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Oyster Reef and Estuarine Landscape Restoration

Kenneth L. Heck, Jr.
NGI Conference, May 2007

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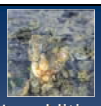

Why Oyster Reef Restoration ?

- In addition to the multimillion dollar US fishery they support, oyster reefs provide key ecological functions:
  - -serve as habitat for finfish & shellfish
  - -stabilize shorelines
  - -filter suspended solids and phytoplankton from the water column
  - -sequester excess nutrients (nitrogen, phosphorous, and carbon)

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Video of a healthy Alabama oyster reef

QuickTime™ and a
H.263 decompressor
are needed to see this picture.

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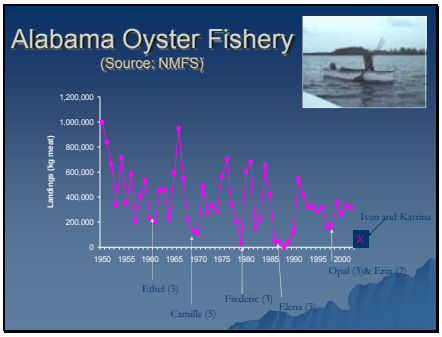

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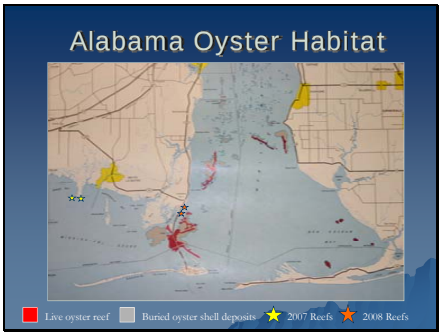

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The southwest corner of Mobile Bay is the location where the dissolved oxygen is reliably high enough for oyster reef development, predation rates are usually low, and larval supply is good. Therefore, this area is the site of greatest reef development in Mobile Bay.

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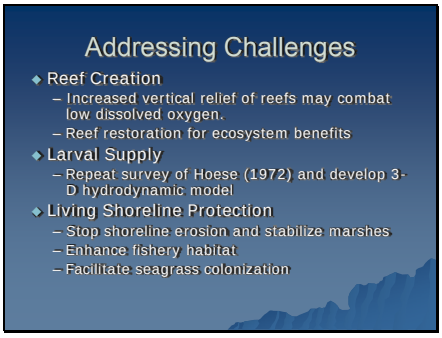

Three major elements of our reef restoration program.

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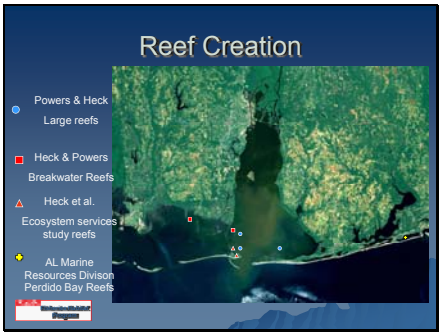

Locations of reef restoration efforts in Coastal Alabama.

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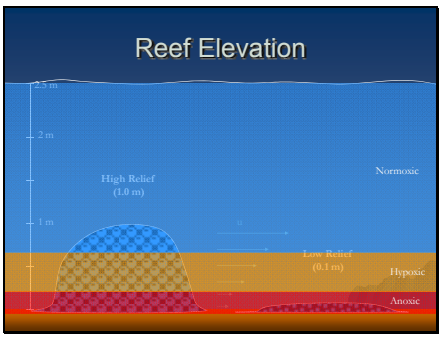

How increased vertical relief of reefs can ameliorate negative effects of low oxygen concentration.

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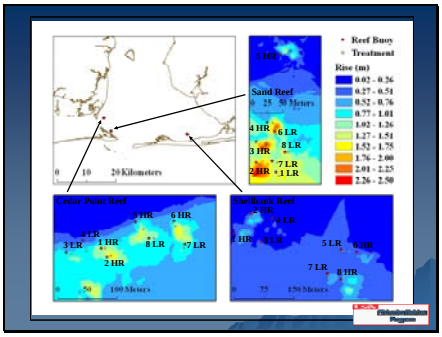

Vertical relief of restored large reefs at Sand Reef, Cedar Point and Shellbanks.

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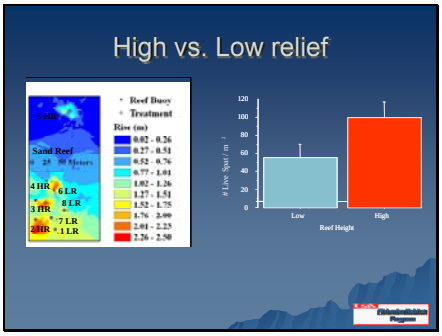

Surprisingly, we found no significant effect of vertical relief on oyster settlement and survival.

