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

Project Title: Estimating Distribution and Abundance of Wintering Sea Ducks in Nantucket Sound (Project #57)

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Project Description: Mass Audubon proposed to develop accurate estimates of the relative abundance of wintering sea ducks in Nantucket Sound, Massachusetts. Reliable estimates of variation in relative abundance and distribution of sea ducks on their winter range are needed to assess the impacts of existing and proposed development on these species (e.g., NAWMP, 1998).

Objectives: Our primary objectives have been to conduct multiple aerial surveys along a defined, fixed transect grid in Nantucket Sound (hereafter "Standard" surveys) during the winter months in order to estimate the relative abundance and distribution of wintering ducks and seabirds in Nantucket Sound, and assess any annual and/or seasonal variation in their abundance and distribution. During this third and final ('05- '06) field season, we conducted additional (hereafter "Extended") surveys in waters immediately outside the Sound (Fig. 1), in efforts to place our Sound data into a broader geographical context. Our three-year study was designed to address several questions about sea duck seasonal abundance and distribution: 1) Does the relative abundance of the different duck species fluctuate significantly from year to year; 2) Does the distribution of duck rafts shift annually throughout the Sound or do rafts occur in similar locations in consecutive years; and 3) Are the intra-annual patterns of waterfowl relative abundance consistent from year to year? Three years is the minimum level of sampling recommended by the U. S. Fish and Wildlife Service to begin to estimate the annual variability in the use of a habitat by birds.

Preliminary Results:

Project Status: We completed the third and final year of waterfowl surveys during the 2005- 2006 winter season. Seven Standard surveys and five Extended surveys were conducted between October 28, 2005 and March 29, 2006. The third year of data,

combined with data collected in the previous two field seasons indicated that 1) the relative abundance of our focal species of waterfowl fluctuated significantly from year to year, 2) the locations of large rafts of ducks shifted within the Sound between study years, and 3) the intra-annual patterns of relative abundance varied from year to year.

Waterfowl abundance and densities

Standard Surveys

We counted a total of 137,963 waterfowl in 7 aerial surveys. We recorded 20 species of sea ducks and other waterbirds, the most abundant of which were common eiders; the eider total of 72,832 represented 52.8% of the total waterfowl numbers. The total of all scoter species combined over the entire winter season was 37,972, representing 27.5% of all recorded waterfowl, and the seasonal Long-tailed Duck total of 26,347 represented 19.1%. The highest single-day waterfowl count was made on February 22, 2006, when a total of 42,790 ducks were counted.

Extended Surveys

We counted a total of 219,842 waterfowl in 5 aerial surveys. We recorded 19 species of sea ducks and other waterbirds, the most abundant of which were common eiders; the eider total of 168,830 represented 76.8% of the total waterfowl numbers. The seasonal Long-tailed Duck total of 33,946 represented 15.4% of all recorded waterfowl, and the total of all scoter species combined over the entire winter season was 17,047, representing 7.8%. The highest single-day waterfowl count was made on December 12, 2005, when a total of 76,171 ducks were counted.

The following table summarizes the mean number and % of total waterfowl for eiders, scoters (all 3 species), and Long-tailed Ducks, and standard deviation per aerial survey:

	Standard Surveys			**Extended Surveys**		
Species	**% of total waterfowl**	**Mean**	**Standard Deviation**	**% of total waterfowl**	**Mean**	**Standard Deviation**
Common Eider	52.8	10,405	10,837	76.8	33,766	25,196
Scoter (all species)	27.5	5,425	4,240	7.8	3,409	2,592
Long-Tailed Ducks	19.1	3,764	2,723	15.4	6,789	8,486

Waterfowl distribution

Most of the waterfowl recorded on both Standard surveys and Extended surveys were clustered within relatively few, discrete areas (Fig. 5), and this non-random distributional pattern persisted throughout the field season. Though this pattern was weakest in Long-tailed Ducks, it was more prevalent with this species on Extended surveys than on Standard surveys (Fig. 3).

Selected comparisons between Standard surveys and Extended surveys

The seasonal grand total of 219,842 waterfowl recorded on Extended surveys was 59% greater than the total of 137,963 recorded on Standard surveys. The ratio of scoter numbers (all species) to the combined total of all waterfowl was much higher on Standard surveys (27.5%) than on Extended surveys (7.8%). While Long-tailed Ducks were distributed virtually throughout the Standard survey route, the great majority of the LTDUs recorded on Extended surveys were distributed south and east of Nantucket, with very few farther west, south of Martha's Vineyard (Fig. 3).

