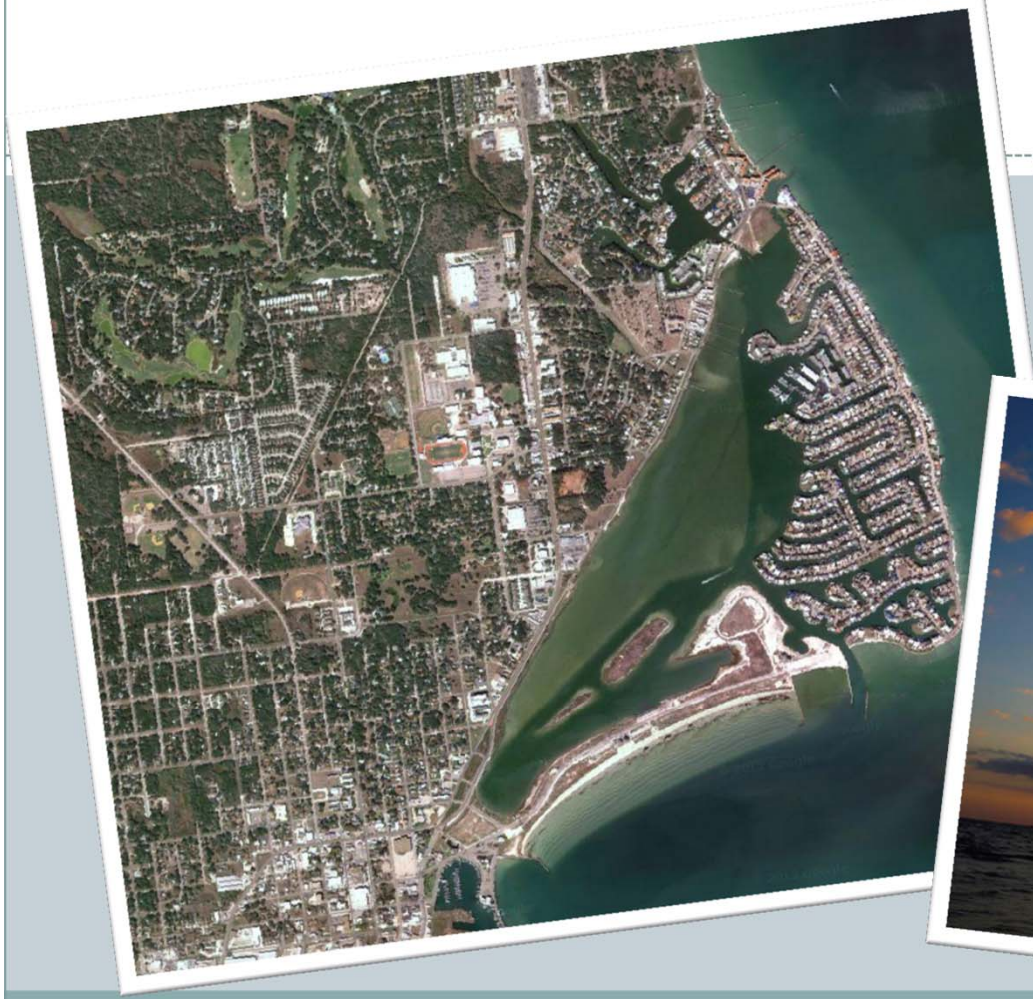
Using SWMP to Address Local Water Quality Information Needs

Sally Palmer, Dr. Kiersten Madden, Rae Mooney, Dr. Ed Buskey

Mission-Aransas National Estuarine Research Reserve, University of Texas Marine Science Institute

Setting the scene :
Little Bay, Rockport Texas

25.8% over age of 65 (2010 Census)



