

BAFFIN BAY SHORELINES

by Raymond Suhm*

Abstract

Located along the South Texas coast, Baffin Bay is a complex of three finger-like arms: Cayo del Grullo, Laguna Salada, and Alazan Bay. These waters are shallow (less than 8 feet) and generally hypersaline. Wind-driven waves and tides have a profound effect on the nearshore current system; the transportation and deposition of sediment and whether or not a shoreline is erosional are affected. Further, the processes that shape the shore zone of Baffin Bay are naturally induced; urban and industrial development are minimal and have not greatly affected these processes.

Several segments of the Baffin Bay shoreline were studied to (1) determine if eroding or accreting, and (2) describe the character, variation, and origin of the particles comprising the beach and nearshore sediment. The shorelines of western Baffin Bay and Alazan Bay were walked out to determine the locales of erosion and deposition and systematically collect sediment. Numerous photographs (including aerial photos) were also taken. These data, when compared with future studies, would allow the detection of any short-term changes in the shore.

The Shore: Erosional shorelines predominate over depositional shorelines. Recognition of erosional shorelines is from the occurrence of high water waves at a position just below the bay-confining Pleistocene Beaumont Clay bluffs. Either a thin residual lag gravel or a thin ephemeral deposit of sand, shell, and pebbles rest on an ubiquitous wave-cut terrace. Erosional shorelines develop from a dominance of marine processes combined with a minimal amount of longshore-drifted sediment.

Depositional shorelines form under the influence of lessened marine processes combined with maximal contributions of longshore-drifted sediment. At high water the waves do not make contact with the bay-confining bluffs; rather, waves meet previously deposited sediment such as spits, barrier bars, deltas, and older (now vegetated) beaches. When local hydrodynamic conditions change, however, depositional shorelines may temporarily be subjected to erosion, often severe erosion.

The Sediment: Sediments of the beach and nearshore zones consist of varying proportions of quartz, shell (chiefly Mulinia), oolites, and caliche and sandy clay pebbles. Variability of the sediment is attributed to fluctuations in velocity and direction of longshore drift, dissimilarity of the hydrodynamic behavior of sediment fractions and the presence or absence of shoal grass which parallels the shore.

The quartz fraction has been studied intensely (Texas A&I Research Grant 2816). The quartz, mainly limited to the beach and shallow water nearshore, is transparent, subangular, and fine-grained. Statistical studies of the quartz, such as grain size distribution, show that the quartz is derived from stream influx during peak rainfall periods. However, contributions from the break-up of the bay-confining bluffs and the wind transport of quartz from sand fields are also indicated.

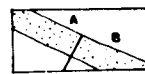
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SHORELINE MAP OF CAYO DEL GRULLO AND LAGUNA SALADA

LEGEND



EROSIONAL SHORELINE



DEPOSITIONAL SHORELINE

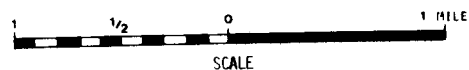
A - WITH ROCKY LAG

B - WITH LOW WATER BEACH

A - WITH VEGETATED BEACH

B - WITH SPIT, BARRIER, OR DELTA FRONT BEACH

NUMBERS REFER TO BEACH SEDIMENT SAMPLE



Loyola Beach

Riviera Beach

US NAVAL
RESERVATION
ARABIAN TUNNEL
(under)

