2010

Texas Bays and Estuaries Meeting

Marine Science Institute

The University of Texas at Austin

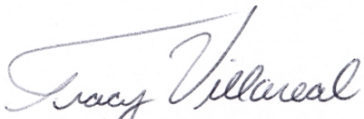
Port Aransas, Texas

April 15-16, 2010

Welcome to the 2010 Texas Bays and Estuaries Meeting!

This marks the 6th[rd] year of this revived meeting and is the first year we have had participants from Mexico. This year we are hosting a continuation of a *Sargassum* management symposium held previously in Corpus Christi. John Adams is the convener, so thank him for his efforts. As in past years, a notice board will be set up next to the Visitor Center's office, and a payphone is located near the restrooms. During the meeting, please refrain from smoking in the buildings. Restrooms are located in the Visitor's Center next to the library. Lunch will be served under the laboratory overhang next to the parking lot. Dinner will be served either outside or in the Visitor's Center lobby, depending on the weather. Beer and wine are available at dinner for one ticket (one ticket = $2.00). There is a ticket in your registration envelope to get you started. You must use the tickets, as the bartender will not accept cash. You may wander freely with your drinks, but please do not leave the campus with them. Please make time to examine the posters in the auditorium. Authors will be at their posters from 5 to 5:45 or whenever the BBQ pulls them away.

We hope you enjoy the meeting and look forward to seeing you again in the future!



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Generous sponsors of the Student Presentation Award: 1st $200, 2nd $100.

TBEM workers! Thank them if you see them!
Laura Ryckman, Colbi Brown, Amy Pyle, Lisa Havel, & Jena Campbell, Katie Swanson

Student Awards:
Student presentations are an important aspect of this meeting. The Best Student Presentation awards are one of the ways we have to acknowledge excellence in research. The Coastal Bend Bays Foundation has continued its support of this award ($200 for 1st, $100 for second).

2005: **Jason James**, TAMU, Corpus Christi, 1st Place, **Tatum Neeley**, TAMU, College Station, 2nd Place
2006: **Harris Mulhstein**, UT, Austin 1st Place. **Lucia B. Carreon Martinez**, UT Austin, 2nd Place
2007: **Matt Hubner** 1st Place, TAMU, Corpus Christi, 2007. **Megan Fencil**, UT Austin, 2nd Place,
2008**: John Froeschke**, TAMU, Corpus Christi, 1st place. **Laura Ryckman**m UT, Austin and **Katie Swanson**, UT, Austin, tie for 2nd place.
2009**: Christopher Wilson**, University of Texas, Austin. 1st place. **Danielle Crossen**, 2nd place, University of Houston, Clear Lake.

Texas Bays and Estuaries Meeting Program

Thursday, April 15, 2010

0730 - Registration, Visitor's Center Lobby, UTMSI, Port Aransas, TX

0820 - Welcome and Opening Remarks

0830- **Gene expression of nitrogen assimilation in the Texas brown tide *Aureoumbra lagunensis.*** Marco Agostoni, and Deana L. Erdner. University of Texas at Austin, Marine Science Institute, Port Aransas, TX

0850 – **16S rDNA Characterization of Epiphytic Bacteria on Seagrasses from an Estuary and a Hypersaline Lagoon on the South Texas Coas**t. Valerie K. Chilton, Kirk Cammarata

0910**- Habitat Selection of Red Drum Larvae: Preliminary Results and Future Research.** Lisa Havel and L. A. Fuiman, University of Texas Marine Science Institute

0930 - **Potential Sea-Level Rise Impacts on Coastal Woodlands on Lamar and Live Oak Peninsulas and Conservation Recommendations for Neotropical Avifauna.** Rosaleen March and Elizabeth Smith, Texas A&M University-Corpus Christi

0950- Colonization Dynamics of Benthic Habitats in Bahia Grande: four years post-flood. Troy McWhorter, Oscar Sosa, Mario Marquez, Erika Cornejo, Melissa Fuentes, David Hicks, University of Texas Brownsville

1010– **BREAK**

1040 **– Geomorphic response of beaches and foredunes to Hurricane Ike.** Anthony Reisinger[1], James Gibeaut[1], Tiffany Caudle[2] , John Andrews[2], Lihong Su[1], Diana Del Angel[1], Boris Radosavljevic[1], Eleonor Barraza[1] , Ali McKenzie[1] Greg Hauger[3], Dan Prouty[4], [1]Harte Research Institute, Texas A & M Corpus Christi . [2] Bureau of Economic Geology, The University of Texas at Austin . [3] Conrad Blucher Institute, Texas A & M Corpus Christi, [4] National Geodetic Survey NOAA

1100 – **Effects of summer diurnal hypoxia on harpacticoid copepod reproduction in Corpus Christi Bay, Texas.** Laura Ryckman[1], Edward Buskey[1] and Paul Montagna[2], [1]University of Texas Marine Science Institute, University of Texas at Austin. [2]Harte Research Institute for Gulf of Mexico Studies, Texas A&M Corpus Christi

1120 – **Nutrient Dose and Seasonal Dependence of Epiphyte Accumulation on *Halodule wrightii*.** Sweatman, Jennifer L.; Cammarata, Kirk, Texas A&M University – Corpus Christi; 6300 Ocean Dr., Corpus Christi, TX, 78412

1140 – **Crab-Mediated Effects on Salt Marshes.** Huy D. Vu, Jane Buck, Steven C. Pennings. Department of Biology and Biochemistry, University of Houston, Houston, TX 77204

1200- **Testing the Intermediate Disturbance Hypothesis for Artificial Reef Fouling Communities.** Edward Walk, David W. Hicks, Carlos Cintra Buenrostro, University of Texas Brownsville; Dale Shively, Texas Parks and Wildlife Dept

1220 – LUNCH catered by Robert's of MSI ($0.01 charge).

1300 - **The effects of natural and anthropogenic hydrologic changes on carbon and nitrogen dynamics in a subtropical estuarine food web**
Sarah Wallace, Susan Schonberg, Kimberly Jackson, and Ken Dunton.. University of Texas Marine Science Institute, Port Aransas, TX 78373

1320 – **Assessing the potential environmental impact of an offshore drilling platform prior to trans-continental relocation.**
Christopher Wilson, Kenneth Dunton, Susan Schonberg, The University of Texas at Austin Marine Science Institute

1340 – **Decadal changes in Precipitation, Evaporation and Temperature monitored at UTMSI**. Anthony F. (Tony) Amos, Univ. of Texas Marine Science Institute.

