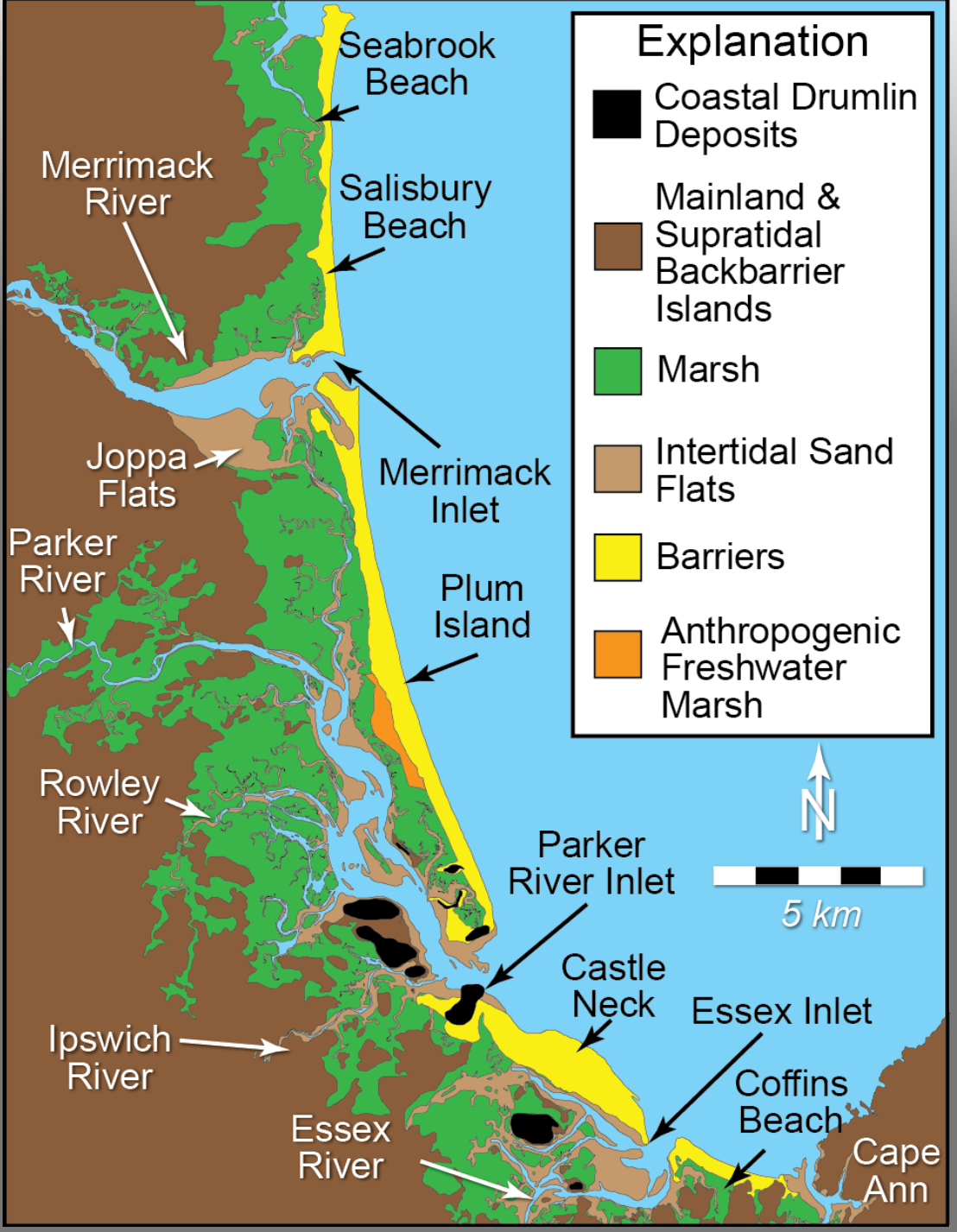


Beach and Barrier Island Response to Climate Change

- Frequency of storms will likely not change
- Warmer water may lead to larger magnitude storms
- Geomorphic changes primarily responding to SLR
- SLR leads to loss of sand offshore
- Sand will be lost to Ebb-tidal delta
- Sand will likely move into the Sound
- Plum Island contains 32 million m^3
- Changes to barrier system will occur slowly (although houses adjacent to the beach will be impacted)