Courtesy of FFWS

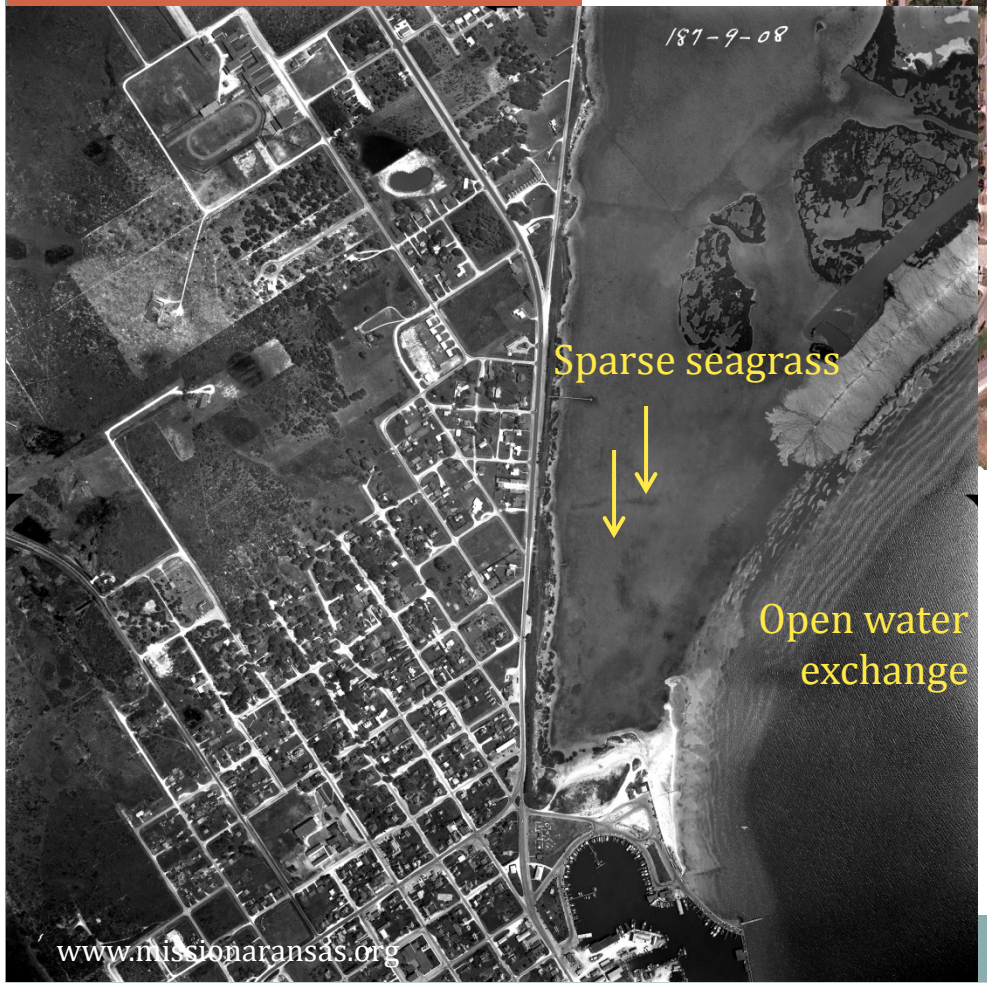
Courtesy of Stuart Seeger

1959

verses

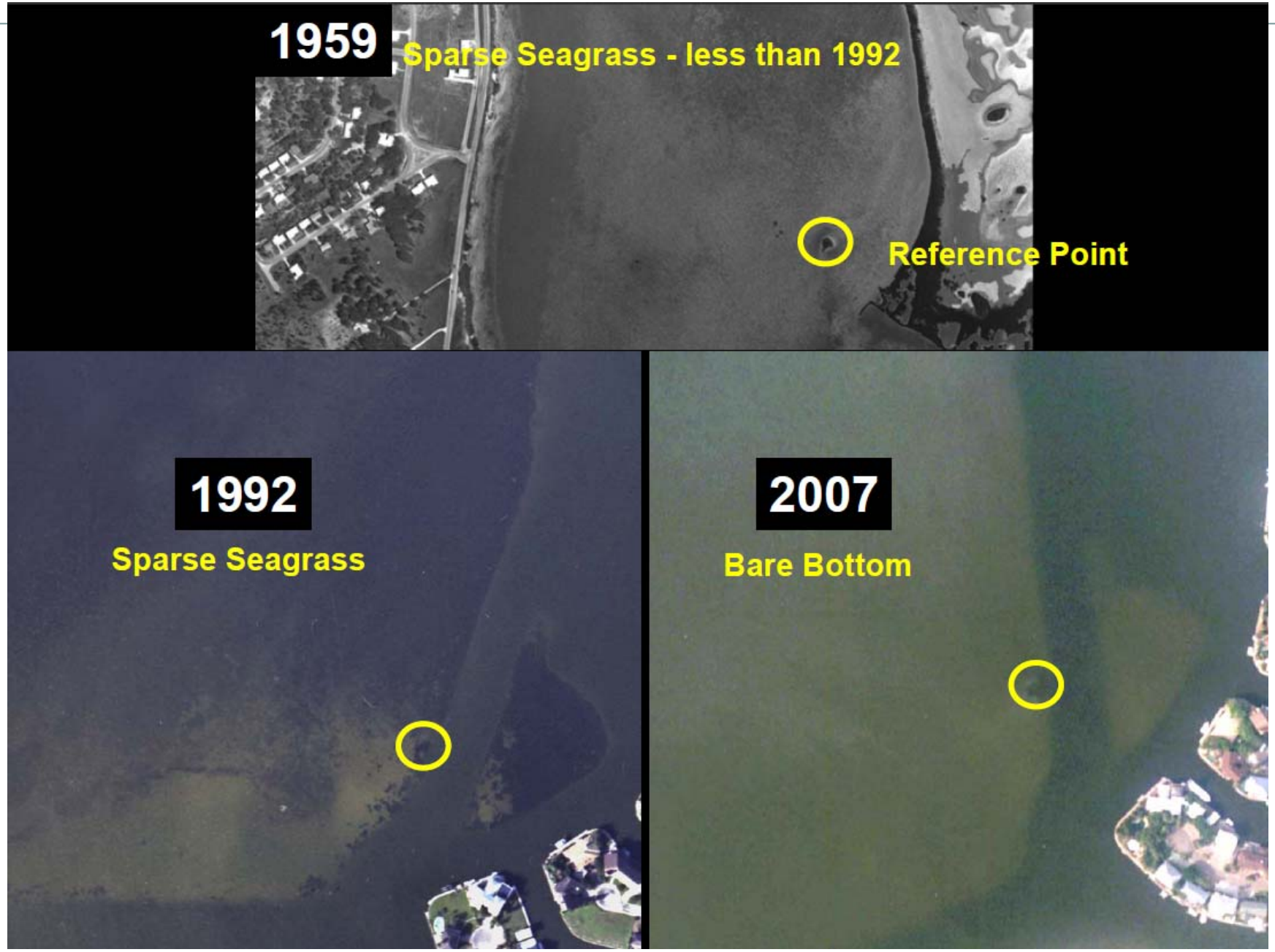
2013

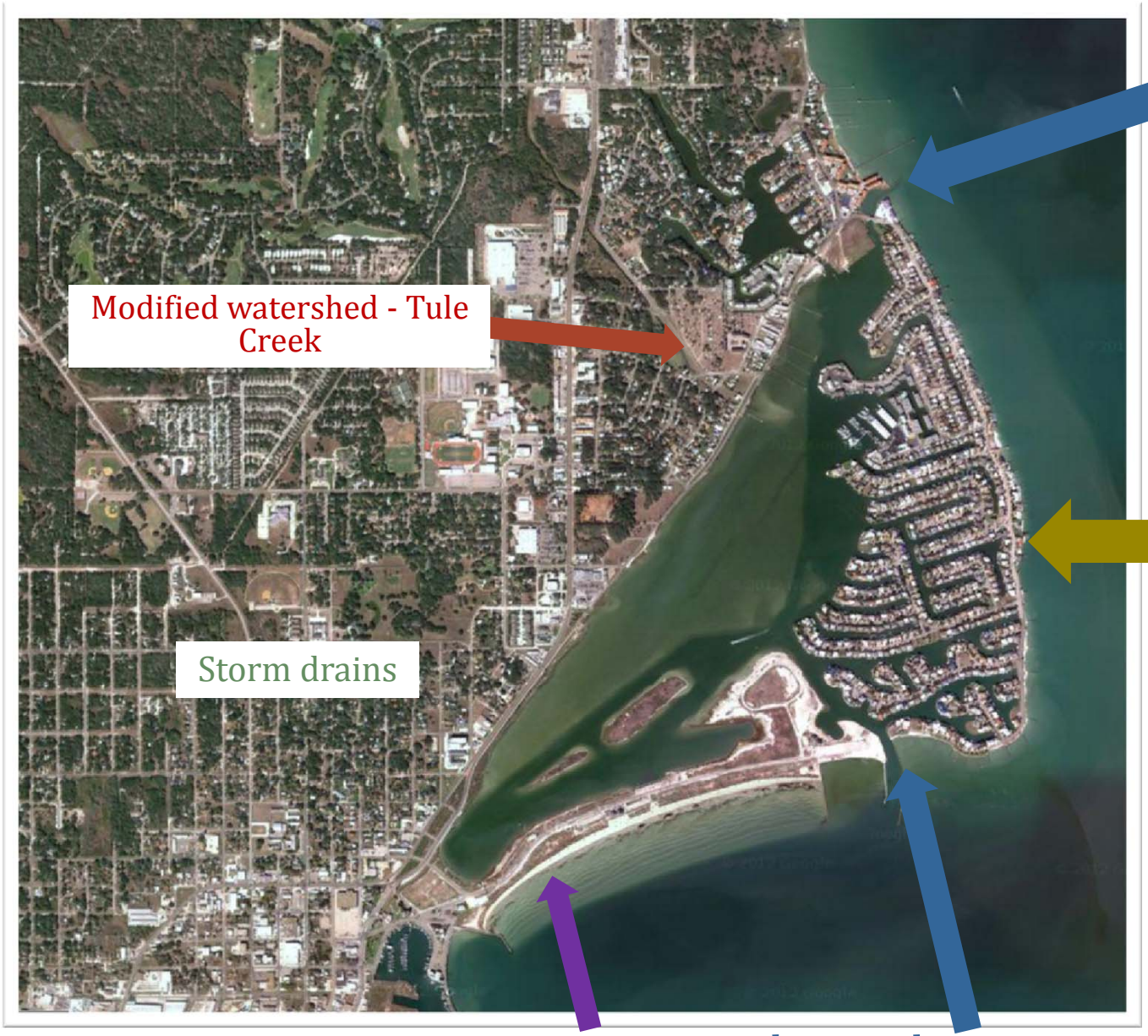
1959

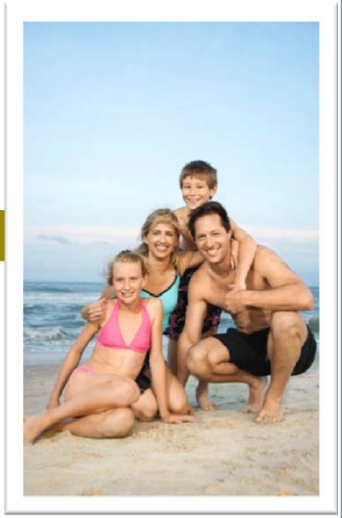

187-9-08
Sparse seagrass
Open water exchange
www.missionaransas.org

NOW

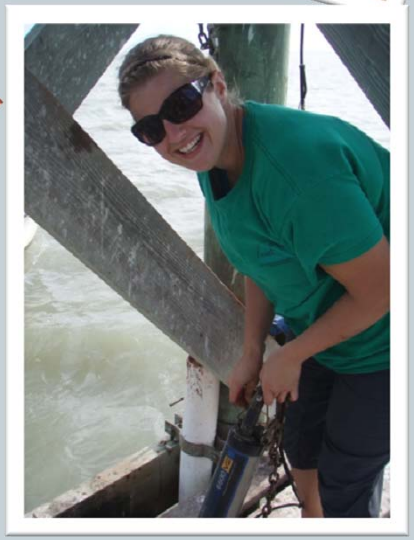

Fringing seagrass
Closed/limited water exchange


1959
Sparse Seagrass - less than 1992
Reference Point
1992
Sparse Seagrass
2007
Bare Bottom


bay exchange
Modified watershed - Tule Creek
Storm drains
fill
bay exchange



Collaboration



