

ID: W2991549837

TITLE: Assessing ecological risks caused by human activities in rapid urbanization coastal areas: Towards an integrated approach to determining key areas of terrestrial-oceanic ecosystems preservation and restoration

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ABSTRACT:

Rapid urbanization and industrialization in the coastal zone have caused increasingly serious impacts on coastal ecosystems. It is necessary to assess the ecological risk caused by human activities to determine key areas of terrestrial-oceanic ecosystems preservation and restoration to ensure sustainable ecological management in the coastal zone. Key areas of ecosystem preservation and restoration were studied through the assessment of the impacts of ecological pressure sources related to human activities from the perspective of terrestrial-oceanic ecosystems, using the habitat risk assessment (HRA) and habitat quality (HQ) models in the Chinese coastal zone. The results showed that the impact of human activities on the terrestrial ecosystems in the South of China was significantly lower than that in the North. An improvement rate of habitat quality was noticed only in the south and central coastal areas when further away from industrial land. Agricultural production, urban expansion, and industrial pollution had major negative impacts on the habitat quality of terrestrial ecosystems in the Chinese coastal zone, and also threatened the health of marine ecosystems. The ecological risks caused by human activities in the offshore areas of northern Shandong and eastern Jiangsu were relatively low. Mineral development in the north, excessive nitrogen and phosphorus emissions from agricultural production in the south, and port operations were important drivers of increased ecological risks in offshore areas. There were regional spatial differences in the key ecosystem preservation and restoration areas. The provinces of Shandong, Jiangsu, Hebei, Liaoning, and Guangdong are key areas for strengthening the preservation and restoration of terrestrial-oceanic ecosystems. This study provides a reference for large-scale territorial spatial planning and ecosystems conservation.

SOURCE: Science of the total environment

PDF URL: None

CITED BY COUNT: 112

PUBLICATION YEAR: 2020

TYPE: article

CONCEPTS: ['Ecosystem', 'Habitat', 'Terrestrial ecosystem', 'Marine ecosystem', 'Urbanization', 'Restoration ecology', 'Environmental science', 'Threatened species', 'Ecosystem services', 'Ecosystem health', 'Environmental protection', 'Ecology', 'Geography', 'Environmental resource management', 'Biology']