Transport Pathways

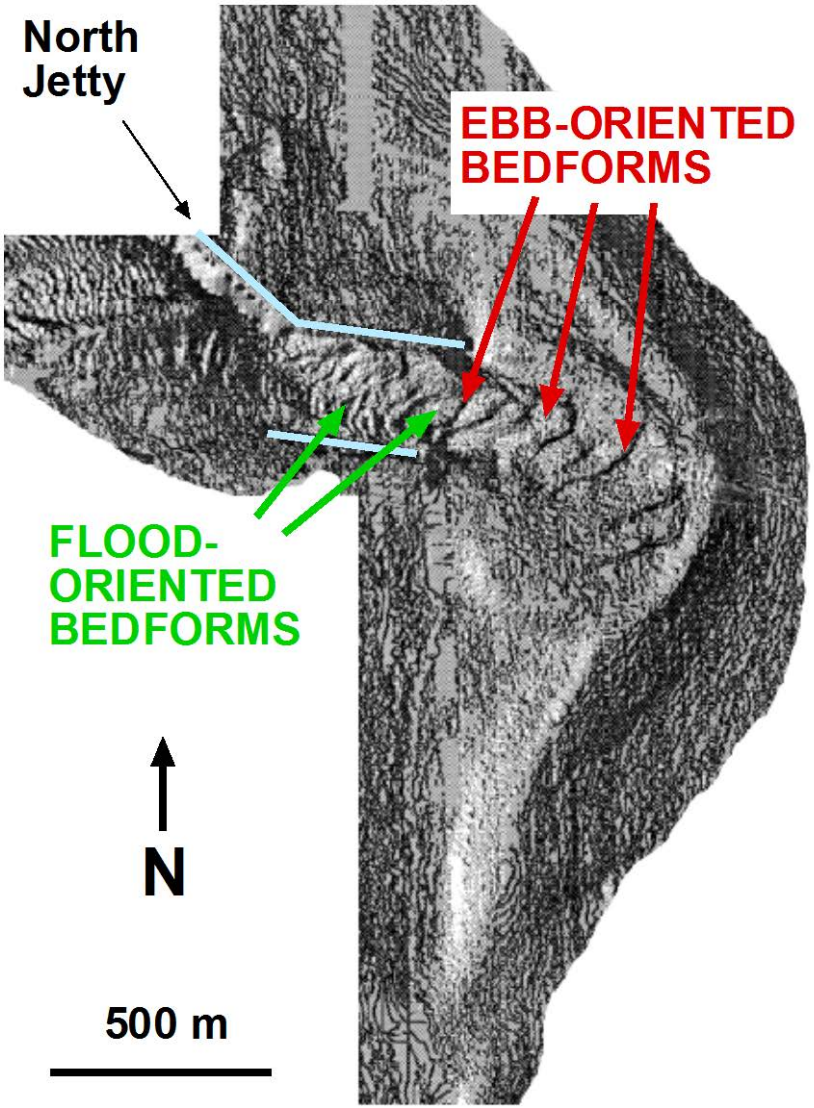
Lidar Survey shows configuration of the channel bottom

