2011 Texas Bays and Estuaries Meeting

MARINE SCIENCE INSTITUTE
THE UNIVERSITY OF TEXAS AT AUSTIN

PORT ARANSAS, TEXAS APRIL 27-28, 2011

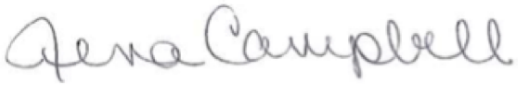
Aerial vew of Nueces Bay restoration project, a joint effort between Coastal Conservation Association of Texas and Coastal Bend Bays and Estuaries programs. Photo courtesy of ccatexas.org.

TABLE OF CONTENTS

Welcome to the 2011 Texas Bays and Estuaries Meeting!

The University of Texas Marine Science Institute is proud to host the 7th annual Texas Bays and Estuaries Meeting. We have a great program of talks and posters this year, and we thank all those participating in the meeting. Please remember that all campus buildings are non-smoking. Restrooms are located in the Visitor's Center next to the library – there will be signs posted. Lunch and dinner will be served in the auditorium with catering provided by Robert's and Miss K's, respectively. Beer and wine are available at dinner for one ticket (one ticket = $2.00). There is a complimentary ticket included with your name badge during registration. You must use the tickets, as the bartender will not accept cash. Additional tickets are available for purchase from a meeting staff member. You may wander freely with your drinks, but please do not leave the campus with them. Authors will be at their posters from 5:00-6:00.

We hope you enjoy the meeting and look forward to seeing you again next year!



Jena Campbell
Marine Science Institute
The University of Texas at Austin

Organized and Hosted by:

Marine Science Institute
The University of Texas at Austin
Jena Campbell, Convener

TBEM workers! Thank them if you see them!
Jena Campbell, Colt Cook, Lisa Havel, Avier Montalvo, & Sarah Wallace

Thanks to our Sponsor!

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 2nd).

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, Austin, 1st Place
Lucia B. Carreon Martinez, The University of Texas, Austin, 2nd Place

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

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

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

Schedule: Wednesday, April 27, 2011

07:30 - Registration, Visitor's Center Lobby, The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

08:20 - Welcome and Opening Remarks - Lee A. Fuiman Ph.D, Director, The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

--Plankton Ecology--

08:30 - **The Role of *Noctiluca scintillans* Grazing on the Red Tide Dinoflagellate, *Karenia brevis***
Campbell, Jena R., Buskey, Edward J. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

08:50 - **Unique Head Structure of Seahorse Provides Hydrodynamic Stealth When Feeding on Evasive Copepod Prey**
Gemmel, Brad[1], Sheng, Jian[2], and Buskey, Edward J.[1]. [1]The University of Texas at Austin, Marine Science Institute, Port Aransas, TX; [2] University of Minnesota Aerospace and Mechanics

--Benthic Ecology--

09:10 - **Assessing the Swash Zone Macrobenthic Community Response to a Beach Re-nourishment Episode on South Padre Island, TX**
McWhorter, Troy[1], Hicks, David[1], and Treviño, Reuben[2]. [1]The University of Texas at Brownsville, Brownsville, TX; [2]City of South Padre Island

09:30 - **Long-Term Trends and Response of Benthic Macrofauna to Climate Variability in the Lavaca-Colorado Estuary, Texas**
Palmer, Terry A., Pollack, Jennifer Beseres, and Montagna, Paul A. Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi

09:50 - **Break**

--Special Topics--

10:10 - **Validating the Concepts of Vulnerability and Resiliency in Fishing Dependent Communities: Mixed Methodologies Incorporating Primary and Secondary Data**
Blount, Benjamin[1], Jacob, Steve[2], Weeks, Pris[3], Jepson, Michael[4]. [1]SocioEcological Informatics; [2]York College of Pennsylvania; [3]Houston Advanced Research Center; [4]NOAA Fisheries

10:30 - **Current Status of Dermo Disease in Oysters of Matagorda and Aransas Bay Systems**
Ray, Sammy M.[1], Pollack, Jennifer B.[2], and Culbertson, Jan[3]. [1]Professor Emeritus Texas A&M University at Galveston; [2]Professional Research Professor, Fisheries and Mariculture Program Coordination, Texas A&M University-Corpus Christi, [3]Fisheries Scientist, Texas Parks and Wildlife Department

10:50 - **The "Sargassum Sparrow" and Other Consequences of Weed on Gulf Beaches**
Amos, Anthony F. (Tony). The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

11:10 - **Coastal Issues Forum of the Coastal Bend Bays Foundation**
Adams, John S. Coastal Bend Bays Foundation, Corpus Christi, TX

--Seagrass Ecology--

11:30 - **Evidence for Turtlegrass Seed Consumption by Blue Crabs**
Darnell, Kelly M and Dunton, Kenneth H. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

11:50 - **Monitoring Texas Seagrasses for Wastewater Impacts**
Radloff, Patricia L., Ph.D., Contreras, Cindy, Whisenant, Adam, and Bronson, Jennifer M. Water Resources Branch, Texas Parks and Wildlife Department, Austin, TX

12:10 - **LUNCH** (Catered by Robert's) at The University of Texas at Austin, Marine Science Institute Visitor's Center

Wednesday, April 27, 2011 (Continued)

13:10 - **DNA Microsatellite Variation in *Halodule wrightii* from the Texas Gulf Coast**
Schonacher, Tabitha, Barrett, Michael, and Larkin, Patrick. Dept. of Physical and Environmental Sciences, Texas A&M University-Corpus Christi

13:30 - **Response of an Estuarine Dependent Species to Fragmentation**
Williams, Jason[1], Stunz, Gregory[1], Holt, Joan[2], Hensgen, Geoff[2], and Robillard, Megan[1]. [1]Harte Research Institute for Gulf of Mexico Studies and Department of Life Sciences, Texas A&M University-Corpus Christi, TX; [2]The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

--Habitat Assessment/Restoration--

13:50 - **Assessing Longitudinal and Transverse Gradients Within the Riparian Corridor Along the Mission River**
Davis, Nicole[1] and Smith, Elizabeth[2]. [1]Texas A&M University-Corpus Christi; [2]International Crane Foundation

14:10 - **Identifying Suitable Locations for Oyster Reef Restoration in Texas**
Pollack, Jennifer[1], Cleveland, Drew[2], Montagna, Paul[2], Piper, Erin[3], and Dellapenna, Tim[4]. [1]Department of Life Sciences, Texas A&M University-Corpus Christi; [2]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi; [3]NMFS Habitat Conservation Division, Galveston, TX; [4]Department of Marine Science/Oceanography, Texas A&M University-Galveston

14:30 - **Defining Assembly Rules for Predicting Whooping Crane Territory Location and Shapes with Sea-Level Scenarios**
Smith, Elizabeth H.[1,2] and Davis, Nicole[2]. [1]International Crane Foundation; [2]Center for Coastal Studies, Texas A&M University-Corpus Christi

14:50 - **Central Texas Gulf Coast Estuarine Marsh and Tidal-Flat Change, Mid-1950's to 2009**
Tremblay, Thomas A[1] and Calnan, Thomas R.[2]. [1]Bureau of Economic Geology, John A. and Katherine G. Jackson School of Geosciences, The University of Texas at Austin; [2]Texas General Land Office, Coastal Grants and Funding

15:10 - **BREAK**

--Coastal Dynamics--

15:30 - **Wave and Current Characteristics at the Aransas Pass Tidal Inlet, Port Aransas, Texas**
Min, Dong-Ha. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

15:50 - **Examining Near-Shore Hydrographic Profiles & Hypoxia Along the Texas Coast**
Mullins, R. L., DiMarco, S. F., Zhang, X., and Guinasso, N.L., Jr. Texas A&M University, Department of Oceanography, College Station, TX

16:10 - **Seasonal and Storm Induced Morphology Change at Packery Channel**
Williams, Deidre D. Division of Nearshore Research, Texas A&M University-Corpus Christi

--Trophic Ecology--

16:30 - **Trophic Structure of the Nueces Marsh, TX**
Wallace, Sarah C. and Dunton, Kenneth. The Unviersity of Texas at Austin, Marine Science Institute, Port Aransas, TX

16:50 - **Sucking the Life Out: What are the Dynamics Between Parasites and Estuarine Fishes?**
Cook, Colt and Munguia, Pablo. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

17:10 - End of Oral Presentations; **Poster Session** and Cash Bar at The University of Texas at Austin, Marine Science Institute **Visitor's Center**

18:00 - **Dinner** (Catered by Miss K's Deli) at The University of Texas at Austin, Marine Science Institute **Visitor's Center**

