2012 Texas Bays and Estuaries Meeting

Photo courtesy of Texas Historical Commission.

Texas Bays and Estuaries Meeting

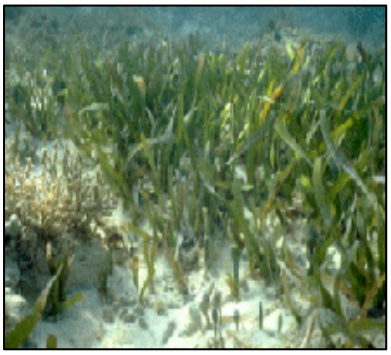
TBEM

Marine Science Institute
THE UNIVERSITY OF TEXAS AT AUSTIN

Port Aransas, Texas
April 11-12, 2012

Photo of the Nueces Delta Preserve. The Preserve includes mud flats, pothole wetlands, marsh, bay and river habitats. Photo courtesy of the Coastal Bend Bays and Estuaries Program.

Table of Contents



Welcome to the 2012 Texas Bays and Estuaries Meeting

The University of Texas Marine Science Institute is proud to host the 8th 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 nonsmoking. Restrooms are located in the Visitor's Center, across from the auditorium. Lunch will be served outside at the picnic tables under the Main Laboratory Building 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 are two complimentary tickets 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!

Kelly Darnell and Nathan McTigue
Marine Science Institute
The University of Texas

Schedule:
Wednesday April 11, 2012

08:00 AM - Registration, Visitor's Center Lobby, The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

08:45 AM - Welcome and Opening Remarks – G. Joan Holt, Ph.D, Associate Chair, The University of Texas at Austin, Marine Science Institute, Port Aransas, TX

-Harmful Algal Blooms-

9:00 AM – **The role of protozoan grazers in harmful algal bloom dynamics**
Campbell, J.R.; Buskey, E.J. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

9:15 AM – **Evaluation of brevetoxin accumulation and degradation in fish found on Texas beaches during red tide blooms**
Rafalski, Alexandra V.; Savage, Marci L.; Zimba, Paul V. Texas A&M University – Corpus Christi, Corpus Christi, TX.

9:30 AM – **The 2011-2012 Texas red tide (*Karenia brevis*) bloom**
Byrd, Meridith. Texas Parks and Wildlife Department, Victoria, TX.

9:45 AM – **Effects of amino acids on the growth and microcystin production of *Microcystis aeruginosa***
Dai, Ruihua. Fudan University, the Department of Environmental Science and Engineering, Shanghai, China.

-Plant Ecology-

10:00 AM – **Genetic analysis of seagrass (*Halodule wrightii*) populations from the Texas Gulf coast**
Larkin, Patrick D.; Maloney, Tabitha; Barrett, Michael; Paturzzio, Mindy. Texas A&M University-Corpus Christi, Corpus Christi, TX.

10:15 AM – **Genetic variation among seedbanks of the seagrass *Halodule wrightii* (Ascherson) from the Texas Gulf coast.**
Barrett, Michael; Larkin, Patrick. Texas A&M University–Corpus Christi, Corpus Christi, TX.

10:30 AM – **BREAK**

Wednesday April 11, 2012 (continued)

11:00 AM – **Composition of south Texas coast macroalgae**
Savage, Marci L.; Rafalski, Alexandra V.; Zimba, Paul V. Texas A&M University – Corpus Christi, Corpus Christi, TX.

11:15 AM – **The effects of exceptional drought and increased saltmarsh salinity on Carolina wolfberry (*Lycium carolinianum*)**
Borne, Ella Grace[1]; Bogrand, Ashley[1]; Pearman, Kelsey[1]; Ragan, Niki[1]; Smith, Elizabeth[2] and Wozniak, Jeffrey R.[3] [1]Department of Biological Sciences, Sam Houston State Univ., Huntsville, TX. [2]International Crane Foundation, Corpus Christi, TX. [3]Texas Research Institute for Environmental Studies, Sam Houston State Univ., Huntsville, TX.

11:30 AM – **The colonization and age structure of red mangrove (*Rhizophora mangle*) trees along the coast of Texas**
Wilson, Christopher J.; Jackson, Kimberly; Dunton, Kenneth H. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

11:45 AM – **LUNCH,** (Catered by Robert's) at picnic tables under the Main Laboratory Building

-Larval Fish Ecology-

1:30 PM – **Influence of maternally derived and dietary fatty acids on ecological performance of larval red drum (*Sciaenops ocellatus*)**
Perez, Kestrel O.; Lashua, Sheena; Fuiman, Lee A. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

1:45 PM **– Dynamics of arachidonic acid transfer from diet to eggs in red drum (*Sciaenops ocellatus*)**
Fuiman, Lee A.; Faulk, Cynthia K. Marine Science Institute, The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

2:00 PM – **Larval red drum (*Sciaenops ocellatus*) change their behavior in response to acoustic stimulus**
Havel, Lisa N.; Wilson, Christopher J.; Fuiman, Lee A. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

2:15 PM – **An imaged-based larval fish key for the Texas coast**
Williams, Jason A.; Stunz, Greg W. Harte Research Institute, Texas A&M University, Corpus Christi, TX.

2:30 PM – **BREAK**

Wednesday April 11, 2012 (continued)

-Fish & Fisheries-

3:00 PM – **Discriminating natal origin of hatchery reared and wild spotted seatrout using otolith microchemistry**
Curtis, Judson M.[1]; Stunz, Greg W.[1]; Overath, R. Deborah[2]; Vega, Robert R.[3]
[1]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University - Corpus Christi, Corpus Christi, TX. [2]Department of Life Sciences, Texas A&M University - Corpus Christi, Corpus Christi, TX. [3]Texas Parks & Wildlife Department, CCA-CPL Marine Development Center, Corpus Christi, TX.

3:15 PM – **Using otolith chemistry as a novel proxy of hypoxic exposure in a marine fish**
Mohan, John A.; Walther, Benjamin; Thomas, Peter; Saydur, Rahman. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

3:30 PM – **Ecology and conservation of benthopelagic rays in the Gulf of Mexico: a review and prospectus**
Ajemian, Matthew J. Harte Research Institute, Texas A&M University – Corpus Christi, Corpus Christi, TX.

3:45 PM – **Evaluation of the first three years of the Tarpon Observation Network**
Morris, Artussee D. Texas Parks & Wildlife Department, Coastal Fisheries Division, Corpus Christi, TX.

-Pollutants and Toxins-

4:00 PM – **Acute toxicity of three dispersants alone and in combination with crude oil on *Callinectes sapidus* megalopae**
Fern, Rachel R; Withers, Kim. Texas A&M University – Corpus Christi, Center for Coastal Studies, Corpus Christi, TX.

4:15 PM – **Impact of dry-wet cycles on PAHs released from sediments, south Texas**
Wang Zucheng[1,2]; Liu Zhanfei[1]. [1]The University of Texas at Austin, Marine Science Institute, Port Aransas, TX. [2]East China Normal University, Shanghai, China.

4:30 PM – **Health effects characterization for fish and blue crab consumption from Galveston Bay, Texas**
Sweet, Stephen T. [1]; Wade, Terry, L[1].; Sericano, Jose L. [1];Tennant, Michael[2]; Wiles, Kirk[2].
[1]Texas A&M University, Geochemical and Environmental Resarch Group, College Station, TX.
[2]Texas Department of State Health Services, Seafood and Aquatic Life Group, Austin, TX.

5:00 PM – **Poster Session**

6:00 PM – **DINNER,** (Catered by Miss K's) at the Marine Science Institute Visitor's Center, bar closes at 7:30 PM

Thursday April 12, 2012

-Ecosystem Dynamics-

9:00 AM – **A conceptual framework for linking ecosystem services to an oyster reef Emergy Model.**
Blomberg, Brittany N.; Francis, Jeff; Hutchison, Lauren; Montagna, Paul; Beseres Pollack, Jennifer; Yoskowitz, David. Harte Research Institute, Texas A&M University – Corpus Christi, Corpus Christi, TX.