www.missionaransas.org

Methodology

Installed “SWMP” station for water quality:

- Temperature
- Salinity
- Dissolved oxygen
- pH
- Turbidity
- Chlorophyll
- Nutrients (monthly)

Methodology

- Nutrients & phytoplankton - monthly
- Seagrass - annual
  - % cover
  - Height
  - Aerial extent
  - Water quality
  - Total suspended solids
  - Seagrass C/N/P ratios
  - Isotopic signatures
  - Seed reserve
- Light attenuation
- System-wide monitoring program stations used as a pristine comparison.

Communication - Lessons learned

- Audience is concerned citizens
- Lessons learned
  - More time and effort is necessary than to resource managers
  - On-going project
  - More outreach materials and visuals
  - Less jargon
  - Higher frequency of outreach needed

Since August 2012 - 12 related news articles published in local paper!

Saturday, July 10, 2010 Volume 141 • No. 41 www.rockportpilot.com

Study reveals no 'single' Little Bay solution

By MIKE PROBST
Editor & Publisher

Elected representatives from the City of Rockport, Aransas County, the Aransas County Navigation District (ACND), and the Town of Fulton gathered at Rockport City Hall Tuesday, July 6 to hear an assessment of Little Bay water and sediment quality, and how that relates to the decline in seagrasses in Little Bay.

The two-year study was conducted by the Mission-Aransas National Estuarine Research Reserve (NERR) in coordination with the Coastal Bend Bays & Estuaries Program, with funding by local governmental entities. The original study was to cover a period of one year, but it was extended over a two-year period at no additional cost. The period studied was May 2008 to June 2010.

The NEER's Dr. Kenneth Dunton and doctoral candidate Christopher Wilson made the presentation which was followed by a brief discussion.

