

**Sea Duck Joint Venture**  
**Annual Project Summary for Endorsed Projects**  
**FY 2010 – (October 1, 2009 to Sept 30, 2010)**

**Project Title: SDJV # 117 Population Delineation, Migratory Connectivity and Habitat Use of Atlantic Scoters: Black Scoters**

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**Project Description:** Up to 2007, only 34 Black and 27 Surf Scoters had been marked with PTTs in eastern North America. These birds provided the first insights into the migratory movements of eastern North American scoters. In 2009, we marked an additional 20 females; however, sample sizes must be increased to improve our understanding of the movements and affiliations for these populations. For example, of the females that have been tracked from wintering and spring staging sites along the Atlantic Coast, a large proportion have moved to breed in the central boreal forest (Perry et al. 2006), which is outside the known breeding range for Black Scoters (Bordage and Savard 1995), and thought just to support breeding Surf (Savard et al. 1998) and White-winged Scoters (Brown and Fredrickson 1997). This has implications for delineation of the eastern and western populations of Black Scoters, for interpreting the results of the May breeding pair surveys which the scoters are not be speciated during, and for the design of future breeding surveys for sea ducks.

Our study area was located at a spring staging area on the Bay of Chaleur between New Brunswick and Québec (Fig. 1). This site is the major spring stop-over site for migrating Black Scoters in eastern North America. We used standard night-lighting procedures (Perry 2005) and floating mist-nets (Bowman 2007) to capture Black Scoters and all birds were marked with a stainless steel band before release. Females were aged by probing the bursa. Females with no bursa, or bursal length less than 10 mm, were classified as adults and sub-adults, respectively, and, were retained for instrumentation. When females were captured with their mate, the mate was retained and released with

the female.

Within 24 hours after capture, birds underwent an intra-abdominal surgery to implant PTT 100 satellite transmitters (42 g) manufactured by Microwave, Inc., Columbia, Maryland. Ducks were released near their capture site.



Fig. 1. Location of study area, Bay of Chaleur, NB.

**Objectives:** Our objective for 2010 was to tag 35 adult Black Scoters with satellite tags to assist in defining the distribution of Black Scoters on their breeding and molting areas.

**Preliminary Results:** Between 29 April and 5 May 2009 we captured 79 Black Scoters and 2 Surf Scoters, and between 1 and 8 May 2010 we captured 71 Black Scoters, 11 Surf Scoters and 1 White-winged Scoter (Table 1). All birds were tagged with SS USFWS bands. In 2009, we tagged 18 adult and 2 sub-adult female Black Scoters, and in 2010, we tagged 16 adult and 3 sub-adult female and 28 adult male Black Scoters (Table 2). In addition, we tagged one adult male Surf Scoter in 2010. Follows are preliminary summaries for the performance of the tags and select periods of the annual cycle.

**Performance of Tags--.** The tags were programmed with two different duty-cycles. In 2009, tags were programmed on a 6 h on and 72 h off cycle, while all tags in 2010 were programmed with a 2 h on and 72 h off cycle. ARGOS data used in this analysis covered the period from 5 May 2009 to 20 September 2010.

The 2009 tags transmitted an average of ~140 cycles and lasted about 1.2 years. During this period they averaged ~3 class 1 or better locations per on cycle of which there an average of 1.3 class 3 locations per cycle (Table 3). The 2010 tags had only

transmitted for about 3.5 months and transmitted an average of ~40 on cycles at this time of this summary. During this period they averaged 2 class 1 or better locations per on cycle of which there an average of 0.5 class 3 locations per cycle (Table 3).