9:15 AM – **Solar radiation-enhanced dissolution of particulate organic matter from resuspended sediments in Nueces Marsh, TX**
Liu, Qiyuan; Shank, G. Christopher. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

9:30 AM – **Landscape level patterns in saltmarsh pond salinity and the effects of Whooping Crane behavior and territory selection**
Borne, Ella Grace[1]; Bogrand, Ashley[1]; Pearman, Kelsey[1]; Ragan, Niki[1]; Smith, Elizabeth[2] and Wozniak, Jeffrey R.[3] [1]Department of Biological Sciences, Sam Houston State Univ., Huntsville, TX. [2]International Crane Foundation, Corpus Christi, TX. [3]Texas Research Institute for Environmental Studies, Sam Houston State Univ., Huntsville, TX.

9:45 AM – **Crabs digging creeks in sinking salt marshes.**
Vu, Huy D.; Wieski, Kazimierz,; Pennings, Steve C. University of Houston, Houston, TX.

-Special Topics-

10:00 AM – **An international estuarine and marine living resource species interaction database for the Gulf of Mexico large marine ecosystem**
Simons[1], James D.; Yuan[2], May; Carollo[3], Cristina; Schoonard[4], Cristina M.; Hendrix[1], Tinara. [1]Texas A&M University, Center for Coastal Studies, Corpus Christi, TX. [2]University of Oklahoma, Center for Spatial Analysis, Norman, OK. [3]Texas A&M University, Harte Research Institute, Corpus Christi, TX. [4]Florida Wildlife Research Institute, St. Petersburg, FL.

10:15 AM – **Evaporation in a semi-arid place: where does the water go when it's not there in the first place?**
Amos, Anthony F. (Tony). The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.

10:45 AM – **Award Ceremony for Best Student Oral and Poster Presentations**

--End of 2012 Texas Bays and Estuaries Meeting--

Organized and Hosted By:

Marine Science Institute
The University of Texas at Austin
Kelly Darnell and Nathan McTigue, Conveners
Dr. G. Joan Holt, Associate Chair

TBEM workers, Thank them if you see them!
Joseph Aizen, Karen Bishop, Colt Cook, Catalina Cuellar, Kelly Darnell, Claire Griffin, Lisa Havel, Kellie Hoppe, Matt Khosh, Ellen Knapke, Qiyuan Liu, Nathan McTigue, Megan Nims, Kestrel Perez, Joseph Stachelek, Wenxian Tan and Skye Woodcock

Thanks to our Sponsors!

Marine Science Institute
THE UNIVERSITY OF TEXAS AT AUSTIN

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 and Estuaries Program has continued its support of this award ($250 for 1st, $150 for 2nd and $100 for 3rd).

2005: **Jason James**, Texas A&M Corpus Christi, 1st Place
Tatum Neeley, Texas A&M University, College Station, 2nd Place
2006: **Harris Mulhstein**, The University of Texas at Austin 1st Place
Lucia B. Carreon Martinez, The University of Texas at Austin, 2nd Place
2007: **Matt Hubner,** Texas A&M Corpus Christi, 1st Place
Megan Fencil, The University of Texas at Austin, 2nd Place
2008: **John Froeschke**, Texas A&M Corpus Christi, 1st Place
Laura Ryckman, The University of Texas at Austin,
Katie Swanson, The University of Texas at Austin tie for 2nd Place
2009**: Christopher Wilson**, The University of Texas at Austin, 1st Place
Danielle Crossen, University of Houston, Clear Lake, 2nd Place
2011: **Rachel Mills**, The University of Texas at Austin, 1st Place
Kelly Darnell, The University of Texas at Austin, 2nd Place

Abstracts for Oral Presentations

Ecology and Conservation of Benthopelagic Rays in the Gulf of Mexico: A Review and Prospectus

Ajemian, Matthew J. Harte Research Institute, Texas A&M University – Corpus Christi, Corpus Christi, TX.
Email: Matt.Ajemian@tamucc.edu

Benthopelagic stingrays are migratory fishes that fulfill integral roles in marine environments as benthic predators and agents of episodic bioturbation. However, given their low commercial value and, in some cases, shared shellfish resources with humans, these fishes have lacked any management protocols. One species of migratory ray, the cownose *Rhinoptera bonasus*, has purportedly impaired bivalve restoration programs across the US east coast. These findings led to the consideration of predator control programs for cownose rays in Chesapeake Bay despite life history studies that identify the extremely low fecundity of this species and weak evidence of natural predation by rays on commercial bivalves (e.g. eastern oyster *Crassostrea virginica*). In the Gulf of Mexico, multiple studies identify the lack of impact of cownose rays on exploitable shellfish. Additionally, recent genetic evidence suggests the presence of a nearly indistinguishable IUCN-endangered congener (*R. brasiliensis*) common to the Gulf of Mexico, particularly off the coast of Texas. This talk explores potential migratory pathways of multiple ray species across the Gulf of Mexico and identifies threats to these species throughout this large marine ecosystem. Future tagging studies using coastal tracking arrays and satellite telemetry are encouraged, with an emphasis on intra-gulf connectivity of ray populations.

Evaporation in a Semi-Arid Place: Where Does the Water Go When it's Not There in the First Place?

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

Using data from the UTMSI Pier Weather/Tide/Currents instruments and the Evaporation and Precipitation monitors on the UTMSI grounds the paper examines evaporation on scales ranging from daily, seasonally, and over a decade of measurement. The relative importance of factors controlling evaporation (temperature, humidity and winds) locally is presented. The remarkable effects of cold fronts and subsequent high pressure events ("Northers") on these parameters are shown. This is a follow up of the paper "Decadal changes in Precipitation, Evaporation and Temperature monitored at UTMSI" presented at this meeting two years ago.

Abstracts for Oral Presentations (continued)

Genetic Variation Among Seedbanks of the Seagrass *Halodule wrightii* (Ascherson) from the Texas Gulf Coast.

Barrett, Michael; Larkin, Patrick. Texas A&M University–Corpus Christi, Corpus Christi, TX.
Email: michael.barrett@tamucc.edu

Seagrasses typically exhibit asexual reproduction through rhizome elongation, but sexual reproduction (seeds) likely contributes to genetic diversity in many populations. Seedbanks may serve as a reservoir of genetic diversity in the event of a loss of standing plant populations through natural or anthropogenic causes. We used DNA microsatellite markers to examine genetic variation in *Halodule wrightii* seedbanks from the south Texas coast. We examined 6 loci in populations from the Lower Laguna Madre, Upper Laguna Madre and Redfish Bay. Estimates of genetic variation were compared to values obtained for standing plants from the same locations. Analysis of seed samples indicated allelic richness (A_r) values ranging from approximately 2 to 3, mean observed (H_o) and mean expected (H_e) heterozygosity ranging from 0.38 to 0.65, and 0.37 to 0.63, respectively, and mean inbreeding (F_{IS}) coefficients ranging from -0.015 to 0.114. These analyses, although showing slight variation, exhibit a general trend that was similar to values observed in the standing plant populations. It seems likely that *H. wrightii* seedbanks can serve as potential reservoirs of genetic variation in the event of disturbance or loss of standing plant populations.

A Conceptual Framework for Linking Ecosystem Services to an Oyster Reef Emergy Model.

