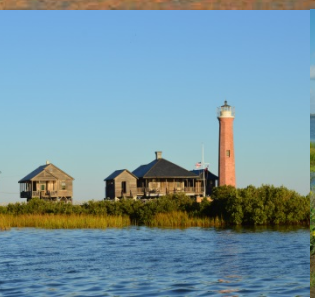
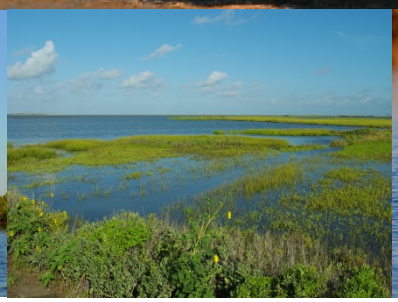
2014 Texas Bays and Estuaries Meeting

The University of Texas Marine Science Institute
Port Aransas, Texas
April 23-24, 2014

Texas Bays and Estuaries Meeting

TBEM

MISSION ★ ARANSAS
NATIONAL ESTUARINE RESEARCH RESERVE

THE UNIVERSITY OF TEXAS AT AUSTIN
Marine Science Institute
College of Natural Sciences

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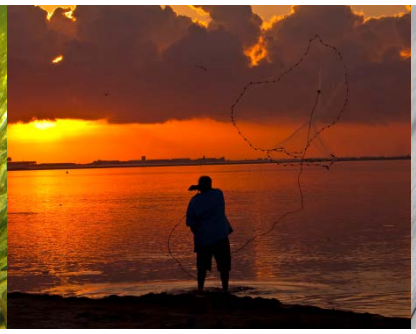


Welcome!

The University of Texas Marine Science Institute is proud to host the 10th annual Texas Bays and Estuaries Meeting. We have a great program of talks and posters this year from all around the state, and we are truly excited for the great turnout.

Please remember that all campus buildings are nonsmoking. Restrooms are located across from the auditorium in the Visitor's Center. VHP Catering will be providing lunch on both days and Wednesday night's dinner. Beer and wine will be available during the poster session, at dinner, and on the sunset cruise. Each registered participant has been provided three complimentary drink tickets with his/her name badge (1 ticket = 1 drink). You must use these tickets for drinks, as the bartender will not accept cash. You may wander freely with your drinks, but please do not leave the campus with them (unless on the boat). Authors will be at their posters from 5:00 to 6:30 during the poster session on Wednesday evening (April 23rd).

Once again, thank you all for participating and we hope you enjoy the meeting!

See you again next year!

Sally M. Palmer Kristin R. Ransom Katie Swanson

Texas Bays and Estuaries Meeting Committee

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Jo Leta Gavit, Marine Science Advisory Council Member,
University of Texas Marine Science Institute

COASTAL BEND BAYS & ESTUARIES PROGRAM

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Dedicated to protecting our bays and estuaries

THE UNIVERSITY OF TEXAS AT AUSTIN
Marine Science Institute
College of Natural Sciences

MISSION ★ ARANSAS
NATIONAL ESTUARINE RESEARCH RESERVE

Invited Speakers Biographies

Mr. Richard Day, USGS National Wetlands Research Center

Richard Day is a Geographer at the U.S. Geological Survey, National Wetlands Research Center in Lafayette, LA. He has been working in the field of Forested Wetland Ecology in freshwater and saltwater habitats, including baldcypress, bottomland hardwood, and mangrove forests. His research program involves field studies as well as greenhouse experiments: effects of hydrology, nutrient availability, and saltwater on baldcypress, effects of green-tree reservoir management on bottomland hardwoods, and effects of temperature on mangrove survival and growth. He is particularly interested in the biogeography of mangrove species and the effects of climate change (temperature and rainfall/freshwater availability) on the distribution of species of mangrove. Richard has more than 30 years experience studying mangrove ecology around the perimeter of the Gulf of Mexico, including research in Florida, Louisiana, Texas, and Mexico.

Dr. Paul Montagna, Endowed Chair for Ecosystem Studies and Modeling, Harte Research Institute, Texas A&M University – Corpus Christi

The major focus of Dr. Montagna's research is on the importance of environmental flows to maintain ecosystem health, and in particular the freshwater inflow requirements to maintain estuary water quality, productivity, and communities. Other research related to environmental flows includes nutrient loading, hypoxia causes and biological effects, and oyster dynamics and restoration. A second focus of his research is on deep-sea ecology, particularly as it relates to the long-term effects of the Deep-water Horizon event of 2010.

Dr. Jane Caffrey, University of West Florida

Dr. Jane M. Caffrey is an Associate Professor in the Center for Environmental Diagnostics and Bioremediation at the University of West Florida. Her research interests are estuarine nutrient biogeochemistry; water quality including the factors controlling dissolved oxygen dynamics; and analysis of time series data. She has examined how microbial transformations in subtidal habitats such as sediments, seagrass beds and oyster reefs result in the removal of fixed nitrogen from estuaries. Understanding the environmental conditions that favor the biogeochemical removal of fixed nitrogen from coastal ecosystems is critical to improving management strategies. She has worked on water quality issues in estuaries with local, state and federal agencies.

Dr. Curtis Suttle, Professor of Earth & Ocean Sciences, Microbiology & Immunology, and Botany; Associate Dean of Science, University of British Columbia

Dr. Suttle is one of the world's leading marine virologists, and is among a small group of researchers that is credited with launching the field of marine virology nearly twenty years ago. These studies demonstrated that viruses are not only the most abundant and genetically diverse biological entities in the World's oceans, but they are major agents of mortality. The results have had a significant impact on our understanding of nutrient and energy flow in the oceans, and have been a catalyst in the re-invigoration of phage biology and environmental virology. His contributions cross over many fields including biological oceanography, environmental microbiology, microbial ecology, virology and phycology. His active research program encompasses environmental microbiology and virology, but primarily focuses on viruses, their diversity and the roles that they play in the global system. He has active projects examining viruses in extreme environments including high-Arctic ecosystems and the deep sub-surface, as well as studies of natural reservoirs of viral pathogens, the use of viruses as environmental proxies, the isolation and characterization of unusual viruses, the evolution and diversity of viruses and viral communities, and viruses as proxies for life on other planets.

Schedule:

Wednesday, April 23, 2014

8:00 AM - Registration, Visitor's Center lobby, The University of Texas at Austin, Marine Science Institute, Port Aransas, Texas.

8:45 AM - Welcome and Opening Remarks- Dr. Robert Dickey, Director, The University of Texas at Austin, Marine Science Institute, Port Aransas, Texas.

-VEGETATION-

9:00 AM - **U.S. Geological Survey National Wetlands Research Center: Coastal research in Texas and the northern Gulf of Mexico.**
Richard H. Day; U.S. Geological Survey, National Wetlands Research Center, Lafayette, LA. (*Invited Speaker)*

9:30 AM - **Ecological Implications of Black Mangrove Expansion in the Gulf of Mexico.**
[1]Carolyn A. Weaver*, [2]Anna R. Armitage, [3]Sean P. Charles, [4]Sayatani Dastidar, [4]Hongyu Guo, [5]Zoe Hughes, [3]John S. Kominoski, [2]Ashley Whitt, [2]Steven C. Pennings; [1]Dept. of Ecosystem Science and Management, Texas A&M University; [2]Dept. of Marine Biology, Texas A&M University at Galveston; [3]Dept. of Biological Sciences, Florida International University; [4]Dept. of Biology and Biochemistry, University of Houston; [5]Dept. of Earth and Environment, Boston University. (*Student Presentation)*

9:45 AM - **Macroclimatic Controls on Tidal Wetland Ecosystems: Variation in Foundation Plant Community Zonation Across Abiotic Gradients in Three Northern Gulf of Mexico Estuaries.**
[1]Christopher A. Gabler*, [2]Michael J. Osland, [2]James B. Grace, [2]Camille L. Stagg, [2]Richard H. Day, [2]Stephen B. Hartley, [2]Nicholas Enwright, [3]Andrew S. From; [1]Gabler Groundwork, U.S. Geological Survey, National Wetlands Research Center; [2]U.S. Geological Survey, National Wetlands Research Center; [3]Five Rivers Services, LLC, U.S. Geological Survey, National Wetlands Research Center.

10:00 AM- **BREAK**

-VEGETATION (continued)-

10:15 AM - **Three years of seagrass monitoring in Texas: Using landscape-scale data to identify trends in seagrass coverage.**
Sara Wilson* and Kenneth H. Dunton; University of Texas Marine Science Institute. (*Student Presentation*)

Wednesday, April 23, 2014 (continued)

10:30 AM - **From water flow to nutrient loading: understanding factors that influence seagrass reproduction.**
Kelly M. Darnell* and Kenneth H. Dunton; University of Texas Marine Science Institute. (*Student Presentation*)

10:45 AM - **Genetic relationships among populations of the seagrass *Halodule wrightii* (shoalgrass).**
Patrick D. Larkin*, Tabitha Maloney, Sebastion Rubiano-Rincon, Michael Barrett; Texas A&M University-Corpus Christi.

11:00 AM - **Texas gulf region cooperative weed management area: A Brazilian pepper-tree pilot project.**
[1]Justin Bush*, [2]Michael Murphrey*; [1]Lady Bird Johnson Wildflower Center, University of Texas at Austin; [2]Texas A&M Forest Service, Lufkin, Texas.

-HABITAT RESTORATION-

11:15 AM - **Wetland Restoration at Little Chocolate Bayou Park.**
Rhonda Cummins; Texas Sea Grant Extension Program, Calhoun County.

11:30 AM - **Applying the Conservation Design Approach for Whooping Crane Conservation Planning in Texas, USA.**
[1]Elizabeth H. Smith*, [2]Felipe Chavez-Ramirez, [3]Luz Lumb; [1]International Crane Foundation; [2]Gulf Coast Bird Observatory; [3]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi.

11:45 AM - **Development of an Oyster Habitat Suitability Model in Galveston Bay, Texas for Prioritizing Oyster Reef Conservation and Restoration Efforts.**
Michael Thompson; The Nature Conservancy, Texas Chapter.

12:00 PM - **Meta-analysis of oyster reef restoration effort and success in Atlantic and Gulf of Mexico ecoregions of the United States.**
[1]Brittany N. Blomberg*, [2]Jennifer Beseres Pollack, and [1]Paul Montagna; [1]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University – Corpus Christi; [2]Department of Life Sciences, Texas A&M University – Corpus Christi. (*Student Presentation*)

12:15 PM - **LUNCH** (Catered by VHP Catering) in Visitor's Center lobby.

Wednesday, April 23, 2014 (continued)

-POLICY AND MANAGEMENT-

1:15 PM - **Freshwater inflow to estuaries: water run to waste?**
Paul Montagna; Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi. (*Invited Speaker*)

1:45 PM - **Influence of changes in developed land and precipitation on hydrology of a coastal Texas watershed.**
Cesar R Castillo; Dept. of Geography, Texas A&M University. (*Student Presentation*)

2:00 PM - **Evaluating Vulnerability of Coastal Ecosystems & Communities Using Long-term Data Sets in the Mission-Aransas Reserve.**
[1] Kiersten M. Stanzel[*], [1]Buskey, E.J., [1]Palmer, S., [1]Xue, J., and [2]H. Wade; [1]Mission-Aransas National Estuarine Research Reserve, University of Texas Marine Science Institute; [2]Texas Sea Grant.

2:15 PM - **Texas Tidal Inlet Protection Strategies.**
Graham Ellison, R. B. Jensen, & Tony Wood*; Texas A&M Corpus Christi.

2:30 PM - ***GoMexSI*: A resource for Texas scientists, fishermen, and educators.**
[1]James Simons*, [2]May Yuan, [3]Cristina Carollo, [4]Marie Eugenia Vega Cendejas, [5]Jorrit Poelen, [6]Cristina Schoonard, [6]Dave Reed, [7]Leslie Peart, [8]Marybeth Green; [1]Center for Coastal Studies, Texas A&M University-Corpus Christi; [2]Geoinformatics and Center for Spatial Analysis, University of Oklahoma; [3]Harte Research Institute, Texas A&M University-Corpus Christi; [4]Centro de Investigacion de Estudios Avanzados del Instituto Politecnico Nacional, Unidad Mérida; [5]Data Analysis and Visualization Consultant; [6]Florida Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission; [7]Texas State Aquarium; [8]Texas A&M University-Kingsville.

2:45 PM - **BREAK**

-INVERTEBRATE ECOLOGY-

3:00 PM - **The Effect of Reducing Commercial Shrimping Effort on Landings, Catch Efficiency, and Bycatch.**
Mark R. Fisher; Texas Parks and Wildlife.

3:15 PM - **Toxicity effects of mysidophycin, a novel toxin produced by *Nueces mysidocida gen. nov.* & *sp. nov.***
I-Shuo Huang; Biology Department, Texas A&M University, Corpus Christi. (*Student Presentation*)

Wednesday, April 23, 2014 (continued)

3:30 PM - **A comparative Life-Cycle Assessment of substrate material used in oyster reef restoration.**
Mariana A. Devlin; Harte Research Institute, Texas A&M University Corpus Christi. (*Student Presentation*)

3:45 PM - **The role of predation cue sources in inducible defenses in the Eastern oyster (*Crassostrea virginica*).**
Avery Scherer*, Lunt, J., Draper, A., Smee, L.; Texas A&M University-Corpus Christi. (*Student Presentation*)

4:00 PM - **Molluscan diversity in texas bays and nearshore.**
Fabio Moretzsohn*, Noe Barrera, and Wes Tunnell**;** Harte Research Institute, Texas A&M University-Corpus Christi.

4:15 PM - **Temperature-dependent growth and size-at-maturity in the blue crab *Callinectes sapidus.***
M. Zachary Darnell; Nicholls State University.

4:30 PM - **BREAK**

4:45 PM - **Poster Session/ Hors d'oeuvre Hour** (Catered by VHP Catering) located in the Marine Science Institute's breezeway, between the Main Lab building and Administrative Building.

6:15PM - **Poster Session Complete**
Please find your way to the UTMSI boat marina to start loading onto the *Mustang*.

6:30 PM - **Sunset Cruise** aboard the *Mustang.*

8:00 PM - **Return to UTMSI Marina**

Thursday, April 24, 2014

8:00 AM - Registration, Visitor's Center lobby, The University of Texas at Austin, Marine Science Institute, Port Aransas, Texas.

-POLLUTION AND NUTRIENTS-

8:45 AM - **The Value of Long Term Monitoring to Research and Management: Using High Frequency Water Quality Data to Understand Ecological Processes.**
Jane Caffrey; Center of Environmental Diagnostics and Bioremedation, University of West Florida. (*Invited Speaker*)

9:15 AM - **Long-term Water Quality and Environmental Changes in Baffin Bay as Inferred from Sediment Cores—Preliminary Results.**
[1]Mark Besonen*, [2]Paul Zimba, [2]Erin Hill, [3]Philippe Tissot, [1]Mark McKay, [2]Brien Nicolau, [1]Xinping Hu, [1]Jim Silliman; [1]Department of Physical and Environmental Sciences, TAMUCC; [2]Center for Coastal Studies, TAMUCC; [3]Conrad Blucher Institute for Surveying and Science, TAMUCC.

9:30 AM - **Ammonium dynamics along the river-estuary transition zone in the Mission-Aransas estuary.**
[1,3]D.A. Bruesewitz, [1]W.S. Gardner, [1,2]Rae Mooney*, and [1,2]E.J. Buskey; [1]University of Texas Marine Science Institute; [2]Mission-Aransas National Estuarine Research Reserve; [3]Colby College, Environmental Studies Program.

