

# Coastal Geomorphology and Estuarine Ecohydrology

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**Introduction:** Coastal and estuarine systems are morphologically complex. They are characterized by interactions between hydrodynamics, geomorphology and biota (amongst other factors) in which an increasing influence from sedimentary and biotic processes (i.e. ecohydrology) can be observed as one progresses from shore platforms and cliffs, foreshore and beach, back-beach and dune, to saltmarshes, tidal creeks and lagoons.

**Methods:** This paper explores the key information needs of coastal scientists and stakeholders with respect to the response of coastal geomorphic systems and estuarine ecohydrology to climate change and human activity, with an emphasis on: 1. prediction of coastal change due to a range of drivers (climate, sea-level, storms, sediment supply, human interventions); and 2. maintaining ecological status, ecosystem health, ecosystem services. The overarching aim is thus to provide relevant information for sustainable coastal resource use under increasing pressure (coastal erosion and flood risk, population growth in coastal cities etc.)

**Results:** Frameworks such as the *ecosystem approach* and *estuarine ecohydrology* provide effective means for coastal and estuarine decision making that link the physical environment to human well-being and economic sustainability. They also offer mechanisms for wider stakeholder engagement in defining the priorities for future resource management. Such strategic decision-making is, however, highly dependent upon the provision of well resolved projections of future coastal change, which remains a challenge for the wider geomorphological and sedimentological research community.

**Discussion:** Key challenges for coastal and estuarine morphological modelling include:

1. Reduced complexity modelling/CA models
2. Conceptual models
3. Model integration
4. Spanning timescales of operation
5. Better collaboration/data sharing
6. Linking coastal sediment and morphological models to ecohydrology and ecosystem services frameworks

Examples of good practice in these areas highlight the ways in which the science community is

providing information that is of critical relevance for sustainable coastal resource management.