1400 – **What can optical measurements tell us about physical processes in the coastal zone?,** Darek Bogucki. Department of Physical & Environmental Sciences. Texas A&M University-Corpus Christi

1420 – **Conservation Planning to Address the Effects of Harmful Algal Blooms along the Texas Coast** Luci Cook-Hildreth, Tim Birdsong, Wendy Connally. Texas Parks and Wildlife Department

1440 – **Total regeneration vs. net ammonium (NH_4^+) fluxes, NH_4^+ demand, and hurricane effects at the sediment-water-interface in the hypoxic northern Gulf of Mexico (NGOMEX)**
Xiao Lin, Mark J. McCarthy, and Wayne S. Gardner, The University of Texas at Austin Marine Science Institute. Port Aransas, TX 78373, USA

1500 – **Break**

1530 – **Green sea turtle assemblages in Texas' Lower Laguna Madre.** Tasha L. Metz and André M. Landry, Jr., Texas A&M University-Galveston (Oral presentation); metzt@tamug.edu

1550 **– A Survey of Ten Texas Intertidal Rivers for *Prymnesium parvum*.** Janet Nelson[1] and Meridith Byrd[2] Texas Parks and Wildlife Department, Austin, TX, [2] Texas Parks and Wildlife Department, Port O'Connor, TX

1610– Thermal experience affects the ability of red drum larvae to escape from predators. Alfredo F. Ojanguren and Lee A. Fuiman, University of Texas at Austin Marine Science Institute - Port Aransas

1630– **Texas Healthy Habitats program,** Rhonda Cummins, Texas Sea Grant Extension Program, Calhoun County.

1650 – **Health Advisories for Consumption of Fish from Galveston Bay, Texas**. Terry L. Wade, Stephen T. Sweet and Jose L. Sericano, GERG Texas A&M University terry@gerg.tamu.edu, Jerry Ward, Michael Tennant, Zack Thomas, and Kirk Wiles, Texas Department of State Health Services Seafood and Aquatic Life Group.

1710 – End of talks, Poster Session and cash bar at the UTMSI Visitor Center.

- BBQ Dinner and cash bar: Steve Lew's BBQ, Rockport, TX ($0.01 charge).

1930 - Bar closes

ABSTRACTS – Texas Bays and Estuaries Oral Presentations

Decadal changes in Precipitation, Evaporation and Temperature monitored at UTMSI.
Anthony F. (Tony) Amos. University of Texas Marine Science Institute, Port Aransas, Texas ,
afamos@mail.utexas.edu

The Coastal Bend climate is generally classified as being semi-arid; evaporation greatly exceeding precipitation. While the evaporation rate has remained quite constant in the past decade, precipitation has varied widely. Air and sea temperature, humidity, atmospheric pressure, precipitation and salinity have been monitored at UTMSI in Port Aransas and other nearby locations for the past three decades. Since 1985 UTMSI has maintained the official Weather Service Cooperative Weather Observer Station (#7170) that monitors air temperature and rainfall. Over the 25-year span, annual rainfall has varied from 497mm (19.55") in the drought year of 1989 to 1411mm (55.56") in the wettest year of 2004 and the running mean has steadily increased to 907mm (35.71") by 2009. In 2009, a total of 95mm (3.73") of rain was recorded to the end of August but 630mm (24.79") fell from September through December and an additional 331mm (13.05") in the present year to-date. Daily evaporation rates have been monitored since 2001. Precipitation has exceeded precipitation for only 22 months of the 111-month record. Evaporation has exceeded Precipitation in all years (ranging from 114% in 2004 to 273% the very next year). Other factors controlling evaporation are explored. Atmospheric temperature has steadily increased at a rate of 0.1C per annum in the past quarter century.

Gene expression of nitrogen assimilation in the Texas brown tide *Aureoumbra lagunensis.*

Marco Agostoni[1], and Deana L. Erdner University of Texas at Austin, Marine Science Institute, Port Aransas, TX. Email address: agostoni@mail.utexas.edu

Understanding the influences of nutrient type and availability in harmful algal blooms will help to define the dynamics of these events. One approach for understanding nutrient use is to examine the expression of genes responsible for nutrient assimilation. The pelagophyte *Aureoumbra lagunensis* causes ecosystem disruptive algal blooms, and is responsible for the longest recorded harmful algal bloom (1989-1997). Because of *Aureoumbra*'s small size and its inability to use nitrate, it has been hypothesized that its ability to use ammonium and organic nitrogen, especially at low concentration, led to the unusual persistence of this bloom. Overall, our aim is to determine gene expression changes under growth on different nitrogen sources, with an eventual intent of developing expression assays that are indicative of nitrogen source use and/or sufficiency in *Aureoumbra*. We have cloned the genes encoding nitrogen assimilation from *Aureoumbra* and developed specific primers. We are using quantitative real-time PCR to determine the expression of the genes in cells grown on different nutrients both inorganic and organic, and these results will be presented. The data generated will provide insight into algal nutritional physiology, and ultimately help us to understand nitrogen use and sufficiency in natural populations of *Aureoumbra lagunensis*.

What can optical measurements tell us about physical processes in the coastal zone? Darek Bogucki, Department of Physical & Environmental Sciences, Texas A&M University-Corpus Christi. darek.bogucki@tamucc.edu

ABSTRACT: Small scale physical processes in the ocean play a key role in a range of environmental processes such as air-sea gas transfer, large scale ocean circulation, dispersion of pollutants, sediment transfer, coastal residence time and particle dynamics. Turbulence affects the path of light through water, thus providing a means to use optics to quantify small-scale physical processes. Recent progress in optical theory, laboratory experiments, and novel instrumentation leads to optical sensors which can provide time series and profiles of quantities such as the rates of turbulent dissipation of energy or temperature concurrently with observations of particle-flow interactions. These measurements can be made from either in situ or remote platforms, such as LIDAR from aircraft or satellites. I will present measurements of turbulent dissipation in the coastal zone, particle flow interaction, and well resolved oceanic temperature spectra with elusive Batchelor range. I will finish by outlining an approach to use lidar to quantify mixing dynamics in the coastal environment.

