

**Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 2006 – (October 1, 2005 to September 30 2006)**

Project Title (SDJV Project #83): Great Lakes Winter Sea Duck Survey

Partners:

Scott Petrie, Long Point Waterfowl & Wetlands Research Fund; spetrie@bsc-eoc.org

Shannon Badzinski, LPWRF; sbadzinski@bsc-eoc.org

Ken Ross, Canadian Wildlife Service – Ontario Region; ken.ross@ec.gc.ca

Norm North, Canadian Wildlife Service – Ontario Region; norm.north@ec.gc.ca

Project Description: Since the late 1980s / early 1990s, non-native zebra and quagga mussels have greatly increased throughout the lower Great Lakes. During the same time, winter diving duck and sea duck use has increased greatly, especially on the Canadian side of Lake Ontario, in response to the increase in prey abundance and milder winter conditions. This increase in winter duck use resulted in the initiation of the Lower Great Lakes (LGL) January Survey in 2002.

The LGL January Survey is an annual (2002-2006), coordinated Canadian and US aerial waterfowl survey of lakes Ontario, Erie, and St. Clair. The survey is flown in early-mid January (similar time to the Mid-winter Survey at traditional wintering areas) to estimate numbers of wintering waterfowl along shorelines of the Canadian and US sides of the LGL. The LGL January Survey provides data on numbers of dabbling ducks and Canada Geese, but also on several diving duck and sea duck species, most notably Long-tailed Ducks (LTDU). For example, an average of 50,214 LTDU were counted each January during the LGL January Survey, and > 90% of those birds were located on the Canadian side of Lake Ontario. Based on these survey results, the northern portions of Lake Ontario have been identified as the most important wintering area for LTDU on the LGL.

The LGL January Survey currently only is flown along shoreline habitat and detects waterfowl that are up to 1 km off shore. As a result, the survey likely provides reasonably good estimates for species that frequent shoreline or nearshore habitats. Some diving duck species, particularly sea ducks (e.g. LTDU, scoter spp, etc.), often forage far offshore because of their deep diving abilities. Thus, the LGL January Survey, like most other standard shoreline surveys, may only record a very small portion of LTDU and scoter spp actually present given that many others may be as far as 10 km off shore. It was therefore necessary to carry out reconnaissance surveys over a wide range of distances from shore in order to establish a better survey framework (survey intensity, stratification, etc.) for sea ducks. These improvements, in turn, should improve the reliability of population estimates and provide added information for geographic distribution and broad-scale habitat use of wintering sea ducks on the LGL.

Objective:

1. Determine if adding several offshore survey transects to the LGL January Survey increases survey effectiveness for sea ducks, mainly Long-tailed Ducks and scoter spp.

Preliminary Results: After the formal 2006 LGL January Survey, we flew four additional “modified” surveys mid-day on the Canadian side of Lake Ontario (from Oshawa – Stoney Creek, Ontario) on 13, 21, and 31 January and 23 February. In addition to the usual shoreline transect (0.5 km offshore, 140 km long), we flew several other parallel transects that were 2 km, 4 km, 10 km, and 20 km offshore (Figure 1). The plane was flown at an altitude of 100 m and observers on each side estimated numbers of diving ducks and sea ducks on each transect out to a distance of approximately 0.5 km.

During the 13 January survey we flew the shoreline, 2 km, 4 km, and 20 km transects. Diving ducks were observed on all transects except the one 20 km offshore (Table 1). As a result, we eliminated the 20 km transect from subsequent surveys.

During the 20 January survey, we flew the shoreline, 2 km, and 4 km transects plus one that was 10 km offshore. Variable numbers of diving ducks were counted on all four of these transects (Table 2). As a result, we included the 10 km transect on all subsequent surveys; transect-specific and overall counts of the 31 January and 23 February surveys are summarized by species in Tables 3 and 4.

Overall, we determined that 83% to 100% of scaup (primarily Greater Scaup) spp, Bufflehead, Common Goldeneye, Common Merganser, and Red-breasted Merganser were counted on the shoreline transect, but all individuals of these species were accounted for by addition of the 2 km transect (Table 5, Figures 2a,b). The shoreline transect contained 57% of LTDU and 48% of scoter spp (Table 5, Figure 2a). About an additional 30% of both LTDU (cumulative = 87%) and scoter spp (cumulative = 76%) were counted on the 2 km transect, and more than 98% of individuals of each species observed were accounted for after inclusion of the 4 km transect (Figure 2b).

These results suggest that expanding the current Lower Great Lakes Survey to include an additional transect 2 km offshore would greatly increase data on number (plus geographic distribution and habitat use) of sea ducks, particularly LTDU and scoter spp, counted during the survey. Our results suggest that 13% and 24% of LTDU and scoter spp, respectively, are located ≥ 4 km offshore. Adding more transects further offshore would provide even better counts of LTDU and scoter spp, but would not be cost effective on a large scale given that sea duck numbers are generally low and groups are widely distributed.

