ERRATUM

Daytime Spring Migration of Scoters (*Melanitta* spp.) in the Bay of Fundy

ALEXANDER L. BOND[1,3], PETER W. HICKLIN*[2] AND MATTHEW R. EVANS[1,4]

[1]Department of Biology, Mount Allison University, Sackville, New Brunswick, E4L 1G7, Canada

[2]Canadian Wildlife Service-Atlantic Region, Environment Canada, Sackville, New Brunswick, E4L 1G6, Canada

[3]Current Address: Department of Biology, Memorial University of Newfoundland, St. John's, Newfoundland and Labrador, A1B 3X9, Canada

[4]Current Address: Biology Department, University of Illinois at Springfield, Springfield, Illinois, 62703, U.S.A.

*Corresponding Author; E-mail: peter.hicklin@ec.gc.ca

In a recent paper (Bond et al. 2007), we formulated estimates of the numbers of scoters (*Melanitta* spp.) migrating across Point Lepreau, New Brunswick, in spring during daylight hours. An error in our calculations has been brought to our attention and we now present the corrected estimates (Table 1). Our mistake was in failing to adjust the 2-hour sample totals (i.e. the number of birds recorded every 15 minutes followed by a 15-minute rest period over 4 hours of observations) to the full 4-hour observation period. Hence, the 2-hr sampling totals for each species recorded over the sampling period needed to be doubled in order to adjust for the full 4-hour period upon which we based the rate of movement for each species (no. scoters/hr).

ACKNOWLEDGMENTS

We are indebted to I. Cameron for pointing out our error and the Saint John Naturalists' Club for their continued support of the Point Lepreau Bird Observatory.

LITERATURE CITED

Bond, A. L., P. W. Hicklin and M. R. Evans. 2007. Daytime spring migrations of scoters (*Melanitta* spp.) in the Bay of Fundy. Waterbirds 30: 566-572.

Table 1. The annual population estimates of migrant Black, Surf and White-winged Scoters, based on 15-minute count periods undertaken by volunteers, at the Point Lepreau Bird Observatory at Point Lepreau, NB, from 1996-2004, and the estimated percentiles of the North American populations for each species. The previous population estimates and percentiles published in Bond et al. 2007 are incorrect and the corrections are shown here.

Year	No. days observations	Black Scoter		Surf Scoter		White-winged Scoter	
		observed	estimated	observed	estimated	observed	estimated
1996	52	172,680	189,284	66,642	73,050	3,593	3,938
1997	31	96,510	177,453	59,661	109,700	4,719	8,678
1998	21	116,819	317,080	25,662	69,655	2,315	6,282
1999	43	72,346	95,901	54,466	72,199	4,049	5,367
2000	51	164,323	183,655	179,754	200,902	6,699	7,488
2001	54	156,373	165,060	96,010	101,344	8,057	8,505
2002	57	160,152	160,152	42,523	42,523	4,250	4,250
2003	55	139,622	144,699	61,660	63,902	3,029	3,139
2004	50	126,318	144,003	64,996	74,096	4,752	5,417
Mean ± SE	46 ± 12.3	175,254 ± 20,044		89,708 ± 15,376		5,896 ± 665	
CV[a]		34		51		34	
% of N.A. population		56-75		12-35		~1	
Previous estimate		87,626 ± 10,021 (28-37%)		44,854 ± 7,688 (6-18%)		2,948 ± 333 (~0.5%)	

[a]CV = coefficient of variation = SD/mean × 100.