Ebb-oriented 1.5 m high, λ = 80 m migrating out the inlet channel

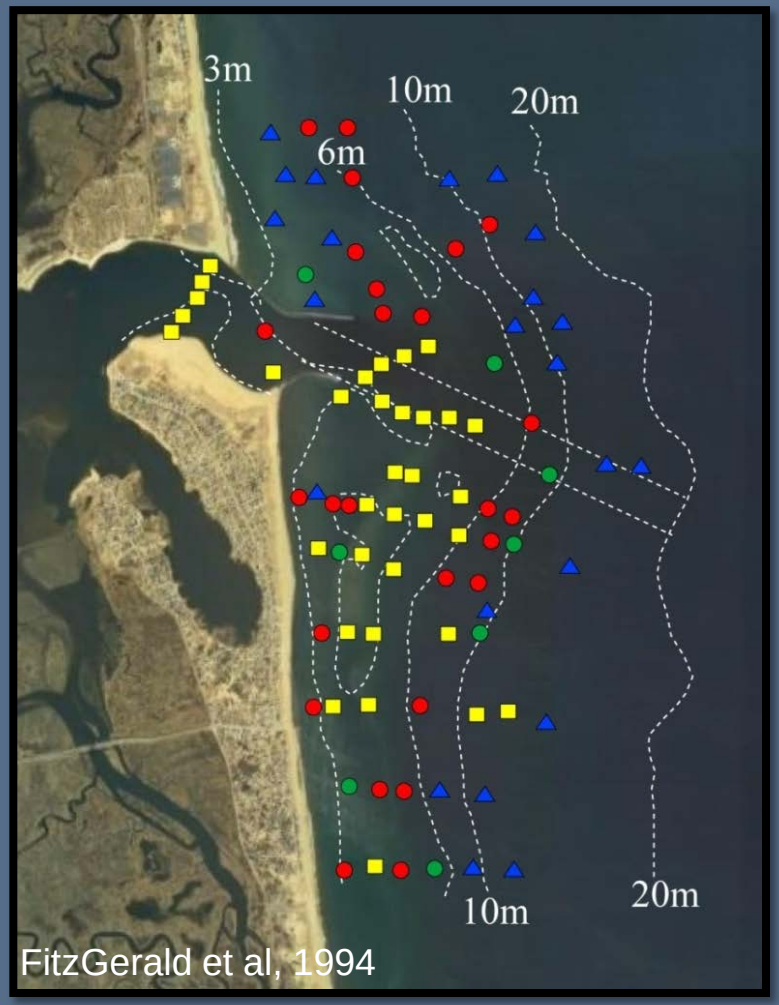
South side of channel exhibits flood oriented mega-ripples