9:45 AM - **Measuring Effects of Non-Point Source Nitrogen Loading and Production Response in a Shallow Well Mixed Coastal Lagoon.**
Evan Turner; Harte Research Institute, Texas A&M University-Corpus Christi. (*Student Presentation*)

10:00 AM - **Modeling Inorganic Nutrient Distributions Among Hydrologic Gradients Using Multivariate Approaches.**
Bhanu Paudel* and Paul Montagna; Texas A&M Corpus Christi. (*Student Presentation*)

10:15 AM - **BREAK**

-POLLUTION AND NUTRIENTS (continued)-

10:30 AM - **Turbidity as a Refuge.**
Jessica Lunt*, Delbert L. Smee; Texas A&M University- Corpus Christi. (*Student Presentation*)

Thursday, April 24, 2014 (continued)

10:45 AM - **The role of temperature, sunlight and nutrient in affecting degradation of crude oil in Gulf of Mexico waters.**
Zhanfei Liu*, Jiqing Liu, Hernando Bacosa, Deana Erdner; University of Texas Marine Science Institute.

11:00 AM - **The Gang of Five: A 25-year record of five common marine debris items on Texas Gulf Beaches.**
Anthony F. Amos; The University of Texas Marine Science Institute.

-LARVAL FISH-

11:15 AM - **How sensory systems influence settlement patterns in larval red drum (*Sciaenops ocellatus*).**
Lisa Havel*, & L.A. Fuiman; University of Texas Marine Science Institute. (*Student Presentation*)

11:30 AM - **Importance of larval diet for growth, survival, and behavioral performance of southern flounder larvae.**
Erik W. Oberg* and Lee A. Fuiman; Marine Science Institute, The University of Texas at Austin. (*Student Presentation*)

11:45 AM - **Recruitment of juvenile fish at an artificial reef in the Gulf of Mexico.**
Rachel Arney* and Dr. Richard Kline; Biological Sciences Department, The University of Texas Brownsville. (*Student Presentation*)

12:00 PM - **LUNCH** (Catered by VHP Catering) in the Visitor's Center lobby.

-HABITAT AND ECOSYSTEMS-

1:00 PM - **Viruses are major players in marine systems**
Curtis Suttle; Departments of Earth, Ocean & Atmospheric Sciences, Microbiology & Immunology and Botany, University of British Columbia, Vancouver BC, Canada. (*Invited Speaker*)

1:30 PM - **Phytoplankton community responses to tropical storms in the Mission-Aransas Estuary**
[1,2]Sílvia Anglès*, [2]Antoni Jordi and [1]Lisa Campbell; [1]Department of Oceanography, Texas A&M University; [2]IMEDEA, Institute for Mediterranean Advanced Studies (UIB-CSIC).

Thursday, April 24, 2014 (continued)

1:45 PM - **Monitoring current patterns within the Mission-Aransas and Guadalupe estuaries, Texas, with tilt current meters.**
[1]Lindsay Scheef[*], [1]Edward Buskey, and [2]George Ward; [1]Mission-Aransas National Estuarine Research Reserve, University of Texas Marine Science Institute; [2]Center for Research in Water Resources, University of Texas at Austin.

2:00 PM - **Informing Conservation and Resiliency Planning in Corpus Christi Bay utilizing Sea-level Rise and Storm Surge Impact Scenarios.**
Jorge Brenner; The Nature Conservancy, Texas Chapter.

2:15 PM - **Salt Marsh Pond Classification and Fish Assemblage Structure at the Aransas National Wildlife Refuge.**
Niki Ragan* & Jeffrey R. Wozniak; Department of Biological Sciences, Sam Houston State University. (*Student Presentation*)

2:30 PM - **Short term temporal trends in activity and habitat selection of the Texas diamondback terrapin.**
[1]Emma Clarkson*, [2]Dr. George Guillen; [1]Texas Parks and Wildlife; [2]The University of Houston Clear Lake/Environmental Institute of Houston.

2:45 PM - **Deep-water coral assemblages of relict reefs off the south Texas Coast.**
[1]Rebekah Rodriguez*, [1]David Hicks, [2]John W. Tunnell, Jr., [2]Thomas C. Shirley, [3]Peter J. Etnoyer, [4]Emma Hickerson; [1]University of Texas at Brownsville; [2]Texas A&M University-Corpus Christi; [3]NOAA-CCEHBR; [4]NOAA-FGBNMS. (*Student Presentation*)

3:00 PM - BREAK

-FISH AND FISHERIES-

3:15 PM - **Current composition of sportfish populations at an artificial reef off the coast of Texas.**
Catheline Froehlich*, Richard Kline; University of Texas Brownsville. (*Student Presentation*)

3:30 PM - **Genetic composition of invasive lionfish at the Flower Garden Banks National Marine Sanctuary.**
[1]John E. Johnson*, [2]Michelle Johnston, [1]J. Derek Hogan; [1]Texas A&M University-Corpus Christi; [2]Flower Garden Banks National Marine Sanctuary. (*Student Presentation*)

3:45 PM - **Historical and current trends in Texas' nearshore shark assemblage.**
Jose, Philip*, Stunz, Gregory W., Ajemian, Matt; Harte Research Institute for Gulf of Mexico Studies, Texas A&M University – Corpus Christi. (*Student Presentation*)

Thursday, April 24, 2014 (continued)

4:00 PM - **Impacts of Reopening a Natural Tidal Inlet on Fisheries in Mesquite Bay, Texas.**
Quentin Hall*, Greg Stunz, Jason Williams, and Megan Robillard; The Harte Research Institute for Gulf of Mexico Studies. (*Student Presentation*)

4:15 PM - **Evaluation of *Prymnesium parvum* fatty acid amide accumulation and their contribution to fish mortality events.**
[1]Sean P. O'Mara*, [2]Greg Southard, [1]Danielle Guttierrez, and [1]Paul V. Zimba; [1]Texas A & M University – Corpus Christi; [2]Texas Parks and Wildlife Department, Inland Fisheries-Analytical Services. (*Student Presentation*)

4:30 PM - **Updating and Enhancing the Texas Coast Public Access Inventory.**
Heather Wade; Texas Sea Grant, Texas A&M University.

4:45 PM - **2014 TBEM Closed**

Student Awards

Student presentations and posters are an important aspect of this meeting. The best student awards for presentations and posters are one of the ways we have to acknowledge excellence in research.

The best student presentation awards are generously sponsored by the Coastal Bend Bays and Estuaries Program to acknowledge excellence in research in this format ($200 for 1st Place, $150 for 2nd Place and $100 for 3rd Place).

Previous Presentation Winners:

2005: **Jason James**, Texas A&M Corpus Christi, 1st Place
Tatum Neeley, Texas A&M University, College Station, 2nd Place

2006: **Harris Mulhstein**, The University of Texas at Austin 1st Place
Lucia B. Carreon Martinez, The University of Texas at Austin, 2nd Place

2007: **Matt Hubner**, Texas A&M Corpus Christi, 1st Place
Megan Fencil, The University of Texas at Austin, 2nd Place

2008: **John Froeschke**, Texas A&M Corpus Christi, 1st Place
Laura Ryckman, The University of Texas at Austin, tie for 2nd Place
Katie Swanson, The University of Texas at Austin, tie for 2nd Place

2009: **Christopher Wilson**, The University of Texas at Austin, 1st Place
Danielle Crossen, University of Houston, Clear Lake, 2nd Place

2011: **Rachel Mills**, The University of Texas at Austin, 1st Place
Kelly Darnell, The University of Texas at Austin, 2nd Place

2012: **Lisa Havel**, The University of Texas at Austin, 1st Place
Huy Vu, University of Houston, 2nd Place
Jena Campbell, The University of Texas at Austin, 3rd Place

2013: **Jud Curtis**, Texas A&M Corpus Christi, 1st Place
Kimberly Bittler, The University of Texas at Austin, 2nd Place
Brittany Bloomberg, Texas A&M Corpus Christi, 3rd Place

The best student poster awards are generously sponsored by the Coastal Bend Bays Foundation to acknowledge excellence in research in this format ($150 for 1st Place, $100 for 2nd Place and $50 for 3rd Place).

Previous Poster Winners:

2013: **Xinxin Li**, Texas A&M University, 1st Place
Allan Jones, The University of Texas at Austin, 2nd Place
Aubrey Lashaway, The University of Texas at Austin, 3rd Place

COASTAL BEND BAYS & ESTUARIES PROGRAM

COASTAL BEND BAYS FOUNDATION
Dedicated to protecting our bays and estuaries

Abstracts for Oral Presentations

U.S. Geological Survey National Wetlands Research Center: Coastal research in Texas and the northern Gulf of Mexico.

Richard H. Day; U.S. Geological Survey, National Wetlands Research Center, Lafayette, LA. (*Invited Speaker)*

The USGS National Wetlands Research Center (NWRC) has always maintained a strong presence in coastal Texas. Early reports include population studies of redhead ducks and community profiles such as "The ecology of open-bay bottoms of Texas". Current studies focus primarily on coastal vegetation research, modeling, and classification. Mapping projects have produced a classification of coastal emergent marsh vegetation types (fresh, intermediate, brackish, and saline) from Corpus Christi to the Sabine River, updated National Wetlands Inventory status and trends, and will analyze land loss/gain and wetland classification in the Texas Chenier Plain. Gulf-wide models have identified winter climate-based thresholds that separate mangroves from salt marshes and precipitation-based thresholds that separate vegetated from non-vegetated wetlands. Field research with study sites in Texas include investigations of: (1) the influence of macroclimatic factors on the distribution and abundance of foundation plant species in Gulf Coast tidal wetlands; (2) wetland responses to sea-level rise in coastal National Wildlife Refuges using rod surface elevation tables (rSETs); and (3) the effects of black mangrove structural development on soil properties and processes within mangrove-marsh ecotones. Mangrove research in Louisiana applicable to Texas includes the development of allometric models for freeze-affected black mangroves, greenhouse and field studies of freeze tolerance, and evaluations of methods for restoring mangrove and saltmarsh wetlands. Future land use and climate change in Texas will have a large impact on coastal wetland ecosystems. NWRC welcomes collaboration with government, nongovernment, and academic scientists and environmental managers to improve our understanding and management of these valuable ecosystems.

Ecological Implications of Black Mangrove Expansion in the Gulf of Mexico.

[1]Carolyn A. Weaver*, [2]Anna R. Armitage, [3]Sean P. Charles, [4]Sayatani Dastidar, [4]Hongyu Guo, [5]Zoe Hughes, [3]John S. Kominoski, [2]Ashley Whitt, [2]Steven C. Pennings; [1]Dept. of Ecosystem Science and Management, Texas A&M University; [2]Dept. of Marine Biology, Texas A&M University at Galveston; [3]Dept. of Biological Sciences, Florida International University; [4]Dept. of Biology and Biochemistry, University of Houston; [5]Dept. of Earth and Environment, Boston University. (*Student Presentation)*

Black mangroves (*Avicennia germinans*) are expanding into areas historically occupied by salt marsh plants on the Texas coast. Over the coming decades, mangrove distributions are expected to continue expanding due to rising global temperatures and milder winters. To examine the ecological consequences of these vegetation changes, we paired a large manipulative experiment with field surveys in and around the Mission-Aransas National Estuarine Research Reserve, TX. In the summer of 2012, we manipulated mangrove density within ten large experimental plots on Harbor Island, Port Aransas. Removal of mangroves strongly affected microclimate (wind speed was higher and air temperature lower); mangrove removal also led to

increased marsh plant cover (primarily *Batis maritima* and *Sarcocornia* sp). We hypothesize that within 2 years, mangrove removal will also increase soil porewater salinity, affect marine macroinvertebrate and terrestrial arthropod densities, and marine nekton and bird habitat utilization. Adjacent field survey data revealed vegetation species richness and marine nekton community composition differences between marsh and mangrove dominated sites. Few edaphic characteristic differences were identified between sites, and were not definitely linked to the dominant vegetation type. We hypothesize continued monitoring will identify differences in processes such as accretion and nutrient storage dynamics. We also expect to find trophic relationships to vary between marsh and mangrove dominated sites. These data provide information on which coastal wetland ecosystem services are most likely to be affected by the salt marsh to mangrove transition. Further, these data will allow coastal industries to adaptively manage for future environmental changes.

Macroclimatic Controls on Tidal Wetland Ecosystems: Variation in Foundation Plant Community Zonation Across Abiotic Gradients in Three Northern Gulf of Mexico Estuaries.

[1]Christopher A. Gabler*, [2]Michael J. Osland, [2]James B. Grace, [2]Camille L. Stagg, [2]Richard H. Day, [2]Stephen B. Hartley, [2]Nicholas Enwright, [3]Andrew S. From; [1]Gabler Groundwork, U.S. Geological Survey, National Wetlands Research Center; [2]U.S. Geological Survey, National Wetlands Research Center; [3]Five Rivers Services, LLC, U.S. Geological Survey, National Wetlands Research Center.

The northern Gulf of Mexico coast spans broad macroclimate gradients, including both temperature and precipitation. However, the effects of macroclimate on coastal wetland ecosystems are poorly understood and much more investigation is needed at the regional scale. This study investigates the following questions: (1) How do macroclimatic factors influence the distribution and abundance of foundation plant species in Gulf Coast tidal wetlands?; and (2) What conditions characterize ecological transition points where major shifts occur in tidal wetland community structure or species dominance? We quantified plant community structure and composition across elevation and salinity gradients in three Gulf Coast estuaries that represent broad temperature and rainfall gradients: Grand Bay, Mississippi; Mission-Aransas Estuary, Texas; and Lower Laguna Madre, Texas. Sampling was designed to identify transitions between vegetation zones and utilized real-time kinematic GPS elevation data. We fit nonlinear distribution models using geomorphic and coverage data for common species and calculated transitional elevations using model derivatives. We quantified major differences among the estuaries in plant community structure, composition, abundance and zonation that are attributable to macroclimatic drivers. The hottest, driest estuary (Laguna Madre) had the most unvegetated land (e.g., algal flats) and the lowest total vegetation cover, light interception and canopy heights. At the local scale (i.e., intra-estuary), we quantified ecological transition points associated with changes in elevation, salinity and/or soil texture/chemistry. These transitions reflect conditions that are greatly influenced by macroclimatic drivers, especially rainfall. Our results highlight the importance of accounting for macroclimatic change within future-focused climate-based management decisions for coastal wetlands.

Three years of seagrass monitoring in Texas: Using landscape-scale data to identify trends in seagrass coverage.

Sara Wilson* and Kenneth H. Dunton; University of Texas Marine Science Institute. (*Student Presentation*)

From 2011-2013, a statewide seagrass monitoring program was conducted at 567 permanent sampling stations across three regions of the Texas coast: the Mission-Aransas National Estuarine Research Reserve/Corpus Christi Bay (MANERR/CCB), Upper Laguna Madre (ULM), and Lower Laguna Madre (LLM). In MANERR/CCB, total seagrass percent cover varied across all three years, first increasing then decreasing. This region was also uniquely characterized by having records of all five species of seagrasses common to Texas across all years. In ULM, total seagrass percent cover followed the same pattern, increasing from 2011-2012, then decreasing from 2012-2013. In 2011, all five seagrass species were present in the ULM region, but *Thalassia testudinum* was absent from 2012-2013, and *Halophila engelmannii* was absent in 2013. In LLM, total seagrass cover continually increased from 2011-2013. All five seagrass species were present in LLM throughout this period, except in 2011-2012 when *H. engelmannii* was absent. Data from this landscape-scale, rapid assessment monitoring effort is invaluable in assessing long-term spatial and temporal trends in seagrass abundance and condition across the Texas coast. Our monitoring efforts are expected to continue through at least 2015.