Daytime Spring Migrations of Scoters (*Melanitta* spp.) in the Bay of Fundy

ALEXANDER L. BOND[1,3], P. W. HICKLIN[2] AND M. EVANS[1]

[1]Mount Allison University, Biology Department, Sackville, New Brunswick, Canada E4L 1G7

[2]Canadian Wildlife Service-Atlantic Region, Environment Canada, Sackville, New Brunswick, Canada E4L 1G6

[3]Present Address: Atlantic Cooperative Wildlife Ecology Research Network, Department of Biology, University of New Brunswick, Fredericton, New Brunswick, Canada E3B 6E1

Abstract.—Each spring, Black Scoters (*Melanitta nigra*), Surf Scoters (*M. perspicillata*) and White-winged Scoters (*M. fusca*), pass through the Bay of Fundy in daytime on their northward migration to the sub-arctic breeding grounds. Their migrations along the Fundy coast were monitored from the Point Lepreau Bird Observatory at Point Lepreau, New Brunswick, from 1996 to 2004. Black Scoters migrated first (peak migration day: 13-17 April), followed by Surfs (23-25 April) and White-wings (22-28 April) which migrated together, although White-wings persisted over a longer period. Based on their rates of passage, we estimated the relative proportions of the wintering eastern North American populations of scoters, assumed to be of breeding age, which migrated by Point Lepreau each spring. We determined that 6-18% and 28-37% of the North American breeding populations of Surf Scoters and Black Scoters, respectively, utilized this northward migration route annually. The low numbers of White-wings (0.4-0.6%) suggested that larger numbers of this species employed a different migration route in spring or migrated at night. This observatory offers an exceptional facility for monitoring this group of sea ducks, over time. *Received 28 April 2006, accepted 1 March 2007.*

Key words.—Point Lepreau Bird Observatory, Bay of Fundy, spring migration, chronology, Black Scoters, Surf Scoters, White-winged Scoters, *Melanitta nigra*, *Melanitta perspicillata*, *Melanitta fusca*, sea ducks.

Waterbirds 30(4): 566-572, 2007

In his discussion of Black Scoters *Melanitta nigra*, Bellrose (1980) described their breeding range as an "enigma" and their migration corridors as a "dilemma". In The Birds of North America series, the Black Scoter is described as being one of North America's least known waterfowl (Bordage and Savard 1995), the Surf Scoter *M. perspicillata* as one of our least known sea ducks with the distinction of being the least studied in North America (Savard *et al.* 1998) and the White-winged Scoter *M. fusca* as the largest and best-known (Brown and Frederickson 1997). Compilations of field studies on the breeding biology and population dynamics of White-winged Scoters in northern Canada (1975-2003) have recently been published (Alisauskas *et al.* 2004; Traylor *et al.* 2004). But with respect to the three species' migrations, Brown and Frederickson (1997) noted the paucity of data. For Surf Scoters, Savard *et al.* (1998), indicated that in spring, "thousands" migrated through the Bay of Fundy, crossed overland north of Cape Jourimain in southeastern New Brunswick and congregated at Chaleur Bay in northeastern New Brunswick, in early May. However, a clear chronology of the rates of spring migratory movements up the Bay of Fundy, and the numbers of ducks involved, are not available in these publications nor in the unpublished reports quoted therein (e.g., Lehoux *et al.* 1995; Morrier *et al.* 1997; Falardeau and Savard 2003). With reference to the Black Scoter migration peaks, Bordage and Savard (1995) stated that in Northumberland Strait, the northerly migration peaked on 10 May with the earliest record on 22 April. In the St. Lawrence system, Quebec, the first spring arrivals occurred in the second half of April with peak abundances in mid-May. In the three monographs, the Bay of Fundy is mentioned but once and only with reference to Surf Scoters; all fail to mention the concurrence of Black and White-winged Scoters in spring. The present paper documents the strategic importance of the Bay of Fundy as a common spring migratory route for significant portions of the eastern populations of Black and Surf Scoters with lesser numbers of White-winged Scoters, and the Point Lepreau Bird Observatory at Point Lepreau,

New Brunswick, as a unique venue to quantify their population numbers, over time.

