

Spring and early summer distribution of scoters and eiders in the St. Lawrence River estuary

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Abstract

We studied the spring and summer distributions of scoters and eiders within the St. Lawrence estuary with a combination of aerial and ground surveys. Aerial surveys were designed especially for scoters; they were flown higher (150 m) and covered a wider area (unlimited distance) than conventional waterfowl surveys. These surveys yielded nearly 10 times as many scoters as did conventional surveys. Approximately 40 000 scoters (the largest number observed in the aerial surveys) were counted in the study area on 9 May 1995. By 23 May, most scoters had departed for their breeding areas. In early May, scoters were most numerous along the north shore of the eastern portion of the St. Lawrence River estuary, and few birds used the south shore. Ground surveys suggest that most male scoters were back in the estuary by the end of June. During wing moult, the distribution of scoters was more clumped than in spring; as well, the south shore was more heavily used, and several sectors were avoided. Both Surf Scoters *Melanitta perspicillata* and Black Scoters *M. nigra* are abundant in spring, but the summer scoter population is composed mostly of Surf Scoters. Important staging areas include the underwater plateaus around Île Patte de Lièvre, where birds also moult, and a few areas east of Forestville (Îlets Jérémie, Pointe-aux-Outardes). In the spring, scoters also concentrate south of Île aux Fraises, a well-known spawning site for Atlantic herring *Clupea harengus*. During the moult, scoters were seen east of Île du Chafaud aux Basques, east of Île Patte de Lièvre, and at Îlets Jérémie and Papinachois on the north shore; and at L'Anse au Sable, Archipel des Rasades, and Saint-André-de-Kamouraska on the south shore.

Résumé

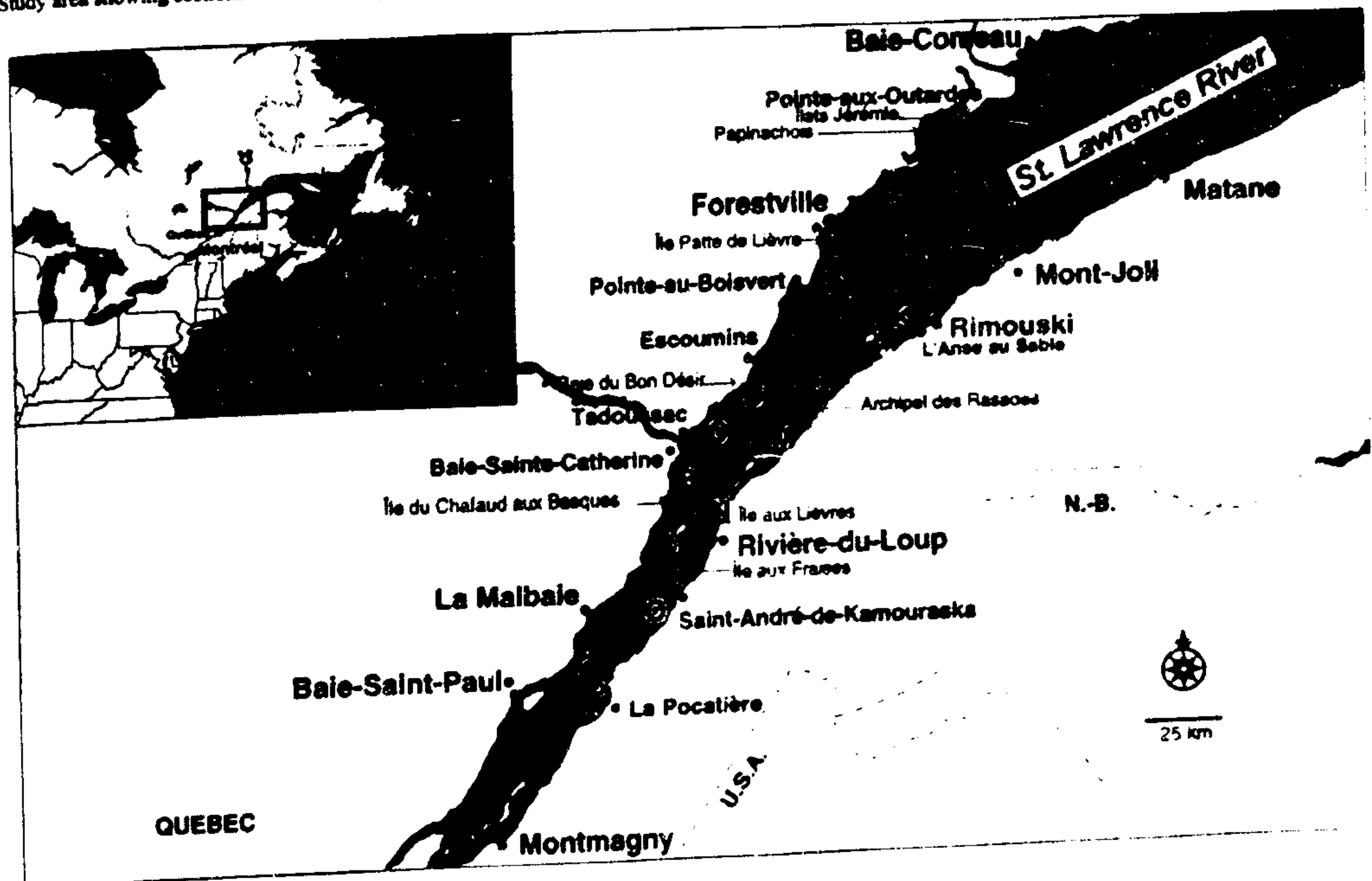
Nous avons étudié la distribution des macreuses et des eiders au printemps et en été à l'estuaire du Saint-Laurent au moyen de relevés aériens et au sol. Les relevés aériens étaient conçus spécialement pour les macreuses; ils étaient pris de plus haut (150 m) et couvraient une plus grande surface (distance illimitée) que les relevés habituels de sauvagine. Ces relevés ont permis de repérer près de 10 fois plus de macreuses que les relevés habituels. On a dénombré environ 40 000 macreuses (le plus grand nombre jamais observé dans des relevés aériens) dans le secteur couvert par l'étude effectuée le 9 mai 1995. Au 23 mai, la plupart des

