

**SEA DUCK JOINT VENTURE  
ANNUAL PROJECT SUMMARY FOR ENDORSED PROJECTS  
FY 2009 – (OCTOBER 1, 2008 TO SEPT 30, 2009)**

PROJECT TITLE

Avalon Seawatch: Long-term monitoring water bird migration along the southern Atlantic Coast of New Jersey

PRINCIPAL INVESTIGATOR

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BACKGROUND

Assessing population status and trends in many Arctic and sub-Arctic breeding waterfowl is challenging because counting them across their range during the nesting season is logistically difficult. They also can be difficult to count on their wintering grounds as they may be widespread across the offshore waters of large lakes and extensive coastlines. The Sea Duck Joint Venture's (SDJV) recent draft document "Recommendations for Monitoring North American Sea Ducks" suggests that most traditional waterfowl surveys are not designed to gather the data necessary to generate reliable population size and trend estimates for sea ducks. Furthermore, the SDJV draft report indicates that designing and implementing surveys and monitoring programs that provide specific data on population size, status, and trends are urgently needed for most species in this group.

Counts of birds passing during migration can be useful for assessing population trends in species that are difficult to monitor during the breeding season (Farmer et al. 2008, Bart and Ralph 2005, Hoffman and Smith 2003, Dunn and Hussell 1995). In particular, systematic counts of migrating diurnal raptors from fixed locations along migration routes have proven useful in identifying trends in several species (Hoffman and Smith 2003, Titus and Fuller 1990). At some survey locations (e.g., Cape May, Hawk Mountain), data has been collected for thirty or more years.

Similar to raptors, systematic waterbird counts from fixed points along migration routes might be useful in assessing population status and trend in difficult to monitor sea ducks. Although less widespread than raptor migration watches, several waterbird migration monitoring sites, like Avalon, NJ, Whitefish Point, MI and Braddock Bay, NY, have systematically counted sea ducks and waterbirds for more than ten years.

In particular, the waterbird migration count operated by New Jersey Audubon Society (NJAS) at Avalon, NJ (a.k.a. the Avalon Sea Watch), potentially counts the majority of Black and Surf Scoters wintering south of Delaware Bay. Since 1995, an average of nearly 160,000 Surf Scoters (*Melanitta perspicillata*), 140,000 Black Scoters (*Melanitta nigra*) and 84,000 unidentified "dark-winged" scoters, have been counted each fall migration season (Table 1). Furthermore, maximum counts in 1999 of 208,857 Surf Scoters (*Melanitta perspicillata*), 256,633 Black Scoters (*Melanitta nigra*) and 36,895 unidentified "dark-winged" scoters, were a major rationale for the monitoring committee to increase the population estimates for the Atlantic populations of these scoters.

## GOALS AND OBJECTIVES

Our goal is to provide important data on Atlantic sea duck and other waterbird populations by continuing our work at the Avalon Sea Watch. Specifically, our objectives are to (1) characterize daily and seasonal waterbird movement patterns along southern New Jersey's Atlantic coast during southbound passage, (2) investigate how movement patterns are modified by environmental factors (e.g., meteorological conditions, sea surface water temperature) and (3) monitor long-term changes in waterbird populations monitored during the period of the study

## METHODS

We conducted waterbird migration counts from the sea wall at the eastern end of the Avalon/Stone Harbor barrier island (~74.71° W, 39.11° N), Cape May County, New Jersey (Figure 2). The site provides an unobstructed view of the Atlantic Ocean and additionally is close to several offshore shoals that appear to channel passage of migrating waterbirds toward the coast.

An observer conducted daily surveys from sunrise to sunset between 22 Sept and 22 December 2008 using binoculars (e.g., 8x42, 20x60 image stabilized) and spotting scopes. Generally, a single observer is responsible for enumerating the migration on a given day. Using tally counters, an observer enumerated all species and individuals flying in west-southwesterly direction. Note that the general orientation of the coastline in this region of New Jersey is east-northeast to west-southwest. Hourly tallies were recorded on data sheets for each species' observed. Additionally, on two days per week, a second observer counted all species and individuals flying in northeasterly directions. We hired one full-time primary counter, who was responsible for conducting surveys five days per week. We also hired a second counter who made observations on two days per week when the primary counter was off.

