

The background of the slide is a photograph of tall, thin grasses, likely beach grasses, with their seed heads reaching upwards. The grasses are in the foreground, slightly out of focus, and are set against a clear blue sky. In the lower portion of the image, a body of water is visible, reflecting the sky and the grasses. The overall scene is bright and natural, suggesting a coastal or wetland environment.

*Responses by Macrobenthic Assemblages
to Extensive Beach Restoration
at Perdido Key, Florida*

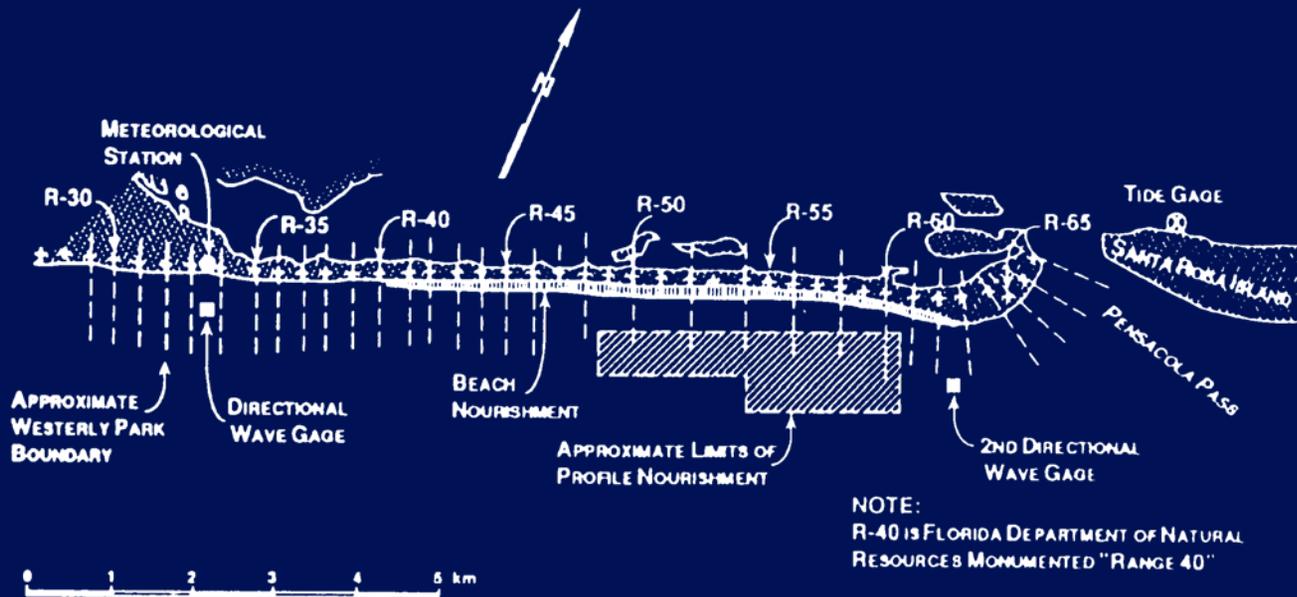
Chet F. Rakocinski, Richard W. Heard, Sara E. LeCroy,
Jerry A. McLelland and Ted Simons

The University of Southern Mississippi
College of Marine Sciences



Perdido Key belongs to the chain of barrier islands protecting the coastline of the northern *Gulf of Mexico*

Covering 24 km of sandy-shore ecosystem, the eastern 11 km of the key belongs to the *Gulf Islands National Seashore*



For one year, between Autumn 1989 and 1990, 4.1 million cubic meters of dredge material was deposited along 7 km of sandy beach shoreline during the beach nourishment phase

Between Autumn 1990 and 1991, another 3.0 million cubic meters of material was deposited subtidally across 3.8 km of shoreline at the 22 foot depth contour during the profile nourishment phase



An offshore dredge pumped fill material from the channel bottom of Pensacola Pass



Offshore fill material was directly transported and distributed to shoreline areas through an elaborate pipeline system

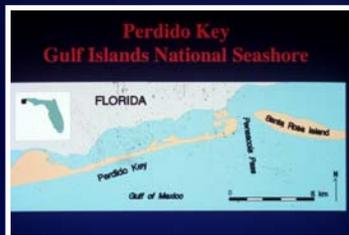
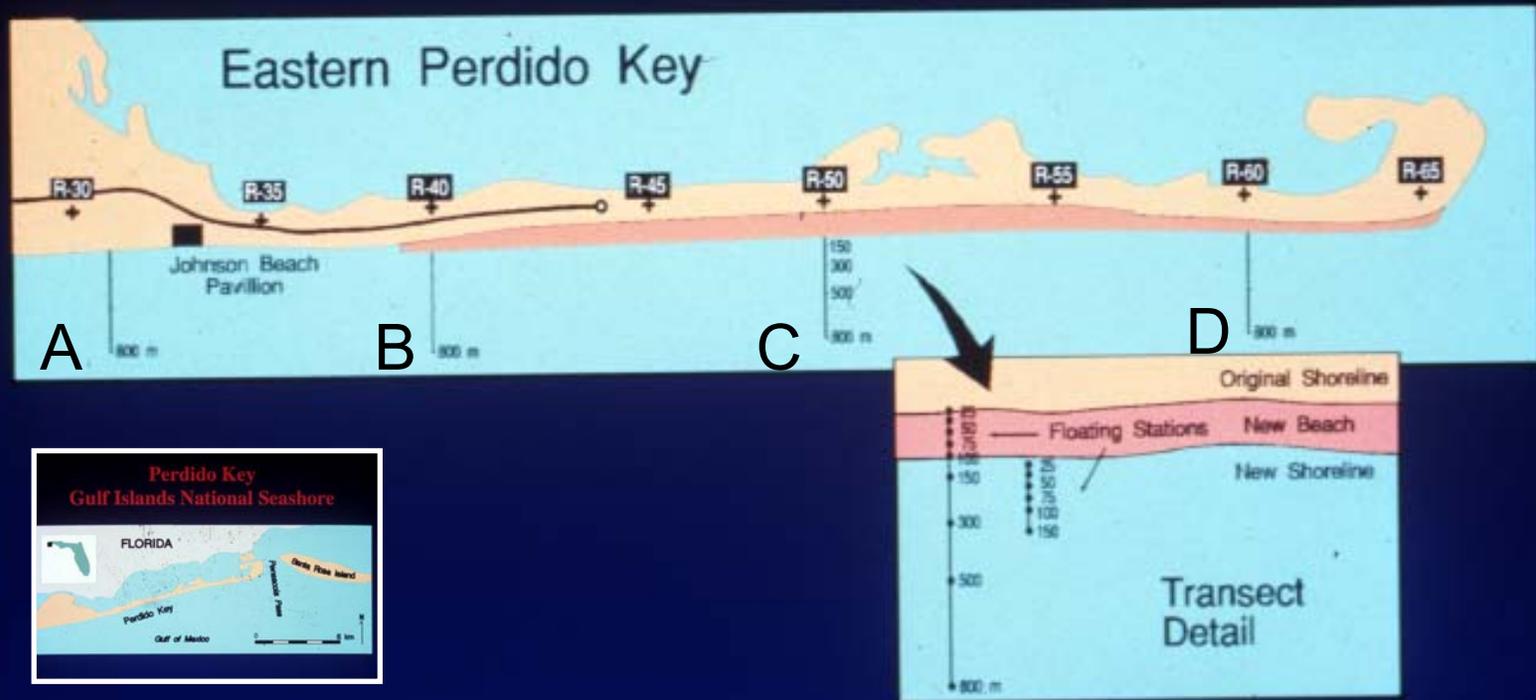


