctic. This opportunity came in the form of a job offer from the Gwich'in Renewable Resource Board (GRRB) in Inuvik, Northwest Territories. Over the next two years, I worked on projects involving wildlife and forest management in the Gwich'in Settlement Area. It was during this time that I became interested in pursuing graduate work that would focus on waterfowl breeding in the Arctic. My thesis project developed in response to concerns voiced by the communities of Inuvik, Aklavik, Tsiigehtchic, and Fort McPherson. Gwich'in elders and hunters from these Mackenzie Delta communities had noticed a decline in the number of white-winged scoters (*Melanitta fusca*) and surf scoters (*M. perspicillata*) returning to the area each year (Gwich'in Elders, 1997). Scoters, locally known as black ducks, are an important subsistence resource for Gwich'in people, so there was strong local support for a project focusing on these species of sea ducks. In September 2000, I began my M.Sc. program in Biology with Dr. Robert Clark at the University of Saskatchewan. My thesis work focuses on learning more about the habitat requirements of white-winged and surf scoters in the Mackenzie Delta region.

A CONTINENTAL DECLINE IN SCOTER POPULATIONS: BACKGROUND INFORMATION

A closer look at the literature revealed that a decline in scoter populations has been noticed throughout most of their historical breeding range. This continental population decline has raised concern about underlying causes of decreases and long-term viability of these species of sea ducks. The decline has been most pronounced in the boreal forest of northern Alberta, British Columbia, and the Northwest Territories, where the combined scoter population has decreased by an estimated 75% since the 1950s (Canadian Wildlife Service (CWS) Prairie and Northern Region Sea Duck Team, 2000). This is of particular concern because annual surveys indicate that the majority of the combined scoter population breeds in this region, most notably in the boreal forest between Great Slave Lake and the Arctic Ocean (Bellrose, 1980). Because scoters are possibly the least-studied species of waterfowl in North America (Bellrose, 1980), reasons for the decline are not well understood.

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 forgo breeding in some years. Offspring survival and recruitment into the population follow a pattern of "boom and bust" (Krementz et al., 1997). These features may accentuate the sensitivity of scoters to habitat alteration and disturbance (Brown and Fredrickson, 1989, 1997; Savard et al., 1998).

Data collected by the U.S. Fish and Wildlife Service suggest that breeding success of scoters may have decreased since the early 1970s (Krementz et al., 1997; CWS 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

Shannon Haszard conducting a helicopter survey.

Lakes and channels of the Mackenzie Delta.

Bob Clark and John Edwards searching for scoters by boat in the Mackenzie Delta.

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 is coupled with a 9–11 week fledging period (Brown and Fredrickson, 1997), and adult females usually abandon broods between weeks one and three. Thus 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 demands for energy (needed for thermoregulation) against equally demanding requirements for growth (Brown, 1981; Brown and Fredrickson, 1986). Such a high energy demand may account for scoter ducklings' dependence on predictable, energy-rich food resources (Brown, 1981; Brown and Fredrickson, 1986, 1989). This implies that female scoters may exhibit a high level of habitat selectivity related to specific wetland features that offer good-quality foraging for nutrient-rich foods or provide physical protection to ducklings. My project addresses these hypotheses 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.

A surf scoter pair in a small pond.

STUDY AREA, PROJECT DESIGN AND IMPLEMENTATION

Our limited knowledge about habitat requirements and breeding biology of these species originates from studies of relatively small, isolated populations: white-winged scoters in prairie-parklands and surf scoters in forested areas of Quebec (Brown and Brown, 1981; Brown and Fredrickson, 1986, 1989; Kehoe, 1986; Savard and Lamothe, 1991; Reed et al., 1994). Because most of the breeding scoter population occurs between Great Slave Lake and the Arctic Ocean (Bellrose, 1980), new information about habitat requirements in this part of their core breeding range will contribute to understanding their ecology and developing conservation initiatives. Oil and gas development is being proposed for much of the Mackenzie Delta over the next few years. A better understanding of those habitat characteristics that contribute to successful breeding and brood rearing will allow managers to ensure that appropriate scoter habitat is safeguarded during development. This information can also be used to establish a baseline for monitoring habitat changes that may occur as a result of future development activities.