METHODS

Observational Procedures

This study took place at the Point Lepreau Bird Observatory (PLBO), situated on the southernmost point of mainland New Brunswick, extending approximately three km into the mouth of the Bay of Fundy (45°03'30"W, 66°27'50"N; Fig. 1). The Saint John Naturalists' Club has undertaken a long-term project of monitoring seabirds and coastal waterbirds at this site since 1996 and the procedures employed (McCurdy *et al.* 2004) were developed from Hussell and Ralph (1998). Over all years, counts of migrating scoters were undertaken annually between approximately 15 March and 27 April in 1996-2004, inclusive. Since field observations began before the first birds arrived and continued after the last scoters were seen, the numbers of days of migration for each year and for each species were determined by direct observation. No observations were made during inclement weather, particularly on days with fog and rain, when visibility was compromised. The annual numbers of days of observation ranged from 21 to 57 (Table 1) with a mean of 46 ± 12.3 d/y. Overall, 414 observation days were recorded over the nine years.

The observatory is located approximately six to seven m from the end of the point, and sits eight to nine m above mean high water. The viewing/counting area (portion of the coastline where birds are visible and may be counted) spans 240°. Maximum visibility approached 40 km to Grand Manan Island (Fig. 1). Flight direction was classified as "east", "west" or "probable known stopover" (PKS). Those ducks classified under "east" included all northward migrants while those under "west" referred to southward flying birds as the observatory faced southward, and northward-moving ducks flew by from right to left (west to east); ducks classified as PKS were stationary on the water in the count area. Those birds originally recorded as PKS but which later moved eastward or westward, were re-categorized as such.

Migrating and resting ducks were counted visually with binoculars of varying magnifications depending on the observer. Four-hour observation sessions were conducted at times of adequate natural light which occurred from 06.30 h to 18.30 h and consisted of eight "count periods" and eight "rest periods", each 15 min in length. The purpose of the rest periods was to prevent eye fatigue. The assumption was that observations conducted during the count periods were representative of the complete session such that the results for two successive observation periods added together (number of ducks seen over 30 min) and multiplied by two provided an estimate of the number of ducks per h migrating in the direction noted by the observer.

The numbers of each species flying by the observatory were estimated by either a direct count or by estimating the size of large flocks. Two observers were usually present: one observing and counting and one recording the numbers and determining the species composition of mixed flocks.

Observers were mostly volunteers and to minimize observer bias, one experienced observer was always

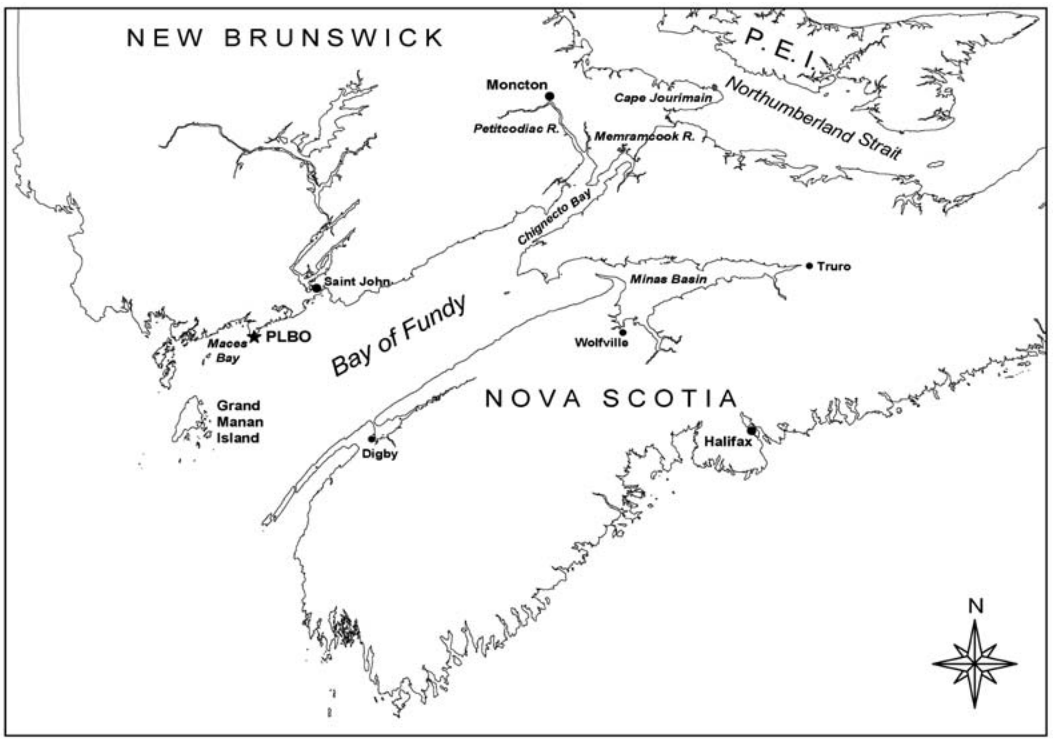

Figure 1. Map of the Bay of Fundy showing the location of the Point Lepreau Bird Observatory (PLBO).