From water flow to nutrient loading: understanding factors that influence seagrass reproduction.

Kelly M. Darnell* and Kenneth H. Dunton; University of Texas Marine Science Institute. (*Student Presentation*)

Seagrasses are submerged marine angiosperms capable of sexual reproduction and asexual clonal growth. Clonal growth was traditionally considered the dominant mode of seagrass expansion, so few studies have investigated sexual reproduction. Recent advances, however, indicate that seagrass genotypic diversity is higher than expected given primarily clonal expansion, and as a result, sexual reproduction is now considered important for seagrass bed establishment and maintenance, but can be highly variable spatially and temporally. We have investigated separately the influence of nutrients, consumption and water flow on flowering, seed survival, and seed dispersal for two common seagrass species in the Gulf of Mexico: turtle grass (*Thalassia testudinum*) and shoal grass (*Halodule wrightii*). All three factors can substantially impact seagrass reproductive success. Turtle grass produces fewer flowers (but more somatic tissue) when exposed to high pore-water ammonium than when exposed to low pore-water ammonium, suggesting that nutrient loading can dramatically influence seagrass reproductive output. Seed consumption may also limit reproduction and recruitment in some areas, as several local crustaceans consume large quantities of turtle grass and shoal grass seeds, which do not survive consumption. Finally, local currents likely impact recruitment by driving dispersal patterns, which are species-specific and tightly coupled with seed morphology. A thorough understanding of seagrass reproductive ecology is necessary for appropriate and effective conservation and should be incorporated into future restoration efforts.

Genetic relationships among populations of the seagrass *Halodule wrightii* (shoalgrass).
Patrick D. Larkin*, Tabitha Maloney, Sebastion Rubiano-Rincon, Michael Barrett; Texas A&M University-Corpus Christi.

Halodule wrightii (shoalgrass) is a critical ecosystem forming species throughout the Gulf of Mexico, and the most abundant seagrass on the Texas coast. Molecular genetic work has shown that while Texas *H. wrightii* populations frequently exhibit similar genetic diversity values (H_e, A_R, F_{IS}) they differ substantially in terms of clonal diversity (R). Without substantial gene flow populations with low clonal diversity have a higher potential for inbreeding, and a reduced capacity to adapt to environmental change. We undertook this study to examine the genetic relationship (differentiation), a proxy estimate for gene flow, among populations of *H. wrightii* from the Texas Coast. A number of estimates of genetic differentiation (F_{ST}, G''_{ST}, D_{est}, AMOVA) indicate high, historical gene flow among the populations, with little evidence for isolation-by-distance for even the most distantly separated populations. Indeed, population assignment tests indicate a significant degree of similarity among populations from the Lower Laguna Madre and the Coastal Bend.

Texas gulf region cooperative weed management area: A Brazilian pepper-tree pilot project.
[1]Justin Bush*, [2]Michael Murphrey*; [1]Lady Bird Johnson Wildflower Center, University of Texas at Austin; [2]Texas A&M Forest Service, Lufkin, Texas.

The City of Port Aransas, in partnership with the Texas A&M Forest Service and the Lady Bird Johnson Wildflower Center, were awarded a National Fish and Wildlife Foundation, pulling Together Initiative grant to fund a pilot project establishing one of the first State of Texas' Cooperative Weed Management Area (CWMA). The initial target species of this CWMA will be the invasive Brazilian peppertree. The CWMA will allow project partners to leverage localized treatments to the regional level through coordination with key stakeholders and community members.

Wetland Restoration at Little Chocolate Bayou Park.
Rhonda Cummins; Texas Sea Grant Extension Program, Calhoun County.

From the beginning when the permits and grant were secured in the early 1990's, Little Chocolate Bayou Park was unique because it became what was the first, and perhaps the only, county park located inside a Texas city. The 43-acre project includes a wetland area designated to remain undeveloped for critical habitat which was degraded over the years by local residents due to ignorance of the area's value. Texas Sea Grant is leading restoration efforts of the area and adding an interpretative trail to educate park visitors. The trail is a component of the outdoor classroom that is being built to enrich curriculum of local schools by providing opportunities to learn environmental science in their own backyard. Several adult volunteers from the community are involved with the effort including some Texas Master Naturalists and Alcoa employees. The efforts are being funded in part by a grant from the Aloca Foundation and donations from Rexco, Inc. More importantly, this is an ongoing service-learning project

for students at Our Lady of the Gulf Catholic School. Service-learning has been defined as "a form of instruction in which students design projects to address community needs as part of their academic studies." Thus far, the students have transplanted *Spartina alterniflora* and installed outdoor benches. They are propagating *Avicennia germinans* to transplant for increased habitat for the Eastern Willet which has returned to the area for nesting. Students are also helping with the design and installation of the trail signs this spring.

Applying the Conservation Design Approach for Whooping Crane Conservation Planning in Texas, USA.

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The last wild flock of whooping cranes winters in a limited area along northwestern Gulf coast in and around Aransas National Wildlife Refuge, Texas. Conservation goals include conserving 125,000 acres of suitable habitat for 1000 individuals and 250 nesting pair. To adequately quantify potential habitat coverage and evaluate landscape patterns for conservation planning we combined three land-cover databases into a comprehensive habitat type dataset (CHTD) to develop a preliminary habitat type dataset for whooping cranes. Using historical crane survey points from 2004-2010, we identified the habitat-type with each location, ranked the use, then created potential habitat type maps using the CHTD and calculated extent by rank. Use of habitat types at the micro level were not possible, given the error within each of the databases use; however, the meso level provided valuable spatial coverage and amount of habitat available under current conditions. We identified 104,000 acres within the pilot project area for potential conservation. The mesohabitat type matrix was then crosswalked to land cover classes in the Sea Level Affecting Marsh Model, and potential changes predicted for various sea-level rise scenarios. Overall, habitat types currently used by whooping cranes will decrease over in the current wintering area by 23-54% depending on sea-level rise scenario (0.37-2.0 m). We identified the data gaps and information necessary to evaluate habitat quality at various spatial and temporal scales. Recommendations for improving the datasets as well as directions conservation strategies should take are also considered.

Development of an Oyster Habitat Suitability Model in Galveston Bay, Texas for Prioritizing Oyster Reef Conservation and Restoration Efforts.

Michael Thompson; The Nature Conservancy, Texas Chapter.

Oyster reefs are important habitats in Texas estuaries that provide a diversity of ecosystem services to coastal communities, including fisheries habitat and coastal protection. Unfortunately, due to development, destructive harvesting practices, storm impacts and degradation of water quality oyster reefs have become one of the most threatened habitats in our marine ecosystems. Oyster reef restoration can help mitigate future impacts from these threats; however, in order to provide the greatest chance of successful restoration projects it's necessary to site them within areas of the estuarine system that have the best chance of supporting long-term growth and reproductive success. Spatial modeling using GIS applications can provide an

improved scientific approach and methodology when identifying and ranking suitable habitat for oyster reef restoration activities which can reduce some of the uncertainty during the site selection process, while increasing the chances of successful reef colonization and growth. The purpose of this research was to design and develop a comprehensive GIS habitat suitability model for Galveston Bay, Texas which will provide a series of spatial indices for oyster reef restoration determined by the purpose of the restoration effort. The indices created through this modeling effort include a 1) Habitat Suitability Index, 2) Restoration Suitability Index and 3) Economic/Social Suitability Index. The framework and models developed during this project are flexible and have been designed to be used in other geographies in order to provide a series of effective science-based decision-support tools for spatial planning, resource management and oyster reef restoration efforts around the globe.

Meta-analysis of oyster reef restoration effort and success in Atlantic and Gulf of Mexico ecoregions of the United States.

[1]Brittany N. Blomberg[*], [2]Jennifer Beseres Pollack, and [1]Paul Montagna; [1]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University – Corpus Christi; [2]Department of Life Sciences, Texas A&M University – Corpus Christi. (*Student Presentation*)

Efforts to restore oyster reefs have increased dramatically in recent decades. Although restoration projects have ignited public interest in restoring oyster populations, many projects have been unable to demonstrate significant or quantifiable success, particularly in terms of ecological function or provision of ecosystem services. Failure to demonstrate success is in part due to a lack of comprehensive monitoring and poorly defined success metrics. However, in some regions, successful restoration may simply be impossible under current conditions. We conduct a comparative analysis of oyster (*Crassostrea virginica*) populations and restoration efforts by ecoregion along the US Atlantic and Gulf coasts. The history of oyster exploitation, magnitude of loss, and current status of oysters and environmental conditions are reviewed to highlight differences between regions and implications for restoration. A meta-analysis of restoration projects is conducted to compare trends in restoration effort, goals, and reported success metrics. We seek to broadly identify why restoration efforts have or have not been successful and how regional factors influence the magnitude of success. Continued support from funding entities and public stakeholders depends on our ability to demonstrate restoration success. We emphasize that selection of proposed restoration projects and allocation of funding should prioritize regions with the highest probability of success, rather than regions exhibiting the greatest losses. This analysis indicates that the Gulf of Mexico shows the most promise for large-scale restoration success.

Freshwater inflow to estuaries: water run to waste?

Paul Montagna; Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi. (*Invited Speaker*)

An estuary is a transition zone where salt water from the sea mixes with fresh water from the land. Estuarine scientists have long argued that freshwater inflow to estuaries regulates salinity, nutrients, and sediments, and is fundamental to the functioning of an estuary. However, water availability is a limiting factor for human population growth and prosperity, and human systems

have altered landscapes and the water cycle. People argue that water running over a dam to an estuary is water run to waste, and laws regulating water quantity are rare. Consequently, since 1960 the volume of water in reservoirs has quadrupled, the volume of water withdrawn from rivers and lakes has doubled, and 60% of the Earth's runoff is captured; all of which has led to a global dewatering of estuaries that has setup a conflict between water suppliers and those seeking protection of river and estuary health. The science supporting environmental flow management is sometimes attacked by the media and those seeking to promote water development, but the State of Texas has led the way in developing a set of strong management tools providing a strong scientific basis for an ecosystem approach to the stewardship of environmental flows. Demonstrating that we can have water for people and the environment.

Influence of changes in developed land and precipitation on hydrology of a coastal Texas watershed.

Cesar R Castillo; Dept. of Geography, Texas A&M University. (*Student Presentation*)

Freshwater inflows, one of the most important factors in the overall health of estuarine environments, can be altered both by regional climatic influences as well as changes in land use and land cover. A scenario analysis is conducted to study the individual and combined impacts of changes in developed land and precipitation patterns in a coastal Texas watershed. The watershed is one of the major sources of freshwater and sediment for the estuarine environment within the Mission-Aransas National Estuarine Research Reserve (NERR). Our scenario analysis suggests that climatic changes seem more influential than land changes at the watershed level. However, localized impacts of land change may still be significant on habitats in and around the NERR site. Results from the watershed-level analysis poorly agree with the recommended freshwater inflows established for the region, which deserve further scrutiny. Our findings suggest that geomorphic characteristics of the streams in the watershed need to be taken into consideration in hydrological modeling. Further research on the interactions between land change and hydrological dynamics should also aim for tighter temporal integration of the two sets of processes.

Evaluating Vulnerability of Coastal Ecosystems & Communities Using Long-term Data Sets in the Mission-Aransas Reserve.

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Climate change will impact the natural and human communities of the Mission-Aransas National Estuarine Research Reserve, resulting in the potential loss of estuarine habitats and associated species, as well as adverse impacts to local economies and infrastructure. In order to improve the resiliency of the Reserve habitats/species and communities, we must strengthen our understanding of climate change and develop adaptation strategies that address the major climate change threats. Vulnerability assessments are a key tool for developing this understanding, and they provide information for the creation of adaptation plans. The Mission-Aransas Reserve is collaborating with Texas Sea Grant to conduct a vulnerability assessment of

the Reserve and its surrounding communities. Specific goals of the project include: (1) synthesize and analyze long-term datasets from the Reserve and partner organizations to understand the sensitivity of species to climate variables, (2) assess the vulnerability of Reserve species to future climate change using relevant data, tools, and expert elicitation, and (3) assess social vulnerability of local communities to potential climate change hazards. To date, efforts have focused on analyzing Reserve-relevant data from Texas Parks and Wildlife Department's Fisheries Independent data and National Audubon's Christmas Bird Count data. Both datasets were examined for relationships between species abundance and temperature, "winter freeze," and "summer drought." Next steps are to conduct the vulnerability assessment and assess social sensitivity. The results of this project will provide resource managers and local officials with the information they need to protect habitats and species, as well as human communities.

Texas Tidal Inlet Protection Strategies.
Graham Ellison, R. B. Jensen, & Tony Wood*; Texas A&M Corpus Christi.

The threat of oil pollution to Texas bays and estuaries is significant. Prevailing and seasonal currents can drive offshore oil spills toward the Texas coast, as evidenced by the recent Texas City Y Kirby barge spill. Part of this small inshore spill (180,000 gallons) was carried offshore by tidal currents, and then moved south and spread out by the influence of weather systems and seasonal longshore currents. It reached beaches, inlets, and inland bays from Galveston to south of Corpus Christi. The next spill could be much larger or could be compounded by hurricane weather conditions. The Texas General Land office has funded a two-year study of the inlets along the Texas coast. This study seeks to identify the most sensitive habitats and to identify improved protective strategies that will help to minimize the chances for spilled oil from offshore entering into the more sensitive inshore habitats. The strategies applied to inlets are often similar to those that are used in rivers. Successful strategies depend on interpreting and applying information such as the inlet shape, bottom profile and water depths, tides, and currents to determine which strategies and equipment to use. The proper placement and alignment of boom and skimmers is essential. The authors will identify the research methodologies as well as the rationale and strategies that have been recommended for various inlets in south Texas. The goal is to minimize the impact of offshore spills on the more sensitive inshore habitats.

***GoMexSI*: A resource for Texas scientists, fishermen, and educators.**

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Much attention has been devoted to the measurement and cataloguing of biodiversity throughout the world and in the Gulf of Mexico over the past 30 to 50 years. However, the systematic recording and cataloguing of species interactions has received far less attention. Nevertheless, it is this biostructure that defines and governs the flow of energy through the ecosystem. The Gulf of Mexico Species Interaction (*GoMexSI*) database and web application, which was officially released on 3 September 2013, is striving to rectify this situation in the Gulf of Mexico. Collecting, extracting, and archiving data from published and un-published resources and data contributors, we now have trophic interaction data for fishes from 53 sources (out of 747), with a total of 34,902 interactions from 1,240 unique interactors. For Texas bays and estuaries we have approximately 70 references from which to extract data. In the future, trophic data for taxa such as sea and shore birds, marine mammals, sea turtles, crustaceans, and others will be added. Beyond trophic interactions we will include other interactions such as parasitic, amensal, commensal, and mutualistic relationships. Data can be examined in three ways – by a taxonomic, spatial, or exploratory query. The trophic data will be valuable to fisheries modelers whom require large amounts of highly resolved diet data. A page devoted to fishermen where they will be able to examine the prey organisms of their favorite game fish is being planned. Educational tools are under development by scientists from Texas State Aquarium and Texas A&M University-Kingsville.

The Effect of Reducing Commercial Shrimping Effort on Landings, Catch Efficiency, and Bycatch.

Mark R. Fisher; Texas Parks and Wildlife.