Blomberg, Brittany N.; Francis, Jeff; Hutchison, Lauren; Montagna, Paul; Beseres Pollack, Jennifer; Yoskowitz, David. Harte Research Institute, Texas A&M University – Corpus Christi, Corpus Christi, TX.
Email: Brittany.blomberg@tamucc.edu

Here we present a conceptual framework for linking ecosystem services to an emergy model of an oyster reef. Emergy is a measure of all energy necessary to produce a good or service, and thus can be thought of as 'energy memory.' Emergy evaluations can be used to represent environmental and economic values of a system in equivalent units, generally in units of solar energy. We have extended the basic emergy framework to include pathways to ecosystem services provided to humans. Focus will be on three ecosystem services provided by oyster reefs: nutrient regulation, food provision (i.e., oyster harvest), and recreational opportunities. To adequately represent the total importance of oyster reefs to humans beyond typical market values, we must also include the numerous ecosystem services important for human well-being. By linking emergy analysis to ecosystem services, we can begin to quantify the total value of ecosystems. In the future, we plan to use this model to quantify ecosystem services provided by a subtidal oyster reef ecosystem in south Texas.

Abstracts for Oral Presentations (continued)

The 2011-2012 Texas Red Tide (*Karenia brevis*) Bloom

Byrd, Meridith. Texas Parks and Wildlife Department, Victoria, TX.
Email: meridith.byrd@tpwd.state.tx.us

The Texas coast experienced a major bloom of the toxin-producing dinoflagellate *Karenia brevis* beginning in the fall of 2011. This was Texas' largest *K. brevis* bloom in over a decade, stretching from the lower portion of Galveston Bay to the Rio Grande. The event was closely monitored by a number of entities, including the Texas Parks and Wildlife Department, Texas Department of State Health Services, Texas AgriLife Extension, Padre Island National Seashore, Texas A&M University and the University of Texas. Data collected reveal that the active bloom lasted nearly five months and killed an estimated 4.4 million fish. The Texas oyster industry suffered a major blow, as the bloom prevented oyster season from opening on November 1, 2011 as scheduled. Though cell concentrations declined drastically throughout the month of January, brevetoxin levels remained elevated in oysters. In late January 2012, San Antonio and Espiritu Santo bays were the first to open to shellfish harvesting. By mid March, only portions of Matagorda Bay remained closed due to *K. brevis*.

The role of protozoan grazers in harmful algal bloom dynamics

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

The increasing occurrence of harmful algal blooms (HABs) has prompted studies aimed at determining biotic and abiotic factors which may promote bloom initiation, maintenance, and decline. Although many studies have tried to evaluate the effectiveness of "top-down" or "bottom-up" control of HABs, there is evidence to support both mechanisms. Protozoan grazers are likely candidates for "top-down" control of HAB species since they have the potential to increase their populations at growth rates similar to those found for many HAB species. However, it is difficult to determine if protozoan grazers are feeding on HAB species based on microscope observations alone. PCR amplification of genetic material, focused on a species- or genus-specific HAB gene, will more precisely determine 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. The dinoflagellates Noctiluca scintillans and Protoceratium sp. are the grazers included in this study. This same PCR technique can be used during a natural HAB to determine which grazers are feeding on the HAB species.

Abstracts for Oral Presentations (continued)

Discriminating Natal Origin of Hatchery Reared and Wild Spotted Seatrout Using Otolith Microchemistry

Curtis, Judson M.[1]; Stunz, Greg W.[1]; Overath, R. Deborah[2]; Vega, Robert R.[3] [1]Harte Research Institute for Gulf of Mexico Studies, Texas A&M University - Corpus Christi, Corpus Christi, TX. [2]Department of Life Sciences, Texas A&M University - Corpus Christi, Corpus Christi, TX. [3]Texas Parks & Wildlife Department, CCA-CPL Marine Development Center, Corpus Christi, TX.
Email: judd.curtis@tamucc.edu

A major goal of stock enhancement is to increase species abundance and potential harvest by supplementing wild population recruitment. The efficacy of these efforts is obviously reliant upon the survival of these hatchery-reared organisms after release, and determining their fate is essential to understanding the success of these programs. In Texas, spotted seatrout (*Cynoscion nebulosus*) represent the number one recreational fishery and are stocked in coastal bays and estuaries to enhance natural fish abundance. The natural chemical properties of fish otoliths represent one mechanism to track the fate of hatchery-reared fish in the wild and make inferences about their movement and survival. Young-of-year spotted seatrout were collected from three Texas bays and three Texas saltwater fish hatcheries. Sagittal otoliths were extracted and analyzed for stable isotopes $\delta^{18}O$ and $\delta^{13}C$, and a suite of twelve trace elements. Multivariate analysis of variance (MANOVA) and univariate ANOVA tests indicated significant differences among natal origins and reduced the number of chemistry predictors to nine. Linear discriminant analysis using jackknifed crossvalidation successfully classified 94% of fish to their correct natal origin. These results indicate that otolith chemistry will be a powerful tool for discriminating hatchery-reared fish from wild fish and for identifying natal origins of spotted seatrout. The chemical signature patterns reflected in the otoliths establish a baseline for tracking the fate of hatchery-reared fish in the wild. This information can provide better estimates of stock enhancement success to fishery managers by reducing the ambiguity surrounding the fate of hatchery-reared fish.

Effects of amino acids on the growth and microcystin production of *Microcystis aeruginosa*

Dai, Ruihua. Fudan University, the Department of Environmental Science and Engineering, Shanghai, China.
Email: rhdai@fudan.edu.cn

A *Microcystis aeruginosa* which produced high content of microcystin -LR (MC-LR) but no microcystin-RR (MC-RR) was isolated from Dianchi Lake in China. In the molecular structure of MC-LR, glutamic acid, aspartic acid, leucine, alanine and arginine are the constitutional components which are abundant in natural water. In this paper, effects of six amino acids at their natural concentrations on the growth of the *Microcystis aeruginosa* and the microcystin (MC) production were studied in batch culture. *Microcystis aeruginosa* could assimilate alanine, leucine and arginine as sole nitrogen sources for growth and MC production. In the presence of glutamic acid and aspartic acid, *Microcystis aeruginosa* grew quickly and became yellow and died after 96 h.

Abstracts for Oral Presentations (continued)

Acute Toxicity of Three Dispersants Alone and in Combination with Crude Oil on *Callinectes sapidus* Megalopae

Fern, Rachel R; Withers, Kim. Texas A&M University – Corpus Christi, Center for Coastal Studies, Corpus Christi, TX.
Email: Rachel.Fern@tamucc.edu

During the Deepwater Horizon incident in 2010, approximately 1.8 million gallons of Corexit® dispersants were approved for use directly onto the released oil. Blue crab (*Callinectes sapidus*) megalopae are pelagic and are likely to be one of the first organisms exposed to spilled oil and applied dispersants in open-ocean and nearshore waters. The commercial and ecological significance of this species makes establishing toxicity effects of oil and dispersants vital. This study examined acute toxicity of Corexit® 9500, Corexit® 9527, and Microblaze® (a product that may enhance bio-degradation of the released oil and the Corexit dispersants) alone and in combination with crude oil. In addition, Microblaze® was applied to crude oil dispersed with each Corexit® dispersant to investigate the combined effect of Microblaze® on the toxicity of the Corexit® 9500, 9527and crude oil mixtures. Blue crab megalopae were exposed for 48 hours to varying dosages of each treatment. Preliminary results indicate that oil treated with dispersants was more toxic than either oil or dispersants alone. Microblaze® was essentially non-toxic. Analyses of oil residue in surviving megalopae and Microblaze® on oil-dispersant combinations are on-going. Such research may provide essential baseline data needed to determine the optimal dosing of dispersants. It will aid also in the creation of future recovery plans, which balance dispersant use and dosage with anticipated crab fishery impacts.

