

Abstract

A Dynamic Revetment (gravel beach) was installed in November, 2011 on the shoreline along the northeastern edge of the Hatfield Marine Science Center (HMSC) to mitigate erosion that threatened HMSC critical infrastructure. Shoreline topographic and biological monitoring was initiated before and continued after the project completion. Monitoring of beach profiles indicated that as of December 2013, the 2011 Dynamic Revetment Project (DRP) has successfully stabilized the shoreline in the project area. Erosion in the unprotected Reference area in the period 2009-2012 has been as great as 9 m (29.5 ft). There were significantly more invertebrates associated with beach wrack in the 2011 DRP area as compared with the Reference or 2007 DRP areas. Fish were significantly more abundant in the Reference area compared to the DRP. Maximum abundance was consistently observed at Reference Site 4, which has a uniquely high degree of physical habitat complexity, resulting from trees that have been eroded onto the shore. There were significantly greater vegetation coverage and significantly lesser presence of non-living substrata in the Reference area as compared to the DRP. These differences are consistent with pre-project site differences, probably resulting from a low area of the shoreline which allows increased flooding and associated disturbance in the DRP back shore area. There were no marine mammals observed in either the DRP or Reference areas over the 43 surveys conducted over the 2012 survey period. Although there were about three times more birds observed in the Reference area, there were no statistically significant differences in the number of birds observed based either on tide (high vs. low) or sample area (DRP vs. Reference). The number of bird taxa observed was similar in both areas, and most abundant species were similar between the two areas. Fish, birds and wrack invertebrates, such as beach hoppers), were shown to utilize the DRP project area. Biological differences in fish, birds and vegetation observed in year 1 of post-project monitoring tended to reflect differences in habitat that were present before the DRP project.