

## Interaction and its integrated management of mangrove forest and flow

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For the better management and sustainable use of coastal ecosystem, research publications on interactions between mangrove root systems and flow are reviewed. Interactions between mangrove root systems and flow are classified and reviewed; namely 1) the wake behind a single stem and root of a mangrove tree, 2) the wake behind stems and roots, 3) flow in a simple swamp with mangroves, 4) flow in a swamp with a secondary creek network, 5) flow in R-type mangal, 6) flow in F-type mangal, 7) holistic circulation in watersheds and bay systems, and 8) an integrated view of ecosystem networks. These interactions can be a clue to understanding future changes of environment in mangrove forests and surrounding coastal areas. Mangrove forests will play an important role in adaptation to and mitigation of global warming, implementation of Eco- DRR (Disaster Risk Reduction by Ecosystem), and achieving SDGs (Sustainable Development Goals). By this review, the importance of physical-based monitoring and adaptive management to sustain mangrove forests is highlighted.

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