Project Status: This initial study was successful in that it allowed us to meet our main objective. Specifically, it enabled us to determine the optimal distance that transects should be located from the shoreline during the annual LGL January Survey to provide better counts of wintering diving and sea ducks wintering on Lake Ontario. Implementing these changes to future surveys will also allow us to understand better winter sea duck distributions and broad-scale habitat use on Lake Ontario.

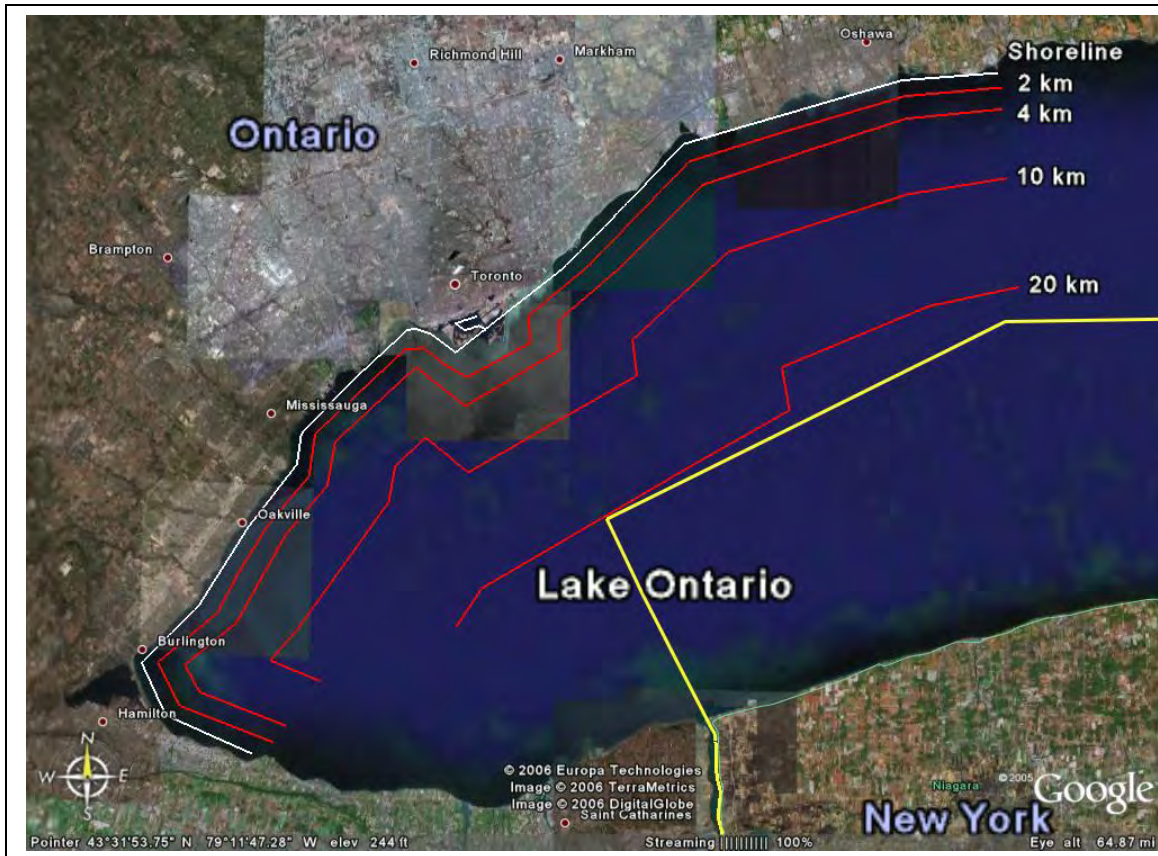


Figure 1. Survey area on western Lake Ontario showing the 5 transects on which diving and sea ducks were counted from mid-January to late-February 2006. The shoreline transect (white) is 0.5 km offshore and is traditionally flown during the Lower Great Lakes January survey; the additional transects (red) were added to determine offshore abundances of sea ducks.

