

**BREEDING ECOLOGY OF BLUE-BILLS (SCAUP) AND BLACK DUCKS (SCOTERS)  
PROGRESS REPORT – FIELD SEASON, 2003**

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**Background**

Blue-bills (Scaup) and Black Ducks (Scoter) (Figure 1) are two types of diving ducks that nest primarily in the boreal forest. Populations of both species have been declining rapidly since the late 1970's. Their main breeding area is in the NWT and that is also where the steepest declines are. The Gwich'in people noticed the declines and approached Ducks Unlimited to help them do something about it. However, because so little is known about these birds, even together we have difficulty deciding why the decline is happening. So, one important first step is to gather basic information on breeding success and habitat needs, which will help us begin understanding why declines have happened. The Ducks Unlimited/Gwich'in project in the Cardinal Lake area is taking that first crucial step towards conservation, but it will take several years of continued partnership to accomplish.



Figure 1. Blue-bill (Scaup) Pair on Left and Male Black Duck (Scoter) on Right.

This study will gather information on how many females attempt to breed, how many eggs they lay, how many of their nests hatch, how many of their ducklings survive and how many females survive the breeding and non-breeding seasons. We will also determine key habitats for nesting and raising young and are particularly interested in knowing if and why breeding success differs among habitats. Besides helping understand the ducks, this information can also help local land-use managers decide which land-use activities can take place and where within the GSA (Gwich'in Settlement Area).

In short, this partnership-based research between Ducks Unlimited and the Gwich'in will help us better understand the requirements of Blue-bills and Black Ducks and why they are declining. This knowledge is essential to developing conservation plans to ensure that there are birds for future generations to enjoy.

### Study Area

The study area (N67°36' W133°39') is about 18 km northeast of Tsiigehtchic, roughly 80 km south of Inuvik, NWT and approximately 7 km east of the Dempster Highway and includes Cardinal, Tundra and Clearwater Lakes (Figure 2).