19:30 - Bar Closes

Thursday, April 28, 2011

--Fisheries Ecology--

08:30 - **Larval Size Influences Depth of Residence During Settlement in Red Drum (*Sciaenops ocellatus)***
Havel, Lisa N.[1], Ojanguren, Alfredo F.[2], and Fuiman, Lee A.[1]. [1]The University of Texas at Austin, Marine Science Institute, Port Aransas, TX; [2] University of St. Andrews Scottish Oceans Institute

08:50 - **Age, Size at Sex and Evidence for Sex Reversal in Common Snook (*Centropomus undecimalis*) in South Texas**
Kline, Richard J.[1], Ferrara, Allyse [2], Holt, G. Joan [1], Khan, Izhar A. [3] & Lopez, Genaro [4]. [1]The University of Texas at Austin, Marine Science Institute, Port Aransas, TX; [2]Nicholls State University, Thibodaux, LA; [3]U.S. Fish and Wildlife Service, Dexter National Fish Hatchery & Technology Center, Dexter, NM; [4]The University of Texas at Brownsville, Brownsville, TX

09:10 - **Habitat Requirements of Juvenile Southern Flounder (*Paralichthys lethostigma*) in South Texas**
Nims, Megan K. and Walther, Benjamin D. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

09:30 - **Linkage Mapping in the Red Drum, *Sciaenops ocellatus***
Portnoy, David S., Hollenbeck, Christopher M., and Gold, John R. Center for Biosystematics and Biodiversity, Texas A&M University, College Station, TX

09:50 - **Break**

--Nutrient Dynamics--

10:10 - **Seasonal Nitrogen Dynamics Along a River-Estuary Continuum in the Western Gulf of Mexico (Copano Bay, Texas)**
Bruesewitz, Denise A., Gardner, Wayne S., Buskey, Edward J., McClelland, Jim, and Mooney, Rae. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

10:30 - **Estimating Free-Water Primary Production, Respiration and Net Ecosystem Metabolism in the Mission-Aransas National Estuarine Research Reserve (NERR).**
Pollard, Lindsey D., Bruesewitz, Denise A., Mooney, Rae F., McClelland, James W., and Buskey, Edward J. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

10:50 - **Nutrient and Organic Matter Dynamics Following Storm Events in the Mission-Aransas National Estuarine Research Reserve (NERR)**
Mooney, Rae F., McClelland, James W., Bruesewitz, Denise A., and Buskey, Edward J. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

11:10 - **Human Impacts on the Coastal Environment: Relationships Between Land Use/Land Cover and Inorganic Nitrogen in South Texas Watershed**
Mills, Rachel and McClelland, James W. The University of Texas Marine, Science Institute, Port Aransas, TX

11:30 - **Characterization of Wetland Sedimentary Organic Matter Using Solid-State Nuclear Magnetic Resonance**
Liu, Zhanfei. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

--End of 2011 Texas Bays & Estuaries Meeting--

Abstracts: Oral Presentations

Adams, John S. Coastal Bend Bays Foundation, Corpus Christi, TX.

The Coastal Bend Bays Foundation (CBBF) is a member driven non profit (501(c)3) that encompasses 12 Counties in the Coastal Bend of Texas. Four tenets of the organization are: Communication; Conservation & Advocacy; Research; and Education & Outreach. Several of these tenets overlap in theory and practice, and that fact makes the organizational goals even more important. The Executive Board and the 25 Trustees are all volunteers, and work closely with the CBBF Executive Director to achieve the goals established by the Trustees. Several local environmental enhancement projects are completed each year, including marsh restoration and creation, invasive species removal, among others. A monthly Coastal Issues Forum (CIF) is one of the mainstays of the CBBF. The goals of the CIF is to get local environmental issues to the table, where representatives of industry and environmental groups can hear all sides of a proposed project, discuss the merits and demerits of the project, offer and consider constructive criticism, then reach consensus. The monthly forums are always free and open to the public, and are promoted on the CBBF website - baysfoundation.org .

The "Sargassum Sparrow" and Other Consequences of Weed on Gulf Beaches

Amos, Anthony F. (Tony). The University of Texas at Austin, Marine Science Institute, Port Aransas, TX. Email address: afamos@mail.utexas.edu

Sargassum weed (*Sargassum nitans* & *S. fluitans*) is deposited on South Texas barrier Island Gulf beaches annually. In a calendar year, the first significant amount of weed on the beach can occur as early as January or as late as April. Peak weed quantities occur in May. The timing of weed arrival can affect the feeding behavior of non marine birds seen regularly on the beach as well as shorebirds. I examine the occurrence of the savannah sparrow (*Passerculus sandwichensis*) a winter visitor and migrant and the Great-tailed grackle (*Quiscalus* mexicanus) a resident species in relationship to an estimate of weed on the beach over 33 years of observation. In general I look at the effect of large amounts of weed on the beach in concert with tidal cycles and the ability of shorebirds to feed in the swash zone in the presence of weed. The potential effect of the weed on juvenile and nesting sea turtles is also discussed and beach management practices by municipalities is discussed briefly.

Validating the Concepts of Vulnerability and Resiliency in Fishing Dependent Communities: Mixed Methodologies Incorporating Primary and Secondary Data

Blount, Benjamin[1], Jacob, Steve[2], Weeks, Pris[3], Jepson, Michael[4]. [1]SocioEcological Informatics bblount_sei@sbcglobal.net; [2]York College of Pennsylvania sjacob@ycp.edu; [3]Houston Advanced Research Center pweeks@harc.edu; [4]NOAA Fisheries michale.jepson@noaa.gov

Even though the concepts of community vulnerability and resiliency are of increasing interest to applied anthropologists, the meaning of these terms is contested. In this paper we take an emergent grounded approach to these concepts. Using two unrelated data sources and mixed methodologies we establish areas of consensus of meaning. Both quantitative secondary data and qualitative primary data from ethnographic field research are incorporated. Techniques for integrating differing data sources are developed and the substantive results establish areas of consensus for the concepts. The project lends support for the utility of social indicators of community resilience and vulnerability.

Abstracts: Oral Presentations (continued)

Seasonal Nitrogen Dynamics Along a River-Estuary Continuum in the Western Gulf of Mexico (Copano Bay, Texas)

Bruesewitz, Denise A., Gardner, Wayne S., Buskey, Edward J., McClelland, Jim, and Mooney, Rae. The University of Texas at Austin Marine Science Institute, Port Aransas, TX. Email address: dbruesew@gmail.com

A mechanistic understanding of nitrogen (N) dynamics from inflowing rivers to estuaries is important to understanding and managing increasing coastal eutrophication. We examined N cycling in a Western Gulf of Mexico riverine-estuarine system (Mission and Aransas Rivers to Copano Bay). Sediment N dynamics and sediment oxygen demand (SOD) were measured at two sites in Copano Bay using continuous flow experiments on intact sediment cores in August and November 2010 and in February 2011, concurrent with measurements of water column ammonium (NH_4^+) potential-uptake and regeneration in the estuary and its two inflowing rivers. August NH_4^+ uptake increased from upriver to the mouth of the estuary, and then declined in the bay (0.08, 0.23 and 0.10 mmol N L^{-2} h^{-1}, respectively). SOD was relatively high and constant in Copano Bay across the three seasonal samplings (608-943 mmol O_2 m^{-2} h^{-1}). Net N_2 fluxes from the estuary showed net denitrification both in August (38-30 mmol N m^{-2} h^{-1}) and November (54-105 mmol N m^{-2} h^{-1}), with potential denitrification rates up to 213 mmol N m^{-2} h^{-1}. Copano Bay exhibited elevated chlorophyll-*a*, nutrients, N-transformation rates, and SOD in November after a major flood. Copano Bay switched from net denitrification to net N fixation in February, when water column nutrients concentrations were low, with N fixation rates up to 88 mmol N m^{-2} h^{-1}. Our seasonal sampling to date has illustrated the importance of freshwater inputs of nutrients and organic matter to the productivity of the estuary.

The Role of *Noctiluca scintillans* Grazing on the Red Tide Dinoflagellate, *Karenia brevis*

Campbell, Jena R., Buskey, Edward J. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX. Email address: jena23@mail.utexas.edu

The increasing occurrence of harmful algal blooms (HAB) has prompted studies aimed at determining biotic and abiotic factors which may promote bloom initiation. Although many studies have tried to determine either “top-down” or “bottom-up” controls of HABs, there is evidence to support both mechanisms. Species- or genus-specific DNA primers were used to more definitively determine top-down control of selected HAB species by a particular ciliate or dinoflagellate grazer. PCR amplification of genetic material, focused on a species-specific HAB gene, more precisely determines if an individual grazer has ingested a HAB species during controlled grazing experiments; these results can then be tested in natural grazer assemblages. Long-term grazing experiments will show whether a particular grazer can be an effective “top-down” control of a HAB species. Initial studies have used *Noctiluca scintillans* grazing on the HAB species *Karenia brevis*. To date, there has been successful DNA analysis of *K. brevis* cells ingested by *N. scintillans*. Long-term grazing experiments show evidence of population suppression of *K. brevis* by *N. scintillans*; however, *K. brevis* does not appear to be an ideal food source for *N. scintillans*.