Migration--. A composite map of the tracks for all birds is shown in Figure 2. Maps depicting movements of individual birds can be found at [http://www.seaturtle.org/tracking/?project\\_id=395](http://www.seaturtle.org/tracking/?project_id=395) and [http://www.seaturtle.org/tracking/?project\\_id=499](http://www.seaturtle.org/tracking/?project_id=499). These tracks indicate that eastern Black Scoters follow a tight migration corridor in a northeasterly direction from their wintering areas along the east coast of the USA to the Bay of Chaleur, NB, then turning northwest and migrating across James Bay and terminating their migration between James Bay and the North West Territories, with a few birds migrating to the Ungava Peninsula. On their return migration almost all birds stopped in James Bay or southern Hudson's Bay, where they likely moulted, then reversed their route back to their wintering areas. A few birds may have taken a more direct route overland on their return.

Table 3 summarizes the locations of the terminus points of spring migration for birds that migrated to an inland area (potential breeding site). Females showed a strong tendency to migration to the North West Territories and northern Manitoba with only about 30% moving to known breeding areas in northern Ontario and the Ungava Peninsula in Québec and Labrador. Most males did not migrate to potential breeding areas, but moved directly to moulting areas in along the North Shore of the Gulf of St. Lawrence and James Bay. The few that did move to breeding areas (30%; Table 3) appeared to be associated with breeding areas in northern Ontario and the Ungava Peninsula.

Breeding Site Fidelity --. For 15 of the females tracked from 2009 we have captured two annual migrations between their spring staging and breeding areas. Six of the 15 females returned to the exact same potential breeding location in both years suggesting that Black Scoters have a strong fidelity to breeding sites (Figure 3).

James Bay Moulting Area-. James Bay is a known moulting area for Black Scoters. Black Scoters arrived in James Bay as early as May (Figure 4 and 5). Most of the females departed James Bay by early June, while the majority of males stayed in James Bay for the summer. Most of the males that stayed in James Bay moulted along the west coast of the Bay and on the southern side of Akimiski Island, with a couple of males moulting in the islands along the eastern side of James Bay (Fig. 4).

Many of the females returned to James Bay by September, stopping along the southwest coast of Hudson's Bay along the way (Fig. 5). Females moulted throughout James Bay, but showed a stronger tendency to used the eastern side of James Bay than the males. A cursory examination of the data suggested that females initiated their moult in September which was about 1.5 months later than for males.

Wintering Areas--. To date, we only have winter location data for the 15 females released in 2009. Figure 6 shows all the location data for these females between September 2009 and March 2010. The birds were distributed from northern Florida to Nantucket, with wintering sites at Nantucket, New York, Delaware Bay, Pamlico Sound and near Charleston (Fig. 6). Figure 7 shows patterns of season use for the Delaware Bay and Pamlico Sound areas. The birds arrived at these areas in November and remained there throughout the winter, during which this they appeared to make small local movements.

**Project Status:** We are currently tracking two of the 15 birds tagged in 2009, and 42 of the 48 birds tagged in 2010. The two tags from 2009 have exceeded their projected battery life and are not expected to transmit for much longer. The life expectancy of the batteries for 2010 tags may exceed 2.5 years and will hopefully provide location data for at least another full annual cycle. Performance of the 2 h on cycle has not been fully evaluated, and there is potential that their performance may be limited when the birds are in the low latitudes (Wells-Berlin pers. comm.). Regardless, the potential of the program will not be realized until spring 2011 when the tags have been out for at least one annual cycle.

Table 1. Numbers of scoters captured in Bay of Chaleur NB and QC in 2009 and 2010.

Year	Species	Females		Males		Total
		Adult	Sub-Adult	Adult	Sub-Adult	
2009	Black Scoter	22	3	41	13	79
	Surf Scoter	0	0	2	0	2
	Total	22	3	43	13	81
2010	Black Scoter	16	4	50	1	71
	Surf Scoter	3	0	8	0	11
	White-winged Scoter	0	0	0	1	1

Table 2. Number of Black Scoters implanted with PTTs in 2009 and 2010.