macreuses étaient parties pour leurs aires de reproduction. Au début de mai, les macreuses étaient très nombreuses le long de la côte nord de la partie est de l'estuaire du Saint-Laurent, et peu d'oiseaux utilisaient la côte sud. Les relevés au sol indiquent que la plupart des macreuses mâles étaient revenues à l'estuaire vers la fin de juin. Au cours de la mue des ailes, la distribution des macreuses présentait davantage de rassemblements qu'au printemps; en outre, la côte sud était plus fréquentée et plusieurs secteurs étaient évités. Les Macreuses à front blanc (*Melanitta perspicillata*) et les Macreuses noires (*M. nigra*) sont abondantes au printemps, mais la population estivale de macreuses se compose principalement de Macreuses à front blanc. Les importantes aires de repos comprennent les plateaux submergés entourant l'Île Patte de Lièvre, où les oiseaux muent également, et quelques secteurs à l'est de Forestville (Îlets Jérémie, Pointe-aux-Outardes). Au printemps, les macreuses se concentrent également au sud de de l'Île aux Fraises, une frayère bien connue du hareng de l'Atlantique (*Clupea harengus*). Durant la mue, des macreuses ont été vues à l'est de l'Île du Chafaud aux Basques, à l'est de l'Île Patte de Lièvre et aux Îlets Jérémie et Papinachois sur la côte nord, et à l'Anse au Sable, à l'archipel des Rasades et à Saint-André-de-Kamouraska sur la côte sud.