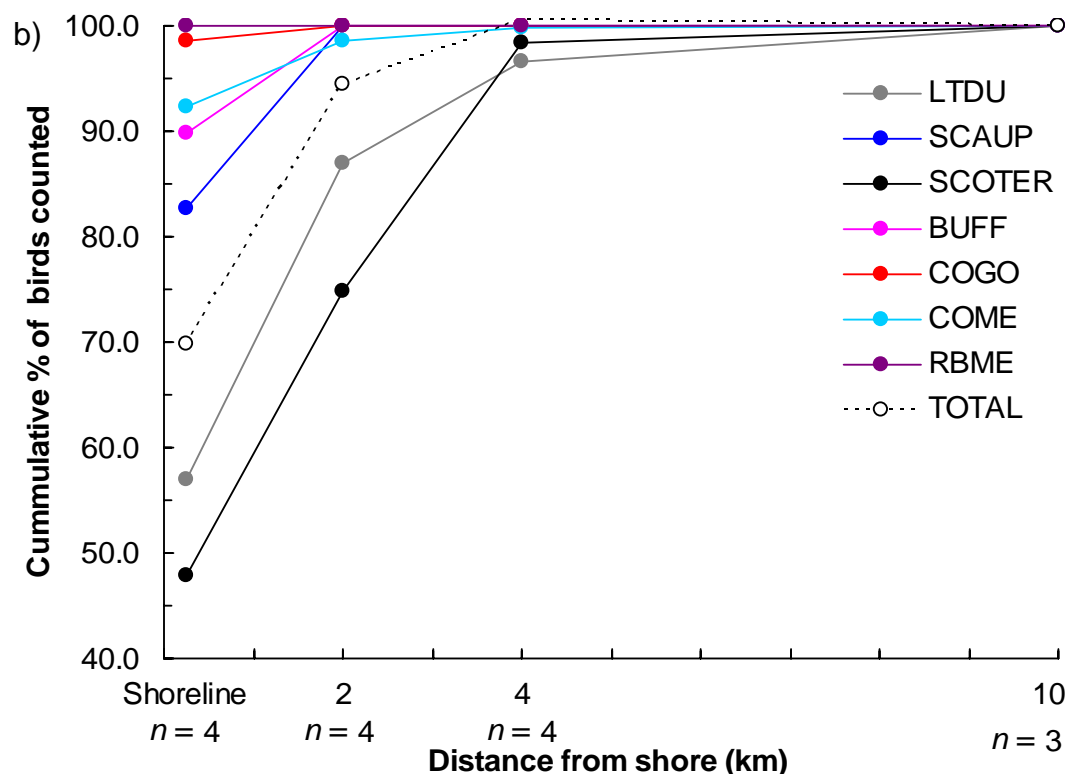
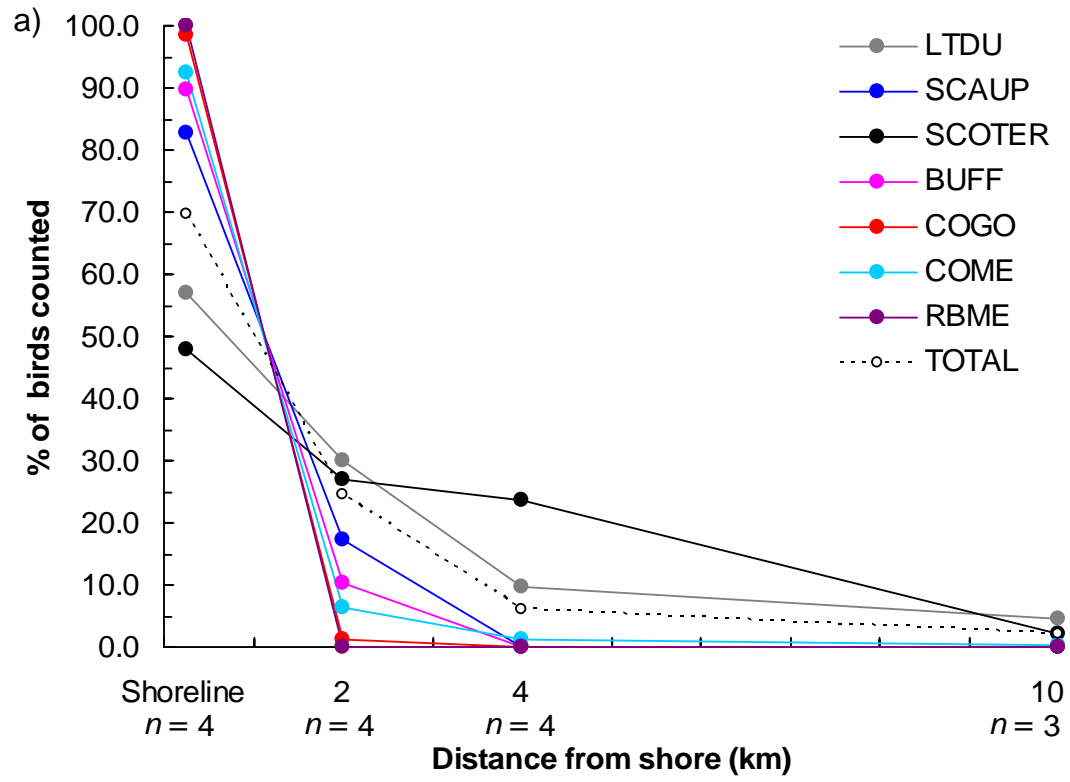


Figure 2. Mean percentage (a) and cumulative mean percentage (b) of waterfowl counted along the Ontario shoreline and on transects located 2 km, 4 km, and 10 km off shore in western Lake Ontario.