	2009		2010	
	Male	Female	Male	Female
Second Year	0	3	0	3
Adult	0	17	28	16

Table 2. Average number of locations acquired per on cycle ( $\pm$ SD) for 42 g PTTs with 2 and 6 hour on, and 72 h off duty-cycles.

Duty-Cycle	No. Cycles	Location Class			
		3	2	1	>0
2 h on 72 h off (n=48)	42 $\pm$ 8.9	0.5 $\pm$ 0.4	0.8 $\pm$ 0.4	0.7 $\pm$ 0.4	2.0 $\pm$ 0.8
6 h on 72 h off (n=15)	139 $\pm$ 9.4	1.3 $\pm$ 0.6	1.8 $\pm$ 0.5	1.3 $\pm$ 0.5	3.0 $\pm$ 0.2

Table 3. Location of terminus of the spring migration for Black Scoters marked at Bay of Chaleur, NB in 2009 and 2010 (note: birds that migrated directly to their molting area are not included).

	Area			
	NWT	MB	ON	QC
Male	0	0	1	6
Female	12	7	1	7

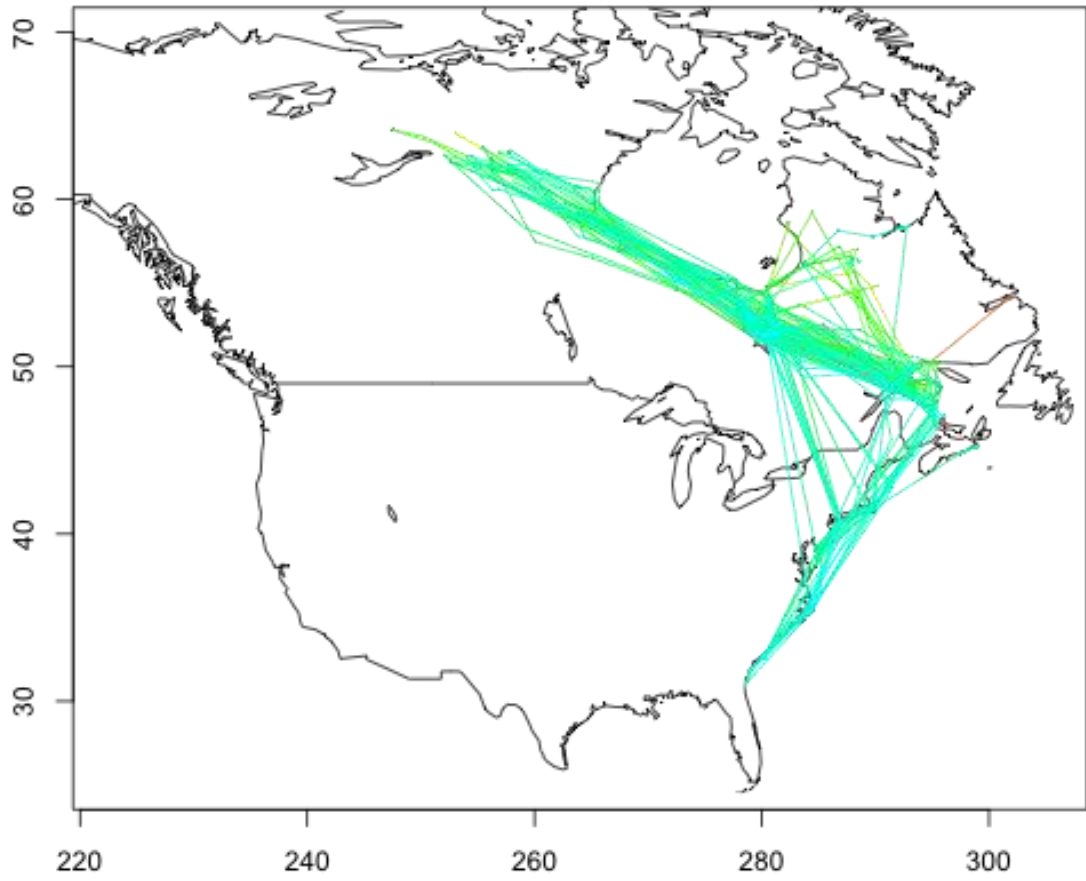


Figure 2. Composite map of all migration tracks from 57 Black Scoters tagged at Bay of Chaleur, NB in 2008 and 2009.