1.0 Introduction

Until recently, scoters were among the least-known waterfowl of North America (Savard and Lamothe 1991; Bordage and Savard 1995). Spring and fall aerial surveys have indicated the presence of several thousand Surf Scoters *Melanitta perspicillata* and Black Scoters *M. nigra* in the St. Lawrence estuary (Lehoux et al. 1985; Dorais and Brault 1995). While the fall distribution of scoters has been quantified (Bédard et al. 1997a), spring distributions remain poorly documented. Scoters are still actively hunted and may be declining in the east (Ad Hoc Sea Duck Committee 1994); thus, it is important to document their distribution and habitat use during their stay in the St. Lawrence estuary. We present here the results of aerial and ground surveys conducted in spring and summer within the St. Lawrence estuary and review what is known of the spring distribution of scoters. We also report counts of Common Eiders *Somateria mollissima* that were detected by our surveys.

Figure 1
Study area showing sections of aerial survey



2.0 Study area

The area surveyed covered most of the St. Lawrence estuary, from Baie-Saint-Paul to Baie-Comeau on the north shore and from Montmagny to Mont-Joli on the south shore (Fig. 1). Shallow waters around Île aux Fraises and the south shore of Île aux Lièvres were also surveyed. The large foreshore in front of Baie-Sainte-Catherine was covered thoroughly with several flight lines, as was the large underwater plateau west of Forestville.

3.0 Methods

In 1994, an aerial survey was conducted on 27 July to find moulting scoters. The survey was designed especially for scoters: the flight line covered all underwater plateaus, avoided marshes, and was flown at a height of 150 m with an unlimited survey width. The survey was done from a twin-engine Highlander. Observers concentrated on spotting flocks of scoters. Once a flock was located, its position was recorded on a map and its size and species composition were estimated. Results were compiled per section of shore (Fig. 1). In 1995, three aerial surveys were conducted in the spring (2, 9, and 23 May) using the same protocol as in 1994. A few localized ground surveys were also conducted in accessible areas. Scoters were counted from observation points on the shore.

4.0 Results

4.1 Distribution of scoters

Nearly 15 000 scoters, mostly Surf and Black scoters, were already present in the estuary by 2 May (Table 1). Numbers increased to nearly 39 500 birds by 9 May. Most scoters had left the estuary by 23 May. Numbers of scoters increased again throughout the summer, reaching almost 13 000 birds on 27 July.

As expected, scoters were not evenly distributed within the estuary. They were, however, more widespread in spring than in summer. Few scoters were observed on the south shore in the spring, most being located along the north shore. In the summer, however, proportionally more scoters used the south shore (Table 1).

In early May, scoters outnumbered Common Eiders by a factor of two (39 526 vs. 18 613) (Tables 1 and 2). The distribution of scoters and Common Eiders differed considerably at this time of the year. The area around Île Patte de Lièvre was the area most frequented by scoters, supporting 66% and 52% of the scoters present in the estuary on 2 May and 9 May, respectively. In contrast, the same area supported <2% of the Common Eiders on the same dates. A ground survey conducted on 4 May 1995 between Pointe-au-Boisvert and Forestville (section F) yielded around 7500 scoters, which compares well with the 9720 birds seen during the aerial survey two days earlier. These observations confirm that this sector is important for scoters in spring.

The only section with more scoters on 23 May than earlier in May was Baie du Bon Désir (section D). On 23

Table 1
Abundance of scoters (number of birds observed) as indicated by aerial surveys conducted in the St. Lawrence estuary^a

| | North shore sections | | | | | | | | South shore sections | | | | | | | | Total | |
|--------------|----------------------|-------|-------|-----|-----|--------|-------|-------|----------------------|----|-------|-----|-------|----|----|----|-------------|-------------|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | North shore | South shore |
| 2 May 1995 | 84 | 363 | 645 | 58 | 124 | 9 720 | 3 387 | 40 | 64 | 0 | 11 | 73 | 57 | 10 | 10 | 6 | 14 485 | 167 |
| 9 May 1995 | 358 | 426 | 1 431 | 487 | 389 | 20 732 | 6 046 | 7 920 | 1 096 | 31 | 92 | 190 | 145 | 80 | 38 | 65 | 38 885 | 641 |
| 23 May 1995 | 47 | 202 | 294 | 824 | 0 | 228 | 0 | 0 | 82 | 0 | 0 | 0 | 28 | 73 | 30 | | 1 677 | 131 |
| 27 July 1994 | 0 | 1 050 | 0 | 0 | 0 | 5 000 | 1 500 | 2 500 | 0 | 0 | 1 500 | 250 | 1 060 | 0 | 0 | 0 | 10 050 | 2 810 |

^a See Figure 1 for location of sections.