Hourly and daily data were entered into MS Excel spreadsheets and converted to an MS Access database. We summarized (i.e., text, graphics) seasonal and daily temporal patterns of all waterbird movement observed during the study period and for five most commonly recorded species. Data collected in 2008 will be used with previously collected data (i.e., 1995-2007, west-southwesterly movements only) to assess changes in populations observed over the last 14 years.

## PRELIMINARY RESULTS

We collected data on 92 days for an average of 10.38 hours/day  $\pm$  SE 0.12. During the survey we recorded 947,318 individuals of 75 species (Table 1). Five of these species, Red-throated Loon (*Gavia stellata*), Double-crested Cormorant (*Phalacrocorax auritus*), Northern Gannet (*Morus bassanus*), Black Scoter (*Melanitta nigra*), Surf Scoter (*Melanitta perspicillata*) accounted for 88% of the total individuals recorded during the study period. Furthermore, 51% of the total individuals recorded (484,200) were Black or Surf Scoter.

Seasonal patterns of passage varied considerably among these five species. Approximately 50% of Black and Surf Scoters of the seasonal passage was recorded by 31 October – 1 November (Figure 1). However, the Black Scoter migration appeared more protracted. Seventy-seven percent of the total Black Scoter passage population was recorded between 18 October and 30 November (44 days), while 78% of Surf Scoters were recorded between 18 October and 12 November (26 days, Figure 1). Double-crested Cormorant migration appeared somewhat earlier than the scoters. Fifty percent of the passage population was recorded by 2 November, while approximately 80% were observed from 10

October – 11 November (33 days, Figure 1). In contrast, Northern Gannet and Red-throated Loon appear to migrate later in the season. Approximately 50% passed the watch site by 12 November and 20 November, respectively (Figure 1). Both species have comparatively narrow passage windows. Seventy-one percent of the Northern Gannet passage population was recorded between 2 and 23 November (22 days), while nearly 75% of all Red-throated Loons were recorded from 13 November – 2 December (20 days, Figure 1).

Peak daily passage of Double-crested Cormorants, Northern Gannets, and Red-throated Loons appears to occur during the first hour after sunrise and decreases throughout the day. Black Scoter flights typically peak during midday, while Surf Scoters peak in the late afternoon. Preliminary analyses suggest no significant inter-annual trends in total numbers of birds, or in numbers of the five most numerous species. However, large inter-annual variation in counts may preclude meaningful assessment of population trends given the relatively short duration of the study to-date.

#### PROJECT STATUS

We believe the work conducted in 2008 was successful at meeting our primary objective to monitor the temporal passage of waterbirds migrating along New Jersey’s Atlantic coast. We continue to assert that this work is one of the best methods for estimating changes in certain waterbird populations (e.g., Black and Surf Scoters, Red-throated Loon, possibly Double-crested Cormorant and Northern Gannet). Future work will focus on the effects of large-scale weather systems and ocean temperatures on seasonal patterns of movement, and improving population trend assessment.

#### PROJECT FUNDING SOURCES (US\$)

SDJV (USFWS) Contribution	Other U.S. federal contributions	U.S. non-federal contributions	Canadian federal contributions	Canadian non-federal contributions	Source of funding (name of agency or organization)
\$4000		\$16000			Kowa Optimed (\$8K), NJAS (\$8K in-kind)

#### TOTAL EXPENDITURES BY CATEGORY (SDJV PLUS ALL PARTNER CONTRIBUTIONS; US\$)

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
<b>Banding</b> (include only if this was a major element of study)					
<b>Surveys</b> (include only if this was a major element of study)			\$20000		\$20000
<b>Research</b>					

Table 1. Total and peak one-day counts of waterbird species recorded at the Avalon Sea Watch, Cape May County, New Jersey, 22 September - 22 December 2008.

