Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 2008 – (October 1, 2007 to Sept 30, 2008)
Reporting Deadline: September 29, 2008

Project Title:

Distribution, habitat characteristics, prey abundance and diet of surf scoters (*Melanitta perspicillata*) and long-tailed ducks (*Clangula hyemalis*) in polyhaline wintering habitats in the mid-Atlantic region: a comparison of shallow coastal lagoons and Chesapeake Bay environs (SDJV #104)

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Project Description:

Populations of most sea duck species are either decreasing or little is known about their status. Even less is known about specific ecological associations along the Atlantic coast of the U.S. SDJV has identified information on population ecology and habitat requirements as "crucial" to properly manage sea duck populations.

We are targeting surf scoters (*Melanitta perspicillata*) and long-tailed ducks (*Clangula hyemalis*) wintering in polyhaline portions of Chesapeake Bay and nearby mid-Atlantic coastal bays.

Our study combines frequent field surveys of the distribution and abundance of sea ducks with habitat descriptors (e.g., grain size in soft-sediment habitats, seagrass cover and oyster reef density), prey species abundance and water quality (temperature, salinity, dissolved oxygen and turbidity) to evaluate sea duck habitat utilization across the two study areas.

Objectives:

1. Compare the distribution, fine-scale habitat characteristics and diet of surf scoters and long-tailed ducks in two discrete mid-Atlantic environs:
    a. Polyhaline area of the lower Chesapeake Bay;
    b. Coastal bays seaward of the Delmarva Peninsula;

2. Qualitatively compare these results to previous studies in the fresher mesohaline portion of Chesapeake Bay;
3. Investigate the proximity of winter foraging habitat to oyster reefs, seagrass beds and emergent shorelines for both species.

Preliminary Results*:*

Both study areas appear to be important to long-tailed ducks and SUSC, but for potentially different reasons. Data from this study suggest that the lower Chesapeake Bay and Atlantic coastal bays are important to long-tailed ducks throughout the winter. The same was observed for surf scoters in Chesapeake Bay. However, the role of coastal bays to surf scoters may be more as staging areas for subsequent regional movements or further southward migration. This does not diminish their importance, though.

Diets of long-tailed ducks in both study areas contained a disproportionate amount of crustaceans, especially those in the orders *Thalassinidea* and *Caridea*. These are burrowing shrimp and true shrimp (mainly *Crangon septemspinosa*), respectively. Other crustaceans included amphipods, isopods and some brachyurans. Polychaetes and gastropods were also important. Similar results for crustaceans have been reported for long-tailed ducks foraging in soft-sediments in other regions, but contrast somewhat with those in the upper Chesapeake Bay. Surf scoters consumed bivalves (especially in coastal bays) and nemerteans in Chesapeake Bay disproportionately to their availability in benthic samples. Nemerteans are relatively large infaunal worms and along with polychaetes, comprised ~65 % of the aggregate diet of surf scoters in Chesapeake Bay which is comparable to results for several areas on the west coast.

Sea ducks in the upper Bay may use degraded oyster and gravel beds. We found some evidence of that in the lower Bay as well, but only minor use of healthy intertidal oyster reefs in seaward coastal bays. However, the overall density of potential prey was much higher in this coastal bay than in Chesapeake Bay. This may suggest that in areas of very productive benthic communities, the importance of epifaunal oyster bed communities diminishes. If this is indeed the case, then the inverse may be inferred; as benthic (especially infaunal) communities diminish in eutrophied estuaries such as Chesapeake Bay, hard substrate communities may become relatively more important to sea ducks.

There was segregation between these two sea duck species across many levels. We documented subtle, but possibly important, temporal and spatial differences. The abiotic and biotic components of habitat are often closely related and we observed differences between species for several aspects: bathymetry, sediment characteristics and diet. When viewed holistically, especially in the absence of many mixed species aggregations, it appears that long-tailed ducks and surf scoters are exploiting different niches, although there is likely some overlap. These results are similar to those for multiple sea duck species in other coastal regions.

Several aspects of sea duck conservation are suggested by our data. Both the lower Chesapeake Bay and seaward coastal lagoons are important to both long-tailed ducks and surf scoters, but species-specific habitat needs are at least partially different in both time and space. This suggests individual management perspectives for each species (e.g. protecting infaunal benthos vs. mobile crustaceans). Spatial tools that are available, such as GIS, can be beneficially utilized to further inform conservation efforts and expand on basic research

results. For example, spatially explicit plots of the relative diet proportion of individual ducks can suggest management options tied directly to anthropogenic activities such as hunting pressure, commercial wild fisheries and aquaculture development.

This study implies that the relationships between sea ducks and soft and hard bottom habitats in the mid-Atlantic are complex. In the face of continued habitat degradation and shoreline development, this type of detailed habitat data will be very meaningful and have practical impacts on sea duck conservation.

Project Status*:*

We have completed all field sampling, sample processing and data analysis. We will be submitting a narrative manuscript style final report and several GIS components to SDJV by September 30, 2009 per our initial reporting requirements.

Project Funding Sources (US$). Complete only if funded by SDJV in FY08; this is used to document: 1) how SDJV-appropriated funds are matched, and 2) how much partner resources are going into sea duck work. Include approximate dollar value of in-kind contributions in costs. Add rows as needed for additional partners.

SDJV (USFWS) Contribution	Other U.S. federal contributions	U.S. non-federal contributions	Canadian federal contributions	Canadian non-federal contributions	Source of funding (agency or organization)
$35,793		$36,985			VA Institute of Marine Science

Total Expenditures by Category (SDJV plus all partner contributions; US$). Complete only if project was funded by SDJV in FY08; total dollar amounts should match those in previous table.

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
Banding (include only if this was a major element of study)					
Surveys (include only if this was a major element of study)				**$6,900**	**$6,900**
Research				**$65,878**	**$65,878**
			Total	**$72,778**	**$72,778**