Table 1. Numbers observed and annual population estimates for Black, Surf and White-winged Scoters based on daily counts migrating by the Point Lepreau Bird Observatory, 1996-2004, inclusive.

Year	No. days observations	Black Scoter		Surf Scoter		White-winged Scoter	
		observed	estimated	observed	estimated	observed	estimated
1996	52	85,339	94,641	33,412	36,525	1,796	1,969
1997	31	48,255	88,727	29,830	54,851	2,360	4,339
1998	21	58,409	158,538	12,831	34,827	1,257	3,140
1999	43	36,173	47,950	27,233	36,100	2,024	2,683
2000	51	82,161	91,827	89,877	100,451	3,350	3,744
2001	54	78,215	82,560	48,005	50,672	4,029	4,253
2002	57	80,076	80,076	21,262	21,262	2,125	2,125
2003	55	69,811	72,350	30,830	31,951	1,515	1,570
2004	50	63,159	72,001	32,498	37,048	2,376	2,709
Mean ± SE	46 ± 12.3		87,626 ± 10,021		44,854 ± 7,688		2,948 ± 333
CV*			34%		51%		34%

*The coefficient of variation (CV) computed as SD/mean *100.

present. In cases where only one observer was present, it was usually an experienced observer, and the movement was either small enough so that he/she could record the observations, or use a tape recorder and transcribe the data at the completion of each observation period.

Population Estimates

Determining the numbers of birds in migration each year generated our population estimates for each species. The number of birds per h computed for each day was multiplied by twelve (daily hours of visible migration) to estimate the number of birds flying across Point Lepreau per day by species. Our data, and previous data (Hicklin and Bunker-Popma 2001), indicated that scoters migrated from 06.30 h-18.30 h. These daily estimates were then summed to give an "uncorrected" total for each year. As the number of observation days varied among years, we accounted for missing observation days by applying a correction factor to the uncorrected estimates of each species. The correction factor was the total number of days of migration (57) divided by the number of days of observation for any given year (see Table 1) which represented the effort of observation required to reach the equivalent degree of effort associated with the maximum 57 d of observations. The uncorrected population estimate multiplied by the correction factor provided the new "corrected" population estimate which accounted for all days that ducks would have migrated along that section of the Fundy coast.

Statistical Procedures

All statistical tests were performed using JMP 4.0 statistical software (SAS 2001). The hours of observation were corrected for input errors (i.e., not entering time for the last rest period) and the mean numbers of scoters migrating per hour were calculated.

To describe species migration chronologies, data were pooled over all nine years, which approximated a normal distribution. To determine differences in peak migration dates between years, within and between species, a two-way ANOVA was used. A linear regression of peak migration dates against year was used to examine an overall trend of peak migration date for all three species and t-tests were used to compare mean peak migration dates between species. A daily chronology for each species was analyzed using a linear regression of number of ducks observed against hour of the day. For all regression and correlation analyses, P values, not r values, were used to determine significance. A significance level of $P < 0.05$ was used for all statistical tests.

RESULTS

Black Scoters

There was no difference in annual peak dates between years for this species (two-way ANOVA, $F = 1.25$, $P = 0.3$, $N = 9$ y), and, over the nine-year period, a normal distribution was approximated. Yearly migration peaks ranged over a 19-d period between 15 March and 19 May with the mean peak days, over all years, during the period 13-17 April (Fig. 2). Numbers of Black Scoters seen on peak days ranged from 750 (in 2000) to over 1,600 (in 1996 and 2003) per h of observation, and, over all hours of observation, averaged 185 ± 24 per h over the nine-year period. Annual population estimates ranged from 48,000 (1999) to 159,000 ducks (1998; Table 1). Over all years, a mean population number of approximately 88,000 ± 10,000 (SE) Black Scoters was estimated to travel northward along the western shore of the Bay of Fundy each spring (Table 1).