Abstracts: Oral Presentations (continued)

Sucking the Life Out: What are the Dynamics Between Parasites and Estuarine Fishes?
Cook, Colt and Munguia, Pablo. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX. Email address: coltcook@mail.utexas.edu

The Texas Gulf coast is comprised of a series of highly dynamic estuarine systems that experience large fluctuations in salinity and other abiotic parameters. These fluctuations greatly influence the location and timing of species interactions, thus altering food web dynamics within the system. Much of the research within food webs has focused on bottom-up processes driven by primary production. However, recent studies have shown the importance of top-down controls by consumers in these ecosystems. Parasitism is thought to be one mechanism that may control top-down processes within estuarine food webs. Parasitism is extremely common in nature and is one factor that can contribute significantly to food web stability and structure. Parasites, although usually small in body size, can account for a substantial portion of the biomass within an ecosystem, which can lead to strong community effects. Other attributes of parasites that can account for substantial changes in communities are that more than half of the organisms in the world behave as a parasite at some point during their life and that almost all organisms in the world are parasitized. Because estuarine functions such as diversity and productivity depend on environmental conditions, it is thought that parasite infection could be dependent as well. Therefore, parasite infection rate is thought to fluctuate along with environmental conditions. By taking into account parameters of estuarine environments such as flow, salinity, and temperature this preliminary research study aims to identify the dynamics between parasitic organisms and their shallow-water estuarine fish hosts.

Evidence for Turtlegrass Seed Consumption by Blue Crabs
Darnell, Kelly M and Dunton, Kenneth H. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX. Email address: kellymdarnell@mail.utexas.edu

While seagrass propagation has historically been attributed primarily to vegetative rhizomatous growth, recent studies suggest that sexual reproduction (i.e. fruit and seed production) may also play a large role. Consequently, it is necessary to understand factors that limit fruit and seed dispersal and successful seedling recruitment. Fruit and seed consumption by crustaceans can produce a top-down effect on seagrass recruitment potential. We examined consumption by a common crustacean found in South Texas estuaries (blue crabs) on turtlegrass fruits and seeds. A series of laboratory experiments were conducted during summer 2010 to quantify the amounts of turtlegrass fruits and seeds eaten over a 24-h period by blue crabs. Blue crabs consumed an average of 1.14 0.39 g of fruits over 24 hours. This consumption is equivalent to the weight of a single fruit (1.35 0.03 g). However, crabs crushed and partially consumed 72% of offered fruits and often selectively ate the seeds. Crabs ate an average of 0.66 g of seeds, but crushed 70% of offered seeds. There was no difference among crab size classes in amount of fruits or seeds consumed. Results of this study indicate that, in laboratory conditions, blue crabs consume turtlegrass reproductive tissues. Fruit and seed consumption by blue crabs may be an influential top-down effect limiting successful seagrass recruitment. Future studies will incorporate field experiments and a wider variety of potential consumers.

Abstracts: Oral Presentations (continued)

Assessing Longitudinal and Transverse Gradients Within the Riparian Corridor Along the Mission River

Davis, Nicole[1] and Smith, Elizabeth[2]. [1]Texas A&M University-Corpus Christi nmorgan1@islander.tamucc.edu; [2]International Crane Foundation esmith@savingcranes.org

A general understanding of riparian corridors dynamics within South Texas is lacking. This study provides a phytosociological description of the riparian corridor along the tidally influenced Mission River, Texas and evaluates important environmental parameters influencing riparian communities. Above and below tidal sites were sampled in the summer of 2009 and 2010 to characterize and assess the riparian corridor community. A total of 33 transects, oriented perpendicular to the river, were pre-determined from the combination of elevation, soil, land use/land cover, and wetland digital data in ArcMap 9.3.1. Sampling included 137 plots placed within topographic gradients along transects. Woody species with diameters ≥ 3 cm at breast height (dbh) were documented and measured. Most important species along the Mission River were *Ulmus crassifolia, Celtis laevigata*, *Ehretia anacua, Vitis mustangensis*, *Acer negundo, Carya illinoinensis*, *Fraxinus berlandieriana,* and *Quercus virginiana.* A 2-way, fully-nested ANOVA indicated a significant difference in woody species and associated basal areas between the above and below tidal sites. Additionally, a significant difference in the dbh of major woody riparian vegetation (Kruskal-Wallis ANOVA on Rank Test; p=<0.001) existed across the floodplain. The results of this study indicate riparian species type and distribution differ longitudinally along the Mission River across a tidal gradient. The transverse distribution across the floodplain and the abundance of mid-to-late successional species compared to pioneer species verify elevation and stream flow as key environmental parameters restricting woody riparian species to certain parts of the floodplain, thus, influencing the riparian corridor along the Mission River, Texas.

Unique Head Structure of Seahorse Provides Hydrodynamic Stealth When Feeding on Evasive Copepod Prey

Gemmel, Brad[1], Sheng, Jian[2], and Buskey, Edward J.[1]. [1]The University of Texas at Austin Marine Science Institute; [2] University of Minnesota Aerospace and Mechanics. Email address: bgemmell@mail.utexas.edu

Seahorses are visually hunting predators which must be within close range in order to perform a rapid strike on evasive planktonic prey. Copepods are highly sensitive to the approach of a predator and respond with rapid escape jumps. This study investigates differences in flow patterns around the head of the dwarf seahorse, *Hippocampus zosterae* during successful and unsuccessful feedings attempts on the copepod *Acartia tonsa* using high resolution 3-Dimensional, high speed holographic video techniques. Using phytoplankton as a tracer, we recorded and reconstructed flow fields around the head of the seahorse and its prey during both successful and unsuccessful attacks. Particle Image Velocimetry (PIV) was used to isolate morphological influence on flow fields using preserved specimens. The results from both studies reveal that head shape creates a stagnation zone which allows the seahorse to approach evasive copepods without triggering escape behavior when appropriate approach velocity is employed. For slow swimming species, the need to approach prey without creating a hydrodynamic disturbance may have selected for a head shape exhibited by Syngnathid fish (seahorse, pipefish and seadragons) that produces a stagnation zone which minimizes disturbance above the mouth.

Abstracts: Oral Presentations (continued)

Larval Size Influences Depth of Residence During Settlement in Red Drum (*Sciaenops ocellatus)*

Havel, Lisa N.[1], Ojanguren, Alfredo F.[2], and Fuiman, Lee A.[1]. [1]The University of Texas at Austin Marine Science Institute; [2] University of St. Andrews Scottish Oceans Institute. Email address: l.havel@mail.utexas.edu

Planktonic larvae shift to nursery habitats when their ability to exploit benthic habitats surpasses the benefits they gain from residing in the water column. To maximize chances of survival, individuals should abruptly settle onto the first structured substrate they encounter. However, a detailed behavioral study on this transition is missing for estuarine species. Previous studies on larval red drum (*Sciaenops ocellatus*) suggested that individuals settle at about 7 mm SL, however sampling efforts indiscriminately collected larvae from both the substrate and water column above it. While useful for determining horizontal spatial patterns, traditional sampling does not provide information on vertical movement to the substrate during settlement. We examined the relationship between larval size and habitat use with both laboratory and field experiments. Laboratory experiments were conducted to establish substrate preference (sand, oyster shells, and artificial seagrass) at different sizes. Results indicated larvae might leave the water column around 10 mm SL regardless of substrate type. This suggested that transition from the water column occurred at larger sizes than previously reported. We tested this in small field enclosures that allowed separate sampling of the water column and substrate (seagrass). Larvae collected from the water column were smaller on average than larvae in the seagrass. At the commonly accepted settlement size (7 mm SL), over half of the larvae were still in the water column. While red drum might be reaching nursery grounds at a small size, our data suggest they are not settling to the structured habitat until later in development.