Common name	Scientific name	Total count	Peak count
Red-throated Loon	<i>Gavia stellata</i>	49113	7882
Common Loon	<i>Gavia immer</i>	2680	587
Red-necked Grebe	<i>Podiceps grisegena</i>	4	1
Horned Grebe	<i>Podiceps auritus</i>	44	8
Leach's Storm Petrel	<i>Oceanodroma leucorhoa</i>	1	1
Brown Pelican	<i>Pelicanus occidentalis</i>	287	40
Great Cormorant	<i>Phalacrocorax carbo</i>	114	17
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	188372	24637
Northern Gannet	<i>Morus bassanus</i>	113710	21627
Great Blue Heron	<i>Ardea herodias</i>	566	118
Great Egret	<i>Ardea alba</i>	572	149
Snowy Egret	<i>Egretta thula</i>	602	163
Tri-colored Heron	<i>Egretta tricolor</i>	25	19
Little Blue Heron	<i>Egretta caerulea</i>	34	17
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	2	2
Glossy Ibis	<i>Plegadis falcinellus</i>	9	8
Tundra Swan	<i>Cygnus columbianus</i>	98	39
Canada Goose	<i>Branta canadensis</i>	13342	5377
Cackling Goose	<i>Branta minima</i>	4	4
Brant	<i>Branta bernicla</i>	7648	1398
Snow Goose	<i>Chen caerulescens</i>	11861	10,174
Goose, sp.*		11	11
Wood Duck	<i>Aix sponsa</i>	768	114
Mallard	<i>Anas platyrhynchos</i>	238	27
American Black Duck	<i>Anas rubripes</i>	2255	394
Gadwall	<i>Anas strepera</i>	159	35
Northern Pintail	<i>Anas acuta</i>	1972	207
American Wigeon	<i>Anas americana</i>	741	167
Northern Shoveler	<i>Anas clypeata</i>	78	42
Dabbling sp.*		466	123
Blue-winged Teal	<i>Anas discors</i>	28	14
Green-winged Teal	<i>Anas crecca</i>	10269	1346
Teal sp.*		3	3
Duck sp.*		3	3
Redhead	<i>Aythya americana</i>	6	4
Ring-necked Duck	<i>Aythya collaris</i>	76	16
Greater Scaup	<i>Aythya marila</i>	1122	226
Lesser Scaup	<i>Aythya affinis</i>	1333	300
Scaup sp.		57	30
<i>Aythya</i> , sp.		129	57
Common Eider	<i>Somateria mollissima</i>	60	15
King Eider	<i>Somateria spectabilis</i>	8	1
Eider sp.*		1	1
Harlequin Duck	<i>Histrionicus histrionicus</i>	6	2

Table 1. (continued)

Long-tailed Duck	<i>Clangula hyemalis</i>	1336	147
Surf Scoter	<i>Melanitta perspicillata</i>	157153	29017
Black Scoter	<i>Melanitta nigra</i>	235094	38284
White-winged Scoter	<i>Melanitta fusca</i>	790	115
<i>Dk-wing Scoter*</i>		91953	27762
<i>Scoter sp.*</i>		19968	9730
Common Goldeneye	<i>Bucephala clangula</i>	37	10
Bufflehead	<i>Bucephala albeola</i>	1266	339
Hooded Merganser	<i>Lophodytes cucullatus</i>	83	23
Red-breasted Merganser	<i>Mergus serrator</i>	1703	261
Ruddy Duck	<i>Oxyura jamaicensis</i>	7	3
Sandhill Crane	<i>Grus canadensis</i>	2	2
American Golden Plover	<i>Pluvialis dominica</i>	7	6
Killdeer	<i>Charadrius vociferus</i>	7	2
American Ospreycatcher	<i>Haematopus palliatus</i>	798	131
Greater Yellowlegs	<i>Tringa melanoleuca</i>	4	2
Hudsonian Godwit	<i>Limosa haemastica</i>	1	1
Marbled Godwit	<i>Limosa fedoa</i>	9	7
Red Knot	<i>Calidris canutus</i>	30	30
American Woodcock	<i>Scolopax minor</i>	1	1
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	31	3
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	1	1
<i>Jaeger, sp.*</i>		9	2
Little Gull	<i>Larus minutus</i>	1	1
Bonaparte's Gull	<i>Larus philadelphia</i>	1102	352
Black-headed Gull	<i>Larus ridibundus</i>	1	1
Laughing Gull	<i>Larus atricilla</i>	9495	1355
Ring-billed Gull	<i>Larus delawarensis</i>	10106	1792
Herring Gull	<i>Larus argentatus</i>	3024	344
Iceland Gull	<i>Larus glaucoides</i>	2	1
Glaucous Gull	<i>Larus hyperboreus</i>	1	1
Lesser Black-backed Gull	<i>Larus fuscus</i>	16	3
Greater Black-backed Gull	<i>Larus marinus</i>	430	103
Black-legged Kittiwake	<i>Rissa tridactyla</i>	3	1
Caspian Tern	<i>Sterna caspia</i>	38	15
Royal Tern	<i>Sterna maxima</i>	752	126
Common Tern	<i>Sterna hirundo</i>	311	109
Forster's Tern	<i>Sterna fosteri</i>	2311	293
Gull-billed Tern	<i>Sterna nilotica</i>	1	1
Black Skimmer	<i>Rhynchops niger</i>	522	160
<i>Tern sp.*</i>		9	9
Razorbill	<i>Alca torida</i>	22	8
<i>Alcid, sp.*</i>		4	4
Total species recorded*		75	
Total individuals recorded		947318	