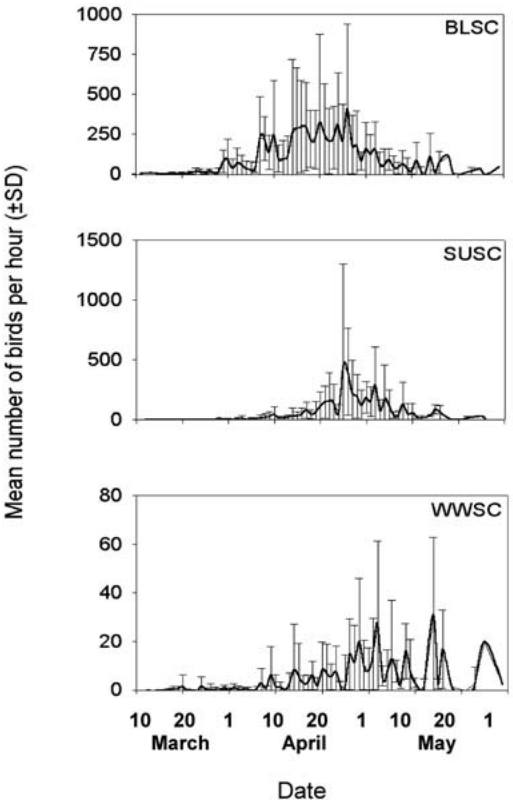

Figure 2. The mean numbers of Black Scoters (A), Surf Scoters (B) and White-winged Scoters (C) per hour (± SD) observed each Julian day during spring migration at the Point Lepreau Bird Observatory, Point Lepreau, New Brunswick, between 1996 and 2004, inclusive.

Surf Scoters

Surf Scoters migrated in lower numbers than Black Scoters, and over a slightly shorter period. The earliest notable migration of Surf Scoters over the study period did not occur until 4 April and was mostly over by 9 May, ten days earlier than Black Scoters. Peaks ranged from 20 April to 1 May, with the mean on 23-25 April, nine days later than Black Scoters (Fig. 2). Fewer than 1,000 Surf Scoters per h were recorded on peak days and, over nine years of observations, they averaged 136 ± 26 individuals/h, except in 2000 when over 2,300 per h were recorded on 24 April. As with Black Scoters, there were no significant differences in peak dates (two-way ANOVA, $F = 0.35$, $P = 0.6$, $N = 9$ years) although peak movements occurred over a 19-d period with more birds migrating between, and including, 27 April to 6 May. Annual population estimates over the study period ranged between 21,000 (2002) and 100,000 ducks (2000) and an average of 45,000 ± 8,000 Surf Scoters migrated across Point Lepreau each spring over the nine-year period (Table 1).

White-winged Scoters

White-winged Scoters were the least numerous of the three species in the Bay of Fundy in spring, with peak days averaging 9 ± 13 ducks per h. There was not one year when more than 100 White-winged Scoters per h were ever recorded. Their migration occurred in the same general period as Surf Scoters, ranging from about 4 April to 14 May with peak days between 22-28 April (Fig. 2). Our annual estimates ranged from 1,600 ducks (2003) to 4,000 in 2001. Again, no significant differences were found between years (two-way ANOVA, $F = 1.25$, $P = 0.3$, $N = 9$ years) and an average of 3,000 ± 300 ducks were recorded each year (Table 1).