Seasonal changes

Large numbers of Long-tailed Ducks recorded on the Extended surveys early in the season were not recorded on subsequent surveys, while the numbers on Standard surveys remained relatively stable throughout the study period. We cannot account for this significant decrease, but we suspect the birds may have shifted farther offshore, beyond the boundaries of the Extended surveys.

Project Funding Sources:

SDJV (USFWS) Contribution	Other U. S. Federal Contributions	U.S. non-federal contributions	Canadian federal contributions	Canadian non-federal contributions	Sources of funding
$10,000					
		$40,000			Island Foundation
		$20,000			Massachusetts Environmental Trust
		$11,595			MAS In-kind

Total Expenditures by Category (US$):

Activity	**Breeding**	**Molting**	**Migration**	**Wintering**	**Total**
Banding					
Surveys				$81,236	$81,236
Research					
Communication					
Coordination					
Administration					

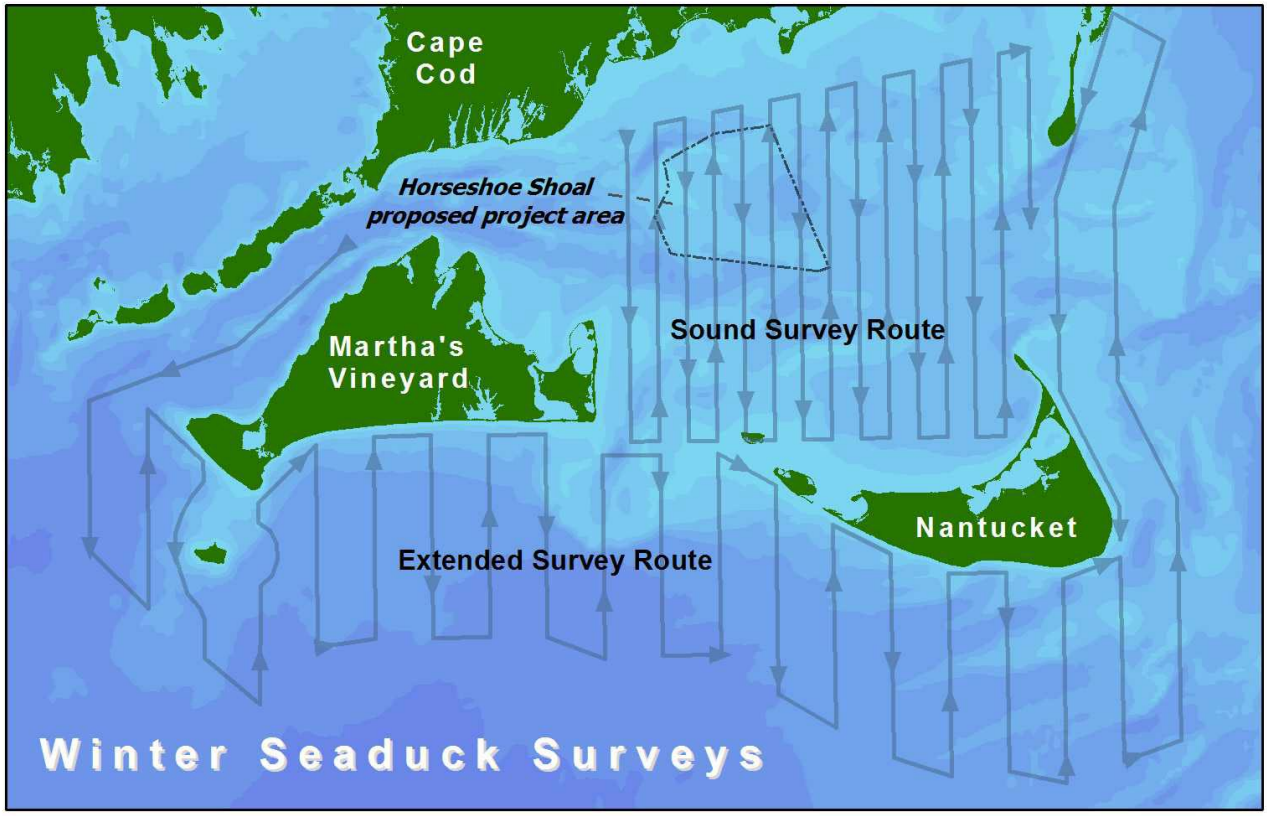

Fig. 1
Flight routes for Standard and Extended surveys

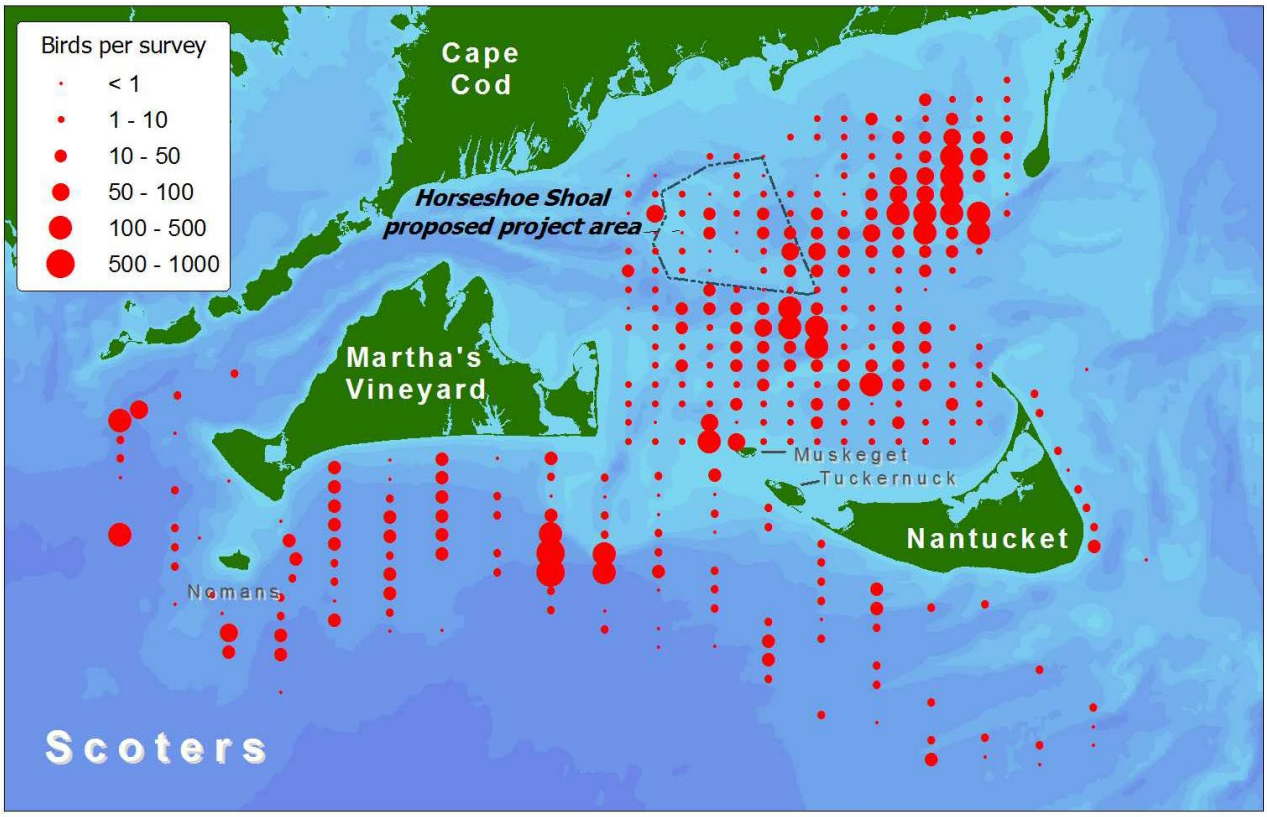

Fig. 2
Distribution and relative abundance of scoters (3 spp.)