Concerns about overcapitalization in the commercial bay shrimp boat fleet, growth overfishing of shrimp and bycatch of nontargeted species caused the Texas Parks and Wildlife Department (TPW) to implement a cap on the number of commercial bay shrimping licenses that could be sold, and a buyback program to reduce the number of existing licenses. A total of 2,125 licenses have been bought back since the beginning of the program in 1997, resulting in a 66% reduction in licenses. Bay shrimp landings are currently 10% of the amount landed in 1997, while commercial shrimping effort is now at 4%. Catch per unit of effort is 4 times higher than in 1997, indicating greater efficiency in the fleet. Abundance of bycatch species has increased to record high numbers in TPW's fishery-independent trawl survey. The buyback program is meeting TPW's goals and will continue in the future.

Toxicity effects of mysidophycin, a novel toxin produced by *Nueces mysidocida gen. nov.* & *sp. nov.*

I-Shuo Huang; Biology Department, Texas A&M University, Corpus Christi. (*Student Presentation*)

Cyanobacterial toxins occur widely in freshwater systems, while fewer toxins are known from marine systems. It is likely that many other marine cyanobacterial toxins are undescribed. *Nueces mysidocida gen. nov.* & *sp. nov.*, a new to science marine cyanobacteria, was isolated from a mysid mortality event occurring in an aquatic animal rearing facility. Molecular phylogenetic analysis in addition to morphology (SEM, TEM) has confirmed its uniqueness. Unialgal bulk cultures were used to produce sufficient material for toxin isolation. Isolation of mysidophycin was assessed by bioassay-guided fractionation using HPLC/MS. Mysidophycin has a unique mass-to-charge ratio of 679.3 amu that does not match any known toxins. Structural confirmation using NMR suggested that mysidophycin is a glycosidic compound. Toxicity of fish, mysids, and copepods occur after toxin exposure. LD_{50} values of fish, mysids, copepods, mammalian cell lines and algae will be determined. The LD_{50} experiments will be helpful for understanding the species response once exposed to the toxin and the relative potency of the toxin compared to other toxins. Toxicity of this novel toxin to other known toxins will be compared to provide information on its relative potency.

A comparative Life-Cycle Assessment of substrate material used in oyster reef restoration.

Mariana A. Devlin; Harte Research Institute, Texas A&M University Corpus Christi. (*Student Presentation*)

In response to the continued decline of oyster reefs, there have been global efforts to improve their condition through reef restoration and management. In Texas, restoration projects typically involve the deployment of hard material onto natural beds to provide suitable substrate for oyster larvae to attach and grow. Previous research on the environmental effects of oyster restoration has focused on the direct effects of restored/constructed reefs on reef resident or reef faunal communities, as well as oyster recruitment and growth (Rodney and Paynter 2006, Peterson et al. 2003). However, there can be an extensive range of environmental effects associated with the life-cycle (extraction, manufacturing, transfer, and deployment) of natural or alternative substrates used for reef restoration. This study quantified environmental impacts of five different substrates used in an oyster reef restoration project in the Texas Coastal Bend using Life Cycle Assessment (LCA) methodology. Four environmental impact categories were used to analyze river rock, limestone, concrete, oyster shell, and porcelain. Results suggest that environmental impact is greatly influenced by substrate weight and distance traveled, and that mined materials (river rock and limestone) have a higher environmental impact than recycled materials. Furthermore, results suggest that placing recycled substrates into the bay for oyster reef restoration will prevent negative environmental effects associated with the disposal of substrates into landfills. This study applied LCA in a novel way to analyze indirect environmental impacts associated with oyster reef restoration substrates to aid restoration practitioners through the selection of alternative substrate materials.

The role of predation cue sources in inducible defenses in the Eastern oyster (*Crassostrea virginica*).

Avery Scherer*, Lunt, J., Draper, A., Smee, L.; Texas A&M University-Corpus Christi. (*Student Presentation*)

The amount of information and its reliability conveyed through predation cues can be impacted greatly by the source of the cues. Cues from predators can indicate predator species, proximity, and diet while cues from prey indicate organisms recently consumed and potentially indicate threats from cryptic predators. Costs may differ between these cues as well, as predator cues can vary greatly, be highly specific, or require previous exposure for recognition. In contrast, conspecific alarm cues are often innately recognized but can be misleading in the source of damage to the cue-producing organism. This study investigates the role direct cues from predators and indirect cues from prey organisms play in the induction of eastern oyster (*Crassostrea virginica*) morphological defenses. Shell diameter, weight, and compression force were measured for newly settled oysters exposed to crushed conspecifics or exudates from blue crabs (*Callinectes sapidus*). Initial analysis suggests oysters respond more strongly to direct cues than to indirect cues.

Molluscan diversity in texas bays and nearshore.

Fabio Moretzsohn*, Noe Barrera, and Wes Tunnell**;** Harte Research Institute, Texas A&M University-Corpus Christi.

Mollusks are a major component of benthic communities in all seven major estuarine systems in Texas. They dominate the macroinfaunal biomass in certain areas, constitute important links in the food web, and play critical roles in the estuarine ecosystem. For example, the small bivalve *Mulinia lateralis* is the main food source for black drum, and can be present in high densities in areas with low salinity but also in high salinity as in Baffin Bay. It is the most abundant mollusk found in beach drift along bay beaches. About 250 species of mollusks have been reported from Texas estuarine systems, and over 700 species have been reported from the Texas Gulf coast. Mollusks are found in virtually all estuarine habitats, with freshwater inflow and salinity regimes being the governing factors in determining the composition of molluscan communities. Some mollusks occur predominantly in fresh or brackish water, others in salt marshes or bays, and some also occur in marine waters. In the marine environment, mollusks range from the shore to the bottom of the Gulf of Mexico, with the highest diversity usually found offshore in depths between 20 and 60 m, and decreasing with depth. The Flower Garden Banks and other offshore banks are home to a diverse molluscan fauna, including species that are found in much shallower waters elsewhere (e.g., *Strombus gigas*). Our new field guide discussing and illustrating the most common 300 species of mollusks from Texas bays and Gulf beaches will soon be published by Texas A&M Press.

Temperature-dependent growth and size-at-maturity in the blue crab *Callinectes sapidus.*
M. Zachary Darnell; Nicholls State University.

Blue crab size-at-maturity has decreased throughout much of their range, potentially due to number of genetic or environmental factors. Surveys have found both temporal and spatial trends in size-at-maturity, supporting the hypothesis that size and growth rates are influenced by the environment. Crabs reach maturity at larger sizes in low-salinity, cool areas, and at smaller sizes in high salinity, warm areas. Like all crustaceans, blue crabs grow discontinuously, increasing in size only during the molt. Growth rate is thus defined by two factors: intermolt period (IMP) and growth per molt (GPM). We investigated the effects of salinity and temperature on IMP and GPM. Crabs were collected as megalopae and held in one of six treatments until the 6th juvenile stage. Crabs were fed daily and measured following each molt. While salinity did not have a significant effect on any aspect of growth, temperature significantly affected both IMP and GPM. Higher temperature reduced both IMP and GPM: crabs reared at 30°C molted more frequently than crabs reared at 20°C, but exhibited a lower GPM, resulting in a smaller size at each stage. These results suggest that temperature plays an important role in determining blue crab growth rates and size-at-maturity.

The Value of Long Term Monitoring to Research and Management: Using High Frequency Water Quality Data to Understand Ecological Processes.
Jane Caffrey; Center of Environmental Diagnostics and Bioremedation, University of West Florida. (*Invited Speaker*)

Advances in technology have greatly increased our ability to collect water quality data over a variety of space and time scales. For example, commercially available data sondes deployed to collect time series of temperature, salinity and dissolved oxygen data can capture events from hourly (tidal and diurnal) time scales to seasonal time scales capturing freshwater runoff and algal blooms. Analysis of data from these long-term deployments provides insights into the relative importance of anthropogenic and external drivers on estuarine ecosystem function. Dissolved oxygen time series have been used to estimate daily gross production, respiration and net ecosystem metabolism (NEM). However, long-term estimates of primary production and ecosystem respiration are rare in the estuarine literature, yet they provide fundamental information about the trophic status of these sensitive environments. When collected consistently, this approach makes it possible to resolve long-term trends, but perhaps more importantly, it provides a historical benchmark against which future patterns may be evaluated. The role of estuaries and coastal oceans in global carbon budgets continues to be a topic of active research and debate, and a clear understanding of the factors that affect the carbon balance is crucial for making informed management decisions. Clearly the net metabolic balance of estuaries and the coastal zone are sensitive to temperature and eutrophication, but will also be affected by emerging environmental changes such as sea level rise and ocean acidification. Thus, maintenance of active monitoring networks is critical to evaluate the role of human activities in modulating these processes.

Long-term Water Quality and Environmental Changes in Baffin Bay as Inferred from Sediment Cores—Preliminary Results.

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The deterioration of water quality conditions in Baffin Bay (Kleberg and Kenedy Counties, TX) has become of great concern with particular issues including the trend towards eutrophic conditions, elevated chlorophyll concentrations, the occurrence of nuisance brown tide blooms, and a potential disruption of the aquatic food web. Though increased nutrient loading due to human impact plays a role, natural factors, possibly related to wet/dry climate regimes, and the very restricted circulation of Baffin Bay, also strongly moderate the system. Preliminary analysis of a sediment core from the Cayo del Grullo tributary shows a strong increase in chlorophyll concentrations towards the top of the core, which reflects recent human impact. But it also archives individual algal blooms (potentially brown tide), and shows possibly cyclic episodes of increased primary productivity (based on elevated chlorophyll concentrations) from time periods before the first recorded brown tide bloom in 1990, and even before ~1850, when significant human impact in the watershed began. This confirms the significance of natural factors as mentioned above, and suggests a long-term perspective is needed to provide a fundamental frame of reference for understanding the present state of the system, and thus, for making the most informed management decisions and recommendations. We expect to extend our preliminary work to a series of sediment cores from the bay system, and will also employ additional analyses to help us interpret changes in past water quality conditions, algal biomass based on chlorophyll concentrations, allocthonous terrestrial/fluvial input versus autochthonous biologic production, and changing salinity levels.

Ammonium dynamics along the river-estuary transition zone in the Mission-Aransas estuary.

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Environmental conditions change rapidly across the river-estuary continuum, making this an important, but rarely examined, area of study. Freshwater and estuarine ecosystems respond differently to nutrient inputs, further emphasizing the importance of nutrient studies across the salinity gradient. Ammonium (NH_4^+) is an important nutrient supporting phytoplankton production in both freshwater and estuarine systems. In this study, NH_4^+ uptake and regeneration were calculated across the river-estuary transition zone from the Mission and Aransas rivers and Copano Bay, Texas. Experiments were conducted seasonally over one year and included flood and drought conditions. Within this system, NH_4^+ concentrations were normally low and do not reveal the dynamics of nutrient transformations. NH_4^+ regeneration in the water column is especially important during droughts when riverine inputs are low. During a flooding event, demand for NH_4^+ decreased and regeneration was high across the system. In particular, the lower river sites were hot spots for NH_4^+ cycling and production, as shown by the

high Chl-*a* concentrations. This study demonstrates the importance of N-cycling in the water column of rivers, which differs from most estuarine studies that focus on the benthos. Continued studies across the freshwater-estuary transition zone are needed to manage nutrient inputs and increase our understanding of coastal watersheds.

Measuring Effects of Non-Point Source Nitrogen Loading and Production Response in a Shallow Well Mixed Coastal Lagoon.

Evan Turner; Harte Research Institute, Texas A&M University-Corpus Christi. (*Student Presentation*)

Short-term inorganic nutrient and suspended sediment concentrations were measured in Corpus Christi Bay, Texas to determine patterns of annual nutrient dynamics. Two fixed stations along the eastern coastline were sampled weekly for a continuous year at the same time each day. Dissolved inorganic Nitrogen (DIN) concentrations averaged less than 1 µmol/L for the year, but brief pulses coincide with localized rainfall. Chlorophyll-a did not increase after nutrient pulses, instead following longer seasonal trends. Dissolved Oxygen < 4 mg/L was measured in June, 2012 along the north eastern coastline of Corpus Christi Bay which places hypoxic conditions far northern of previous estimates. Non-point source nutrient loading such as runoff due to precipitation brings nitrogen in the form of [NO_2^- + NO_3^-] along the coastline, while the center of the bay remains continuously oligotrophic despite strong mixing. Thus, Corpus Christi Bay has spatially dependent nutrient dynamics from local geochemical cycles, which in part explains why hypoxia regions are spatially explicit and seasonal.

Modeling Inorganic Nutrient Distributions Among Hydrologic Gradients Using Multivariate Approaches.

Bhanu Paudel* and Paul Montagna; Texas A&M Corpus Christi. (*Student Presentation*)

River inflow can control the distribution of dissolved inorganic nutrients in an estuary. It is expected that estuaries with different inflow will have different nutrient transport and different structural and functional balance of nutrient dynamics. A long term (1987-2012) data set of nutrients in the three South Texas Estuaries (the Guadalupe, Lavaca-Colorado, and Nueces Estuaries) was used to test these hypotheses. The nutrients in the estuaries were compared using multivariate linear regression and structural equation modeling (SEM). The estuaries are relatively oligotrophic because detecting ammonia, nitrite+nitrate, and orthophosphate concentrations each of ≤ 1 µmol/L in the Nueces Estuary had probabilities of 0.63, 0.75, and 0.64 respectively. Although the Guadalupe and Lavaca-Colorado Estuaries have more river inflow than the Nueces Estuary, the probability of detecting dissolved inorganic nitrogen (DIN) (ammonia+nitrite+nitrate) concentrations of ≤ 1 µmol/L was greater than 0.5. In all three estuaries, silicate was constantly available and was of high concentration throughout the 25 years, whereas inorganic nitrogen and phosphorus concentrations have decreased since 1987. The SEM identified that environmental-flow and phytoplankton were the most important predictor variables to predict DIN and other nutrients, whereas TSS was important in predicting phosphorous and silica. The direct negative effect of latent variable phytoplankton to DIN implies remineralization is likely maintaining the supply of DIN concentrations. Environmental

flow was identified as the most important predictor variable in maintaining DIN. However, the low path coefficient of environment flow to nitrogen and other nutrients indicate there is insufficient river inflow to maintain inorganic nitrogen and phosphorus concentration into the estuaries.

Turbidity as a Refuge.

Jessica Lunt*, Delbert L. Smee; Texas A&M University- Corpus Christi. (*Student Presentation*)

Development and nutrient input are causing turbidity to increase in coastal areas. Yet, little is known about how turbidity affects marine communities. Previous research has indicated that increased turbidity alters predator- prey interactions, decreasing predation efficiency of visual predators. However, predators depending on sensory modalities other than vision may not be affected by an increase in turbidity. A series of field experiments indicated that turbidity alters trophic interactions in St. Charles Bay. Mud crabs (*Panopeus* spp.), an important intermediate predator on oyster reefs, were more abundant on oyster reefs in St. Charles Bay, Texas when turbidity exceed 30 NTU ($p = 0.03$). Fish predation on tethered *Panopeus herbstii* was greatest when turbidity was low (<30 NTU, $p < 0.05$). In high turbidity (> 30 NTU), predation on *P. herbstii* was greatest ($p = 0.02$) as was predation by crabs ($p = 0.003$). A series of laboratory experiments were also conducted to determine if the changes in predation observed in the field were caused by alterations to predator feeding efficiency. In mesocosm studies, turbidity decreased pinfish predation on shrimp ($p = 0.009$) but did not alter the predation efficiency of blue crabs. Elevated turbidity can alter trophic interactions in estuaries by altering species composition and trophic interactions.

The role of temperature, sunlight and nutrient in affecting degradation of crude oil in Gulf of Mexico waters.

