Sea Duck Joint Venture Annual Project Summary for Projects -FY 2008

PROJECT TITLE: Avalon New Jersey Sea Watch: Addressing Monitoring Prerequisites (SDJV Project #97)

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Partners: New Jersey Audubon Society, Kowa Optimed, Inc., (partial support of the Avalon Seawatch), Sea Duck Joint Vneture, and US Fish and Wildlife Service, Chesapeake Bay Field Office – Coastal Program.

Project Description and Objectives:
New Jersey Audubon Society has conducted daily waterbird migration counts at Avalon, NJ, from sunrise to sunset between 22 September and 22 December since 1995. Observers attempt to count all migrating waterbirds passing to the southwest within about 6-7 km of shore, although this distance varies with visibility. In 2007, over 492,000 scoters (*Melanitta spp.*), approximately half of the estimated Atlantic populations, were counted. The SDJV identified three potential biases that should be evaluated before counts of visible migration can be used to reliably monitor seaduck populations. We attempted to address the following questions: (1) Do sea ducks migrate at night making daylight counts unreliable; (2) What proportion of sea duck migration occurs beyond an observer's visual limit; and (3) What proportion of migrating sea ducks move northward and may be double counted.

Figure 1. Location of Avalon Sea Watch

Preliminary Results:
We monitored bird migration passing the Avalon Sea Watch using vertical and horizontal X-band marine radar on 19 days between 29 October and 1 December 2007. On 11 days, we collected data continuously for 24 hours (i.e., sunrise to sunrise the following morning), while on 8 days we collected data during fewer than 24 hours/day. We conducted simultaneous visual observations, mostly during daylight hours to compare with radar observations. More than 1400 visual observations of migrating waterbirds (i.e., mostly red-throated and common loons, surf and black scoters, double-crested cormorants) were recorded. We are comparing these data with radar images

collected during daylight hours to evaluate the effectiveness of observers to enumerate waterbird passage. Also, we are using simultaneously collected visual and radar data to catalog species-specific flight characteristics. This will allow us to infer the identity of targets detected during nighttime radar sampling.

Figure 2. Radar unit and observer at Avalon NJ.

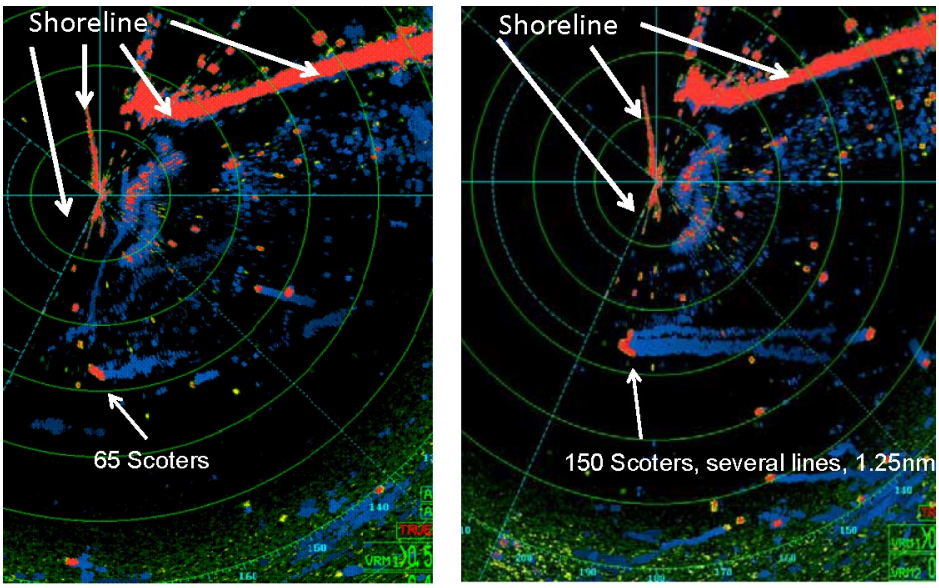

Figure 3. Two images from horizontally-oriented radar showing flocks of migrating scoters.

Question 1.

Visual review of the radar data and 10 hours of visual observations against the moon's reflection on the water, suggests that little waterbird migration occurs after sunset. We are currently using proprietary software developed by NJAS staff to quantify targets by size category (e.g., small, medium, large) and make comparisons between diurnal and nocturnal migration magnitude. We are using one radar image for every ten minutes of sampling to insure complete turnover of targets in the radar's sampling space. Preliminary quantitative analysis of data from two days suggest that nocturnal waterbird migration represents a small portion of total passage at the Avalon Sea Watch.

Question 2.
We found that visual detection of waterbird movements are limited to approximately 7.4 km from shore under ideal conditions and about 5.5 km under typical conditions. All seaduck flocks detected by radar were detected by observers. However, several flocks detected by observers were not detected by the radar. Wind direction and speed influence flight paths and altitudes of migrating waterbirds and this affects detection by the radar. For example, when winds are strong and opposing the direction of flight, birds tend to fly closer to the water, making them more difficult to detect by radar. This difficulty increases as a function of distance from the radar, as birds will be increasingly below the radar's detection horizon. We are currently evaluating these data to better elucidate relationships between wind conditions and detectability.

Question 3.
Based on visual observations, we found that 4.6 percent of the scoter flocks and 1.66 percent of the individual scoters flew north during daylight hours. We also found that approximately 0.95 percent of the individual scoters passed to the south during the 30 minute period before sunrise and after sunset, the prescribed starting and ending time of the count.

Project Status: We continue to analyze radar data to quantify differences in diurnal and nocturnal passage and the radar's effective detection range.

Project Funding Sources (US$). Project funded in FY-07, but conducted in 08 and matches are from 08 and have not been accounted for previously.

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)
		2,220			Kowa Optics Seawatch operations (16 days)
		12,500			NJ Audubon Society – PI, Research Assoc. salary. Radar operation
	12,350				USFWS, Chesapeake Bay Field Office, Forsell - travel and salary
14,760					SDJV to NJAS
14,760	12,350	14,720			Total - $41,830 SDJV - $14,760 Match - $27,070

Total Expenditures by Category (SDJV plus all partner contributions; US$). Project funded in FY-07, but conducted in 08 and matches are from 08 and have not been accounted for previously.

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
Banding					
Surveys					
Research			**41,830**		**41,830**