DETRITUS PRODUCTION AND EPIBENTHIC COMMUNITIES OF NATURAL VERSUS CONSTRUCTED SALT MARSHES

A Thesis

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ABSTRACT

The natural marsh contained significantly more individual invertebrates (2-3x) than the 4-year-old constructed marsh. Seasonality, elevation, sediment characteristics, vegetative cover, and possibly food availability affected invertebrate densities in the marshes. However, decomposition rates in the constructed and natural marshes were similar. Invertebrate densities must increase in order for the food chain of the constructed marsh to function naturally.

Litter bags with 5mm mesh were used to trap invertebrates. Bags were placed in each marsh at low elvations with (80-100%) and without (0%) vegetative cover, and at the high elevation with cover for one and two month periods. Sampling was done quarterly. The most abundant species was a larval Dipteran, Pericoma, which was significantly more abundant (up to 9x) in the natural marsh (ANOVA, $p < 0.05$). An anemone, Diadumene franciscana, was found only in the natural marsh. In the constructed marsh, there were significantly more Hemigrapsus crabs in all sites sampled. the invertebrates showed marked peaks in abundances in different seasons. In the natural marsh areas with 80-100% cover of cordgrass supported twice as many invertebrates as areas with 0-20% cover. The high elevation had different species composition than the low elvation sites.

Decomposition rates and invertebrate abundances were both measured using litter bags filled with Spartina foliosa. Decomposition rates at a low elevation in each marsh were measured for two different mesh sizes (2mm and 5mm). Bags were placed in the marsh in April 1988 and 3 replicate bags were removed after 1,2,4, and 8 months. Plants in both marshes were 93-98% decomposed after the eighth month, and the rates were similar in both marshes. Litter bags were also placed at a higher elevation (20cm above the low elevation) in the natural marsh. The decomposition rates were similar in the high elevation. Nitrogen content (TKN) of the litter increased through time, but was similar in both marshes.

The four-year-old Caltrans marsh has not yet attained the necessary complement of invertebrates that will allow it to support the food chain that is associated with the habitat. The low invertebrate densities may not provide enough food for the fish and birds that forage in the marsh. The prey base of the constructed marsh should increase as the marsh matures and plant cover increases, allowing the constructed marsh to function naturally.