Age, Size at Sex and Evidence for Sex Reversal in Common Snook (*Centropomus undecimalis*) in South Texas

Kline, Richard J.[1], Ferrara, Allyse [2], Holt, G. Joan [1], Khan, Izhar A. [3] & Lopez, Genaro [4]. [1]The University of Texas at Austin Marine Science Institute, Port Aransas, TX; [2]Nicholls State University, Thibodaux, LA; [3]U.S. Fish and Wildlife Service, Dexter National Fish Hatchery & Technology Center, Dexter, NM; [4]The University of Texas at Brownsville, Brownsville, TX. Email address: rjkline@mail.utexas.edu

While there are many explanations for the collapse of the snook (*Centropomus undecimalis*) fishery in Texas after 1940, such as freezes, overfishing and reduced fresh-water inflow, the Texas snook population appears to be increasing in recent years. Juveniles are commonly captured in brackish canals and the Rio Grande, and more landings are reported in south Texas. The population is still quite small compared to the Florida and Mexican snook populations, and more information is needed to adequately manage this hermaphroditic species along the Texas coast. To date, little is known regarding the sex ratio, age structure and age at sex change for the Texas population. In the present study, length, weight and sex identifications were determined for 155 common snook sampled from the lower Laguna Madre and Brownsville ship channel over a three-year period. Length-at-sex data from Texas snook followed trends seen in Florida, with the smallest fish being males, and the lengths of females and males overlapping at larger sizes (650 to 980 mm). Sectioned otoliths from 53 snook were used to determine a size-at-age relationship. Ages determined for Texas snook revealed a younger population than seen in Florida, with ages ranging from less than a year to 6.5 years for the largest female fish captured. Evidence of protandrous sex change was observed in five individuals. Ongoing research to define the spawning period for Texas snook and an analysis of trends in gonadal development seen in three years of sampling will be discussed.

Abstracts: Oral Presentations (continued)

Characterization of Wetland Sedimentary Organic Matter Using Solid-State Nuclear Magnetic Resonance

Liu, Zhanfei. The University of Texas at Austin Marine Science Institute. Email address: zhanfei.liu@mail.utexas.edu

Sedimentary organic matter (SOM) is crucial in preserving fertility of the soil and controlling carbon and nitrogen cycles in wetlands ecosystems. Deciphering structural information of SOM remains a key to furthering our understanding of SOM geochemistry, such as its preservation and degradation. However, little is known about chemical structures of SOM due to the limitation of available analytical techniques. For example, only less than 10% of the carbon in SOM can be characterized into specific compounds that are detectable by wet-chemistry methods such as gas or liquid chromatography. Solid state ^{13}C nuclear magnetic resonance (NMR) offers great advantages for characterizing SOM, as it is nondestructive to sample integrity and can "see" all the carbon functionalities. Here we used ^{13}C NMR, together with the liquid chromatography, to characterize SOM collected in the McGuill Lake and salt marshes in the Copano Bay within the Mission-Aransas National Estuarine Research Reserve (NERR). From the NMR spectra, contribution of lignins and carbohydrates to SOM in the McGuill Lake decreases significantly with sediment size, from >300, 300-125, 126-63, 63-32, to < 32m, but that of lipids increases with size, suggesting that freshwater grasses such as bulrush in the lake become finer as they degrade. Consistently, contents of total hydrolyzable amino acids (THAA) in the lake sediments decrease gradually with size. However, THAA contents in the salt marsh sediment increase with size. This opposite pattern between fresh and saline sediments may be explained by factors such as mineralogy, and organic matter source and contents.

Assessing the Swash Zone Macrobenthic Community Response to a Beach Re-nourishment Episode on South Padre Island, TX

McWhorter, Troy[1], Hicks, David[1], and Treviño, Reuben[2]. [1]The University of Texas Brownsville; [2]City of South Padre Island Email address: david.hicks@utb.edu

A continuing struggle with retreating shorelines on South Padre Island (SPI) has prompted the adoption of dredge-and-fill techniques to stem sediment losses. Between February and March, 2010, approximately 130,000 cubic yards of sediment was transferred from the Brownsville Ship Channel to a 2,500 ft length of beach near the northern terminus of the city of SPI's resort district. While the importance of swash zone macrofaunal invertebrates is understood relatively well in terms of their trophic linkage to backshore, nearshore, and avifaunal communities, the potential effects of such extensive modifications to their local environment on their community remains a grey area. The aim of this study is to characterize swash zone community composition from a pre- and post-disturbance paradigm. Pre-disturbance comparisons among experimental and northern and southern references sites found the swash communities 44 and 54% dissimilar, respectively, with the latter being significant primarily as a result differences in *Donax variabilis* and *Scolelepis squamata* abundances. Subsequent beach re-nourishment activities appeared to have little effect on the swash zone community. One month following the operation, experimental and reference site assemblages were not significantly different. Three months post-operation, the experimental and southern reference site assemblages were only marginally different (average dissimilarity of 53%), attributable primarily to lower *Scolelepis squamata* and greater Haustoriid amphipod abundances at the experimental site. While experimental and reference swash zone communities remained relatively similar throughout the study, a strong seasonal shift in community composition was observed from the study's onset in March through the final sampling event in June.

Abstracts: Oral Presentations (continued)

Human Impacts on the Coastal Environment: Relationships Between Land Use/Land Cover and Inorganic Nitrogen in South Texas Watershed

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Human activities have greatly altered delivery of nutrients and organic matter to estuarine environments through changes in land use and land cover (LULC). Nitrogen loading studies have been of particular importance since it is often the limiting nutrient in coastal systems. In this study, data from multiple sub-watersheds within the Guadalupe River (GR) and San Antonio River (SAR) drainage basins were used to compare LULC to inorganic nitrogen concentrations. Historical nitrogen data from the Texas Commission on Environmental Quality (TCEQ) were compared with LULC information extracted from geographical information systems (GIS) data layers for 1992 and 2001. On an areal basis, both drainage basins are dominated by forest and shrub/grass cover at higher elevations and agricultural LULC types on the coastal plain. In addition, the SAR has a major metropolitan area in its watershed, the city of San Antonio (population 1,373,668). Between 1992 and 2001, urban expansion accounted for the largest percentage changes in LULC for sub-watersheds within the SAR drainage basin. In contrast, changes in percent forest cover were largest for most of the sub-watersheds in the GR drainage basin. Nitrate concentrations were positively correlated with percent urban coverage and negatively correlated with percent grassland/shrub cover in both watersheds. These relationships were evident within both time slices and also showed shifts consistent with increasing urban land cover over time. No relationships between LULC and ammonium were evident. These results may be useful for anticipating how changes in LULC will influence nitrate export to coastal waters of South Texas in the future.

Wave and Current Characteristics at the Aransas Pass Tidal Inlet, Port Aransas, Texas

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Understanding of the ocean wave dynamics in the coastal environment is important for better prediction and planning for coastal erosion, navigation, potential contaminant spill event, or recreational activities at the surf zone. Although the Aransas Pass tidal inlet, TX is a major shipping passage, nature of surface wave characteristics at the inlet is not very well studied and understood yet, especially compared to that of currents and tides. Funneling of waves along the inlet with varying bottom depth with non-uniform currents according to tidal cycles may vary the propagating wave characteristics, especially wavelength and subsequently wave steepness. Waves tend to steepen with their height increased and length decreased when propagating against the ebb current, for instance. The waves are measured, along with the currents, with a Nortek 1 MHz Aquadopp acoustic current profiler at the UT Marine Science pier at the inlet during June 2010-April 2011 period. The currents and waves are measured and recorded at 10-min and 1-hr intervals, respectively, and the waves are calculated by the PUV method. The preliminary data indicate that the mean wave period and significant wave height are about 3-4 sec and 0.1-1.0 m, respectively during the observation period. Time series measurement data of currents and surface waves will be compared and discussed in more detail.

Abstracts: Oral Presentations (continued)

Nutrient and Organic Matter Dynamics Following Storm Events in the Mission-Aransas National Estuarine Research Reserve (NERR)

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During storm events, rivers deliver a disproportionate amount of freshwater, nutrients, and organic matter to the coast. This is especially important in South Texas where one storm event can contribute the majority of freshwater for an entire year. Conversely, years can go by without any storm events and estuaries turn hypersaline. This talk addresses two studies which investigate the role of storm events in watershed export and estuarine response in the Mission-Aransas NERR. Following major storm events in 2007, we found elevated soluble reactive phosphorus (SRP), dissolved organic carbon and nitrogen, and chlorophyll-*a* concentrations in Copano Bay for many months. We did not measure increased inorganic nitrogen concentrations, but we did not sample until ~3 weeks after the storms and excess N may have been taken up quickly by phytoplankton. Following these storm events, the system entered a drought and salinity went from 0 to greater than 40 psu in 2 years. This study led us to our current work in which we are targeting high-frequency sampling in the bay immediately following storm events and measuring nutrient cycling rates throughout the year, including storms and droughts. In September and October 2010 we sampled Copano Bay following a series of storm events and elevated nitrate, ammonium, and SRP concentrations were measured. Nitrate and ammonium were taken up quickly, while SRP remained elevated for months. These studies demonstrate the importance of sampling during storm events and that storm inputs can support increased production for extended periods after events.