16S rDNA Characterization of Epiphytic Bacteria on Seagrasses from an Estuary and a Hypersaline Lagoon on the South Texas Coast. Valerie K. Chilton[1], Kirk Cammarata[1]
[1]Department of Life Sciences, Texas A&M University – Corpus Christi
Valerie.Chilton@tamucc.edu

There is concern for the global decline of seagrass beds due to their ecological importance. Epiphytic biofilms of bacteria and algae may contribute to the decline of seagrasses by shading the light required for photosynthesis. Eutrophication and other environmental changes may affect the overall quantity, diversity and species richness of these epiphytes. Because microbial populations can be indicators of biogeochemical conditions, characterization of the epiphytic organisms, particularly bacteria, will provide insight into environmental conditions.

Representative bacterial epiphyte species assemblages on both *Halodule wrightii* and cellulose substrates were compared between the Corpus Christi Bay estuary (East Flats) and a hypersaline lagoon (Upper Laguna Madre). Species assemblage profiles were generated by denaturing gradient gel electrophoresis (DGGE) following amplification of 16S rDNA genes using primers for alphaproteobacteria, gammaproteobacteria, cyanobacteria, and bacteroidetes.

Unique diversity and richness were observed for bacterial assemblages from the estuary and hypersaline lagoon, whereas assemblages taken from seagrass leaves and substrates appeared to have mostly similar diversity. A striking difference between seagrass leaf and substrate for a cyanobacterial amplicon suggests a host-specific preference. Some DGGE bands were excised, re-amplified, cloned, and sequenced. Comparison of a clone library to Ribosomal Database Project II indicates the presence of methanotrophs, nitrogen fixers, nitrifiers, sulfide oxidizers, and other species indicative of an interface between aerobic and anaerobic conditions.

Texas Healthy Habitats program, Rhonda Cummins, Texas Sea Grant Extension Program, Calhoun County. rdcummins@ag.tamu.edu

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. Locally, the Texas Healthy Habitats program involves middle and high school students, teachers, and community members in service-learning projects that improve and restore the natural environment. Working with Texas Parks and Wildlife and other partners, local schools can change the world, or at least a small part of it. In Calhoun County, a Travis Middle School environmental club, the Water Watchers, received a $15,000 grant last summer made possible by a donation from EnCana Oil & Gas (USA) Inc. to the Texas Parks and Wildlife Foundation.

The Water Watchers' project is located in a small area of a city park on Lavaca Bay that has been adversely impacted by development. They are reversing man's impact by using debris to create and improve habitat for common and priority species. They are converting an area with a decommissioned boat ramp into a native salt marsh using smooth cordgrass, black mangoves, and Carolina wolfberries that the students have transplanted and propagated. The debris from the boat ramp is being used to create an artificial reef just off shore of this "new" salt marsh to create habitat for aquatic species, including priority species, as well as slow down wave action to help the newly planted vegetation survive.

Habitat Selection of Red Drum Larvae: Preliminary Results and Future Research.
Lisa Havel and L. A. Fuiman. University of Texas Marine Science Institute
l.havel@mail.utexas.edu

Many marine fishes have complex life histories with pelagic larval phases followed by demersal juvenile and adult stages. The pelagic phase provides larvae an opportunity to disperse and then settle in a new location or return to their natal spawning site. Upon settlement a new suite of interactions, from the population to the ecosystem level, takes place, which have profound ecological and evolutionary consequences. While both phases have been widely studied across many species, much less is known about the transition from the pelagic to the benthic stage. In particular, little is known about the behavioral mechanisms of habitat selection in larval fishes. Settlement may depend on vision, auditory senses, and olfaction; however, their role in habitat selection is not well understood. The aim of my dissertation is to understand the process of settlement in red drum *Sciaenops ocellatus*, an ecologically and commercially important estuarine fish. I will use a suite of experiments to test hypotheses on the role of sensory systems in habitat choice, as well as attempt to determine how ontogeny affects preferences. Preliminary results on behavioral changes in this species when presented with olfactory cues will be discussed, as well as upcoming experiments and hypotheses.

Conservation Planning to Address the Effects of Harmful Algal Blooms along the Texas Coast

Luci Cook-Hildreth, Tim Birdsong, Wendy Connally. Texas Parks and Wildlife Department
Luci.Cook-Hildreth@tpwd.state.tx.us

In order to be eligible to receive funds through the Wildlife Conservation and Restoration Program and the State Wildlife Grants Program, Congress required each state fish and game agency to develop a State Wildlife Action Plan by 2006. These plans assess the health of the state's fish, wildlife and habitats, identify the problems they face, and outline their long-term conservation needs. Periodic updates to the plans are required, and the Texas Wildlife Action Plan (TXWAP) is scheduled to be updated in 2010. In order to insure that the impacts and related research needs of Harmful Algal Blooms (HABs) were accurately represented in the 2010 update, Texas Parks and Wildlife Department organized a planning workshop in Corpus Christi, hosted by the Harte Research Institute for Gulf of Mexico Studies. The primary goals of the workshop were: (1) identify key natural resource conservation issues associated with HABs in Texas; (2) identify information gaps that hinder the development of conservation strategies for addressing HABs; and (3) identify research and conservation priorities for addressing HABs in Texas. This presentation will provide an overview of the role that the TXWAP has played in guiding and supporting HABs research since 2006, summarize outcomes of the recent HABs workshop, and highlight opportunities to contribute to the update of the TXWAP through upcoming workshops planned along the Texas coast.