Migration Chronology and Timing

When the migration chronologies of the three scoters at Point Lepreau were compared, Black Scoters arrived first, followed by Surfs and White-wings together, although the migration of White-wings extended for a period almost 20 d longer than both Blacks and Surfs in some years and in much smaller numbers (Fig. 2). Black Scoters peaked significantly earlier than both Surf Scoters ($t = 3.54$, $P < 0.05$, $N = 9$ years) and White-winged Scoters ($t = 2.71$, $P < 0.01$, $N = 9$ years), but there was no significant difference between Surfs and White-wings ($t = 0.27$, $P = 0.79$, $N = 9$ years). The shorter migration period (Fig. 2) and greater coefficient of variation (51%) in population estimates of Surf Scoters (Table 1) indicates that this species migrated more quickly and with greater variation in flock sizes than either Blacks or White-wings.

The three species' migration chronologies per day on an hourly scale are shown in Fig. 3. The peak time for migration for all three species occurred from 07.30-07.45 h.

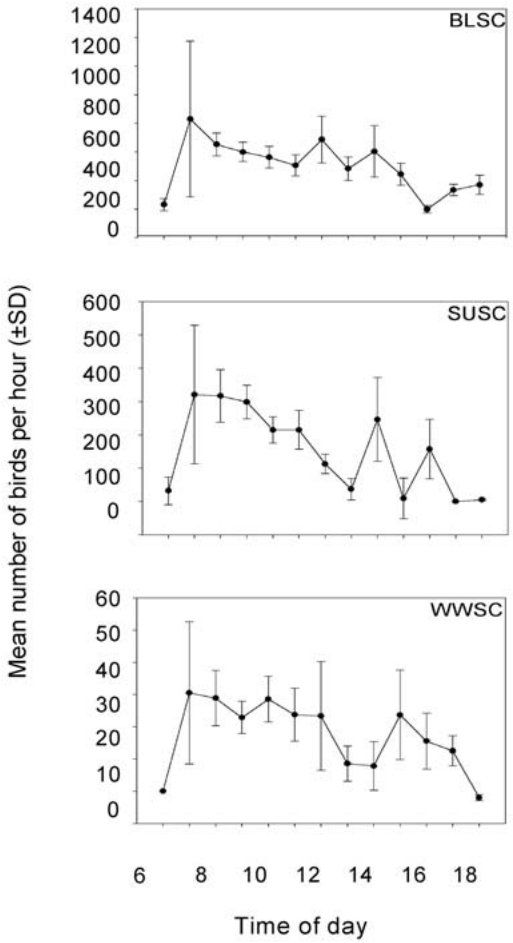

Figure 3. The mean numbers of Black Scoters (BLSC), Surf Scoters (SUSC) and White-winged Scoters (WWSC) (± SD) in relation to hour of the day between 06.00 and 19.00 h.

However, the numbers of Black Scoters and Surf Scoters also peaked around 14.00-14.30 h (180 and 150 ducks, respectively), but not at levels comparable to the morning maxima (over 450 Blacks, nearly 200 Surfs and 22 White-wings; see Fig. 3).

There was a statistically significant negative correlation between the numbers of ducks and the time of day for Black Scoters ($r = -0.36$, $P < 0.01$, $N = 399$ days over nine years), Surf Scoters ($r = -0.52$, $P < 0.0001$, $N = 399$ days over nine years), and White-wings as well ($r = 0.27$, $P < 0.1$, $N = 399$ days over nine years). This suggests that, at least for Surf Scoters and Black Scoters, there was a daily migration pattern with numbers of migrants/hour decreasing from 08.00 h to dusk.

Although there were no statistical differences between peak days across years, there was a trend towards later migration for all three species over the nine-year period. Linear regressions between peak days (Julian dates) and year (1995-2004, inclusive) for the three species indicated that rate of change was greatest for Black Scoters at 1.15 d/y while for Surfs and White-wings, the rates were 0.92 d/y and 0.27 d/y, respectively (Fig. 4).