Table 2
Abundance of Common Eiders (number of birds observed) as indicated by aerial surveys conducted in the St. Lawrence estuary^a

| | North shore sections | | | | | | | | South shore sections | | | | | | | | Total | |
|-------------|----------------------|-------|-------|-----|-------|-----|-------|-----|----------------------|-----|-------|-----|-----|----|----|---|-------------|-------------|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | North shore | South shore |
| 2 May 1995 | 124 | 639 | 154 | 499 | 2 396 | 28 | 174 | 109 | 1 409 | 143 | 2 067 | 110 | 424 | 87 | 20 | 0 | 5 532 | 2 851 |
| 9 May 1995 | 85 | 1 869 | 1 248 | 576 | 261 | 349 | 1 956 | 545 | 3 749 | 557 | 6 242 | 118 | 936 | 92 | 30 | 0 | 10 638 | 7 975 |
| 23 May 1995 | 139 | 821 | 690 | 219 | 532 | 93 | 553 | 108 | 2 712 | 133 | 1 214 | 5 | 410 | 36 | 87 | 0 | 5 867 | 1 885 |

^a See Figure 1 for location of sections.

May, most remaining scoters were located in the western portion of the estuary, on both the north and south shores. In the summer, during the wing moult, scoters were more concentrated than in the spring. The area around Île Patte de Lièvre was again the most heavily used, and the sectors east of Forestville were also used by some moulting scoters. Three areas were used more heavily by scoters during the moult than in the spring. The foreshore just east of Île du Chafaud aux Basques had twice as many scoters in the summer than in the spring, and two south shore areas (K and M, Table 1) had nearly 10 times as many scoters in the summer.

In May, all three species of scoters were observed in the estuary. The White-winged Scoter *Melanitta fusca* was the least numerous, with fewer than 1000 birds identified. Both Surf and Black scoters were abundant; however, because of the large number of unidentified scoters in our surveys, we cannot estimate their relative abundance. Other surveys have confirmed the abundance of both species in the spring and the near absence of Black Scoters in the fall (Table 3).

By the third week of May, most scoters had left the St. Lawrence estuary (Table 1). At Île Patte de Lièvre, only a few hundred scoters were seen on 23 May. A ground survey conducted in this area yielded 5000 scoters at 19:00 on 27 June, and a recount at 06:00 on 28 June yielded 6650 scoters distributed in 15 rafts of 200–1500 birds, several kilometres offshore. On 3 July, approximately 1000 scoters were counted at Saint-André-de-Kamouraska, suggesting an early return of birds from the breeding areas.

4.2 Distribution of Common Eiders

As mentioned above, the distribution of Common Eider, a species breeding within the estuary, was quite different from that of scoters (Tables 1 and 2). Scoters' numbers within the estuary decreased from 39 526 on 9 May 1995 to 1808 on 23 May, a 95% decrease. Common Eider

numbers went from 18 613 to 7752, a decrease of 58%, probably because males move to other areas and females are on their nests at this time. As expected, the larger concentrations of eiders were associated with breeding islands. Sections I and K (Fig. 1) contained the most important breeding islands and thus supported the largest concentrations of eiders.

A partial ground survey conducted on 27 June yielded concentrations of Common Eider males at Baie du Bon Désir (1200) and just offshore of Pointe-au-Boisvert (3000).

4.3 Comparisons with other waterfowl surveys

We compared our scoter surveys with general waterfowl surveys conducted in the same areas. Results are quite compelling (Table 4), demonstrating that generalized waterfowl surveys can produce biased estimates for some species. Nearly 10 times more scoters were detected in the scoter survey than in the general survey for the same area.