Total regeneration vs. net ammonium (NH_4^+) fluxes, NH_4^+ demand, and hurricane effects at the sediment-water-interface in the hypoxic northern Gulf of Mexico (NGOMEX)

Xiao Lin, Mark J. McCarthy, and Wayne S. Gardner. The University of Texas at Austin Marine Science Institute. Port Aransas, TX 78373, USA mailto:mshawl1983@gmail.com

Abstract A new approach, combining $^{15}NH_4^+$ isotope dilution and continuous-flow techniques, provided total and net NH_4^+ fluxes and sediment NH_4^+ demand (SAD) at the sediment water interface (SWI) of a hypoxic (C6) and normoxic site (CT) in the northern Gulf of Mexico before (July) and after (September) two hurricanes (Gustav and Ike) in 2008. Total regeneration fluxes were significantly higher than net fluxes at CT in July and C6 in September but not at C6 in July or CT in September. Net flux was higher at C6 than CT in July but lower than CT in September. In contrast, total regeneration fluxes were higher at C6 than CT on both dates. Total regeneration flux decreased after the hurricanes at C6. SAD values were higher at C6 than CT in September but not in July. All SAD values were > 2-fold higher than corresponding net fluxes, indicating SWI NH_4^+ limitation. Conclusions: (1) net fluxes sometimes underestimated total regeneration and uptake rates, (2) hurricane activity decreased N dynamics, and (3) SAD values indicated microbial N limitation before and after the hurricanes. These results clarify understanding of SWI-N dynamics obtained from net flux measurements by including information on total NH_4^+ regeneration, actual uptake, and demand.

Potential Sea-Level Rise Impacts on Coastal Woodlands on Lamar and Live Oak Peninsulas and Conservation Recommendations for Neotropical Avifauna

Rosaleen March and Elizabeth Smith, Texas A&M University-Corpus Christi
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The Texas Coastal Bend provides critical habitat to neotropical migrants that utilize woodland habitats. To determine where conservation priorities should be focused on each peninsula, we characterized habitat complexity under reference conditions and predicted shifts from various sea-level rise (SLR) scenarios. Models were developed in GIS using the following data: elevation, soil, ecological habitats, and wetland composition. Potential habitat conversion was evaluated using three scenarios: 1-, 2-, and 3-m SLR. On the Lamar peninsula, 1-m SLR resulted in 7% reduction of evergreen woodland; and, with 3-m SLR, evergreen reduced 71%. Due to its higher elevation, Live Oak exhibited less evergreen woodland habitat loss. At 1-m SLR, < 1% loss in evergreen occurred, whereas as 3-m SLR, overall loss to evergreen habitat occurred at 15%. Conservation lands have been designated on Lamar Peninsula; however, 2- and 3-m SLR will drastically reduce woodland coverage. Woodland areas not affected by SLR are currently being developed; therefore, conservation should be emphasized in higher elevation areas adjacent to existing easements. On Live Oak Peninsula, a small percentage of woodlands would be potentially affected by SLR; however, woodland areas throughout the peninsula are rapidly becoming fragmented and converted as a result of unplanned development. We propose expanding existing protected areas and conserving new areas of woodlands that are at high elevations, are large, and exhibit low fragmentation.

Green sea turtle assemblages in Texas' Lower Laguna Madre.

Tasha L. Metz and André M. Landry, Jr., Texas A&M University-Galveston;
mmetzt@tamug.eduail

Texas waters provide essential habitat to five protected sea turtle species, including the green turtle (*Chelonia mydas*). Population dynamics of Texas' green turtle assemblage are virtually unknown to management agencies, despite the likelihood constituent stocks represent the largest northern Gulf concentration of conspecifics west of Florida. To fill this informational void, entanglement netting, visual surveys and satellite telemetry were utilized across four seasonal periods to assess abundance, distribution, and habitat use of greens within seagrass and jettied habitats of the Lower Laguna Madre (LLM). These efforts provided evidence for an exponentially increasing abundance of green turtles in Texas waters since 1991, with this population concentrated in lower reaches of the LLM. Visual sightings of post-pelagic greens at the Brazos-Santiago Pass jetties during 2009 were roughly nine times those reported by Coyne (1994) for comparable months in 1992-1993. This population growth included the increased frequency of smaller individuals in study-wide catches since 2006, likely an artifact of enhanced recruitment from elevated nesting productivity at beaches in Mexico, Florida, and the Caribbean. Two greens satellite tracked during this study made seasonal migrations into Mexican waters following passage of strong cold fronts. However, many greens may overwinter in the LLM as evidenced by a record-breaking cold-stunning event in January 2010 that involved hundreds of green turtles and heightened concern for its impact on this species' population status in Texas.

Colonization Dynamics of Benthic Habitats in Bahia Grande: four years post-flood

Troy McWhorter (troy_mcwhorter@yahoo.com), Oscar Sosa, Mario Marquez, Erika Cornejo, Melissa Fuentes, David Hicks, University of Texas Brownsville

In July 2005, the former 2,600-hectare playa lake, Bahia Grande, was re-connected for the first time in 70 years to the tidal waters of the lower Laguna Madre. Immediately following re-flooding, a monitoring program was initiated to document colonization and succession of benthic habitats to provide natural resource managers supplementary data for evaluating the ecological successes of restoration efforts. Surveys were conducted quarterly at 24 randomly generated sites. Prior to the removal of three flow-constricting culverts (2007) from the 4.5 m wide pilot channel, extreme hypersalinity (80 to >100 ppt) events were observed to periodically interrupt and redirect successional sequences. Since the removal of the culverts, a more moderate hypersalinity regime (~45-60 ppt) has prevailed. During periods of moderate hypersalinity, benthic sediments were colonized by typical lagoonal species (polychaete worms, bivalve molluscs, and small benthic crustaceans) similar to that of Laguna Madre. During periods of extreme hypersalinity, succession redirects towards a community similar in composition to those of wind-tidal flats and coastal evaporative salt ponds (salt tolerant insect larvae and adults). The Bahia Grande's anticipated value as nursery habitat for juveniles of important commercial species (finfish and shellfish) will be diminished under the current widely fluctuating salinity regime. Therefore, the findings reported herein continue to support the need for future manipulations and enhancement actions to prevent the development of extreme hypersalinity.