Zhanfei Liu*, Jiqing Liu, Hernando Bacosa, Deana Erdner; University of Texas Marine Science Institute.

As one of the major weathering processes, degradation of crude oil in marine waters depends on many environmental factors, such as sunlight, temperature, nutrients and initial bacterial community, yet their respective roles have not been systematically studied. This knowledge is critical to evaluate the fate of oil, considering that oil spills, such as the *Deepwater Horizon* (*DWH*) one, are often across large environmental gradients in marine waters. Based on field samples and on-deck incubations, we examined the degradation of petroleum hydrocarbons under different environment conditions, including temperature, sunlight, nutrient and initial bacterial communities. The degradation of oil mousses or slicks from sea surface was extensive, as most of the polycyclic aromatic hydrocarbons (PAHs) and a major faction of alkanes were lost during the transit from the accident site to coastal marshes. Within these oil mousses, certain *Gamma- and Alphaproteobacteria* were the prevailing groups, which may relate to high temperatures and strong irradiance in surface Gulf waters. Our on-deck incubations further confirmed that temperature, sunlight and initial bacterial community can be important in controlling the development of certain oil degraders and the subsequent oil degradation. For example, *Cycloclasticus*, a well-known degrader of aromatic hydrocarbons,

grew well only under both 4ºC and when inoculating deep-water bacterial assemblages. Petroleum hydrocarbons lost 30-75% over two months of incubations regardless of temperature, and surprisingly, PAHs degraded faster at 4 than 24ºC. Our incubation experiments further showed that PAHs were strongly photosensitive, as a major fraction of aromatics was degraded within a month. The bacterial community in the oil sample under natural sunlight developed into a similar structure to those observed in the field oil mousses. Taken together, this study provides crucial results for predicting the rates of oil degradation in Gulf waters, and offers insights into the relevant mechanisms of oil degradation.

The Gang of Five: A 25-year record of five common marine debris items on Texas Gulf Beaches.

Anthony F. Amos; The University of Texas Marine Science Institute.

Five distinctive types of anthropogenic litter have been monitored throughout various projects the author has devised to study marine debris on Texas barrier island Gulf beaches. They are single drink beverage containers (BEVG), one gallon milk jugs (MILK), egg cartons (EGGC), green bleach bottles from Mexico (GBOT), and containers of chemicals and oils (CHEM), mostly 5-gallon plastic pails. Counts of marine debris started in 1998 on Mustang Island and 1995 on San Jose Island Gulf beaches. Both surveys continue to this day. Beach trash is removed irregularly from Mustang Island beach but is not removed from San Jose Island beach*. The trend is negative on both venues but the difficulties involved in assessing the magnitude of the material and the great variability in factors controlling its presence at any one time on both island's beaches make this an imprecise science. Special attention is paid to the chemical/oil containers on Mustang Island and where possible, content status is noted (Empty, full, partially full, content ID, label, no label, manufacturer, lid, no lid, reused to contain other chemical, container material [plastic, metal], color, condition, presence of epi-bionts, date, time at sea). The majority of these contain(ed) oils, lubricants, and cleaning solutions from the offshore oil servicing and commercial fishing industries

*There are semi-annual volunteer cleanups on the far southern tip of San Jose Island beach.

How sensory systems influence settlement patterns in larval red drum (*Sciaenops ocellatus*).

Lisa Havel*, & L.A. Fuiman; University of Texas Marine Science Institute. (*Student Presentation*)

Settlement is arguably the last stage of high mortality in the life cycle of marine fishes, making the number of larvae that successfully settle to a benthic habitat a reasonable determinant of future population size. Habitat selection during settlement is likely an active process, however, much of what we know comes from studies focused exclusively on coral reef ecosystems. We conducted experiments to examine how estuarine fish larvae (red drum, *Sciaenops ocellatus*) might actively choose settlement sites based on information received from their senses. Larvae reduced their activity in the presence of elevated sound pressure levels (acoustic noise). Their activity increased in the presence of the chemical cue lignin, whereas tannin did not cause a change in activity. Larvae spent more time in water masses taken from seagrass beds compared

to control saltwater. Larvae positioned themselves differently in the water column depending on the substrate color, moving closer to a yellow (sand) bottom than a green (seagrass) bottom at pre-settlement sizes. Additionally, red drum settled at different sizes to sand, oyster shells and seagrass. We interpret these findings as evidence for active settlement in an estuarine-dependent fish species.

Importance of larval diet for growth, survival, and behavioral performance of southern flounder larvae.

Erik W. Oberg* and Lee A. Fuiman; Marine Science Institute, The University of Texas at Austin. (*Student Presentation*)

Risk of mortality is high during the larval period of most marine fishes and nutrition is one contributing factor. Highly unsaturated fatty acids (HUFAs), such as docosahexaenoic (DHA) and arachidonic (ARA), are important nutrients for larval fish but very little information regarding the HUFA requirements of pre-metamorphic southern flounder (*Paralichthys lethostigma*) larvae is available. We conducted an experiment to characterize the effects of dietary levels of DHA and ARA on southern flounder. We measured specific growth rate (SGR), survival, and behavioral performance of southern flounder 15 days posthatch (dph) raised on live prey with four different fatty acid compositions (High DHA, High ARA, Low DHA, Low ARA). Growth was not significantly different among treatments. Survival was highest in the Low ARA treatment at 10.0 ± 3.46% and lowest in the Low DHA treatment at 1.9 ± 1.58%. In addition, certain behavioral performance traits differed among treatments. This new information about the early nutritional requirements of this species could help improve stock enhancement efforts to support the recovery of this fishery.

Recruitment of juvenile fish at an artificial reef in the Gulf of Mexico.

Rachel Arney* and Dr. Richard Kline; Biological Sciences Department, The University of Texas Brownsville. (*Student Presentation*)

Artificial reefs are fisheries resources used to colonize commercially valuable fish. (Artificial reefs along the Texas coast gross revenue every year through sport fishing and SCUBA diving, and they have been promoted as a means to enhance fish stocks.) In 2011, the Texas Parks and Wildlife Department deployed 4,000 concrete culverts as an artificial reef seven miles off the coast of Port Mansfield, TX. These concrete culverts can serve as habitat for highly desired sport fish species in the Gulf of Mexico. Because the means of fish recruitment to artificial reefs may be attributed to direct settlement or movement of larger individuals to the reef sites and by habitat complexity, the aim of this study was to assess juvenile fish recruitment at particular culvert reef configurations and compare them with observed adult fish populations. Standard monitoring units for measuring the recruitment of fishes were used in this study. Eighteen artificial coral units enclosed in anti-predator cages were deployed at nine sites in the artificial reef grid. The structures were placed in (discrete) habitat types of clumped, patchy, and bare culvert areas further characterized by sonar side-scan imaging based on measurements of rugosity, vertical relief, and percent substrate cover. Because epi-faunal community development on an artificial reef varies seasonally, the units were sampled bi-monthly. As of

February 2014, 16 different juvenile species belonging to ten families for a total of 183 fish were quantified. This study will continue throughout the summer of 2014.

Viruses are major players in marine systems

Curtis Suttle; Departments of Earth, Ocean & Atmospheric Sciences, Microbiology & Immunology and Botany, University of British Columbia, Vancouver BC, Canada. (*Invited Speaker*)

Viruses are by far the most abundant member of the plankton, ranging in abundance from about a million to 100 million viruses /mL, translating into ~1030 viruses in the oceans. End-to-end, the virus particles in the oceans would stretch about 10 million light years, or farther than the nearest 40 galaxies. They also likely comprise most of the greatest genetic diversity on Earth, with most putative coding sequences having no obvious homologues. As major agents of mortality, marine viruses also play an important role in structuring communities and nutrient cycling. It is estimated that viruses kill about 20% of the biomass in the oceans each day through lysis of microbes. This material is rapidly processed through the viral shunt, and results in the release of ammonium that fuels primary production. As we learn more about marine viruses and their role in the global system, it is clear that they need to be thought of as critical cogs in the global system, rather than only as inconvenient pathogens of economical and societal consequence.

Phytoplankton community responses to tropical storms in the Mission-Aransas Estuary.

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Episodic events such as hurricanes and tropical storms may increase in the future due to global warming. To understand their potential impact on the phytoplankton community, we investigated the effect of four tropical storms on the phytoplankton community composition in the Mission-Aransas National Estuarine Research Reserve (NERR). We used the phytoplankton time series at high temporal resolution from the Imaging Flow CytoBot deployed at the entrance of the Mission-Aransas NERR since 2007. During year 2010, two tropical storm periods were observed: June-July, where two consecutive tropical storms occurred, and September, during which a major tropical storm was preceded by a smaller one. Both periods were characterized by strong winds and high rainfall during the storms and a subsequent period of high river discharge. In the June-July period, the first tropical storm had dramatic effects on the abundance of diatoms, which increased during the last day of the storm and the following day. Diatom abundance continued increasing during the subsequent discharge after this storm. Dinoflagellates, flagellates and haptophytes increased in abundance mostly during the river discharges after both storms. The second storm had little effect, with the majority of groups decreasing. The September period was characterized by exceptional river discharge following the major tropical storm, where dinoflagellates, flagellates and haptophytes underwent a noticeable increase. The small storm that preceded the major storm triggered an increase of

some of the diatoms and dinoflagellates, but the effect was less dramatic compared to the first storm of the June-July period.

Monitoring current patterns within the Mission-Aransas and Guadalupe estuaries, Texas, with tilt current meters.

[1]Lindsay Scheef[*], [1]Edward Buskey, and [2]George Ward; [1]Mission-Aransas National Estuarine Research Reserve, University of Texas Marine Science Institute; [2]Center for Research in Water Resources, University of Texas at Austin.

Many ecologically and economically important species that spend part or all of their lives in estuaries rely on the lower salinity conditions maintained by freshwater inputs from the surrounding watershed. However, the Mission-Aransas Estuary along the Texas Gulf Coast commonly becomes hypersaline during periods of low rainfall. In the face of climate change and the increasing water demands of a rapidly growing population, the Mission-Aransas Estuary and its adjoining neighbor, the Guadalupe Estuary, could potentially experience dramatic reductions in freshwater inflows that perpetuate high salinity conditions beyond the tolerance of the ecosystem. A better understanding of how water circulates within the estuaries and exchanges between them is needed to anticipate how changes in freshwater inputs will influence salinity conditions in each part of the system. To accomplish this, numerous tilt current meters are being deployed throughout the Mission-Aransas and Guadalupe estuaries to record the direction and speed of water flows. The data collected with these meters will allow for new analyses of long-term monitoring data currently being collected within the Mission-Aransas National Estuarine Research Reserve and will be used to make adjustments to a salinity model that informs freshwater inflow management decisions for the estuaries.

Informing Conservation and Resiliency Planning in Corpus Christi Bay utilizing Sea-level Rise and Storm Surge Impact Scenarios.

Jorge Brenner; The Nature Conservancy, Texas Chapter.

Low elevation coastal communities in Texas and are extremely vulnerable to coastal hazards, including sea-level rise and storm surge. Through a local participatory stakeholder process we identified current and future conservation planning efforts best suited to be informed by sea-level rise (SLR), storm surge projections and socioeconomic indicators for Corpus Christi Bay, Texas. The outcomes of this process were incorporated into the Nature Conservancy's Conservation and Resiliency framework, which has been utilized in other geographies in Texas and at sites in Florida and Mississippi. This framework consists of a series of conservation and resilience analyses which integrate future SLR scenarios from the Sea Level Affecting Marshes Model (SLAMM) and ADvanced Circulation (ADCIRC) storm surge models to assess marsh viability, community risk and resiliency in order to provide recommendations for future marsh management in light of these potential climate-based threats. The results of these modeling analyses estimate the potential impacts of SLR and storm surge scenarios to human communities and natural habitats surrounding Corpus Christi Bay and can be used by community planners, emergency management professionals, conservation organizations and the public to assess potential risk to property and habitats in their communities. Our findings

suggest that SLR impacts can be significant to coastal habitats, especially salt and fresh water marshes, and communities around Corpus Christi Bay and that the potential future impacts of SLR and storm events should be considered during future decision-making processes in order to ensure sustainable habitats that increase community resiliency in the face of an uncertain future.

Salt Marsh Pond Classification and Fish Assemblage Structure at the Aransas National Wildlife Refuge.

Niki Ragan* & Jeffrey R. Wozniak; Department of Biological Sciences, Sam Houston State University. (*Student Presentation*)

In estuarine systems, inundation regime plays a vital role in shaping the physical and chemical characteristics of saltwater ponds. Along the Texas Gulf coast, saltwater ponds are scattered across the coastal marsh landscape, with each pond possessing a varying degree of hydrological connectivity to adjacent estuarine waters. The timing, frequency and magnitude of connection events can directly influence both the abiotic and biotic components of the ponds. To determine how the degree of hydrological connectivity impacts these systems at the Aransas National Wildlife Refuge (ANWR), I collected physical (e.g., pond size, vegetation and edge type, soil cores) and biogeochemical (e.g., temperature, salinity, pH, dissolved oxygen) data to characterize pond structure during the summer of 2013. In addition, fish assemblage data was collected via seine and minnow traps to determine if pond conditions affect the composition of fish assemblages. I found that my *a priori* classifications of pond connectivity produced defined group clusters, while fish presence-absence data did not. Though the presence of resident marsh species cannot be used to determine connectivity to the adjacent estuary, the relative abundances of those species can be used to predict the degree of pond connectivity. To date, most efforts to understanding how altered hydroperiod impacts the marsh complex at the ANWR have focused on the marsh platform and not the salt marsh ponds. My focus here on the salt marsh ponds is an important step to linking hydrologic drivers to the greater marsh ecosystem, food web dynamics, and the overall coastal management practices in the region.

Short term temporal trends in activity and habitat selection of the Texas diamondback terrapin.

[1]Emma Clarkson*, [2]Dr. George Guillen; [1]Texas Parks and Wildlife; [2]The University of Houston Clear Lake/Environmental Institute of Houston.

Little is known about Diamondback terrapins (*Malaclemys terrapin*) in Texas, including habitat selection, range, and behavioral and activity trends, and even less is known about the nocturnal habits of the Diamondback terrapin. We looked at short-term temporal patterns (diel period and months within one year) in movement (as defined by the minimum straight line distance of travel, which is our estimation of daily range), habitat selection, behavior, and activity. We found a high interaction between season and diel period, with higher nocturnal behavioral and activity levels occurring during mating season. Significant interaction between soil, water, and air temperature and terrapin behavior was also detected. We also found significant decreases in distance travelled at night versus during the day as well as a preference for denser and taller vegetation at night, which may indicate increased predator avoidance behavior. We documented the first occurrence of large social burrows outside of brumation periods, with sometimes as

many as 22 terrapins per burrow. While these groups exhibited no diel trends in behavior, sex ratios in these burrows changed as the season progressed. These behavioral trends may provide information on the nesting and mating seasons of Texas Diamondback terrapins, of which little is presently known. This study is the first comprehensive report on terrapin behavior, activity, and habitat selection in Texas, and will be integral in our understanding of the regional habits of Diamondback terrapin. The trends observed in this study are very unique as compared to the trends observed on the East Coast, and will provide a baseline for future research with Texas terrapins.

Deep-water coral assemblages of relict reefs off the south Texas Coast.