Examining Near-Shore Hydrographic Profiles & Hypoxia Along the Texas Coast

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The near-shore Texas environment is vulnerable to many coastal hazards. Coastal surveys conducted by TPWD and NOAA since 1985 have consistently measured hypoxia extending from Texas-Louisiana border to Matagorda Bay. Recent increases in shipboard, moored, and remote sensing observations of near-shore water quality provide insight into the unique spatial and temporal characteristics of Texas hypoxia. These events are not necessarily attributed to the progression of the Dead Zone westward or attributed to increased anthropogenic riverine nutrient inputs. The temporal extent of these events also statistically differs from the summer Dead Zone. Conclusive results from an environmental mooring deployed in 2009 and 2010 depict rapidly forming summer and fall hypoxic events lasting 18 - 36 hours, which exhibit different oxygen dynamics than the LA shelf. During NOAA-funded study to determine areal extent of northern GOM hypoxia, survey cruises included deployment of a cabled towfish, the Sea Sciences Inc. Acrobat, which provided horizontal spatial resolution of 100 – 200 meters for hydrographic properties on the Texas shelf and mapped hypoxia events occurring in south Texas independent of freshwater river inflows. Additionally, output from a TAMU coupled physical-biogeochemical-numerical model provided important evidence into formation processes and sensitivity of Texas hypoxia and how events respond to river and wind forcing, as seen in 2007 with severe flooding of the Brazos River and 2008 with four tropical storms mixing nearshore Texas waters. Results presented from the shipboard and moored observations and model will address the processes responsible for formation, duration, and variability of near-shore Texas hypoxia.

Abstracts: Oral Presentations (continued)

Habitat Requirements of Juvenile Southern Flounder (*Paralichthys lethostigma*) in South Texas

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Previous research, conducted in North Carolina and the northern Gulf of Mexico, has established that there is extensive use of freshwater habitat by juvenile southern flounder (*Paralichthys lethostigma*). Juvenile southern flounder have been collected at salinities below 10 ppt in Aransas Bay, suggesting that southern flounder in Texas might also utilize freshwater habitat. However, considering the dynamic climate of south Texas and the fact that southern flounder in Texas have been shown to have significant genetic and physiological differences from their congeners in other regions, the importance of freshwater habitat to juvenile southern flounder in Texas must be established. Patterns of freshwater residence will be determined using otolith microchemistry by analyzing stable isotope ($^{87}Sr/^{86}Sr$) and trace element (Sr/Ca, Ba/Ca) ratios to determine movements across salinity boundaries. In order for trace elemental analyses to be performed on otoliths, the trace elemental concentration of tributaries to the area must first be established. Water samples collected in the summer of 2010 from the major tributaries to the Aransas, Copano, San Antonio, and Mission Bay systems indicate that $\delta^{18}O$ and trace element (Sr/Ca and Ba/Ca) values show significant variation among locations. These results indicate that if southern flounder in Texas do exhibit a freshwater residency period, it should be possible to assign an individual fish to a particular freshwater habitat. This work will provide fisheries managers with a more informed understanding of habitat requirements of juvenile southern flounder, leading to the implementation of more comprehensive and effective conservation and management strategies.

Long-Term Trends and Response of Benthic Macrofauna to Climate Variability in the Lavaca-Colorado Estuary, Texas

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Long-term trends and relationships between benthic macrofauna and hydrological conditions were examined in the Lavaca-Colorado Estuary, Texas. Four stations representing a broad range of salinities in the Lavaca-Colorado Estuary have been sampled quarterly for benthic macrofauna and hydrography from April 1988 to October 2008. The potential role of climate variability on local salinity patterns and benthic populations was investigated using the Oceanic Niño Index (ONI), North Atlantic Oscillation (NAO) and North Pacific Index (NPI). Mean salinity declined during the 20-year study period. Observed changes in salinity were related to river discharge and the ONI because there were more El Niño events (wet periods in Texas) in the second half of the study period than the first.. Benthic macrofaunal abundance and species richness were significantly correlated with salinity, the NAO and the ONI, indicating that global climate variability and the resulting effects on local salinity patterns are important factors shaping benthic macrofaunal communities. There was no significant linear trend in temperature or dissolved oxygen over time, and negative correlations between the most abundant species (*Mediomastus ambiseta*) and temperature were likely due to seasonality. While it is obvious that drivers other than physical hydrological factors can affect benthic macrofaunal communities, strong connections between global climate signals, precipitation and local salinity patterns provided the most plausible mechanistic connection between climatic variability and benthic macrofaunal response in the estuary.

Abstracts: Oral Presentations (continued)

Identifying Suitable Locations for Oyster Reef Restoration in Texas

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Texas produces the second-largest oyster harvest in the U.S., with an estimated $19 million generated in 2007. Yet, oyster reefs are the most threatened marine habitat on earth, with an estimated 85-91% lost globally. Although oysters cover large expanses of many Texas estuaries, this habitat has been greatly reduced due to shell dredging, reduced water quality and disease. Numerous projects are seeking to restore degraded reefs, but no standardized assessment methodology exists to identify and prioritize areas with the highest needs and probability of restoration success. The goal of this project was to develop a method for identifying suitable locations for oyster reef restoration in Texas by analyzing the condition of oyster populations, water quality, and bay bottom sediments and profiles. Priority areas for reef restoration are those with historically high spat and live oyster abundance, low disease levels, favorable long-term water quality and stable underlying geology. Maps were created to assist stakeholders in identifying suitable areas for future restoration projects.

Estimating Free-Water Primary Production, Respiration and Net Ecosystem Metabolism in the Mission-Aransas National Estuarine Research Reserve (NERR).

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Gross primary production (GPP), community respiration (CR) and net ecosystem metabolism (NEM) are increasingly used indicators of ecosystem function in estuaries and bays. High-frequency (15-min) measurements of dissolved oxygen, salinity, temperature, light and wind speed were collected at two sites in Copano Bay, part of the Mission-Aransas NERR. We have incorporated these data along with dynamic calculation of the air-sea exchange coefficient (k) into the model used by Caffrey et al. 2004 to calculate free-water metabolism metrics. The model indicated that NEM varied seasonally, between sites, and due to differences in freshwater input to Copano Bay. Results suggested net autotrophy (GPP exceeds CR) at stations Copano East and West during 2007-2010. When comparing the annual mean of a severe drought year (2009) to that of a normal rainfall year (2010), NEM values were lower, yet remained autotrophic during periods of low fresh water input. Values at Copano East ranged from −0.184-2.3 $gCm^{-2}d^{-1}$ with mean 1.30 $gCm^{-2}d^{-1}$ in 2009 and −1.37—5.58 $gCm^{-2}d^{-1}$ with mean 1.66 $gCm^{-2}d^{-1}$in 2010. Values at Copano West in 2009 ranged from −0.328-2.68 $gCm^{-2}d^{-1}$ with mean 1.23 g C m^{-2} d^{-1} and 0.169-3.91 g C m^{-2} d^{-1} with mean 1.28 g C m^{-2} d^{-1} in 2010. Seasonal fluctuations in NEM were found and although Copano Bay remains autotrophic throughout the year, GPP and CR at both stations shifted toward zero during winter months. Interbay measurements of metabolism metrics will be a valuable tool for understanding ecosystem function and for developing pilot nutrient criteria for the estuary.

Abstracts: Oral Presentations (continued)

Linkage Mapping in the Red Drum, *Sciaenops ocellatus*

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In protecting biota modern conservation and management efforts should strive to preserve genetic resources and evolutionary potential within individual species. For widely distributed, exploited marine species, this means identifying geographic assemblages that possess localized adaptive variation. This poses a problem for traditional population-genetic approaches because high gene flow tends to homogenize neutral genetic variation, even in the face of localized selection. A population genomics approach that surveys large portions of the genome to distinguish between areas under selection and those that are neutral is required. Linkage mapping is a vital first step in this process.

Red drum, *Sciaenops ocellatus*, are heavily exploited in recreational fisheries along both the Gulf of Mexico and southeast Atlantic coasts of the United States. The intense overfishing has precipitated stock-enhancement programs in Texas, Florida, Georgia, and South Carolina, where hatchery-raised fingerlings are released into coastal waters. The current status of the species, its wide distribution, and access to progeny from known mating pairs make this an ideal species for genomic mapping. Here we present results of sex-specific genetic linkage mapping. The present map is constructed with more than 200 microsatellite loci and will provide a new 'tool' for stock identification and more effective conservation and management of red drum resources. Implications and future directions of red drum genomics are also discussed.