Dynamics of Arachidonic Acid Transfer from Diet to Eggs in Red Drum (*Sciaenops ocellatus*)

Fuiman, Lee A.; Faulk, Cynthia K. Marine Science Institute, The University of Texas at Austin, Port Aransas, TX.
Email: lee.fuiman@mail.utexas.edu

Red drum is a recreationally important marine fish with a wide geographic range and is the subject of stock-enhancement programs in some regions. Successful stock-enhancement efforts dependent on the production of high quality eggs and larvae that will survive after being released into nursery habitats. Long chain, highly unsaturated fatty acids (HUFA) including arachidonic acid (ARA) play an important role in reproduction, development, growth, and ecological performance of fishes. As marine fishes have limited ability to produce HUFAs, these fatty acids must be obtained by through the diet, and the adult diet is the supply for eggs and early larvae. The period of time over which the maternal diet influences the fatty acid composition of the eggs is not known. We varied the level of ARA in the diet of broodstock and quantified ARA levels in eggs to quantify the relationship between maternal diet and egg fatty acid composition. Measureable changes in the eggs occurred within 2-24 d following the diet shift. We found that the rate at which ARA levels changed in eggs was related to the ARA content of both the diets before and after the shift. We present a preliminary model for predicting the rate of ARA incorporation in red drum eggs based on broodstock diet. Such information will help hatchery managers design broodstock diets that optimize egg fatty acid levels while minimizing use of non-sustainable feed sources.

Abstracts for Oral Presentations (continued)

Larval Red Drum (*Sciaenops ocellatus*) Change their Behavior in Response to Acoustic Stimulus

Havel, Lisa N.; Wilson, Christopher J.; Fuiman, Lee A. The University of Texas at Austin Marine Science Institute, Port Aransas, TX.
Email: l.havel@utexas.edu

Seagrass meadows in Texas bays provide important nursery grounds for fishes and invertebrates. These habitats afford both food and refuge, but another potential advantage of seagrass habitats is their unique acoustic properties. The free gas contained within the plant tissue and the bubbles produced during photosynthesis form an acoustically compressible substrate, which alters the estuarine soundscape. It is hypothesized that larval fishes that use seagrass meadows as nursery habitat preferentially settle within the seagrass meadows because of the reduction in sound within. In laboratory trials, we examined the behavioral response of larval red drum (*Sciaenops ocellatus*) over a range of sizes to a 500-Hz pure sine tone at four separate amplitude treatments and white noise in the frequency band of 0.1 to 1.0 kHz. These five acoustic treatments represented amplitudes the larvae experience while in the local pelagic and demersal environments. Each larva was tested in a paired comparison: without introduced sound (control) and with one of the five acoustic treatments. Results showed that size is positively related to swimming speed, and individuals covered less distance (swam more slowly) during the sound treatment compared to the control (quiet period). The increase in swimming speed associated with quieter environments could translate into differences in foraging efficiency and predator encounter rates depending on the habitat in which a larva settles, consequently affecting chances of survival.

Genetic analysis of seagrass (*Halodule wrightii*) populations from the Texas Gulf coast

Larkin, Patrick D.; Maloney, Tabitha; Barrett, Michael; Paturzzio, Mindy. Texas A&M University-Corpus Christi, Corpus Christi, TX.
Email: patrick.larkin@tamucc.edu

We provide here the first extensive report on genetic variation in the seagrass *Halodule wrightii* L. Ascherson. *H. wrightii* is prominent in the western tropical Atlantic and is the most abundant seagrass species found along the Texas Gulf coast. Seagrasses are noted for the number of "ecological services" they provide such as primary production, fisheries habitat, and stabilization of the seabed, yet increasing anthropogenic pressure threatens their viability in many coastal areas. We have developed a set of 8 microsatellite markers to investigate population genetic variation in this species. 10 populations were sampled, spanning the primary range of Texas seagrass habitat. The mean number of alleles across populations ranged from 2.9-5.8. Mean observed heterozygosity (H_o) across all populations was = 0.55 while mean expected heterozygosity (H_e) was = 0.49. Clonal richness varied widely. Populations near the northern boundary of *H. wrightii*'s Texas range were dominated by only a few clones, while those from the relatively undeveloped shorelines of the Laguna Madre region were much more diverse. Compared to other seagrass species, *H. wrightii* populations from the Texas coast exhibit somewhat lower values for several population genetic variation estimates.

Abstracts for Oral Presentations (continued)

Solar Radiation-enhanced Dissolution of Particulate Organic Matter from Resuspended Sediments in Nueces Marsh, TX

Liu, Qiyuan; Shank, G. Christopher. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.
Email: qliu@utexas.edu

Irradiation of particulate organic matter (POM) by sunlight in aquatic systems can lead to substantial changes in the chemical makeup of POM including releasing organic moieties to the dissolved phase (DOM). We studied resuspensions of Nueces Marsh sediments under solar radiation to test if photodissolution of POM can result in the production of important quantities of dissolved organic carbon (DOC), chromophoric DOM (CDOM), and total dissolved nitrogen (TDN). Irradiation experiments incorporating a solar simulator (SunTest XLS+) demonstrated that suspensions of wet (raw) sediments (400-500 mg L^{-1} dry wt) in artificial seawater produced ~50 µmol C L^{-1} DOC, ~2 m^{-1} (a_{305}) CDOM, and ~40 µmol N L^{-1} TDN after 24 hrs of exposure. Irradiated suspensions of dried sediments and artificial seawater produced three-fold more DOC, slightly more CDOM, and twice as much of TDN than the suspension of undried sediments. Resuspension experiments using organic-rich Nueces marsh water (DOC = 5.22 mg C L^{-1}) showed that although DOC concentrations in irradiated wet sediment suspensions did not change significantly, TDN concentrations did increase by 20-30% and the presence of POM dampened the CDOM photobleaching. The results indicate that sedimentary POM may serve as an important DOC, CDOM and TDN source for shallow coastal systems, potentially altering the previous view of marsh carbon and nutrients budgets.

Using Otolith Chemistry as a Novel Proxy of Hypoxic Exposure in a Marine Fish

Mohan, John A.; Walther, Benjamin; Thomas, Peter; Saydur, Rahman. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.
Email: john.mohan@mail.utexas.edu

Assessing the effects of hypoxia on fish populations requires a valid natural geochemical 'tag' that can be used as a proxy of duration and magnitude of hypoxic exposure. Hypoxia alters bottom water chemistry due to reductive release of dissolved manganese, which may be recorded in otoliths of fish inhabiting those waters. Alternatively, hypoxia may alter fish physiological stress and thus incorporation rates of trace elements regardless of ambient concentrations. We examined the elemental composition of otoliths from Atlantic croaker exposed to hypoxia in both experimental and natural settings. In the laboratory, fish were exposed for 4 weeks to hypoxia in recirculating seawater tanks. No significant differences in otolith Mn/Ca, Mg/Ca, Sr/Ca or Ba/Ca ratios were observed between control and hypoxia-exposed fish, suggesting that physiological stress alone does not induce detectable differences in otolith chemistry. Wild fish were collected from across the northern Gulf of Mexico 'Dead Zone' during October 2010, and seasonal patterns in otolith chemistry were quantified. Patterns of otolith Mn/Ca ratios depended on collection location. Fish from some locations exhibited springtime Mn/Ca maxima that were orders of magnitude higher than background concentrations, while fish from other locations showed minimal seasonal variation in Mn/Ca. Sediment loads of Mn influence ambient dissolved Mn release during hypoxic conditions, and depletion of Mn from the sediments during prolonged and severe hypoxia, such as during the summer, may limit the use of otolith Mn as an unequivocal marker of hypoxic exposure in the Gulf of Mexico.