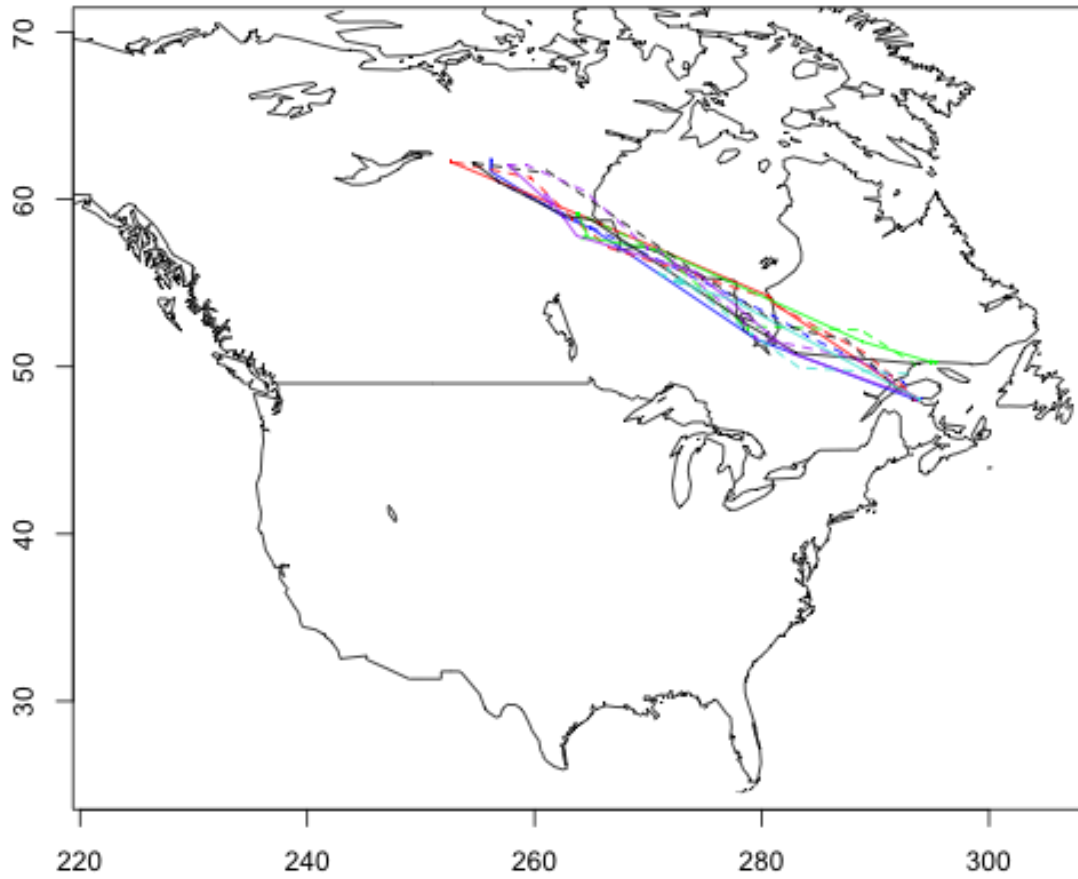


Figure 3. Spring migration tracks between the spring staging area in Bay of Chaleur and their breeding area for 6 adult female Black Scoters in 2009 (solid line) and 2010 (dashed line).