Monitoring Texas Seagrasses for Wastewater Impacts

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Seagrass beds are critical nursery habitat for estuarine fisheries and wildlife, providing food for fish, waterfowl and sea turtles, cycling nutrients, and stabilizing sediments. Increasing development along the Texas coast threatens seagrass habitat in many ways, one of which is the discharge of wastewater into seagrass areas. A residential development planned for the Port Bay area (Aransas County) includes a proposed domestic wastewater discharge near seagrass beds in Port Bay. In Texas, wastewater discharges are permitted by the Texas Commission on Environmental Quality (TCEQ). Permits are written to ensure compliance with the state's water quality standards. The TCEQ writes stringent nutrient limits (nitrogen and phosphorus) into wastewater permits which discharge to seagrass beds, based on best professional judgment. No studies have been performed to find whether these permit limits are, in fact, protective of seagrasses. Seagrass beds in Port Bay were sampled using protocols recommended by seagrass researchers (Dunton et al 2007) to determine seagrass condition and evaluate environmental stressors. The study included three major components: landscape monitoring using aerial photography, seagrass condition and water quality indicators, and fluorometric epiphyte analysis. A second site, East Flats, is located in Corpus Christi Bay near Port Aransas, and was sampled using the same protocols and level of effort, as a point of reference. This data set will be considered a baseline for seagrass and environmental conditions in the area, and the study will be repeated using the same protocols and sampling stations after the wastewater discharge commences.

Abstracts: Oral Presentations (continued)

Current Status of Dermo Disease in Oysters of Matagorda and Aransas Bay Systems
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The protozoan parasite Perkinsus marinus, which causes Dermo disease in oysters, has survived the winter of 2010 and early spring of 2011 in greater abundance than usual in two central Texas bay systems. The current level of Dermo disease in these oysters does not bode well for the near future if the prediction of drought conditions in Central and South Texas for the next 18 months holds true. Oyster samples taken in early March 2011 appear to confirm increasing levels of Dermo disease as the water temperatures of these bays rise. Oyster samples taken in late March are yet to be analyzed. Comments concerning the early activity of the Southern Oyster drill (*Stramonita (thais) haestoma*) in Galveston Bay will be made.

DNA Microsatellite Variation in *Halodule wrightii* from the Texas Gulf Coast
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Halodule wrightii is a seagrass that grows in shallow waters in the Gulf of Mexico. Increasing anthropogenic pressures threaten the viability and genetic variation of *Halodule wrightii* populations. Decreased genetic variation leads to a decrease in evolutionary potential and increased population inbreeding. The purpose of this study is to identify genetic variation among populations of *Halodule wrightii* from the Texas Gulf Coast. *H. wrightii* samples were collected from ten sites, spanning the lower third of the Texas coast. Polymerase chain reaction based DNA markers, known as microsatellites, were developed to produce estimates of genetic variation within and among these populations. Twenty-one loci have been examined, nine of which have been polymorphic. To date, four of these loci have been analyzed across all ten populations. We have found from 1-10 alleles per locus in each population and a fair degree of heterozygosity.

Defining Assembly Rules for Predicting Whooping Crane Territory Location and Shapes with Sea-Level Scenarios
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Whooping cranes are one of the two species found in North America and the rarest crane species worldwide. Cranes migrate from their breeding area at Wood Buffalo National Park in northern Alberta to wintering area at Aransas National Wildlife Refuge and surrounding lands in the Texas Coastal Bend. Defended territories range from about 100 to 180 ha and encompass a diversity of coastal habitats along a topographic gradient. Currently, territories cover habitats from bay shoreline into high marsh/flats and are generally aligned linearly along the peninsulas and leeside of barrier islands. Sea-level rise projections from an application of the sea-level affecting marshes model (SLAMM 6) for Aransas NWR and surrounding areas provide predictions of wetland habitat shifts in relation to A1B mean and max scenarios, as well as 1-, 1.5-, and 2-meter total increases over 25-, 50-, 75-, and 100-yr increments. While some predictions show a shift landward while maintaining a similar width, other low areas increase in wetland extent and width. Prior to overlaying potential territories onto this landscape, further understanding is needed to determine if territory shapes would change in relation to habitat availability. Consideration was given to maximize diversity within a territory, minimize territory boundary length with adjacent territories, or align with shoreline or tidal network. These approaches will be helpful to determine if current protected areas will support increasing territory needs with increasing population size or if additional habitat is needed to support a recovering population of this endangered species.

Abstracts: Oral Presentations (continued)

Central Texas Gulf Coast Estuarine Marsh and Tidal-Flat Change, Mid-1950's to 2009

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Estuarine marshes and tidal flats are critical components of the Texas coastal wetland ecosystem. Biological and chemical productivity in marshes and flats is essential to coastal flora and fauna. In a series of status and trends studies of wetland habitats along the central Texas coast, we analyzed changes in wetland and aquatic habitats between the mid-1950's and 2009. Studies of this nature provide useful information for habitat management, thus ensuring marsh protection and preservation. This study focuses on historical changes in estuarine marsh and tidal-flat habitats at several locations along the central Texas coast. Wetland habitats on the Texas coast are dominated by estuarine emergent wetlands. Since the mid-1950's there has been a net gain (~15%) of estuarine marsh habitat and a net loss (~57%) of tidal-flat habitat in central coast wetlands. One of the main factors affecting wetland systems on the Texas coast is the rate of relative sea-level rise (RSLR). In some locations, human-induced subsidence and faulting have accelerated rates of RSLR, contributing to marsh loss. However, overall rates of RSLR along the central coast are relatively low, compared with those of the upper coast, and marsh area has remained stable or has expanded over time. The long-term decline in the extent of tidal-flat habitat in central coastal wetlands is consistent with trends found throughout Texas coastal wetlands. As sea level rises, flats are replaced by other habitats. In addition to accelerated rates of relative sea-level rise, other stressors contribute to wetland change on the Texas coast.

Trophic Structure of the Nueces Masrh, TX

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Salt marsh food webs rely on organic matter from several sources, with terrestrial, freshwater, and marine input supplementing in situ production. The multitude of potential carbon sources makes it difficult to ascertain which sources consumer organisms assimilate. We used a dual isotope approach ($^{13}C/^{15}N$) examine the trophic structure within two adjacent tidal creeks, one of which received freshwater inflow in the form of treated wastewater effluent. Stable nitrogen and carbon isotopic analyses of benthic 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. We found that both wastewater and reference channels possessed similar trophic structures with three trophic levels. The $\delta^{13}C$ values of consumer organisms were also similar between the reference and wastewater channels. However, a majority of the organisms collected from the wastewater channel were significantly enriched in ^{15}N compared to their reference counterparts. The exceptions to this pattern of enrichment were the planktivorous organisms, which retained $\delta^{15}N$ values similar to the reference site. These data suggest that wastewater-derived, ^{15}N-enriched nitrogen is entering the Nueces Marsh food web through detrital rather than grazing-based pathways. This suggests that at least two distinct energy pathways may exist within the over-arching food web structure.

Abstracts: Oral Presentations (continued)

Seasonal and Storm Induced Morphology Change at Packery Channel

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Surveys of bathymetry and topography show that the Packery Channel System, including the inlet and adjacent beaches of Mustang and Padre Island, responds rapidly (weeks to months) and seasonally to changes in wind, waves and current. Observed seasonal changes are distinct and surveying at the peak of such change provides insight into the direction and magnitude of sediment transport. Interruption by hurricane and tropical storms can either reinforce or reverse transport direction producing channel and nearshore morpohology more typical of an alternate season. Surveys were developed to measure bathymetry through a dense network of data points that are modeled to reveal morphologic features such as shoals and sand bars. Interpretation of patterns in migration and modification of these features over time provides insight into the direction and magnitude of sediment transport. Surveys are conducted to capture the seasonal peak condition observed during summer, winter and spring, which is considered a transitional period. Although trends in seasonality have been observed, the new inlet has not reached equilibrium. Sediment transport into the channel during storms further complicates the interpretation of seasonal trends. Surveys conducted over a 3-week period before and after Hurricane Ike show rapid reversal in sediment transport. Post-storm recovery, defined as scour of the channel and advance of the adjacent shoreline, is site specific. The rate and extent of channel recovery channel is dependent on wind and water level fluctuations and resulting increases in current speed. Beach recovery is most influenced by inlet proximity and breaks in the dune system.