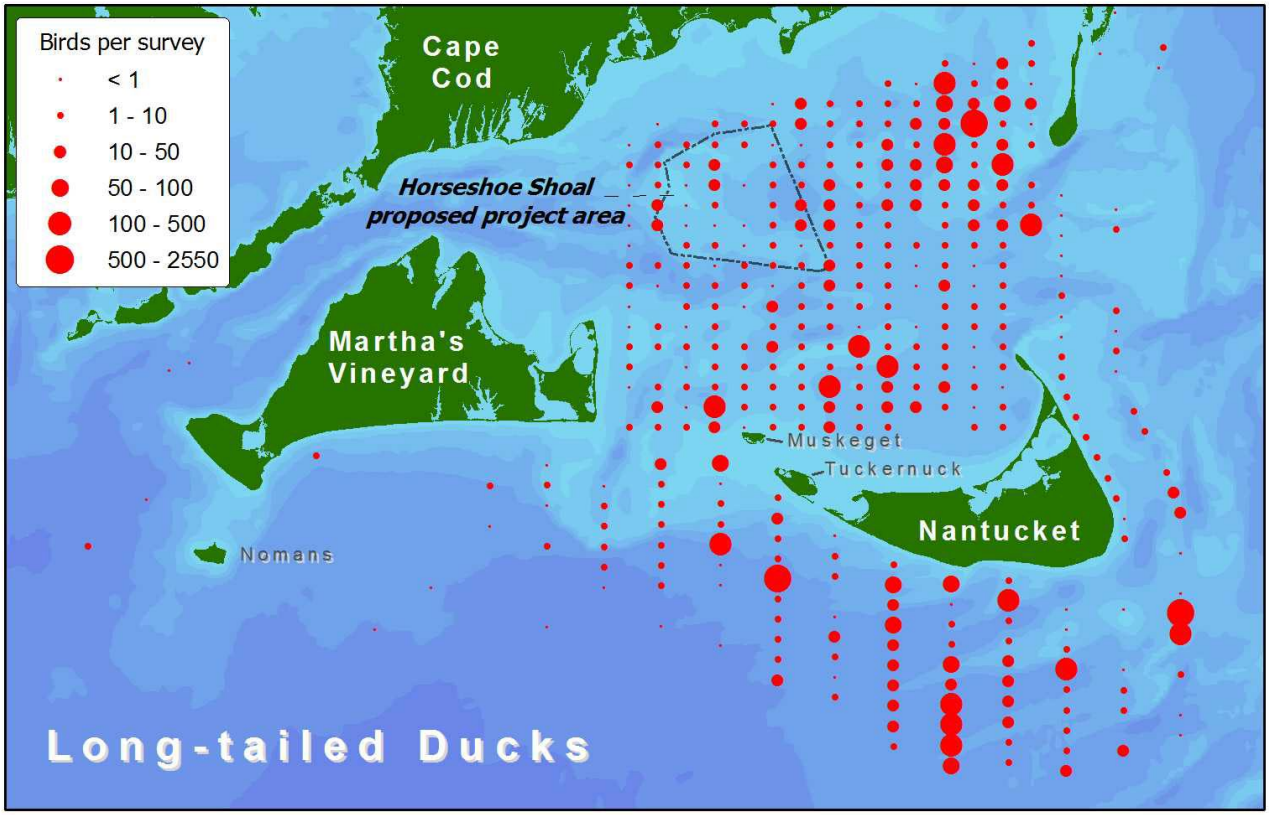

Fig. 3
Distribution and relative abundance of Long-tailed Ducks

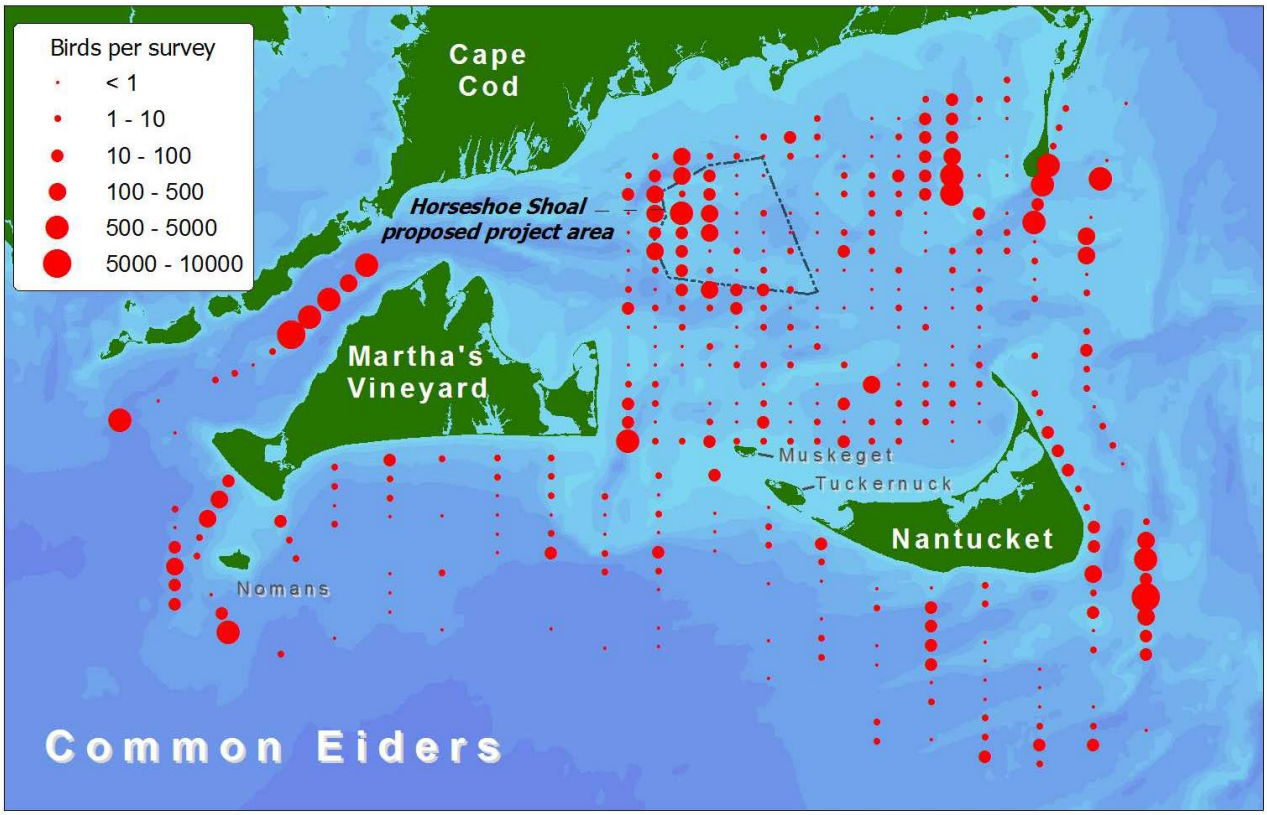

Fig. 4