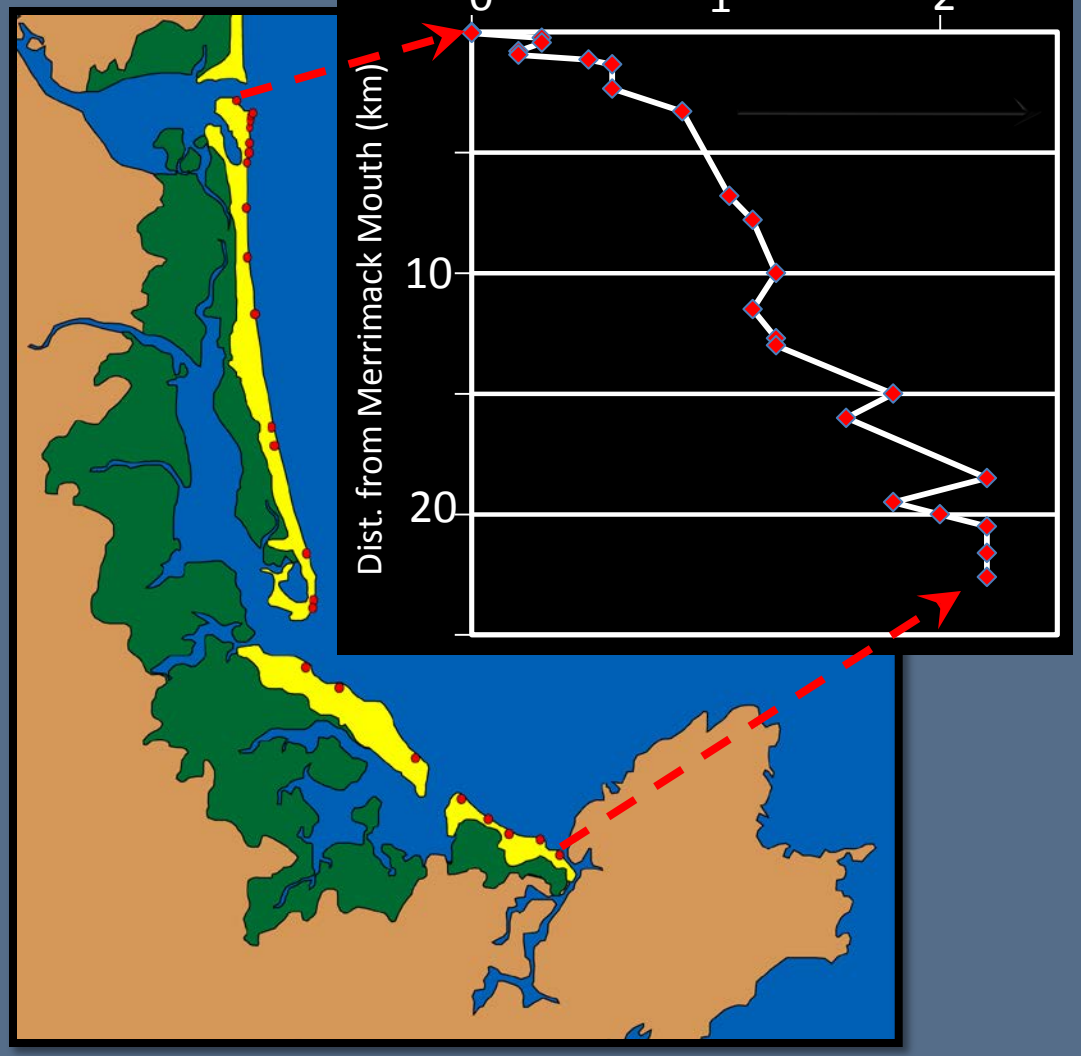
Indicates inlet exporting sand and some recirculation of sand