Response of an Estuarine Dependent Species to Fragmentation

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Seagrass beds play a crucial role in the survival of estuarine-dependent species by serving as important nursery habitat. With increasing anthropogenic activity along our coasts, there has been a concern over the loss of such important habitats. Typically, habitat loss is preceded by fragmentation, a process whereby large continuous habitats are broken into smaller more isolated patches. To test what impact fragmentation may have on estuarine-dependent species, we investigated the density, growth, and movement of newly settled red drum (*Sciaenops ocellatus*) in response to varying levels of fragmentation (High, Medium, and Low) in Corpus Christi and Aransas Bays, Texas. Red drum were collected in fall 2009 (Oct-Nov) using an epibenthic sled for density estimates and bag seine for growth and movement experiments. There was no significant difference in densities of red drum among fragmented habitats. However, there was a significant difference in their size; larger fish were found in non-fragmented areas. Growth rates were compared among fragmented habitats using RNA:DNA ratios and otolith microstructure, and we found no significant difference among fragmentation levels. 200 wild red drum ($\bar{x}$ = 23.24 mm SL) were caught, tagged, and released into a single patch within three highly fragmented networks. Within 24 hours all but one fish moved out of the fragmented networks. The majority of recaptured fish (6.6%) were found in a neighboring, non-fragmented seagrass bed 50 m from their release point. Results suggest a temporal transition in size and density of juvenile red drum from fragmented sites to more continuous seagrass beds.

Abstracts: Poster Presentations

Seagrass Conservation: What Have Genes got to do with it?

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Seagrasses form the basis of highly productive and valuable coastal ecosystems. Unfortunately, many seagrass ecosystems around the world are in decline, usually the result of encroachment by burgeoning coastal populations. Genetic diversity, represented by the forms of genes (*alleles*), combinations (*genotypes*) and frequency with which they occur in populations, has been shown to be strongly correlated with population survival. High levels of genetic diversity enable populations to adapt to changes in their environment, and reduce the harmful effects associated with inbreeding. Genetic diversity in a population has also been associated with an enhanced ability to resist, and recover from, environmental stress. Our laboratory uses the tools of biochemistry to examine genetic diversity at the molecular level. We take advantage of naturally occurring differences in the DNA of individuals (*polymorphisms*) to obtain estimates for the number of alleles in a population, the number of individuals with different *combinations* of alleles (genotypes), and the relative proportion of these genotypes in a given population. Information on genetic diversity in seagrass populations will enable us to produce a map of its distribution and abundance along the Texas coast. This will be a valuable resource for establishing conservation priorities, and identifying donor stocks for future restoration efforts.

How do Freshwater Inflows Affect Spatial and Temporal Patterns of Water Quality in Galveston Bay, Texas (USA)?

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Examination of the impacts of freshwater inflow and bay circulation is a priority area for National Estuary Programs, and specifically the Galveston Bay program in Texas. Programs endeavor to define beneficial freshwater inflows necessary for salinity, nutrient and sediment loading regimes adequate to maintain productivity of economically important and ecologically significant species. With a rapidly expanding urban population in Texas, particularly in coastal municipalities, the challenge to meet human's needs for water while maintaining critical freshwater inflows will be the greatest challenge in the coming decades. We used a Dataflow, a flow-thru water quality instrument, to map temperature, salinity, chlorophyll, dissolved organic matter, pH, conductivity and transmittance. We found that spatial and temporal distributions are dependent on the magnitude and duration of freshwater inflow events. Depending on antecedent conditions, the response to freshwater inflows also varied. Our findings will ultimately be used to develop intense process-based understanding of the linkages between the magnitude of freshwater inflows and nutrient loading on primary productivity for the Galveston Bay ecosystem.

Abstracts: Poster Presentations (continued)

Phytoplankton Community Composition Shifts in Response to Freshwater Inflow in Galveston Bay, TX

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The Galveston Bay Estuary Program identified an "examination of the impacts of freshwater inflow and bay circulation" as priority areas in its comprehensive conservation management action plan for 2001-2005. The program's goal was specifically to ensure *beneficial* freshwater inflows necessary for a salinity, nutrient and sediment loading regimes adequate to maintain productivity of economically important and ecologically characteristic species in Galveston Bay. The major gap in the present knowledge is a clear understanding of the downstream ecological impacts of changes to freshwater inflows on estuaries, specifically phytoplankton communities. Here, phytoplankton community structure was monitored in response to freshwater inflows in Galveston Bay using pigments as chemical biomarkers. This study spanned a range of inflow conditions into the Galveston Bay estuary between March and December of 2009. We were able to characterize pigment composition during variable flow periods using multivariate statistical methods and assessed the significance of results using Multivariate Analysis of Variance (MANOVA). According to results, significant differences existed in the pigment composition between flow periods where the relative abundance of diatoms were increased in spring and fall months when flow was high (>7000 cfs), and the relative abundance of cyanobacteria were increased during summer months when flow was low (<7000 cfs). In addition, environmental vector fitting allowed us to show nitrate + nitrite concentrations were increased in high flow periods while temperature and salinity were increased in low flow periods. This research demonstrates the importance of freshwater inflows as an underlying mechanism driving primary production in coastal communities.

Cloning the Actin Gene of the Seagrass *Syringodium filiforme* for Use in Gene Expression Studies

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Seagrass meadows are highly diverse and productive ecosystems that benefit a variety of different species, however they are rapidly declining worldwide. Common seagrass monitoring techniques based on biomass measurement are "lagging indicators" of seagrass status and do not directly address the underlying reason(s) for the decline. Genomic indicators offer an alternative perspective on the assessment of seagrass status and stress. Actin is a highly conserved protein vital in cellular processes and is considered a "house-keeping" gene. The genetic sequence for actin in *Syringodium filiforme* can be used as a control to help determine the level of expression of stress related genes. Our goal was to clone and sequence the actin gene from *Syringodium filiforme*. Genomic DNA was isolated from *Syringodium* rhizome tissue and used to amplify actin homologues based on primer sequences derived from the rice genome. The 2 Kb product corresponding to exons 2-4 was cloned and sequenced. Four clones were sequenced and compared to databases with BLASTN to identify sequence homology. *Syringodium* actin sequences aligned most closely (70-86% similarity) with *Helianthus annuus.* Future directions include cloning and sequencing stress related genes.

Abstracts: Poster Presentations (continued)

Thermal Refuges: Protecting Fish During Arctic Fronts

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In 2005 the Texas Parks and Wildlife Commission approved a proposal giving authority to the Texas Parks and Wildlife Department (TPWD) executive director to close deep water areas along the Texas coast during freeze events. Historically, fish have been observed congregating in these areas, as they act as a thermal refuge providing warmer water than the surrounding shallow flats. This law was implemented for the first time in February 2011, when air temperatures dropped below freezing reaching 22^0F and water temperatures reaching near 32^0F coast wide. Thermal refuge closures are one more management tool that TPWD can implement to minimize impacts and ensure healthy fish populations.

Image Fusion Techniques and its Applications in Geomorphological Change Analysis

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Availability of highly accurate and spatially as well as spectrally dense topographic data provided us with myriad opportunities for advancing our understanding of how the coastal environment has evolved over time, as well as predicting its future evolution in the event of large magnitude storms (such as hurricanes) or human made disasters such as oil spill. This poster will address the applications of a serious of algorithms that were developed for 3D visualization morphological change analysis of dynamic coastal environment using point cloud data and image-fusion techniques. Tools developed as part of this investigation will be used to address shoreline erosion, beach-dune sediment budget, status and trends of aquatic habitats, and restoration of beaches, dunes, and wetlands along the Texas Gulf shorelines. The tools will allow any users run GEOID model and bias correction on raw point-cloud data as well as to convert ASCII point cloud data into LAS 1.3 format and its conversion to seamless raster grid with user-defined variable cell size. These programs will also integrate X, Y, Z values of lidar point could data with RGB values of imagery, which could be useful tool for visualization and morphological change analysis. It will also allow users to convert LAS format point-cloud data into other data formats such as KML, VRML, OSG etc. thus allowing any user to visualize/analyze the data on any computer (Windows, Apple, and Linux), using free visualization software such Google Earth, Open Scene Graph, Qsplat etc. Practical application of these tools will be demonstrated using examples from Gulf coast.

Abstracts: Poster Presentations (continued)

The Critical Thermal Maximum of Juvenile Red Drum Reared for Out-of-Season Stocking in Texas

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Hatchery propagated red drum, are released by the Texas Parks and Wildlife Department during the spring, summer and fall seasons to supplement natural stocks. Reported success of out-of-season summer stocked red drum has been low or nonexistent and several theories, including high temperature mortality, have been suggested as the cause. The present study was devised to determine the critical thermal maximum (CTM) of pond raised juvenile red drum that had previously been exposed to diurnal temperatures of the summer season. Laboratory studies designed to mimic temperature increase rates common to TPWD rearing ponds (+0.25°C/h) were used to examine rates of mortality in juvenile red drum collected from three separate ponds exposed to the ambient fluctuating temperatures of the summer season. The critical thermal maximum was significantly lower ($P < 0.0001$) for two fish trials (LT^{50} = 37.1°C and 37.0°C) as compared to another fish trial (LT^{50} =38.7°C). This difference correlated with the fish size of each trial; smaller-sized fish in two trials (range 18-32mm in TL) had the lower CTMs whereas, the other trial with larger-sized fish (range 31-50mm) had the higher CTM, giving evidence for positive-size dependence in the CTM. The CTMs obtained here represent temperatures higher than the maximum temperatures encountered in grow-out ponds during the summer season, a finding that indicates high temperature exposure alone may not be the sole cause for low success of out-of-season stocking.

