

6. INTERACTION WITH NATURAL FEATURES AND CONSTRUCTED WORKS

6.1 INTRODUCTION

Assuming that sea level will rise a significant amount over the next century, and that shorelines will generally respond in some manner, the question arises as to by what means can (or will) this response be modified or prevented. Natural features such as shoals, headlands, inlets and even barrier islands themselves will cause the neighboring shorelines to respond in a manner different from that of the typical "open" coast. Man-made engineering works, e.g. breakwaters, jetties, and beach fills, by their very purpose alter shoreline response from that of nature, and so can modify shoreline response to sea level rise. Alternatively, the design, construction, and cost of coastal projects is highly dependent on local water depth. Relative sea level rise must therefore be addressed for a project having a long design-life.

On a sandy coast, sea level rise generally invokes shoreline response by two mechanisms. First is simply the retreat due to flooding or inundation, which is often small because natural beach profiles are usually concave upwards in shape. However, the rise in sea level builds a large potential for additional erosion and shoreline retreat induced by wave action, which can be quite severe. The only means of preventing shoreline retreat due to inundation is by constructing dikes and seawalls. All other features which modify shoreline response, both natural and man-made, do so by altering or reducing the wave climate and have little effect on the inundation component. These features/structures are now discussed individually.

6.2 NATURAL FEATURES

Barrier islands - are the elongated natural islands composed of sandy material, which front a substantial portion of the mainlands of the world. These islands block out the wave activity to which the mainland shoreline would otherwise be subjected, essentially acting like large breakwaters. Although the mainland shorelines are still vulnerable to flooding due to sea level rise and wind-waves generated locally in the bays, barrier islands are the paramount safeguard against realization of the full erosional potential of sea level rise in the back-bay region. This potential is especially strong