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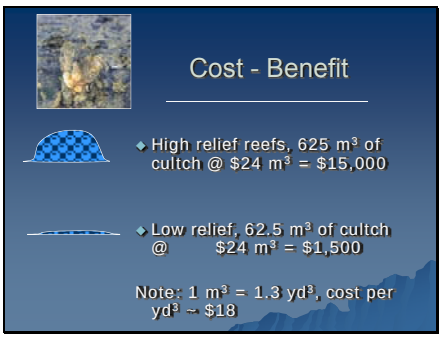

Since we saw no significant effect of vertical relief (high versus low) on oyster settlement or survival, it is most economical to restore low relief reefs.

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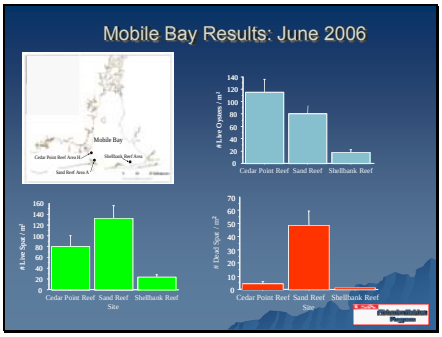

As expected, we found good larval settlement and Cedar Point (and also at Sand Reef) with greatest survival at Cedar Point.

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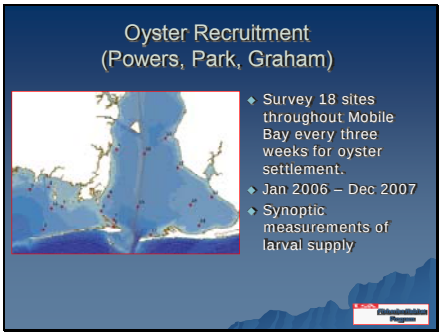

Locations of oyster settlement studies.

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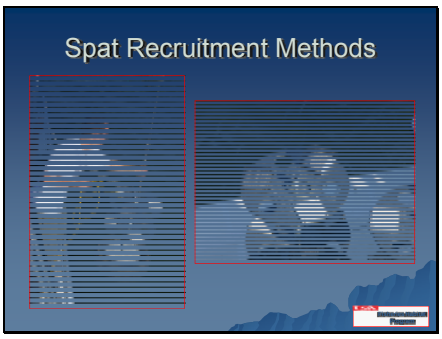

Settlement plates placed on weighted arrays to estimate oyster larval settlement rates.

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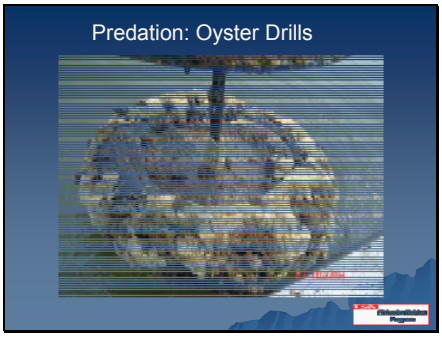

Oyster drill predation on newly settled oysterswas extremely intense, as reflected by the large aggregation of oyster drill egg cases on weighted arrays.

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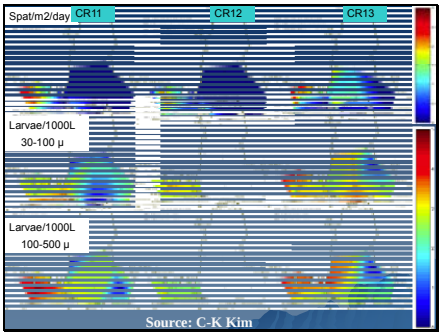

Results of model simulations of different sized larvae and newly settled oysters (spat) in Mobile Bay. Overall, greatest spat settlement occurred along the western shore of Mobile Bay and in Mississippi Sound.

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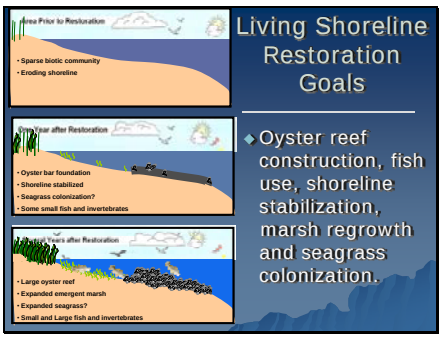

Overview of expected results of living shoreline program element.

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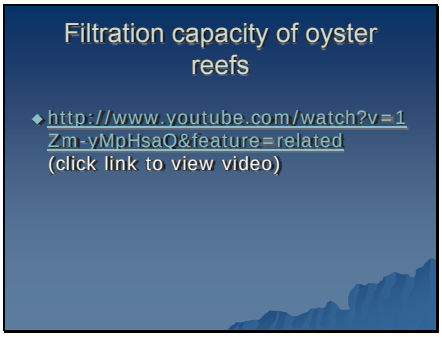

This video shows why it is possible that large oyster populations could clear up turbid water and promote the growth of bottom-dwelling plants such as seagrasses

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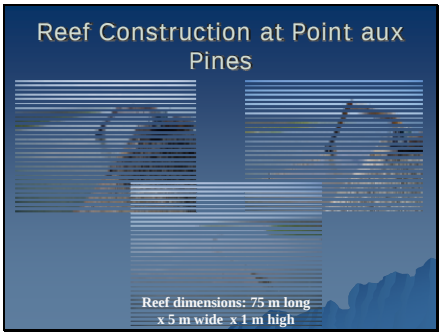

Breakwater reefs under construction seaward of eroding salt marsh in Grand Bay, AL.