See STUDY, page 7A

Problem = We needed a better method of communication

Solution = report card approach

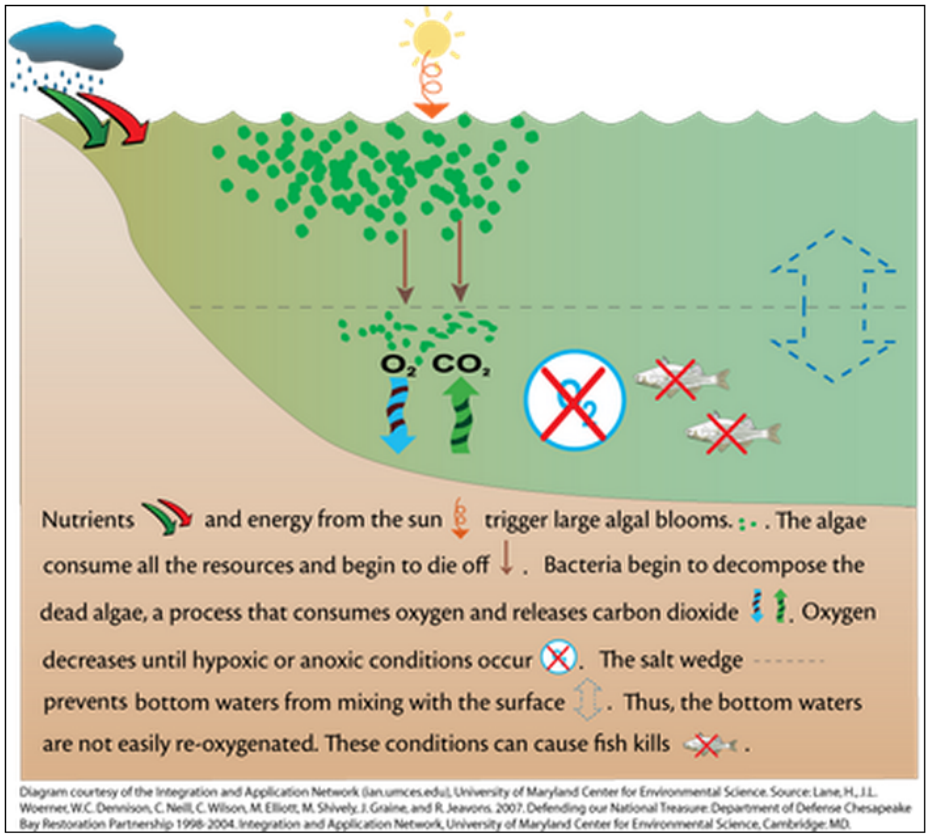
ecocheck
How healthy is your ecosystem?

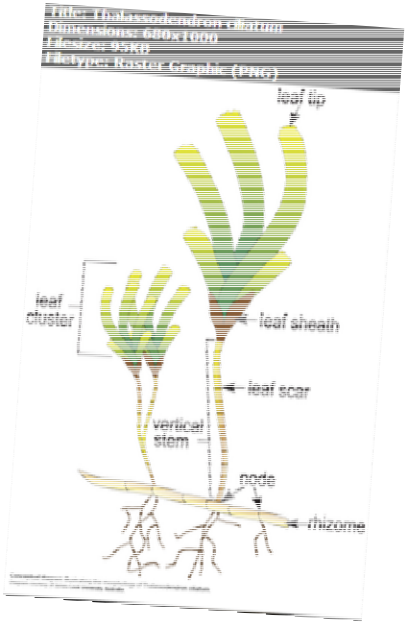
Ecocheck is part of the Integration and Application Network, with a focus on ecosystem health reporting.

- Integration of geographically detailed assessments
- Forecasts of Chesapeake Bay ecosystem health
- Timely and scientifically rigorous communication products

