Abstract

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Using Sustainable Solution for Shoreline Management

The city of Alexandria is located at the southern Mediterranean coast with a population of about 4 million inhabitants. It occupies an area of about 300 square kilometers, with an increasing demand for development of new land. Alexandria coastal zone suffers from erosion and flooding problems, it also tolerates degradation of water quality due to land-based pollution. The Strategic Action Plan for the Mediterranean countries has identified two hot spots (El-Mex Bay and Abu-Qir Bay) on Alexandria coastal zone. These hot spots have been experiencing a continuous increase in population, development, and environmental degradation. Obtaining a sustainable shore protection and stabilization method which provides environment-friendly coastal solution with less execution cost and duration is an important issue for governors and design makers. One of these methods is the Artificial Submerged Reefs, ASR, which has minimum influence on the environment and sea traffic, in addition to being a suitable environment for the growth of useful fauna and flora. A new numerical tool has been used to predict the sedimentation at the lee of the Artificial Submerged Reefs (Geo-textile Mega-containers sand filling) and its stability. The environmental impacts of Alexandria conventional submerged breakwater, constructed four years ago to protect Alexandria coastline from erosion, is discussed. A comparative analysis between Alexandria conventional submerged breakwater and proposed Mega geo-containers artificial submerged reef is presented. The artificial submerged reef saves fifty percent of the cost and seventy percent of construction time compared to conventional shore protection structure. The artificial submerged reef has also positive impacts on the marine environment. These sustainable environmental techniques will help in touristic development and protection of Egypt coastal zone and will also be applied in light of the objectives set by Alexandria Integrated Coastal Zone Management Project (AICZM), Environmental and Social Impact Assessment (Ministry of State for Environmental Affairs, Arab Republic of Egypt, 2009).