Conservation Planning to Address the Effects of Harmful Algal Blooms along the Texas Coast. Janet Nelson[1] and Meridith Byrd[2] [1] Texas Parks and Wildlife Department, Austin, TX janet.nelson@tpwd.state.tx.us. [2] Texas Parks and Wildlife Department, Port O'Connor, TX

Since 2001 Texas has experienced a marked increase in the frequency, duration, and intensity of blooms of the toxic haptophyte *Prymnesium parvum*, commonly known as the golden alga. *P. parvum* blooms have affected five Texas river basins: the Canadian, Red, Brazos, Colorado, and Rio Grande. Though most of these blooms have occurred in the upper portions of these river basins, in early 2006 two fish kills were confirmed along the lower Brazos River, marking the first occurrence of *P. parvum* near the coast. In 2008 blooms were confirmed in an additional four waterbodies along the lower Texas coast. There is concern over the possibility of *P. parvum* entering and blooming in Texas' estuaries because the species is primarily an estuarine organism in other parts of the world. This study surveyed *P. parvum* concentrations in the tidal portion of ten Texas rivers: the Sabine, Trinity, Brazos, Colorado, Lavaca, Guadalupe, Aransas, Nueces, Arroyo Colorado, and the Rio Grande. The 2008 season proved to be atypical, as the warm, wet winter may have prohibited large-scale blooms from occurring. No *P. parvum* were found in any of the samples. In 2009 the typical large inland blooms returned and *P. parvum* was present at two locations along the Texas coast in the tidal portions of the Arroyo Colorado and the Brazos River.

Thermal experience affects the ability of red drum larvae to escape from predators.
Alfredo F. Ojanguren and Lee A. Fuiman, University of Texas at Austin Marine Science Institute - Port Aransas afo132@mail.utexas.edu

Environmental conditions have well-known immediate effects and less-studied long term phenotypic consequences for fish larvae. For instance, water temperature affects metabolism, developmental rate, growth and performance in general functions, but the permanent effects on fish phenotype are largely unexplored. Red drum (*Sciaenops ocellatus*) is an interesting model organism to test these ideas because females spawn during a period of sharp decline in water temperatures, between September and November (from 30 ºC to 20 ºC). Previous research on this species has shown a seasonal decrease in performance of wild. The aim of this study was to investigate the effects of incubation temperature on behavioral performance of settlement size larvae. Fertilized eggs were collected immediately after spawning and incubated under different thermal regimes. When larvae reached the settlement size (c. 20 days post hatching), twenty four fish from each incubation temperature were tested for escape responses to a visual stimulus. The experiments were replicated to account for possible differences between egg batches. Our results contribute to a better understanding of the effects of early thermal experience on behavioral traits with potential consequences for recruitment of marine fish.

Geomorphic response of beaches and foredunes to Hurricane Ike. Anthony Reisinger[1], James Gibeaut[1], Tiffany Caudle[2] , John Andrews[2], Lihong Su[1], Diana Del Angel[1], Boris Radosavljevic[1], Eleonor Barraza[1] , Ali McKenzie[1] Greg Hauger[3], Dan Prouty[4]

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[2] Bureau of Economic Geology, The University of Texas at Austin
[3] Conrad Blucher Institute, Texas A & M Corpus Christi
[4] National Geodetic Survey NOAA
Hurricane Ike struck the Texas coast on September 13, 2008, making landfall on the eastern end of Galveston Island as a large and strong category 2 hurricane. Storm surge reached a maximum of 6.4 meters causing overwash of the barrier island which resulted in near complete loss of the foredune complex from Follets Island to High Island. A change analysis was performed using pre-and post-storm comparisons of airborne lidar surveys, beach profiles, and aerial photography. Volumetric lidar comparisons spanning the landfall area showed most beaches experienced erosion of their beach/foredune complex and averaged 0.74 m^3/m^2, whereas, washover deposition for these sites averaged 0.21 m^3/m^2. Shoreline retreat after the storm, varied from 10 to more than 80 m with an average of 64 meters. However, three months later shorelines had advanced an average of 37 m. Beach profiles measured 6 months post-storm show complicated pattern of recovery. In some areas, enough sand returned to the profile to advance the shoreline to the pre-storm location. Even though the shoreline position has recovered in these areas, the profile remains low. This shoreline is undergoing long-term retreat. Thus, if morphologic recovery occurs, it will likely take years without intervention.

Effects of summer diurnal hypoxia on harpacticoid copepod reproduction in Corpus Christi Bay, Texas

Laura Ryckman[1], Edward Buskey[1] and Paul Montagna[2], [1]University of Texas Marine Science Institute, University of Texas at Austin (ryckman@mail.utexas.edu), [2]Harte Research Institute for Gulf of Mexico Studies, Texas A&M Corpus Christi

Hypoxic (dissolved oxygen less than 2 mg/L) events occur in the summertime during early morning hours in Corpus Christi Bay, Texas. Exposure to hypoxia corresponds to decreased population density and diversity of benthic organisms. The sub-lethal effects of adverse environmental conditions, such as hypoxia, can be measured by changes in reproduction in indicator organisms. Meiobenthic harpacticoid copepods carry their eggs, and so egg development is influenced by the environmental conditions the parent organism experiences. The purpose of the current study is to examine the effect of hypoxia on the reproduction of harpacticoid copepods in a diurnally hypoxic bay. Harpacticoid copepod abundance varied greatly between replicate samples for all stations and dates. The total abundance, biomass and abundance of gravid females were related to the spatial and temporal patterns of probabilities of hypoxia. Decreased abundances and biomass were observed at stations more likely to be hypoxic in June and July, but the percentage of gravid females in the population did not differ by site type or date. Effects of hypoxia on harpacticoid copepods in this system were reduced compared to areas that experienced constant hypoxia. The duration and concentration of dissolved oxygen are important determinants to the effects of hypoxia on harpacticoid copepod abundance and reproduction.

