ABSTRACT

POST-STORM BEACH RESPONSE AND RECOVERY ALONG THE SILICICLASTIC COAST OF NASUGBU BAY, BATANGAS

Astrid Korina S. Gabo
University of the Philippines, 2018

Adviser: Cherry L. Ringor, PhD.
Reader: Fernando P. Siringan PhD.

Landward migration of shoreline position indicates beach response to erosional events, while seaward shoreline movement corresponds to beach recovery. Typically, high-magnitude events such as storms trigger increased rates of shoreline movement. As the Philippines receives a high frequency of tropical cyclones, heightened wind speeds associated with such events translate to erosive waves affecting erosional processes. This study evaluated beach response to single-storm events and post storm recovery through an overall accounting of monthly changes in shoreline position and beach morphology using in situ data; and by analyzing multiple-storm impact to shoreline position using Landsat images. In the field, shoreline traces along the waterline were recorded using handheld GPS receivers. At the same time, beach profiling was done along 20 cross-shore profiles using the Emery rod method. These were done monthly from July 2015 - August 2016 along the ~5-km fairly straight coastline of Nasugbu Bay fed by Lian and Wawa Rivers. Moreover, shoreline extracted from available Landsat images (2006 - 2016) corresponding to pre- and post-storm dates were utilized. Net shoreline movement (NSM) was calculated using the Digital Shoreline Analysis System (DSAS), a software extension for ArcGIS. The NSM associated with single-storm events showed consistently eroding shorelines; while, multiple-storm response differ as erosion is not cumulative to the number of storms due to the erosion-recovery nature of beaches after every typhoon. Post-storm recovery was observed for both single- and multiple-storms with mone month post storm as the shortest observed period. On a long-term perspective, the study site has an accreting behavior that is largely influenced by the sediments supplied from the rivers. However, it still encounters severe net erosion of up to 50 m. Such drastic shoreline movement occurred along the river mouth. Human activities and structures built nearer to the waterline and along the edge of the river remain vulnerable to erosion regardless of the accreting nature of the study site. Taking account of shoreline and beach morphological changes may supplement practical planning and decision making for sustainable beach change; as well as prevent impulsive and costly resolutions that might exacerbate existing problems and vulnerability to hazards such as coastal erosion.

Keywords: storm-induced erosion, net shoreline movement, post-storm recovery