



# DETECTION OF UAV-BASED ESTUARINE MORPHODYNAMICS IN SOUTH EASTERN COAST OF SRI LANKA

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**Abstract:** Morphological changes in beaches occur when a river breaches and migrates alongshore. The present study investigates the movement of the ephemeral river channel across the Oluvil beach, forming a shallow pool and foredunes, using Unmanned Aerial Vehicle (UAV) imagery, Structure from Motion photogrammetry, and historical Google Earth imagery. The effects of river breach movement and tide disconnect the link between pool and sandbar resulting in freshwater spills over sandbar to the sea. Consequently, coastal erosion may cause reduction in coastal land mass due to mismanagement of the river mouth. Additionally, water hyacinth (*Eichhornia crassipes*), an alien invasive weed was observed at the river-mouth inlet and spreading over the pool. Rural communities harvest rush-ware i.e. borupang (*Eleocharis* spp.) from coastal marshes and dry them on the beach for weaving mats. Human-induced land-use change and sea level rise cause shoreline change and erosion in Oluvil beach. Digital Elevation Model (DEM) was created from UAV imagery, and then sea level rise models were made under different inundation levels varying from 3 m to 5 m at 0.5 m intervals. According to the sea level rise models, if the sea level rise increases by 5 m, a small portion of the sand bar will remain, and the pool would connect with the sea. Historical Google Earth images from 2006 to 2023 were observed to detect the estuarine morphodynamic changes at Oluvil beach. A significant reduction of coastal land mass was observed from 2019 to 2023. Present study recommends a jetty construction at the river mouth for the smooth water flow directly into the sea to minimize the coastal erosion and the loss of vegetation in the study area as the sustainable coastal management strategies.

**Keywords:** Estuarine morphodynamics, Foredune, UAV, Oluvil beach, River mouth