Abstracts for Oral Presentations (continued)

Evaluation of the First Three Years of the Tarpon Observation Network
Morris, Artussee D.. Texas Parks & Wildlife Department, Coastal Fisheries Division, Corpus Christi, TX.
Email: art.morris@tpwd.state.tx.us

Launched May 5, 2009 the volunteer based online Tarpon Observation Network application seeks to consolidate public observations of tarpon *Megalops atlanticus* in Texas marine waters. Since the application launched, 35 independent observations have been logged in. Most (11) of the observations were "caught and released", followed by 10 observations of "rolling" tarpon and nine "jumped" tarpon. Three observations were "found dead", with one each "retained" and "swimming". The majority of the submissions (18) were entered in 2010, with 12 in 2009 and five in 2011. Nine of the observations were of tarpon < 0.762 m, 16 observations were of tarpon 0.762-1.524 m with five observations of tarpon > 1.524 m. Nineteen of the 35 observations had water temperatures recorded ranging from 17.8 to 29.4° C averaging 27.1° C. The majority (31) of the observations were south of the Colorado River with the area near Corpus Christi, TX accounting for the most observations. These observations parallel TPWD routine monitoring data closely, with exceptions of the documentation of smaller juveniles. While the application is popular with a small percentage of the angling public, it is unlikely that the application is capturing a significant proportion of the overall tarpon encounters on the Texas coast due to a number of reasons. Nevertheless, the application is revealing some previously undocumented areas of juvenile tarpon use in Texas waters.

Landscape Level Patterns in Saltmarsh Pond Salinity and the Effects of Whooping Crane Behavior and Territory Selection
Borne, Ella Grace[1]; Bogrand, Ashley[1]; Pearman, Kelsey[1]; Ragan, Niki[1]; Smith, Elizabeth[2] and Wozniak, Jeffrey R.[3] [1]Department of Biological Sciences, Sam Houston State Univ., Huntsville, TX. [2]International Crane Foundation, Corpus Christi, TX. [3]Texas Research Institute for Environmental Studies, Sam Houston State Univ., Huntsville, TX.
Email: kelsey.pearman@shsu.edu

Along the Texas gulf coast, saltmarsh ecosystems and the organisms which inhabit them are under considerable stress from both natural and anthropogenic threats. The coastal saltmarshes of the Aransas National Wildlife Refuge (ANWR) are directly threatened by a unique collection of both artificial and natural environmental drivers; including the long-term press of sea-level rise (SLR), increasing temperatures, and altered precipitation regimes (e.g., drought). Considered by many to be the most well-known endangered bird in North America, the Whooping Crane (*Grus americana*) winters exclusively in the coastal marshes surrounding the ANWR. Recent and substantial crane die-offs (e.g., 23 birds in winter 2008-'09) have been attributed by many to elevated salinities in the estuary and decreased crane food resources.In this project we focus on how Whooping Crane behavior and territory selection are influenced by food resource availability and environmental impacts. Specifically, we are working to determine how changes in Whooping Crane behavioral decisions (potentially driven by saltmarsh pond salinity patterns) can result in spatial shifts in territory size (plasticity) through time. Through conducting Whooping Crane observations along the Blackjack Peninsula we are working to document how the current drought conditions are impacting Whooping Crane territory selection and defense, and foraging tactics and effort.

Abstracts for Oral Presentations (continued)

Influence of Maternally Derived and Dietary Fatty Acids on Ecological Performance of Larval Red Drum (Sciaenops ocellatus)

Perez, Kestrel O.; Lashua, Sheena; Fuiman, Lee A. Marine Science Institute, The University of Texas at Austin, 750 Channel View Drive, Port Aransas, TX.
Email: kperez@mail.utexas.edu

Dietary intake of certain essential fatty acids, particularly arachidonic acid (ARA) and docosahexaenoic acid (DHA,) by fish larvae is known to benefit their growth and survival. Correlations have also been reported between concentrations of ARA and DHA in eggs and the anti-predator performance of larvae. We evaluated the combined effects of varying supply of these fatty acids in eggs and in the larval diet on larval routine swimming and anti-predator behaviors. First, we determined the natural levels of these essential fatty acids by collecting wild red drum eggs from the tidal inlet at Port Aransas, Texas, in 2009, 2010 and 2011. Mean ARA levels in wild eggs were higher than typical levels in captive spawned red drum eggs (7.2 vs. 5.0 mg g-1 dry weight), whereas mean DHA levels were lower in wild eggs than in typical captive spawned eggs (23.7 vs. 38.5 mg g-1 dry weight). We then conducted a supplementation experiment and a depletion experiment using captive red drum broodstock with the goal of reaching wild levels of ARA and DHA in the eggs. Larvae were fed either non-enriched Artemia sp. nauplii or Artemia nauplii at one of two levels of enrichment (1x, 2x), and performance was measured after 3 weeks. Fish that had been fed the 2x enrichment diet consistently reacted to the predatory stimulus sooner (shorter latency) than fish in the other diet treatments. Knowing these causes of variation in larval performance suggests that corrective measures incorporated into hatchery protocols could improve the efficacy of stock-enhancement programs.

Evaluation of Brevetoxin Accumulation and Degradation in Fish Found on Texas Beaches During Red Tide Blooms

Rafalski, Alexandra V.; Savage, Marci L.; Zimba, Paul V. Texas A&M University – Corpus Christi, Corpus Christi, TX.
Email: alexandra.rafalski@tamucc.edu

Karenia brevis red tides naturally occur along the Texas Gulf coast; large-scale blooms, however, can have profound negative effects on human and animal health, local economies, and the aquatic ecosystem. In addition, it is presumed that beached fish deposited on the upper surf line or buried in the sand that have accumulated brevetoxin may pose a health risk to scavenging terrestrial animals. As brevetoxicosis has been implicated in recent mortality events of birds and canids along the Texas coast, it is important to understand the availability of brevetoxin to the terrestrial ecosystem through these fish. Freshly dead striped mullet (*Mugil cephalus*) and pinfish (*Lagodon rhomboides*) were collected during the 2009 and 2011 red tide blooms, respectively. Fish were placed above and below sand in mesh enclosures and allowed to decompose; fish were removed up to 77 days after the start of the experiment to quantify the brevetoxin concentration in the muscle tissue. Brevetoxin ELISA kits were used to measure the concentration of PbTx-2 in the muscle samples to generate brevetoxin degradation models for beached fish. The concentration of brevetoxin decreased to 75% of the initial levels within 8 days, with maximum degradation of greater than 90% between 15-23 days. No difference was found between the rate of brevetoxin concentration among species or sample location (above the sand or buried). Such information can be utilized in beach closure recommendations concerning pet safety and also to assess the risk of brevetoxicosis in coastal ecosystems.

Abstracts for Oral Presentations (continued)

The Effects of Exceptional Drought and Increased Saltmarsh Salinity on Carolina Wolfberry (*Lycium carolinianum*)

Borne, Ella Grace[1]; Bogrand, Ashley[1]; Pearman, Kelsey[1]; Ragan, Niki[1]; Smith, Elizabeth[2] and Wozniak, Jeffrey R.[3] [1]Department of Biological Sciences, Sam Houston State Univ., Huntsville, TX. [2]International Crane Foundation, Corpus Christi, TX. [3]Texas Research Institute for Environmental Studies, Sam Houston State Univ., Huntsville, TX.
Email: niki.ragan@shsu.edu

The supply of freshwater to estuarine ecosystems is a critical factor in maintaining the overall health and organization of coastal marshes. The coupled effects of decreased freshwater inflows to the estuary and other natural processes (e.g., local precipitation, tides, wind, etc.) can combine to exert significant salt-stress on coastal marshes. Herein we present a preliminary synthesis of the drought effects on the coastal marshes of the Aransas National Wildlife Refuge (ANWR). We assess how decreased precipitation and freshwater inflows to San Antonio Bay drive shifts in coastal saltmarsh salinity and ultimately work to impact coastal marsh vegetation, namely the Carolina wolfberry (*Lycium carolinianum*). As part of this study, we examined past estuarine inflow patterns from the period of record to determine the severity of the current drought as compared to previous low inflow years. Our results indicate that wolfberry plants have had a significant negative response to increased salinity and decreased hydrologic connectivity to estuarine water. The coastal marshes of the ANWR are home to the last wild migratory population of endangered Whooping Crane (*Grus americana*), which feeds on wolfberry fruit during their time at ANWR. Moving forward, we are continuing to observe changes in estuarine and saltmarsh salinity patterns, as well as phenology shifts for the wolfberry plant. The short-term response of the saltmarsh system to these recent increases in local rainfall may have a direct link to food resource availability and the health of the endangered Whooping Crane at the ANWR.