After beach restoration, the beach profile was filled in over 7 kilometers of shoreline and the beach widened by 135 meters near the eastern end of the key, while gradually narrowing to only 20 meters wider at the westward limit

QUESTIONS ABOUT MACROBENTHIC RESPONSES

- HOW WAS THE PHYSICAL HABITAT ALTERED BY BEACH AND PROFILE NOURISHMENT ?
- HOW DID THE BENTHIC FAUNA RESPOND TO APPARENT CHANGES IN THE PHYSICAL HABITAT ?
- HOW DID SELECTED INDICATOR TAXA RESPOND TO APPARENT CHANGES IN THE PHYSICAL HABITAT ?
- HOW WAS BENTHIC ASSEMBLAGE STRUCTURE AFFECTED BY APPARENT CHANGES IN THE PHYSICAL HABITAT ?
- TO WHAT EXTENT DID BENTHIC RECOVERY OCCUR ?

Benthic Community Studies



TO CHARACTERIZE MACROBENTHIC RESPONSES TO BEACH RESTORATION, AN OPTIMUM IMPACT STUDY DESIGN WAS IMPLEMENTED

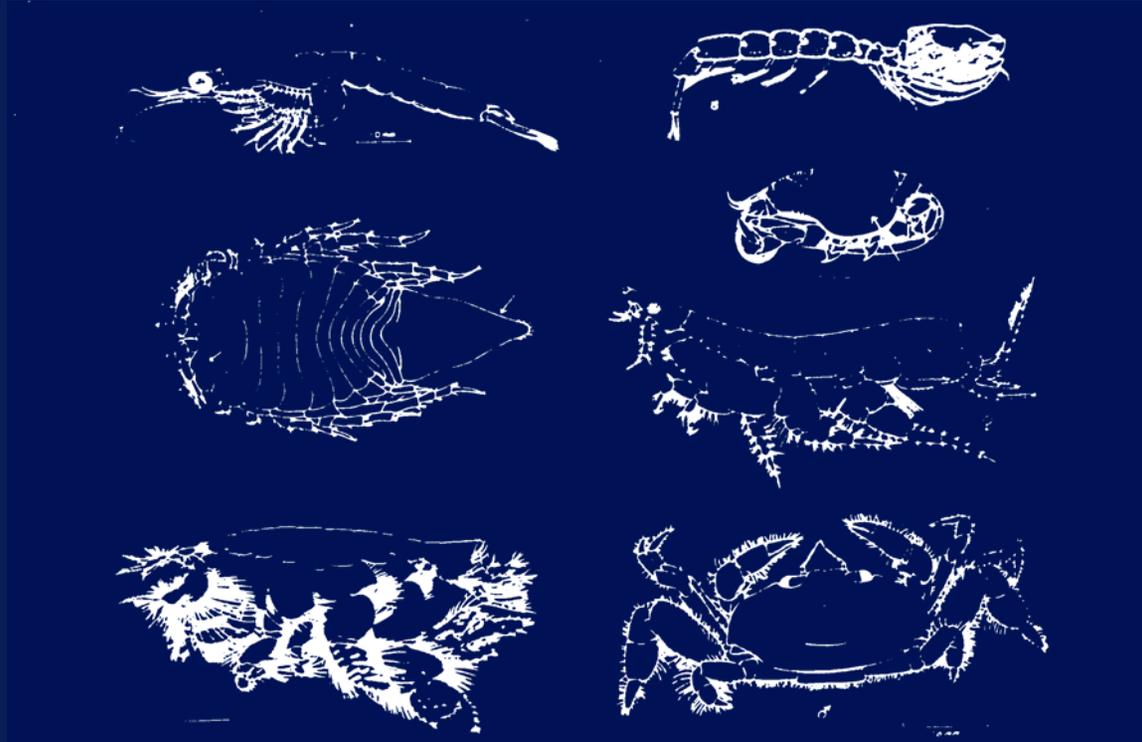
TEN BIOMONITORING SURVEYS WERE CONDUCTED, ONE PRE-RESTORATION SURVEY IN AUTUMN 1989, THE FIRST POST-NOURISHMENT SURVEY IN AUTUMN 1990, AND EIGHT OTHER SUBSEQUENT QUARTERLY SURVEYS, WITH THE LAST SURVEY BEING COMPLETED IN AUTUMN 1992