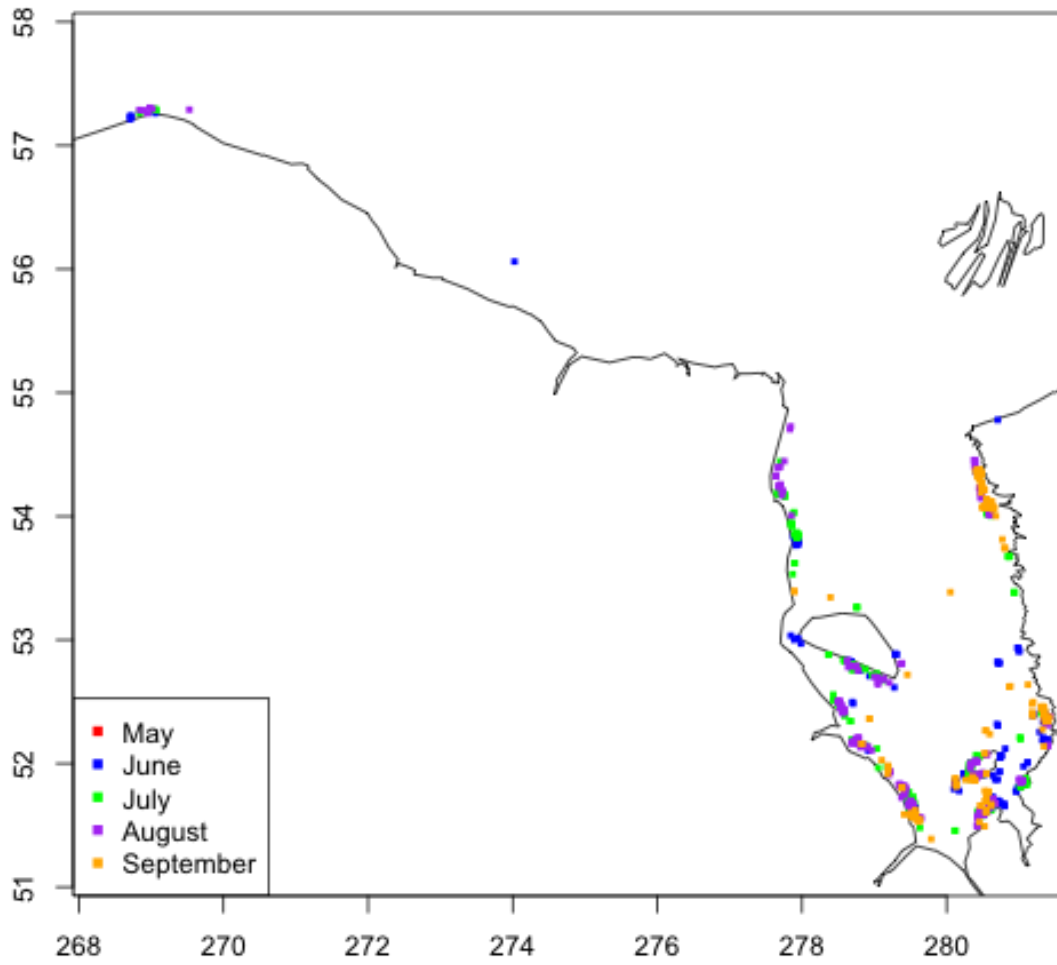


Figure 4. Map showing seasonal patterns of use of lower Hudson's Bay and James Bay by adult Black Scoters in 2010.



