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Historical Analysis of the Landscape Changes and the Eco-Environment Effects on the Coastal Zone of Bohai Bay, China

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Abstract : During the past few decades, there has been an increase in the number of coastal land reclamation projects for residential, commercial and industrial purposes in more and more coastal cities of China, which led to the destruction of the wetlands and loss of the sensitive marine habitats. Meanwhile, the influences and nature of these projects attract widespread public and academic concern. For identifying the trend of landscape (esp. Coastal reclamation) and ecological environment changes, understanding of which interacted, and offering a general science for the development of regional plans. In the paper, a case study was carried out in Bohai Bay area, based on the analysis of remote sensing data. Land use maps were created for 1954, 1970, 1981, 1990, 2000 and 2010. Landscape metrics were calculated and illustrated that the degree of reclamation changes was linked to the hydrodynamic environment and macrobenthos community. The results indicated that the worst of the loss of initial areas occurred during 1954-1970, with 65.6% lost mostly to salt field; to 2010, Coastal reclamation area increased more than 200km^2 as artificial landscape. The numerical simulation of tidal current field in 2003 and 2010 respectively showed that the flow velocity in offshore became faster (from 2-5 cm/s to 10-20 cm/s), and the flow direction seem to go astray. These significant changes of coastline were not conducive to the spread of pollutants and degradation. Additionally, the dominant macrobenthos analysis from 1958 to 2012 showed that Musculus senhousei (Benson, 1842) spread very fast and had been the predominant species in the recent years, which was a disturbance tolerant species.

Keywords : Bohai Bay, coastal reclamation, landscape change, spatial patterns
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