EIGHT $1/64 \text{ m}^2$ BOX-CORE SAMPLES WERE TAKEN AT EACH STATION ON A TRANSECT (TOTAL POSSIBLE # CORES = 288 [4 x 9 x 8]) DURING EACH SURVEY PERIOD





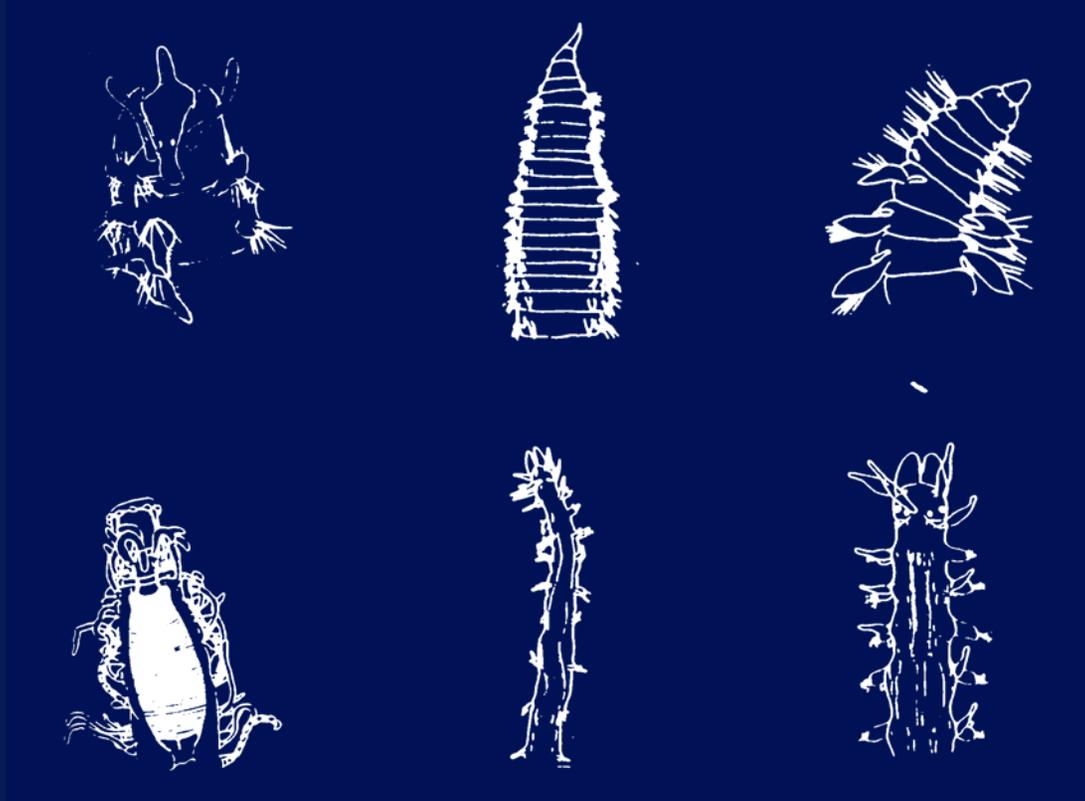
More Than 300 Taxa were identified, including members of 11 Phyla and at least 20 Classes



SOME COMMON CRUSTACEANS (top to bottom) INCLUDED:

Metamysidopsis swifti
Chirodotea excavata
Haustorius sp A
Cyclaspis pustulata
Emerita talpoida
Eudevenopus honduranus
Pinnixa sp C

Two Taxonomic groups, polychaetes and crustaceans, together made up about 75 % of both the numbers of organisms and species



SOME COMMON POLYCHAETES (left to right) INCLUDED:

Scololepis squamata

Leitoscoloplos fragilis

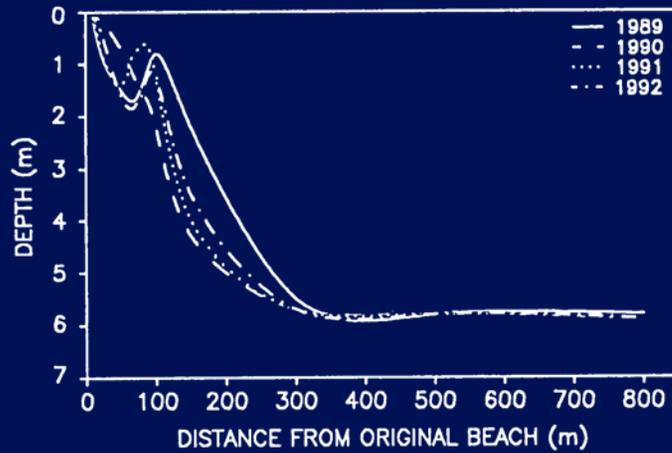
Paraonis fulgens

Streptosyllis pettitbonae

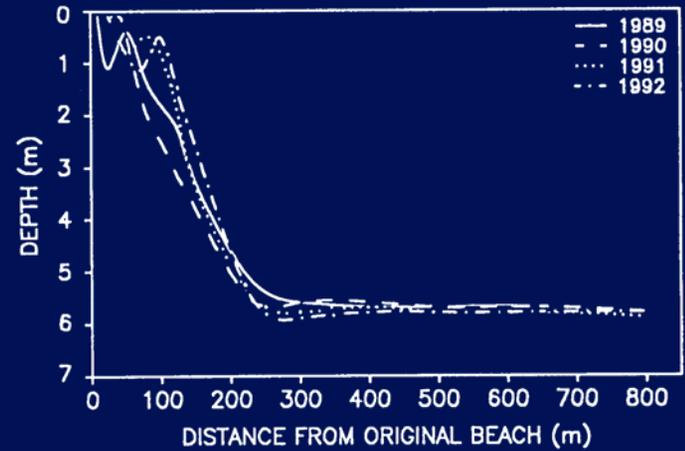
Brania wellfleetensis

Parapionosyllis longicirrata

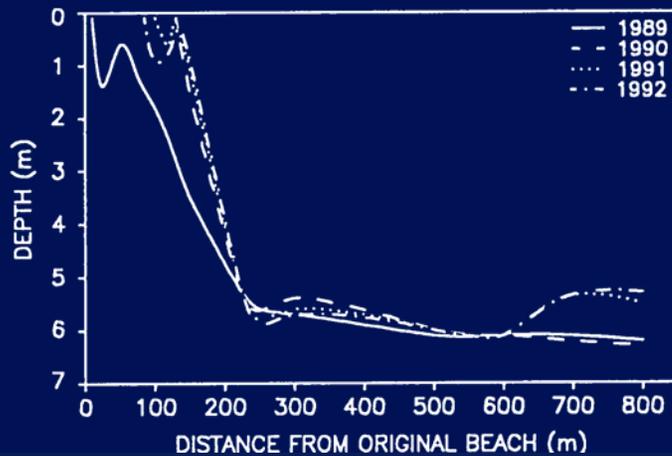
AUTUMN DEPTH PROFILES
TRANSECT A



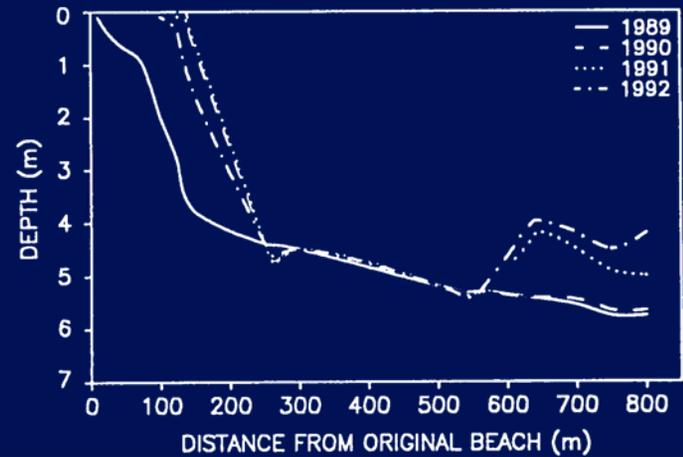
AUTUMN DEPTH PROFILES
TRANSECT B



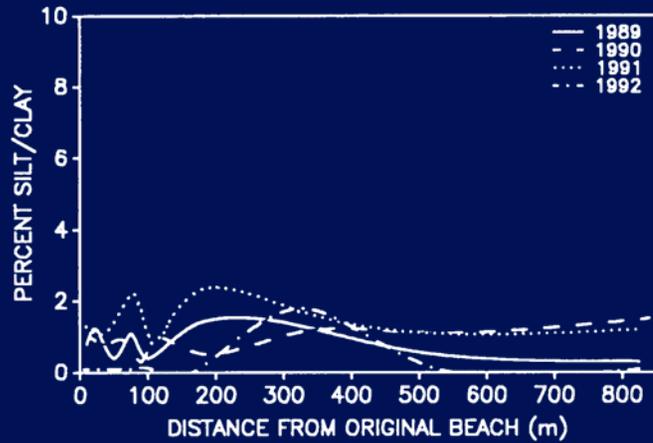
AUTUMN DEPTH PROFILES
