ABSTRACT OF THE DISSERTATION

The impact of predation by shorebirds, benthic feeding fish and a crab on the shallow living invertebrates in intertidal mudflats of two southern California lagoons

by

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The effects of predation by shorebirds, fish and the crab, Pachygrapsus crassipes, on three intertidal mudflats were studied using exclosures. The three study sites covered a range of silt-clay/sand concentrations ranging from a high silt-clay concentration, the muddy site, to a high sand concentration, the muddy sand site. The prey, mostly polychaete and oligochaete worms, were similar in all areas. Shorebirds reduced the prey during their period of occurrence from fall to spring at the muddy site but not at the other sites. The crabs reduced the prey during the summer on the muddy sand site but were unimportant as predators at the other two sites. Fish had no major effect at any site. The prey recovered to high densities during the period that the major predator was absent.

A variety of exclosures was used to allow the effects of the various types of predators to be separated from each other. Exclosures have also been shown to produce various artifacts, mostly resulting from

increased or decreased sedimentation. This may produce changes in the prey population which are unrelated to the effects of predation. To detect these artifacts, control exclosures were used. These were designed to mimic the effects of the exclosures but allow predation to occur. The design and result of these are discussed.

Since prey densities reached similar densities in all three areas, and birds occurred in all three areas but had a measurable effect in only the area with little sand, it was hypothesized that sand interfered with prey capture by the birds. To test this patches of sandy mud were made in the muddy area and the amount of time the birds spent feeding in the muddy areas was compared to the amount of time spent in the areas where sand had been added. The assumption was that birds would spend less time where they were less successful. The amount of time spent feeding in the areas with added sand was significantly less than the time spent in the muddy areas. Since the addition of sand had no significant effect of the prey density, this result suggests that the reduced effect of birds in and of bird use on the sandier areas was caused by lower success in prey capture in these areas.

A comparison of these results to other studies of the effects of predation on community structure and the implications of these results for the management of wetland areas, especially on the West Coast, are discussed.