[1]Rebekah Rodriguez*, [1]David Hicks, [2]John W. Tunnell, Jr., [2]Thomas C. Shirley, [3]Peter J. Etnoyer, [4]Emma Hickerson; [1]University of Texas at Brownsville; [2]Texas A&M University-Corpus Christi; [3]NOAA-CCEHBR; [4]NOAA-FGBNMS. (*Student Presentation*)

In September 2012, the Schmidt Ocean Institute research vessel, *Falkor* set out on a two week field trial entitled, "*Mapping the South Texas Banks.*" The South Texas Banks are the remnants of a barrier reefs that paralleled the Texas coast between 18,000 to 12,000 years BP correlating with the late Pleistocene to early Holocene epochs. Located ~ 97 km off the coast, they protrude to heights ranging 58 to 83 m below the sea surface. Multiple ROV transects were made across five of the relic banks. Quantification of coral taxa was accomplished by reviewing ~36 h of ROV footage. Species richness ranged from a low 10 species at Blackfish ridge to a high of 17 species at Dream. Evenness ranged from a low of 0.48 at Baker to a high of 0.66 at Blackfish ridge. Shannon's diversity index ranged from a low 1.36 at Dream to a high of 1.52 at Blackfish Ridge. A two way fixed PERMANOVA was used to compare the coral communities across banks and their associated slopes and terraces. Bank communities were significantly distinct ($p=0.001$). All terraces were significantly different ($p<0.001$) as were all slopes except for Aransas vs. Blackfish ($p=0.8868$) and Baker vs. Dream ($p=0.216$). Slope and terrace within all banks were significantly different except for Harte Bank ($p=0.1463$). The Sea Whip group contributing 61% to the Aransas and 25% to Harte. Slope and terrace had a 32% similarity with the Sea Whip group accounting for 27% of slope and 28% of terrace.
(*)- Graduate student presenter
Presentation type: Oral

Current composition of sportfish populations at an artificial reef off the coast of Texas.

Catheline Froehlich*, Richard Kline; University of Texas Brownsville. (*Student Presentation*)

Fishing pressure on popular sportfishes continues to increase at an alarming rate in the Gulf of Mexico. Yet the sand and mud bottom along the western coast is covered with limited natural coral and hard structure that sportfish use as habitat, including snappers and groupers. Artificial reefs have become an important solution to increase habitat in reef depleted coasts, and hopefully reduce fishing pressure on several species. The majority of fishery management bases current sportfish population estimates on fishery-dependent data, such as fishermen catch. Yet such data only takes into account what fishermen might catch and keep based on allowed size and bag limits. On the other hand, fishery-independent population surveys, including visual

SCUBA surveys, measure present relative sportfish populations. A yearlong SCUBA survey is being undertaken at an artificial culvert reef off the coast of Port Mansfield, TX, to assess fish community composition. The reef is composed of thousands of concrete culverts that are randomly distributed in a 1 km^2 area. Three distinct habitat types are present: dense patches of culverts, loose patches of culverts, and bare areas. Alongside SCUBA surveys, red snapper sizes are being measured to assess red snapper population structure. Current results show that highest species richness and abundance occurs on dense patches, whereas species diversity and red snapper sizes are relatively equal among both dense and loose patches. Most sites are characterized by several species, including red and gray snappers. Such findings can increase awareness of the efficacy of artificial reefs in attracting important sportfishes.

Genetic composition of invasive lionfish at the Flower Garden Banks National Marine Sanctuary.

[1]John E. Johnson*, [2]Michelle Johnston, [1]J. Derek Hogan; [1]Texas A&M University-Corpus Christi; [2]Flower Garden Banks National Marine Sanctuary. (*Student Presentation*)

Lionfish (*Pterois volitans*) have invaded Atlantic waters and rapidly spread through the Caribbean and most recently into the Gulf of Mexico (GOM). In Texas, lionfish were first sighted at the Flower Garden Banks National Marine Sanctuary (FGBNS) in 2011. This invasive predator is an emerging threat to coastal ecosystems in Texas, and in 2013 they have been spotted at an inlet to Corpus Christi Bay. Genetic analyses have determined that there are two differentiated populations of *P. volitans*, one in the Atlantic and one in the Caribbean. Observational data suggest that populations in the Florida GOM may have come from the Florida Atlantic population, but little is known of the composition of the Texas populations of this invader. Here we determine the genetic composition of lionfish at the FGBNMS to ascertain; (1) which species have invaded the Texas coast and, (2) to determine the likely route (i.e. Florida or Caribbean) that lionfish invaded the Texas GOM. Understanding the genetic composition and patterns of connectivity of lionfish can aid in multi-agency management efforts to control lionfish populations.

Historical and current trends in Texas' nearshore shark assemblage.

Jose, Philip*, Stunz, Gregory W., Ajemian, Matt; Harte Research Institute for Gulf of Mexico Studies, Texas A&M University – Corpus Christi. (*Student Presentation*)

Large sharks are apex predators that play a crucial role in structuring marine ecosystems. By examining historical trends in fisheries, numerous studies have shown declining shark populations worldwide as a result of overfishing of these k-selected species. However, these meta-analyses have utilized limited fishery-independent data and have neglected nearshore coastal habitats. Using a long-term dataset from recreational anglers targeting sharks in nearshore Texas waters, our study assessed the state of the nearshore shark community using size based indicators (SBI) and multivariate analysis of monthly catch records. We compared historical and contemporary catch data to determine potential changes in assemblage type and shark size since the 1970s. Multivariate techniques revealed a general shift in shark community assemblage from larger to smaller species. Specifically, bull shark abundance declined while

blacktip abundance increased. SBI analysis showed a decrease in mean total length in the shark community from 201.6 cm to 122.6 cm. Examination of the dominant species over time showed a large decrease in mean length of bull sharks from 232.8 cm to 175.1 cm and a modest increase in blacktip sharks from 125.1 cm to 127.9 cm. Size spectra analysis indicated a removal of large predators occurred. Our findings document a significant change in the size and composition of Texas' nearshore shark community potentially driven by overfishing and removal of large sharks as demonstrated in other regions of the Gulf of Mexico. Future management decisions should account for this removal and address rebuilding stocks of large sharks.

Impacts of Reopening a Natural Tidal Inlet on Fisheries in Mesquite Bay, Texas.

Quentin Hall*, Greg Stunz, Jason Williams, and Megan Robillard; The Harte Research Institute for Gulf of Mexico Studies. (*Student Presentation*)

In April of 2014 a collaborative effort began to physically reopen Cedar Bayou, a natural tidal inlet that historically linked Mesquite Bay, TX, to the Gulf of Mexico. The inlet was intentionally closed in 1979 to prevent contaminants from the Ixtoc I oil spill from reaching fragile nearshore estuarine and wetland ecosystems. Research has shown the importance of tidal inlets for migration and dispersal of juvenile and adult nekton. The main objective of this study is to quantify changes to densities of estuarine-dependent species recruiting to seagrass (*Halodule wrightii*) nursery habitats in the Mesquite Bay complex before and after reopening the inlet. Juvenile fish and crustaceans were sampled during the fall, winter, and spring recruitment seasons using an epibenthic sled. Samples have been collected for two years pre-opening and will be collected one year post-opening. The study is a classic before-after control-impact design where selected seagrass beds near Cedar Bayou (impact) and Aransas Bay (control) will be analyzed. Preliminary results of the two years of fall pre-opening data suggest differences in density of estuarine-dependent fishes in control and impact areas. Based on our previous research, we expect to observe an increase in newly-settled, estuarine-dependent nekton densities at impact sites after the inlet is reopened. This may translate into increased overall estuarine productivity particularly for estuarine-dependent species in the Mesquite Bay complex.

Evaluation of *Prymnesium parvum* fatty acid amide accumulation and their contribution to fish mortality events.

[1]Sean P. O'Mara*, [2]Greg Southard, [1]Danielle Guttierrez, and [1]Paul V. Zimba; [1]Texas A & M University – Corpus Christi; [2]Texas Parks and Wildlife Department, Inland Fisheries-Analytical Services. (*Student Presentation*)

Prymnesium parvum, a haptophyte, has been a reported HAB species for nearly a century, including losses of over 30 million fish in Texas alone resulting in economic losses surpassing $10 million USD. Previous attempts to determine factors influencing *P. parvum* growth and toxin production found poor correlations, possibly due to the incomplete identification of *P. parvum* toxic metabolites. Field samples from Texas water bodies experiencing fish mortality and elevated *P. parvum* levels were used to determine a cell density to FAA relationship. Three unialgal cultures and 3 nutrient treatments were used to assess growth rate, photosynthetic

efficiency, and FAA accumulation as a function of N & P availability. This study confirms the presence of FAA in Texas *P. parvum* bloom samples and cultured isolates, with a high correlation (R^2=0.66) between cell density and FAA concentration. There was a significant difference in doublings per day (k) between strains ($p<.001$), and between treatments ($p<0.05$) for one strain. Relative FAA/cell concentrations in N & P limited cultures were significantly higher than control for two strains. FAA were present in all samples and cultures tested, confirming the importance of FAA in fish mortality events. Increasing FAA accumulation under nutrient limited growth may be a survival mechanism employed by *P. parvum*; diverting energy from growth processes to toxin production may cause fish mortality, thereby releasing nutrients. This hypothesis is supported by the majority of reported Texas *P. parvum* blooms occurring during the winter months when decreased run-off can lead to nutrient limitation.

Updating and Enhancing the Texas Coast Public Access Inventory.
Heather Wade; Texas Sea Grant, Texas A&M University.

In partnership with the Texas General Land Office (TGLO), Texas Sea Grant (TXSG) is updating the Texas Coast Public Access Inventory and enhancing the (TGLO) Beach and Bay Access Guide (BBAG). This project meets the needs Texas Sea Grant's strategic planning efforts to address public access and access planning, while also meeting the needs of TGLO's 309 Project Enhancement Strategy for Public Access. In the 309 Enhancement Strategy Public Access Section, TGLO states the need for "conducting a comprehensive inventory of coastal public access in Texas to support access planning". Further, the only effort to do this in Texas thus far has been by TGLO, was conducted in 1989-1999, and updated in 2003. Since ten years have passed, it is of utmost importance to update the Public Access Inventory, as there have been changes seen along Texas beaches and bays (the creation of new access sites, the loss of once existing sites, population growth, and increases in tourism). The BBAG will be enhanced by providing up to date access data, photos of public access sites and amenities, and embedded into various forms of outreach and communication. The inventory will be available through a variety of sources: digital format, coastal access website interactive map, a phone application, and regional brochures. The project is taking place over three phases and is currently in phase 2. Texas Sea Grant is taking feedback from the public and will incorporate this feedback into the inventory and how it is used and managed.

Abstracts for Poster Presentations

Stratification associated with a riverine tidal freshwater ecosystem, Mission River, TX, USA.

[1]Allan E. Jones*, [3]Ben Hodges, [2]Jim McClelland, [1]Kevan Moffett; [1]Department of Geological Sciences, University of Texas at Austin; [2]Marine Science Institute, University of Texas at Austin; [3]Department of Civil, Architectural and Environmental Engineering. (*Student Presentation*)

The connection between terrestrial rivers and the estuarine environment governs the timing and magnitude of fluxes to the coast, which largely controls coastal ecology. Tidal influence impacts river flow, creating a transitional zone between the river and estuary with little net downstream flow. This tidal freshwater river reach will exhibit long nutrient and water residence times, controlling the timing and magnitude of fluxes to the estuary. We term this transitional zone the *riverine tidal freshwater ecosystem* (RTFE). Previous observations suggested an RTFE exists within the Mission River of southern Texas. This study investigated the impact on the RTFE of downstream estuarine stratification. Two ~22 km long surveys of the Mission River were completed just downstream of the expected RTFE during the spring ebb and flood tides of 14 and 15 of September 2013, respectively. Each longitudinal survey profiled the water column with a multi-parameter probe to observe the spatial structure of temperature, electrical conductivity (converted to salinity), dissolved oxygen (DO) and pH. The survey data revealed a highly stratified salinity profile, with saline water (> 35 PSU) intruding ~29 km upstream. The upstream most portion of intruded basal saline water surveyed (19-29 km upstream) was spatially correlated to water column pockets of warm temperature, low pH, and low DO. This stratification of multiple variables suggests this segment of the Mission River does not undergo nightly overturning. This implies stable stratification downstream of the RTFE, which will impact the velocity profile and balance of forces that create the Mission River RTFE.

Mapping Seagrass in the Redfish Bay, Texas via WorldView-2 Imagery.

Lihong Su* and James Gibeaut; Harte Research Institute for Gulf of Mexico Studies, Texas A&M University - Corpus Christi.

Seagrass meadows play important roles as a habitat for many marine organisms, traps for sediment, and buffers against wave actions. The objective of this paper is to obtain presence of seagrass meadows in the Redfish Bay, Texas from WorldView-2 imagery. The seagrass meadows grow in shallow and clear water areas in the Redfish Bay. The WorldView-2 satellite can acquire multispectral imagery from the bay bottom with 2 m spatial resolution 8 multispectral bands and 0.46 m panchromatic imagery. The Redfish Bay is characterized by high nutrient levels and is influenced by fairly turbid waters. The atmosphere of top radiance was transformed to the bottom reflectance through the atmospheric correction and the water column correction. The object based image analysis was used to identify seagrass meadows distributions in the Redfish Bay. This investigation demonstrated that seagrass presence can be identified with 94% accuracy though seagrass species cannot be satisfactorily recognized. The results implied that the WorldView-2 satellite imagery is a suitable data source for seagrass

distribution mapping. WorldView-2 provides two new spectral bands, namely Coastal and Yellow, for coastal and ocean color applications. Our experiments show the Coastal useful to water column correction and the Yellow helpful to classification.

Multiplatform Mangrove Mapping in the Coastal Bend, Texas Gulf Coast.
Thomas A. Tremblay; Bureau of Economic Geology, The University of Texas at Austin.

Mangroves, primarily black mangrove (*Avicennia germinans*), are an increasingly abundant component of saltmarshes along the Texas Coastal Bend. Mangroves in the Coastal Bend were manually mapped from multiple remotely sensed images. A late spring 2013 lidar survey provided highly accurate topographic data and high resolution color infrared (CIR) aerial imagery. Ancillary information was also derived from 2012 NAIP imagery. Mangrove location and extent are used by resource agencies pursuing habitat conservation and management for the endangered whooping crane (*Grus americana*), as well as other coastal resources. Previous wetland studies (White et al., 2002, 2006) within the barrier system of the Coastal Bend mapped 240 ha (594 acres) of mangroves in 2001 and 2004. Most mangroves occurred in the marshes at Pass Cavallo and on Mud Island. By 2013, mangrove had occupied 1,315 ha (3,247 acres), mostly in areas previously occupied by low salt marsh. Mangrove area remained stable on San Jose Island and the western portion of Matagorda Island. Most mangrove expansion occurred on the bayward side of east Matagorda Island, in the fringe marshes of Espiritu Santo Bay at the northeast tip of Matagorda Island, and the dredge material islands between the Gulf Intracoastal Waterway and Espiritu Santo Bay. The latest National Wetlands Inventory (NWI) interpreted from 2008-09 imagery mapped less than 10 ha (24 acres) of mangrove within the study area. The manually interpreted mangrove habitat map will be used as reference data for determining the best methods for automatic classification of mangrove habitat from hyperspectral imagery.