Sand sourced from offshore has likely ceased



Plum Island Formation: Riverine Source & Regressive Delta Deposits



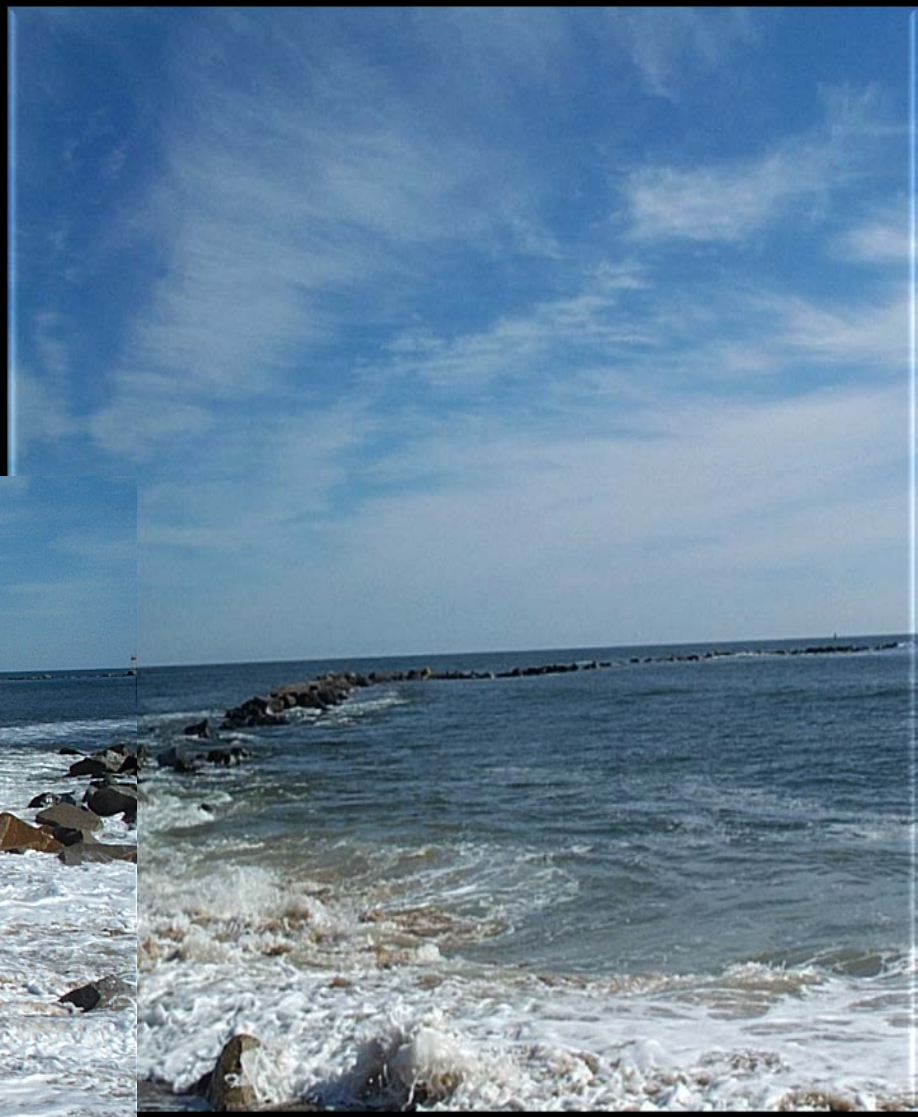


- Very Coarse Sand and Gravel (<0 ϕ)
- Coarse Sand (0-1ϕ)
- Medium Sand (1-2 ϕ)
- Fine and Very Fine Sand (>2 ϕ)


Jetties
Groins
Photo by Michael Morris

South Jetty

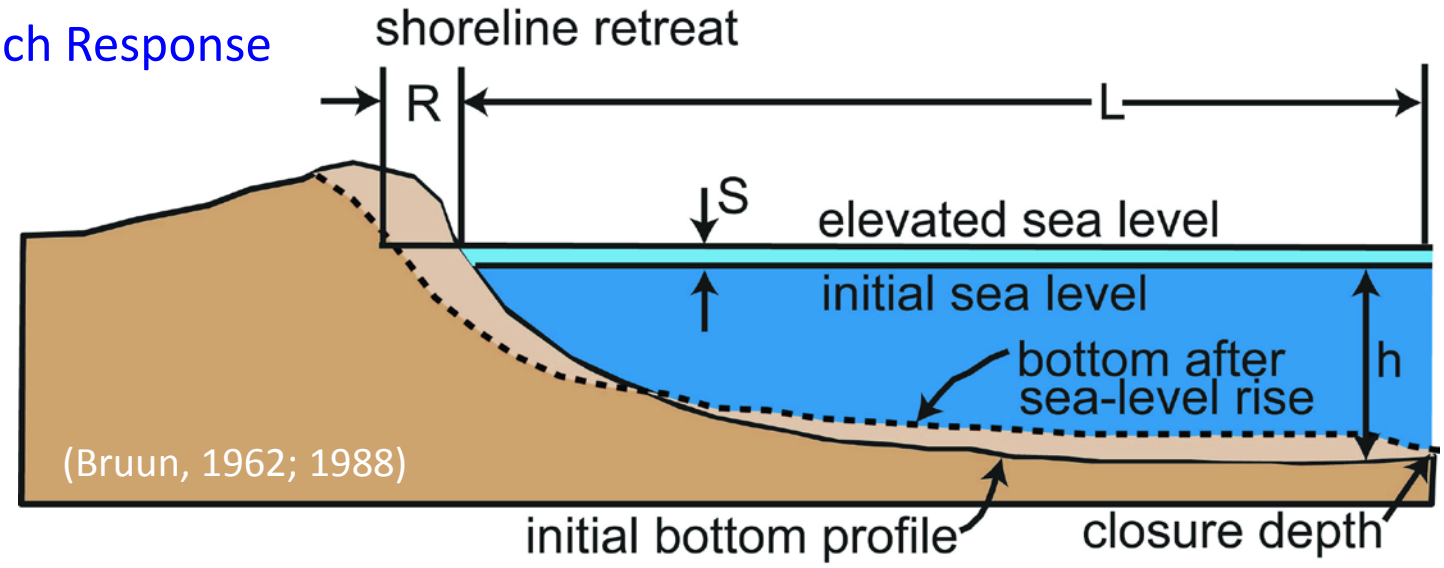
Transport over the jetty by large wave swell feeding sand into the inlet and to Reservation Terrace beach