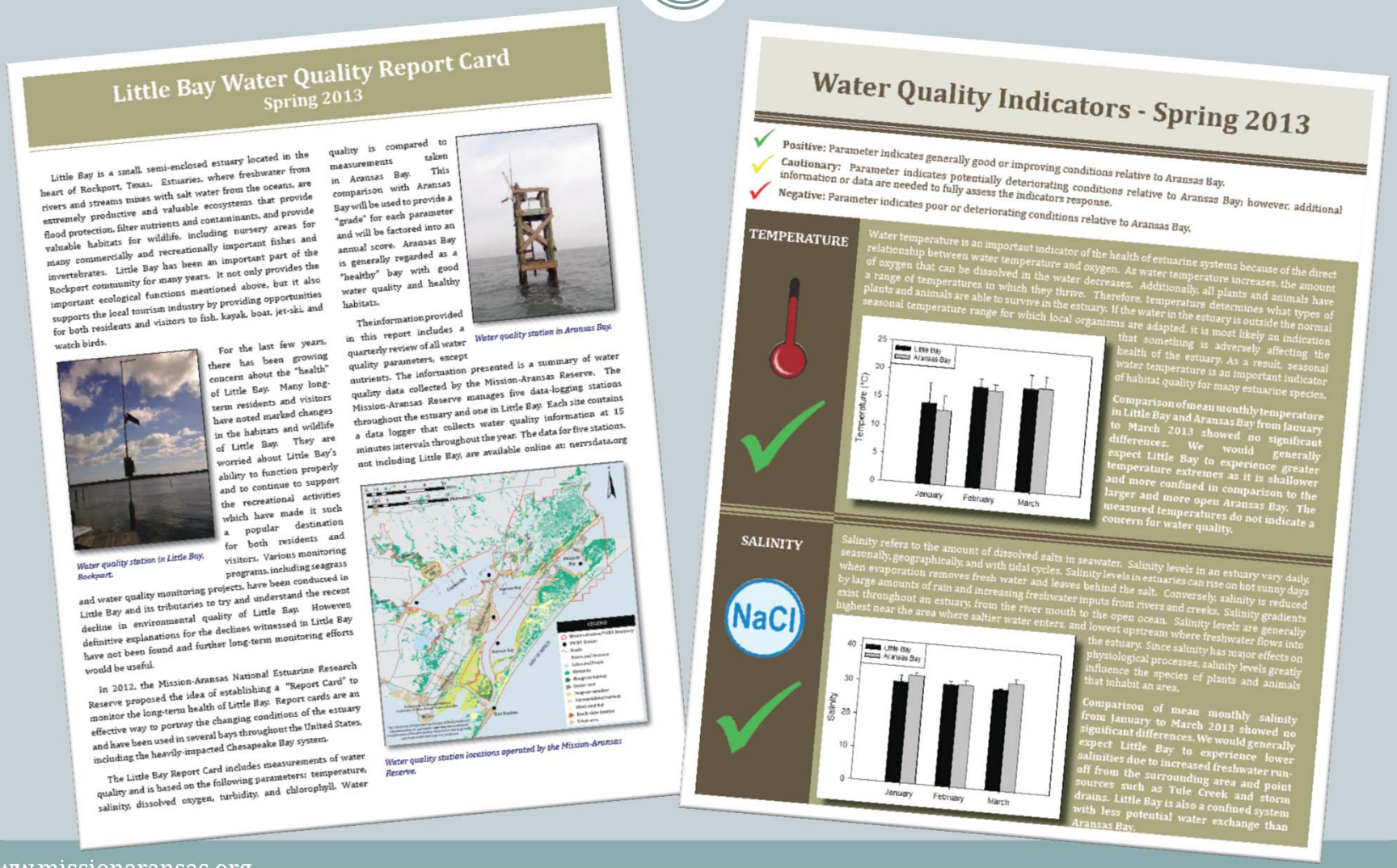
http://ian.umces.edu

3989 free high resolution images
2692 free vector symbols





Communication



Little Bay Water Quality Report Card
Spring 2013

Little Bay is a small, semi-enclosed estuary located in the heart of Rockport, Texas. Estuaries, where freshwater from rivers and streams mixes with salt water from the oceans, are extremely productive and valuable ecosystems that provide flood protection, filter nutrients and contaminants, and provide valuable habitats for wildlife, including nursery areas for many commercially and recreationally important fishes and invertebrates. Little Bay has been an important part of the Rockport community for many years. It not only provides the important ecological functions mentioned above, but it also supports the local tourism industry by providing opportunities for both residents and visitors to fish, kayak, boat, jet-ski, and watch birds.

Water quality station in Little Bay, Rockport.

For the last few years, there has been growing concern about the "health" of Little Bay. Many long-term residents and visitors have noted marked changes in the habitats and wildlife of Little Bay. They are worried about Little Bay's ability to function properly and to continue to support the recreational activities which have made it such a popular destination for both residents and visitors. Various monitoring programs, including seagrass and water quality monitoring projects, have been conducted in Little Bay and its tributaries to try and understand the recent decline in environmental quality of Little Bay. However, definitive explanations for the declines witnessed in Little Bay have not been found and further long-term monitoring efforts would be useful.