Quantitative Modeling of Flood Insurance Claims, Inundation, and Sea Level Rise as a tool for Coastal Planning and Policy.
[1]Heather Wade*, [2]Philippe Tissot, and [1]Richard Mclaughlin; [1]Harte Research Institute, Texas A&M University-Corpus Christi; [2]Conrad Blucher Institute, Texas A&M University-Corpus Christi. (*Student Presentation*)

A quantitative model was created to predict changes in flood losses and investigate their relationship with relative sea level rise (RSLR), inundation frequency, and other potential factors to provide a basis for discussion of future changes in insurance policies. A multi-linear regression model was calibrated for several Texas coastal counties. The methods included collection of relevant datasets, data manipulation, forward progression analysis, and model validation through training and testing. Study data consisted of tide station water level measurements, flood insurance policies and paid losses, census population counts, and precipitation. Differences in the predictor ranking are attributed to the relative exposure of counties to coastal or riverine flooding. Randomly dividing the data into training and testing sets to evaluate the resistance of the model to extreme events shows the importance of such events. The presence/absence of key events in the testing set result in models that under/over-predict losses. Results of the model are helpful to compare locations and discuss the relative

impacts of the causes for insurance claims. It is important to develop methods for assessing the impact that RSLR and coastal flooding events have on social-ecological systems at both the local and regional scales and this can be done by looking at economic impacts such as insurance claims and paid losses. Finally, comparing the roles of specific processes such as RSLR, population growth, and storms on flood insurance claims can provide researchers more information as to how coastal planning and policy can best be used to manage social-ecological systems.

Your Voice Counts: Using Social Valuation to Assess and Protect Ecosystem Services in the Mission-Aransas National Estuarine Research Reserve.

Mayra Lopez; Harte Research Institute, Texas A&M Corpus Christi. (*Student Presentation*)

Ecosystem services are the benefits that humans derive from nature, which are necessary to live a full and healthy life. These services include, but are not limited to, food, shelter, waste disposal, storm protection, and recreation. For this study, we will identify locations in the Mission Aransas National Estuarine Research Reserve (MA-NERR) that are the most important to active and passive users, as well as measuring the level of importance between locations on a weighted scale. Several methods will be offered to people willing to complete the survey, which includes an online website, over the phone, through the mail, and in person. For the in person surveys, a total of twelve sampling sites have been chosen in areas within the MA-NERR. The sites were selected to give researchers the best possibility of having sufficient random population samples. The data will be analyzed using ArcGIS and the USGS application for the assessment, mapping, modeling, and quantifying of ecosystem services called SolVES (Social Valuation for Ecosystem Services). The final product will be a report focused on the MA-NERR, identifying areas of importance on heat maps, modeling sites with insufficient survey data, and ranking locations by type of ecosystem service. This study will provide useful information for resource managers and policy-makers in terms of making management decisions, as well as encouraging public participation to provide a sense of democracy and legitimacy to the decision-making process utilized by resource managers.

An analysis of fish communities on South Texas artificial reefs: Does structure type matter?

Katelin L. Stroman*, Jennifer J. Wetz, Matthew J. Ajemian, and Gregory W. Stunz; Texas A&M University, Corpus Christi. (*Student Presentation*)

The installation of oil and gas platforms in the Gulf of Mexico has been considered one of the largest unintentional artificial reef programs in the world as these structures are purported to function like reefs and provide settlement habitats for various marine organisms. When platforms are decommissioned, they can be donated to state Rigs-to-Reefs programs and reefed in two configurations, toppled or cutoff (a partial removal). Unfortunately, despite the rapid growth of Rigs-to-Reefs programs across the globe, there is a paucity of studies examining how reef configuration affects fish community structure. Here, we evaluate fish community differences between three types of oil and gas platform reefs (standing, toppled, cutoff) using underwater visual census data collected by a remotely operated vehicle (ROV). The ROV

surveyed fish communities along 10 m depth increments of each reef from the surface to the seabed. At each depth interval we identified all fish to species and enumerated all individuals observed. A trophic guild and level were also assigned to each species using data from FishBase, and weighted to the number of individuals observed in the sampling period. To determine differences in fish community and trophic assemblage, data were statistically compared across structure types and various water depths. Preliminary analyses indicate distinct reef fish communities among structure types, with greater diversity and contributions of herbivores on standing platforms. The differences of these ecological assemblages should be further explored to better assess the fisheries consequences of various decommissioning options.

Response of macrobenthic communities to varying land uses in Oso Bay, Corpus Christi, Texas.

Kevin De Santiago*, Jennifer Pollack, Terry Palmer, Michael Wetz; Texas A&M University, Corpus Christi. (*Student Presentation*)

Coastal systems are subject to stress stemming from both natural and anthropogenic disturbances. One disturbance, known as nutrient loading, supports algal blooms that affect populations living within oxygen deprived sediment. Oso Bay, Corpus Christi, Texas is a standing example of a marine system affected by excessive nutrient loading and can provide insight as to how nutrient loading may affect benthic communities. This study focuses on six sites in Oso Bay; five of which correspond to sources of anthropogenic runoff and include input from a wastewater treatment plant, an active and inactive golf course, residential areas, engineered stormwater, agricultural and industrial cooling water runoff. The sixth site is a site of continuous saltwater exchange between Oso Bay and Corpus Christi Bay. Beginning in February 2013, sediment samples have been collected monthly using benthic cores. Water quality parameters such temperature, salinity, and pH were measured concurrently. Temporal and spatial differences in macrobenthos were determined by comparing the species richness and abundance across the sites and amongst sampling dates. Preliminary results indicate strong seasonality amongst macrobenthos communities. Information on macrobenthos distribution spatial distribution across a gradient of varying anthropogenic inputs can help inform coastal resource management decisions.

Biological observations at the University Beach, Texas A&M University-Corpus Christi.

Fabio Moretzsohn; Harte Research Institute, Texas A&M University-Corpus Christi.

The campus of the Texas A&M University-Corpus Christi (TAMUCC) is located on a 240 acres island (actually it is a peninsula), Ward Island, between Corpus Christi Bay and Oso Bay. A small beach was constructed in 2001 on the Corpus Christi Bay side of the island, the University beach (UB), to restore part of the natural beach that had been lost over 70 years ago. It is 365 m long and about 30–60 m wide. The beach cell is surrounded by three breakwaters and flanked by two groins, protecting it from the bay, although it is often quite windy, hence, it is a popular destination for kite surfers. The wind and water transport sediments around, making the beach a dynamic coastal environment. Tombolos can sometimes be seen when the tide is low. As part of a monitoring project on the differential sorting of valves of *Periploma*

margaritaceum, a bivalve, in beach drift, weekly visits have been done to UB in the past 26 months. Although the ratio between left and right valves vary widely spatially and temporally, the average L/R valve ratio at UB was 26% (StDev: 17.1, range: 0 to 78%, n = 56), compared to 50% (StDev: 34.8, range: 2 to 150%, n = 25) on Gulf beaches along the Texas coast. Besides a discussion of preliminary results, this poster will also present some interesting biological observations and discoveries. Despite the restored beach being only 13 years old, it already supports a diverse ecosystem.

Estimating immigration of juvenile Atlantic croaker into Texas estuaries using tissue stable isotope analysis.

John A. Mohan* and Benjamin Walther; The University of Texas at Austin, Marine Science Institute. (*Student Presentation*)

The patterns and timing of animal migration are important factors influencing trophic dynamics, energy transfer, and connectivity of habitats. The timing of inshore immigration of juvenile fish may vary on geographic scales related to local hydrography (i.e. freshwater inflow) and physicochemical characteristics (i.e. salinity and temperature) of specific estuaries that vary by latitude. Tissue stable isotope analysis (SIA) of carbon and nitrogen in tissues with different turnover rates (e.g. muscle~slow and liver~fast) can reveal information on diet source (marine vs. estuarine) and trophic level, thereby providing insight into the timing of estuarine ingress across multiple life history stages. This study utilizes muscle and liver tissue SIA of juvenile croaker collected in Galveston Bay, Mission-Aransas, and Laguna Madre to compare patterns of estuarine immigration and trophic level estimates. $\delta^{15}N$ isotopes in both liver and muscle tissues were highly correlated (r^2=0.98) and showed clear geographic separation between bays. Muscle and liver $\delta^{13}C$ values were also correlated (r^2=0.79), but overlap in $\delta^{13}C$ values occurred between all bays. Tissue-diet equilibration times determined in the lab will be used to predict expected equilibrated C and N values of both liver and muscle tissue for each bay. Deviations between expected and observed values will be used to categorize immigrants as early or late migrants in each bay. We demonstrate the utility of using controlled lab experiments, multiple isotopes, and multiple tissues to estimate migration timing in juvenile fish along the Texas coast.

Innovative oyster reef restoration in Matagorda Bay, TX.

Julie Sullivan*, Mark Dumesnil; The Nature Conservancy.

The restoration of a once massive reef in Matagorda Bay is being undertaken by the Nature Conservancy in Texas. Once recorded as nearly four miles long, 490 acres in size, four to five feet thick with waves breaking over the reef's crest and a lighthouse placed on the end of the reef to notify ships of its presence, Half Moon Reef was once a prominent landmark of Matagorda Bay. You'd never know it if you visited today, as all that is left of the once massive oyster reef is a pile of shell hash 5 to 7 feet below the water's surface where the reef once stood tall. Several innovative methods are being tested in this reef's design. We are using an unusual range of material sizes: limestone and concrete ranging in size from 6 inches to 3 feet to increase the size variability of interstitial spaces available as habitat for associated marine fauna.

We are placing the material in a series of parallel rows rather than as one large pile which should increase nutrients available to the oysters and allow them to grow into their footprint. The rows are being created with a crest height of 3 feet rather than as flat rows to mimic the 3-dimensional qualities of undisturbed oyster reefs. This project helps provide for sustainable fisheries, restores marine habitat, and adds to the resiliency of Matagorda Bay and its communities.

Bathymetric Lidar Survey of Redfish Bay, TX Using Discrete-Return And Full-Waveform Ranging Modes.

[1,2]M. J. Starek*, [3]J.C. Fernandez-Diaz, [2]J.G. Gibeaut, [3]C. Glennie, [3]R.L. Shrestha, [3]Z. Pan, [2]A. Lord, [2]J. Wood, [3]A. Sighani; [1]School of Engineering and Computer Science, Texas A&M University-Corpus Christi; [2]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi; [3]National Center for Airborne Laser Mapping, University of Houston.

Researchers with the Coastal and Marine Geospatial Lab (CMGL) of the Harte Research Institute at Texas A&M University-Corpus Christi and the University of Houston's (UH) National Center for Airborne Laser Mapping (NCALM) conducted a coordinated airborne and boat survey of the Redfish Bay State Scientific Area, TX to investigate the shallow water mapping capabilities of a bathymetric lidar system. UH/NCALM conducted the airborne survey using their single-frequency 532 nm green lidar system called Aquarius. CMGL conducted a grid-based boat survey of the bay to collect in-situ GPS elevation data and measure benthic coverage (e.g. seagrass type and canopy height). The return signal of an Aquarius lidar pulse is analyzed in real time by a hardware-based constant fraction discriminator (CFD) to detect returns from objects on the surface and determine ranges to those objects. This approach is commonly called discrete-return ranging, and Aquarius can record up to 4 returns per an emitted laser pulse. In contrast, full-waveform digitization records the incoming energy of an emitted pulse by sampling it at very high-frequency. Post-processing algorithms can then be applied to detect returns (ranges) from the digitized waveform. For this survey, a waveform digitizer was operated simultaneously to record the return waveforms at a rate of 1GHz with 12 bit dynamic range. This work compares bathymetric elevation derived from the discrete-return lidar data and full-waveform lidar data in the shallow bay. Additionally, the potential of this technology for extracting metrics on seagrass canopy and distribution will be presented.

Delineation of Marsh Types of the Texas Coast from Corpus Christi Bay to the Sabine River in 2010.

[1]Nicholas Enwright, [1]Stephen B. Hartley, [2]Michael G. Brasher*, [3]Jenneke M. Visser, [4]Michael K. Mitchell, [5]Bart M. Ballard, [2]Mark W. Parr, [1]Brady R. Couvillion, [2]Barry C. Wilson; [1]U.S. Geological Survey National Wetlands Research Center; [2]Gulf Coast Joint Venture; [3]University of Louisiana-Lafayette, Institute of Coastal Ecology and Engineering; [4]Ducks Unlimited, Inc., Southern Regional Office; [5]Texas A&M University-Kingsville, Department of Animal and Wildlife Sciences.

Detailed information on the extent and distribution of marsh vegetation zones throughout the Texas coast has been historically unavailable. To address this data gap, the U.S. Geological Survey National Wetlands Research Center, in collaboration with others, produced a seamless and standardized classification of marsh vegetation types indicative of salinity zones (i.e., fresh, intermediate, brackish, and saline) along the mid- and upper Texas coast from Corpus Christi Bay to the Sabine River. Decision tree analyses were used to classify marsh types from a combination of 1,000 reference points, multitemporal satellite imagery from 2009 - 2011, LiDAR data, contemporary land cover classifications, and other spatial variables believed to influence marsh vegetation zonation. Overall accuracy was 91% (95% CI: 89.2 – 92.8) with a kappa statistic of 0.79 (95% CI: 0.77 - 0.81). We created an alternative classification of only three marsh types, in which intermediate and brackish marsh were combined. Overall accuracy of the alternative classification was 92.4% (95% CI: 90.7 - 94.2) and the kappa statistic was 0.83 (95% CI: 0.81 - 0.85). Mean user's accuracy for the four- and three- marsh type classifications was 65.4% and 75.6%, respectively, while mean producer's accuracy was 56.7% and 65.1%. This project demonstrated the effectiveness of a consistent and repeatable methodology for delineating salinity zones of Texas coastal marshes at a landscape scale. This classification will enable state agencies and conservation partnerships (e.g., Gulf Coast Prairie Landscape Conservation Cooperative and the Gulf Coast Joint Venture) to develop and/or refine conservation plans for priority coastal resources.

The importance of salinity tolerance in *Rangia cuneata.*

David Franklin; Texas A&M University-Corpus Christi, Environmental Science Department. (*Student Presentation*)

This poster describes a proposed research project that test the hypothesis that *Rangia cuneata* have tolerate salinity changes based on the salinity range in which they live. Clams that live in high salinity environments (>20 psu) should have a greater tolerance to higher salinity than clams that live in lower salinity waters (<10 psu). Another objective of this project is to test to see if size relates to salinity tolerance.

The importance of *Rangia cuneata* to Texas and the Gulf of Mexico is severely underestimated. They occupy estuaries that range in salinity from 0 to ~25 psu and serve as food source for multiple organisms, including humans. Its broad range of salinity tolerance allows it to be one of the few species that can inhabit areas were salinity changes regularly. In fact, *Rangia cuneata* requires salinity change to spawn. Multiple sizes of *Rangia cuneata*, meaning multiple age groups, are an indicator of regular freshwater inflow into the system.

Severe drought in Texas over many years has forced the communities of *Rangia cuneata* to move upstream. Some species that rely on Rangia sp. as juveniles or adults are commercially and recreationally harvested (e.g. blue crab *Callinectes sapidus* crab and black drum *Pogonias cromis*). It is important to understand what has caused this shift, either (1) competition from other mollusks that can tolerate higher salinity, or (2) an inability to tolerate the higher salinities for prolonged periods of time. Upstream shifts may have negative effects on the species that rely on *Rangia cuneata*.

Roadmap to Malathion.
Kelly Correia; Texas A&M Corpus Christi.

Malathion has been in circulation in our environment since the 1950s, and is most commonly used for mosquito and fly control. Although malathion is very efficient at keeping the mosquito and fly population in check, it has recently been shown to have many adverse effects on non-target organisms, such as crabs and lobsters. These effects are both lethal and sub-lethal and vary based on the species, life-stage, the concentration of malathion present, overall conditions at the time of pesticide exposure, and the interval of exposure. Very high concentrations of malathion were used in 2001, with an estimated 9.1 million kg of malathion being applied at both crop and non-crop locations in the United States. Seventy-five percent of this malathion was applied in the state of Texas. Recent surveys have shown a decrease in the amount of malathion being applied nationally. However, the application of malathion is worse on the environment than what was originally predicted.