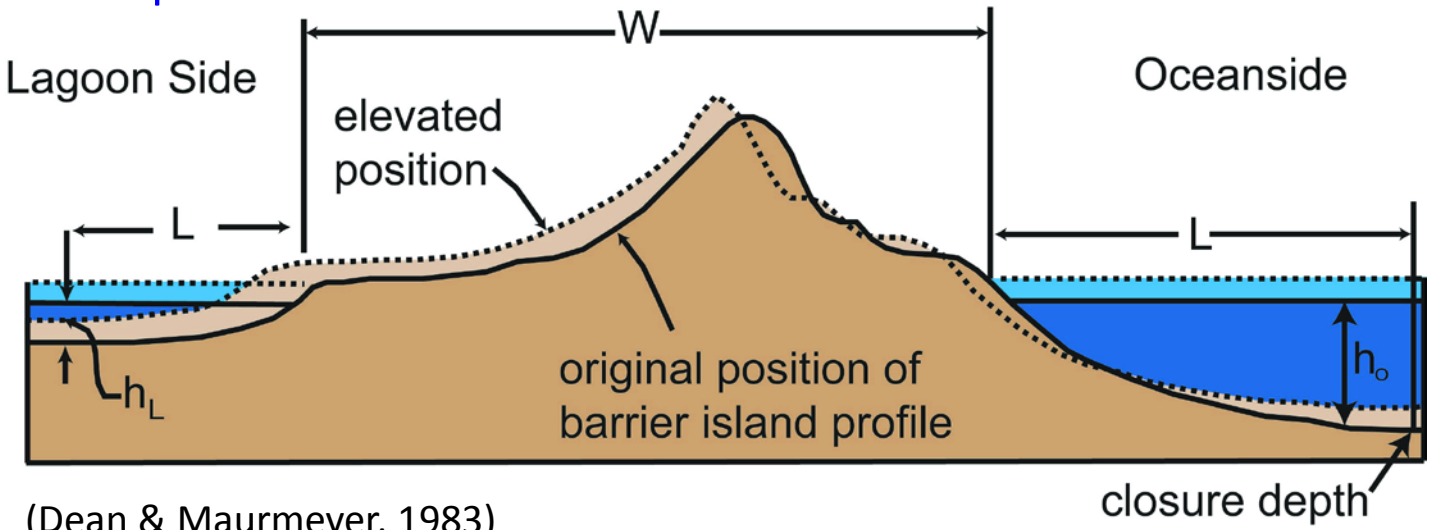
Photos from Michael Morris

Beach & Barrier Response to Sea Level Rise

1. Beach Response

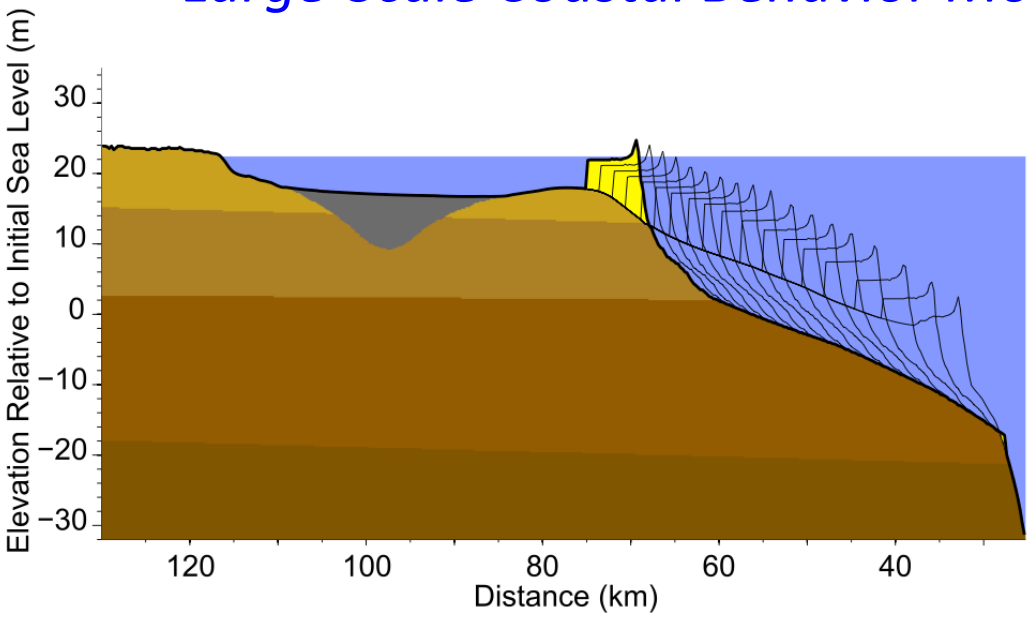


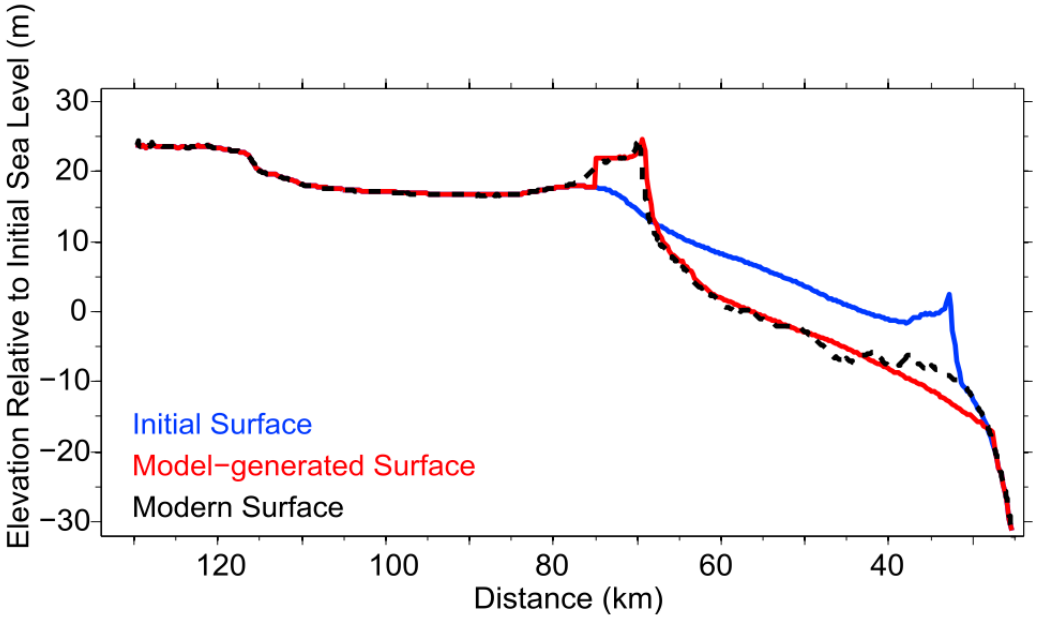
2. Barrier Response



(Dean & Maurmeyer, 1983)

Large-Scale Coastal Behavior Models





(Moore et al, 2010)

Initial Models:

- Governed by SLR scenario
- Geometric Cross-shore model
- Conservation of mass
- Equilibrium profile

GEOMBEST (Geomorphic Model of Barrier, Estuarine, and Shoreface Translations)

- Improved by adding composition of sea floor
- Erodible substrate
- Useful for inverse modeling

- *Plum Island* 150 -450 m wide
- *Castle Neck* 250 to ~1 km wide