Nutrient Dose and Seasonal Dependence of Epiphyte Accumulation on *Halodule wrightii*

Sweatman, Jennifer L.; Cammarata, Kirk, Texas A&M University – Corpus Christi; 6300 Ocean Dr., Corpus Christi, TX, 78412, Jennifer.Sweatman@tamucc.edu

Nutrient loading in estuarine habitats as a result of anthropogenic influences is potentially harmful to seagrasses and could increase epiphyte accumulation. Epiphyte accumulations for monotypic *Halodule wrightii* stands from East Flats and Nighthawk Bay in the Upper Laguna Madre were compared using a novel method of epiphyte quantification with improved spatiotemporal resolution. In addition to seagrass blade length, width, and area, this technique fluoresces and quantifies epiphyte loads based on their unique photosynthetic pigments and fluorescence properties. We measured epiphyte accumulation on *H. wrightii* in response to two concentrations of nutrients (low, 120 g, and high, 500 g) during three seasons (early summer, late summer, and fall). During early summer and fall sampling seasons at East Flats, epiphyte abundance was significantly different among all three fertilizer treatments. During late summer, epiphyte abundance was significantly higher at both low and high fertilizer concentrations than at the control. No increase was detected in epiphyte abundance at Nighthawk Bay during early and late summer seasons. In the Fall, however, epiphyte abundances were significantly higher when exposed to the high fertilizer concentration than the low and control concentrations. Salinity, temperature, and grazers present were observed at both sites. Intrinsic differences between sites may be the most important factors determining effects of nutrient enrichment on epiphyte accumulation on seagrasses.

Crab-Mediated Effects on Salt Marshes. Huy D. Vu, Jane Buck, Steven C. Pennings. Department of Biology and Biochemistry, University of Houston, Houston, TX 77204

Salt marshes provide many ecosystem services to humanity, but are threatened by sea-level rise. Many studies examining the impacts of sea-level rise neglect the role of marsh biota. In some areas, sea-level rise is leading to rapid headward erosion of marsh creeks, characterized by dense crab populations. Crab burrowing and herbivory might affect creek erosion, but little is known about how these processes vary among crab species. We compared burrowing and herbivory rates of four common marsh crabs (*Sesarma reticulatum*, *Eurytium limosum*, *Panopeus herbstii*, *Uca pugnax*) in a mesocosm experiment. The four crab species differed in their impacts. *Sesarma* excavated the most soil and strongly reduced both below and above-ground *Spartina* biomass. Feeding assays showed that this crab directly consumes *Spartina*. *Eurytium* and *Panopeus*, which are predators, reduced below-ground *Spartina* biomass, likely by damaging roots while burrowing. *Uca*, which is a deposit feeder, increased both below and above-ground *Spartina* biomass, likely by improving soil oxygenation. In sum, crabs may mediate creek growth in response to sea level rise by excavating sediments, by indirectly damaging plant roots and weakening their ability to bind marsh sediments, and by directly consuming marsh plants. Because different crab species differ in these effects, the net impact of the crab community on marsh responses to sea level rise will be a function of the relative abundance of different crab species.

Testing the Intermediate Disturbance Hypothesis for Artificial Reef Fouling Communities

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On November 17, 2007 the 473 ft *U.S.T.S. Texas Clipper* became the newest addition to the Texas Artificial Reef Program. Artificial reefs are deployed for the purpose of influencing physical, biological, and/or socioeconomic processes related to marine resources in areas wherein natural hard substrata are rare. The establishment of the Texas Clipper Reef off the southernmost Texas coast provided a unique opportunity for testing the Intermediate Disturbance Hypothesis (IDH) to assess the applicability of artificial disturbances as a management tool for increasing diversity of fouling communities in artificial reefs. Physical disturbances (control 0%, low 22%, medium 38.5%, and high 55%) were applied to steel settlement plates (12 per treatment) attached to the hull of the ship over an eight month period. All treatments were replicated within each of six experimental plate racks (complete randomized block design within-block replication). The results provided little support for the IDH wherein species richness is maximized at intermediate disturbance levels. Instead, species richness was greatest in the control and low disturbance treatments and significantly decreased with increasing disturbance levels. Fouling communities exhibit rapid growth and colonization rates while simultaneously experiencing high attrition through predation and short individual life spans. Accordingly, such communities likely exist at a high disturbance intensity and frequency in which further disturbance decrease species richness.

Health Advisories for Consumption of Fish from Galveston Bay, Texas. Terry L. Wade, Stephen T. Sweet and Jose L. Sericano, GERG Texas A&M University terry@gerg.tamu.edu Jerry Ward, Michael Tennant, Zack Thomas, and Kirk Wiles, Texas Department of State Health Services Seafood and Aquatic Life Group.

Contaminants of potential adverse human health concern were monitored by analyses of fish and blue crab tissues from Galveston Bay, Texas. The first 122 samples were collected between April and June 2006 and the second 82 samples between November 2006 and May 2007. Samples were analyzed for trace elements (As, Cd, Cu, Pb, Hg, Se and Zn), organochlorine pesticides (OC), volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), polychlorinated biphenyls (PCBs), polychlorinated dibenzofurans and polychlorinated dibenzo-*p*-dioxins (PCDFs/PCDDs). Contaminant concentrations were compared to health assessment comparison values (HACV) for humans. Concentrations of trace elements, VOC, SVOC and OC were all below the HACV. Gaftopsail catfish and spotted seatrout indicated the presence of PCDFs/PCDDs and PCBs at concentrations above the HACV. These findings resulted in issuance of a consumption advisory (one 8 oz meal per month for general population and no consumption for women who are nursing, pregnant or who may become pregnant and children under 12) in 2008 for all catfish species and spotted seatrout from Galveston Bay. Other species (blue crab, red drum, black drum and southern flounder) were sampled and found safe to eat. The contaminants do not pose a threat for other recreational uses of the bay.

The effects of natural and anthropogenic hydrologic changes on carbon and nitrogen dynamics in a subtropical estuarine food web. Sarah Wallace, Susan Schonberg, Kimberly Jackson, and Ken Dunton.. University of Texas Marine Science Institute, Port Aransas, TX 78373. sarahwallace@mail.utexas.edu

The delivery of organic matter and nutrients to estuaries is tightly coupled to freshwater inflow. In South Texas, natural cycles of flood and drought, combined with anthropogenic disturbances to hydrology, make these parameters variable on spatial and temporal scales. We investigated the long-term impacts of hydrologic alterations, including flood, drought, and wastewater inflow, on the benthic and pelagic food webs within the Nueces marsh. Stable nitrogen and carbon isotopic analyses of sediment, algae, emergent vegetation, and infaunal and epifaunal invertebrates were used in conjunction with water column collections of particulate organic matter, zooplankton, and fish to construct food webs based on their ^{15}N values . Our comparative approach utilized recently collected samples and historical data collected at both reference and wastewater diversion stations under varying climatic conditions. We found clear enrichment in $\delta^{15}N$ in wastewater sites as compared to reference sites under normal hydrologic conditions. During drought conditions, benthic and pelagic biota in both wastewater and reference sites were characterized by having elevated $\delta^{15}N$ signatures. Data from flood years indicated a change in organic matter supply and nekton distribution during periods of high water. These data indicate that enriched N enters the food web through both grazer and detrital pathways, and indicates important patterns of site fidelity in top nekton predators.