Prairie Wetlands Restored

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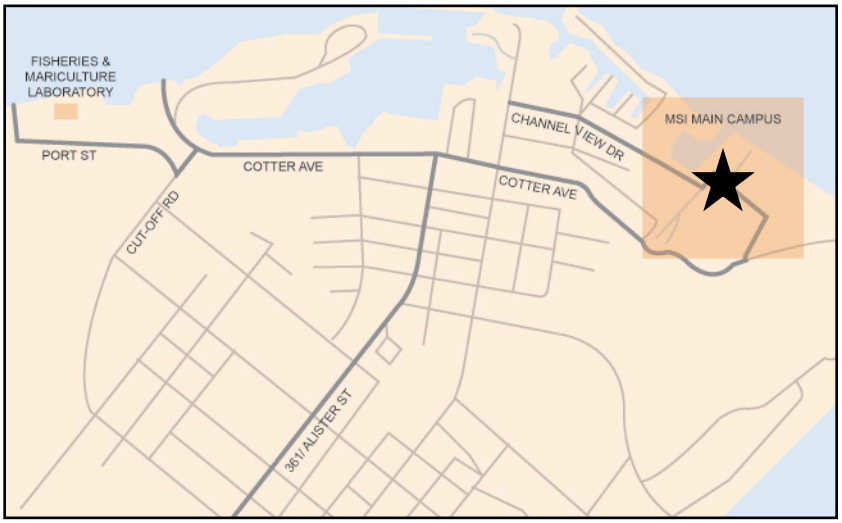
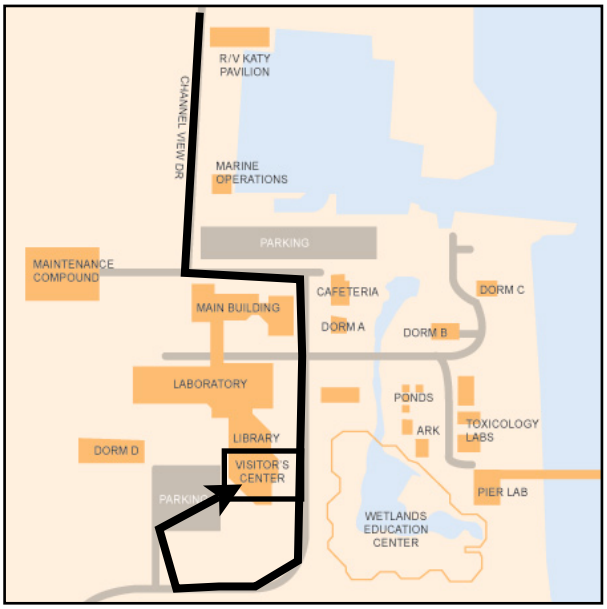
Topographic maps from the 1920s and aerial photos from the 1930's show that freshwater wetlands once occupied 25-30% of the mid and upper Texas Coastal Plain, an area of 7 million acres. About half of these wetlands were embedded within a tall grass prairie matrix and mostwere filled and drained for rice culture and pasturage. Sheldon Lake State Park is 2900 acres of what was once coastal prairie and pine/oak savanna, dotted and crossed by circular and linear marsh basins. Rice production on the property filled or drained almost all of the original prairie wetlands. Texas Parks and Wildlife, in partnership with Texas AgriLife Extension Service and the Texas State Soil and Water Conservation Board, is now restoring the Park's agricultural lands to presettlement conditions for the conservation of native plant and animal populations. This goal will also provide visitors an authentic view of the region's original landscape, and serve as an inexpensive example of how other rice-land wetlands can be restored.

All restoration phases carefully removed fill material to expose the original wetland topsoil and to restore the original hydrology of these marsh complexes. Low berms block the artificial drainage swales created by farmers to drain the agricultural fields. The wetlands and surrounding uplands were planted with native vegetation, while the excavated soils were either used on site or are placed in upland areas subsequently seeded with native prairie mixes. The restoration project has been very successful and is subsequently being used as a template for regional wetland restoration and/or mitigation projects.

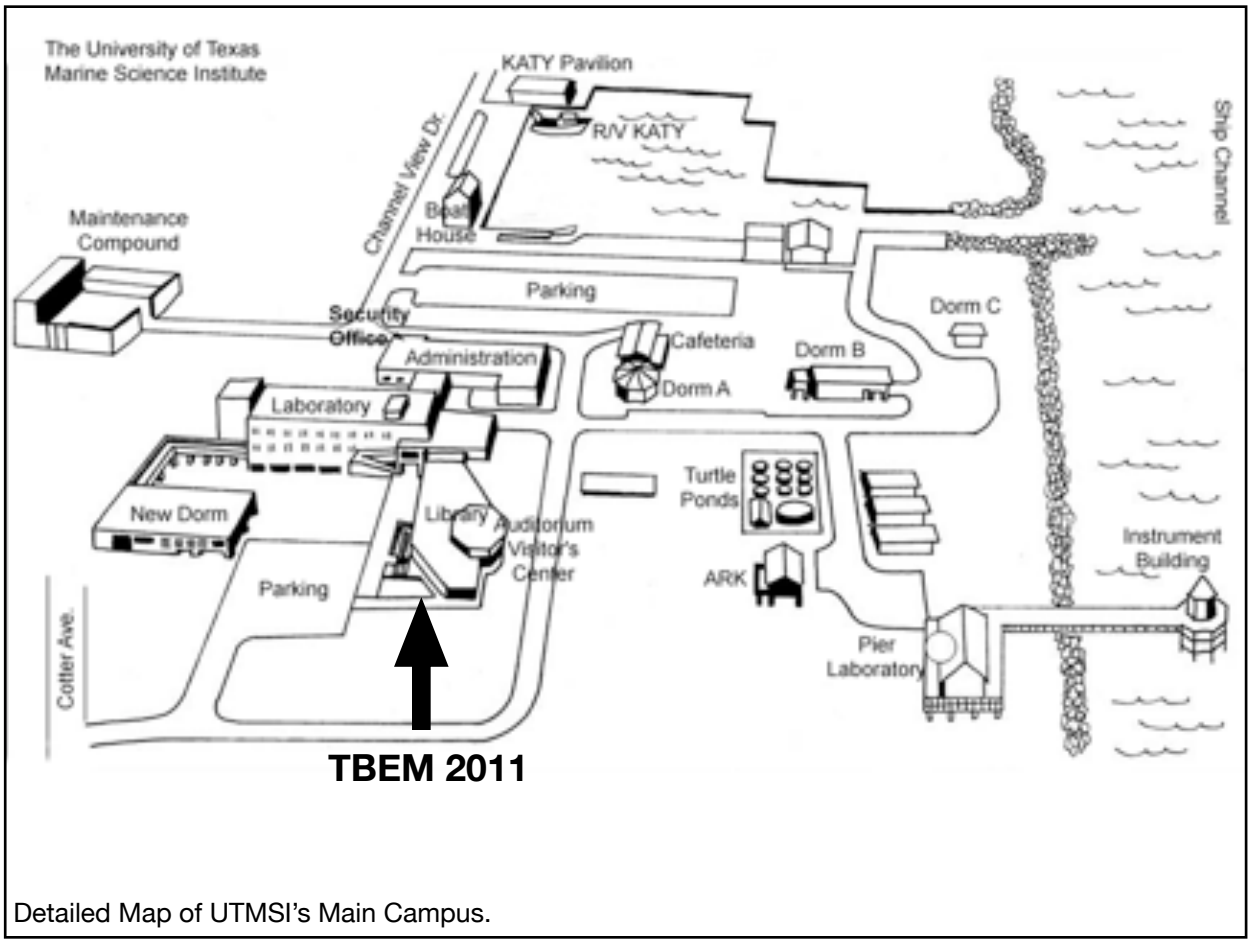
Facility Maps & Directions



2011 TBEM is located at the **main campus** (star) of The University of Texas at Austin, Marine Science Institute (UTMSI).



Proceed down Channel View Dr. to the UTMSI **Visitors Center** (box).



Detailed Map of UTMSI's Main Campus.

(Above) UTMSI Main Campus *(CC) Larry D. Moore*

(Above) Fisheries and Mariculture Laboratory *(CC) Barrett Fines*

The University of Texas at Austin, Marine Science Institute (UTMSI) 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.

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