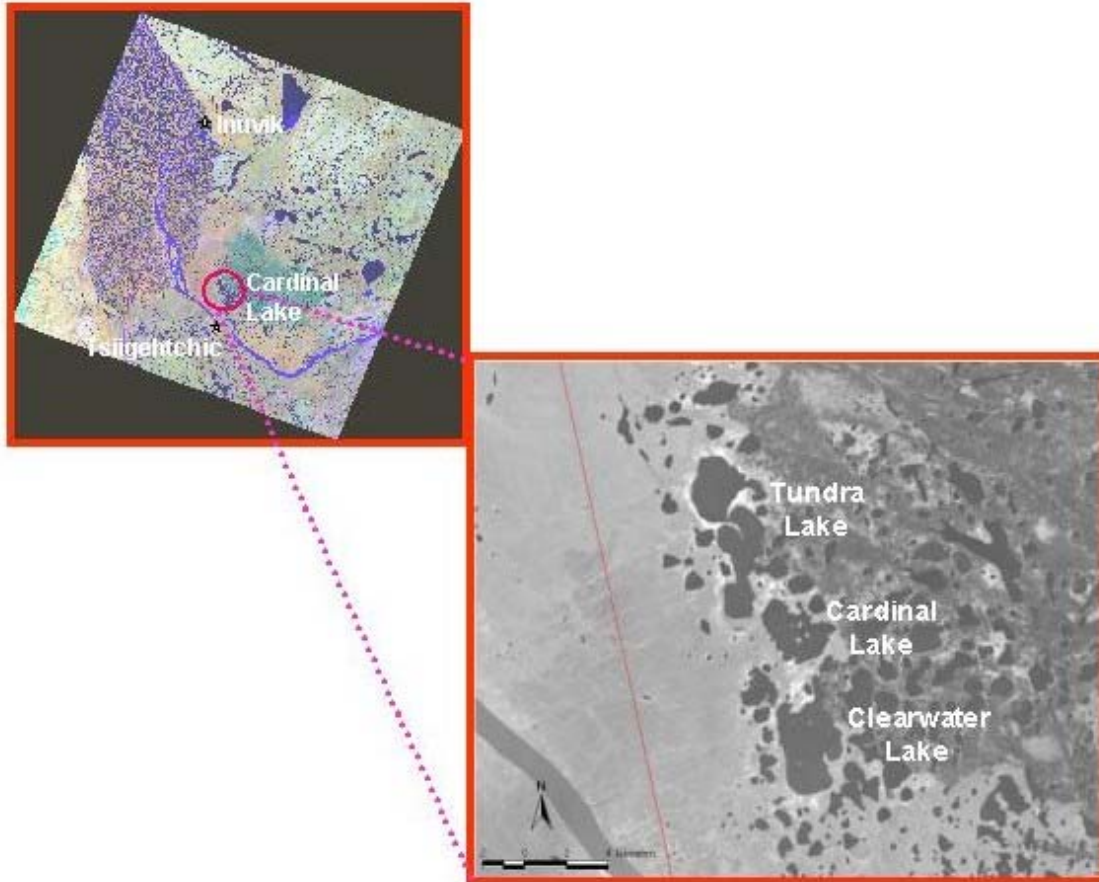


Figure 2. Cardinal Lake Study Area

In the 2003 field season, camp was occupied from May 28<sup>th</sup> to August 20<sup>th</sup>, and was situated in a natural clearing along the western shore of Cardinal Lake. We obtained a residential lease authorization from the Gwich'in Tribal Council, which allowed us to build 2 tent platforms and frames for our wall tents. These will be turned over to the Gwich'in at the end of our project. We hired a Community Research Assistant (formerly called an Environmental Monitor), and a technician from Tsiigehtchic for the summer. We also hired two people from the Ducks Unlimited Training course offered in Inuvik through Aurora College, but unfortunately one person broke his leg before the field season and could not work.

Permits were obtained from the Gwicha Gwich'in Council, Gwich'in Renewable Resources Board, Gwich'in Tribal Council, Resources, Wildlife and Economic

Development (GNWT), the Canadian Wildlife Service, and the Manitoba Wildlife Animal Care Committee.

## **Methods and Preliminary Results**

### Waterfowl Body Condition and Contaminants

We collected 25 and 24 female blue-bills and black ducks, respectively to determine the amount of fat these birds have ready to invest into nesting. This information is important to assess the ability of the birds to produce eggs, helps us determine the percentage of adult females that actually nest (also called breeding propensity), and will provide insight into the conditions of migration areas. The blue-bill females, and possibly the black ducks (if funds permit), also will be analyzed for selenium and mercury, two contaminants that they are known to encounter.

### Waterfowl Trapping

Trapping during the 2003 pre-nesting period occurred June 5<sup>th</sup> to 24<sup>th</sup>, using a fine net supported by floats on Cardinal and Tundra Lakes. We caught black ducks during this period. Female Blue-bills were trapped from July 8<sup>th</sup> to August 5<sup>th</sup>, during the nesting period using hand-held nets and walk-in traps that allow trapped females to incubate eggs.

### Capture and Marking

A total of 118 birds were captured, measured, weighed and banded. Table 1 shows the breakdown by species and sex. This included 22 Blue-bills (1 Greater Scaup and 21 Lesser Scaup) and 90 Black Ducks (1 Surf Scoter, the rest White-winged Scoters). Because female Blue-bills could only be captured on the nest and few nests survived predators until hatch, we did not catch as many as we anticipated.

Female Blue-bill and Black Ducks were fitted with radio transmitters and nasal markers so that we could follow and identify specific individuals. This type of marking is essential to gather the information that will help us begin understanding population declines. Without it, our progress towards conservation would be impossible.

### Tracking

Bird movements were followed using radio tracking equipment, which picked up signals from the ducks fitted with radio transmitters. Several sites were chosen along the shores of Cardinal and Tundra Lakes, from which we tracked these ducks. As well, we obtained regular visual observations to determine social status of females. Birds were tracked daily whenever possible during the prelaying period, then 2 – 3 time per week there after.

Table 1. Birds captured and banded - Cardinal Lake, 2002

<b>Species</b>	<b># Banded Female</b>	<b># Banded Male</b>	<b># Banded Total</b>
Blue-bill/ Greater Scaup	0	1	1
Long-tailed Duck	0	6	6
Blue-bill/ Lesser Scaup	20	1	21
Black Duck/Surf Scoter	0	1	1
Black Duck/ White-winged Scoter	27	62	89

### Nest Searching

Nest searching occurred between June 26<sup>th</sup> and July 21<sup>st</sup>, during the period when females sit on nests. Although Blue-bill nests are found in a variety of habitats, nest searching efforts were focused along the edges of wetlands, especially in meadow and shrubby areas where studies (Fournier and Hines, 2001) have shown that most Blue-bills are likely to nest. Black ducks tend to nest farther from water and we relied on radio tracking to locate nests. We searched about 120 linear km of wetland margin on foot, with repeat visits to about 48 km of that, and found 153 nests belonging to 9 species (Table 2), including 122 Blue-bill nests and 5 Black Duck nests. Three of the Black Duck nests were those of females trapped during the pre-nesting phase.

Table 2. Number of nests found by species – Cardinal Lake, 2003. Nest numbers from 2002 are given for a comparison. We searched about 120 linear km of wetland margin in 2003 and about 48 km in 2002.