My research is being conducted in the Mackenzie Delta and surrounding upland area south of Inuvik, Northwest Territories (68˚N, 134˚W). The Delta, characterized by many lakes and the channels of the Mackenzie River, is surrounded by an upland area of low relief, with wetlands ranging from small stagnant ponds to large deep lakes. The Delta forest is dominated by white spruce, while that of the upland is dominated by stunted black spruce. The only road in the region, the Dempster Highway, runs through the upland along the southern and eastern sides of the Delta until it reaches Inuvik.

This summer, I conducted helicopter surveys of 220 wetlands in 31 randomly selected plots. Half of the plots

were in the Delta, and half were in the upland habitat. Each wetland was surveyed twice in June for breeding pairs and twice in early August for broods. Wetlands were then classified as used or not used by pairs and broods of both species. In mid-August, I revisited a subset of used and non-used wetlands to collect water samples and data concerning characteristics of each wetland and its surrounding upland habitat.

PRELIMINARY RESULTS

Initial results indicate that white-winged scoter pairs are more abundant than those of surf scoters in both Delta and upland regions. Pairs of both species occupy upland lakes more frequently than Delta lakes and seem to be more abundant on medium and large wetlands than on small wetlands. Although we observed 394 pairs of white-winged scoters and 68 pairs of surf scoters during the two breeding pair surveys, we observed only 68 white-winged scoter broods and 20 surf scoter broods. The broods were distributed approximately equally between Delta and upland lakes. I am currently compiling and analyzing data to verify these initial impressions and evaluate a habitat selection pattern. I will conduct a second field season next summer to compare predicted scoter distributions (based on results from 2001 data) and observed scoter distributions from independent surveys of new lakes in new plots.

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REFERENCES

BELLROSE, F.C. 1980. The ducks, geese, and swans of North America. Harrisburg, Pennsylvania: Stackpole Books.

BROWN, P.W. 1981. Reproductive ecology of the white-winged scoter. Ph.D. dissertation, University of Missouri, Columbia.

BROWN, P.W., and BROWN, M.A. 1981. Nesting biology of the white-winged scoter. Journal of Wildlife Management 45(1): 38–45.

BROWN, P.W., and FREDRICKSON, L.H. 1986. Food habits of breeding white-winged scoters. Canadian Journal of Zoology 64:1652–1654.

———. 1989. White-winged scoter, *Melanitta fusca*, populations and nesting on Redberry Lake, Saskatchewan. Canadian Field-Naturalist 103(2):240–247.

———. 1997. White-winged scoter (*Melanitta fusca*). In: Poole, A., and Gill, F., eds. The birds of North America, No. 274. Philadelphia: The Academy of Natural Sciences and Washington, D.C.: The American Ornithologists' Union.

CANADIAN WILDLIFE SERVICE PRAIRIE NORTHERN REGION SEA DUCK TEAM. 2000. Sea duck research priorities for prairie and northern region. Unpubl. Report. Available from the Canadian Wildlife Service, c/o Lynne Dickson, #200, 4999 – 98 Avenue, Edmonton, Alberta T6B 2X3.

GWICH'IN ELDERS. 1997. Gwich'in words about the land. Inuvik: Gwich'in Renewable Resource Board.

KEHOE, F.P. 1986. The adaptive significance of creching behavior in the white-winged scoter (*Melanitta fusca deglandi*). M.S. Thesis, University of Guelph. Guelph, Ontario. 67 p.

KEHOE, F.P., BROWN, P.W., and HOUSTON, C.S. 1989. Survival and longevity of white-winged scoters nesting in central Saskatchewan. Journal of Field Ornithology 60(2):133–136.

KREMENTZ, D.G., BROWN, P.W., KEHOE, F.P., and HOUSTON, C.S. 1997. Population dynamics of white-winged scoters. Journal of Wildlife Management 61(1):222–227.

REED, A., AUBRY, Y., and REED, E. 1994. Surf scoter, *Melanitta perspicillata*, nesting in southern Quebec. Canadian Field-Naturalist 108(3):364–365.

SAVARD, J.-P.L., and LAMOTHE, P. 1991. Distribution, abundance, and aspects of breeding ecology of black scoters, *Melanitta nigra*, and surf scoters, *Melanitta perspicillata*, in northern Quebec. Canadian Field-Naturalist105(4):488–496.

SAVARD, J.-P.L., BORDAGE, D., and REED, A. 1998. Surf scoter (*Melanitta perspicillata*). In: Poole, A., and Gill, F., eds. The birds of North America, No. 363. Philadelphia: The Birds of North America, Inc.

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