UNIVERSITY OF CALIFORNIA, SAN DIEGO

The Role of Resident Fishes in Linking Habitats of a Southern California Salt Marsh

A dissertation submitted in partial satisfaction of the
requirements for the Degree of Philosophy
in Oceanography

by

Drew M. Talley

Committee in charge:

Lisa A. Levin, Chair
Paul K. Dayton
Jeffrey B. Graham
Kaustuv Roy
Bradley T. Werner

2000

ABSTRACT OF THE DISSERTATION

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Drew Matthew Talley
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Professor Lisa A. Levin, Chair

Natural environments are not homogenous, but instead are mosaic landscapes often comprised of quite environmentally distinct habitats. They harbor distinct biological communities, which vary across a number of spatial and temporal scales. These habitats are not isolated, but are connected through physical and biological linkages which themselves vary through time and across spatial scales. This study addressed the effect of habitat heterogeneity on the resident fish community of a tidal salt marsh in Mission Bay, CA, and examined how fish-utilization patterns mediated linkages between habitats. First, reproductive and habitat utilization data were combined with a comprehensive review of the literature on *F. parvipinnis* to highlight major gaps in our understanding of this important species. Next, small- (decimeter) and larger-scale (100's of meter) patterns of habitat utilization within the marsh landscape were examined. Physical environments differed among microhabitats (seagrass beds, unvegetated flat, subtidal creeks, intertidal creeks, and intertidal pools), and changed over short (tidal) through longer (interannual) time scales. Small resident fishes recognized and responded to these habitats, showing preferences in

utilization even at the smallest spatial scales examined. *Fundulus parvipinnis* habitat preferences changed through ontogeny, with small juveniles preferring intertidal pool and shallow creek habitats, while larger juveniles selected deeper habitats. Nighttime foraging of *Fundulus parvipinnis*, a numerical dominant in the southern California marsh fish community, was also investigated. *Fundulus parvipinnis* was found to feed nocturnally, but with reduced efficiency, ingesting more detritus at night than during daytime. Further, *F. parvipinnis* was shown to spawn on nighttime spring tides in Mission Bay. Thus, habitat value changes for this species over diel time scales. Finally, the potential consequences of microhabitat availability were explored in a study of ichthyofaunal colonization of a newly-created marsh was examined in Mission Bay, CA. This highly-modified habitat was rapidly colonized by fishes, but in the created marsh size-structure of the fish communities was skewed towards larger individuals. Lack of juveniles was attributed to absence of critical pool and shallow creek (microhabitat) availability. The results of this study indicate that the activities of resident fishes can create linkages at multiple scales between habitats within the wetland mosaic.

SUPPORT ACKNOWLEDGEMENT

This research was made possible by funding from California Sea Grant, and I have been continually impressed with how hard they have worked to support my education and my research. While everyone at Sea Grant has been very helpful, I would like in particular to thank Dolores Wesson, whose professionalism and commitment are incomparable. Additional funding was provided by the SIO Development Office, a Mildred E. Mathias Student Research Grant from the University of California Natural Reserve System, and the North County Chapter of the Sierra Club.

R/CZ-140