5.0 Discussion

5.1 Survey efficiency

More scoters frequent the upper portion of the St. Lawrence estuary than previously thought. Previous surveys in this sector had been multispecies surveys concentrating on the waterfowl associated with tidal marshes and flown at only about 75 m altitude (Dupuis 1976; Dorais and Brault 1995). Understandably, these surveys missed offshore flocks of scoters, highlighting the difficulties associated with interpreting multispecies surveys. It is clear that scoters, dabbling ducks, and even goldeneyes cannot be surveyed efficiently at the same time. Savard (1990) reached similar conclusions for wintering populations of American Black Ducks *Anas rubripes* and goldeneyes (*Bucephala* spp.). In light of these observations, multispecies surveys should be interpreted with

Table 3
Spring and fall species composition of scoters in the St. Lawrence estuary

| | % of individuals | | | n ^a | Reference |
|-------------------|------------------|-------------|-------------|----------------|--------------------------|
| | Black Scoter | Surf Scoter | Scoter spp. | | |
| Spring | | | | | |
| 27 April 1992 | 67 | 19 | 15 | 2 620 | Dorais and Brault (1995) |
| 11 May 1992 | 29 | 47 | 23 | 34 290 | Dorais and Brault (1995) |
| 12 May 1975 | 32 | 66 | 2 | 11 834 | Dupuis (1976) |
| 19 May 1992 | 18 | 69 | 13 | 41 781 | Dorais and Brault (1995) |
| Fall | | | | | |
| 9 September 1991 | 18 | 56 | 26 | 9 188 | Dorais and Brault (1995) |
| 4 September 1975 | 5 | 95 | 0 | 1 654 | Dupuis (1976) |
| 18 September 1975 | 0 | 100 | 0 | 7 978 | Dupuis (1976) |
| 25 September 1975 | 0 | 80 | 20 | 4 720 | Dupuis (1976) |
| 2 October 1975 | 1 | 93 | 6 | 3 556 | Dupuis (1976) |
| 9 October 1975 | 0 | 99 | 1 | 6 133 | Dupuis (1976) |
| 27 October 1975 | 37 | 56 | 7 | 2 930 | Dupuis (1976) |
| 7 November 1991 | 3 | 96 | 1 | 8 499 | Dorais and Brault (1995) |

^a Number of scoters observed. Different amount of the estuary covered during the different surveys.

Table 4
Comparison of the number of scoters recorded in aerial surveys conducted in 1992 (Dorais and Brault 1995) and 1995 (this study) in the same sections of the estuary. Surveys conducted in 1992 were designed to survey all waterfowl species, whereas surveys in 1995 were designed specifically for scoters.

| | Number of scoters |
|---------------|-------------------|
| 27 April 1992 | 1 048 |
| 2 May 1995 | 13 974 |
| 11 May 1992 | 4 512 |
| 9 May 1995 | 37 005 |

extreme caution, as they may not provide reliable data for some of the species surveyed.

5.2 Distribution

There is some indication that there are slightly more scoters in spring than in fall in the St. Lawrence estuary (Lehoux et al. 1985). However, because no standardized surveys have been done over the whole estuary, this remains to be confirmed. Species composition, however, changes drastically between spring, summer, and fall. Black Scoters, numerous during the spring staging period, are nearly absent in summer and fall. In spring, scoter distributions in the St. Lawrence estuary may be influenced, in part, by Atlantic herring *Clupea harengus* spawning locations and timing. Scoters are often associated with herring spawn on the west coast (Munro and Clemens 1931) and have been used to locate herring spawning sites within the St. Lawrence estuary (J. Munro, pers. commun.). The large number of birds occasionally recorded around Île aux Fraises and at the west point of Île aux Lièvres in the spring (Lehoux et al. 1985; Bédard et al. 1997b) may be feeding on herring eggs. This area, contrary to other sites, is used only during spring migration. This opportunistic use of herring spawning sites may explain in part the more widespread spring distribution of scoters within the estuary (Bédard et al. 1997b). Little is known of moulting scoters and eiders, and typically few aerial surveys

have been conducted in July and August, so their distribution at this time of year is still largely unknown.