DISCUSSION

The spring migration chronologies of all three scoter species along the coast of the Bay of Fundy at Point Lepreau overlapped. However, Black Scoters migrated earlier than either Surfs or White-wings. These spring migration patterns differed from fall patterns observed by Hicklin and Bunker-Popma (2001) at Money Point, Cape Jourimain in New Brunswick: as in spring, Surfs and White-wings overlapped but Blacks, which migrated the earliest, were the latest migrating species in the fall. However, more scoters were observed at the PLBO in the spring than at Money Point (Cape Jourimain National Wildlife Area) along the Northumberland Strait in fall, indicating that many

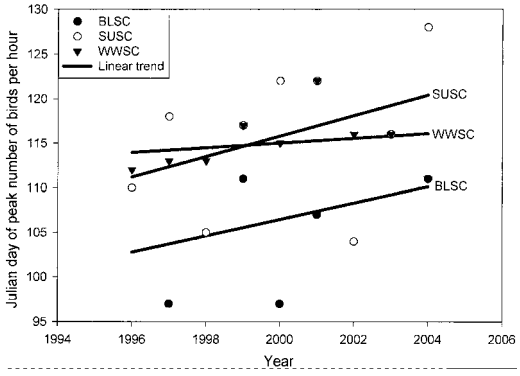

Figure 4. Linear regressions of dates of peak movements (Julian days) and years when counts were made of the numbers of Surf Scoters, Black Scoters and White-winged Scoters migrating per hour each across the Point Lepreau Bird Observatory, at Point Lepreau, New Brunswick, from 1996 to 2004, inclusive.

scoters must use different routes over both seasons (see MacKinnon *et al.* 1991; Hicklin and Bunker-Popma 2001).

Prior to this study, there were no reliable estimates for the population sizes of the three scoter species in Atlantic Canada. Estimates obtained from throughout the province of New Brunswick in spring ranged from 60,000 (Point La Nim, N.B.; Clifford and Lushington 2000) to 150,000 (Restigouche estuary in 1973; Christie 1980). Aerial surveys conducted by the Canadian Wildlife Service during the spring months of 1975 along the Northumberland Strait found between 30,000 and 40,000 scoters (MacKinnon *et al.* 1991) which suggested that substantial numbers migrated across the strait, a conclusion also reached by the present study but with greater numbers of ducks.

The population numbers of the three species estimated from the observations at the PLBO range between 0.4-0.6% (White-wings), 6-18% (Surfs) and 28-37% (Blacks) of the published continental population numbers in the species accounts of The Birds of North America (see Bordage and Savard 1995, Brown and Frederickson 1997, and Savard *et al.* 1998). Hence, significant portions of the North American eastern breeding populations of Black Scoters and Surf Scoters pass by the PLBO during the daytime when migrating northward in spring; the relatively low numbers of White-wings noted in the course of these surveys suggest that this species may use a different northward route to the breeding grounds in daytime.

Only scoters migrating during daylight and along the New Brunswick shore of the Bay of Fundy could be observed. From Point Lepreau, the Bay of Fundy extends approximately 13 km to the coast of Nova Scotia; hence, sea ducks migrating offshore of Point Lepreau, nearer the Nova Scotia coastline as well as those migrating at night, would remain unaccounted for.

The relatively low numbers of White-wings noted in the course of these surveys suggest that this species, and significant portions of Blacks and Surfs, may employ a different northward route to the breeding grounds in spring.

It can be generalized that daytime migration of scoters occurs from 06.30-18.30 h based on the observations conducted at the Point Lepreau Bird Observatory. Therefore, at this particular point in the Bay of Fundy, scoters migrated during all twelve hours of daytime in the spring between 15 March and 28 May, inclusive, and this would represent the minimum daytime migration of this group of seaducks at Point Lepreau. However, there remains a strong possibility that scoters migrate northward up the Bay of Fundy at night (see Savard *et al.* 1998; J. Wilson, pers. comm.) and perhaps along the Fundy and/or the Atlantic shores of Nova Scotia. Therefore, the population estimates presented herein must be regarded as minimal values.

