GREAT AND SNOWY EGRET FORAGING ECOLOGY IN RHODE ISLAND

BY

ELIZABETH CORINNE DECELLES

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ABSTRACT

Both Great Egrets (*Ardea alba*) and Snowy Egrets (*Egretta thula*) have been declining since 2002 in Rhode Island. I hypothesized this decline could be related to a reduction in prey density and availability. Egrets are opportunistic foragers and exploit a variety of nekton species, yet little is known about their diet in southern New England. I investigated egret foraging ecology during the summers of 2008 and 2009 in Narragansett Bay, Rhode Island. To assess prey selection, I used throw traps to estimate nekton density at egret foraging locations in 8 salt marshes. To directly quantify the diet of chicks, I conducted regurgitation surveys within nesting colonies. In 2008, dominant nekton at egret foraging locations included Grass Shrimp (*Paleomonetes pugio*), Mummichog (*Fundulus heteroclitus*), and Striped Killifish (*Fundulus majalis*). In contrast, regurgitation samples were dominated by Winter Flounder (*Pseudopleuronectes americanus*, 49.5% aggregate biomass), while Mummichog, Grass Shrimp and Silversides (*Menidia menidia*) only accounted for 36% of aggregate biomass in regurgitation samples combined. In 2009, Silversides accounted for 79.2% of the chicks' diet based on regurgitation samples and no Winter Flounder were detected. Dominant available nekton in 2009 included Mummichog, Grass Shrimp and Green Crab (*Carcinus maenas*). In contrast, only 1.6 % of total nekton individuals detected at egret foraging locations were Silversides.

Winter Flounder and Silversides are among the few nekton species available and large enough for egrets to successfully forage on during the early summer. However, throw trap data suggest that these species were scarce during this study in salt marsh habitats. This could be a function of schooling fish behavior and the low

probability of catching larger nekton individuals in throw trap samples, or nekton could be concentrated in other habitats or marshes I did not sample during this study. This suggests that biologists interested in enhancing egret and nekton populations through habitat manipulation or restoration in the region should potentially target areas which may have a higher abundance of these species (fringe marsh with shallow eelgrass habitats, coastal ponds, and upper-Bay estuaries) for conservation and management. However, results from this part of my project are inconclusive and future research should be focused on more regurgitation collections and throw trapping in other potential foraging habitats not sampled: coastal ponds, marshes closer to breeding colonies, and shallow eelgrass habitat, before management decisions are made.

I also investigated foraging egret microhabitat preferences within salt marshes. During these surveys, I assessed microhabitat selection by foraging egrets and compared nekton densities between microhabitats. I found no significant differences in nekton densities among sites or microhabitat (creek, pool, egret foraging or random sites) basis; but did detect differences in egret densities. Microhabitat analysis for egrets suggests that creeks and pools within salt marshes provide critical egret foraging habitat, which concurs with past research. Egrets rarely forage in mosquito ditches (0.03% of all observations), and I never observed egrets foraging in areas dominated by common reed (*Phragmites australis*). In fact, marshes with more *Phragmites* and mosquito ditching had lower egret densities than marshes that had available foraging habitat during all tidal stages (more creeks, pools, and *Spartina* marsh). These results suggest that the availability of prey and foraging habitat, not

prey density and distribution, may be limiting local egret populations. Thus, managers interested in increasing egret use of local salt marshes should concentrate in altering mosquito ditches to slow marsh drainage and managing sections of salt marshes dominated by *Phragmites* to increase the amount of preferred microhabitats: shallow creeks and pools.