In the St. Lawrence estuary, moulting scoters are more clumped than in either spring or fall, although moulting sites are also used by spring and fall migrating birds (Bédard et al. 1997a). Most scoters moulting in the estuary are Surf Scoters, but a few Black and White-winged scoters may moult there as well. Surf Scoters breed farther south than Black Scoters (Savard and Lamothe 1991; Reed et al. 1994; Bordage 1996), and males moulting in the St. Lawrence estuary likely originate from the more southerly breeding sites. In eastern North America, the most important moulting site for Black Scoters is located in James Bay, where the majority of the eastern population is believed to moult (Ross 1982, 1983; Bordage and Savard 1995). No such large moulting concentration has yet been located for Surf Scoters but there seem to be important moulting flocks along the Labrador coast (Lock 1986; Goudie et al. 1994) and in the St. Lawrence estuary and gulf. Moulting migration is a well-documented phenomenon in sea ducks, which will fly thousands of kilometres to reach suitable moulting sites (Salomonsen 1968; Petersen 1981).

Scoters seen in early June in the St. Lawrence estuary are likely nonbreeders (mostly first- or second-year birds), but there may also be some adult birds. Nonbreeding by adults has been documented in eiders (Coulson 1984) and seabirds (Kaldec and Drury 1968; Wooller and Coulson 1977) and could possibly occur in scoters. Morrier et al. (1997) found that breeding males departed from their breeding lakes as early as the third week of June. Bédard et al. (1997b) reported an increase in scoter numbers at the west point of Île aux Lièvres at the same time, confirming an early arrival of moulting scoter drakes in the St. Lawrence estuary.

The distribution of Common Eiders in the spring confirms earlier observations by Gauthier and Bédard (1976) and Bédard et al. (1986) indicating a concentration around breeding islands. These authors also indicated that more than half the males left the estuary in late May - early June for unknown areas. This accounts, in part, for the lower number of eiders we observed in late May. The moulting sites we observed are the same ones noticed by Bédard et al. (1986), probably indicating a traditional use of these sites. It is

interesting to note that scoters and eiders tend to use different moulting sites. Both, however, are concentrated at this time and often form very tight flocks.

5.3 Important areas

The most important identified site for scoters is the foreshore west of Île Patte de Lièvre, which supports the highest number of scoters in spring, summer, and fall (Bédard et al. 1997a). Moulting sites also included Saint-André-de-Kamouraska and the foreshore east of Île du Chafaud aux Basques. Important moulting sites east of Baie-Comeau remain to be identified. Several sites are used year after year by scoters, indicating the patchy nature of suitable habitats. Black and Surf scoters feed on a variety of shellfish (Stott and Olson 1973; Vermeer 1981; Vermeer and Bourne 1984) abundant in specific habitats. It is important to identify significant areas used by scoters and eiders, for several reasons. First, we may want to avoid locating shellfish aquaculture farms in these sectors, as sea ducks can have a significant impact on their yield (Rueggeberg and Booth 1989; Parsons et al. 1990). Second, we may want to regulate shellfish harvesting in these areas, as overharvesting may affect the food resources available to scoters. Third, we may also want to minimize disturbance by boat traffic in the most important areas. Fourth, we may want to identify these areas as highly sensitive in oil spill contingency plans, as sea ducks are extremely vulnerable (King and Sanger 1979; Hooper et al. 1987; Rodway et al. 1989), especially when moulting. Finally, we may want to create marine protected areas at the most important sites.

5.4 Conclusion

Our study confirmed the abundance of sea ducks in spring and summer in the St. Lawrence estuary and shed some doubts on the reliability of multispecies surveys for estimation of sea duck trends. However, much remains to be known about the ecology of sea ducks within the St. Lawrence estuary.

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