\*Common names in italics are individuals that could only be identified to species group and are not included in the count of species recorded.

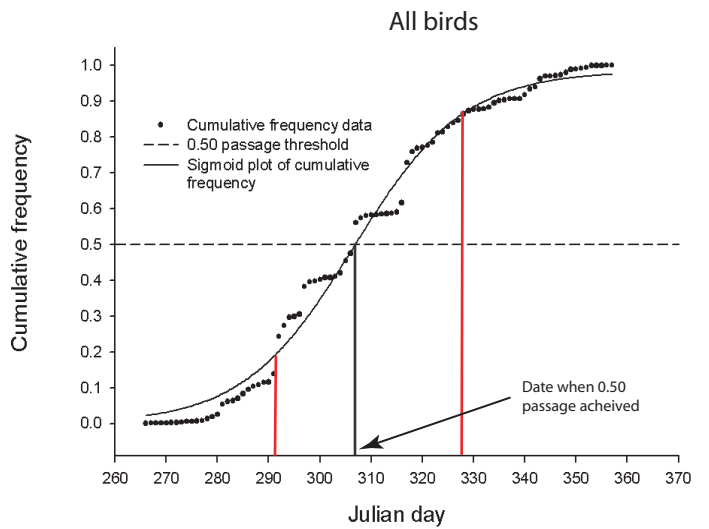
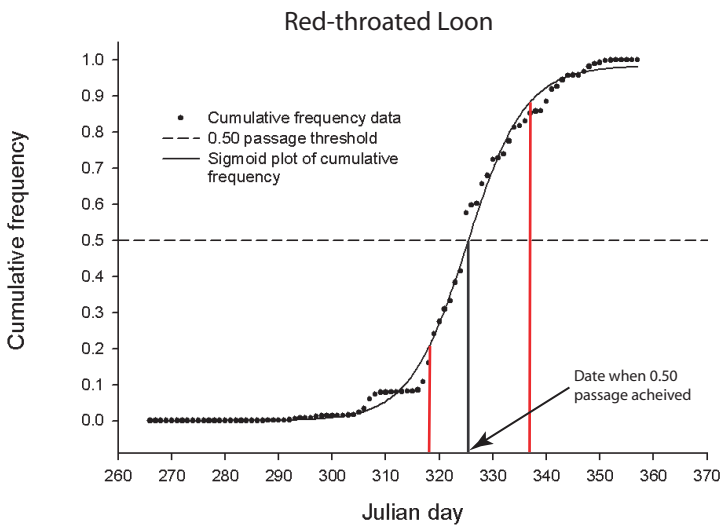
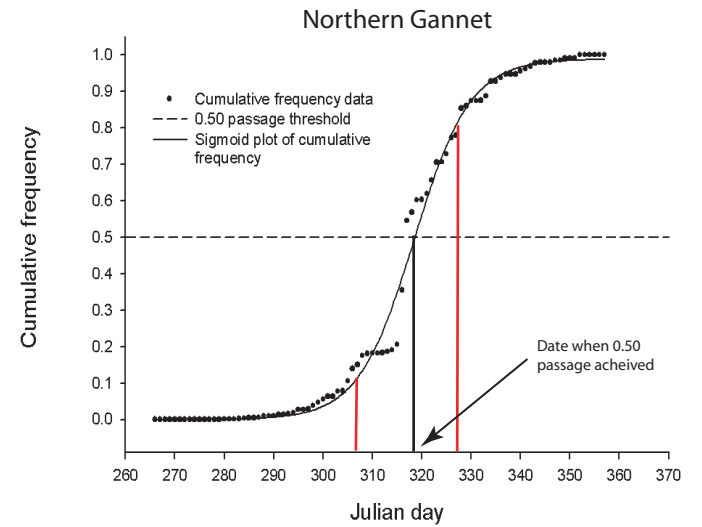
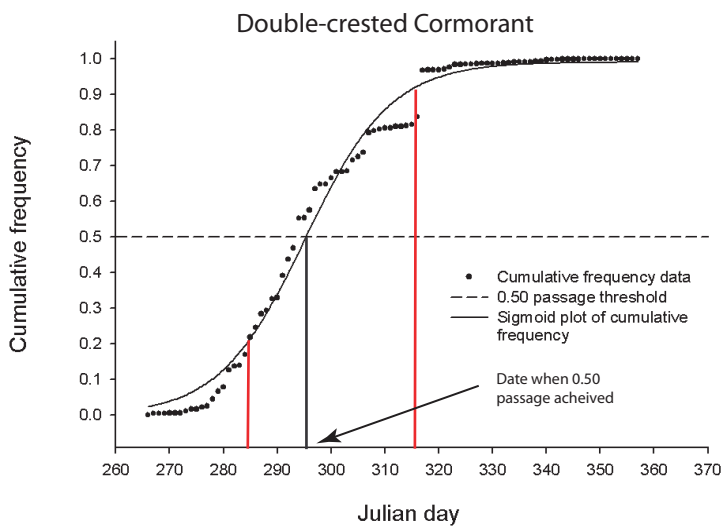
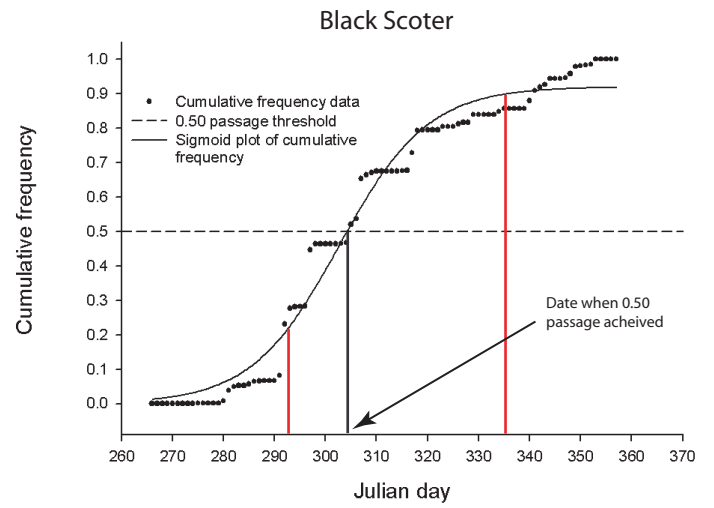
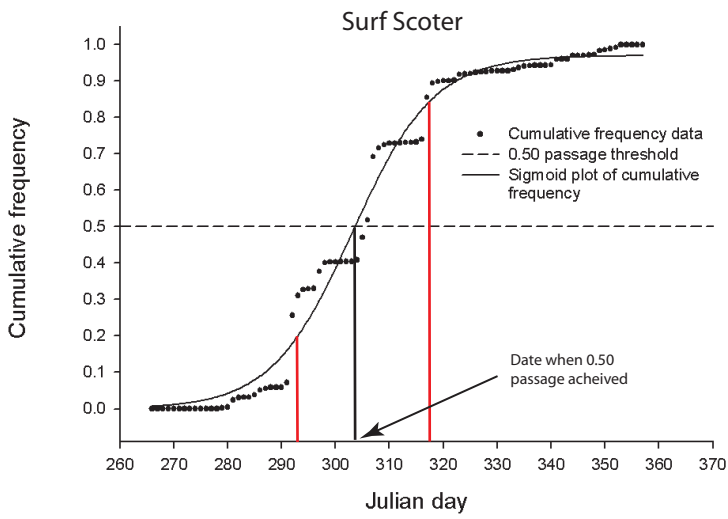


Figure 1. Cumulative frequency plots for the five most abundant species and all species combined recorded at the Avalon Seawatch, Cape May County, NJ., 22 September - 22 December 2008. Plots show the date when 50% of the individuals were recorded (solid black vertical line) and the dates between which approximately 75% of the individuals were recorded (solid red vertical lines).