
Recovery of Infaunal Crustacean Colonies Following a Period of Rapid Sedimentation and Defaunation: A Neoichnological Examination Following Beach Rejuvenation on the South Side of Packery Channel, North Padre Island, Texas

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ABSTRACT

Infaunal and epifaunal burrowing organisms commonly experience environmental stress as a consequence of rapid increases in sedimentation rate. If the increase in sedimentation rate is gradual, organisms can respond by adjusting their burrow geometry to accommodate the new location of the sediment-water interface. If sedimentation rate is very rapid, environmental stress may result in organisms experiencing major colonial disruption or even total defaunation. In the ancient rock record, it is documented that the burrows of infaunal crustaceans (*Ophiomorpha* and *Thalassinoides*) are present in both fair-weather and storm deposits, although there is little information about the rate of re-colonization following a major storm event or a rapid increase in sedimentation rate, such as that produced by a wave-dominated delta system during the rapid deposition of a stream mouth bar onto underlying shoreface sands.

Recent nourishment and rejuvenation of a 3800 ft (1.2 km) section of beach, facilitated by re-deposition of 110,000 yd³ (84,100 m³) of sand dredged during re-opening of littorally-closed Packery Channel, provides an excellent opportunity to examine response of infaunal burrowing crustaceans to a sudden increase in vertical sediment rate to 0.6-5.0 ft/yr (0.2-1.5 m/yr) and/or rapid beach progradation. Sand re-deposition and subsequent storm-induced littoral drift resulted in over 330 ft (100 m) of beach progradation between December 2003 and August 2005.

Recent investigations of population densities of ghost shrimp *Callichirus islagrande* on the beach south of Packery Channel South Jetty provides quantitative data on the re-colonization rate of these infaunal burrowing crustaceans. Since August 2005, *Callichirus islagrande* have almost returned to normal North Padre Island colonial densities, at an average lateral, landward re-colonization rate of 33.8 ft/month (10.3 m/month).