Sea Duck Joint Venture
Annual Project Summary
FY 2005

Project Title – SDJV # 55: **Monitoring Atlantic Flyway Black Scoters**

Principle Investigators –

Keith McAloney – Canadian Wildlife Service, Box 6227, 17 Waterfowl Lane, Sackville, NB E4L 1G6
keith.mcaloney@ec.gc.ca

Jean-Pierre Savard, Canadian Wildlife Service, 1141 Route de l'Eglise, Box 10100, Sainte Foy, QE, G1V 4H5 jean-pierre.savard@ec.gc.ca

Scott Gilliland, Canadian Wildlife Service, 6 Bruce St. Mount Pearl, NL. A1N 4T3
scott.gilliland@ec.gc.ca

Partners – SDJV, CWS-QR and CWS-AR

Project Description: Aerial surveys were conducted during spring staging in Baie Chaleur, NB and the north shore of the Saint Lawrence estuary, Quebec as the entire Atlantic Flyway population of Black Scoter *(Melanitta nigra)* is thought to stop there for 3-5 weeks during spring migration. As the total breeding range for this species is undefined but known to be widespread in remote northern areas and since winter range extends from Nova Scotia to Georgia, the spring staging grounds may be the best opportunity to survey for population size and trends.

Methods:

Aerial Survey --. On 05 May and 10 May 2005, we surveyed the Bay of Chaleur from 47.926 degrees latitude, 66.042 degrees longitude in NB to 48.071 degrees latitude, 66.301 degrees longitude in Quebec. Aerial counts were carried from a Cessna 172 flown at an altitude of 90 m at a speed of 130 km/h. We attempted to cover the entire bay including all offshore areas. We counted all scoters encountered on the survey. Where possible, we recorded the species and location (coastal block) of all observations. Counts were conducted on north shore Saint Lawrence estuary, Quebec on 9 May and 19 May using similar aircraft at height of 150 meters and speed of 100km/hr.

Aerial Photos --. On the May 10 survey in Baie Chaleur, we evaluated the use of aerial photos to estimate the species and sex composition of the flocks, and observer error in visual estimates of flock sizes. All photos were taken with a Canon EOS Digital Rebel camera using a 28 -135 mm image stabilized lens. Focal length of the lens was varied from 50 -135mm, and shutter speed, film speed combinations of: 1/160s and 200 ISO, 1/200s and 200 ISO, 1/250 s and 200 ISO, and 1/320 s and 400 ISO.

Low altitude photos of flocks were taken 90 m to evaluate if they could be used to measure species and sex composition of flocks. To evaluate observer error in flock estimation we took high altitude photos and corresponding visual estimates from an altitude of 215 m. Each image was examined using the software ImageJ and photo counts of flocks were made with the manual counting tool of the software's Particle Analysis feature. Photo counts were considered to be an accurate count. We combined visual estimates (available for all flocks) and photo counts of scoters via a ratio estimator (see Bordage et. al 1998).

In addition to the aerial surveys, a small contract was let for two naturalists to conduct kayak surveys in Baie Chaleur to gather information of species composition and sex ratios for spring staging scoters.

Objectives – Project addresses SDJV priority of attempting to develop affordable., repeatable surveys for population monitoring.

Preliminary Results and Discussion -

Species Composition--. Kayak surveys from May 3 to May 20 (n=7) determined species composition and sex ratio of flocks totaling 9,202 scoters which were 95% Black Scoter and 63% males.

Population Estimates--.Adverse weather conditions forced the abandonment of the 29 April survey of Baie Chaleur and delayed initiation of the Saint Lawrence survey until 9 May. Thus, each area was surveyed twice instead of the proposed three times.

On 5 May we identified 2,029 Black scoter, 197 Surf Scoter and 55,124 unidentified scoters in large flocks. Adjusting the count of unidentified scoters for the

species composition measured from the kayak surveys (91% Black Scoters; above) we estimate a total of 52, 191 Black scoter observed on 5 May in Baie Chaleur.

Surveys in Quebec on May 9, recorded 11,480 Black scoter, 26, 805 Surf scoter and 60, 990 unidentified Scoter. The proportion of Black Scoters in identified flocks was 0.3, resulting in an overall estimate of 29,777 Black Scoter.

The 10 May low altitude survey of the Bay of Chaleur produced a visual estimate of 45,560 scoters (42,826 or 94% Black Scoter; Table 1). The birds were distributed over the entire bay in loose aggregations and occurred in patches of varying densities. Because flocks were not discrete, the observer and photographer were unable produce visual estimates and photographs for corresponding flocks at low altitude. Hence we were only able to collect combinations of photos and visual estimates from the high altitude pass.

Evaluation of Aerial Photos --. During the low altitude pass we took 140 photos of groups scoters. All photos were high enough quality to count the number of birds on the image. Female white-winged, surf and black scoters, and male white-wing and black scoters have few unique plumage characteristics, hence high quality images are required to discriminate among these cohorts. Unfortunately the image quality was not high enough to confidently discriminate among the scoter species and the sexes. The main problem was image blur. It maybe possible to reduce image blur by increasing shutter speed above 1/320 s and/or using shorter focal lengths. Shorter focal lengths maybe achieved if a camera capable of higher than 6.3 mega pixels was used.

During the high altitude pass we acquired 23 photos of nine flocks that had corresponding visual estimates. The number of birds was countable for eight of the flocks (Table 1). The visual estimates were an average of 18% lower then the corresponding photo count. Combining the photo counts and visual estimates using ratio estimation techniques produced a total of 53,213±6,189 scoters (±SE). Although not significantly different from the visual estimate (45,560), the photo-corrected estimate accounts for observer errors in flock estimation. Observer errors may vary among observers or with environmental conditions, hence photo corrected counts maybe more comparable among surveys.

The 9 May survey in Saint Lawrence and May 10 survey in Baie Chaleur are the only two surveys close enough to avoid double counting. Any over night movement would have been north from Chaleur to saint Lawrence so resulting estimate does not double count birds. The combined estimate (Table 2) of 88,547 Black Scoter is estimated spring population for 2005.

Table 1. Results of aerial surveys of scoters ducks in the Bay of Chaleur New Brunswick, 10 May 2005.

		Photo Comparisons	
Count Type	Visual Estimate	Visual Estimate	Photo count
Survey Altitude	90 m	215 m	215 m
Number of Flocks	250	8	8
Mean Flock Size	182	102	135
SD Flock Size	306	132	175
Total Birds	45560	812	1083
Corrected Estimate	53213	-	-
(SE Estimate)	6189	-	-

Table 2. Combined Estimates for Saint Lawrence and Baie Chaleur May 9-10, 2005

Location	Total Scoters	% Black Scoter	# Black Scoter	Photo Corrected
St. Lawrence	99,275	30	29,783	36,320
Baie Chaleur	45,560	94	42,826	52,227
Total				88,547

Project Status – Preliminary assessment of survey completed. Objective partially completed in terms of feasibility and obtaining total numbers. Future work should concentrate of refining photo techniques so species composition and sex ratios can be obtained from air. Budget permitting, we will conduct this work on Baie Chaleur in 2006 and put forward as 2007 proposal to SDJV if techniques prove to be feasible.