TRANSECT C



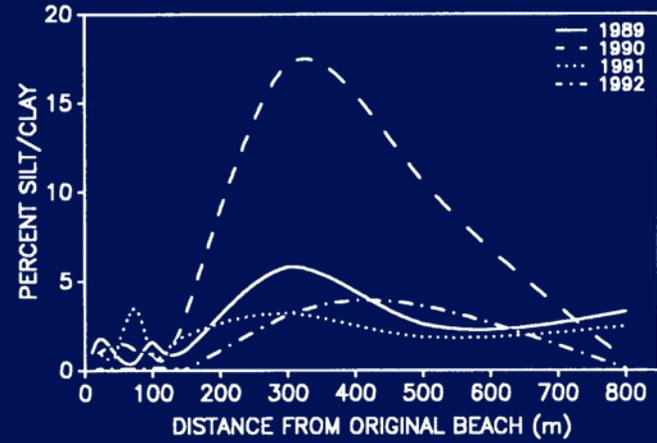
AUTUMN DEPTH PROFILES
TRANSECT D



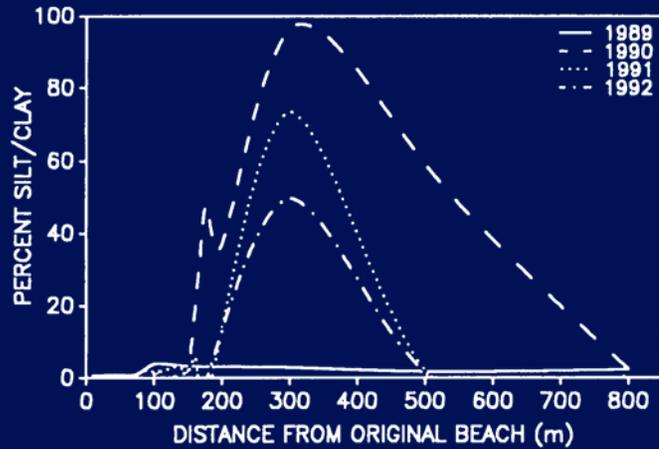
PERCENT SILT/CLAY
TRANSECT A



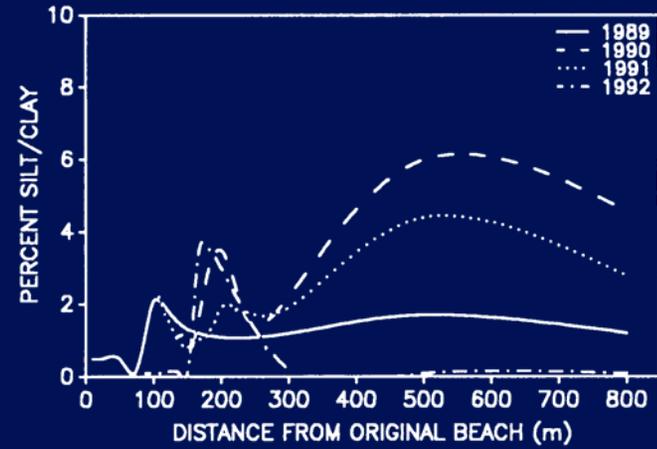
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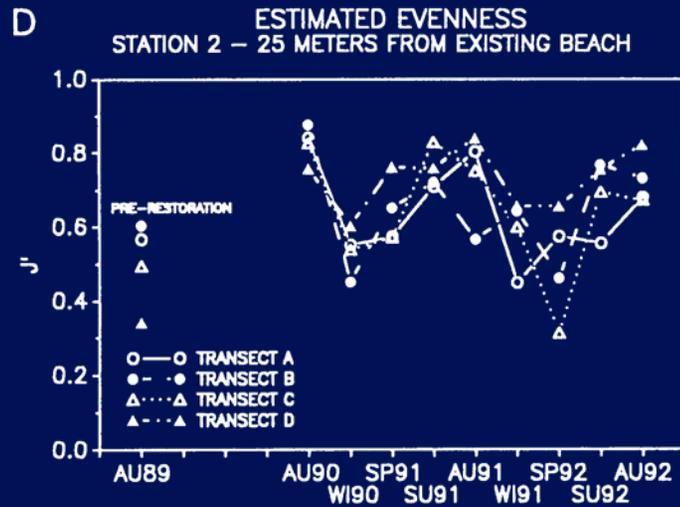
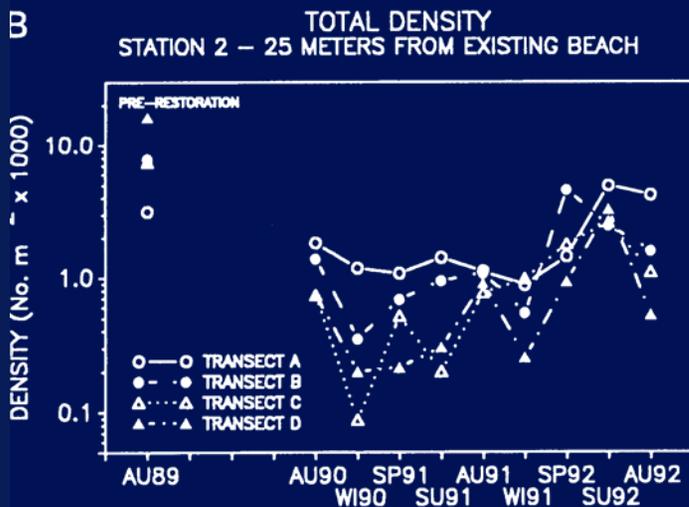
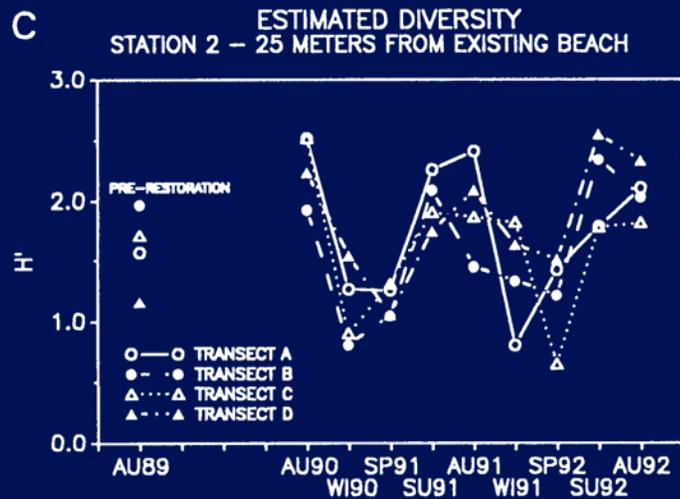
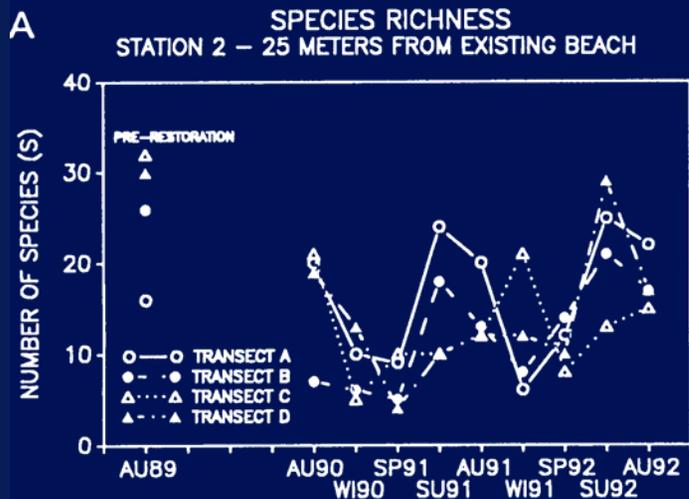