Composition of South Texas Coast Macroalgae

Savage, Marci L.; Rafalski, Alexandra V.; Zimba, Paul V. Texas A&M University – Corpus Christi, Corpus Christi, TX.
Email: msavage@islander.tamucc.edu

The Coastal Bend region of Texas has an abundant flora of red, green, and brown macroalgae. No published studies have evaluated the chemical composition of these primary producers. The biochemical composition of 13 species was assessed; additionally the fatty acid composition was determined to assess the nutritional quality of the lipid component. The macroalgae were primarily composed of at least 75% carbohydrate and were determined to contain few essential fatty acids, largely composed of non-essential fatty acids such as C16:0, C15:0, and C18:1n9t at approximately 31, 16, and 11% respectively. None of the essential fatty acids are present at percents generally higher than 5%. There may be some seasonal effects on the biochemical composition of the macroalgae; higher percentages of protein appear to be stored during the colder months.

Abstracts for Oral Presentations (continued)

An International Estuarine and Marine Living Resource Species Interaction Database for the Gulf of Mexico Large Marine Ecosystem

Simons[1], James D.; Yuan[2], May; Carollo[3], Cristina; Schoonard[4], Cristina M.; Hendrix[1], Tinara.
[1]Texas A&M University, Center for Coastal Studies, Corpus Christi, TX. [2]University of Oklahoma, Center for Spatial Analysis, Norman, OK. [3]Texas A&M University, Harte Research Institute, Corpus Christi, TX. [4]Florida Wildlife Research Institute, St. Petersburg, FL.
Email: james.simons@tamucc.edu

Development of ecosystem-based management models depends, to a large extent, on the availability of species interaction data. These models may address ecological questions, examine ecosystem trophic structure, or be used in placement analysis for marine protected areas, among other uses. Collection of species interaction data requires extensive field and ship time and is becoming prohibitively expensive, particularly at the scale of a large marine ecosystem (LME), thus it is extremely important that these data be preserved and accessible. Many studies on species interactions, at varying scales, have been conducted in the Gulf of Mexico (Gulf), and they are currently being compiled into a database, which will link, and share data with global efforts such as FishBase, SeaLifeBase, Lifemapper, Encyclopedia of Life and the Data Conservancy. We report on a collection of 747 references to trophic interaction data for fishes from the Gulf, examine spatial characteristics of the references, describe taxonomic distribution of fish species examined, and identify taxonomic data gaps. To date, geo-coding, and collection of metadata lite, a condensed version of customary metadata that answers the "who, what, where, when, and why", has been performed on all 747 references, while ~60% of the references have had habitat data digitized and standardized using the Coastal and Marine Ecological Classification Standard. A spatially compliant database is under construction using PostgreSQL and PostGIS. We compare the nature, and extent of these data to other trophic database efforts conducted in LMEs worldwide.

Health Effects Characterization for Fish and Blue Crab Consumption from Galveston Bay, Texas

Sweet, Stephen T. [1]; Wade, Terry, L[1].; Sericano, Jose L. [1];Tennant, Michael[2]; Wiles, Kirk[2].
[1]Texas A&M University, Geochemical and Environmental Resarch Group, College Station, TX.
[2]Texas Department of State Health Services, Seafood and Aquatic Life Group, Austin, TX.
Email: sweet@gerg.tamu.edu

Contaminants of potential adverse human health concern were monitored in fish and blue crab tissues from Galveston Bay, Texas. A total of 204 samples were collected between April to June 2006 (122 samples) and November 2006 to May 2007 (82 samples). 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. PCDFs/PCDDs and PCBs were detected at concentrations above the HACV in gaff-topsail catfish (*Bagre marinus*) and spotted sea trout (*Cynoscion nebulosus*) resulting in the issuance of a consumption advisory (one 8 oz meal per month for the general population and no consumption for women who are nursing, pregnant or who may become pregnant and children under 12) in 2008. Other species (blue crab, red drum, black drum and southern flounder) analyzed were found safe to eat based on HACV. Sampling in Galveston Bay is continuing to expand the sampling coverage as well as to determine if the concentrations of PCDFs/PCDDs and PCBs have changed and advisories need to be altered.

Abstracts for Oral Presentations (continued)

Crabs Digging Creeks in Sinking Salt Marshes.
Vu, Huy D.; Wieski, Kazimierz,; Pennings, Steve C. University of Houston, Houston, TX.
Email: hdvu4@mail.uh.edu

Salt marshes provide many ecosystem services, but are threatened by sea-level rise (SLR). Many studies examining the impacts of SLR neglect the role of the marsh biota. SLR is leading to rapid headward erosion of marsh creeks, which are 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 conducted field and mesocosm experiments to examine the effects of four common marsh crabs on plant productivity and soil erosion. *Sesarma* excavated the most soil (~146g/week/crab) and reduced both below and above-ground *Spartina* biomass. The level of bioturbation varied across the marsh but was highest at the creek heads. Creek heads with vegetation removed grew at a significantly faster rate (2.3 m/yr.) than control creeks (1.5 m/yr.). In sum, crabs may mediate creek growth in response to SLR 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 SLR is a function of the relative abundance of different crab species.

Impact of dry-wet cycles on PAHs released from sediments, south Texas
Wang, Zucheng[1,2]; Liu, Zhanfei[1]. [1]The University of Texas at Austin, Marine Science Institute, Port Aransas, TX. [2]East China Normal University, Shanghai, China.
Email: benny2004.wang@gmail.com

Wet-dry cycles are frequently occurring in wetland sediments in South Texas, and these cycles impact geochemistry of wetland sediments significantly. But how drying process affected the distribution of organic contaminants between water and sediment is less known. In this study, we showed that when dried sediments from south Texas wetlands were rewetted, certain polycyclic aromatic hydrocarbons (PAHs) including naphthalene, phenanthrene, fluoranthene and pyrene were preferentially released into solution (total amount from 10.85ng/L to 32.56ng/L) compared with wet sediments that have not been dried. The release of PAHs was mostly from the dominant finer fractions (<63μm), but when normalized to mass, PAHs were readily released from the 125-300 μm fraction. Source analysis showed that 125-300 μm fraction contained PAHs from incomplete combustion of petroleum-related products, which may lead to the readily release of PAHs to solution after a dry-wet cycle. Overall, this study provides valuable information how the water quality may change upon drought-flood cycles that often seen in south Texas.

Abstracts for Oral Presentations (continued)

An Imaged-Based Larval Fish Key for the Texas Coast

Williams, Jason A.; Stunz, Greg W. Harte Research Institute, Texas A&M University, Corpus Christi, TX.
Email: jason.williams@tamucc.edu

Species identification is a crucial component to any ecological or biological study. Often this phase of identification of larval or juvenile organisms is difficult and very time consuming because most scientific identification keys are dichotomous, therefore not very user-friendly. To speed up the this process, researchers typically look for a few identifying characteristics of a particular organism to avoid the tedious dichotomous keys, and this can be very challenging given that many species share similar pigments and morphologies. Therefore, my aim was to create an imaged-based larval fish key that was user friendly and first person driven. The ultimate goal of this project is to have an accessible, web-based larval fish key that can be used as a reference for anyone attempting to identify common larval fish along the Texas coast. Throughout the years I have preserved and photographed common larval fish found within bays and estuaries along the Texas coast. To date, 23 species have been identified, photographed and added to a larval key. Preliminary use has been successful and I hope to expand upon the key by adding more larval and juvenile species.