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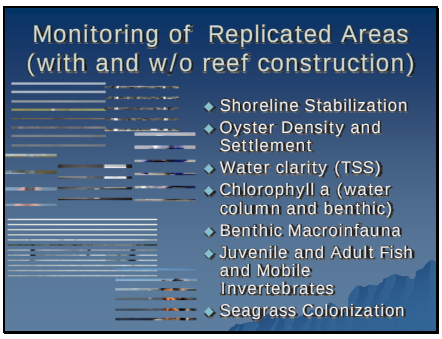

Response variables being measured in association with breakwater reef construction.

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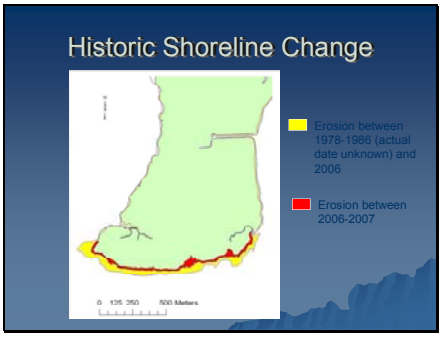

Documentation of the eroding shoreline at Point aux Pins in Grand Bay.

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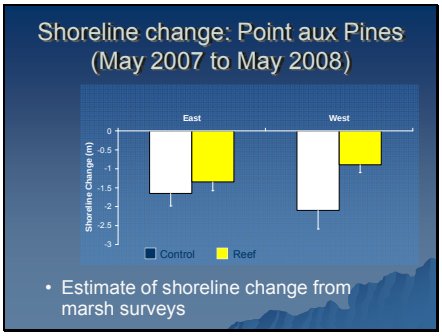

Results show that although the shoreline continued to erode in both reef and non-reef areas, the rate of erosion was reduced where reefs were present.

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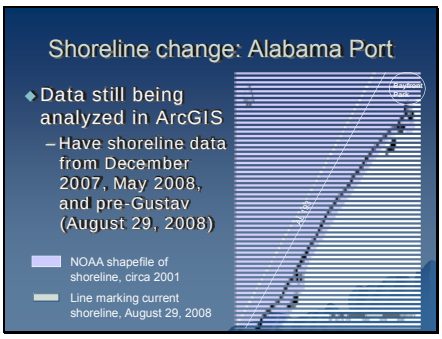

We will construct shoreline maps at a second location near Alabama Port in late 2009 and draw conclusions about the value of the shoreline protection and stablization project.

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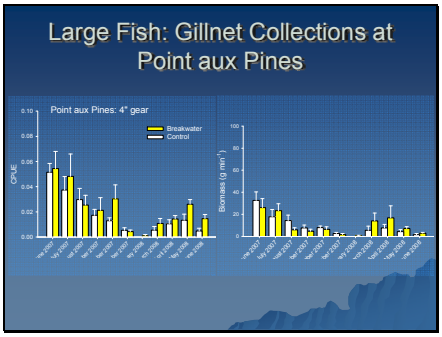

Usually more fish were collected at the Breakwater reefs than at the control areas without reefs.

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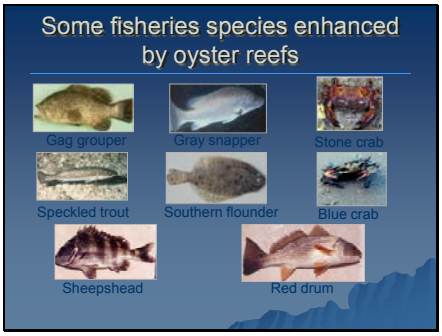

Some of the fish species enhanced by the presence of the breakwater reefs.

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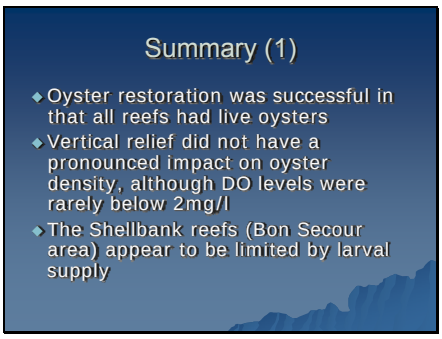

Overall conclusions of the different elements of the reef restoration program to date.

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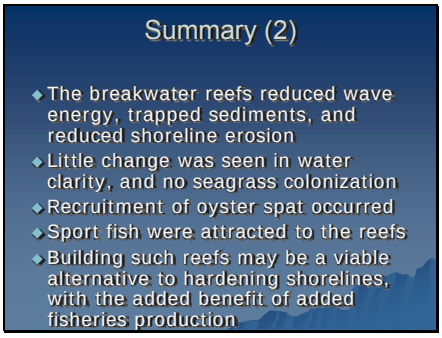

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