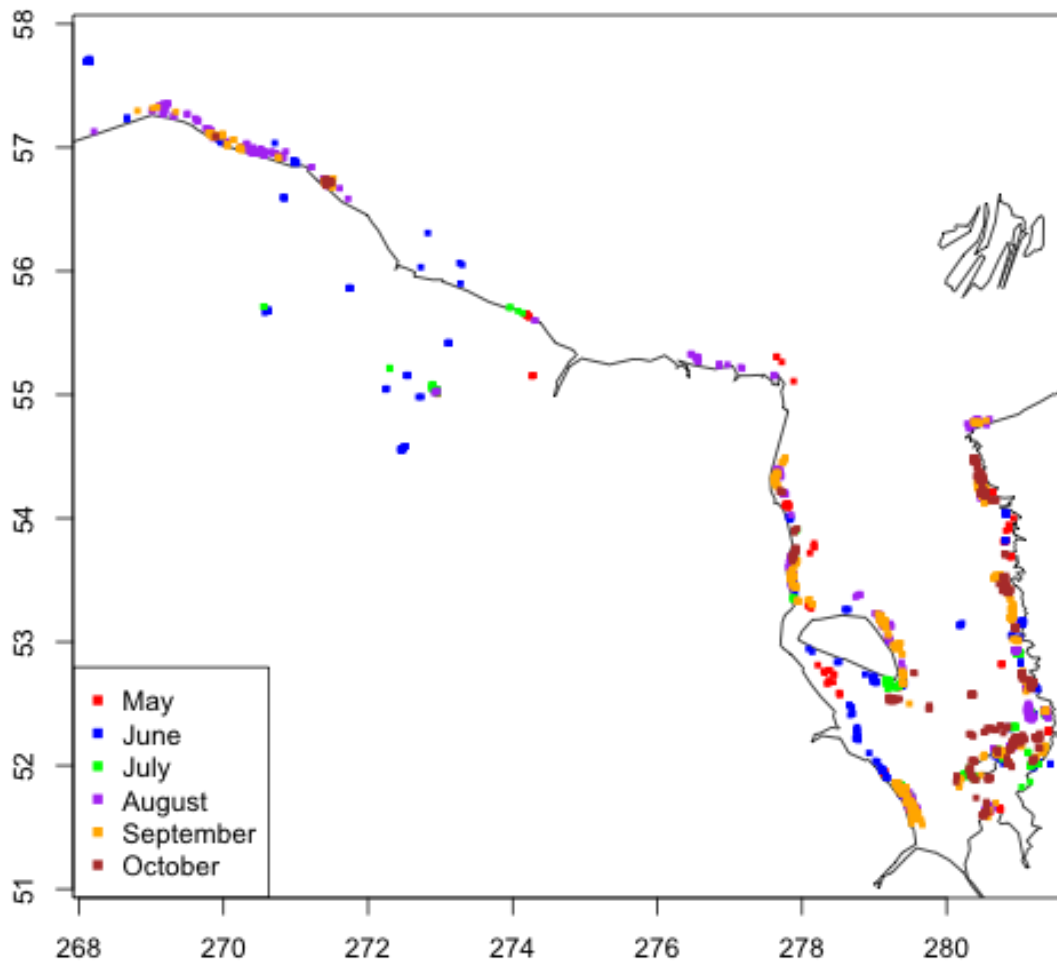


Figure 5. Figure 4. Map showing seasonal patterns of use of lower Hudson's Bay and James Bay by female Black Scoters in 2009 and 2010.