The Colonization and Age Structure of Red Mangrove (*Rhizophora mangle*) Trees Along the Coast of Texas

Wilson, Christopher J.; Jackson, Kimberly; Dunton, Kenneth H. The University of Texas at Austin Marine Science Institute, 750 Channel View Drive, Port Aransas, TX.
Email: cjw32485@gmail.com

The southeastern Gulf coast of Texas lies at 27.8˚N and represents a historical boundary separating salt marsh and mangrove plant communities. Over the past century, the frequency of freeze events in South Texas has slowly diminished, providing an opportunity for freeze-intolerant black mangrove trees to flourish and displace expansive coastal salt marshes. Within the last decade, red mangrove trees have become increasingly established along marsh edges within the mixed black mangrove and *Spartina alterniflora* vegetation assemblage. We hypothesized that the recent colonization of red mangroves is facilitated by consecutive mild winters observed during the past decade. In order to address this hypothesis, 111 red mangrove trees were surveyed on Harbor Island near Port Aransas, Texas. Juvenile red mangrove trees are reliably aged from the number of leaf node scars present along the main stem. A local annual leaf scar node production rate was calculated from red mangrove trees planted at the University of Texas at Austin Marine Science Institute and used to age the surveyed individuals on Harbor Island. The dates of propagule establishment were then compared to local climate records and historical tropical storm activity in South Texas over the past two decades. Our data suggests that red mangrove populations along the Texas Gulf coast are migrating northward as annual freeze events become increasingly rare.

Abstracts for Poster Presentations

Relative Habitat Value Of Alternative Substrates For Oyster Reef Restoration In St. Charles Bay, Texas

George, Lindsey M.; Pollack, Jennifer B.; Blomberg, Brittany N.; Nevins, Jaimie A. Texas A&M University – Corpus Christi, Corpus Christi, TX.
Email: lgeorge1@islander.tamucc.edu

Oyster reef habitats have declined from historic levels due to overharvest and degraded water quality. Oyster spat prefer to settle on existing oyster shell. When oysters are harvested, an important component of their habitat is also removed: the oyster shells. In Texas, oyster shell must be purchased from wholesalers and is expensive. This study will incorporate laboratory and field experiments to assess habitat value of lower cost alternative substrates (crushed concrete, porcelain, limestone, and river rock, as well as oyster shell) for reef resident fishes and macro-invertebrates. Field studies will utilize replicate trays of each substrate type throughout St. Charles bay during spring and fall 2012. Trays will be retrieved after three months and assessed for oyster recruitment and health, faunal diversity and density. Laboratory experiments will use these substrates to observe prey substrate choice in the presence and absence of a predator (e.g. pinfish, blue crab). Rectangular tanks will be filled with paired substrate combinations and natural densities of selected prey (e.g. brown shrimp, juvenile red drum). Substrate and treatment combinations will be repeated over a period of three months. Results may enable future restoration plans to be implemented at a lower cost while providing similar habitat functions.

Mangroves Invading Texas Salt Marshes: Does It Matter?

Pennings, Steven C.[1], Armitage, Anna R.[2], Guo, Hongyu[1], Hughes, Zoe[3], Weaver, Carolyn A.[2]
1: University of Houston; 2: Texas A&M University at Galveston; 3: Boston University.
Email: greatuniverse@hotmail.com

On the Texas coast, mangroves regularly expand from persistent populations into salt marshes during periods with warm winters, and occasionally contract in distribution during periods with severe freezes. Over the coming decades, mangrove distributions are expected to continue expanding due to rising global temperatures and milder winters. As a result, large areas of the Texas coast that historically have been dominated by salt marshes will become dominated by mangroves. Will this matter? We hypothesize that that changes in coastal vegetation are likely to change the quality of coastal wetlands for supporting shrimp, fish and birds, and change the ability of coastal habitats to buffer wind and wave energy. We will test this hypothesis using a combination of field sampling and a manipulative experiment, working around and within the domain of the Mission-Aransas National Estuarine Research Reserve. Our work will provide information on which ecosystem services provided by coastal wetlands are most likely to be affected by the change from salt marsh to mangroves. This information will allow coastal industries such as fisheries and tourism to be adaptively managed in response to ongoing and future changes in the biological environment.

Abstracts for Poster Presentations (continued)

The Weathering of Macondo Oil After the Deepwater Horizon Oil Spill: Insights From Hydrocarbon Compositions of Oil on Sea Surface and Sediments

Liu, Jiqing; Liu, Zhanfei. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.
Email: jiqing.liu@mail.uexas.edu

The oil and chemical dispersant released during the Deepwater Horizon (DWH) oil spill might have both short- and long-time impacts on the northern Gulf of Mexico ecosystems. Therefore, there is a need to determine the fate, behavior, and weathering degree of the spilled oil. This study evaluated the weathering of Macondo oil after the DWH oil spill by analyzing petroleum hydrocarbon composition and concentration changes of three oil mousses collected from sea surface and sediments in the northern Gulf of Mexico. Oil mousses were collected at stations OSS and CT in May 2010 (100-200 km away from the wellhead), and two sediment samples from the stations SG and SC, 5 miles away from the wellhead in May 2011 in the northern Gulf of Mexico. We also collected oil mousse from salt marsh plants at Marsh Point, Mississippi (MMO). In these samples, *n*-alkanes, polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, BTEX (collective name of benzene, toluene, ethylbenzene, and *p*-, *m*-, and *o*-xylenes), and C_3-benzenes were determined to understand the weathering and fate of the spilled oils. Our results demonstrated that the three oil mousses had undergone lightly to moderately weathering with the pattern of OSS < CTRL<MMO, compared to the MC252 wellhead crude reference oil, and the weathering degree of the mousses is a function of distance the sampling site to the wellhead, as expected. The chemical fingerprinting data also revealed that, after a year of the DWH oil spill, the weathering processes to the oil deposited in sediments were slow and light in both sediment sites, mainly due to abiotic weathering process. This conclusion was also supported by the presence of short-chained *n*-alkanes (C_{10} to C_{15}), BTEX, and C-$_3$ benzenes of two sediments. Our data suggested that the oil on the sea surface in the Gulf waters were heavily weathered along the way to the salt marshes, but the weathering of oil deposited in the sediments were slow and light due to the low temperature.

Characterizing the Oyster Reef Community of Sabine Lake: a Before-After-Control-Impact Study.

Nevins, Jaimie A.; Pollack, Jennifer B.; Stunz, Greg; Blomberg, Brittany N.; George, Lindsey M. Texas A & M University-Corpus Christi, Corpus Christi, TX.
Email: jaimie.nevins@tamucc.edu

Sabine Lake is approximately a 360 km^2 estuary on the Texas-Louisiana border formed by the union of the Neches and Sabine Rivers. This lake is pristine in the extent of its large oyster reef complex with no record of commercial harvest as far back as the 1960's. It is likely one of the largest remaining un-fished oyster reefs in the United States. The overreaching goal of this research project is to describe the oyster population structure and community composition of finfishes and invertebrates on this naturally functioning reef system. There is the potential for the Louisiana half of the lake to be opened up to oyster fishing. If this takes place, this project will look to describe and quantify the changes in the oyster population using a BACI (before-after-control-impact) design. This project will also be looking at the density and diversity of finfish and macro-invertebrates within 3 microhabitats within Sabine Lake: the natural reef complex, nearby non-vegetated bottom, and marsh edge habitats. Both oyster samples and finfish/macro-invertebrate sampling will be conducted biannually starting Fall 2011 and ending Spring 2013.