<b>Species</b>	<b># of Nests 2003</b>	<b># of Nests 2002</b>
Blue-bill/ Lesser Scaup	122	32
Black Duck/ White-winged Scoter	5	4
Ring-neck Duck	1	0
American Wigeon	0	3
Canvasback	0	1

Mallard	4	2
Northern Shoveler	1	2
Long-tailed Duck	1	0
Pacific Loon	6	1
Common Loon	1	0
Tundra Swan	4	3
Unknown Species	8	7
<b>Total</b>	<b>153</b>	<b>55</b>

In addition to habitat, information on the number of eggs, the size of the eggs and the incubation stage of the nest were collected.

#### Nest Initiation, Hatch and Fledging Dates

Blue-bills and Black Ducks start nesting later in the breeding season than other ducks in the study area. Nest initiation refers to the date when a hen lays her first egg. These dates were obtained by looking at eggs, or from ages of ducklings with non-marked hens. Duckling ages were used for Black Ducks because only 5 Black Duck nests were located.

The average ( $\pm 1$  standard deviation) nest initiation and hatch dates for Blue-bill nests were June 23<sup>rd</sup> and July 26<sup>th</sup>, respectively ( $n = 116$  nests,  $\pm 8$  days). For Black Ducks these dates were June 16<sup>th</sup> and July 23<sup>rd</sup>, respectively ( $n = 36$  broods,  $\pm 7$  days). Average estimated fledging dates, when the ducklings have enough feathers to fly, were September 11<sup>th</sup> and October 1<sup>st</sup> for Blue-bills and Black Ducks, respectively. These dates were nearly identical to 2002.

#### Nest and Brood Success

In 2003, none of the five Black Duck nests hatched successfully.

About 32% of the Blue-bill nests that we found hatched successfully ( $n = 114$  in this sample). This value is called “apparent nest success”. Because some nests fail before we can find them, apparent nest success is always higher than the true nest success, which is the percentage of all nests that are started which actually hatch. Estimates of true nest success can be made using the Mayfield-Green method. For our study area, the Mayfield-Green estimate of nest success was 15%. This value is much lower than last year, but comparable to another study done in the Northwest Territories (see Table 3). Most of the nests appeared to be destroyed by mammals.

Table 3. Percentage of nests found during studies in the NWT that hatched (also called apparent nest success) and nest success using the Mayfield-Green method. The Mayfield-Green method is used to account for nests that failed before we could find them, and so helps us obtain a more accurate estimate of true nest success.

<b>Study</b>	<b>Apparent Nest Success</b>	<b>Mayfield-Green Nest Success</b>
Cardinal Lake, 2003	32%	15%
Cardinal Lake, 2002	80%	65%
Yellowknife Fournier & Hines (2001)	37%	18%

In radio marked hens, 90% of the hens from successfully hatched nests had one or more ducklings alive 1 day after hatch, 50% 21 days after hatch and 25% 28 days after hatch. Other studies (Afton, 1984), from the prairies, have found that the proportion of Blue-bill ducklings surviving to 21 days was 67.5%, higher than our study. However, we need several years of study for full assessment.

#### Evaluating Habitat

To better understand how birds use different habitats, we first need to know what type of cover and food is available. We looked at both the vegetation and the food resources by identifying habitat type and sampling aquatic insects.

We looked at the type and distribution of vegetation around wetlands to determine habitat type and are currently looking into comparisons with satellite imagery of the area to tie our findings to the broader habitat assessment in the Gwich'in Settlement Area.

Aquatic insects are the primary food for Blue-bills and Black Ducks. Insect sampling was done at 31 sites across a range of wetland sizes and burn histories to see what food is available. We also counted the number of pairs and broods that use these ponds, plus collected water samples to determine the levels of nutrients present, which should allow us to assess the productivity and importance of these wetlands to waterfowl.

#### **Discussion**

Although the 2003 field season was a success, it is still too early to begin understanding why Blue-bills and Black Ducks are declining. This study requires at least 3 more years before the information we collect will be most valuable and so we hope to keep working with the Gwich'in for everyone's benefit.

### **Acknowledgements & Partnerships**

A large part of the success in 2003 was because we had excellent help from the Gwich'in. We thank you for your support and look forward to working with you in the future.

A special thanks to:

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This project is also part of the Lower Mackenzie Project for which there are many additional partners. These partners are listed in the main project's progress report.

### **Literature Cited**

Fournier, M.A. & J. E. Hines. 2001. Breeding Ecology of Sympatric Greater and Lesser Scaup (*Aythya marila* and *Aythya affinis*) in the Subarctic Northwest Territories. *Arctic* 54: 444-456.

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**Ducks Unlimited Canada**

Ducks Unlimited is a non-profit organization, whose mission is to conserve wetland and associated habitats, which provide healthy environments for wildlife and people.