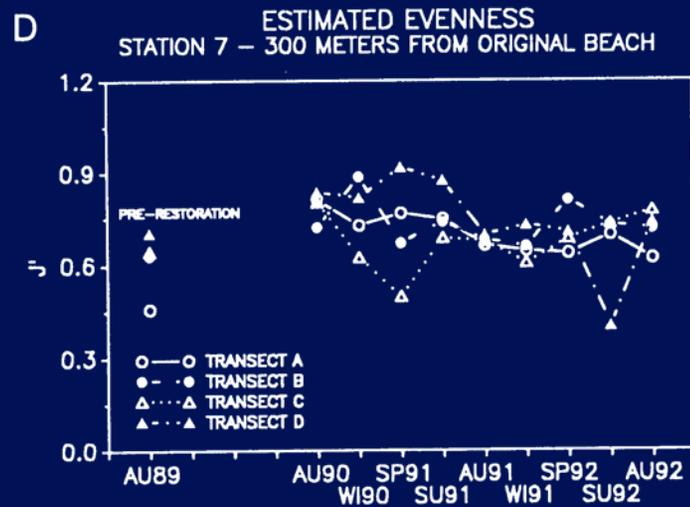
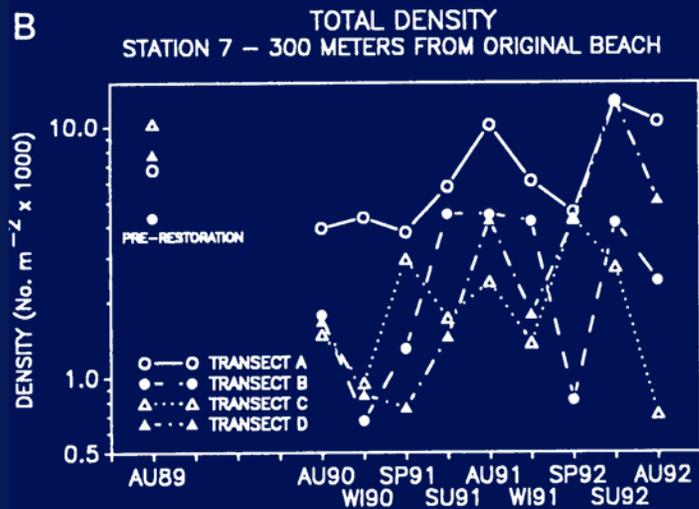
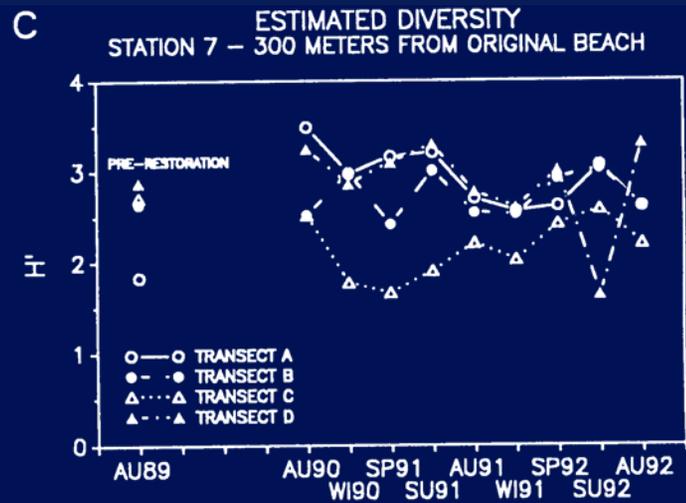
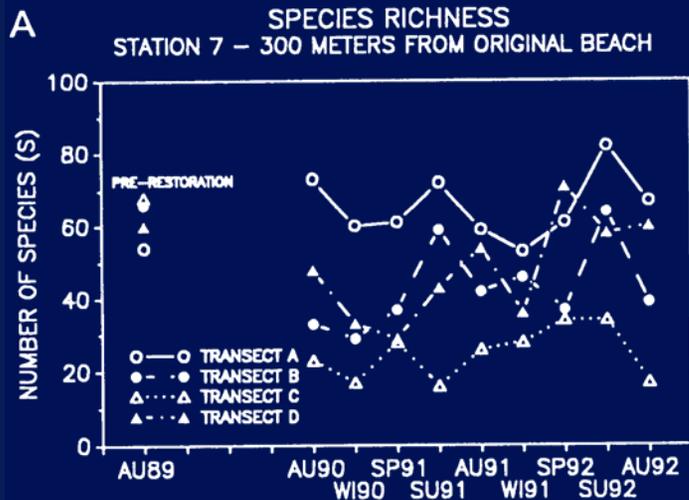