In 2012, the Mission-Aransas National Estuarine Research Reserve proposed the idea of establishing a "Report Card" to monitor the long-term health of Little Bay. Report cards are an effective way to portray the changing conditions of the estuary and have been used in several bays throughout the United States, including the heavily-impacted Chesapeake Bay system.

The Little Bay Report Card includes measurements of water quality and is based on the following parameters: temperature, salinity, dissolved oxygen, turbidity, and chlorophyll. Water quality is compared to measurements taken in Aransas Bay. This comparison with Aransas Bay will be used to provide a "grade" for each parameter and will be factored into an annual score. Aransas Bay is generally regarded as a "healthy" bay with good water quality and healthy habitats.

Water quality station in Aransas Bay.

The information provided in this report includes a quarterly review of all water quality parameters, except nutrients. The information presented is a summary of water quality data collected by the Mission-Aransas Reserve. The Mission-Aransas Reserve manages five data-logging stations throughout the estuary and one in Little Bay. Each site contains a data logger that collects water quality information at 15 minutes intervals throughout the year. The data for five stations, not including Little Bay, are available online at: nerrsdata.org

Water quality station locations operated by the Mission-Aransas Reserve.

Water Quality Indicators - Spring 2013

Positive: Parameter indicates generally good or improving conditions relative to Aransas Bay.

Cautionary: Parameter indicates potentially deteriorating conditions relative to Aransas Bay; however, additional information or data are needed to fully assess the indicators response.

Negative: Parameter indicates poor or deteriorating conditions relative to Aransas Bay.

TEMPERATURE

Water temperature is an important indicator of the health of estuarine systems because of the direct relationship between water temperature and oxygen. As water temperature increases, the amount of oxygen that can be dissolved in the water decreases. Additionally, all plants and animals have a range of temperatures in which they thrive. Therefore, temperature determines what types of plants and animals are able to survive in the estuary. If the water in the estuary is outside the normal seasonal temperature range for which local organisms are adapted, it is most likely an indication that something is adversely affecting the health of the estuary. As a result, seasonal water temperature is an important indicator of habitat quality for many estuarine species.

Comparison of mean monthly temperature in Little Bay and Aransas Bay from January to March 2013 showed no significant differences. We would generally expect Little Bay to experience greater temperature extremes as it is shallower and more confined in comparison to the larger and more open Aransas Bay. The measured temperatures do not indicate a concern for water quality.

SALINITY

NaCl

Salinity refers to the amount of dissolved salts in seawater. Salinity levels in an estuary vary daily, seasonally, geographically, and with tidal cycles. Salinity levels in estuaries can rise on hot sunny days when evaporation removes fresh water and leaves behind the salt. Conversely, salinity is reduced by large amounts of rain and increasing freshwater inputs from rivers and creeks. Salinity gradients exist throughout an estuary, from the river mouth to the open ocean. Salinity levels are generally highest near the area where saltier water enters, and lowest upstream where freshwater flows into the estuary. Since salinity has major effects on physiological processes, salinity levels greatly influence the species of plants and animals that inhabit an area.

Comparison of mean monthly salinity from January to March 2013 showed no significant differences. We would generally expect Little Bay to experience lower salinities due to increased freshwater run-off from the surrounding area and point sources such as Tule Creek and storm drains. Little Bay is also a confined system with less potential water exchange than Aransas Bay.

Communication - Improvement

- Looking for the silver bullet
- Guidance on biological criteria
  - They want thresholds

Outcomes

- Feasibility study to increase water circulation
- Construction of storm water retention ponds in watershed
- Upgrade of wastewater treatment plant
- Informed citizenry and elected officials
- Forming bonds and collaborations with communities
  - New visitor center

Questions?

SALLY PALMER

Sally.palmer@utexas.edu

361-749-3046