LAGUNA SALADA

CURRENT DIRECTION

BAFFIN BAY

La Pierre Landing

Land from
Armed Forces

KLEBERG CO
KENEDY CO

San Joaquin

Sand and Mud

Sandy Hook

7ab

8

5

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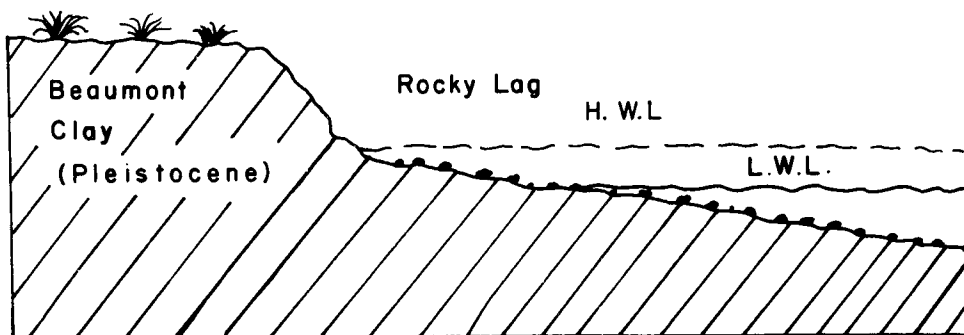
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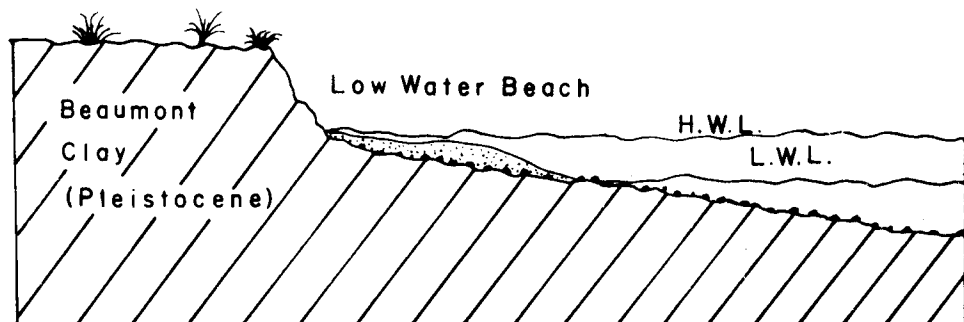
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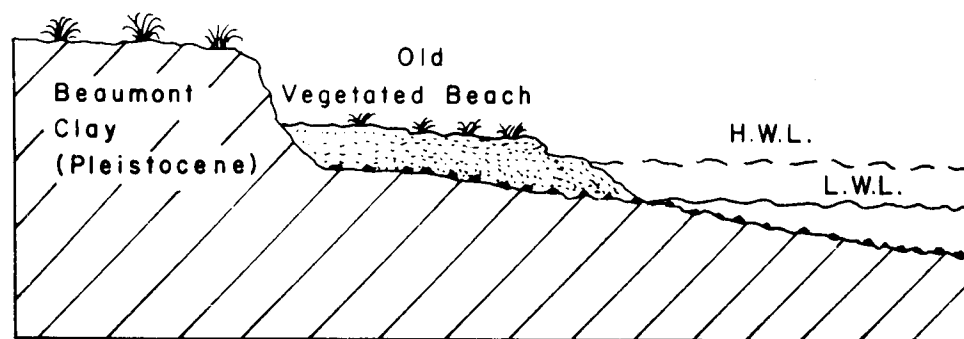


A

EROSIONAL

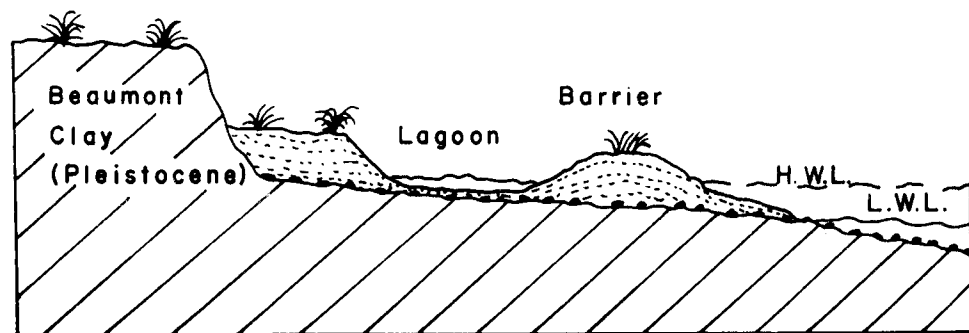


B



A

DEPOSITIONAL



B