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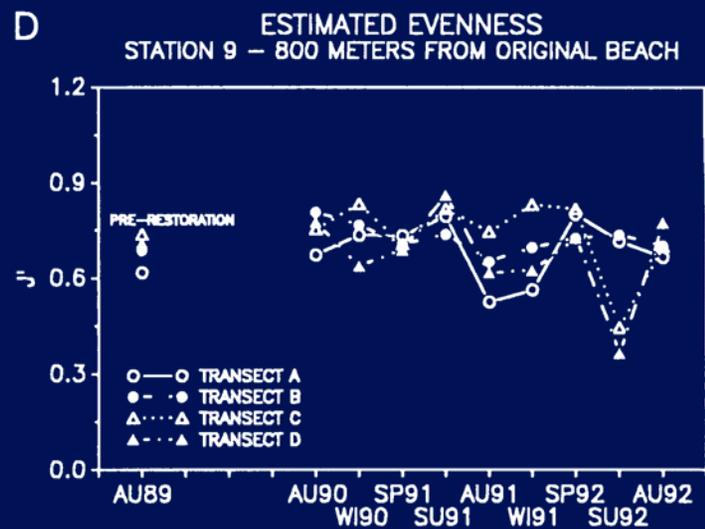
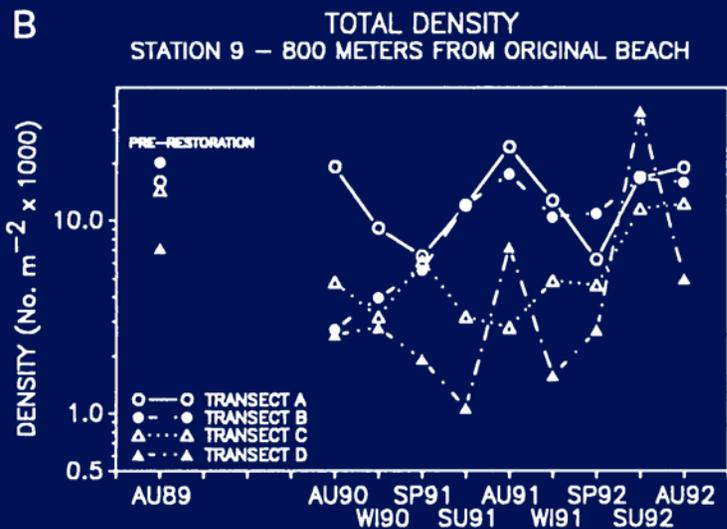
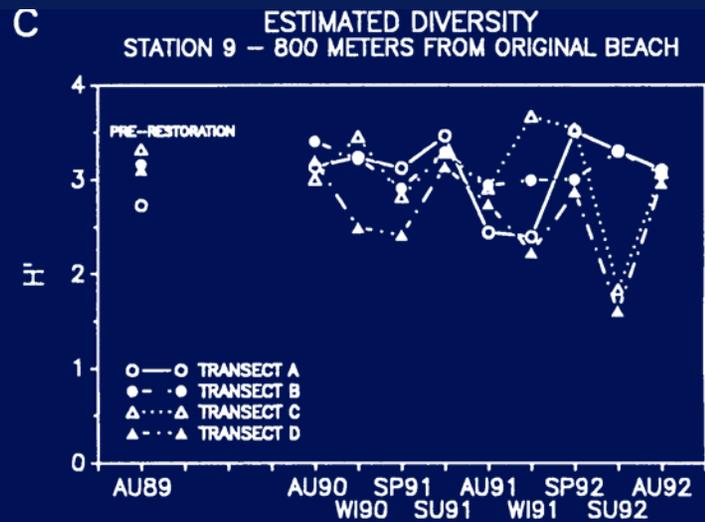
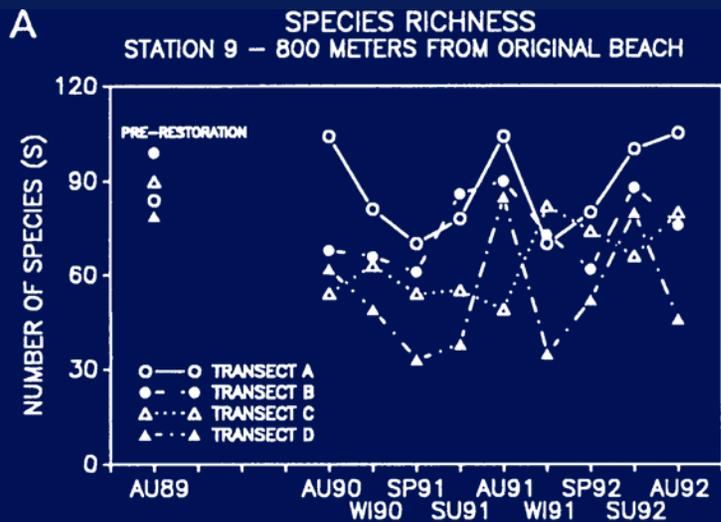