This poster is a review of malathion, why it is a problem, and how it is having a negative effect on non-target organisms, such as many aquatic invertebrate species. This review also assesses two publications that show acute and long term, multiple exposure effects of malathion on blue crab *Callinectes sapidus* and American lobster *Homarus americanus* populations. This review shows that even a pesticide that looks harmless in the beginning can be proven to be very environmentally unfriendly overall.

Ecosystem-level consequences of trematode parasites in an estuarine system.
[1]Julia C. Buck* and [2]Jeffrey R. Wozniak; [1]Texas Research Institute for Environmental Studies, Sam Houston State University; [2]Department of Biological Sciences, Sam Houston State University.

Parasites are increasingly recognized as influential members of ecological communities. Although they are diminishingly small compared to other consumers, their total biomass in a system often exceeds that of top predators, and they can significantly alter food web dynamics. Additionally, parasites may modify ecosystem structure and function; however this has rarely been investigated empirically. Due to their high reproductive output and complex life cycles, members of the class Trematoda (flukes) are particularly influential parasites in estuarine ecosystems. In the coastal marshes of Texas, at least 11 species of trematodes from 8 different families utilize the plicated horn snail (*Cerithidea pliculosa*) as a first intermediate host, fish, crabs, or bivalves as second intermediate hosts, and birds or mammals as final hosts. Trematodes may shape behavior and population dynamics of their hosts, alter interspecific competition, modify energy flow, and influence biodiversity, suggesting their potential for profound ecosystem-level consequences. Here we present experimental plans to investigate the influence of trematode parasites in the marshes of the Guadalupe River Estuary. In this system, hydrological connectivity is regulated by tidal cycles, seasonal water-level shifts, watershed-scale rainfall, and anthropogenically-modified freshwater inflows from the river. Spatio-temporal variability in hydrological connectivity may affect biota, including parasites and their hosts. We will conduct laboratory and in-situ mesocosm experiments to quantify effects of

trematode parasites on ecosystem structure and function, including primary productivity, diversity, and nutrient cycling. Furthermore, our experiments will explore the consequences of variable hydrological connectivity on host-parasite interactions and their effects on ecosystems.

Alkalinity Trends in the Dewatering Estuaries of the Texas Coastal Bend.

Melissa McCutcheon*, Xinping Hu, Jennifer Pollack, Paul Montagna, Zhangxian Ouyang; Texas A&M University Corpus Christi. (*Student Presentation*)

Temporal trends of the alkalinity of 33 estuarine water bodies along the Texas coast were analyzed using alkalinity data collected by the Texas Commission of Environmental Quality (TCEQ) spanning from 1969 to 2010. Significant long-term alkalinity reduction was observed in 21 of the 33 bodies of water, reduction rates spanning from 2.5 to 21.4 μmol L^{-1} yr^{-1}. A survey from October 2013 in Copano and Aransas Bays also revealed significant drawdown of specific alkalinity compared to the Gulf surface waters, indicating alkalinity consumption in the estuary. Since much of the Texas coast has been experiencing low levels of precipitation due to drought conditions and human-regulated freshwater diversion, there has been a decrease in river runoff and therefore less alkalinity transport into the estuaries. We propose that decreasing river flow to the estuaries is a substantial driving force for long-term alkalinity decrease. This trend is likely to introduce acidification risks to the estuaries, potentially threatening shellfish productivity. It will likely also decrease alkalinity export from the bays to the coastal Gulf, which may decrease the buffering capacity of the coastal water to ocean acidification in this region.

New record of *Streblospio gynobranchiata* in Rincon Bayou Estuary, TX.

Meredyth Herdener; Marine Biology Department, Texas A&M University, Corpus Christi. (*Student Presentation*)

Streblospio gynobranchiata was only recently designated as a distinct species within the *Streblospio* genus. Previously, this worm was thought to be another morphotype of *Streblospio benedicti*. *S. gynobranchiata* has been previously identified in northern Texas bays on the Gulf of Mexico, but no further south than Aransas Bay. This study examined macrofauna samples taken from Rincon Bayou, a wetland located on the Nueces Delta located near Corpus Christi, Texas, to determine if *S. gynobranchiata* extends into the southern Texas bays.

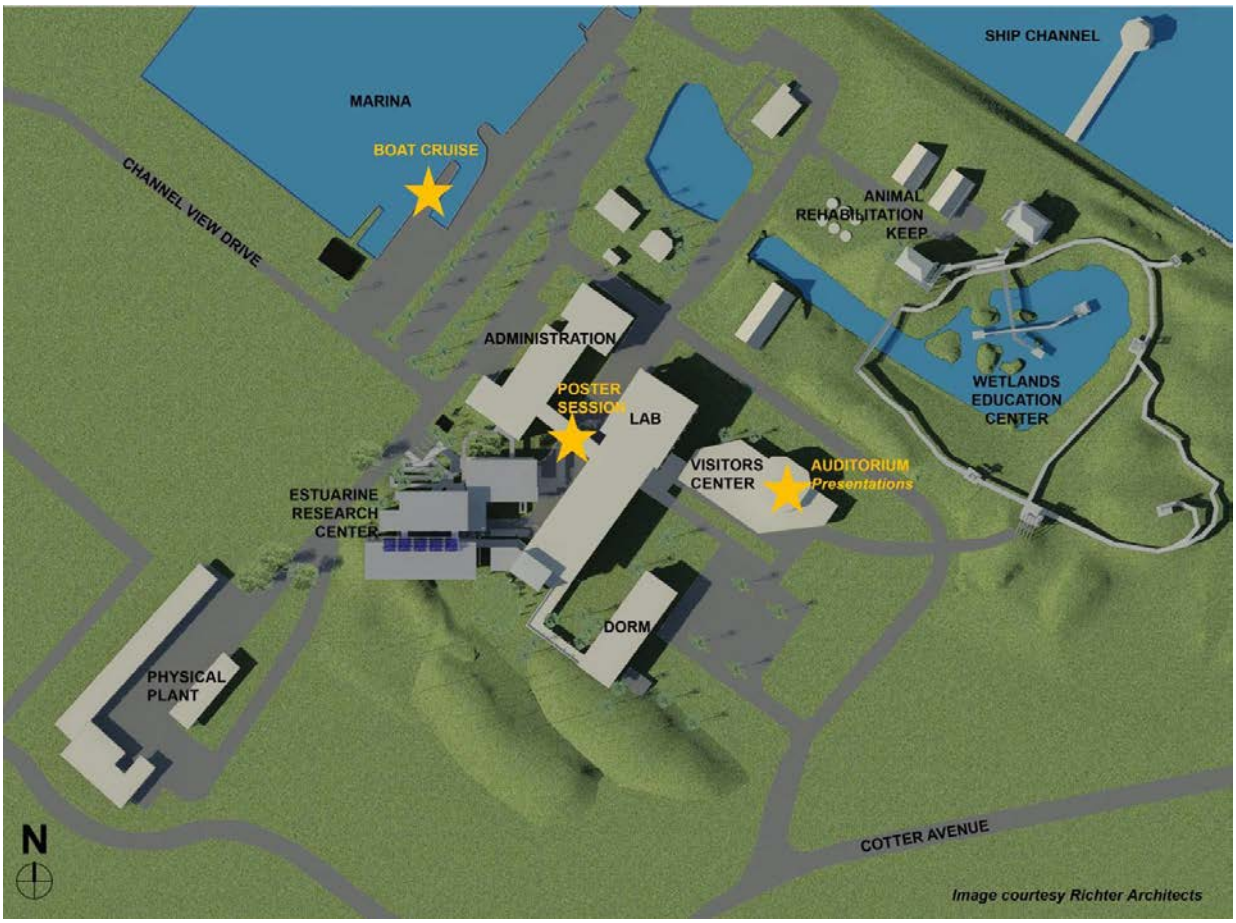
Rincon Bayou is a reverse estuary subjected to periods of intense freshwater inflows from dam releases. *S. gynobranchiata* was found coincident with *S. benedicti* in sieved sediment samples at a depth of zero to three centimeters at a single station located in the upper Rincon Bayou. This particular location is closest to the Nueces overflow channel and is influenced by river inflow. The increase of freshwater inflows through an overflow channel has led to a community structure dominated by *Streblospio spp*. The findings from this study should aid in distinguishing between the two *Streblospio* species in the area. The second species of *Streblospio* present in this area may provide additional information as an indicator species for environmental disturbance in this region which has implications for freshwater management in the Rincon Bayou area.

Using ArcGIS to Classify Seagrass Habitats in the Upper Laguna Madre, Lower Laguna Madre, and Galveston Bay.

Emma Clarkson*, Faye Grubbs, Paul Daugherty; Texas Parks and Wildlife Department.

Establishing baseline information on total seagrass coverage is important for resource managers to assess the condition of the ecosystem. This information can also be used to compare and assess changes over time. Texas Parks and Wildlife is currently utilizing ArcGIS to analyze aerial imagery of the upper and lower Laguna Madre and Galveston Bay. This analysis will identify seagrass habitat and calculate an estimate of seagrass coverage and habitat type in these bay systems. As of now, the analysis of the upper Laguna Madre estimates 5,128 ha of continuous seagrass coverage, 398 ha of "patchy" seagrass coverage, and 2,235 ha of unconsolidated bottom, or sandy bottoms with no seagrass present. The map had an overall accuracy of 80%. This poster highlights the methods used to obtain these estimates and presents the results of this analysis in the upper Laguna Madre. Further potential uses for this analysis are also discussed.

Campus Map



Map of the main campus of The University of Texas Marine Science Institute.

The University of Texas Marine Science Institute is dedicated to the three central functions of a major university (research, education, and outreach) as they apply to the Texas coastal zone and other marine environments. As an organized research unit of The University of Texas at Austin, the main goal of the Marine Science Institute is to improve our understanding of the marine environment through rigorous scientific investigations.

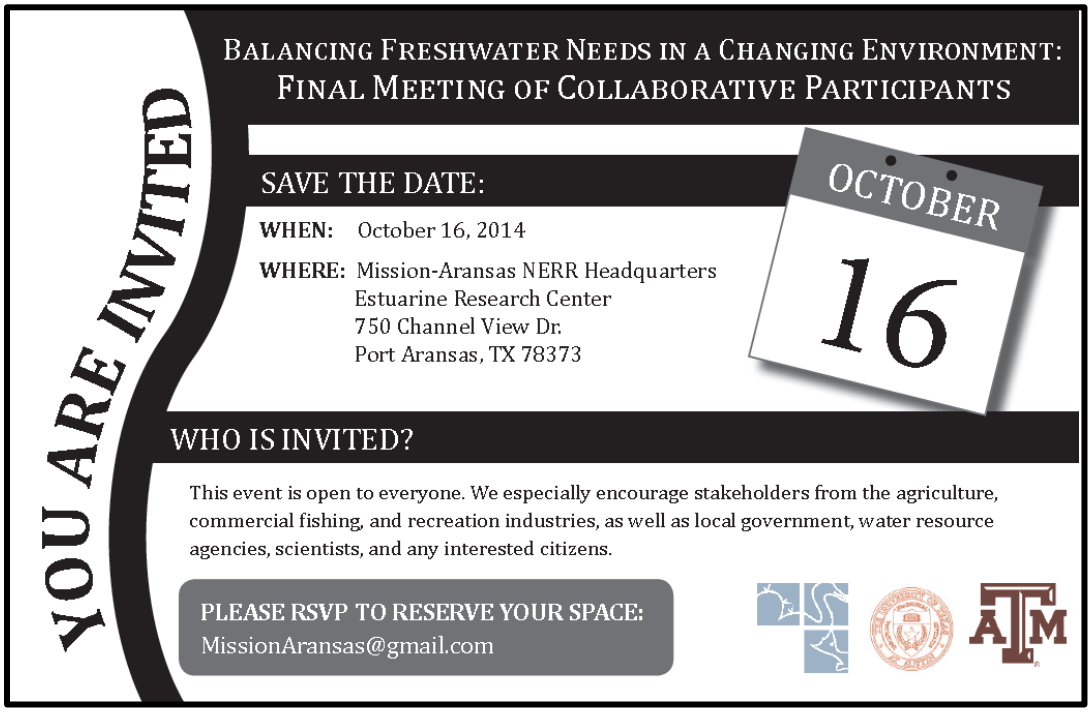
Greening the TBEM 2014

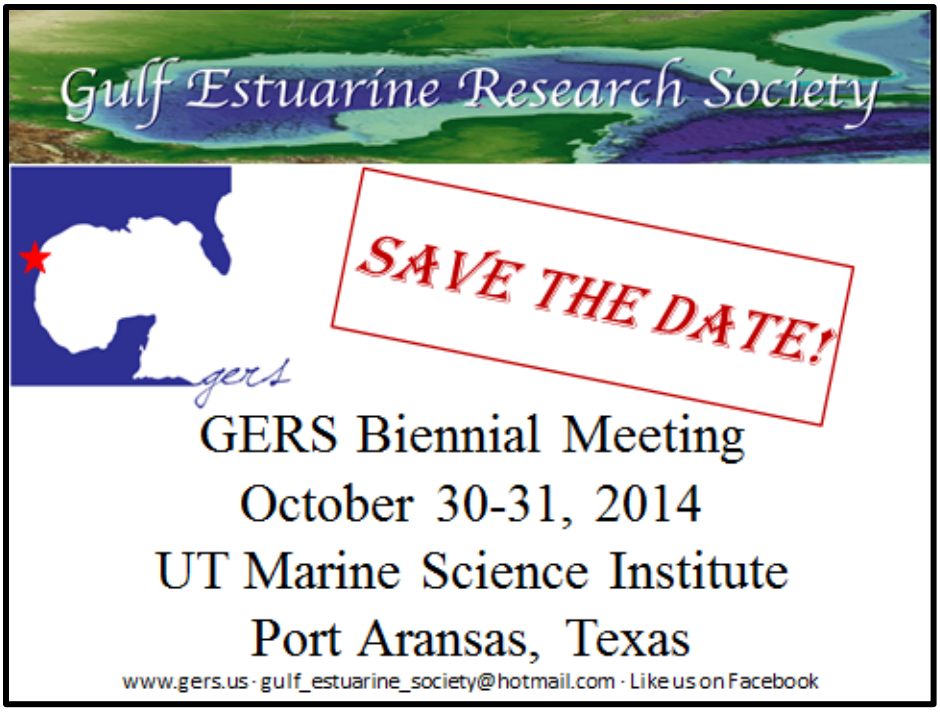
Bringing people together for a large meeting like Texas Bays and Estuaries can create significant environmental impacts. As professionals in our field, it is important for the Mission-Aransas Reserve and the University of Texas Marine Science Institute to lead by example. The following list highlights the steps we've taken to reduce the impact of TBEM 2014:

- Providing paper coffee mugs (please keep and reuse throughout day if possible)
- Convincing vendors to use Styrofoam alternatives
- Reusable bags for meeting materials
- Reusable nametag wallets
- Recycling bins provided by the UTMSI Green Team
- Limited paper use through duplex printing where possible
- Using materials with as much recycled content as possible
- Providing electronic copies of meeting materials to registered participants
- Contracting with local vendors whenever possible

To learn more about the Mission-Aransas Reserve and UTMSI efforts to reduce their environmental impact, check out the UTMSI Green Team (www.utmsi.utexas.edu/greenteam)!

Upcoming Events and Meetings

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