Distribution and relative abundance of Common Eider

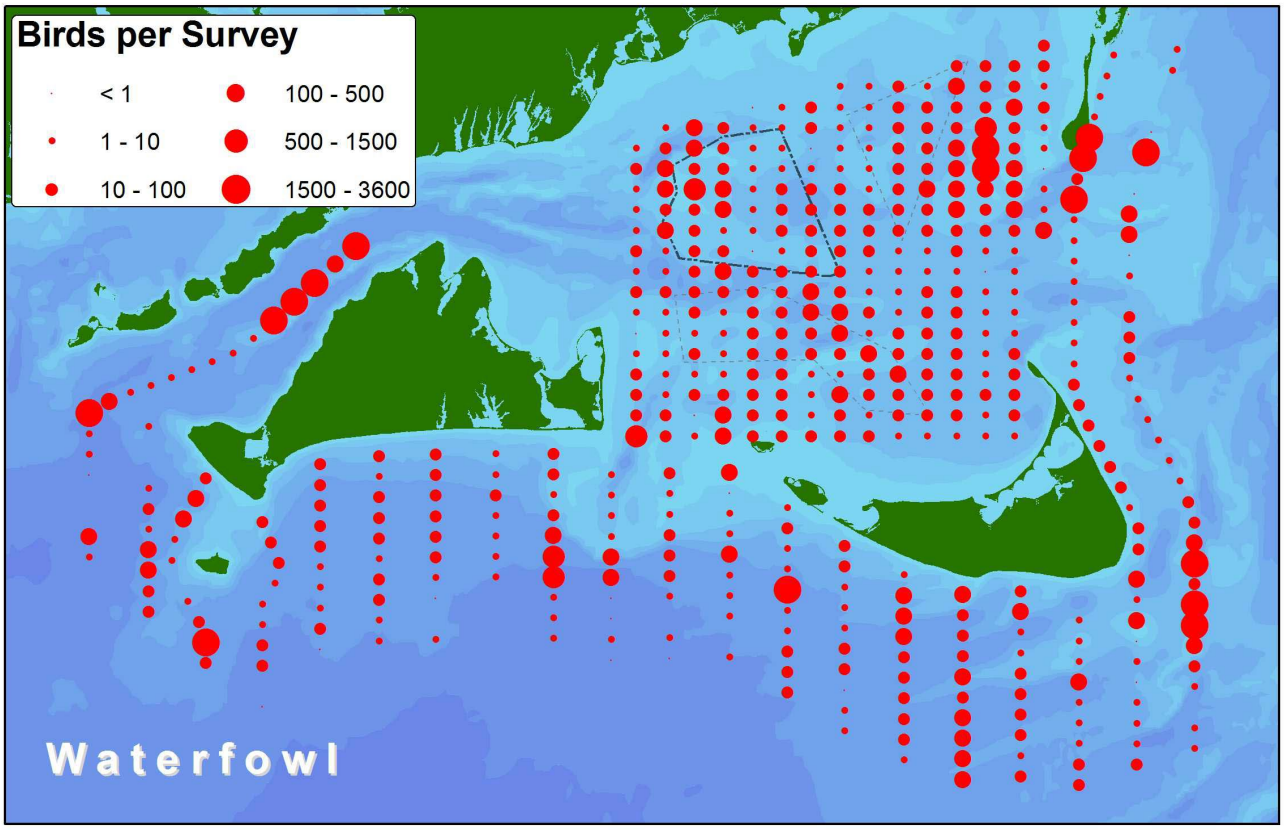

Fig. 5
Distribution and relative abundance of all waterfowl