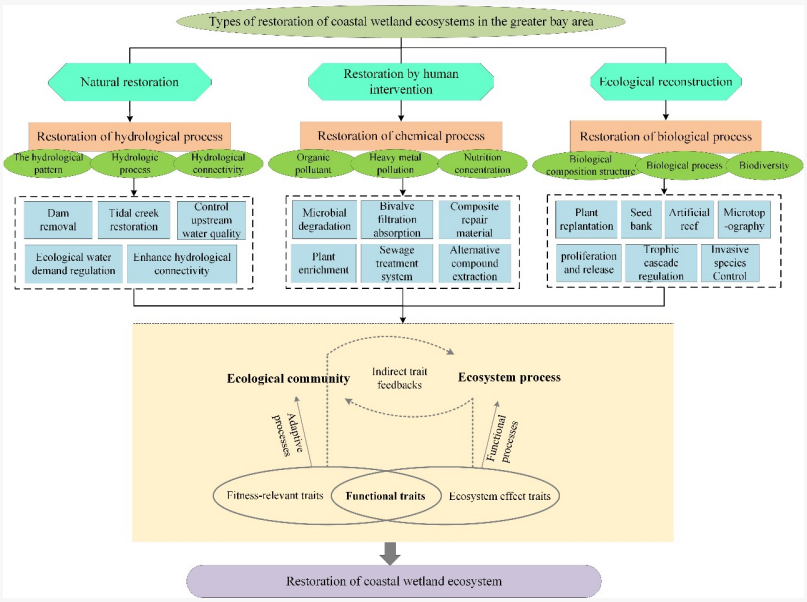
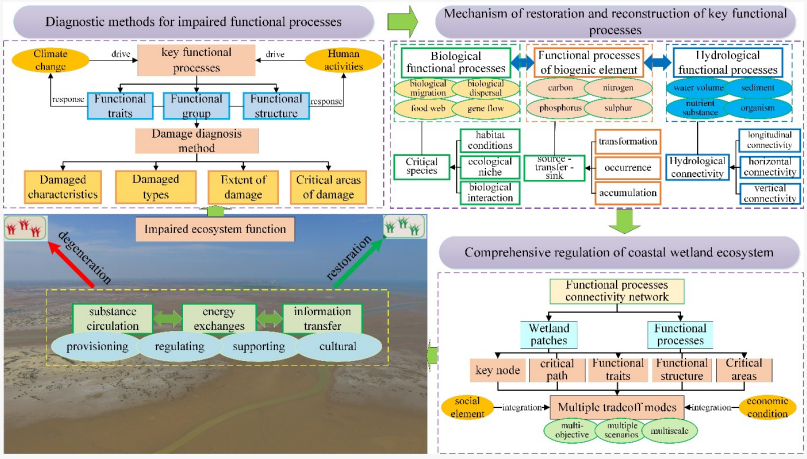
Research progress and development trend of restoration of damaged coastal wetland ecosystems in greater bay areas

GA, UNITED STATES, June 12, 2025 /EINPresswire.com/ -- The present study explores the potential for functional processes maintenance principles to be applied in coastal restoration. In this paper, the research progress and development trend of restoration of damaged coastal wetland ecosystems in greater bay areas were specially discussed in terms of the mechanism, restoration technologies and methods, and the importance and criticality of coastal wetland functional processes to maintaining ecosystem functions, the main future research trends are proposed, which will solve the principal theory facing the restoration of coastal wetland ecosystems in greater bay areas.



MAIN TYPES, METHODS AND PRINCIPLES OF COASTAL WETLAND ECOSYSTEM RESTORATION IN GREATER BAY AREAS



RESTORATION AND DEVELOPMENT TRENDS OF DAMAGED COASTAL WETLAND ECOSYSTEMS IN GREATER BAY AREAS

In a new study(doi: https://doi.org/10.1016/j.wsee.2022.11.004) published in Watershed Ecology and the Environment, a team of researchers from China discussed the research progress and development trends of coastal wetland restoration in GreaterBay Areas.

The researchers highlighted the dual influence of human activities and climate change on the coastal wetlands in these areas, which have suffered damages such as

reduced area, habitat degradation, and impaired ecological functions. “We reviewed the mechanisms and types of coastal wetland ecosystem restoration, and the restoration technologies mainly focus on biological, hydrological, and chemical processes,” shares lead author Shuling Yu. “Hydrological restoration involves measures like restoring tidal exchange and hydrological connectivity, while chemical restoration focuses on addressing organic pollution and heavy metal contamination through methods such as microbial remediation and phytoremediation. Biological restoration emphasizes replanting native species, controlling invasive species, and enhancing biological connectivity via microtopography restoration and artificial reefs.”

The study emphasized the application of functional process maintenance principles in coastal wetland restoration, and systematically expounds the relationship between functional processes and ecosystem functions. “We classified the restoration types of coastal wetlands in Greater Bay Areas into natural restoration, human intervention restoration, and ecological reconstruction, and elaborated on the applicable scenarios and specific methods of each type,” adds Yu.

Further, the researchers clarified the current research progress and existing deficiencies, and proposed future research trends. These include diagnosing impaired functional processes, enhancing biological functional processes, simulating the functional processes of biogenic elements, restoring hydrological functional processes, and constructing a multi-objective, multi-scenario, and multi-scale network comprehensive regulation model. “Through this study, we hope to develop a more systematic and effective restoration strategy by integrating different processes and scales,” says Yu.

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Lucy Wang
BioDesign Research
email us here

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