Table 1. Transect-specific and total counts of waterfowl conducted on western Lake Ontario (Stoney Creek to Oshawa, Ontario) on 13 January 2006.

Species (count)	Transect^a				Total
	Shoreline	2 km	4 km	20 km	
Long-tailed Duck	13482	7273	1915	—	22670
Scaup	19368	18035	0	—	37403
Goldeneye	2529	85	0	—	2614
Bufflehead	1431	0	0	—	1431
Common Merganser	758	20	0	—	778
Red-breasted Merganser	94	0	0	—	94
Black Scoter	1794	3167	1400	—	6361
White-winged Scoter	98	107	800	—	1005
Surf Scoter	41	7	0	—	48
Scoter spp	1933	3281	2200	—	7414
Total	41528	28694	4115	—	72404

^a 20 km transect flown, but no waterfowl were observed.

Table 2. Transect-specific and total counts of waterfowl conducted on western Lake Ontario (Stoney Creek to Oshawa, Ontario) on 20 January 2006.

Species (count)	Transect				Total
	Shoreline	2 km	4 km	10 km	
Long-tailed Duck	23208	23083	3550	1153	50994
Scaup	23544	6350	0	0	29894
Redhead	80	0	0	0	80
Goldeneye	2907	53	0	0	2960
Bufflehead	1705	0	0	0	1705
Common Merganser	1136	93	0	0	1229
Red-breasted Merganser	6038	9	0	0	6047
Black Scoter	3131	3602	3030	0	9763
White-winged Scoter	192	334	610	0	1136
Surf Scoter					
Scoter spp	3323	3936	3640	0	10899
Total	65264	33524	7190	1153	103808

Table 3. Transect-specific and total counts of waterfowl conducted on western Lake Ontario (Stoney Creek to Oshawa, Ontario) on 31 January 2006.

Species (count)	Transect				Total
	Shoreline	2 km	4 km	10 km	
Long-tailed Duck	7572	5025	4003	1721	18321
Scaup	13711	0	0	0	13711
Goldeneye	4059	5	0	0	4064
Bufflehead	2413	0	0	0	2413
Common Merganser	645	16	22	2	685
Red-breasted Merganser	115	0	0	0	115
Black Scoter	659	598	568	120	1945
White-winged Scoter	120	289	2	25	436
Surf Scoter					
Scoter spp	779	887	570	145	2381
Total	30073	5933	4595	1868	41690

Table 4. Transect-specific and total counts of waterfowl conducted on western Lake Ontario (Stoney Creek to Oshawa, Ontario) on 23 February 2006.

Species (count)	Transect				Total
	Shoreline	2 km	4 km	10 km	
Long-tailed Duck	16008	2964	266	401	19639
Scaup	7357	0	0	0	7357
Goldeneye	2887	4	2	3	2896
Bufflehead	1662	1147	0	0	2809
Common Merganser	1184	178	19	8	1389
Red-breasted Merganser	86	0	0	0	86
Black Scoter	181	13	0	0	194
White-winged Scoter	336	41	20	2	399
Surf Scoter					
Scoter spp	517	54	20	2	593
Total	30218	4347	307	414	34769

Table 5. Mean percentages (\pm SE) of individuals of diving duck species counted on shoreline and offshore transects at western Lake Ontario (Stoney Creek to Oshawa, Ontario) from 13 January – 23 February 2006.

Species (%)	Transect ^a			
	Shoreline	2 km	4 km	10 km
Long-tailed Duck	57.0 (10.5)	30.0 (7.2)	9.7 (5.0)	4.6 (3.0)
Scaup	82.6 (13.2)	17.4 (13.2)	0.0	0.0
Redhead	100.0	0.0	0.0	0.0
Canvasback	—	—	—	—
Goldeneye	98.6 (0.8)	1.3 (0.9)	0.0	0.0
Bufflehead	89.8 (11.8)	10.2 (11.8)	0.0	0.0
Common Merganser	92.3 (3.0)	6.3 (2.9)	1.1 (0.9)	0.3 (0.2)
Red-breasted Merganser	100.0	0.0	0.0	0.0
Black Scoter	46.9 (17.9)	31.0 (10.4)	20.6 (8.2)	2.1 (2.5)
White-winged Scoter	34.6 (19.6)	29.2 (15.2)	34.7 (22.2)	2.1 (2.2)
Surf Scoter	85.4	14.6	0.0	0.0
Scoter spp	47.9 (15.4)	26.9 (7.5)	23.6 (8.2)	2.1 (2.4)
Total	69.8 (7.5)	24.7 (7.7)	6.1 (2.4)	2.3 (1.4)