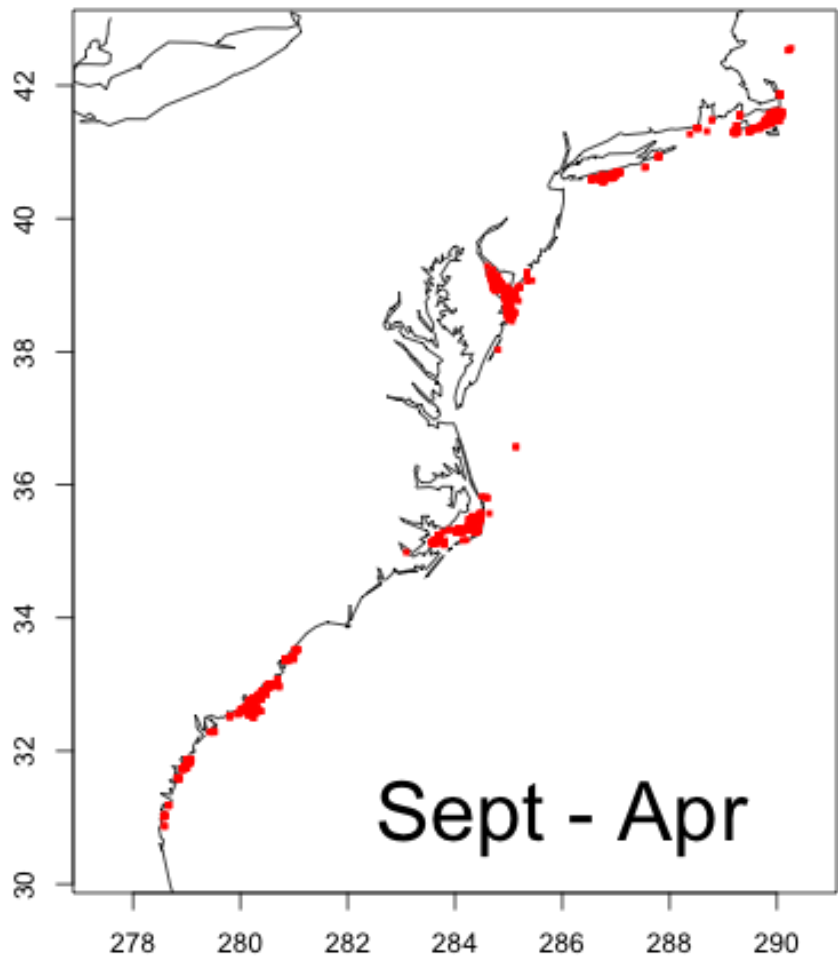


Figure 6. 2009 and 2010 fall – winter locations for 15 female Black Scoters tagged at Bay of Chaleur, NB in spring 2009.

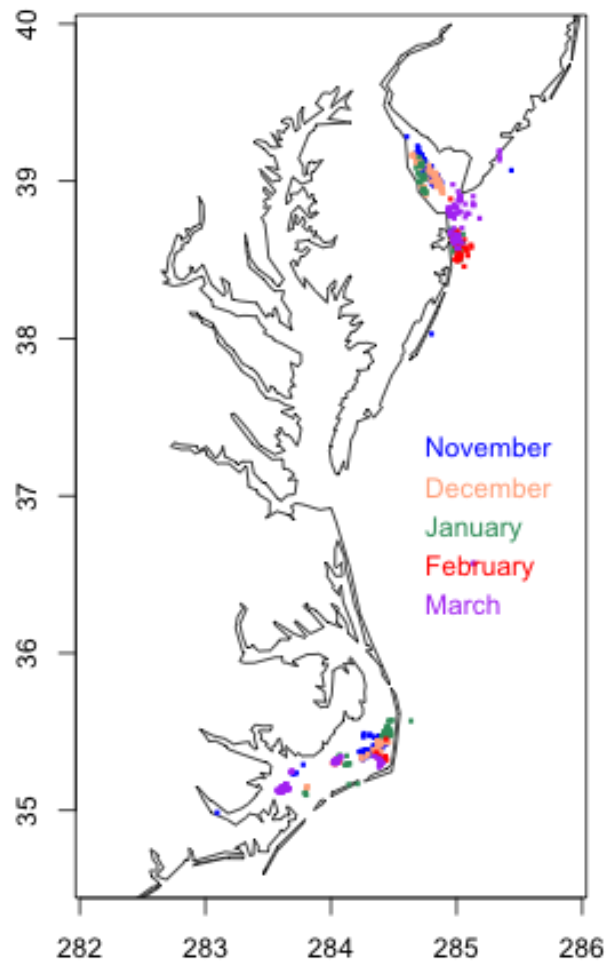


Figure 7. Map showing seasonal patterns of use of Delaware Bay and Pamlico Sound by female Black Scoters tagged at Bay of Chaleur, NB in spring 2009.