Abstracts for Poster Presentations (continued)

Physical Mechanisms Driving Harmful Algae Blooms Along the Texas Coast
Ogle, Marcus T.; Hetland, Rob; Campbell, Lisa. Texas A&M University, Department of Oceanography, College Station, TX.
Email: mogle@ocean.tamu.edu

Harmful Algae Blooms (HABs) of *Karenia brevis* occur almost annually along the West Florida Shelf (WFS) however, blooms along the Texas-Louisiana Shelf are infrequent and sporadic. *K. brevis* produces brevetoxin, a potent, non-fatal, neurotoxin which commonly causes fish kills, respiratory irritation in humans, and potential illness if ingested. While much is known of the blooms along the WFS due to their frequent presence, little is known of the mechanisms of blooms along the Texas-Louisiana Shelf due to their inconsistent presence. To understand the stochastic nature of HABs along the Texas-Louisiana Shelf, historical data from 1996 to present was analyzed from NOAA station PTAT2, in Port Aransas, TX. The monthly mean along-shore component of the wind was statistically significant between bloom and non-bloom years in September ($p<<0.01$) and April ($p=0.0015$), with non-bloom years having a stronger downcoast current compared to years when a bloom was present. Monthly mean water temperature values yielded similar results between bloom and non-bloom years. Both March and September monthly-mean water temperatures were lower during non-bloom years with p-values of 0.01 and 0.048, respectively. These results suggest the possibility of forecasting for Harmful Algae Blooms along the Texas-Louisiana Shelf with currently measured and publicly available data.

A Preliminary Analysis of Oyster Settlement on a Restored Oyster Reef
Rodriguez, Maria C.; Blomberg, Brittany N.; Pollack, Jennifer B. Texas A&M University-Corpus Christi, Corpus Christi, TX.
Email: mrodriguez22@islander.tamucc.edu

Oyster reefs are important elements in estuarine ecosystems. These structures provide various functions for the environment, such as improving water quality, providing habitat for estuarine fauna and aiding in the prevention of the erosion of salt marsh habitats. Oysters are also commercially harvested, and are important economically. These habitats, however, are one of the most threatened, and are declining at an alarming rate. Oyster diseases and destructive harvesting techniques are contributing to oyster reef degradation. Restoration projects are being implemented around the world. A restored reef is deemed successful if it supplies the ecosystem with the same benefits as a natural reef supplies. Oyster larvae (spat) settlement, oyster size, fauna recruitment and water quality are all quantified and measured. For this study, a preliminary comparison of spat settlement will be made between natural and restored reefs. In July 2011, crushed concrete and reclaimed oyster shells were used in the restoration of reef habitat in Copano Bay near Rockport, TX. Six sites each were chosen on restored reef substrate (reclaimed oyster shells) and natural reef substrate (live oysters). In August 2011, 48 baker trays lined with aquaculture mesh and the specified substrate were set out within each habitat type. Six trays from each site will be retrieved quarterly for 2 years. The first samples were collected January 30, 2012. The ultimate goal will be to determine the extent to which the restored reef is able to mimic the function of natural reefs as habitat for fishes and invertebrates.

Abstracts for Poster Presentations (continued)

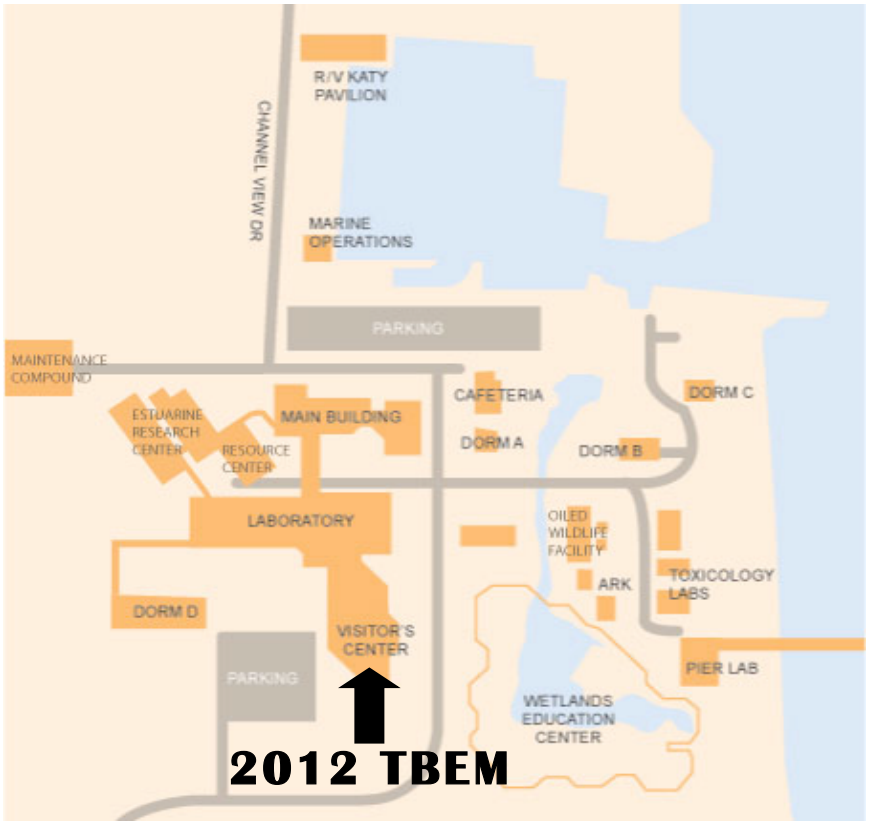
Porewater Salinity Dynamics within the Creekbank Areas of an Irregularly Flooded Salt Marsh

Stachelek, Joseph; Dunton, Kenneth. The University of Texas at Austin, Marine Science Institute, Port Aransas, TX.
Email: jstachelek@utexas.edu

The zonation, physiology, and ecology of emergent salt marsh plants are largely controlled by variations in soil porewater salinity. The influence of porewater salinity on plants in regularly flooded salt marshes is well defined due to predictable diurnal or semidiurnal patterns of tidal inundation. However, the relative impact of environmental variables such as tidal period, precipitation, and freshwater inflow is not well understood in irregularly flooded salt marshes. Using a western Gulf of Mexico (Texas) salt marsh as an example, we examined the relative importance of various freshwater sources on porewater salinity. Conductivity sensors and energy-mass balance simulations provided evidence that porewater flushing was dependent on distance from tidal creeks as well as water level stage. Seasonal water level variations, corresponding with a semiannual tidal cycle, resulted in notable differences in inundation frequency between creekbank and interior marsh areas. Distinct patterns of plant zonation likely persist in this irregularly flooded salt marsh as a result of the periods of regular inundation that accompany the positive phase of the semiannual tidal cycle. We conclude that freshwater inflow events provide critical moderation of tidal creek salinities and flushing of sediment porewater. Severe droughts (like the one presently underway in south Texas) will result in further declines in freshwater inflow, reducing the frequency of low porewater salinity periods that are critical for maintenance of emergent plant communities. Loss of emergent vegetation may ultimately result in reduced abundance of upper trophic level organisms that depend on this system for shelter, food, and habitat.

Facility Map and Directions

2012 TBEM is located at the main campus (star) of The University of Texas at Austin, Marine Science Institute (UTMSI).



Map of the University of Texas Marine Science Institute campus.

(above) UTMSI Visitors Center

(above) UTMSI Main Campus

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

Texas Bays and Estuaries Meeting

TBEM

Marine Science Institute

THE UNIVERSITY OF TEXAS AT AUSTIN