Assessing the potential environmental impact of an offshore drilling platform prior to trans-continental relocation.

Christopher Wilson, Kenneth Dunton, Susan Schonberg, The University of Texas at Austin Marine Science Institute, Email: chriswilson@mail.utexas.edu

The spread of invasive flora and fauna is of major concern world wide as non-native species are capable of devastating local ecosystems. Once an invasive species is introduced to a new habitat, the control or removal of that species is often extremely costly. Scientists are concerned that the trans-continental transport of exploratory drilling platforms may result in the introduction of invasive marine species into new habitats. These drilling platforms can remain stationary for extended periods of time and accumulate a variety of marine life between redeployments. The potential environmental impact of relocating the drilling platform *Ocean America* from the Gulf of Mexico to Australia was assessed by a team of researchers. The scientists traveled offshore to the location of the drilling platform and sampled the encrusting marine life found on the submerged pillars of the structure. Vertical sampling of the pillars, which were raised above the water for transport, provided valuable information used to predict the possible spread of invasive species into Australian waters.

Poster Abstracts

Life history and population genetics research at Perry R. Bass Marine Fisheries Research Station, Texas Parks and Wildlife

Joel Anderson, Dusty McDonald, Britt Bumguardner and William Karel. Perry R. Bass Marine Fisheries Research Station, Texas Parks and Wildlife, Palacios, TX.

The Perry R. Bass Marine Fisheries Research Station (PRB) is the main "basic research" arm of the coastal fisheries division of Texas Parks and Wildlife (TPWD). Biologists at PRB conduct life history and genetics research which is used to support TPWD management strategies, as well as provide basic measures for monitoring the health and sustainability of marine fish populations. Biologists at PRB routinely employ progressive methods to explore age and growth, fecundity, spawning seasonality , migration rates, census population size (N) and genetic population size (N_e) of marine species of interest or concern to the state of Texas. Additionally, cooperative projects with internal and external partners allow PRB staff to expand the general knowledge of the fish, fisheries and marine habitats that characterize the coast of Texas. Such collaborative efforts have allowed PRB to integrate with the scientific community working on coastal issues in Texas, and have provided opportunities to expand the working knowledge used by field biologists and fishery managers. Here, we outline the type of research typically conducted at PRB, and focus on the two main research programs, life history and genetics. We give examples of how the results of ongoing projects may be used to advance the mission of TPWD as it pertains to coastal resource use.

The Texas Paddling Trails Program

Paul Hammerschmidt. Texas Parks and Wildlife Department.

The Texas Paddling Trails Program currently consists of eight coastal paddling trails and ten inland paddling trails. Each Coastal paddling trail showcases an important geological and ecological portion of a Texas bay, bayou, or estuary. This program is a major Texas Parks and Wildlife Department initiative designed to encourage paddling, angling, wildlife viewing alternatives and public access to Texas rivers and bays. The goal of this program is to build and foster a constituency that is aware of and supports wise sustainable use and conservation of aquatic habitats including river, bay and estuary habitats. Further, the Texas Paddling Trails Program is a sustainable economic development tool for local communities where they can promote public awareness of existing trails and develop new public inland and coastal paddling trails throughout the state.

Environmental and Ecological Determinants Influencing Riparian Corridor Dynamics along a Texas Coastal River

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Riparian corridors are important as biological and physical links between terrestrial and aquatic ecosystems. Fennessey Ranch is in Refugio County and managed by a conservation easement through the Mission-Aransas National Estuarine Research Reserve. The 1618.8 ha ranch borders 14.5 km of the Mission River corridor encompassing tidal/non-tidal sections. Temperate and subtropical species may occur in Mission River riparian zone as a result of overlap between Texan and Tamaulipan biotic provinces. The objectives of this study are to: 1) characterize the riparian corridor of a coastal river in a subtropical, semi-arid environment; 2) assess riparian structure along a tidal gradient using environmental and ecological parameters; 3) analyze the affects of sea-level rise and global climate change on the vegetation community in the riparian corridor; and, 4) develop recommendations for sustaining and enhancing riparian vegetation diversity in this coastal landscape. Characterization phase began in summer 2009, and 30 transects were sampled for riparian vegetation species composition and abundance. GIS layers were developed using Digital Elevation Model, Soil Survey Geographic Database, and 1992 National Wetland Inventory data. Hydrologic flows will be assessed using USGS gauge data and models developed to determine flooding extent and frequency patterns. Models will also be used to assess impacts from relative sea level rise. Sensitivity indices will be created for each riparian species to assess potential changes in riparian vegetation dynamics from climate change scenarios.

Vertical Accretion Rates in Estuarine Wetlands Using Cs-137, Mustang Island, TX
Boris Radosavljević[1], James C. Gibeaut[1] , Philippe Tissot[2]
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The hydrodynamic setting of microtidal estuarine wetlands on Mustang Island limits their distribution to elevations of less than 0.5 m MSL. Due to a small tide range, even a 0.1 m increase in sea level can significantly affect wetland distribution. Estuarine wetland environments can remain stable if the accumulation of mineral and organic matter on the marsh surface offsets submergence caused by sea level rise. In this study, radiometric analyses of sediment cores from high marsh, high flat, low marsh and low flat environments were used to calculate accretion rates along two transects on Mustang Island. In addition, grain size, bulk density and organic content using a loss on ignition technique were determined. Our results indicate that accretion rates increase with decreasing elevation. This pattern has been observed in wetland settings elsewhere. Highest accretion rates were measured in low marsh environments (4.69-4.22 mm/yr). Lowest vertical accretion rates occurred consistently in high marsh environments (1.12-1.23 mm/yr). Only one high tidal flat accretion rate was measured (1.7 mm/yr). Accretion rates for low tidal flats could not be determined because the Cs-137 peak could not be located.