ACKNOWLEDGMENTS

We are very grateful to the many volunteers and members of the Saint John Naturalists' Club who made the PLBO possible. In particular, we thank Mr. and Mrs. Jim Wilson for the hospitality and companionship they provided to A.L.B. and R. Blaquiere for his assistance and constant company during the surveys at the PLBO, along with his significant data management skills. We extend our gratitude to J.-P. L. Savard for making available to A.L.B. unpublished data on North American scoter populations and providing constructive critical comments on the manuscript. We are also grateful to the assistance of John Chardine who advised us on numerous matters throughout the preparation of this paper. The members of the Saint John Naturalists' Club provided all the data to A.L.B. accumulated at the PLBO since its inception in order to assist him with the completion of his undergraduate Honors thesis at the biology department, Mount Allison University, Sackville, New Brunswick. Isabelle Robichaud assisted with revising the figures. Funding for this project was provided by the Canadian Wildlife Service, Environment Canada (Atlantic Region).

LITERATURE CITED

Alisauskas, R. T., J. J. Traylor, C. Swoboda and F. P. Kehoe. 2004. Components of Population growth rate for White-winged Scoters in Saskatchewan, Canada. Animal Biodiversity and Conservation 27 (1): 451-460.

Bellrose, F. C. 1980. Ducks, Geese and Swans of North America. Stackpole Books, Harrisburg, Pennsylvania. 540 pp.

Bordage, D. and J.-P. L. Savard. 1995. Black Scoter (*Melanitta nigra*). *In*: The Birds of North America, No. 177 (A. Poole and F. Gill, Eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, DC.

Brown, P. W. and L. H. Frederickson. 1997. White-winged Scoter (*Melanitta fusca*). *In* The Birds of North America, No. 274 (A. Poole and F. Gill, Eds.). The Academy

of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington DC.

Christie, D. S. 1980. Birds of Fundy National Park, Final Report, Volume 1. New Brunswick Museum, Saint John. 120 pp.

Clifford, J. S. and M. Lushington. 2000. Restigouche River scoter study. Canadian Nature Federation (Nature Canada). La Nim, New Brunswick. 41 pp.

Falardeau, G. and J.-P. L. Savard. 2003. Migration printanière des macreuses sur la Côte-Nord et la baie des Chaleurs. Série de rapports techniques Numéro 406, Service canadien de la faune, Environnement Canada.

Hicklin, P. W. and K. Bunker-Pompa. 2001. The spring and fall migrations of scoters, *Melanitta* spp., at Confederation Bridge in the Northumberland Strait between New Brunswick and Prince Edward Island. Canadian Field Naturalist 115(3): 436-445.

Hussell, D. J. T. and C. J. Ralph. 1998. Recommended methods for monitoring bird populations by counting and capture of migrants. Migration Monitoring Council, Intensive Sites Technical Committee. 24 pp. (Available from New Brunswick Department of Natural Resources, Fredericton and the Point Lepreau Bird Observatory).

Lehoux, D., A. Bourget, P. Dupuis and J. Rosa. 1985. La sauvagine dans le système du Saint-Laurent (Fleuve, estuaire, golfe). Canadian Wildlife Service, Québec Region.

MacKinnon, C. M., R. W. Daury and R. J. Hicks. 1991. Seabird and seaduck movement through the Northumberland Strait, 1990. Technical Report No. 130. Canadian Wildlife Service, Atlantic Region.

McCurdy, D, A. McGregor and J. Wilson. 2004. Point Lepreau Bird Observatory Procedure Manual. Saint John Naturalists' Club. Saint John, N.B. 19 pp.

Morrier, A., L. Lesage, A. Reed, and J.-P. L. Savard. 1997. Étude sur l'écologie de la Macreuse a front blanc au lac Malbaie, Réserve des Laurentides—1994-1995. Can. Wildl. Serv., QC, Tech. Report Series no. 301.

SAS Institute. 2001. JMP Start Statistics. Duxbury Press, Pacific Grove, California.

Savard, J.-P. L., D. Bordage and A. Reed. 1998. Surf Scoter (*Melanitta perspicillata*). *In* The Birds of North America, No. 363 (A. Poole and F. Gill, Eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania.

Traylor, J. J., R. T. Alisauskas and F. P. Kehoe. 2004. Nesting ecology of White-winged Scoters (*Melanitta fusca deglandi*) at Redberry Lake, Saskatchewan. Auk 121(3): 950-960.