PERCENT SILT/CLAY
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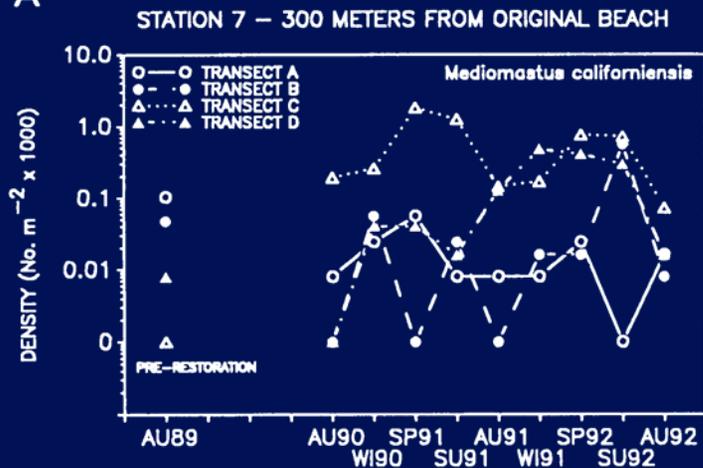




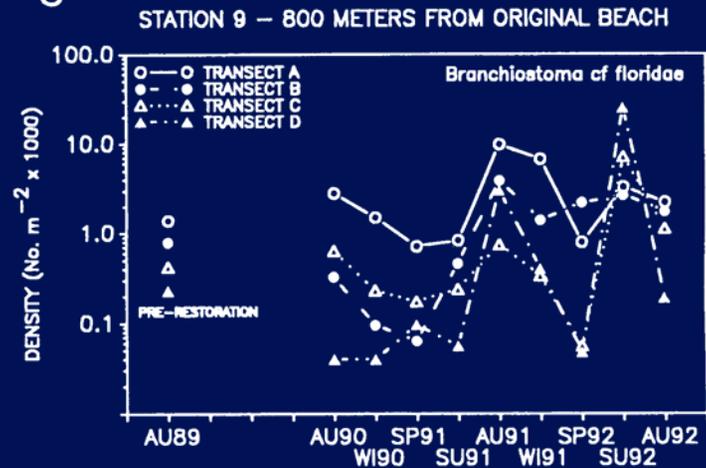




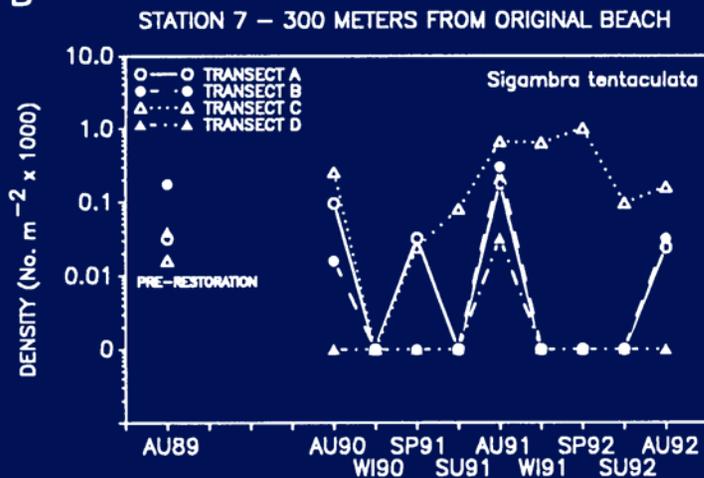
A



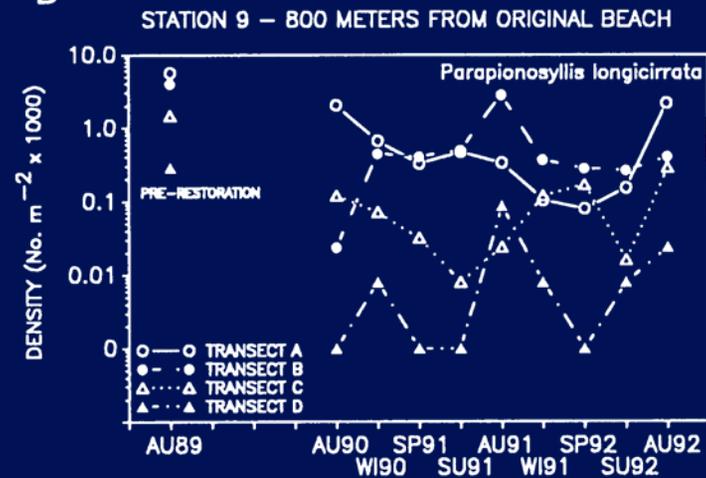
C



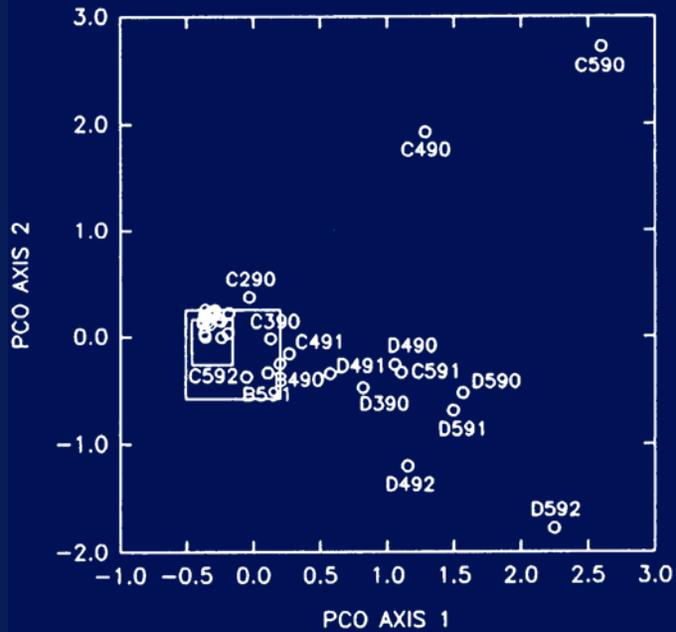
B



D

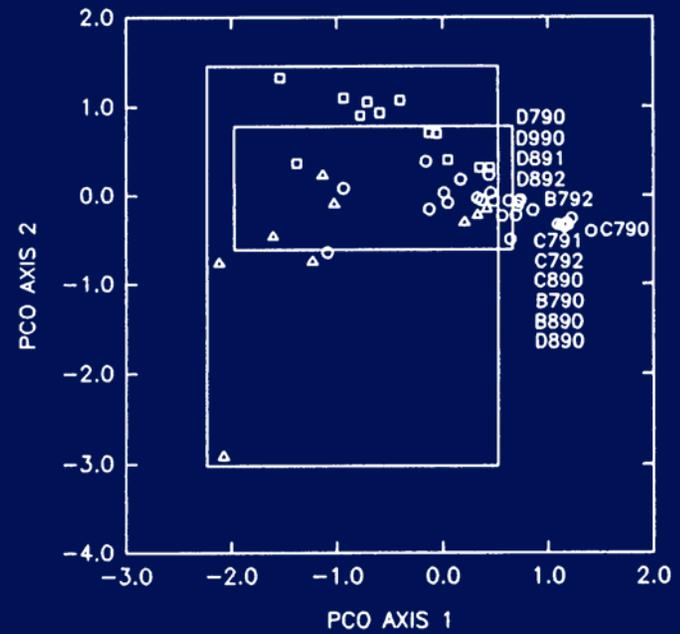


INNER FLOATING STATIONS



a.

OUTER FIXED STATIONS



b.

CONCLUSIONS ABOUT BENTHIC RESPONSES

- ALTERED SEDIMENT COMPOSITION AND DYNAMICS AS WELL AS DEPTH PROFILES OCCURRED FROM BEACH RESTORATION.
- RESPONSES BY THE BENTHOS INCLUDED DECREASED SPECIES RICHNESS AND TOTAL DENSITIES, VARIATION IN ABUNDANCES OF KEY TAXA, INCREASED FLUCTUATIONS IN BENTHIC POPULATIONS, AND SHIFTS IN BENTHIC ASSEMBLAGE STRUCTURE.
- BENTHIC RECOVERY OCCURRED AT MOST STATIONS WITHIN THE STUDY PERIOD, BUT SOME FAUNAL CHANGES PERSISTED.
- OFFSHORE SUBTIDAL BENTHIC ASSEMBLAGES MAY BE LESS RESILIENT THAN CONTIGUOUS SANDY-BEACH ASSEMBLAGES.

The End !