We measured an average 1.52 % organic carbon, with a standard deviation of 1.9 % (N=245). The organic contribution to vertical accretion, therefore, is relatively minor. The highest amount of organics was measured from the surface of an algal mat.
The rate of sea-level rise at the nearby Rockport tide gauge is 5.17 +/- 0.67 mm/yr. As this rate exceeds the accretion rates obtained in this study, significant changes in the distribution of intertidal environments on Mustang Island can be expected in the future.

Evolution of the Texas Parks & Wildlife Ecosystem Resources Program
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Texas Parks and Wildlife Department (TPWD) provides outdoor recreational opportunities by managing and protecting the natural resources of Texas. This includes fisheries, wildlife and plant species as well as acquiring and managing parklands, wildlife management areas, rivers, coastal bay systems and cultural or historic sites. From the humble beginnings as the Fish and Oyster Commission in 1895 to the current TPWD formed in 1963, the organizational structure continues to evolve to meet the needs of the resources and our stakeholders.

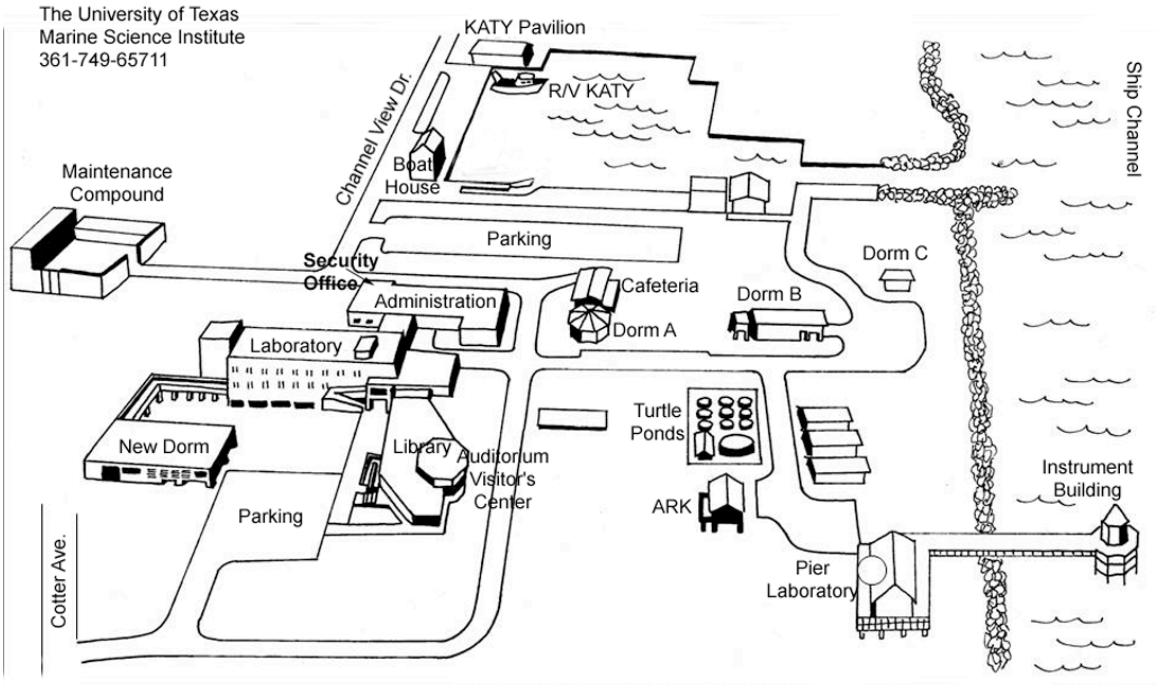
The Resource Protection (RP) Division was created in 1986 by the 69th Legislature to address environmental issues that directly affect the health and productivity of Texas fish and wildlife resources. In 2004, TPWD reorganized to address critical water resource functions. The RP division was dissolved and the coastal components were combined with the Coastal Fisheries Division. In 2008, in order to better integrate ecosystem based management with coastal resource protection needs, the new Ecosystem Resources Program (ERP) was formed.

With respect to the management and protection of fish and wildlife resources, the ERP participates in the research and coordination of water planning, to ensure that sufficient fresh water reaches Texas estuaries. The staff also investigates fish kills and pollution events, provides information and recommendations to local, state, and federal agencies to protect fish and wildlife resources and seeks funding and partnering opportunities to perform habitat conservation, enhancement and restoration projects.

Macrofaunal food web structure associated with subtidal, intertidal, and restored oyster reefs in the Mission-Aransas estuarine system. Jason W. Slocum, James Simons (Texas Parks and Wildlife Department), Greg W. Stunz, David A. McKee Texas A&M University – Corpus Christi,

Oyster reefs serve as important habitat for a variety of marine life. Removal and loss of oyster reefs within coastal habitats is increasing; therefore, ecological function of oyster reefs must be understood to evaluate the roles of these essential habitats and ensure ecosystem productivity. The purpose of this study was to examine food-web structure associated with this biogenic habitat type use both stomach content and stable isotope analyses. Having the ability to examine stomach contents provides a direct link to an organism's range of prey, and preferred food habits, and stable isotope analysis has the ability to indicate relative trophic level of an individual consumer after prey items have been digested. We collected nekton samples using a modified epibenthic sled, and 6 panel gill nets on oyster reefs and mud bottoms in Copano and

Aransas Bays. Stomach contents were done on 281 fishes representing 21 species and 16 families. To date 273 stable isotope samples have been analyzed including samples of particulate organic matter (POM) benthic organic matter (BOM), benthic algae, seagrass, macroinvertebrates and fishes. This study will examine the spatial and seasonal differences in macrofaunal food web structure on intertidal, subtidal and restored oyster reefs and mud bottoms in Copano and Aransas Bays.



The Marine Science Institute is dedicated to the three primary functions of a major university (education, research, and service) as they apply to the Texas coastal zone. It is an organized research unit of the University of Texas at Austin and emphasizes both basic and applied research aimed at understanding the biological, chemical, and physical processes governing the coastal zone ecosystem.